Exhibit 13

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

SECURITIES AND EXCHANGE COMMISSION, Plaintiff, *-against-* **RIPPLE LABS, INC., BRADLEY GARLINGHOUSE, and CHRISTIAN A. LARSEN**, Defendants.	Case No. 20-CV-10832 (AT)

Supplemental Report of Allen Ferrell, Ph.D.

May 13, 2022

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I. ASSIGNMENT AND SUMMARY OF OPINIONS

1. My qualifications and compensation are described in the previous expert reports I have submitted in this matter.[1] The materials I have considered are listed in Appendix B.

2. I have been asked by counsel for Ripple to review, and respond to, the Supplemental Expert Report of Dr. [redacted] of February 28, 2022 (hereinafter "[redacted] Supplemental Report").

3. Dr. [redacted] now claims that "but-for the news and public statements related to Ripple to which XRP prices reacted in a statistically significant way, the USD price per XRP token would have rarely exceeded $0.02."[2] In support of this, the [redacted] Supplemental Report presents so-called but-for counterfactual XRP prices – the prices that supposedly would have obtained absent news about Ripple – which are then compared to actual XRP prices over the May 5, 2014 – October 28, 2020 period ("[redacted] Time Period").[3] Dr. [redacted] claims that, absent the cumulative effect of news concerning Ripple over this entire time period, as of October 28, 2020 the but-for counterfactual XRP price would have been $0.000284[4] compared to the actual XRP price of $0.246. In other words, according to Dr. [redacted] virtually the entire price of XRP as of October 28, 2020 was a function of the previous news and public statements related to Ripple.

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[1] My updated CV is attached hereto as Appendix A. *See also,* Expert Report of Allen F. Ferrell, October 4, 2021 (hereinafter, "Ferrell Report"); Rebuttal Expert Report of Allen F. Ferrell, November 12, 2021.

[2] *See, e.g.*, [redacted] Supplemental Report ¶ 9. S*ee also id.*, ¶¶ 10-19. On a related note, Dr. [redacted] further claims that "purchasing XRP before the release of the news and public statements related to Ripple on the 100 Event Days would have resulted in greater investment returns than purchasing at other times." [redacted] Supplemental Report ¶ 9.

[3] The [redacted] Supplemental Report presents these results using his Model 1 (the "Constant Mean-Return" Model) in his Figures 2 & 4 ("Actual versus Counterfactual XRP Prices") and some summary data with respect to all 20 of his models in Figures 3 and 5 ("Counterfactual XRP Price Summary").

[4] Counterfactual prices per Dr. [redacted] Model 1. Counterfactual prices for Dr. [redacted] other models are similarly trivial.

In short, Dr. [redacted] theory is one of a substantial Ripple-specific positive price return (what is referred to in finance as "alpha").[5] This is demonstrably incorrect, as I showed in my opening report and will demonstrate below.

4. I will begin by noting three aspects of Dr. [redacted] new claims. First, in his supplemental opinion, Dr. [redacted] attempts to draw an economic inference from his but-for, counterfactual XRP pricing over the entire [redacted] Time Period. By contrast, in his original expert report, Dr. [redacted] offered a far more limited opinion: he purported to simply reject the null hypothesis of the independence of Ripple news and XRP price movements based on very short-term (one-day, two-day, and three-day event window) correlations.[6] Dr. [redacted] original decision to confine his claims to refuting this null hypothesis, based on short-term correlations, was a wise one given the obvious concern about the efficiency of the XRP market. Short-term correlations in an inefficient market can be just that: short-term correlations that amount to no more than transitory blips with no longer term implications for pricing. In fact, Dr. [redacted] presented evidence in his original report indicating that the XRP market is *not* efficient during the [redacted] Time Period.[7]

5. Second, on a related note, the [redacted] Supplemental Report presents and makes no new claims concerning the efficiency of the XRP market even though he is extrapolating his very

[5] All of which, once again, makes Dr. [redacted] objection in his rebuttal report to my testing of whether there was an alpha associated with XRP incoherent.

[6] I am not endorsing Dr. [redacted] use of event studies in his Supplemental Report or in the Expert Report of [redacted] Ph.D., October 4, 2021 (hereinafter "[redacted] Report").

[7] *See, e.g.*, [redacted] Report, Appendix F, ¶ 6 ("For both positive and negative autocorrelation, there are periods where such autocorrelation is statistically significant. During these periods, I can reject the hypothesis that XRP prices are even weak form efficient."). In Appendix F, ¶ 4, Footnote 4, Dr. [redacted] also cites the paper Andrew Urquhart, "The Inefficiency of Bitcoin," *Economics Letters* Vol. 148, 2016 ("Since [Bitcoin] is a relatively new investment asset and still in its infancy, it is similar to an emerging market and therefore the inefficiency finding is not surprising."). Dr. [redacted] testified in his deposition that: "The received evidence and the economic literature, consistent with my own analysis, is that the XRP digital token market was likely not semi-strong efficient during the period of interest." Videotaped Deposition of [redacted] Ph.D., February 18, 2022 at 93:23 – 94:3.

short-term correlations over a six year plus period. He is simply silent on the issue of market efficiency.

6. Third, the [redacted] Supplemental Report presents no statistical analysis whatsoever as to whether his claims concerning the estimated long-term price impact extrapolated from his short-term correlations is accurate. Yet again, Dr. [redacted] is notably simply silent on the issue.

7. In fact, as I will now document, Dr. [redacted] but-for, counterfactual prices based on extrapolating his short-term correlations are implausible on their face, inconsistent with the empirical evidence and, remarkably, attributes price impacts to news about Ripple on days that he himself identifies as *not* having any news about Ripple (i.e., days on which there are no "Ripple Events" or "Event Days" as he labels them).[8] In short, his extrapolation of short-term correlations over a six year plus period is fundamentally flawed and obviously so as I show next.

II. THE METHODOLOGY DR. [redacted] USES TO CONSTRUCT HIS COUNTERFACTUAL PRICE IS FLAWED AND SUBSTANTIALLY AFFECTS PRICES ON NON-EVENT DAYS

8. The [redacted] Supplemental Report states:

> For the purposes of the analysis presented below, I begin with the 113 events on 105 unique days represented by the Select Categories analysis in the [redacted] Report. To be conservative, I remove from that set 5 instances of Digital Asset Trading Platform Listings which I could not definitively attribute to the efforts of Ripple Labs based on the set of news I analyzed. The final set of events I study below thus numbers 108 events on 100 unique days. I will refer to these as the "Ripple Events" and the "Event Days," respectively.[9]

In other words, "Event Days" are days that Dr. [redacted] has identified as days on which there was news concerning Ripple whereas non-Event Days are days for which there is no news concerning Ripple. His event study purports to measure the XRP price reaction on "Event Days."

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[8] *See, e.g.*, [redacted] Supplemental Report, ¶¶ 8, 10, and 15.

[9] *See, e.g.*, [redacted] Supplemental Report, ¶ 8.

9. Dr. [redacted] explains that that his counterfactual prices represent the XRP price but-for Ripple news.[10] In other words, the difference between the actual XRP price and the but-for counterfactual price represents his quantification of the price impact of Ripple news. Despite this, Dr. [redacted] but-for counterfactual prices consistently attribute XRP price reactions to news concerning Ripple on non-Event Days. This leads to nonsensical results. For instance, Dr. [redacted] counterfactual prices remarkably shows a price impact of $0.775 (approximately 35 percent of XRP's actual price on that date) on December 29, 2017. But there was no Ripple news on this date according to Dr. [redacted] himself.[11] More generally, he finds a purported price impact associated with Ripple news on 1,909 days during the [redacted] Time Period (when extrapolating from his Model 1 event study) but he identifies a mere 23 Ripple Events.[12]

10. The nonsensical result of attributing XRP price reactions to Ripple news on non-Event Days is a fundamental feature of Dr. [redacted] methodology of mixing returns and but-for counterfactual prices over the [redacted] Time Period.[13] Consider the following illustrative example of [redacted] methodology. Suppose there is a 100% return on an event day such that XRP price increases from $0.25 to $0.50 and, furthermore, suppose that the predicted return on this day is 0%. Dr. [redacted] would replace the 100% return with his predicted return, i.e., 0%, and the counterfactual price at the end of the event day would therefore remain at $0.25. The difference between the actual and counterfactual price is therefore $0.25 at this point. Also suppose there is a 50% return on the following non-event day (with XRP price increasing from $0.50 to $0.75).[14]

[10] *See, e.g.*, [redacted] Supplemental Report, ¶¶ 9, 11 and 16.

[11] Nor does December 29, 2017 fall within a two or three day window that includes an "Event Day."

[12] [redacted] Supplemental Report, ¶ 9, ("when the abnormal returns associated with the 23 statistically significant Ripple Events are removed […].").

[13] *See, e.g.*, [redacted] Supplemental Report, ¶ 12.

[14] This is assuming that Dr. [redacted] conditional for substituting the cumulative returns with predicted return does not hold. *See*, Supplemental Report, ¶ 12.

On the non-event day, the counterfactual price would go up by the actual return of 50%, i.e., from $0.25 to $0.375. The difference between the actual and counterfactual price has now grown from $0.25 ($0.50 - $0.25) to $0.375 ($0.75 – $0.375), a 50% increase on a non-event day.

11. Exhibit 1 sets forth information from Dr. [redacted] own but-for counterfactual prices identified in his Model 1.[15] Exhibit 1 identifies the 10 days with the largest price impact associated with Ripple news according to Dr. [redacted] occurring on [redacted] *Non-Event Days* (top panel) and, as a point of comparison, the 10 days with the largest price impact occurring on [redacted] *Event Days* (bottom panel).

12. Most importantly, the top panel, that is the [redacted] *Non-Event Days*, shows that on these days Dr. [redacted] is estimating large price impacts due to news about Ripple even though according to Dr. [redacted] himself these are not "Event Days." Indeed, these price impacts are often larger than those associated with actual [redacted] *Event Days* when Ripple news was released according to Dr. [redacted] as one can see comparing the top panel to the bottom panel. The same results – large price impacts attributed to Ripple news on non-Event Days – are also identified by Dr. [redacted] other 19 models and their associated but-for counterfactual prices.[16]

13. Needless to say, this makes no economic sense. Dr. [redacted] methodology increases the pricing impact of news about Ripple on days that he himself as identified as non-news days.

[15] Counterfactual prices calculated by Dr. [redacted] using his Model 1. *See, e.g.*, [redacted] Supplemental Report, ¶ 9.

[16] The maximum price impact on the [redacted] *Non-Event Days* across Dr. [redacted] 20 models varies between $0.78 and $0.75 compared to a range of the maximum price impact between $0.41 and $0.15 on [redacted] *Event Days*. Similar results hold when using Dr. [redacted] one-day application. *See, e.g.*, [redacted] Supplemental Report, Figure 5.

III. DR. [redacted] COUNTERFACTUAL PRICES ARE INCONSISTENT WITH THE EMPIRICAL EVIDENCE

14. During the [redacted] Time Period, Bitcoin rose by 2,962% and Ether, which started trading on August 7, 2015, rose by an astonishing 13,920% by the end of the [redacted] Time Period. These are two cryptocurrencies that Dr. [redacted] himself compares to XRP.[17] In comparison, XRP rose 4,616% in the [redacted] Time Period. Nevertheless, Dr. [redacted] claims that XRP would have fallen by 95% in the absence of news concerning Ripple.[18] This is implausible and is, in fact, incorrect as I will now show.

15. More formally, Dr. [redacted] but-for counterfactual XRP prices mathematically imply an average excess 28-day return associated with news about Ripple. For instance, according to his Model 1, the difference between the actual XRP price and the but-for counterfactual price as of October 28, 2020, the end of the [redacted] Time Period, is $0.24562 ($0.24659 - $0.000284). This number – $0.24562 – supposedly reflects the cumulative price impact of news related to Ripple over the [redacted] Time Period (some 77 months). Mathematically this implies an average 28-day excess return (a return above and beyond what one would expect from general movements in the cryptocurrency markets) due to news about Ripple of 19.2%.[19] As the [redacted] Supplemental Report uses 20 models, there are 20 associated implied average

[17] *See, e.g.*, [redacted] Report, ¶ 12. See also, ¶ 114 ("As discussed below, I also find that during the period from 2014 to the end of 2020, XRP returns are correlated with Bitcoin returns, although the magnitude of that correlation fluctuates over time. More importantly, XRP returns can only be partially explained by BTC returns, and sometimes are explained more by ETH returns.").

[18] Dr. [redacted] counterfactual XRP price on October 28, 2020 is $0.000284 and on May 25, 2015 it is $ 0.00693. See, Backup to [redacted] Supplemental Report.

[19] For each 28-day period in the [redacted] Time Period, I calculate the 28-day excess return, the difference between the actual XRP return and Dr. [redacted] but-for return, calculated using his daily counterfactual prices. The reported number is the average of the 28-day excess returns.

excess 28-day excess returns ("[redacted] Excess Returns"). The 28-day [redacted] Excess Returns vary between 11.03% and 23.2%.[20]

16. Fortunately, there is a standard approach to assess whether there is in fact an average excess return over a given time-period: a factor model. As I explained in my original report, factor models are supported by more than 50 years of rigorous, academic research[21] and have been applied to cryptocurrencies among many other assets.[22] Factor models identify whether or not there is an average excess return regardless of whether or not the market is efficient.[23] In my original report I presented a factor model using data from other cryptocurrencies as my explanatory factors. I ran my factor model over two time periods: August 6, 2013 – December, 2020 (Estimation Period 1) and August 11 2015 – December 20, 2020 (Estimation Period 2). My Estimation Period 2 model had an adjusted-R square – the explanatory power of the model in explaining XRP price movements – of 92.3% and utilized some 91 cryptocurrencies (including Ether which started trading on August 7, 2015, a few days before my Estimation Period 2) as I show in Exhibit 2.

17. For 18 of Dr. [redacted] 20 models, the counterfactual price is equal to the actual prices on every day before August 2015. In other words, according to Dr. [redacted] there is no impact on prices associated with the news related to Ripple prior to August, 2015 for these models, including Model 1 which he discusses and presents in Figures 2 and 4 of the [redacted]

[20] I multiply the 28-day average [redacted] Excess Return for the period ending October 28, 2020 by (68/70) to extend the results to December 20, 2020 (the end date of my analysis period). *See*, Ferrell Report, ¶ 169. All the results hold if I simply end my factor model on November 3 (the first Tuesday after October 28, 2020).

[21] *See e.g.*, Ferrell Report, ¶ 91.

[22] *See, e.g.*, Ferrell Report, ¶ 91 and Footnote 154.

[23] *See, e.g.*, L. A. Bebchuk, A. Cohen, C. C. Y. Wang, "Learning and the Disappearing Association Between Governance and Returns," *Journal of Financial Economics*, 108 (2013), at 323-348 (using factor models to measure alpha over multiple years when the market, according to the authors, does not quickly price public information concerning corporate governance).

Supplemental Report.[24] I therefore will use my Estimation Period 2 factor model which I have already developed and presented in my original report in assessing the [redacted] Excess Returns. As I will now show, the statistical evidence is inconsistent with the existence of the [redacted] Excess Returns.

18. I compare the 28-day [redacted] Excess Returns for Estimation Period 2 to the 95% confidence interval for the regression constant in my factor model.[25] The regression constant or "alpha" is the "abnormal return in excess of what could have been achieved by passive investments in the factors."[26] Exhibit 2 shows that the *true* value of the excess return (regression constant) is within -10.3% and 6.0% with a 95% probability.[27] *None* of the 28-day average [redacted] Excess Returns are within the 95% confidence interval of the factor model for any of Dr. [redacted] 20 models as I show in Exhibit 3. In other words, if the [redacted] Excess Returns existed, they would have been identified by the factor model as such in the form of a statistically significant alpha. But the alpha is not statistically significant.[28]

[24] Furthermore, Dr. [redacted] finds a statistically significant abnormal return on an Event Day for only 2 of his 20 models prior to August, 2015, the purported cumulative price impact for these before August 2015 for these two models are only 0.6% out of the purported total cumulative pricing impact of news about Ripple.

[25] For excess returns within the 95% confidence interval, I cannot reject the null hypothesis of the constant term equals zero at the 5% level of statistical significance. *See* J. Stock, and M. Watson, Introduction to Econometrics, 4th Edition, 2019, Pearson, NY, at 75 for a general discussion.

[26] P. Gompers, J. Ishii, and A. Metrick, "Corporate Governance and Equity Prices," *The Quarterly Journal of Economics*, Vol. 118 (1), 2003 at 122. Gompers et al. (2003) implemented a factor asset pricing model.

[27] J. Stock, and M. Watson, Introduction to Econometrics, 4th Edition, 2019, Pearson, NY, at 185, ("A 95% confidence interval for the β_1 is an interval that contains the true value of β_1 with a 95% probability.").

[28] See Exhibit 3 and Ferrell Expert Report.

19. To demonstrate the robustness of my findings, the results in Exhibit 4 shows an analysis of my factor model using 7-day periods, and 30-day periods rather than the 28-day period. The results show that: [29]

(i) my original conclusion that the "XRP's long-run price return are associated with factors outside Ripple's control, namely, price returns of non-XRP cryptocurrencies" is still supported. For example, the coefficients on all four PCs are statistically significant at the 5% level when using 30-day periods for Estimation Period 2.

(ii) XRP price returns (after subtracting the risk-free rate) are not statistically significantly different than zero controlling for non-XRP cryptocurrency market factors. In each of the alternative specifications, none of the constants – which are estimates of the average 7-day, 28-day and 30-day periods XRP price return after subtracting the risk-free rate and controlling for non-XRP cryptocurrency factors – is statistically significant at the 5% level.

(iii) yet again, none of the [redacted] Excess Returns are within the 95% confidence interval of any of the alternative factor models.

20. Exhibit 5 shows the results when using Dr. [redacted] suggested cryptocurrency market factors or account growth he used in 18 out of his 20 models over Estimation Period

[29] These findings also apply when using 28-day frequency but without the THC return and separately, also when using only Coin Market Cap. I also do not find that alpha in the post-BitLicense period is statistically significant at the 5% level.

2.[30,31] As I show in Exhibit 5, none of the regression constants are statistically significant and positive over the long-term even when using Dr. [redacted] suggested factors.[32,33]

21. I conclude that the statistical evidence is inconsistent with the existence of the [redacted] Excess Returns generated from his but-for counterfactual prices.

[30] Dr. [redacted] Models 1 and 11 are not based on cryptocurrency market factors (or account growth). Model 1 is the Constant Mean Return Model and Model 11 is based on lagged XRP returns.

[31] I simply use Dr. [redacted] factors in a long-run regression analysis, but I am not necessarily endorsing Dr. [redacted] factors. The R-squared when using Dr. [redacted] factors is between 8.8% and 90.4%, which is lower than the 92.3% when using my factor model. *See, e.g.*, Ferrell Report, ¶ 98 and Footnote 175.

[32] The constant term represents the "remaining" average return, after accounting for the exposure to the non-XRP cryptocurrency market factors. *See, e.g.*, Ferrell Report, ¶ 96.

[33] These findings also apply when I implement Dr. [redacted] factors with a 7-day period and 30-day period.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on May 13, 2022.

Frank Allen Ferrell

Exhibit 1
Ten Days with the Highest Purported Price Impact of Ripple News

Date	Actual XRP Return	Dr. [redacted] XRP Return	Actual XRP Price	Dr. [redacted] Counterfactual Price	Purported Price Impact of Ripple News
		[redacted] Non-Event Days			
12/29/17	54.5%	54.5%	$2.210	$0.014	$0.775
01/03/18	25.4%	25.4%	$3.110	$0.020	$0.626
01/18/18	22.1%	22.1%	$1.600	$0.010	$0.288
01/07/18	9.4%	9.4%	$3.380	$0.021	$0.288
12/27/17	17.6%	17.6%	$1.400	$0.009	$0.209
01/28/18	14.8%	14.8%	$1.400	$0.009	$0.179
12/31/17	6.5%	6.5%	$2.300	$0.014	$0.139
04/20/18	16.7%	16.7%	$0.925	$0.004	$0.132
01/17/18	11.0%	11.0%	$1.310	$0.008	$0.129
03/04/18	11.3%	11.3%	$1.010	$0.004	$0.102
		[redacted] Event Days			
12/21/17	53.4%	0.5%	$1.190	$0.007	$0.414
12/14/17	83.5%	0.0%	$0.864	$0.008	$0.393
02/09/18	18.5%	0.8%	$0.954	$0.005	$0.149
09/20/18	38.0%	-0.5%	$0.450	$0.001	$0.124
12/12/17	48.4%	0.0%	$0.374	$0.008	$0.122
02/10/18	12.1%	0.8%	$1.070	$0.005	$0.116
09/21/18	24.8%	-0.5%	$0.562	$0.001	$0.112
12/13/17	26.1%	0.0%	$0.471	$0.008	$0.098
02/08/18	11.2%	0.8%	$0.805	$0.005	$0.081
05/16/17	29.3%	1.8%	$0.350	$0.014	$0.079

Source: Backup to [redacted] Supplemental Report.

Notes:
1. Sorted from high to low.
2. Price Impact is defined as the difference between [XRP Price(t)-XRP Price(t-1)] and [Counterfactual Price(t)-Counterfactual Price(t-1)] for a given date t.

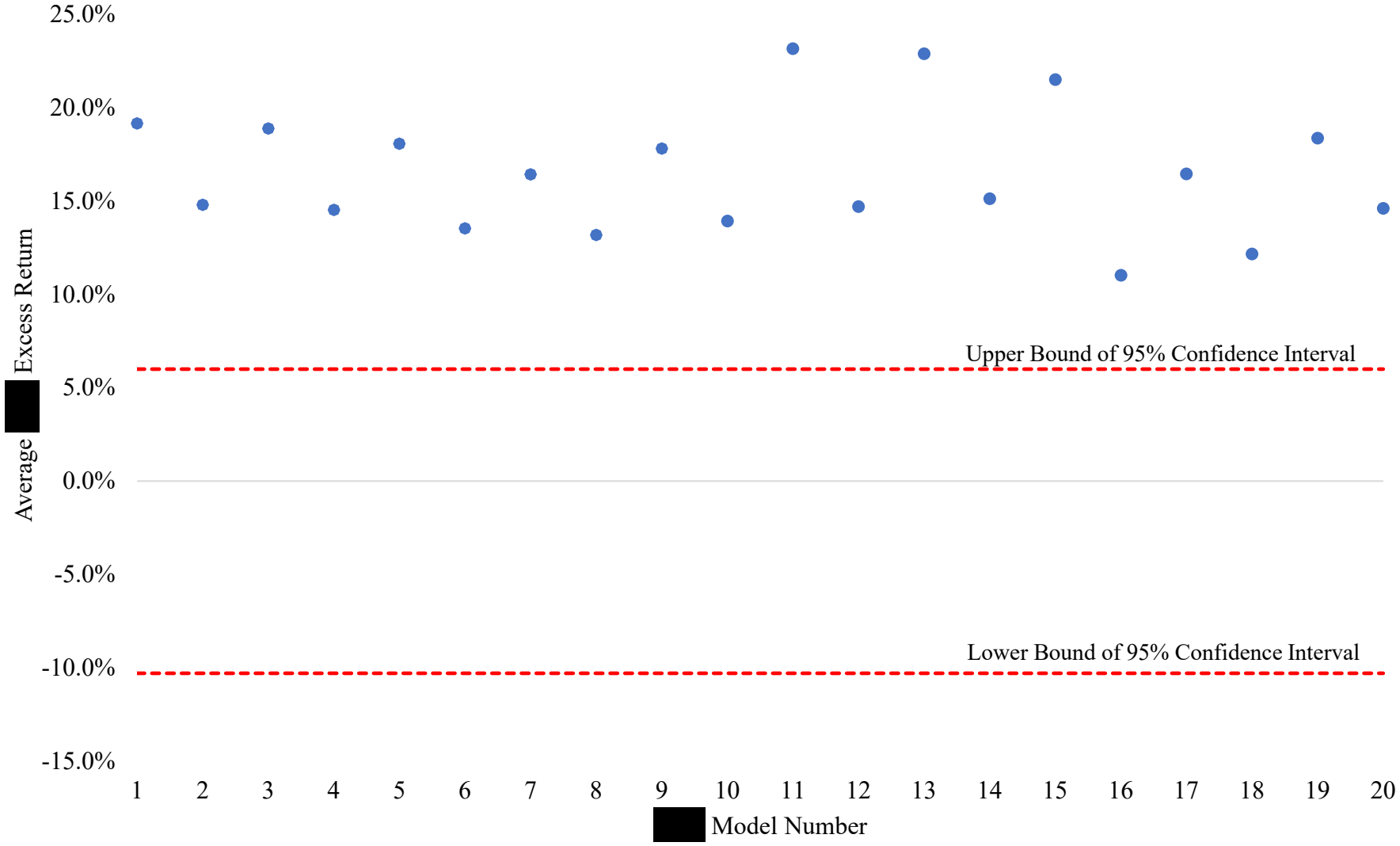
Exhibit 2
Regression of XRP Price Return on Principal Components of Other Cryptocurrencies

	Estimation Period 2 8/11/2015 - 12/20/2020
Constant	-0.022
	(0.041)
Principal Component 1	-0.001*
	(0.000)
Principal Component 2	-0.003*
	(0.001)
Principal Component 3	0.129*
	(0.004)
Principal Component 4	0.052*
	(0.008)
Principal Component 5	0.058*
	(0.012)
Principal Component 6	0.384*
	(0.031)
Principal Component 7	-0.149*
	(0.017)
Principal Component 8	-0.229*
	(0.028)
Principal Component 9	-0.041
	(0.036)
Principal Component 10	0.022
	(0.033)
Principal Component 11	-0.231*
	(0.045)
95% Confidence Interval around	[-10.3%, 6.0%]
Observations	70
Adjusted R-squared	0.923
Non-XRP Coins used in PCA	91

Sources: CryptoCompare; CoinMarketCap.

Notes:
[1] Standard errors, in parentheses, are robust to heteroskedasticity (Huber/White).
[2] * indicates statistical significance at the 5% level.
[3] All return variables are 28-day returns.
[4] The number of Principal Components are selected by the BIC criteria.

Exhibit 3
Average [redacted] Excess Return Falls Outside the 95% Confidence Interval
Estimation Period 2
(August 11, 2015 to December 20, 2020)



Source: Backup to [redacted] Supplemental Report., CoinMarketCap, CryptoCompare

Exhibit 4
Regression of XRP Returns on Principal Components of Other Cryptocurrencies For Alternative Sampling Frequencies
Estimation Period 2
(August 11, 2015 to December 20, 2020)

	28-Day Periods	7-Day Periods	30-Day Periods
Constant	-0.022	0.011	-0.014
	(0.041)	(0.011)	(0.036)
Principal Component 1	-0.001*	-0.000*	0.012*
	(0.000)	(0.000)	(0.000)
Principal Component 2	-0.003*	0.097*	0.228*
	(0.001)	(0.016)	(0.007)
Principal Component 3	0.129*	-0.029*	-0.037*
	(0.004)	(0.012)	(0.006)
Principal Component 4	0.052*	-0.011	-0.133*
	(0.008)	(0.018)	(0.022)
Principal Component 5	0.058*	-0.016	
	(0.012)	(0.015)	
Principal Component 6	0.384*	0.022	
	(0.031)	(0.017)	
Principal Component 7	-0.149*	0.030	
	(0.017)	(0.021)	
Principal Component 8	-0.229*	0.108*	
	(0.028)	(0.030)	
Principal Component 9	-0.041	0.019	
	(0.036)	(0.040)	
Principal Component 10	0.022	0.012	
	(0.033)	(0.039)	
Principal Component 11	-0.231*	-0.021	
	(0.045)	(0.047)	
Principal Component 12		0.068	
		(0.048)	
Principal Component 13		-0.032	
		(0.055)	
Principal Component 14		-0.019	
		(0.037)	
Principal Component 15		-0.331*	
		(0.151)	
95% Confidence Interval around Constant	[-10.3%, 6.0%]	[-1.1%, 3.3%]	[-8.6%, 5.7%]
Observations	70	280	66
Adjusted R-squared	0.923	0.365	0.946

Sources: CryptoCompare; CoinMarketCap.

Notes:
[1] Standard errors, in parentheses, are robust to heteroskedasticity (Huber/White).
[2] * indicates statistical significance at the 5% level.
[3] All return variables are returns over the period indicated in the column heading.
[4] The number of Principal Components are selected by the BIC criteria.

Exhibit 5
Regression of 28-Day XRP Return with Dr. [redacted] Cryptocurrency and Account Growth Factors for Estimation Period 2
(August 11, 2015 to December 20, 2020)

	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 12	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18	Model 19	Model 20
Constant	-0.0635	0.1010	-0.1300	0.0878	-0.1279	0.0239	-0.0205	-0.0879	-0.0813	0.0424	0.0839	0.0097	0.0536	0.0089	-0.0242	-0.0020	-0.0500	-0.0846
	(0.1133)	(0.0892)	(0.0917)	(0.0873)	(0.1098)	(0.0566)	(0.0871)	(0.1056)	(0.0822)	(0.1935)	(0.1135)	(0.1659)	(0.1405)	(0.1694)	(0.0385)	(0.0686)	(0.0730)	(0.1500)
Number of Accounts Growth	7.8055		6.8020		6.9092		1.4782		-0.2462	10.7804		10.9899		11.1823		4.7931		2.2407
	(5.4115)		(5.0828)		(5.0905)		(3.6741)		(2.9377)	(7.9690)		(8.9044)		(8.8978)		(3.1900)		(6.0587)
BTC Return		1.5964	1.1447	1.4661	1.1946	0.1087	0.0868				1.3516	0.7671	1.6636	1.0598	0.0090	-0.1186		
		(0.8533)	(0.8301)	(0.7808)	(0.8072)	(0.3180)	(0.4661)				(0.7059)	(0.7327)	(0.9175)	(0.8134)	(0.2292)	(0.2669)		
ETH Return				0.1242	-0.0543	0.0284	-0.0073						-0.2575	-0.2610	0.0692	0.0306		
				(0.3355)	(0.4345)	(0.0843)	(0.1337)						(0.6294)	(0.5859)	(0.0953)	(0.1019)		
XLM Return						0.7703	0.7498								0.8595	0.7983		
						(0.0441)	(0.0710)								(0.1121)	(0.2407)		
Equal Weighted Index Return								2.2787	2.3008								2.3094	2.1624
								(1.2472)	(1.4592)								(1.3577)	(1.6084)
Lag XRP Return										0.0832	0.2273	0.0815	0.2826	0.1562	-0.3282	-0.2462	0.0663	0.0766
										(1.1459)	(1.1718)	(1.2649)	(1.1304)	(1.2396)	(0.3734)	(0.3883)	(0.8728)	(0.9121)
Lag Number of Accounts Growth										-6.1600		-5.4640		-6.7310		-4.1083		-0.0559
										(6.0150)		(4.8541)		(5.4497)		(4.0517)		(4.8725)
Lag BTC Return											-0.1898	-0.8458	-0.5778	-1.2808	-0.4323	-0.7206		
											(0.9433)	(0.7855)	(1.0631)	(0.9432)	(0.4967)	(0.5326)		
Lag ETH Return													0.3597	0.4346	0.4285	0.4849		
													(0.4550)	(0.3248)	(0.3827)	(0.3281)		
Lag XLM Return															0.2189	0.1414		
															(0.2961)	(0.3181)		
Lag Equal Return																	-0.3964	-0.6290
																	(1.1042)	(1.1617)
Adjusted R-squared	0.1717	0.0983	0.2038	0.0879	0.1923	0.8396	0.8420	0.5504	0.5438	0.2114	0.1170	0.2321	0.1224	0.2504	0.8739	0.9038	0.5447	0.5351

Sources: CoinMarketCap. Dr. [redacted] Supplemental Report Backup.

Notes:
[1] Standard errors, in parentheses, are robust to heteroskedasticity (Huber/White).
[2] * indicates statistical significance at the 5% level.
[3] All return variables are 28-day returns.

May, 2022

Appendix A

Allen Ferrell
Harvard Law School
Cambridge, Massachusetts 02138
Telephone: [redacted]
Email: [redacted]

CURRENT POSITIONS

Greenfield Professor of Securities Law, Harvard Law School

Visiting Professor, Stanford Law School

National Bureau of Economic Research, Research Associate

Member of Editorial Board, Journal of Financial Perspectives

Fellow, Columbia University's Program on the Law and Economics of Capital Markets

Faculty Associate, Kennedy School of Government

Research Associate, European Corporate Governance Institute

EDUCATION

Massachusetts Institute of Technology, Ph.D. in Economics, 2005
Fields in econometrics and finance

Harvard Law School, J.D., 1995, Magna Cum Laude
Recipient of the *Sears Prize* (award given to the two students with the highest grades)
Editor, *Harvard Law Review*

Brown University, B.A. and M.A., 1992, *Magna Cum Laude*

PREVIOUS POSITIONS

Harvard University Fellow
Harvard Law School, 1997

Law Clerk, Justice Anthony M. Kennedy
Supreme Court of the United States; 1996 Term

Law Clerk, Honorable Laurence H. Silberman
United States Court of Appeals for the District of Columbia; 1995 Term

COURSES TAUGHT

Contracts
Corporate Finance
Law and Finance
Securities Litigation & Regulation

REFEREE FOR FOLLOWING JOURNALS

American Law and Economics Review
Journal of Corporation Finance
Journal of Finance
Journal of Financial Perspectives
Journal of Law and Economics
Journal of Law, Economics and Organization
Journal of Legal Studies
Quarterly Journal of Economics

CONSULTING AREAS

Price Impact and Securities Damages, Valuation, Mergers & Acquisitions

Papers

"Are Star Law Firms Better Law Firms?" with Manconi, Neretina, Powley & Renneboog, Working Paper (2021)

"How Accurate are Matrix Bond Prices?" with Drew Roper & Yibai Shu, Working Paper (2018)

"New Special Study of the Securities Markets: Intermediaries" with John Morley in SECURITIES MARKET ISSUES FOR THE 21ST CENTURY (2018) (editors Fox, Glosten, Greene and Patel)

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"The Benefits and Costs of Indices in Empirical Corporate Governance Research," *in* OXFORD HANDBOOK ON CORPORATE LAW AND GOVERNANCE (2016)

"Thirty Years of Shareholder Rights and Stock Returns," with Martijn Cremers, *revise and resubmit Journal of Financial Economics*

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"Event Study Analysis: Correctly Measuring the Dollar Impact of an Event" with Atanu Saha, Working Paper (2011)

"Legal and Economic Issues in Litigation arising from the 2007-2008 Credit Crisis," with Jennifer Bethel and Gang Hu, *in* PRUDENT LENDING RESTORED: SECURITIZATION AFTER THE MORTGAGE MELTDOWN (2009)

"Securities Litigation and the Housing Market Downturn," with Atanu Saha, 35 *Journal of Corporation Law* 97 (2009)

"The Supreme Court's 2005-2008 Securities Law Trio: *Dura Pharmaceuticals, Tellabs*, and *Stoneridge*," 9 *Engage* 32 (2009)

"What Matters in Corporate Governance?" with Lucian Bebchuk & Alma Cohen, 22 *Review of Financial Studies* 783 (2009)

"Do Exchanges, CCPs, and CSDs have Market Power?" *in* GOVERNANCE OF FINANCIAL MARKET INFRASTRUCTURE INSTITUTIONS (Ruben Lee) (2009)

"An Asymmetric Payoff-Based Explanation of IPO 'Underpricing'," Working Paper, with Atanu Saha (2008)

"The Law and Finance of Broker-Dealer Mark-Ups," commissioned study for NASD using proprietary database (2008)

"Majority Voting" *in* REPORT OF THE COMMITTEE ON CAPITAL MARKETS REGULATION (2008)

"The Loss Causation Requirement for Rule 10B-5 Causes of Action: The Implications of *Dura Pharmaceuticals v. Broudo*," with Atanu Saha, 63 BUSINESS LAWYER 163 (2007)

"Mandated Disclosure and Stock Returns: Evidence from the Over-the-Counter Market," 36 *Journal of Legal Studies* 1 (June, 2007)

"Policy Issues Raised by Structured Products," with Jennifer Bethel, *in* BROOKINGS –NOMURA PAPERS IN FINANCIAL SERVICES (2007)

"The Case for Mandatory Disclosure in Securities Regulation around the World," 2 *Brooklyn Journal of Business Law* 81 (2007)

"U.S. Securities Regulation in a World of Global Exchanges," with Reena Aggarwal and Jonathan Katz, *in* EXCHANGES: CHALLENGES AND IMPLICATIONS (2007)

"Shareholder Rights" *in* REPORT OF THE COMMITTEE ON CAPITAL MARKETS REGULATION (2007)

"Creditor Rights: A U.S. Perspective," 22 *Angler- und Glaubigerschutz bei Handelsgesellschaften* 49 (2006)

"Measuring the Effects of Mandated Disclosure," 1 *Berkeley Business Law Journal* 369 (2004)

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"Does the Evidence Favor State Competition in Corporate Law?", with Alma Cohen & Lucian Bebchuk, 90 *California L. Rev.* 1775 (2002)

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"Federal Intervention to Enhance Shareholder Choice," with Lucian Bebchuk, 87 *Virginia Law Review* 993 (2001)

"A New Approach to Regulatory Competition in Takeover Law," with Lucian Bebchuk, 87 *Virginia Law Review* 111 (2001)

"A Proposal for Solving the 'Payment for Order Flow' Problem," 74 *Southern California Law Review* 1027 (2001)

"Federalism and Takeover Law: The Race to Protect Managers from Takeovers," with Lucian Bebchuk, 99 *Columbia L. Rev.* 1168 (1999)

TESTIMONY LAST FOUR YEARS

SEC v. AT&T Inc. et al, 21 Civ. 1951, Expert report and deposition on April 15, 2022

Securitized Asset Funding 2011-2 v. CIBC, Case Index No. 653911/2015, Expert report and deposition on July 30, 2021 and trial testimony March 18 and 21, 2022

SEC v. Ripple, Case No.20-CV-10832, Expert report and deposition on February 23, 2022

Chabot et al. v. Walgreens, M.D. Pa 1:18-cv-02118, Expert report and deposition on January 18, 2022

EIG Energy Fund v. Keppel Offshore & Marine LTD, Case No.18-cv-01047-PGG, Expert report and deposition on December 9, 2021

Purple Mountain Trust v. Wells Fargo et al., Case No. 3:18-cv-03948-JD, Expert report and deposition on December 3, 2021

In re Robinhood Litigation, Case No. Case No. 3:20-cv-01626-JD, Expert reports and deposition on September 30, 2021

In re P3 Health Group Holdings, LLC, Case No. 2021-0518-JTL, Expert report and deposition on August 26, 2021

Pearlstein et al. v. Blackberry Limited, Case No. 1:13-cv-7060-CM, Expert report and deposition on November 3, 2020

In re Grupo Televisa Securities Litigation, Case No. 1:18-cv-01979-LLS, Expert report and deposition on February 21, 2020

In re Snap Securities Litigation, Case No. 2:17-cv-03679-SVW-AGR, Expert report and deposition on December 16, 2019

People of the State of New York v. Exxon Mobil Corporation, Index No. 452044/2018, Expert report and deposition on July 23, 2019 and trial testimony on November 6, 2019

In re Signet Jewelers Limited Securities Litigation, Case No. 1:16-cv-06728-CM, Expert report and deposition on May 14, 2019

Trustees of DALI et al. v. Barrick Gold Corporation, Case No. CV-14-502316-00CP, Ontario Superior Court of Justice, Expert reports and deposition on April 16, 2019

Ramirez v. Exxon Mobil Corporation et al., Case No. 3:16-cv-031110K, Expert report and deposition on March 22, 2019

CC IMA v. IMA Pizza, JAMS Ref No. 1425026556, Testimony on September 13, 2018

Bradley Cooper v. Thoratec Corporation et al., Case No. 4:14-cv-00360-CW, Expert report and deposition on April 11, 2018

Blattman v. C3, Inc. et al., Case No. 1:15-cv-00530-GMS, Expert report and deposition on December 22, 2017

United States v. Kaleil Tuzman, 15 Criminal Case No. 536 (US Attorney for the Southern District of New York), testimony on December 15 and 18, 2017

Appendix B

Materials Considered

Court Documents

First Amended Complaint, *Securities and Exchange Commission v. Ripple Labs, et al.*, No. 1:20-cv-10832 (S.D.N.Y. February 18, 2021)

Expert Reports

Expert Report of Allen F. Ferrell, Ph.D., October 4, 2021

Expert Report of [redacted] Ph.D., October 4, 2021

Rebuttal Expert Report of Allen F. Ferrell, Ph.D., November 12, 2021

Rebuttal Report of [redacted] Ph.D., November 12, 2021

Supplemental Report of [redacted] Ph.D., February 28, 2022

Depositions

Videotaped Deposition of [redacted] Ph.D., February 18, 2022

Academic Literature, Regulatory, and Practitioner Publications

Bebchuk, Lucian, Alma Cohen, and Charles C. Y. Wang, "Learning and the Disappearing Association Between Governance and Returns," *Journal of Financial Economics*, 108, 2013, pp. 323-348

Gompers, Paul, Joy Ishii, and Andrew Metrick, "Corporate Governance and Equity Prices," *The Quarterly Journal of Economics*, Vol. 118 (1), 2003, pp. 107-156

Stock, James H., and Mark W. Watson, Introduction to Econometrics, 4th Edition, 2019, Pearson, NY

Urquhart, Andrew, "The Inefficiency of Bitcoin," *Economic Letters* Vol. 148, 2016, pp. 80-82

Data Sources

Backup to the Supplemental Report of [redacted] Ph.D.
CoinMarketCap
CryptoCompare

Exhibit 14

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

SECURITIES AND EXCHANGE COMMISSION, **Plaintiff** **v** RIPPLE LABS, INC., BRADLEY GARLINGHOUSE, AND CHRISTIAN A. LARSEN, **Defendants**	**20 Civ. 10832**

SUPPLEMENTENTAL EXPERT REPORT OF

[redacted] **Ph.D.**

[redacted]

FEBRUARY 28, 2022

CONTENTS

I. Background and Assignment

1. I have been retained by the Securities and Exchange Commission ("SEC") to provide expert opinions in the matter captioned above. I previously submitted an expert report on October 4, 2021 which was amended on October 6, 2021 ("[redacted] Report") in which I performed an empirical analysis of XRP's price movements and assessed whether certain news and public statements of actions related to Ripple Labs, Inc. ("Ripple") impacted XRP prices. My qualifications, publications, and prior testimonies are described in the [redacted] Report.

2. Dr. Allen Ferrell submitted a report on October 4, 2021 ("Ferrell Report"). I was asked by the SEC to respond to certain opinions in that report, and I submitted a rebuttal report on November 12, 2021 ("[redacted] Rebuttal Report").

3. As rebuttals to the [redacted] Report, M. Laurentius Marais, Ph.D. and Daniel R. Fischel submitted separate expert reports on behalf of Ripple on November 12, 2021 (the "Marais Report" and "Fischel Report," respectively). However, neither Dr. Marais nor Prof. Fischel conducted any independent empirical analysis of XRP price data. None of the analyses or conclusions in the Marais Report or the Fischel Report have caused me to change any of the opinions I have offered in this matter.

4. Since submitting the [redacted] Rebuttal Report, I have been asked by the SEC to provide additional quantification of the economic significance of the impact that certain news related to Ripple had on XRP prices.

5. My opinions are based on my knowledge and expertise gained during my professional career, my academic training and research, and the data I have analyzed in this engagement. In forming my opinions in this matter, I have considered certain documents provided to me. Those documents and materials I relied upon for the [redacted] Report were identified in Appendix B to that report and any additional documents or materials relied upon the [redacted] Rebuttal Report were identified in Appendix A to that report. A list of additional documents I have relied upon in forming the opinions presented in this supplemental report is attached as Appendix A.

6. The opinions stated in this report are based on the evidence that has been provided to me to date. I reserve the right to modify or supplement my conclusions as additional information is made available to me, or as I perform further analysis. [redacted] $600 for my time in this matter. Staff at The Brattle Group have assisted me by performing work at my direction. My opinions are my own, and neither The Brattle Group's nor my compensation are dependent on my opinions or the outcome of this matter.

II. Summary of Opinions

7. The [redacted] Report demonstrates that XRP prices reacted to certain news and public statements related to Ripple.[1] In what follows I will quantify the economic significance of those XRP price reactions.

8. For the purposes of the analysis presented below, I begin with the 113 events on 105 unique days represented by the Select Categories analysis in the [redacted] Report.[2] To be conservative, I remove from that set 5 instances of Digital Asset Trading Platform Listings which I could not definitively attribute to the efforts of Ripple Labs based on the set of news I analyzed.[3] The final set of events I study below thus numbers 108 events on 100 unique days. I will refer to these as the "Ripple Events" and the "Event Days," respectively.

9. My findings are as follows:

   - **But-for the news and public statements related to Ripple to which XRP prices reacted in a statistically significant way, the USD price per XRP token would have rarely exceeded $0.02.** Figure 1 below presents the results for the Constant Mean Return Model (Model 1), described in the [redacted] Report,[4] when the statistically significant abnormal returns associated with Ripple Events are removed from the price history of XRP and a counterfactual price history is constructed (i.e., a price history of XRP "but-for" the statistically significant price reactions to the Ripple Events).

     As shown in the first column of Figure 1, from May 5, 2014 (the first news day I evaluate) through October 28, 2020 (the last news day I evaluate),[5] the average actual XRP price was $0.2136, while the 95th percentile actual price was $0.7003.[6] However, as shown in the second column of Figure 1, when the abnormal returns associated with the 23 statistically significant Ripple Events[7] are removed from this history of 2,369 days, the resulting counterfactual XRP price would be just $0.0044 on average and the 95th percentile counterfactual price would be just $0.0121. Put differently, but-for the news related to Ripple on just 23 days, the XRP price

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1 [redacted] Report, ¶ 12a.

2 The Select Categories combines events from the Milestone, Trading Platform Listings, Customer & Product, Acquisitions & Investments, and Ripple Commercial Initiatives categories. See [redacted] Report, ¶ 98.

3 [redacted] Report, Figure 16. Including these 5 additional listing events would make the results presented herein stronger.

4 [redacted] Report, ¶¶ 39 and 43.

5 See Brattle Workpapers.

6 This means that the actual price of XRP was less than $0.7003 for 95% of the time between May 5, 2014 and October 28, 2020, inclusive, and exceeded $0.7003 for only 5% of the time during this period.

7 Among the 100 Event Days, 23 are associated with significant positive XRP returns. See Brattle Workpapers.

would have rarely surpassed about a penny, and it would never have reached the actual high of $3.38.

FIGURE 1: ACTUAL VS. COUNTERFACTUAL XRP PRICE COMPARISON

	Actual XRP Prices	Counterfactual XRP Prices
Average Price	$0.2136	$0.0044
Standard Deviation	$0.3104	$0.0042
5th Percentile	$0.0048	$0.0003
10th Percentile	$0.0054	$0.0004
25th Percentile	$0.0068	$0.0007
Median	$0.1848	$0.0038
75th Percentile	$0.3018	$0.0067
90th Percentile	$0.4754	$0.0091
95th Percentile	$0.7003	$0.0121
Maximum	$3.3800	$0.0279

Note: Counterfactual prices calculated by removing abnormal returns related to 23 Ripple Event Days.

- **Purchasing XRP before the release of the news and public statements related to Ripple on the 100 Event Days would have resulted in greater investment returns than purchasing at other times.** As shown in Figure 7 below, buying XRP at the closing price the day before the 100 Event Days and then selling 28 days later would have generated an average return on investment of 63.1%, compared to just 7.5% if Event Days are not included.

III. But-For the Ripple Events, XRP Prices Would Have Rarely Exceeded $0.02

10. The [redacted] Report establishes that XRP prices react to certain news and public statements related to Ripple.[8] Put another way, we can interpret statistically significant abnormal returns following the Event Days as attributable to those public statements.[9] As such, the best estimate of the but-for,

[8] [redacted] Report, ¶ 12a.

[9] See, *also*, John Y. Campbell, Andrew W. Lo, and A. Craig MacKinlay, "The Econometrics of Financial Markets," 2nd Edition, 1996, p. 151 ("To appraise the event's impact we require a measure of the abnormal return.") and p. 157 ("We interpret

counterfactual XRP price is found by replacing the *actual* returns in those instances with the *expected* returns. Doing so tells us what XRP prices would have been but-for the news about Ripple on Event Days associated with significant abnormal returns.[10]

11. For example, on May 16, 2017, Ripple announced its intention to escrow 55 billion XRP tokens.[11] The XRP price closed that day at $0.3499, compared to the prior day's close of $0.2707, representing a one-day return of about 25.7%.[12] According to the Constant Mean Return Model (Model 1), the expected return for this day was just 1.8%.[13] This means the abnormal (or unexpected) return was 23.9% on May 16, 2017.[14] This abnormal return is statistically significant at the 5% level.[15] The counterfactual closing price for May 16, 2017 – that is, the XRP price but-for Ripple's announcement – would be just $0.2756 (the prior day's price plus the *expected* 1.8% return).[16] Subsequent XRP prices would therefore be lower, since all future returns would be applied beginning from this new price.

12. In order to construct a full counterfactual price series, I adopt the following methodology. Considering each of the 100 Event Days, if the one-day abnormal return is statistically significant at the 5% one-sided level and positive, I replace the actual return with the expected return.[17] If the two-day cumulative abnormal return is similarly positive and significant (and the one-day return is not significantly negative), I replace the actual return for those two days with their respective expected returns. Finally, if the three-day cumulative abnormal return is similarly positive and significant (and neither the one-day nor the two-day is significantly negative), I replace the actual return for those three days with their expected returns.[18] If none of those (cumulative) abnormal returns is significant and positive, or if any is

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the abnormal return over the event window as a measure of the impact of the event on the value of the firm (or its equity).").

[10] This is precisely the analysis which Prof. Fischel endorses. Without conducting any analysis of XRP prices, Prof. Fischel questions the extent to which XRP holders profited from the events studied in the [redacted] Report, even assuming the abnormal returns related to those events are the results of Ripple's efforts. Fischel Report, ¶ 18.

[11] Brad Garlinghouse, "Ripple to Place 55 Billion XRP in Escrow to Ensure Certainty of Total XRP Supply," ripple.com insights, May 16, 2017, accessed 10/4/2021, https://ripple.com/insights/ripple-to-place-55-billion-xrp-in-escrow-to-ensure-certainty-into-total-xrp-supply/.

[12] The investment return is found as 0.2926 = 0.3499 / 0.2707 – 1. Following common practice, the modeled return in my analysis is found as 0.25664 = ln(0.3499) – ln(0.2707). See Brattle Workpapers.

[13] 0.01787 = 0.1422/0.01398 – 1. See Brattle Workpapers.

[14] This is found as 0.23876 = 0.25664 – 0.017874.

[15] See [redacted] Report, FN 1 and Section V.E and Brattle Workpapers.

[16] This is found as 0.2756 = exp(ln(0.2707) + 0.017874).

[17] For ease of exposition, I focus only on the parametric evaluation of statistical significance, as discussed in the [redacted] Report. See [redacted] Report, ¶ 62.

[18] [redacted] Report, ¶ 61.

significant and negative, I do not adjust the returns. I do this for each of the twenty regression models detailed in the [redacted] Report.[19]

13. Following this procedure, I adjust returns of about two dozen events (23 events) out of about 2,400 days. Prof. Fischel argues that "at face value" two dozen events cannot amount to much of economic significance.[20]

14. I also consider the implications of just examining the one day abnormal return and not giving any credit to significant abnormal returns for longer horizons. This leads me to adjust just 14 returns associated with 14 events.[21] This is a very conservative approach to the extent it takes the XRP price longer than a day to reflect new information.

15. Having removed the significant abnormal returns I then recalculate the XRP price history. The result for Model 1 is presented below in Figure 2. In this case, I adjust returns associated with just 23 of the 100 unique Event Days.[22] The results are striking, and demonstrate the economic significance of these 23 events. The counterfactual price almost cannot be seen on Figure 2 when compared to the actual price. This analysis shows that approximately two dozen events are, in fact, economically significant.

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[19] [redacted] Report, Figure 7.

[20] Fischel Report, ¶ 20 ("In other words, taken at face value, the findings of Dr. [redacted] event study methodology do not demonstrate that XRP holders profit solely or primarily from the efforts of Ripple.").

[21] See Brattle Workpapers.

[22] Recall that in some cases I may adjust just one day's return, sometimes two, and sometimes three depending on the indications of statistical significance of those (cumulative) abnormal returns.

FIGURE 2: ACTUAL VS. COUNTERFACTUAL XRP PRICES
2014 - 2020

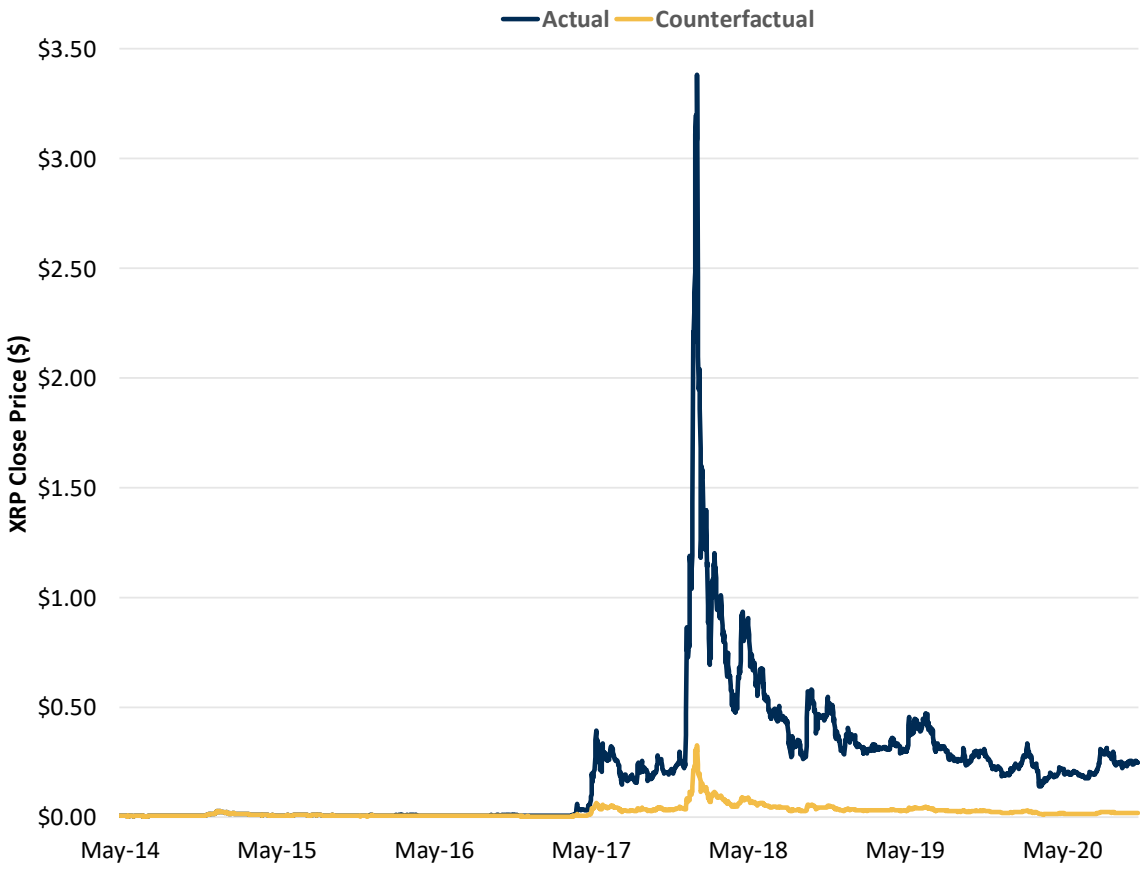
16. Figure 3 summarizes the results across all twenty models. The maximum 95th percentile counterfactual price is just $0.0242, meaning that XRP prices would have only rarely exceeded about two cents but-for the news or public statements related to Ripple Labs. Recall that the actual 95th percentile price over this period was $0.7003, almost 30 times greater.

FIGURE 3: COUNTERFACTUAL XRP PRICE SUMMARY

	No. of Significant Events	Average	Standard Deviation	Percentile Price 5th	10th	25th	Median	75th	90th	95th	Maximum
Actual Price	0	$0.2136	$0.3104	$0.0048	$0.0054	$0.0068	$0.1848	$0.3018	$0.4754	$0.7003	$3.3800
Counterfactuals											
Model 1	23	$0.0044	$0.0042	$0.0003	$0.0004	$0.0007	$0.0038	$0.0067	$0.0091	$0.0121	$0.0279
Model 2	22	$0.0059	$0.0060	$0.0006	$0.0008	$0.0017	$0.0044	$0.0078	$0.0134	$0.0161	$0.0598
Model 3	24	$0.0034	$0.0033	$0.0002	$0.0003	$0.0005	$0.0029	$0.0052	$0.0071	$0.0091	$0.0219
Model 4	20	$0.0058	$0.0054	$0.0007	$0.0010	$0.0017	$0.0044	$0.0077	$0.0130	$0.0159	$0.0478
Model 5	23	$0.0048	$0.0043	$0.0005	$0.0006	$0.0010	$0.0042	$0.0072	$0.0100	$0.0130	$0.0279
Model 6	20	$0.0067	$0.0065	$0.0013	$0.0016	$0.0025	$0.0048	$0.0083	$0.0143	$0.0170	$0.0704
Model 7	21	$0.0061	$0.0055	$0.0009	$0.0011	$0.0018	$0.0048	$0.0080	$0.0140	$0.0167	$0.0453
Model 8	19	$0.0080	$0.0082	$0.0017	$0.0021	$0.0032	$0.0051	$0.0087	$0.0184	$0.0229	$0.0880
Model 9	24	$0.0037	$0.0033	$0.0004	$0.0005	$0.0008	$0.0033	$0.0056	$0.0078	$0.0102	$0.0219
Model 10	21	$0.0060	$0.0055	$0.0011	$0.0013	$0.0021	$0.0046	$0.0079	$0.0129	$0.0158	$0.0534
Model 11	24	$0.0039	$0.0040	$0.0002	$0.0002	$0.0004	$0.0035	$0.0056	$0.0080	$0.0109	$0.0279
Model 12	23	$0.0053	$0.0056	$0.0005	$0.0007	$0.0014	$0.0044	$0.0074	$0.0110	$0.0143	$0.0576
Model 13	24	$0.0039	$0.0040	$0.0002	$0.0002	$0.0004	$0.0034	$0.0056	$0.0080	$0.0108	$0.0279
Model 14	22	$0.0049	$0.0045	$0.0005	$0.0006	$0.0012	$0.0042	$0.0072	$0.0104	$0.0134	$0.0332
Model 15	22	$0.0044	$0.0039	$0.0005	$0.0006	$0.0010	$0.0042	$0.0061	$0.0083	$0.0112	$0.0279
Model 16	21	$0.0077	$0.0092	$0.0019	$0.0023	$0.0033	$0.0052	$0.0085	$0.0142	$0.0207	$0.1156
Model 17	20	$0.0067	$0.0057	$0.0013	$0.0016	$0.0026	$0.0050	$0.0083	$0.0145	$0.0175	$0.0505
Model 18	20	$0.0091	$0.0106	$0.0024	$0.0028	$0.0041	$0.0054	$0.0100	$0.0189	$0.0242	$0.1290
Model 19	24	$0.0045	$0.0041	$0.0005	$0.0006	$0.0010	$0.0041	$0.0066	$0.0088	$0.0116	$0.0279
Model 20	24	$0.0049	$0.0044	$0.0007	$0.0009	$0.0014	$0.0041	$0.0069	$0.0102	$0.0133	$0.0332

17. If I limit my attention only to significant one-day abnormal returns (and thus ignore the extent to which prices might have adjusted after the closing of the Event Day) I continue to see the substantial impact that news or public statements about Ripple Labs has had on XRP prices. Figure 4, below, compares actual XRP prices with the counterfactual price according to Model 1. In this case, I am removing the abnormal returns of just 14 days out of 2,369. The counterfactual price is still substantially lower than actual XRP prices, never exceeding $0.3276.

FIGURE 4: ACTUAL VS. COUNTERFACTUAL XRP PRICES (ONE-DAY APPLICATION)



18. Figure 5 summarizes the results of this conservative, one-day application across all twenty models. The maximum 95th percentile counterfactual price is just $0.1271 (compared to the actual 95th percentile price of $0.7003), meaning that removing the abnormal returns in the hours following announcements on just 14 days, XRP prices would have only rarely exceeded about twelve cents.

FIGURE 5: COUNTERFACTUAL XRP PRICE SUMMARY (ONE-DAY APPLICATION)

	No. of Significant Events	Average	Standard Deviation	Percentile Price 5th	10th	25th	Median	75th	90th	95th	Maximum
Actual Price	0	$0.2136	$0.3104	$0.0048	$0.0054	$0.0068	$0.1848	$0.3018	$0.4754	$0.7003	$3.3800
Counterfactuals											
Model 1	14	$0.0244	$0.0289	$0.0038	$0.0044	$0.0056	$0.0165	$0.0321	$0.0477	$0.0679	$0.3276
Model 2	15	$0.0284	$0.0377	$0.0038	$0.0044	$0.0056	$0.0167	$0.0375	$0.0571	$0.0846	$0.4340
Model 3	15	$0.0234	$0.0273	$0.0037	$0.0045	$0.0059	$0.0161	$0.0306	$0.0453	$0.0642	$0.3101
Model 4	14	$0.0294	$0.0359	$0.0037	$0.0045	$0.0059	$0.0199	$0.0396	$0.0587	$0.0834	$0.4027
Model 5	13	$0.0293	$0.0357	$0.0040	$0.0047	$0.0061	$0.0218	$0.0383	$0.0577	$0.0839	$0.4047
Model 6	12	$0.0373	$0.0474	$0.0040	$0.0047	$0.0061	$0.0283	$0.0499	$0.0754	$0.1100	$0.5309
Model 7	13	$0.0339	$0.0422	$0.0041	$0.0047	$0.0061	$0.0256	$0.0450	$0.0677	$0.0984	$0.4748
Model 8	12	$0.0400	$0.0509	$0.0041	$0.0047	$0.0061	$0.0307	$0.0539	$0.0810	$0.1178	$0.5684
Model 9	14	$0.0272	$0.0326	$0.0038	$0.0046	$0.0059	$0.0202	$0.0356	$0.0531	$0.0765	$0.3694
Model 10	13	$0.0333	$0.0413	$0.0038	$0.0046	$0.0059	$0.0248	$0.0449	$0.0665	$0.0957	$0.4620
Model 11	14	$0.0236	$0.0278	$0.0037	$0.0044	$0.0056	$0.0161	$0.0309	$0.0459	$0.0654	$0.3156
Model 12	15	$0.0288	$0.0392	$0.0033	$0.0042	$0.0056	$0.0172	$0.0374	$0.0555	$0.0885	$0.4540
Model 13	15	$0.0228	$0.0265	$0.0036	$0.0044	$0.0058	$0.0158	$0.0296	$0.0439	$0.0624	$0.3013
Model 14	15	$0.0279	$0.0343	$0.0033	$0.0043	$0.0058	$0.0190	$0.0371	$0.0554	$0.0801	$0.3868
Model 15	13	$0.0285	$0.0347	$0.0040	$0.0047	$0.0061	$0.0212	$0.0372	$0.0561	$0.0816	$0.3937
Model 16	13	$0.0357	$0.0459	$0.0036	$0.0044	$0.0061	$0.0274	$0.0477	$0.0728	$0.1069	$0.5159
Model 17	13	$0.0343	$0.0432	$0.0041	$0.0047	$0.0061	$0.0249	$0.0458	$0.0692	$0.1006	$0.4856
Model 18	13	$0.0419	$0.0550	$0.0039	$0.0046	$0.0061	$0.0318	$0.0567	$0.0867	$0.1271	$0.6133
Model 19	15	$0.0262	$0.0312	$0.0038	$0.0045	$0.0058	$0.0189	$0.0343	$0.0509	$0.0734	$0.3542
Model 20	16	$0.0292	$0.0361	$0.0033	$0.0042	$0.0055	$0.0214	$0.0386	$0.0580	$0.0841	$0.4061

19. These results clearly demonstrate the substantial impact that even a few significant returns relating to news and public announcements about Ripple have had in the history of XRP prices.

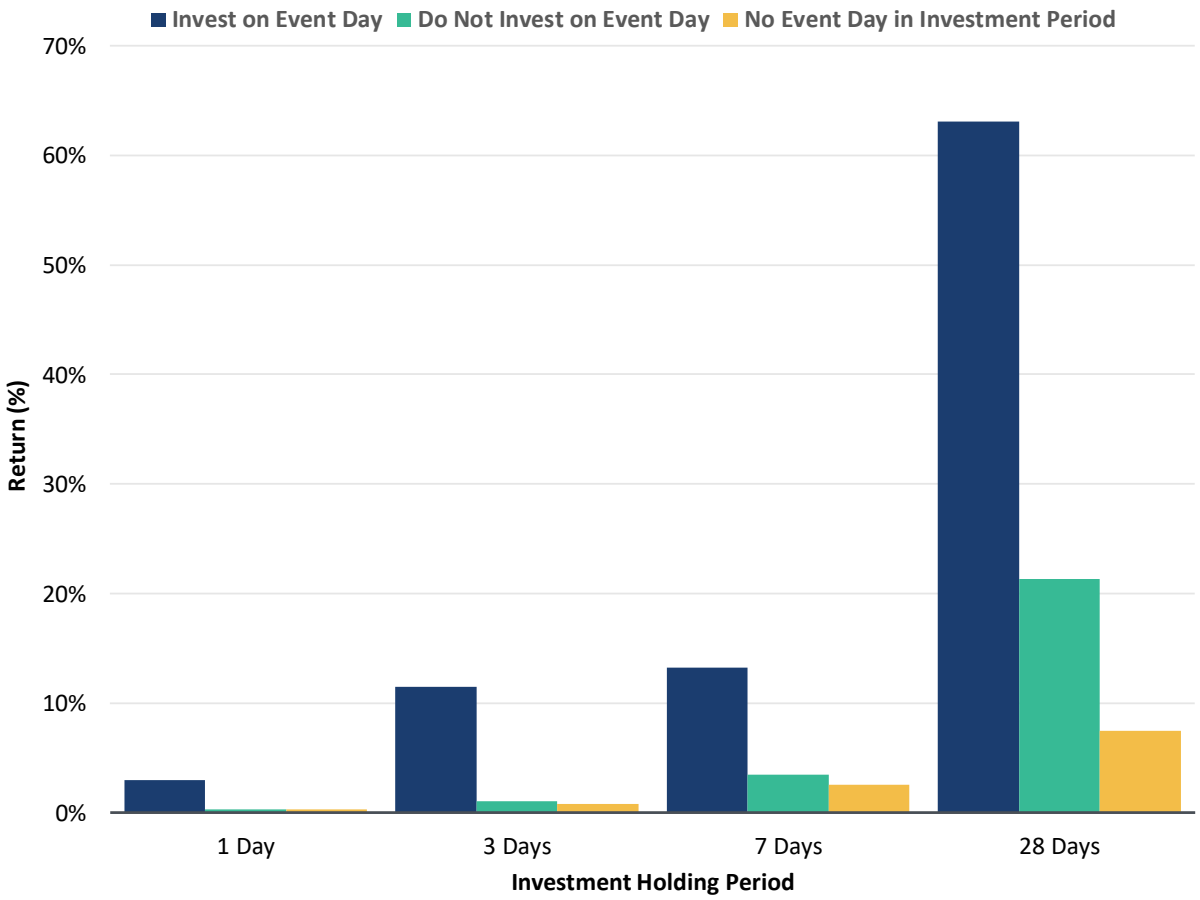
IV. Investment Returns around Ripple Events are Substantially Greater than Otherwise

20. To further address the economic significance of the Ripple Events on XRP prices, I answer the following questions: what would the average return be if an investor bought at closing prices before each of the 100 Event Days, and how would that compare to the average return if she did not?

21. To answer those questions we must specify the holding period of that investment. I consider periods of 1, 3, 7, and 28 days. When comparing the average return for the 100 Event Days to the average return for all other days, the latter may still reflect some benefit from Ripple Events as the holding period will sometimes include an Event Day. To truly isolate the influence of Ripple Events on investment returns, I also calculate the average return considering holding periods which do not contain any Event Days.

22. The results are presented below in Figure 6. For example, an investor investing on the Event Day (i.e., purchasing at the closing price of the day before) would earn an average 28-day return of 63.1% compared to an average return of 21.3% earned when investing on any other days. Excluding those 28 day holding periods which include Event Days, the average return falls to just 7.5%.

FIGURE 6: AVERAGE RETURN ON INVESTMENT COMPARISON



23. The data supporting Figure 6 are presented below in Figure 7.

FIGURE 7: AVERAGE RETURN ON INVESTMENT COMPARISON (DETAIL)

	Holding Period			
	1 Day	3 Days	7 Days	28 Days
Invest on Event Day	3.0%	11.5%	13.2%	63.1%
Do Not Invest on Event Day	0.3%	1.0%	3.5%	21.3%
No Event Day in Investment Period	0.3%	0.8%	2.6%	7.5%

24. An investor who timed investments in XRP around these Ripple Events would have earned substantially greater returns than an investor who did not. This, again, demonstrates the economic significance of the Ripple Events in the history of XRP prices.

X A

Additional Documents Relied Upon

	Expert Reports	Date
[1]	Expert Report of Daniel R. Fischel.	November 12, 2021
[2]	Expert Report of M. Laurentius Marais, PhD.	November 12, 2021

Exhibit 15

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

SECURITIES AND EXCHANGE COMMISSION, **Plaintiff** **v** RIPPLE LABS, INC., BRADLEY GARLINGHOUSE, AND CHRISTIAN A. LARSEN, **Defendants**	**20 Civ. 10832**

AMENDED EXPERT REPORT OF
[redacted] **Ph.D.**

[redacted]

OCTOBER 6, 2021

CONTENTS

I. Qualifications

1. My name is [redacted] and I am a [redacted].

2. I have testified as an expert witness for the Securities and Exchange Commission on event studies and market efficiency. I have worked for defendants, plaintiffs, and governmental agencies in matters involving fraud, conspiracies and manipulations, and multisided platforms. I have worked both in assessing liability issues as well as in estimating damages.

3. I received my [redacted], where I specialized in statistics and econometrics, finance, monetary economics, and numerical methods. I was awarded a [redacted] by the Economics Department. I also received my [redacted] and my [redacted], where I graduated summa cum laude.

4. I began working as an economic consultant in October of 2018. Prior to that, I was employed for fifteen years at [redacted] where I was the [redacted], a team of nearly 100 professionals with responsibility for developing credit models and analytical methodologies for all asset classes across all lines of business. I frequently met with U.S., European, and Asian regulators and policy makers to discuss credit risk, credit ratings performance, risk modeling, and regulatory, antitrust and other policy matters.

5. Before leading the [redacted], I was the [redacted] at [redacted] with responsibilities including Default Research, Model Development and Verification, and Technology.

6. As an economist at [redacted] I specialized in credit research and modelling. While there I developed numerous econometric models of corporate and consumer credit as well as credit rating transitions. I routinely assessed the impact of new information on the credit worthiness of corporates, financial institutions, sovereign entities and structured vehicles.

7. I have developed patented models of default and credit rating transitions and trademarked models of regional real estate prices. I have developed models of residential mortgage default, prepayment and loss which have been used to assess the credit risk of hundreds of billions of dollars in securitizations. I have also developed several models of corporate and consumer credit, financial risk contagion, real estate market performance measures, and pharmaceutical drug development, among others. In addition, I conducted event studies to assess the impact of credit actions and announcements on corporate and sovereign costs of capital.

8. I have authored and co-authored articles in peer reviewed journals, trade publications, and [redacted] Special Comments on subjects such as credit rating performance, corporate and sovereign defaults, collusion, manipulation, and screening. I have also contributed a chapter for a book on emerging markets and sovereign risk which was based, in part, on an event study analysis.

9. My curriculum vitae is included as Appendix A. [redacted] an hourly rate of $600 for my time in this matter. Staff at The Brattle Group have assisted me by performing work at my direction. My opinions are my own, and neither mine nor The Brattle Group's compensation are dependent on my opinions or the outcome of this matter.

II. Assignment

10. I have been retained by the Securities and Exchange Commission ("SEC") to provide expert opinions in the matter captioned above. Specifically, I was asked to perform an empirical analysis of XRP's price movements and assess whether actions by Ripple Labs, Inc. impact XRP prices. In conjunction with this assignment, I have been asked to assess the extent to which XRP price movements are driven by price movement in Bitcoin and other digital tokens. I have also been asked to be prepared to respond as needed on an expert issue or provide a rebuttal report on any subject on which I am qualified to opine.

11. My opinions are based on my knowledge and expertise gained during my professional career and my academic training and research. In forming my opinions in this matter, I have considered certain documents provided to me. A list of the documents I have relied upon is attached as Appendix B. In addition, I have prepared work papers that are available upon request. The opinions stated in this report are based on the evidence that has been provided to me to date. I am not opining on the accuracy of how Ripple describes its products or certain events in news or other public announcements. My work in this matter is ongoing, and I reserve the right to modify or supplement my conclusions as additional information is made available to me, or as I perform further analysis.

III. Summary of Opinions

12. Based on my analysis and review of documents produced in this matter, I have reached the following opinions:

    a. **XRP prices react to certain news and public statements about Ripple's actions.** Using a well-accepted event study methodology, I find statistically significant evidence that XRP prices react to news about Ripple's actions. This is particularly true for news of important milestones in the history of Ripple Labs and for announcements more directly related to XRP. The results hold for nearly all statistical models I examine at scientifically accepted levels of statistical significance. In no case do I

find a significant correlation of news and XRP returns in the days before the news, again confirming that XRP prices are reacting to news about Ripple's actions. Taken together, this evidence indicates that XRP prices react to the news of actions by Ripple Labs.

In Figure 1, I present a summary table that illustrates my findings. Across 20 different regression model specifications, which in varying degrees account for the price movements of digital tokens like Bitcoin ("BTC"), Ether ("ETH"), and other variables, I indicate the cases in which the relationship between news and XRP prices is statistically significant.[1]

FIGURE 1: XRP PRICES REACT TO DIFFERENT TYPES OF RIPPLE NEWS

Model Number	Milestones	Trading Platform Listings	Customers & Product Developments	Ripple Commercialization Initiatives	Select Categories
1	✓	✓	✓	✓	✓
2	✓	✓	✓		✓
3	✓	✓	✓	✓	✓
4	✓	✓	✓		✓
5	✓	✓	✓	✓	✓
6	✓	✓	✓		✓
7	✓	✓	✓	✓	✓
8	✓	✓	✓		✓
9	✓	✓	✓	✓	✓
10	✓	✓	✓		✓
11	✓	✓	✓	✓	✓
12	✓	✓	✓	✓	✓
13	✓	✓	✓	✓	✓
14	✓	✓	✓	✓	✓
15	✓	✓	✓	✓	✓
16	✓	✓	✓		✓
17	✓	✓	✓	✓	✓
18	✓	✓	✓		✓
19	✓	✓	✓	✓	✓
20	✓	✓	✓	✓	✓

Notes:
✓ Indicates significance at the 5% level.
Indicates not significant at the 5% level.

Select Categories is defined as the combination of Corporate Milestones, Trading Platform listings, Customer & Product Announcements, Ripple Commercialization Initiatives, and Acquisitions & Investments.

[1] Throughout this report, unless otherwise noted I shall use the phrase "statistically significant" to refer to model outcomes for which the probability of occurring under the null hypothesis is 5% or less. This "5% significance level" is a common standard for academic research.

b. **The relationship between XRP returns and the returns of other digital tokens changes over time.** In studying the degree to which XRP returns correlate with those of BTC and ETH, I find evidence that those relationships change over time. Correlations with other digital tokens are sometimes zero or even negative. Such correlation does not preclude that XRP prices could react to news and public statements about certain Ripple actions.

IV. Overview of Ripple Labs and XRP

A. Company Overview

13. Ripple Labs, Inc. ("Ripple") is a for-profit technology company based in San Francisco, CA. According to its website, Ripple has 500 employees and nine offices around the globe.[2] Ripple's senior leadership and executives include Chris Larsen, who is the Executive Chairman of Ripple's board of directors and former Chief Executive Officer ("CEO"), Brad Garlinghouse, who currently serves as CEO, and David Schwartz, who serves as Chief Technology Officer ("CTO").[3]

14. Throughout its history, Ripple has highlighted certain news or initiatives of the company. Such announcements relate to Ripple raising funds from venture capital investors in 2015, 2016 and 2019, its joint venture with SBI Holdings, and its receipt of a Bitlicense from the State of New York, Department of Financial Services.[4] Another event in the company's history that Ripple chose to highlight is its decision

[2] "Our Story," Ripple.com, ("500 Employees, 9 Global Offices, 3X YoY Customer Growth"), accessed September 28, 2021, https://ripple.com/company.

[3] "Leadership," Ripple.com, accessed September 28, 2021, https://ripple.com/company/leadership/; *see also,* "Board of Directors," Ripple.com, accessed September 28, 2021, https://ripple.com/company/board-of-directors/.

[4] *See*, e.g., "Ripple Labs Closes $28 Million Series A Funding Round," Ripple, May 19, 2015, accessed September 10, 2021, https://ripple.com/ripple_press/ripple-labs-closes-28-million-series-a-funding-round/; "Ripple Raises $55 Million in Series B Funding," Ripple, September 15, 2016, accessed September 10, 2021, https://ripple.com/ripple_press/ripple-raises-55-million-series-b-funding/;, and "Ripple Caps Record Year With $200 Million Series C Funding," Ripple, December 20, 2019, accessed September 10, 2021, https://ripple.com/insights/ripple-caps-record-year-with-200-million-series-c-funding/. "Ripple Strikes Multi-National Deal with SBI Holdings to Meet Growing Demand for Ripple Solutions Across Asia," Ripple Press, January 28, 2016, accessed September 10, 2021, https://ripple.com/ripple_press/ripple-strikes-multi-national-deal-with-sbi-holdings-to-meet-growing-demand-for-ripple-solutions-across-asia/. *See*, "Ripple Receives New York's First BitLicense for an Institutional Use Case of Digital Assets," Ripple Insights, June 13, 2016, accessed September 10, 2021, https://ripple.com/insights/ripple-receives-new-yorks-first-bitlicense-institutional-use-case-digital-assets/.

to put 55 billion XRP tokens into escrow, which according to Ripple would ensure supply predictability for XRP "investors."[5]

15. According to its website and other promotional materials distributed by the company, Ripple operates a network called RippleNet, which the company advertises as a real-time settlement system that aims to enable nearly instantaneous monetary transactions globally.[6]

16. Prior to branding RippleNet in 2019, Ripple separately marketed its commercial products under the names xRapid, xVia, and xCurrent. xRapid became commercially available in October 2018[7] and was eventually re-branded as On-Demand Liquidity ("ODL").[8] xRapid or ODL allow users to transfer one currency to another with XRP facilitating the transfer.[9] According to Ripple's public announcements, the primary selling point of this process is that it would provide faster and less expensive settlements compared to traditional cross-currency payment processing.[10]

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[5] This action was announced in May 2017 and completed in December 2017. *See,* "Ripple to Place 55 Billion XRP in Escrow to Ensure Certainty of Total XRP Supply," Brad Garlinghouse, *Ripple Insights,* May 16, 2017, accessed September 10, 2021, https://ripple.com/insights/ripple-to-place-55-billion-xrp-in-escrow-to-ensure-certainty-into-total-xrp-supply/. ("By securing the lion's share of our XRP, investors can now mathematically verify the maximum supply of XRP that can enter the market."); *see also,* "Ripple Escrows 55 Billion XRP for Supply Predictability," Ripple Insights, December 7, 2017, accessed September 10, 2021, https://ripple.com/insights/ripple-escrows-55-billion-xrp-for-supply-predictability/.

[6] RippleNet Brochure, Ripple.com, accessed September 28, 2021, https://ripple.com/files/ripplenet_brochure.pdf ("The needs of individuals and businesses sending cross-border payments have dramatically evolved. These customers are now demanding real-time, low-cost and fully trackable payments on a global scale. Yet, today's global payments infrastructure yields an experience that is slow, costly and opaque. Ripple solves these pain points through RippleNet, a network of banks, payment providers and others. Employing Ripple's solutions and a standardized ruleset allows for those connected on RippleNet to efficiently send and receive payments around the world.").

[7] "Ripple Highlights Record Year, xRapid Now Commercially Available," Ripple Press, October 1, 2018, accessed August 22, 2021, https://ripple.com/ripple_press/ripple-highlights-record-year-xrapid-now-commercially-available/.

[8] "Ripple's blockchain cross-border payments network grows to 300," Ledger Insights, November 7, 2019, https://www.ledgerinsights.com/ripple-blockchain-300-customers/, accessed October 1, 2021. ("Until recently, Ripple had two main products called xCurrent and xRapid on RippleNet. The former is a messaging system for payments which competes with SWIFT. The latter uses Ripple's digital currency XRP for fund transfers. However, the two were merged into the RippleNet brand, with xRapid rebranded as On-Demand Liquidity (ODL) which leverages XRP.").

[9] "Free Working Capital with On-Demand Liquidity", Ripple.com, accessed October 1, 2021, https://ripple.com/ripplenet/on-demand-liquidity/. ("Through the On-Demand Liquidity (ODL) service, RippleNet leverages the digital asset XRP as a bridge between two currencies, allowing you to eliminate pre-funding of destination accounts, reduce operational costs and unlock capital.").

[10] *See*, e.g., "goLance Leverages On-Demand Liquidity to Deliver Faster, Cheaper Payments to Their Global Marketplace of Freelancers," Ripple Insights, January 29, 2020, accessed October 1, 2021, https://ripple.com/insights/golance-leverages-on-demand-liquidity-to-deliver-faster-cheaper-payments-to-their-global-marketplace-of-freelancers/. ("RippleNet's On-Demand Liquidity gives us the ability to make hyper-efficient, low-cost payments that make our customers happy and drive growth for our business.").

17. xVia is described as a software tool that provides a single API to standardize connections between different payment networks.[11] xVia signed its first five customers in April of 2018, before later being integrated into RippleNet.[12] xCurrent, which became available in the first quarter of 2018,[13] is the software that eventually became the underlying platform of RippleNet. xCurrent "enables banks to message and settle their transactions… with RippleNet members."[14] The three products were integrated into RippleNet in October of 2019.[15]

18. In addition to its direct commercial efforts, Ripple has engaged in and publicized various other initiatives over time. Some of these initiatives are directed to commercialize its product suite and technology and perhaps ultimately to create use-cases for XRP. As an example, the Xpring program was a venture capital initiative announced in May 2018.[16] The goal of Xpring was to "invest in, incubate, acquire and provide grants to companies and projects run by proven entrepreneurs" who intended to "use XRP and the XRP Ledger…to solve their customer's problems in a transformative way."[17] Company documents indicate that by 2019, Ripple had invested $500M in over 20 companies through Xpring.[18] In 2020, Xpring was re-branded as RippleX.[19]

19. Ripple also engaged in and publicized initiatives directed to more general blockchain research or other company interests. An example of the latter type of initiative is the University Blockchain Research Initiative ("UBRI"). As described by Ripple, UBRI is a partnership program between Ripple and various

[11] *See* Birla Deposition Exhibit 32, WSJ D.Live Briefing Materials, October 30, 2018 [RPLI_SEC 0081034 at RPLI_SEC –81039]; *see also, "*xVia: A brief product overview for payment originators," October 2017, accessed August 26, 2021, https://ripple.com/files/xvia_brochure.pdf, at p. 8.

[12] *See* Asheesh Birla, "xVia Opens New Doors in Emerging Markets," Ripple Insights, April 26, 2018, accessed August 26, 2021, https://ripple.com/insights/xvia-opens-new-doors-in-emerging-markets/.

[13] *See* David Z. Morris, "Ripple-Powered Mobile Payments to Debut at Santander," Fortune, February 3, 2018, accessed August 26, 2021, https://fortune.com/2018/02/03/ripple-mobile-payments-santander/ ("The xCurrent-based service, referred to simply as "Pay" in a recent Santander earnings presentation, is projected to go live in the U.K., Spain, Brazil, and Poland in the first quarter of this year.").

[14] "xCurrent: A brief technical overview for financial institutions on RippleNet," October 2017, accessed August 20, 2021, https://ripple.com/files/xcurrent_brochure.pdf, p. 4.

[15] Sead Fadilpasic, "This is Why Ripple Removed xRapid, xVia, and xCurrent from their Site," Cryptonews, October 9, 2019, accessed August 26, 2021, https://cryptonews.com/news/this-is-why-ripple-removed-xrapid-xvia-and-xcurrent-from-the-4817.htm.

[16] "Welcome to Xpring," Ripple Insights, May 14, 2018, accessed August 20, 2021, https://ripple.com/insights/welcome-to-xpring/.

[17] "Welcome to Xpring," Ripple Insights, May 14, 2018, accessed August 20, 2021, https://ripple.com/insights/welcome-to-xpring/.

[18] *See* Madigan Deposition pp. 198:23 – 205:5; *see also*, Madigan Deposition Exhibit 15, Email from Breanne Madigan to D. Samarasinghe, July 15, 2019, [RPLI_SEC0200768] and Madigan Deposition Exhibit 56, Q2 2019 XRP Markets Report, July 24, 2019.

[19] Madigan Deposition, p. 60:5-13 ("Q… Is – is Xpring something that still exists or that no longer exists? A. So after Ron will and Ethan left around the same time, both the former Xpring team and the markets team were moved under Monica Long in a newly formed group called RippleX.").

universities to "support academic research, technical development and innovation in blockchain, cryptocurrency and, [sic] digital payments."[20] According to its webpage, Ripple has committed $50 million to its UBRI initiative.[21]

20. To date, Ripple's primary source of funding has been sales of XRP tokens, according to company financial statements. As shown in Figure 2, almost all of Ripple's revenue for the years 2013 to 2020 derived from XRP sales. According to figures disseminated by Ripple, it sold approximately $1.4 billion worth of XRP between Q1 2017 and Q4 2020 to a mix of institutional investors and retail investors via digital asset trading platforms and over-the-counter ("OTC") sales.[22] In addition to funding through XRP sales, Ripple also raised approximately $300 million in funding from angel investors and venture capital firms in Series A, Series B, and Series C rounds.[23]

FIGURE 2: RIPPLE LABS REVENUE BY SOURCE, 2013-2020 ($ IN MILLIONS)

	2013	2014	2015	2016	2017	2018	2019	2020
XRP Token Revenue	$4.4	$13.4	$12.2	$15.6	$186.1	$552.1	$710.8	$457.8
Software Revenue	-	-	-	0.1	1.0	2.3	5.1	0.6
Services Revenue	-	0.1	0.5	1.7	3.9	3.1	2.9	0.6
Total Revenue	$4.4	$13.5	$12.7	$17.5	$190.9	$557.6	$718.8	$459.0
XRP Token Revenue (% of Total)	100.0%	99.5%	96.0%	89.6%	97.5%	99.0%	98.9%	99.7%

Note: For the years 2019 and 2020, Ripple Labs lists revenues from "XRP transactions" and "Non-monetary XRP transactions" separately. This table includes the sum of both as "XRP Token Revenue."

Source: Ripple Labs Financial Statements, 2013-2020 (RPLI_SEC 0090938; RPLI_SEC 0426161; NY-9875_T_00017816; RPLI_SEC 0267872; RPLI_SEC 0920429).

[20] "What is University Blockchain Research Initiative (UBRI)?" accessed August 24, 2021, https://ubri.ripple.com/faq/.

[21] "What is University Blockchain Research Initiative (UBRI)?" accessed August 24, 2021, https://ubri.ripple.com/faq/.

[22] "XRP Markets Reports," Ripple, 1Q2017 – 2Q2020, https://ripple.com/insights. *See also,* Figure 6.

[23] "Ripple Labs Closes $28 Million Series A Funding Round," Ripple, May 19, 2015, accessed September 10, 2021, https://ripple.com/ripple_press/ripple-labs-closes-28-million-series-a-funding-round/; "Ripple Raises $55 Million in Series B Funding," Ripple, September 15, 2016, accessed September 10, 2021, available at https://ripple.com/ripple_press/ripple-raises-55-million-series-b-funding/; "Ripple Caps Record Year With $200 Million Series C Funding," Ripple, December 20, 2019, accessed September 10, 2021, available at https://ripple.com/insights/ripple-caps-record-year-with-200-million-series-c-funding/.

B. XRP Trades on Digital Asset Trading Platforms

21. Digital asset trading platforms are marketplaces where those who wish to buy and sell digital tokens such as XRP can connect. Trading is conducted 24 hours a day, seven days a week on digital asset trading platforms, so there is no "opening" and "closing" of daily trading like in traditional financial exchanges.[24] Some of the largest and best-known U.S. trading platforms include Coinbase, Kraken, and Gemini, though there are hundreds of trading platforms globally.

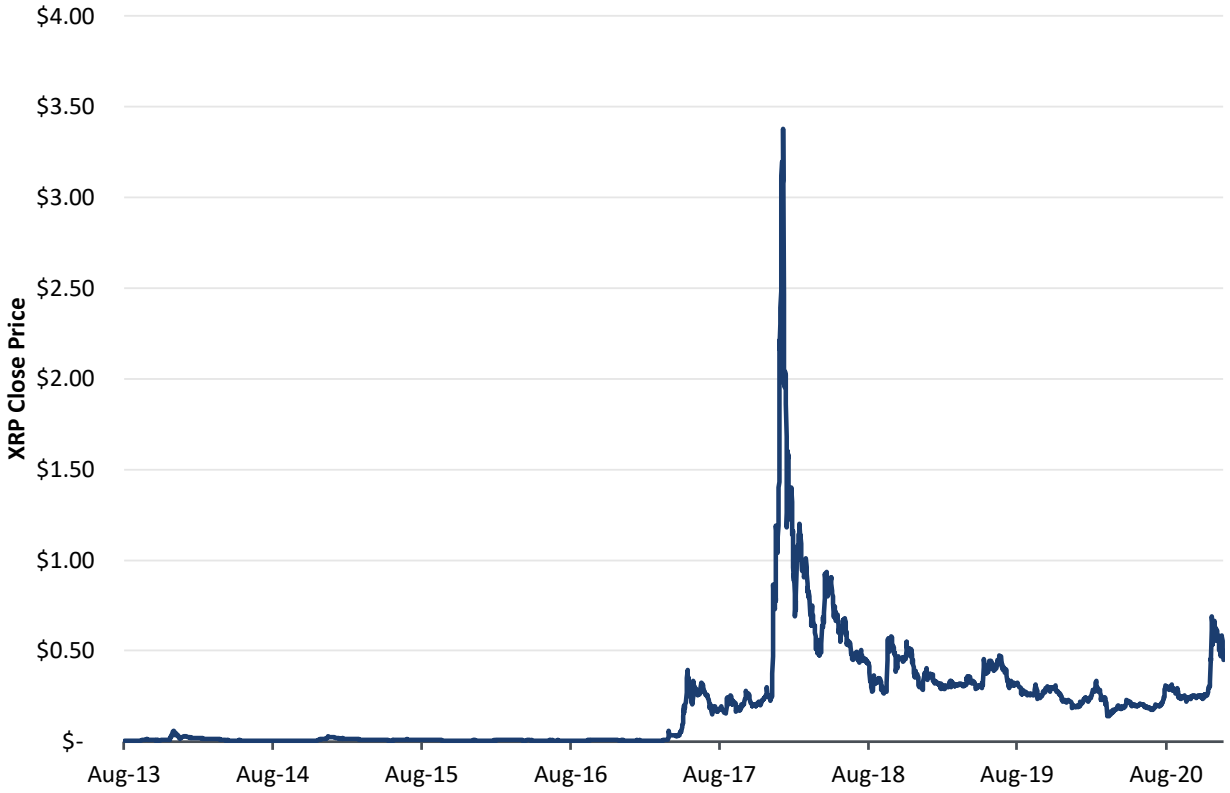
22. As with other digital tokens, XRP trades are in the form of asset pairs in which one specified token is exchanged for another specified token or for a fiat currency. For example, XRP-BTC represents the XRP to Bitcoin ("BTC") pair (i.e., XRP prices denominated in BTC) and XRP-USD represents the XRP to U.S. Dollar pair (i.e., XRP prices denominated in USD).

23. As shown in Figure 3 and Figure 4, XRP prices fluctuated substantially over time. For the first several years, it traded at or below one cent per XRP token for the most part. From mid-2017 to December 2020, XRP prices have ranged from approximately $0.25 per token to a high of about $3.40.[25]

[24] Ash Bennington, "Crypto Assets Trade 24/7 – And that Changes More than Uptime," Coindesk.com, July 24, 2017, accessed September 28, 2021, https://www.coindesk.com/markets/2017/07/24/crypto-assets-trade-247-and-that-changes-more-than-uptime/ ("Let's start with one of the most obvious aspects of cryptocurrency: Markets trade 24 hours a day, seven days a week – and that feature, as I'll explain, changes a lot more than market uptime…For one, the 24-hour market structure requires investors to think about the daily price changes in their positions through a different conceptual lens than their stock portfolios. In the U.S., stocks listed on The New York Stock Exchange or the NASDAQ Stock Market trade, during regular market hours, between 9:30 a.m. and 4 p.m. EST.").

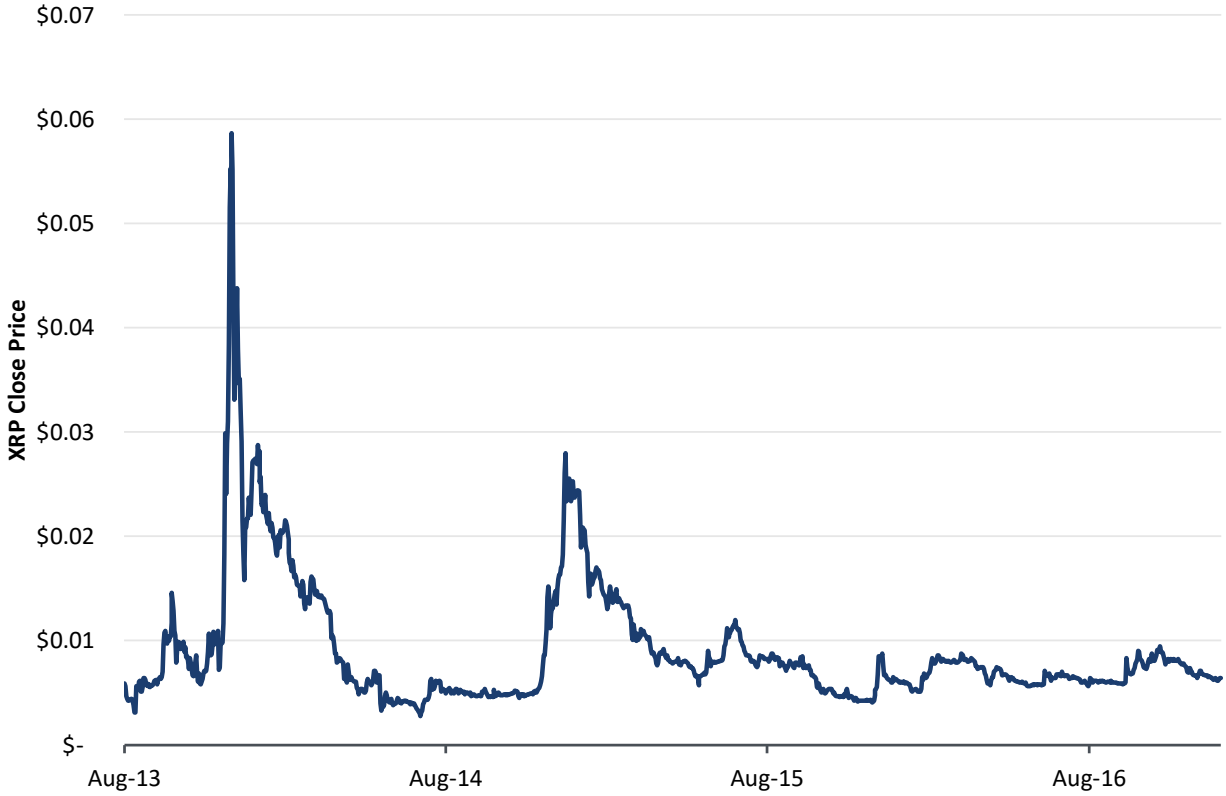
[25] The pricing data in Figure 3 is taken from CoinMarketCap.com, which provides a volume-weighted price across a number of digital asset trading platforms. The website hosts historical daily price data for XRP, including "open" and "close" prices based on the earliest and latest trade data in the UTC time zone, as well as a high price and a low price for the day.

FIGURE 3: XRP CLOSE PRICE, AUGUST 2013 – DECEMBER 22, 2020



Source: CoinMarketCap.

FIGURE 4: XRP CLOSE PRICE, AUGUST 2013 – DECEMBER 31, 2016



Source: CoinMarketCap.

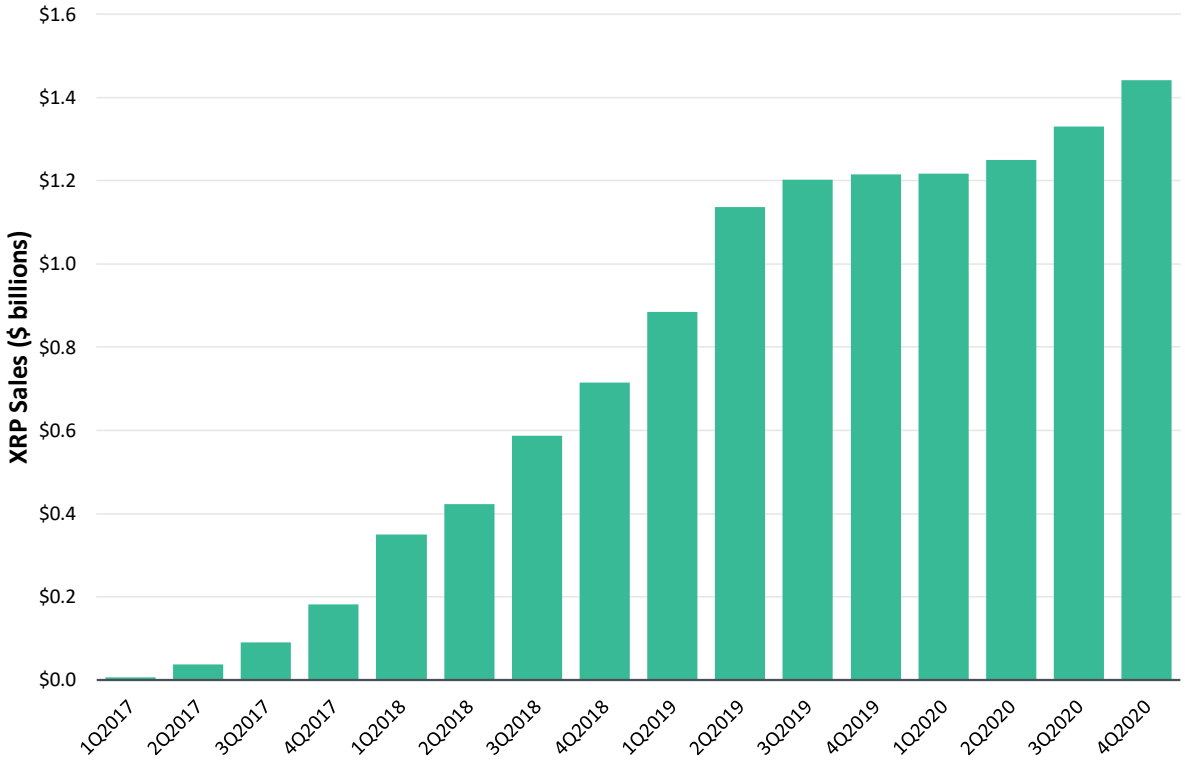
C. Ripple Sold XRP through Various Channels to Fund Operations

24. Ripple has sold more than $1.4 billion dollars worth of XRP tokens through various channels. As Mr. Garlinghouse explained in a February 2020 *Financial Times* article, Ripple was dependent on XRP sales for its operating cash needs, saying that "We would not be profitable or cash flow positive [without selling XRP], I think I've said that."[26]

[26] Izabella Kaminska and Cat Rutter-Pooley, "The art of redefining success, MoneyGram and Ripple edition," Financial Times, February 28, 2020. ("When pressed on Ripple's own profitability, Mr. Garlinghouse noted that Ripple, the company, was cash flow positive. How much of that cash flow was coming from service provision as opposed to sales of pre-existing XRP stock was less clear. Asked if XRP was keeping everything cash flow positive at Ripple Labs, Mr. Garlinghouse answered: 'Well XRP is one source. I don't know how to answer that because if you took away our software revenues, that would make us less profitable. If you took away all our XRP, that makes us less profitable. So I don't think about it as one thing.' He clarified later: 'We would not be profitable or cash flow positive [without selling XRP], I think I've said that. We have now.'").

25. As show in Figure 5, Ripple reported that it raised approximately $1.4 billion from sales of XRP through the fourth quarter of 2020.

FIGURE 5: CUMULATIVE QUARTERLY SALES OF XRP BY RIPPLE



Sources: Ripple sales from Quarterly XRP Markets Reports, 1Q2017 - 4Q2020.

26. Ripple classified its sales of XRP into two categories: programmatic sales and OTC sales.

    a. The programmatic sales were sales of XRP on digital asset trading platforms, managed by third-party market making firms, with two major ones being GSR and Cryptosystems.[27]

[27] Madigan Deposition, p. 51:4-23 ("Q.... When you arrived at Ripple, when you arrived at Ripple, to the extent you knew about programmatic sales, who was buying XRP from Ripple in programmatic sales? A. Sure. So the one point of clarification I wanted to make is that Ripple does not have a trading desk and so Ripple relies on third parties for its programmatic sales; namely, market makers. And, in particular, my recollection is that GSR and Cryptosystems were both managing those sales of XRP. Q. GSR and Cryptosystems were serving as intermediaries between Ripple and the market, is that correct? A. I think that's a fair term, although I don't know what -- yeah, what you'd call them, but they managed the sales of the XRP because Ripple couldn't sell directly.").

b. The OTC sales were negotiated block sales of XRP to large purchasers.[28] The OTC buyers included wealthy individuals, hedge funds, other investment firms, and financial institutions that had contracted with Ripple to transact in XRP using ODL.[29]

27. As show in Figure 6, Ripple reported $745 million of XRP sales in the form of programmatic sales on digital asset trading platforms followed and another $698 million in OTC sales from the first quarter of 2017 through the end of 2020.

[28] Griffin Deposition, pp. 149:6 – 150:18 ("Q. Mr. Griffin, in connection with your employment at Ripple, does the term "OTC sales" mean anything to you? A. Yes. Q. What does it mean? A. An OTC sale is over-the-counter sale. Q. Sale of what? A. XRP. Q. And why -- what's the reference to over the counter?... A. I think the -- the idea of an O – what we -- I would have thought about an OTC as a sale to a large purchaser of XRP. Q. And were you -- what was -- what, if any, was your involvement with OTC sales of XRP while you were employed at Ripple? A. I managed the team that was charged with that responsibility. … Q. And was one of their responsibilities to negotiate the potential purchases of XRP?... A. Yes.").

[29] Griffin Deposition, pp. 163:2 – 164:3. ("Q. …You know, what are the categories of persons that bought XRP from Ripple as OTC purchasers while you were at Ripple?... A. What -- there were individuals and investment firms. So, like, financial institutions. Brokers. I recall vaguely there was also mar -- possibly market makers. I can't remember exactly the composition of who was buying it, but that sounds -- sounds right. Q. To the extent there were individuals, were -- you know, were these wealthy individuals or sort of -- what -- can you give me a little more about the types of individuals?... A. For the most part, that sounds right, that they were wealthy individuals if they were individuals. Q. And does investment firms include, like, hedge funds and things of that nature? A. Right.").

FIGURE 6: RIPPLE QUARTERLY XRP SALES BY CHANNEL
($ MILLIONS)

	Programmatic Sales	OTC Sales	All Sales
	[1]	[2]	[3] = [1] + [2]
1Q2017	-	$6.70	$6.70
2Q2017	$10.30	$21.00	$31.30
3Q2017	$32.60	$19.60	$52.20
4Q2017	$71.50	$20.10	$91.60
1Q2018	$151.10	$16.60	$167.70
2Q2018	$56.66	$16.87	$73.53
3Q2018	$65.27	$98.06	$163.33
4Q2018	$88.88	$40.15	$129.03
1Q2019	$107.49	$61.93	$169.42
2Q2019	$144.64	$106.87	$251.51
3Q2019	$16.12	$50.12	$66.24
4Q2019	-	$13.08	$13.08
1Q2020	-	$1.75	$1.75
2Q2020	-	$32.55	$32.55
3Q2020	-	$81.39	$81.39
4Q2020	-	$111.12	$111.12
Total	**$744.56**	**$697.89**	**$1,442.45**

Sources: XRP Markets Reports, 1Q2017 - 4Q2020.

V. Analytical Methodology

28. In this section, I describe the methodology I use to test whether XRP returns are associated with news about Ripple. My analysis builds upon a well-accepted econometric framework referred to as an event study. An event study is commonly used to measure the impact of new public information on market

prices.[30] Event studies have been widely used in the academic literature for over 40 years,[31] and have also been commonly accepted in the context of securities financial litigation.[32]

29. Event studies on the price of a security generally proceed with the understanding that the price is expected to be affected by important, unanticipated news about the company. For example, if an event study shows that the stock price for Company X does not change following a particular earnings announcement from Company X, this would generally be taken as evidence that the earnings announcement was not "important" (or that it was not "news"). It is generally *not* taken as evidence that the stock price of Company X is independent of the earnings of Company X.

30. In the matter at hand, I understand that the XRP token is not a claim on the assets or earnings of Ripple Labs and that Ripple Labs maintains that market participants do not view Ripple Labs' efforts as relevant to the XRP market price. I have been asked by the SEC's litigation counsel to test whether news about Ripple Labs and its actions is associated with statistically significant XRP price changes. This association can be tested based on the idea of independence – that is, by evaluating the likelihood that news about Ripple Labs would occur at the same time as a significant XRP price change.[33]

31. Even if XRP prices are independent of Ripple Labs, there will likely be, by sheer coincidence, examples of "news" happening at the same time as "significant price changes." Similarly, even if Ripple Labs does affect XRP prices, there will likely be examples of "news" without "significant price changes," and vice versa. To analyze the independence between XRP prices and news about Ripple Labs, I therefore examine the question: Do the instances of "news" coincide with "significant price changes" more frequently than random chance could explain?

32. As a second analysis, I consider the news jointly and test whether, as a group, XRP price increases on news days are significantly large. This analysis, known as the generalized rank test, is also used in the

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[30] A. Craig MacKinlay, "Event Studies in Economics and Finance," *Journal of Economic Literature* Vol. 35, 1997, pp. 13-39 at p. 13.

[31] John J. Binder, "The Event Study Methodology Since 1969," *Review of Quantitative Finance and Accounting* Vol. 11, 1998, pp. 111-137 at p. 111.

[32] *See*, Frank Torchio, "Proper Event Study Analysis in Securities Litigation," *The Journal of Corporation Law,* Vol. 35, 2009, pp. 159-168, at p. 159 ("For over two decades, event studies have been prominently used as a valuation technique in various litigation matters including securities litigation.").

[33] Two events are independent if the occurrence of one event does not affect the occurrence of the other. *See*, e.g., Morris H. DeGroot and Mark J. Schervish, "Probability and Statistics", 4th Edition, p. 66 ("The conditional probability of the event A given that the event B has occurred is the revised probability of A after we learn that B has occurred. It might be the case, however, that no revision is necessary to the probability of A even after we learn that B occurs. … In this case, we say that A and B are independent events.").

academic literature on how digital token prices (including XRP) respond to news events.[34] It tests whether the price returns associated with a collection of events is statistically significant.[35]

33. In this section, I describe my methodology for testing the above question. I begin with a brief primer on event studies in the context of digital tokens, describe the regression models I consider, describe my approach to assembling news, and then explain how I use these elements to statistically evaluate the relationship between Ripple Labs and XRP prices.

A. Event Studies in the Context of Digital Tokens

34. Event studies have been used for decades in academic research to examine market price reactions to the publication of new information.[36] An event study is conducted by first specifying a model of *expected* price movements and then testing the extent to which *actual* price movements differ from those expectations. The econometric question an event study answers is whether the differences between actual and expected price movements are sufficiently large that, from a statistical standpoint, such differences are unlikely to be explained by random chance. "Sufficiently large" differences between the actual price movement and the expected price movement are those which are "statistically significant." I provide a detailed discussion of the event study methodology in Appendix D.

35. Securities markets in which prices adjust to new information "quickly" are called informationally efficient.[37] Academic researchers have found that the digital token markets, including the XRP market, are generally less informationally efficient than the stock market, though there is evidence that efficiency is increasing over time.[38] My own analysis—discussed in detail in Appendix F—is consistent

[34] Mohammad Hashemi Joo, Yuka Nishikawa, and Krishnan Dandapani, "Announcement effects in the cryptocurrency market," *Applied Economics* Vol. 52, No. 44, 2020, pp. 4794-4808 at p. 4800.

[35] This generalized rank testing procedure is developed by James W. Kolari and Seppo Pynnonen. *See*, James W. Kolari and Seppo Pynnonen, "Nonparametric Rank Tests for Event Studies," *Journal of Empirical Finance* Vol. 18, 2011, pp. 953-971.

[36] A. Craig MacKinlay, "Event Studies in Economics and Finance," *Journal of Economic Literature,* Vol. 35, 1997, pp. 13–39. *See also*, Abigail McWilliams and Donald Siegel, "Event studies in management research: Theoretical and empirical issues," *Academy of Management Journal*, Vol. 40, No. 3, 1997, pp. 626-657.

[37] Eugene F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," *The Journal of Finance* Vol. 25 (2), 1970, pp. 383-417.

[38] *See*, e.g, Andrew Urquhart, "The Inefficiency of Bitcoin," *Economics Letters* Vol. 148, 2016, p. 5 ("…we do show that Bitcoin may becoming more efficient with some of the tests for market efficiency suggesting that Bitcoin returns are random in the second subsample. … Since it is a relatively new investment asset and still in its infancy, it is similar to an emerging market and therefore the inefficiency finding is not surprising. Consistent with this argument is that Bitcoin will become more efficient over time as more investors analyse and trade Bitcoin."); Aurelio F. Bariviera, "The Inefficiency of Bitcoin Revisited: A Dynamic Approach," *Economics Letters* Vol. 161, 2017, Abstract ("…daily returns exhibit persistent behavior in the first half of the period under study, whereas its behavior is more informational efficient since 2014."); Aviral Kumar Tiwari, R.K. Jana, Debojyoti Das, and David Roubaud, "Informational Efficiency of Bitcoin—An Extension," *Economics Letters* Vol. 163,

with the academic literature in that, by one common measure of efficiency (serial correlation), the XRP market is not fully efficient during the period of interest.[39]

36. Academic researchers have applied the event study methodology to digital token markets.[40] For example, Joo, Nishikawa, and Dandapani (2020) used an event study to evaluate the price reaction of BTC, ETH, and XRP to major news events and found all three digital tokens have statistically significant abnormal returns in connection with the identified news events.[41]

37. When conducting event studies on digital token prices, academic researchers typically investigate price reactions over multi-day windows.[42] This accounts for the possibility that digital token prices may not react to relevant information as "quickly" as would be observed in some other markets.

38. In my analysis below, I adapt several aspects of the Joo, Nishikawa, and Dandapani (2020) and Gerritsen, Lugtigheid, and Walther (2021) methodologies to the matter at hand. Where they allow up to seven days for prices to react to news, I conservatively limit my analysis to a three day window – meaning, I associate price reactions to a news event on date *t* only if I find evidence of statistically significant price

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2018, Abstract ("We report that the market is informational efficient as consistent to recent findings of Urquhart (2016), Nadarajah and Chu (2017) and Bariviera (2017)."); and pp. 6-7 ("We observe that the market is largely efficient with some exception to the period of April-August, 2013 and August-November, 2016."); and Ahmet Sensoy, "The Inefficiency of Bitcoin Revisited: A High-Frequency Analysis with Alternative Currencies," *Finance Research Letters* Vol. 28, 2019, Abstract ("We find that BTCUSD and BTCEUR markets have become more informationally efficient at the intraday level since the beginning of 2016, and BTCUSD market is slightly more efficient than BTCEUR market in the sample period.").

39 "Serial correlation" refers to the correlation of a data series with its own history, meaning that the data at time *t* is correlated with the data at time $t - s$ for some lag *s*. Because it is the correlation of a data series with its own history, "serial correlation" is also referred to as "autocorrelation."

40 As an early example, see Wenjun Feng, Yiming Wang, and Zhengjun Zhang, "Informed Trading in the Bitcoin Market," *Finance Research Letters* Vol. 26, 2018, pp. 63-70, which finds evidence of informed trading in the Bitcoin market. *See also,* Dirk F. Gerritsen, Rick A.C. Lugtigheid, and Thomas Walther, "Can Bitcoin Investors Profit from Predictions by Crypto Experts?" *Finance Research Letters,* 2021 which analyzes how Bitcoin prices react to analyst commentary.

41 Mohammad Hashemi Joo, Yuka Nishikawa, and Krishnan Dandapani, "Announcement effects in the cryptocurrency market," *Applied Economics* Vol. 52, No. 44, 2020, Abstract ("Abnormal returns as well as cumulative abnormal returns (CARs) around major news announcements, both positive and negative, are investigated for three primary cryptocurrencies: Bitcoin, Ethereum, and Ripple. High abnormal returns are observed on the event day (Day 0), and CARs typically diverge during event windows of (−3, 6) and (0, 6), indicating that the information is not fully reflected in prices immediately after the news events. The CARs that linger for six days after an event suggest that the information flow in the cryptocurrency market is visibly slow. The magnitudes of CARs are larger for negative events than for positive events, implying that the market reaction to negative events is stronger than to positive announcements. The findings of this study may have crucial implications for investors, arbitragers and practitioners as we document evidence of potential trading opportunities for investors who initiate a trading position even after announcements.").

42 For example, the Joo, Nishikawa, and Dandapan (2020) paper investigates price reactions from 3 days before to 6 days after an event. The Gerritsen, Lugtigheid, and Walther (2021) paper investigates price reactions from 4 days before to 4 days after an event. *See also*, Mark Schaub, "On the OCC Announcement Allowing US Banks to Use Stablecoins and the Immediate Impact on Cryptocurrency Valuations," *The Economics and Finance Letters* Vol. 8, 2021, Abstract ("… Bitcoin and Etherium increased over 20% in value within 5 days of the announcement…") and p. 156 ("Returns are reported beginning 10 days before the OCC announcement until 10 days after for a window of (-10, +10).").

movements in the first three days.[43] Also, I limit my analysis to price reactions beginning on the day of the announcement and do not consider that prices may have begun reacting (perhaps based on leaks or rumors) in the days preceding the announcement. To the extent there was any leak of information, my approach is conservative.

B. Modeling XRP Returns

39. In my event study analysis, I consider several regression models of XRP price movements. The first model I consider has no control variables and is known as the Constant Mean Return Model.[44] This model has been used in other digital token event studies.[45] I then add in sequence the returns of Bitcoin (BTC), Ether (ETH), and Lumens (XLM).[46] Finally, I replace the individual return series with an equal-weighted index of these three returns as well as the returns on Binance Coin (BNB) and Ada (ADA).[47]

[43] By adopting this standard, I am not taking the position that price reactions in the XRP token market are necessarily complete in three days. To the extent that prices continue to react for several days after a news event, my approach is conservative in that I will not include such reactions when determining the significance of an event. My results are robust to considering shorter and longer event windows. *See* Appendix E for results over a one day event window and a seven day event windows.

[44] *See*, e.g., Stephen J. Brown and Jerold B. Warner, "Using Daily Stock Returns: The Case of Event Studies," *Journal of Financial Economics* Vol. 14, 1985, pp. 3-31 (discussing estimating excess returns by subtracting mean return from actual returns at pp. 6-7).

[45] *See*, e.g., Mohammad Hashemi Joo, Yuka Nishikawa and Krishnan Dandapani, "Announcement Effects in the Cryptocurrency Market," *Applied Economics* Vol. 52, No. 44, 2020, pp. 4794-4808, at p. 4795 ("…we apply the mean-adjusted returns model. In this model, the mean return of the previous trading days is employed as the baseline-expected return, and abnormal returns are calculated as the difference between the actual daily return and the expected return."). *See also*, Dirk F. Gerritsen, Rick A.C. Lugtigheid, and Thomas Walther, "Can Bitcoin Investors Profit from Predictions by Crypto Experts?" *Finance Research Letters,* 2021.

[46] Stellar, founded in 2014 by Jed McCaleb, one of the co-founders of Ripple, shares similarities with Ripple in their blockchain technologies. The native token of the Stellar blockchain is called Lumens (XLM). *See*, e.g., Mary Ann Callahan, "Ripple vs. Stellar: Will There Be Only One Winner?" FX Empire, Yahoo News, August 29, 2018, accessed September 29, 2021, https://www.yahoo.com/news/ripple-vs-stellar-only-one-083151892.html ("Cryptocurrency enthusiasts frequently compare Stellar and Ripple due to the similarities in their blockchains. … One of the co-founders of Ripple, Jed McCaleb, created Stellar in 2014. As with Ripple and XRP, Stellar refers to the technology, while XLM or Lumens refers to the cryptocurrency. Stellar is like Ripple in that it also allows for quick and affordable sending and receiving of funds. It also has similar coding to Ripple, which should be unsurprising considering their shared founder."). My pricing data for Bitcoin begins on April 28, 2013, for Lumens on August 5, 2014, and for Ether on August 7, 2015. As a result, the models which control for these tokens explicitly are not available in the very early periods of news.

[47] I construct the "equal-weighted index" using data as they become available. In the very early period, the index only comprises Bitcoin for example. My pricing data for Binance Coin and Ada begin relatively late, on July 25, 2017 and October 1, 2017, respectively, hence I do not consider models which explicitly control for those tokens.

40. For each of the five regression models above, I further control for the growth in XRP accounts.[48] This factor has been suggested in recent academic literature to be related to prices of digital tokens.[49] This gives me a total of ten sets of control variables.

41. As I discuss in more detail in Appendix F, over much of the time period in question, the XRP return on date t is correlated with the return on date $t-1$, sometimes positively, sometimes negatively. This is known as "first order autocorrelation." For each of the ten specifications, I therefore also estimate models that control for first order autocorrelation in XRP's residual returns.[50]

42. My analysis thus consists of 20 different models for XRP returns, which I summarize in Figure 7. I estimate all models using data from the prior 180 trading days (roughly six months) up to four days prior to the date of interest.[51, 52]

43. The Constant Mean Return Model evaluates the XRP return in the context of its own recent history; essentially, the model flags a return as "significant" because it is significantly different from the returns of the previous 180 days.[53] By controlling for the returns of other digital tokens, as many of the other

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[48] XRP Scan reports counts of unique account addresses on the XRP Ledger created each day. These addresses are base58-formatted identifiers derived from the associated public key. My data on account creation begins on January 2, 2013 when 3 new accounts are reported. I do not have data on the number of accounts that may have existed before that day and assume it was 0. *See* "Integration Guide: Account," XRPScan, accessed October 2, 2021, https://docs.xrpscan.com/integration-guide.html.

[49] Yukun Liu and Aleh Tsyvinski, "Risks and Returns of Cryptocurrency," *The Review of Financial Studies* Vol. 34, 2021, pp. 2699-2700 ("We use four measures to proxy for the network effect: the number of wallet users, the number of active addresses, the number of transaction count, and the number of payment count. … these results suggest that the network factors that measure the network effect of user adoptions are important drivers of cryptocurrency prices.").

[50] To correct for this autocorrelation, I follow standard practice and regress XRP returns on date t on the control variables measured at t and one lag of XRP returns and the control variables. Gerritsen, Lugtigheid, and Walther (2021) also consider a correction for first order autocorrelation to the Constant Mean Return Model.

[51] A well-accepted method for performing the event study is to estimate a regression model over some period of time (an "estimation window") to quantify the typical relationship between the price movements of the relevant instrument and explanatory factors (often market-wide movements). *See*, for example, A. Craig MacKinlay, "Event Studies in Economics and Finance," *Journal of Economic Literature* Vol. 35, 1997, pp. 13-39 at p. 15 ("For example, in an event study using daily data and the market model, the market model parameters could be estimated over the 120 days prior to the event."). A 120 business day window corresponds to roughly six months of calendar time, or 180 days.

[52] In my analysis, the estimation window (i.e., the 180-day window used to estimate the regression) will change with different dates of interest. This is typically referred to as a "rolling estimation window" (since the estimation window is "rolled forward" for each subsequent date of interest). By using a rolling estimation window, I allow for the relationship between the XRP prices and the explanatory factors, as well as the volatility of the random factor, ε_t, to change over time. Use of a rolling model to account for changing volatility and evolving relationships among factors is often applied and is accepted in peer-reviewed literature. *See* Phillip A. Braun, Daniel B. Nelson, & Alain M. Sunier, "Good News, Bad News, Volatility, and Betas," *The Journal of Finance* Vol. 50 (5), 1995, pp. 1575-1603 at pp. 1575, 1597. Rolling estimation windows have been applied in the context of digital token event studies as well. *See* for example, Joo, Nishikawa, and Dandapani (2020) which uses a 365 day window. Gerritsen, Lugtigheid, and Walther (2021) uses a 49 day window.

[53] Consider the following hypothetical. Suppose that on some date t, it is announced that XRP has been listed on a new trading platform and XRP prices fall 5%. The Constant Mean Return Model will evaluate a return of -5% against the returns

models used in this analysis do, I consider the excess return of XRP prices beyond what can be explained by factors impacting the digital token market more broadly.[54, 55]

FIGURE 7: MODEL SPECIFICATIONS

Model Number	Constant	Independent Variables					Lagged XRP	Lagged Independent Variables
		Account Growth	BTC	ETH	XLM	E-Index		
1	✓							
2	✓	✓						
3	✓		✓					
4	✓	✓	✓					
5	✓		✓	✓				
6	✓	✓	✓	✓				
7	✓		✓	✓	✓			
8	✓	✓	✓	✓	✓			
9	✓					✓		
10	✓	✓				✓		
11	✓						✓	
12	✓	✓					✓	✓
13	✓		✓				✓	✓
14	✓	✓	✓				✓	✓
15	✓		✓	✓			✓	✓
16	✓	✓	✓	✓			✓	✓
17	✓		✓	✓	✓		✓	✓
18	✓	✓	✓	✓	✓		✓	✓
19	✓					✓	✓	✓
20	✓	✓				✓	✓	✓

NOTES:

Check mark indicates the variable is included in the model. E-Index refers to an equal-weighted index across the returns of ADA, BNB, BTC, ETH, and XLM subject to data availability.

of the previous 180 days. Suppose it finds such a return to be "statistically significantly negative." Evaluating the news of the platform listing using this model, I would conclude that there was a significantly negative return at the same time.

54 Now suppose that on that same day it was announced that there had been a major hack to another trading platform, and this news adversely impacted digital tokens more broadly. Suppose BTC and ETH, in particular, drop 10% on date *t*. In a regression model which controls for those returns, the fact that XRP drops only 5% might indicate that its abnormal return – the difference between its actual and expected return – is actually significantly *positive*: its price dropped 5%, but it would be expected (say) to drop 10%, hence its abnormal return was actually +5%. Now evaluating the news of the platform listing using this other model, I would conclude that there was a significantly positive return at the same time.

55 Ignoring stable coins, Bitcoin, Ether, Binance Coin, and Ada are currently the four largest digital tokens by market capitalization. For example, see "Today's Cryptocurrency Prices by Market Cap," CoinMarketCap, accessed October 4, 2021, https://coinmarketcap.com. Lumens is described as having a similar use case as XRP.

C. Identifying Pertinent News to Test

44. While there is generally a presumption that stock prices respond to new and relevant news about the company, one would not expect to see significant price changes accompanying every company announcement. For example, earnings announcements that are in line with investor expectations would not be expected to result in a significant price reaction.[56] An event study analysis can be used in these cases to determine if an earnings announcement (or other strategic announcements by a company about products or clients) was important news by investigating whether or not it is associated with a statistically significant price reaction.

45. A company can also disclose news other than earnings announcements. For example, many companies announce executive staff appointments, such as the appointment of a new CEO. Many companies engage in charitable activities, which they announce. In these cases, the price reaction following the event can be examined to determine if the announcement was "important." If there is a statistically significant price reaction, and if certain conditions can be established,[57] then one might conclude that the market reacted significantly to the announcement. In these cases, it is often not necessary to determine *a priori* if the stock price is expected to react to the news. There is a general presumption that it would if the news were relevant and important. Significant price reactions may be taken as evidence that the news in question was important. However, a lack of significant price reaction to a specific news event is typically not generalized as evidence that the stock price does not react to all other news of the same general type or of news about the efforts, announcements, successes, or failures of the issuer of the stock.

46. In this case, the question of whether XRP prices respond to news about Ripple Labs and its business activities needs to be examined. The question therefore is not whether a particular Ripple action or event is associated with a particular XRP price response (as is the case in many event study disputes), but instead, whether Ripple actions or events are collectively associated with significant XRP price reactions. In other words, I do not presume that XRP prices might react to anything Ripple does; instead, I am investigating whether such a relationship exists.

[56] In line with this, the earnings announcement literature has studied the impact of forecast error on stock prices. Forecast error is typically measured based on the difference between actual earnings and expected earnings. See, e.g., Bradford Cornell and Wayne R. Landsman, "Security Price Response to Quarterly Earnings Announcements and Analysts' Forecast Revisions," *The Accounting Review* Vol. 64 (4), 1989, pp. 680-692, at p. 681 ("The purpose of this paper is to investigate the extent to which revisions of more distant earnings forecasts, as well as the current forecast error, affect stock prices.") and p. 687 ("the forecast error … is given by $(EPS_{it} - E(EPS_{it}|\theta_0))/P_{it}$, where EPS_{it} is the realized quarterly earnings per share, $E(EPS_{it}|\theta_0)$ is the mean pre-announcement IBES consensus forecast of EPS_{it}, …").

[57] Such conditions may include: (i) if there is no other confounding news that day which might explain such movement, (ii) if there is no evidence that the announcement had been leaked or anticipated by the market, and (iii) if there is a plausible explanation as to why the market might react to this announcement.

47. My statistical analysis begins with the hypothesis that there is no link – that the XRP market is independent of news about Ripple Labs.[58] I will then investigate the extent to which the available data are consistent with that hypothesis, or if the hypothesis of independence should be rejected.

48. I first identify the types of news that are relevant for the purpose of testing this relationship. I summarize the news identification process below:

    a. I start with the news which Ripple Labs has identified to be important by virtue of (i) having issued a press release about the event, or (ii) having written about it on its Insights/News page, or (iii) having linked to a third-party news outlet in its curated Newsroom page. By limiting myself to this set of news, I am not taking the position that other events are necessarily "unimportant." I simply assume that based on its understanding of its business and industry, Ripple had some basis to highlight certain events and not others.

    b. I then classify these news announcements into the following categories:

        - **Acquisition & Investment**: announcement of an acquisition or investment made by Ripple Labs, including through its development arm Xpring
        - **Case Study**: discussion of a customer experience or use case of XRP or other Ripple Labs products
        - **Charity**: announcement of a charitable endeavor or donation by Ripple
        - **Corporate Activity & Announcement**: miscellaneous corporate announcement or activity not related to Ripple's products or new customers
        - **Customer & Product:** announcement related to new customer relationship (e.g., financial institutions or money centers often described as "partnering" with Ripple Labs) or products, including enhancements to the XRP ledger protocol
        - **Litigation:** news of litigation or regulatory enforcement involving Ripple Labs
        - **Market Commentary & Company Overview:** general commentary of the digital token market or Ripple Labs
        - **Markets Report:** a quarterly markets report published by Ripple
        - **Milestone:** key event in the history of Ripple Labs not related to products or customers

[58] Throughout this report, the phrase "XRP market" should be understood to mean specifically XRP *prices*, as distinct from other market considerations such as volume or liquidity.

- **Miscellaneous:** other announcement not otherwise categorized
- **Other Initiative:** initiative not primarily described as being related to the commercialization or promotion of Ripple's products or technology in the XRP ecosystem; includes cases of Ripple Labs joining existing interest groups
- **Office and Staff Announcement:** announcement of executive staff changes or the opening of a new office
- **Ripple Commercialization Initiative:** initiative launched by Ripple Labs primarily described as being related to the commercialization or promotion of Ripple's products or technology in the XRP ecosystem
- **Trading Platform:** announcement that XRP is available for trading on a new digital asset trading platform

I acknowledge that such categorizations rely on judgment. However, I show in VI.F.3that my results are robust to alternative categorization choices.

c. Finally, I identify any announcements within a category that should be excluded from the analysis. There are two reasons to exclude an announcement. First, the announcement may substantially repeat a previous announcement; I term such announcements "stale." Second, the nature of the announcement may not have a particular directional implication for XRP prices, even assuming the hypothesis of independence is false. I describe such announcements as "direction uncertain."

I acknowledge again that these considerations require judgment. I show in Appendix E that my results are robust to these exclusions.

49. My initial set of sources consists of 72 Press Releases, 298 Insight Articles, and 323 Newsroom Articles for a total of 693 sources published prior to December 22, 2020.[59] I exclude ten of these sources from my analysis: eight are excluded because the articles are no longer available, one is excluded because it is not available in English, and one is excluded because I could not determine its exact publication date (a review of its content indicates that it would not prove relevant anyway). These exclusions are listed in Figure 8.[60] My final set of sources thus consists of 683 documents which I group into 514 events.[61] These are listed in Appendix C.

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[59] On December 22, 2020 the SEC announced its action against Ripple Labs, which may have had direct effects on XRP prices, over and above any effect it may have on those tokens through an effect on Ripple. I therefore limit my analysis to events reported before December 22, 2020.

[60] In a handful of additional cases the link from the Ripple Newsroom no longer works, however an internet search revealed articles of the same title from the same source. I have included those in my analysis.

[61] Some events are covered by multiple documents, hence there are fewer events than documents.

FIGURE 8: ARTICLES CLASSIFIED AS NOT AVAILABLE

Date	Headline	Source	Reason for Exclusion
8/23/2020	Ripple, A Blockchain-Powered Cross-Border Payments, Addresses an Increasing Need for Immigrant Remittances in the Japanese Market	Ripple Newsroom	Document not in English
n.a.	Ripple and XRP Are More Stable Than You Think	Ripple Newsroom	Document Unavailable
10/14/2016	Bloomberg Markets: Next President Must Have Fintech Plan	Ripple Newsroom	Document Unavailable
6/23/2016	Bloomberg Advantage: Larsen on the Internet of Value	Ripple Newsroom	Document Unavailable
4/28/2015	Building the Value Web with Open Standards	Ripple Newsroom	Document Unavailable
n.a.	Top Five Trends for Payments in 2015	Ripple Newsroom	Document Unavailable
n.a.	Why Do Banks Prefer Ripple Over Bitcoin?	Ripple Newsroom	Document Unavailable
n.a.	Cross-Border Payments Due For Disruption	Ripple Newsroom	Date Indeterminable**
n.a.	Bitcoin Makes Gains With Merchants	Ripple Newsroom	Document Unavailable
9/27/2018	Ripple for Good Supports Education and Financial Inclusion with $100 Million Commitment	Ripple Insights	Document Unavailable

Notes:

** This article is available as part of a report dated spring 2015. I am not able to determine an exact publishing date, so I exclude the article from my analysis, despite its still being available.

50. Below I test the correlation between XRP returns and news announcements in those categories related more directly to XRP, such as Customer & Product. If the null hypothesis of independence is false, then I should find a statistically significant correlation; if it is true, then I should not. For certain other categories, such as general market commentary (often written by third parties and which does not break new information), it seems self-evident that there should be no meaningful connection with the XRP market in any case, hence testing such categories is not informative.

51. It is important to consider the qualitative direction of the news I am evaluating. As a self-selected (by Ripple) set of news, it is strongly biased in favor of "good" news or at worst "neutral" news. Ripple may announce when customers are added to its network, but it may choose not to announce if a customer leaves its network. If the XRP market reacts to this "good" news, then it presumably means that XRP prices increase, they do not decrease. I will thus be testing whether "good news" is correlated with significant *positive* XRP returns, not negative returns.[62]

[62] There is always the subtle possibility that news which appears superficially "good" is nevertheless disappointing to the market. If a company announces an increase in earnings of $0.02 per share when the market had expected $0.05, it is possible that such an announcement might lead to a decrease in the stock price. Likewise, it might be that when Ripple announces a partnership with 7 banks, the market had expected 20. My analysis conservatively assumes that what is superficially "good news" should be met with positive XRP returns. I do not consider a negative return (even if it is significant) to be evidence in support of the proposition that the XRP market reacts to Ripple. I will test for correlation with negative returns as a robustness check.

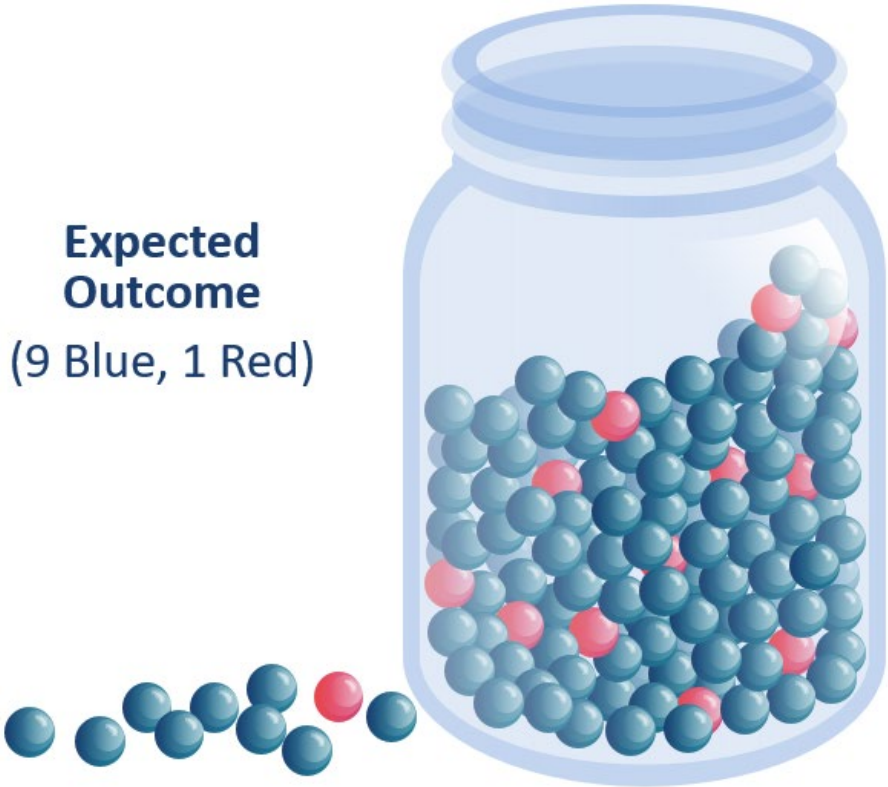
D. Testing for XRP Price Reactions to Ripple News

52. As I explained above, my analysis examines whether instances of Ripple news coincide with significant XRP price changes more frequently than random chance could explain. Consider the following "jar of marbles" example as an illustration of the framework for my statistical analysis:

    a. Imagine a jar with one thousand marbles. Nine hundred are blue, and they are mixed with one hundred red marbles. From this jar of marbles, if one were to draw a marble at random, the likelihood of drawing a red marble is 10% since 10% of all the marbles are red.

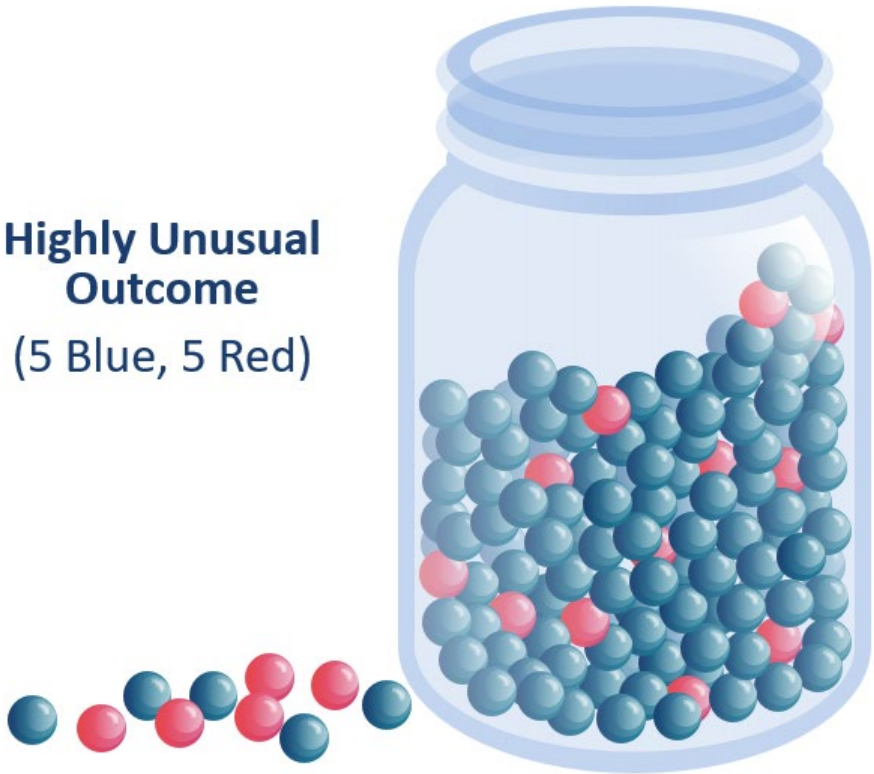
    b. Now imagine 10 marbles are drawn *at random*. Since 10% of all the marbles are red, we would expect to find 1 red marble in this group of 10 (as 10% of 10), as shown in Figure 9. However, as with most experiments that involve randomness, it is possible that we may have two or three. We could likely find no red marbles. It's even theoretically possible to draw 10 red marbles, though that is less likely than winning the lottery.

FIGURE 9: IN A RANDOM DRAW OF 10 MARBLES, ONE IS EXPECTED TO BE RED



c. The likelihood of all outcomes, from having 0 red marbles to having 10, is well understood by statisticians, if the draws are *random*.[63] Across the range of possible outcomes, some are more likely than others. For example, suppose we find 5 of the 10 marbles are red, not 1 as expected, as shown in Figure 10. While having 5 instead of 1 may not seem like a significant outcome, in fact it is. The probability of drawing 5 or more red marbles at random is about 0.15%. That is less likely than two people sharing the same birthday. Against the common academic standard of 5% significance, we would say that this outcome is statistical evidence that the draws were not, in fact, random.

FIGURE 10: DRAWING 5 RED MARBLES IS STATISTICALLY SIGNIFICANT EVIDENCE THAT THE DRAW WAS NOT RANDOM



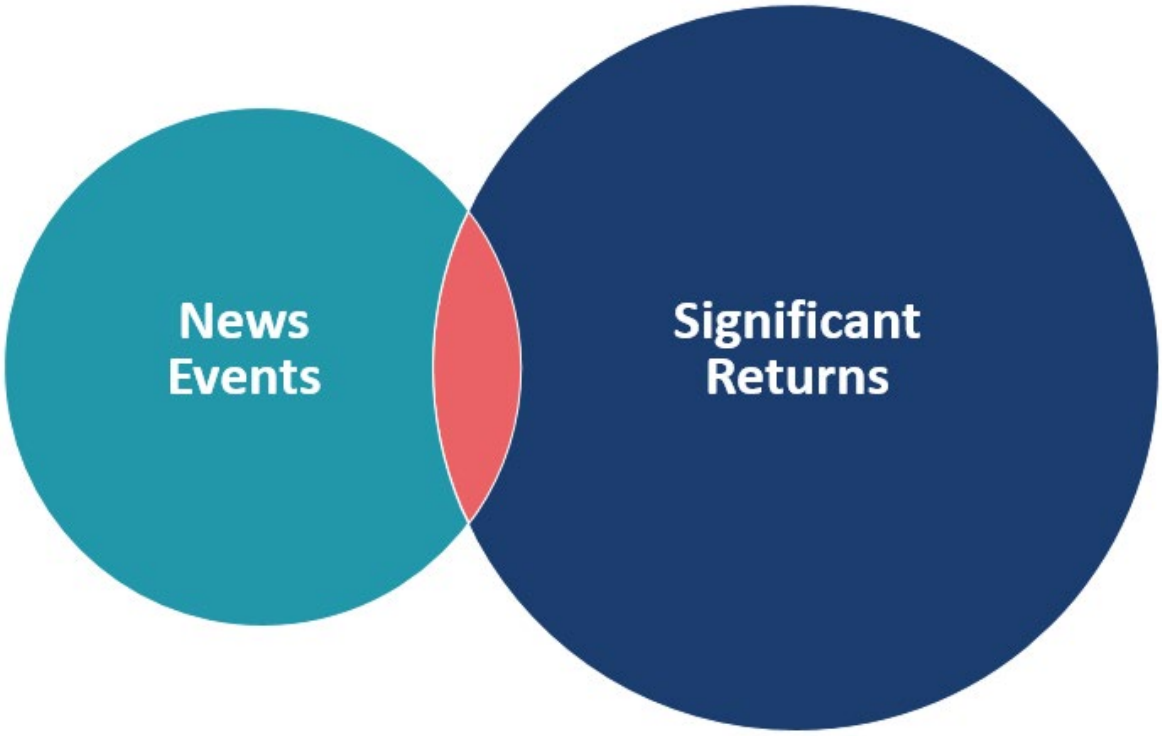
53. In the matter at hand, we do not have marbles which might be red, we have days which might have a significant (positive) XRP return. And rather than draw those days at random, I draw them based on whether there is Ripple Labs news as identified from my news identification process discussed above.

[63] Without replacement, each draw of marbles from the jar changes, however slightly, the probability that the next draw will be red. This complexity separates the binomial distribution (which assumes draws with replacement) from the hypergeometric distribution (which assumes draws without replacement).

54. Between May 5, 2014 (the first instance of news in my set) and December 20, 2020 (the last instance of news in my set before the SEC announced its action against Ripple Labs) there are 2,422 trading days (for illustrative purposes, imagine it is an even 2,500 days). For each of those days, I estimate the regression models that I described above based on the previous 180 trading days.[64] Each model generates an estimated abnormal return on each day, and a measure of the statistical likelihood of that abnormal return. I thus obtain from each model a set of days which have statistically significant positive XRP returns. We can think of this as the "set of red marbles" created by each model.

55. Suppose that a given model classifies 225, or 9%, of those 2,500 returns as significantly positive. Suppose that during the same period, 100 days have pertinent Ripple Labs news. If XRP returns are independent of Ripple Labs news, then we would expect 9 of those 100 "news days" to also have "significant returns" since 9% of all days have significant returns. In other words, if there is no relationship between "news" and "returns," random chance still suggests that there will be some small overlap between those sets, and statistics tells us what that overlap should be. This random overlap is shown in Figure 11.

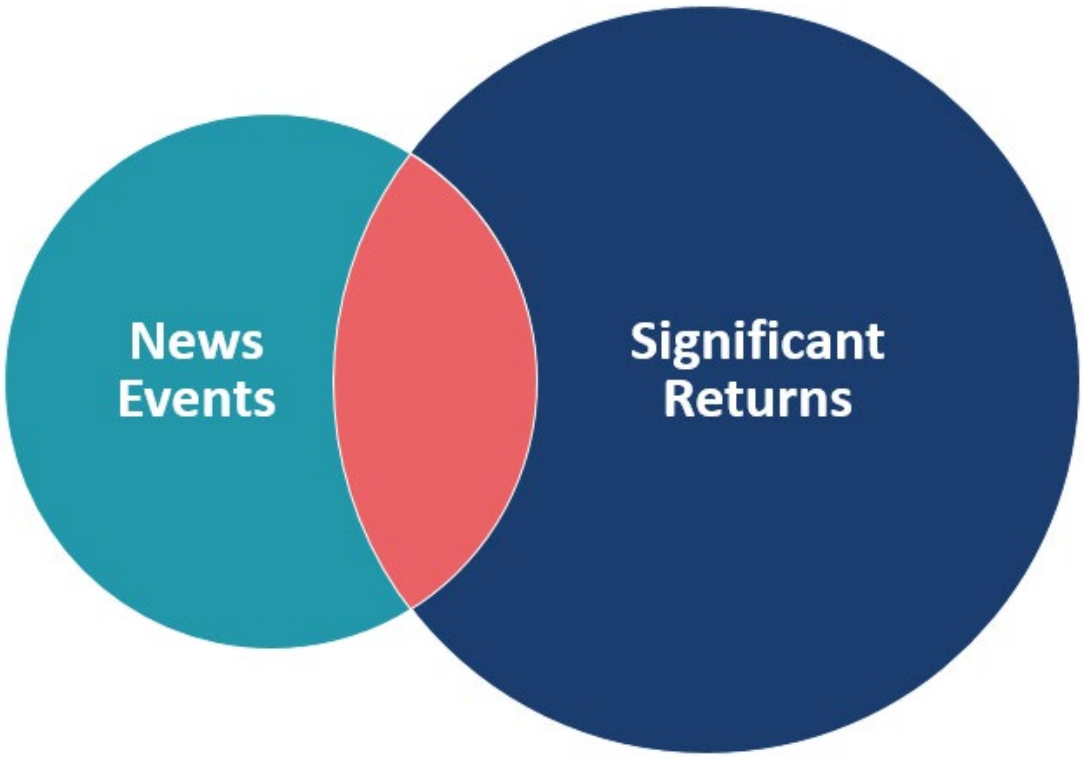
FIGURE 11: THE DEGREE OF OVERLAP IS SMALL IF NEWS EVENTS AND MARKET RETURNS ARE UNRELATED



[64] Note that not every statistical model I consider can be estimated over this entire period. Models which use the returns on certain other digital tokens as controls, for example, cannot be estimate before price data for those tokens become available.

56. But suppose that rather than 9, I find 25 significant returns among the 100 news days. How likely is such an outcome if the XRP market is independent of Ripple Labs? This is exactly analogous to the jar of marbles example: from a jar with 2,500 marbles, with just 225 of them being red, if 100 marbles are drawn at random, how likely is it that 25 or more would be red? If it is unlikely – if, say, the probability of that outcome is less than 5% - then this would be evidence that the draw was *not* random. In the case of XRP returns and Ripple Labs news, this would be evidence that there is a statistically significant relationship or correlation between Ripple Labs news and XRP returns. Figure 12 illustrates such a statistically significant overlap.

FIGURE 12: A LARGE OVERLAP IS STATISTICALLY SIGNIFICANT EVIDENCE THAT NEWS AND RETURNS ARE RELATED



57. To have 25 or more red marbles *from a random draw* is highly unlikely: the probability is just 0.0001%, or about one in 1,000,000, far beyond the common academic standard of 5% significance. To put that in perspective, the probability that two people selected at random share the same birthday is about 2,500 times greater. Such a result is statistical evidence that the draw was not random and is evidence of a statistically significant correlation between Ripple news and XRP returns. This result is effectively what I find below.

58. In summary, my analysis first selects different categories of news event, determines how many of those correspond to significantly positive XRP returns according to different regression models I consider, and then calculates how likely that outcome is. If the likelihood is less than 5%, I will conclude that there is a statistically significant (positive) correlation between the news events in question and XRP returns.

E. Summary of the Empirical Methodology

59. I implement the statistical framework described above with the following steps.

60. First, I specify the regression model of XRP returns. As explained in Section V.B above, I consider 20 different models estimated using 180 day "estimation windows." As shown in Appendix E, my conclusions are robust to longer and shorter estimation windows.

61. Second, I specify the "event window," i.e., the window over which to measure the changes in XRP prices following a news event. As discussed above, I consider event windows over multiple days: date *t* (i.e., a one-day event window coinciding with the day of the news event), dates *t* and *t* + 1 (i.e., a two-day event window), and dates *t*, *t* + 1, and *t* + 2 (i.e., a three-day event window). As shown in Appendix E, my conclusions are robust to longer and shorter event windows.

62. Third, I estimate the (cumulative) abnormal returns for each trading day over the corresponding event window and determine which are significant. I determine the significance of abnormal returns using two approaches:

    a. **Parametric Approach:** assesses the abnormal return against the significant thresholds from the t-distribution (approximately 1.64 for a one-sided test and 1.96 for a two-sided test).[65] This approach is common practice in academic studies.[66]

    b. **Nonparametric Approach:** assesses the abnormal return against the distribution of standardized abnormal returns observed over the 180 days used to estimate the regression model.

63. For both the parametric and nonparametric approaches, I evaluate abnormal returns at the 5%, significance level. For a given significance level, I classify date *t* as "significantly positive" if any of its

[65] The "one-sided" test classifies a return as significant if there is only a 5% probability of drawing a greater (more positive) return. The "two-sided" test classifies a return as significant if there is only a 5% probability of drawing a more extreme (whether positive or negative) return. When using the "two-sided" standard, I continue to restrict myself only to positive returns, unless otherwise noted.

[66] Under general conditions this approach is appropriate. However, those general conditions may not apply in this case. In particular, XRP returns may not be normally distributed. To account for this possibility, the nonparametric method compares the standardized abnormal return from the event window with the distribution of standardized abnormal returns from the estimation data.

cumulative returns over a one-, two-, or three-day event window is significantly positive and none of its returns over those windows is significantly negative.

64. Finally, I examine the interaction between the set of news days I have identified and the set of days with significant positive XRP returns. If there is a relationship between Ripple's actions and XRP returns, then I would expect that (presumptively positive) news would be significantly associated with positive returns. I would not expect that such news would be significantly associated with negative returns, and I consider this robustness check below.

VI. XRP Prices React to News about Ripple's Actions

65. In this section, I describe the results of my analysis. I find that across major milestones in the history of Ripple Labs and across those categories of news more directly related to XRP's proposed use cases, there is statistically significant evidence that the price of XRP reacts to news of Ripple's actions. This holds for nearly all statistical models at any reasonable significance level.

66. In no case do I find a significant correlation between news about Ripple Labs and XRP's negative returns. In no case do I find a significant correlation between news about Ripple Labs and XRP's returns in the days before the news. Furthermore, I find that my results are robust to possible errors in the classification of news events.

67. Taken together, my results indicate that the price of XRP reacts to the news about actions of Ripple Labs. I therefore reject the hypothesis that XRP prices are independent of Ripple Labs.

A. XRP Prices Reacted to Key Milestones in Ripple's History

68. Figure 13 lists eight key corporate milestones in the history of Ripple Labs.[67] These milestones include Ripple's funding rounds, its joint venture with SBI Holdings, the licensing by New York State, and its

[67] I identify nine milestone events in my data, listed in Appendix C. On 5/16/2017, Ripple announces its plan to escrow 55 billion XRP tokens. A Newsroom article from 5/26/2017 again reports Ripple's plan to escrow 55 billion XRP tokens. I exclude the 5/26/2017 event from my analysis as stale. *See* Brad Garlinghouse, "Ripple to Place 55 Billion XRP in Escrow to Ensure Certainty of Total XRP Supply," ripple.com insights, May 16, 2017, accessed 10/4/2021, https://ripple.com/insights/ripple-to-place-55-billion-xrp-in-escrow-to-ensure-certainty-into-total-xrp-supply/ and Ari Levy, "Bitcoin rival Ripple is suddenly sitting on billions of dollars worth of cryptocurrency," CNBC, May 26, 2017, accessed 10/4/2021, https://www.cnbc.com/2017/05/26/bitcoin-rival-ripple-is-sitting-on-many-billions-of-dollars-of-xrp.html.

decision to escrow 55 billion XRP tokens. If the XRP market is independent of Ripple Labs, then there is no reason that XRP prices should react to any of these events.

FIGURE 13: KEY MILESTONE EVENTS

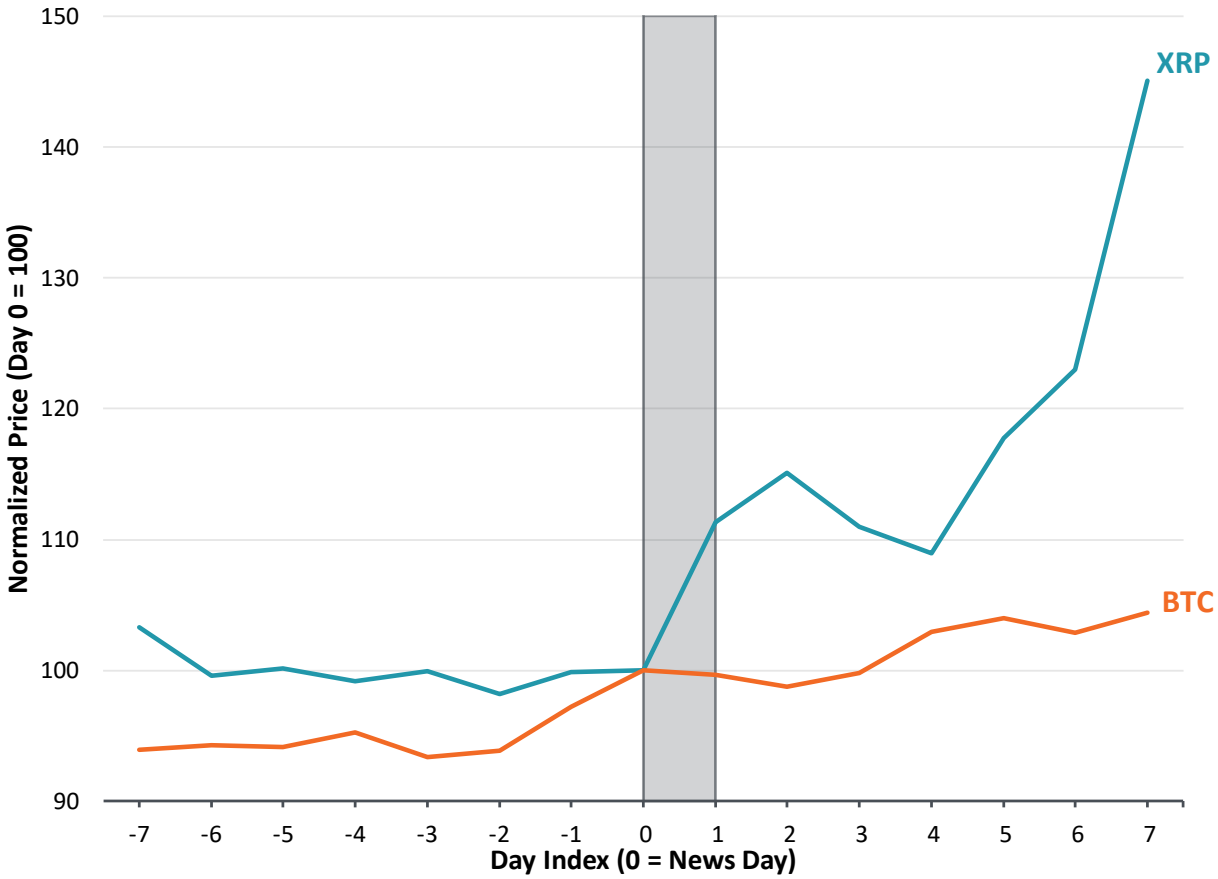
Event Date	Event	Stale?	Representative Document ID	Representative Document Headline
5/18/2015	Series A Funding		7585	Ripple Labs Closes $28 Million Series A Funding Round
10/6/2015	Santander Investment		7580	Ripple Adds Santander InnoVentures Fund as Series A Investor
1/29/2016	SBI Holdings Deal		7578	Ripple Strikes Multi-National Deal with SBI Holdings to Meet Growing Demand for Ripple Solutions Across Asia
6/13/2016	New York BitLicense		8527	Ripple Receives New York's First BitLicense for an Institutional Use Case of Digital Assets
9/15/2016	Series B Funding		7573	Ripple Raises $55 Million in Series B Funding
5/16/2017	Escrow Announcement		8463	Ripple to Place 55 Billion XRP in Escrow to Ensure Certainty of Total XRP Supply
5/26/2017	Escrow Announcement	✓	7793	Bitcoin rival Ripple is suddenly sitting on billions of dollars worth of cryptocurrency
12/8/2017	Escrow Action		8432	Ripple Escrows 55 Billion XRP for Supply Predictability
12/20/2019	Series C Funding		8329	Ripple Caps Record Year With $200 Million Series C Funding

69. Figure 14 plots the average XRP price path for the week leading up to and the week following these milestones and compares it with the average BTC price path.[68] The average XRP price path was essentially flat for the week leading up to a milestone event, then jumps 11% on the milestone date, holds fairly steady for a couple of days, and then appears to increase even further. By contrast, the prices of Bitcoin (commonly known to be the largest digital token by market cap)[69] are comparatively flat around these milestone events, which indicates that the movements in XRP prices are not attributable to movements in the broader digital token market.

[68] For each milestone, I collect prices for the seven days leading up to and following the milestone date. I then normalize the price to 100 at the beginning of the news day (equivalently, the end of the day before the news day). The chart plots the simple average across these normalized price series.

[69] *See* "Today's Cryptocurrency Prices by Market Cap," CoinMarketCap, accessed October 1, 2021, https://coinmarketcap.com/.

FIGURE 14: AVERAGE NORMALIZED PRICE BEFORE AND AFTER RIPPLE MILESTONES EVENTS



Note: Day labels indicate the beginning of the specified day. News Day is shaded in gray. News is released at some point between Day 0 and 1.

70. The first event, Series A funding, is dated May 18, 2015 and the last event, Series C funding, is dated December 20, 2019. This spans 1,678 trading days. I consider 20 different statistical models of XRP returns, each of which generate somewhat different estimates of the abnormal XRP return on each of those days. I then evaluate those abnormal returns at the one-sided 5% significance level determined both parametrically and nonparametrically. The result is 40 potentially different sets of "significant positive XRP return days."[70] As an example, applying the Constant Mean Return Model (Model 1) and the one-sided 5% significance level determined parametrically yields 146 days as "significantly positive."

[70] This follows as 40 = 20 models x 2 methods of determining critical values.

71. Each model measured under each method thus generates a probability of finding a significantly positive XRP day at random. For the Constant Mean Return Model we have been considering, this is 8.7% (146/1,678).

72. If I draw eight days at random from the 1,678 days which span May 18, 2015 through December 20, 2019 where the chance that any one is significant is just 8.7%, the most likely outcome is that I would not draw a single significantly positive day; for the Constant Mean Return Model, the probability of drawing 0 significantly positive days is 48.2%, or 1 in 2.1.

73. However, I do not draw the eight days at random. Rather, I draw the eight days corresponding to the eight milestone events described above. And in that set of eight days, I find six days with significantly positive returns. Where my "success rate" if I were picking these days at random should be 8.7%, my actual success rate is 75% (6/8). The odds of drawing six or more by random chance are about 1 in 100,000, or 0.0010%. The usual scientific standard would consider any outcome with a likelihood of less than 5%, or 1 in 20, as "statistically significant." While it is not impossible to draw 6 by random luck, the more likely explanation is that there is a relationship between this news about Ripple and XRP prices.

74. Figure 15 presents the results of my event study and statistical analysis. A check mark indicates that I find statistically significant evidence of a correlation between XRP price increases and Ripple milestone events. In other words, I can reject the hypothesis that XRP prices are independent of these eight Milestone events.

75. Put another way, the results in Figure 15 mean that statistically I can reject the hypothesis that it is simply coincidence that XRP prices significantly increase at the same time that these events are publicized; there is almost certainly a common factor between them. From an economic perspective, one explanation of course is that news of the event causes the XRP price response.[71]

76. Observing a relationship between XRP prices and Ripple milestone events has important economic implications for the matter at hand. If the XRP market looks to Ripple Labs to create value, then it becomes understandable why certain corporate developments would impact XRP prices. However, if the XRP market does not look to Ripple Labs to create value, then it is difficult to understand why XRP prices would react to these events.

[71] Another explanation would be the reverse – that somehow the news of these events is released in response to XRP price increases but otherwise would not have been released on these days, or that the "price causes the news." A third explanation would be that there is some other factor – an "X factor" – which is driving both these events and the XRP market. These events, of course, are disparate in their nature, including venture funding rounds involving multiple investors, joint ventures in Asia, and licensing decisions made by the state of New York. Many of them also represent the culmination of long processes.

FIGURE 15: XRP PRICES REACT TO RIPPLE MILESTONE EVENTS

Model Number	Parametric	Nonparametric
1	✓	✓
2	✓	✓
3	✓	✓
4	✓	✓
5	✓	✓
6	✓	✓
7	✓	✓
8	✓	✓
9	✓	✓
10	✓	✓
11	✓	✓
12	✓	✓
13	✓	✓
14	✓	✓
15	✓	✓
16	✓	✓
17	✓	✓
18	✓	✓
19	✓	✓
20	✓	✓

Notes:

✓	Indicates significance at the 5% level.
	Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly positive returns are identified at the 5% one-sided level. See Appendix E.

B. XRP Prices Reacted to Digital Asset Trading Platform Listings

77. I have identified eleven announcements related to new listings of XRP on trading platforms.[72] I examine if there is a significant correlation between these announcements and XRP prices.

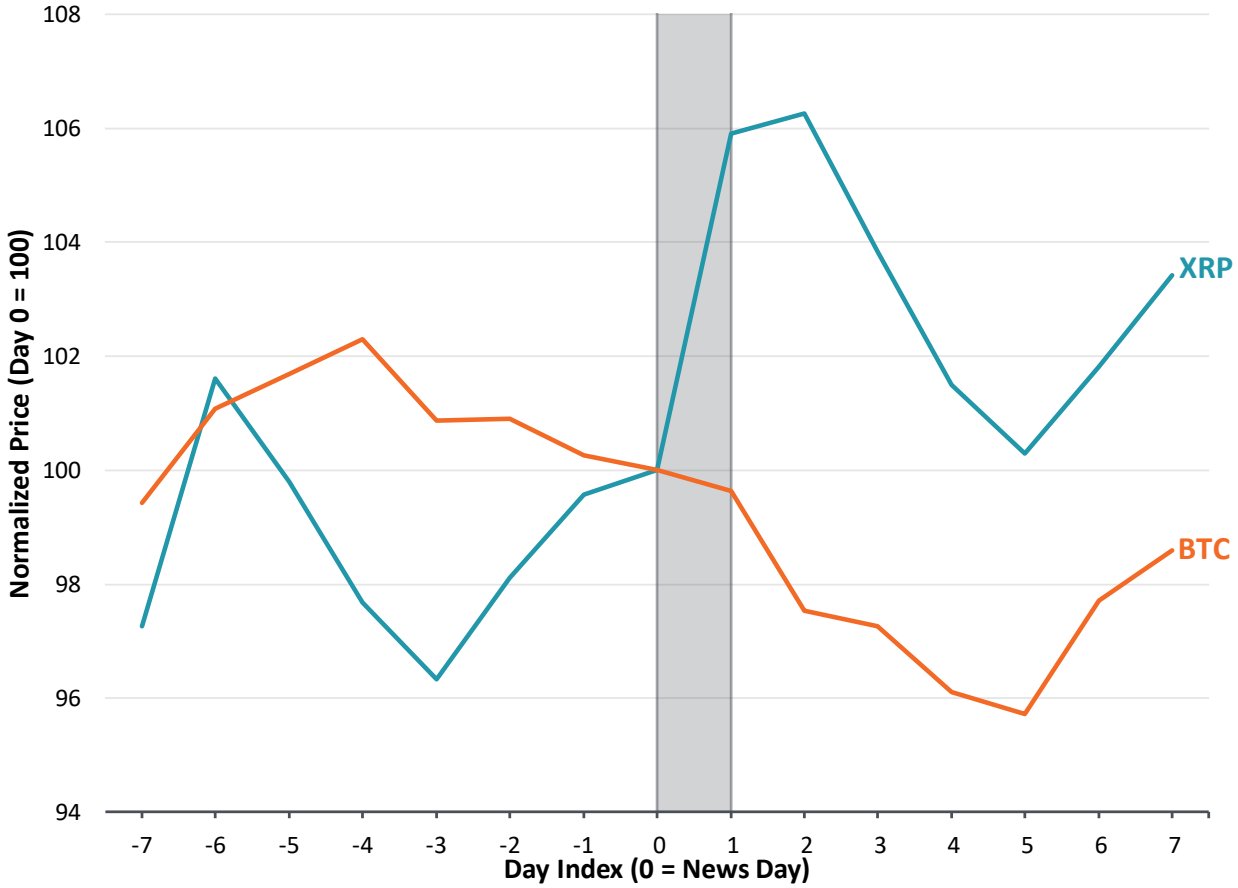
FIGURE 16: KEY TRADING PLATFORM LISTING EVENTS

			Representative Document	
Event Date	Event	Ripple Action?	ID	Headline
2/29/2016	Partnership with Crypto Facilities	✓	8539	Ripple Partners with Crypto Facilities for XRP Derivatives
10/9/2016	Derivatives Listing on Crypto Facilities	✓	8501	Ripple Announces XRP Futures Trading on Crypto Facilities
10/27/2016	Listing on Coincheck		8496	Coincheck Lists XRP on Its Digital Asset Exchange
1/10/2017	Listing on Bitstamp with 0% Fees	✓	8483	Bitstamp Now Trading XRP with 0% Fees
5/18/2017	Listing on Six New Exchanges	✓	7567	XRP Liquidity to Increase With Listings on Six New Exchanges
8/31/2017	Partnership with Bitcoin IRA, Kingdom Trust		8452	It's Never Been Easier to Access and Store XRP
12/21/2017	Listing on CEX.IO, GMOCoin, Huobi.pro		8426	XRP Now Available on 50 Exchanges Worldwide
1/30/2018	Listing on SBI Virtual Currencies		8419	SBI Virtual Currencies to Exclusively List XRP at Launch
3/28/2018	Listing on Uphold		8410	XRP Ecosystem Grows with New Listing on Uphold
8/16/2018	Listing on Bittrex, Bitso, and Coins.ph	✓	7550	xRapid Brings on Three New Exchange Partners
2/12/2020	Partnership with BRD Wallet	✓	8323	BRD Supports XRP and Launches Enterprise Expansion

78. Figure 17 plots the average XRP price path for the week leading up to and the week following these eleven announcements and compares it with the average BTC price path. The XRP price on average jumps 6% on these dates, though the bump appears to be temporary. By contrast, Bitcoin prices are trending down on average and show no particular reaction to these XRP listings.

[72] On January 10, 2017, an Insight article announces that XRP is newly listed on Bitstamp. An announcement dated February 16, 2017 extends that by announcing that a particular trading pair (XRP/BTC) is newly available on that trading platform. I regard this second announcement as qualitatively different from announcing a listing on a new trading platform, hence I do not include it in my analysis.

FIGURE 17: AVERAGE NORMALIZED PRICE BEFORE AND AFTER TRADING PLATFORM LISTINGS



Note: Day labels indicate the beginning of the specified day. News Day is shaded in gray. News is released at some point between Day 0 and 1.

79. The first trading platform announcement is dated February 29, 2016, and the last February 12, 2020, spanning 1,445 days. Using again the example of the Constant Mean Return Model, this model identifies 123 days as being significantly positive (when assessed parametrically) over this period of time. Drawing eleven days at random, the most likely single outcome is to find just one significantly positive day—the probability of this outcome is 39%. But among the eleven trading platform listing days, I find five significantly positive market days.[73] The probability of drawing five or more is just 0.13%, or about 1 in 800.

[73] By "market day," I mean a day with a statistically significant positive abnormal return.

80. Figure 18 presents the result of my event study and statistical analysis. A check mark indicates that I find a statistical evidence of a correlation between XRP prices and announcements of listings on new trading platforms. In other words, I can reject the hypothesis that XRP prices are independent of news of trading platform listings.

FIGURE 18: XRP PRICES REACT TO LISTINGS ON NEW TRADING PLATFORMS

Model Number	Parametric	Nonparametric
1	✓	✓
2	✓	✓
3	✓	✓
4	✓	✓
5	✓	✓
6	✓	✓
7	✓	✓
8	✓	✓
9	✓	✓
10	✓	✓
11	✓	✓
12	✓	✓
13	✓	✓
14	✓	✓
15	✓	✓
16	✓	✓
17	✓	✓
18	✓	✓
19	✓	✓
20	✓	✓

Notes:

✓	Indicates significance at the 5% level.
	Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly positive returns are identified at the 5% one-sided level. See Appendix E.

81. Ripple Labs may not have been an active participant in every trading platform listing. But according to Ripple's announcements, it appears to have been involved in at least some, and this is a type of action

which is significantly correlated with XRP prices. For example, in an Insight Article from October 10, 2016, Ripple writes:

> "In February, Ripple formalized its partnership with Crypto Facilities, a London-based financial services firm that provides FCA-regulated risk management and trading solutions for digital assets. Today, Ripple is excited to announce that Crypto Facilities will be the first derivatives exchange to list regulated XRP futures contracts. To further establish digital assets as a new asset class, Crypto Facilities is also partnering with CME Group, which has invested in Ripple through its venture arm."[74]

82. In my review of these eleven announcements, I believe that six indicate involvement by Ripple.[75] Figure 19 reports the likelihood of the outcomes from this subset of trading platform listings. The subset of trading platform listings which indicate action by Ripple is significantly correlated with XRP prices. Once again, I can reject the hypothesis that XRP prices are independent of trading platform listings.

[74] "Ripple Announces XRP Futures Trading on Crypto Facilities," Ripple.com Insights, October 10, 2016, accessed September 29, 2021, https://ripple.com/insights/ripple-announces-xrp-futures-trading-crypto-facilities/.

[75] I am not taking the position that Ripple was not involved in the other trading platform listings. I am simply identifying those six events for which my reading of the announcements suggests that Ripple likely was involved.

FIGURE 19: XRP PRICES REACT TO NEW TRADING PLATFORM LISTINGS INVOLVING RIPPLE LABS

Model Number	Parametric	Nonparametric
1	✓	✓
2	✓	✓
3	✓	✓
4	✓	✓
5	✓	✓
6	✓	✓
7	✓	✓
8	✓	✓
9	✓	✓
10	✓	✓
11	✓	✓
12	✓	✓
13	✓	✓
14	✓	✓
15	✓	✓
16	✓	✓
17	✓	✓
18	✓	✓
19	✓	✓
20	✓	✓

Notes:

✓	Indicates significance at the 5% level.
	Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly positive returns are identified at the 5% one-sided level. See Appendix E.

C. XRP Prices Reacted to Customer and Product Announcements

83. I have identified 85 announcements related to customer and product developments. It is not always clear if Ripple is an active participant or not. For example, Ripple's first press release, dated May 5,

2014, is headlined "Ripple Labs Announces Fidor Bank AG as First Bank to Use the Ripple Protocol."[76] The body of the announcement says that "Fidor Bank AG [is] the first bank to integrate Ripple," and it goes on to define Ripple as "an open, decentralized payments protocol that enables anything of value to be traded through a global value web." Reading this press release, one could interpret this as an example of a bank choosing to adopt an open source technology such that, in principle, Ripple Labs is in no way involved. In fact, the first several announcements by Ripple – AstroPay, GBI, CBW Bank, and Cross River Bank – read largely the same way.

84. However, following the announcements that CBW Bank and Cross River Bank were integrating the "Ripple protocol" – again defined as the decentralized ledger technology – Chris Larsen, then CEO of Ripple Labs, is quoted in a Newsroom Article saying, "It's a big milestone…We've been working on our enterprise banking strategy for well over a year. It takes awhile for banks to get going."[77] This would suggest that it was, at least in part, due to the efforts of Ripple Labs that some of these first institutions adopted the decentralized protocol.

85. One economic consideration is that not all product developments might be expected to lead directly to increased utilization of XRP. For example, some announce new validators on the XRP ledger; this is different from a new bank joining RippleNet. Also, two events appear to repeat old information and hence are effectively stale.[78] In all, from these 85 events, I exclude 8 as not relevant. These are listed in Figure 20. I note that my conclusions are qualitatively unchanged if these events are included; please see Appendix E.

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[76] "Ripple Labs Announces Fidor Bank AG as First Bank to Use the Ripple Protocol," ripple.com press center, May 5, 2014, accessed September 29, 2021, https://ripple.com/ripple_press/ripple-labs-announces-fidor-bank-ag-as-first-bank-to-use-the-ripple-protocol/.

[77] Biz Carson, "Two US banks are ready to embrace the Ripple protocol, allowing instant global money transfers," Gigaom, September 24, 2014, accessed September 29, 2021, https://gigaom.com/2014/09/24/two-us-banks-are-ready-to-embrace-the-ripple-protocol-allowing-instant-global-money-transfers/.

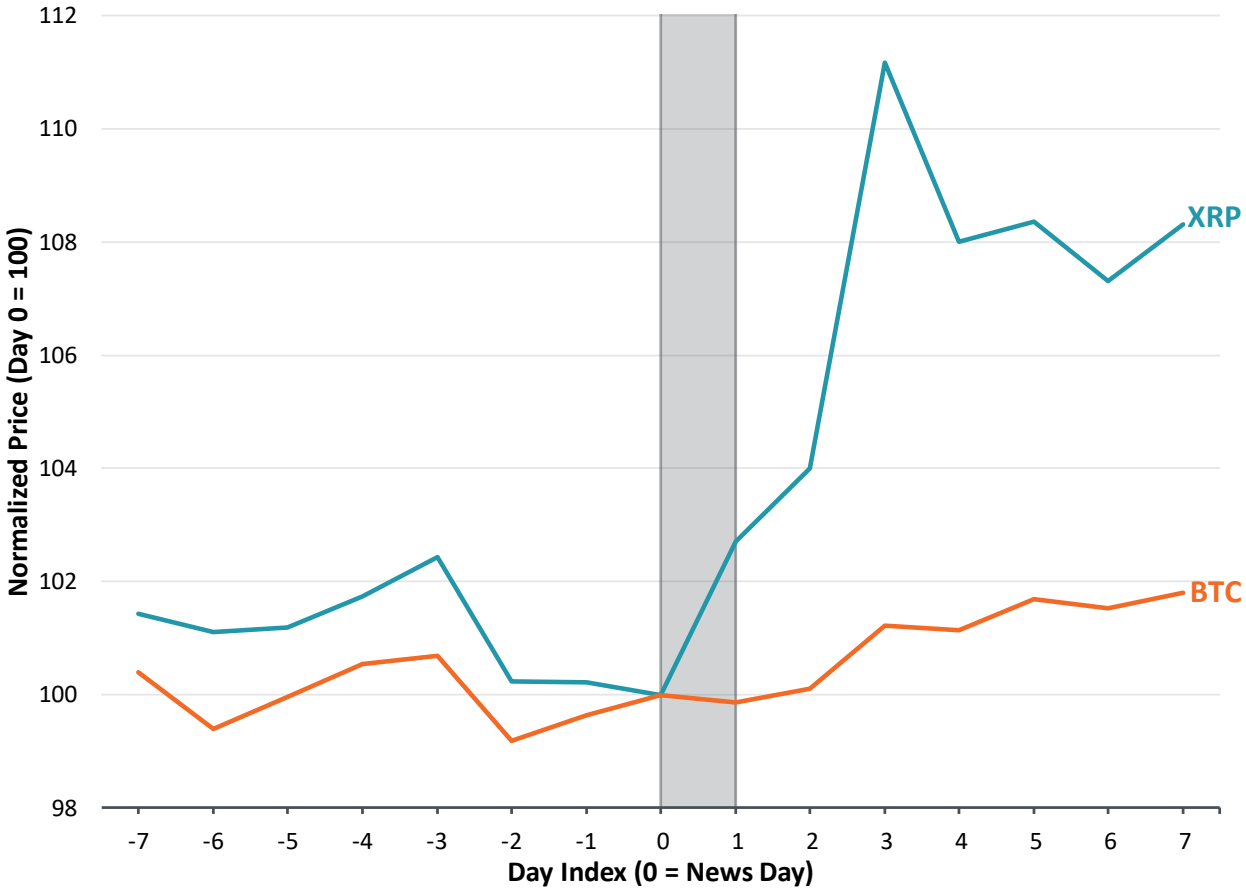
[78] An Insight Article from August 16, 2016 entitled "Multi-Signing in Ripple: A Q&A with David Schwartz" discusses an amendment to the XRP Ledger which had been recently adopted. It is not clear that Ripple Labs sponsored the amendment, but regardless, the amendment itself is not being newly proposed in this article. The second case is a Newsroom Article dated January 29, 2018 entitled "MoneyGram CEO Plans Waves with Ripple" which essentially repeats the news of January 11 from a Press Release headline titled, "Ripple and MoneyGram Partner to Modernize Payments."[78] *See*, "Multi-Signing in Ripple: A Q&A with David Schwartz," ripple.com insights, August 16, 2016, accessed September 29, 2021, https://ripple.com/insights/multi-signing-ripple-qa-david-schwartz/; PYMNTS, "MoneyGram CEO Plans Waves with Ripple," pymnts.com, January 29, 2018, accessed September 29, 2021, https://www.pymnts.com/news/2018/moneygram-ripple-cryptocurrency-blockchain-alex-holmes/; "Ripple and MoneyGram Partner to Modernize Payments," ripple.com press center, January 11, 2018, accessed September 29, 2021, https://ripple.com/ripple_press/ripple-and-moneygram-partner-to-modernize-payments/.

FIGURE 20: EXCLUDED CUSTOMER AND PRODUCT ANNOUNCEMENT EVENTS

		Reason for Exclusion		Representative Document	
Event Date	Event	Stale	Direction Unclear	ID	Headline
1/12/2016	Earthport Launch of Ripple API		✓	8554	Earthport Launches Distributed Ledger Hub
4/12/2016	MIT Runs Ripple Validator		✓	7575	MIT Adopts Ripple Validator to Advance Consensus and Blockchain Research
8/16/2016	Recently Adopted XRP Ledger Amendment	✓		8514	Multi-Signing in Ripple: A Q&A with David Schwartz
11/16/2016	Improvement of RippleCharts		✓	8492	Ripple Announces An Upgrade to RippleCharts
5/11/2017	XRP Ledger Validator Updates		✓	8464	How We Are Further Decentralizing the XRP Ledger to Bolster Robustness for Enterprise Use
7/17/2017	Expansion of XRP Ledger Validator Nodes		✓	8458	XRP Ledger Decentralizes Further With Expansion to 55 Validator Nodes
1/29/2018	Pilot with MoneyGram	✓		7760	MoneyGram CEO Plans Waves With Ripple
2/21/2018	Ripple Releases White Papers		✓	7747	Ripple Papers Pledge New Start for $40 Billion XRP

86. Figure 21 plots the average XRP price path for the week leading up to and week following these 77 announcements and compares it with the average BTC price path. The average XRP price path increases 3% on the announcement date but continues to increase thereafter, ending about 8% higher a week later. By contrast, Bitcoin prices are trending up slowly on average but show no particular reaction to these Ripple announcements.

FIGURE 21: AVERAGE NORMALIZED PRICE BEFORE AND AFTER CUSTOMER AND PRODUCT ANNOUNCEMENTS



Note: Day labels indicate the beginning of the specified day. News Day is shaded in gray. News is released at some point between Day 0 and 1.

87. Figure 22 presents the results of my event study and statistical analysis on customer and product announcements, leading me to reject the hypothesis that XRP prices are independent of these developments.

FIGURE 22: XRP PRICES REACT TO NEW CUSTOMER AND PRODUCT ANNOUNCEMENTS

Model Number	Parametric	Nonparametric
1	✓	✓
2	✓	✓
3	✓	✓
4	✓	✓
5	✓	✓
6	✓	✓
7	✓	✓
8	✓	✓
9	✓	✓
10	✓	✓
11	✓	✓
12	✓	✓
13	✓	✓
14	✓	✓
15	✓	✓
16	✓	✓
17	✓	✓
18	✓	✓
19	✓	✓
20	✓	✓

Notes:

✓	Indicates significance at the 5% level.
	Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly positive returns are identified at the 5% one-sided level. See Appendix E.

D. XRP Prices Reacted to Ripple's Commercialization Initiatives

88. Ripple Labs has launched a number of initiatives described as commercializing or promoting its technology and payment solutions, including some described as creating use-cases for XRP.[79] These include:

- The Global Payments Steering Group (GPSG), described in a Ripple press release as overseeing "the creation and maintenance of Ripple payment transaction rules, formalized standards for activity using Ripple, and other actions to support the implementation of Ripple payment capabilities."[80]
- The Infrastructure Innovation Initiative, described in a Newsroom article as "a team within [Ripple Labs] that will focus on providing Ripple's DLT [Distributed Ledger Technology] and payments technology to central banks and market infrastructures. The initiative will enable regulators and financial institutions (FIs) to use Ripple's technology to explore blockchain themselves and develop solutions."[81]
- The Line of Credit, described in a Ripple Insight Article as "a new beta service on RippleNet that allows customers using On-Demand Liquidity (ODL) to source capital on-demand to initiate cross-border payments at scale using the digital asset XRP."[82]
- The RippleNet Accelerator Program, described in a Ripple Insight Article as "a unique reward for financial institutions that are the first in their markets to process and promote commercial payments on RippleNet…the RippleNet Accelerator Program is funded by $300 million of XRP from Ripple's XRP holdings."[83]

[79] By classifying these initiatives as "Ripple Commercialization Initiatives," I am not taking the position that the initiatives were ultimately successful in commercializing Ripple's technology or in creating use cases for the XRP token, merely that Ripple's descriptions of these initiatives suggest that that would be a goal or objective of the program.

[80] "Major Banks Launch Global Payments Steering Group," ripple.com press center, September 23, 2016, accessed September 29, 2021, https://ripple.com/ripple_press/major-banks-launch-global-payments-steering-group/.

[81] PYMNTS, "Ripple Ramps Up Focus on Blockchain Infrastructure," pymnts.com, December 21, 2017, accessed September 29, 2021, https://www.pymnts.com/news/b2b-payments/2017/ripple-infrastructure-initiative/.

[82] "Fund Instant Cross-Border Payments With a Line of Credit From RippleNet," ripple.com insights, October 8, 2020, accessed September 29, 2021, https://ripple.com/insights/fund-instant-cross-border-payments-with-a-line-of-credit-from-ripplenet/.

[83] "Ripple Rolls Out $300M RippleNet Accelerator Program to Grow Volume and XRP Utility," ripple.com insights, October 13, 2017, accessed September 29, 2021, https://ripple.com/insights/ripple-rolls-300m-ripplenet-accelerator-program-grow-volume-xrp-utility/.

- Xpring, described in a Ripple Insight Article as "a new initiative by Ripple that will invest in, incubate, acquire and provide grants to companies and projects run by proven entrepreneurs. Every entrepreneur will use the digital asset XRP and the XRP Ledger."[84]

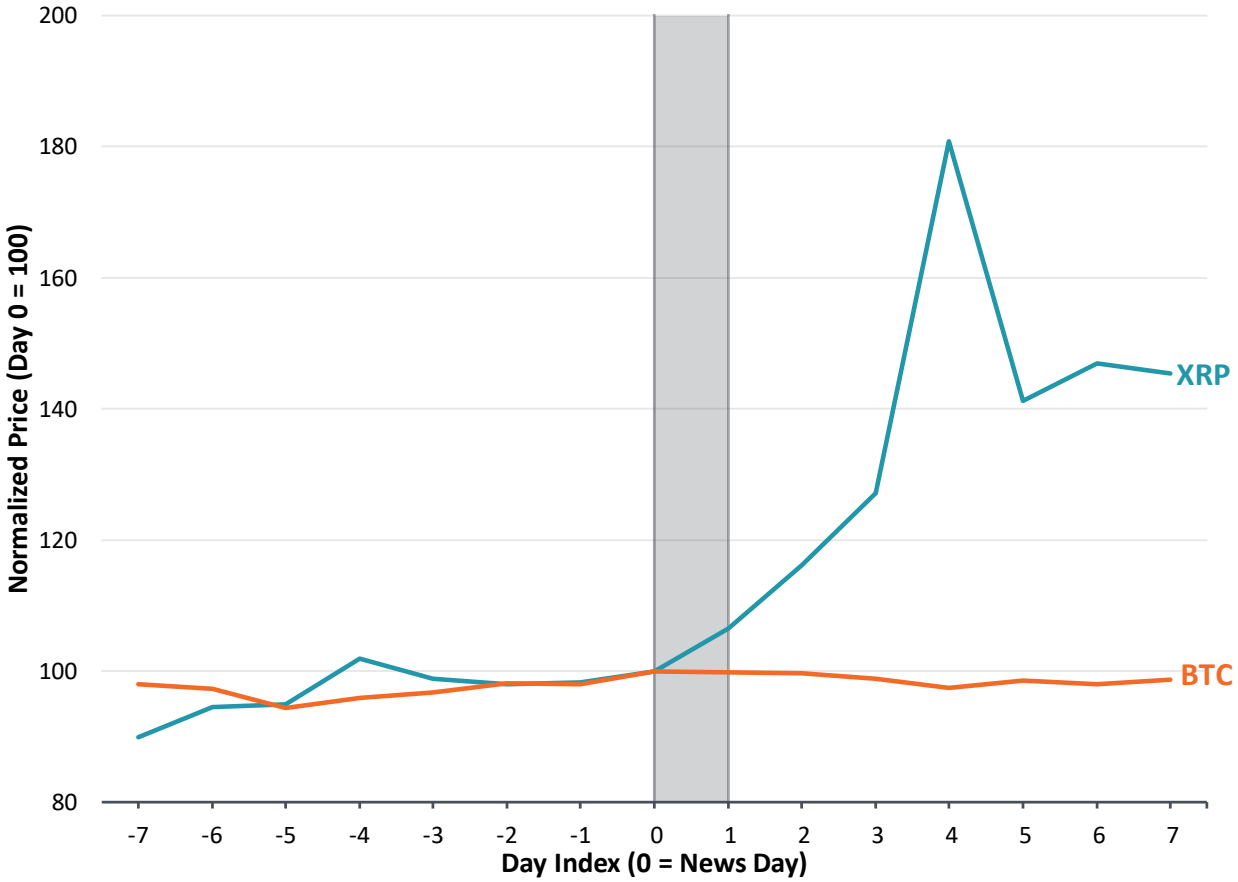
FIGURE 23: KEY RIPPLE COMMERCIALIZATION INITIATIVE EVENTS

		Representative Document	
Event Date	Event	ID	Headline
9/23/2016	Launch GPSG	7571	Major Banks Launch Global Payments Steering Group
3/30/2017	MUFG Joins GPSG	8469	MUFG Joins Ripple's Global Payments Steering Group
10/13/2017	Creation of RippleNet Accelerator Program	8446	Ripple Rolls Out $300M RippleNet Accelerator Program to Grow Volume and XRP Utility
12/19/2017	Establish Infrastructure Innovation Initiative	8428	Exploring Innovation in Payment System Infrastructures
5/14/2018	Announce Xpring	8401	Welcome to Xpring
10/2/2019	Update to Xpring	8340	Announcing the Next Chapter of Xpring, Ripple's Developer Platform
10/8/2020	Launch RippleNet Line of Credit	8298	Fund Instant Cross-Border Payments With a Line of Credit From RippleNet

89. I have identified seven announcements related to these initiatives, either announcing their launch or some expansion to their program; these are listed in Figure 23. Figure 24 plots the average XRP price path for the week leading up to and the week following these announcements and compares it with the average Bitcoin price path. The difference is striking. Average XRP prices increase 7% on the day of the announcement, and one week later are about 50% higher. Bitcoin prices, on the other hand, do not appear to react at all.

[84] "Welcome to Xpring," ripple.com insights, May 14, 2018, accessed September 29, 2021, https://ripple.com/insights/welcome-to-xpring/.

FIGURE 24: AVERAGE NORMALIZED PRICE PATH AROUND RIPPLE'S COMMERCIALIZATION INITIATIVES



Note: Day labels indicate the beginning of the specified day. News Day shaded in gray. News is released at some point between Day 0 and 1.

90. Figure 25 presents the results of my event study and statistical analysis on Ripple Commercialization Initiatives. The statistical evidence here is more mixed than the other news categories I have considered thus far, however, more than half of all models indicate a significantly positive correlation between Ripple Commercialization Initiatives and XRP prices.

FIGURE 25: XRP PRICES REACT TO RIPPLE'S COMMERCIALIZATION INITIATIVES

Model Number	Parametric	Nonparametric
1	✓	✓
2		
3	✓	✓
4		
5	✓	✓
6		
7	✓	✓
8		
9	✓	✓
10		
11	✓	✓
12	✓	✓
13	✓	✓
14	✓	✓
15	✓	✓
16		
17	✓	✓
18		
19	✓	✓
20	✓	✓

Notes:

✓	Indicates significance at the 5% level.
	Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly positive returns are identified at the 5% one-sided level. See Appendix E.

91. By contrast, Ripple Labs has also launched initiatives which do not appear directly related to the commercialization or promotion of its technology, specifically, or to the creation of XRP use cases. These include:

- University Blockchain Research Initiative (UBRI), described in a Ripple press release as "a program comprised of collaborative partnerships with leading universities to support academic research, technical development and innovation in blockchain, cryptocurrency and digital

payments. Through the program, Ripple will donate $50M to universities around the world to help shape the workforce of the future."[85]

- Research Consortium, described in a Newsroom Article which states "SBI Ripple Asia is forming a consortium that will research the use of distributed ledger technology in securities products…the new consortium will see joint efforts from 18 securities firms to research and commercialize applications of emerging technologies, particularly DLT [Distributed Ledger Technology], to improve efficiency for customers, while reducing operational cost."[86]
- Carbon Neutrality, described in a Ripple press release as "several initiatives to lead global finance toward a carbon-neutral future, including the launch of an open-source tool that helps enable any blockchain to decarbonize."[87]
- Ripple Labs periodically announces its participation with existing research initiatives or interest groups. I include such announcements in this analysis.

[85] "Ripple Announces $50M University Blockchain Research Initiative," ripple.com press center, June 4, 2018, accessed September 29, 2021, https://ripple.com/ripple_press/ripple-announces-50m-university-blockchain-research-initiative/.

[86] Wolfie Zhao, "SBI Ripple Asia Forms Consortium to Bring DLT to Securities," CoinDesk, January 30, 2018, accessed September 29, 2021, https://www.coindesk.com/markets/2018/01/30/sbi-ripple-asia-forms-consortium-to-bring-dlt-to-securities/.

[87] "Ripple Leads Sustainability Agenda to Achieve Carbon Neutrality By 2030," ripple.com press center, September 30, 2020, accessed September 29, 2021, https://ripple.com/ripple-press/ripple-leads-sustainability-agenda-to-achieve-carbon-neutrality-by-2030/.

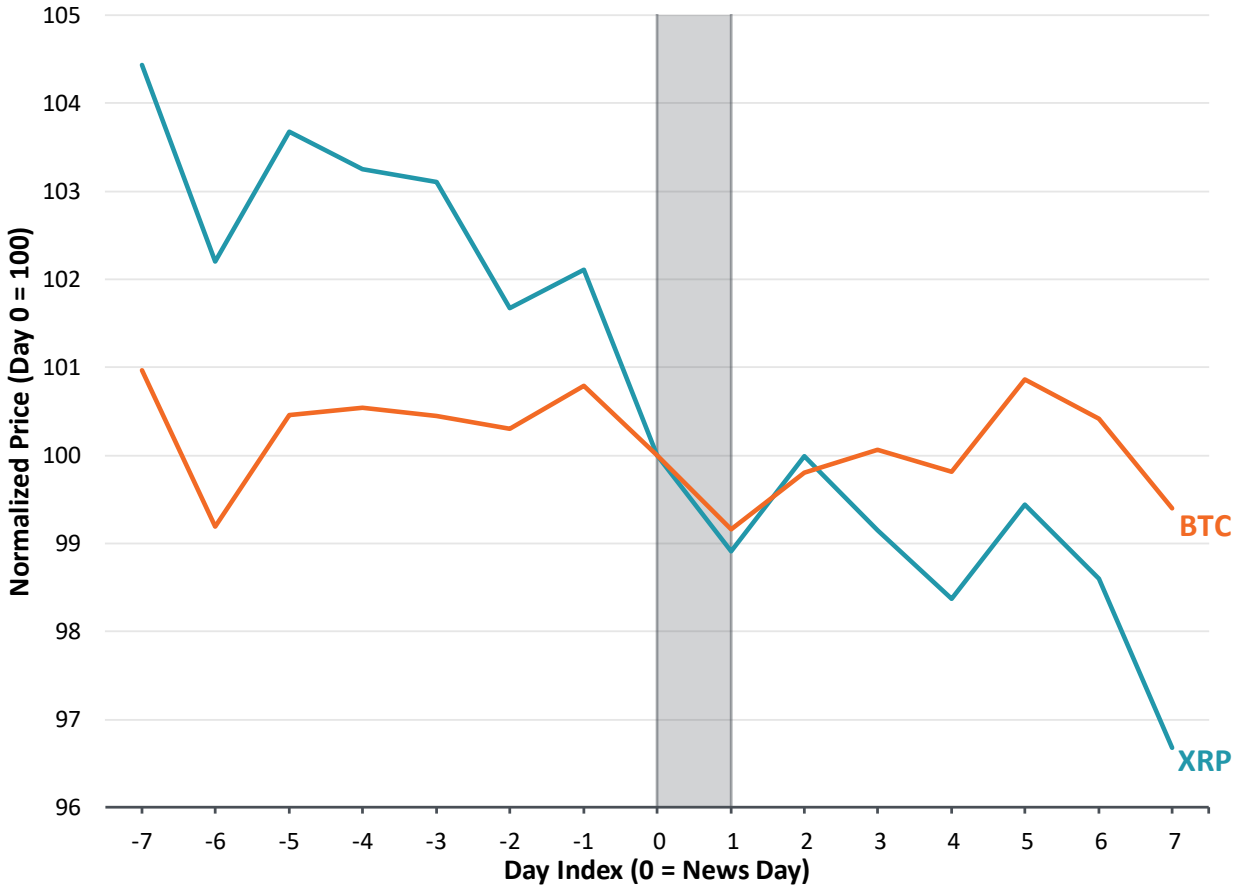
FIGURE 26: KEY OTHER INITIATIVE EVENTS

Event Date	Event	Stale?	Representative Document ID	Representative Document Headline
2/10/2015	Joins Center for Financial Services Innovation		8588	Ripple Labs joins the Center for Financial Services Innovation
2/12/2015	Joins W3C Web Payment Interest Group		7589	Ripple Labs Joins W3C Web Payment Interest Group to Help Set Standards for the Value Web
3/4/2015	Joins International Payments Framework Association		8587	Ripple Labs Joins International Payments Framework Association
6/15/2015	Ryan Zagone Elected to Faster Payments Task Force Steering		8575	Ripple Labs Elected to Fed Steering Committee for Faster Payments
1/30/2018	Creation of SBI Ripple Asia Consortium		7759	SBI Ripple Asia Forms Consortium to Bring DLT to Securities
3/28/2018	Joins Hyperledger Blockchain Consortium		7733	Ripple Joins Hyperledger Blockchain Consortium
6/4/2018	Launch University Blockchain Research Initiative		7552	Ripple Announces $50M University Blockchain Research Initiative
1/23/2019	UBRI Partnership with THUIFR		7679	Ripple Partners With Chinese University for Blockchain Research Program
2/7/2019	Additional UBRI Partnerships		7542	Ripple Announces New University Blockchain Research Initiative Partners, Expands to China and Singapore
7/30/2019	UBRI Expansion to Japan		7538	Ripple Expands University Blockchain Research Initiative Program to Japan, Supports 33 University Partners Across 14 Countries
6/10/2020	Joins ISO 20022 Registration Management Group		8309	ISO 20022: Shaping the Future of Cross-Border Payments
6/18/2020	Joins Open Payments Coalition to launch PayString		8306	Why Ripple Supports PayString
8/26/2020	Additional UBRI Partnerships		8303	UBRI Expands To New Global Markets With More Than 35 University Partners
9/30/2020	Commitment to Carbon-Net Zero by 2030		7529	Ripple Leads Sustainability Agenda to Achieve Carbon Neutrality By 2030
11/2/2020	Commitment to Carbon-Net Zero by 2030	✓	7615	Cryptocurrency's carbon footprint is massive and not sustainable

92. I have identified fourteen relevant announcements related to these initiatives, either announcing their launch or some expansion to their program (see Figure 26).[88] Figure 27 plots the average XRP price path for the week leading up to and following these announcements and compares it with the average BTC

price path. Unlike the direct XRP-related initiatives discussed above, in these cases there appears to be little or no reaction in the XRP markets to these initiatives (if anything, prices are down slightly following these events), and little or no difference between XRP prices and Bitcoin prices in the days immediately surrounding these announcements.

FIGURE 27: AVERAGE NORMALIZED PRICE PATH BEFORE AND AFTER RIPPLE'S OTHER INITIATIVES



Note: Day labels indicate the beginning of the specified day. News Day shaded in gray. News is released at some point between Day 0 and 1.

93. Figure 28 presents the results of my event study and statistical analysis on Ripple's Other Initiatives. Not surprisingly, there is no evidence of any correlation between these initiatives and XRP prices.

[88] I exclude a November 2, 2020 Newsroom Article which repeats the announcement of the sustainability initiative, Ken Weber, "Cryptocurrency's carbon footprint is massive and not sustainable," Forkast, November 2, 2020, accessed September 29, 2021, https://forkast.news/cryptocurrency-big-carbon-footprint-not-sustainable-ripple-ken-weber/.

FIGURE 28: XRP PRICES DO NOT REACT TO RIPPLE'S OTHER INITIATIVES

Model Number	Parametric	Nonparametric
1		
2		
3		
4		
5		
6		
7		
8		
9	**NO SIGNIFICANT RESULTS**	
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Notes:

✓	Indicates significance at the 5% level.
	Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly positive returns are identified at the 5% one-sided level. See Appendix E.

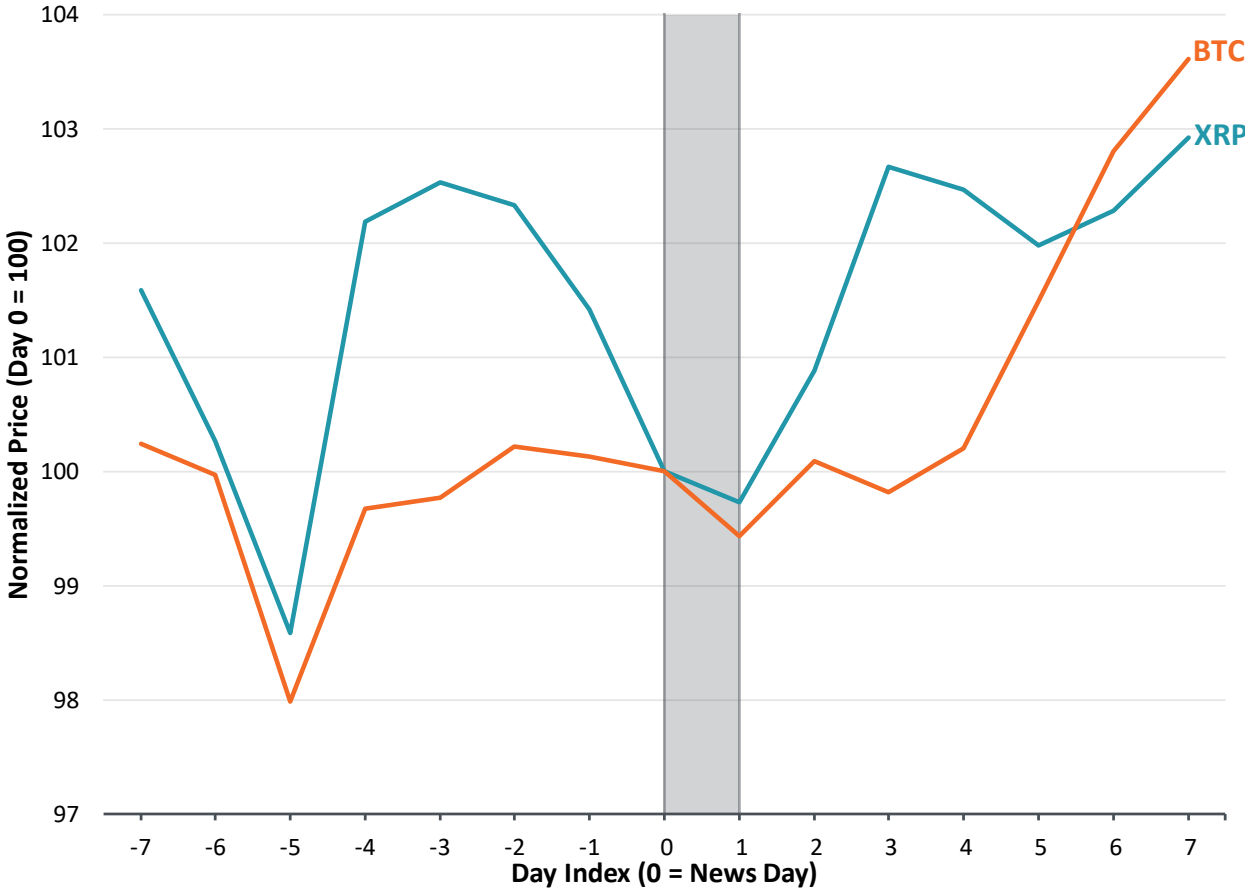
94. The evidence suggests that the XRP market is more responsive to Ripple's Commercialization Initiatives than it is to its other initiatives.

E. XRP Prices Did Not React to Office and Staff Announcements

95. I have identified 28 relevant announcements related to staff or office expansions.[89] Figure 29 plots the average XRP price path for the week leading up to and following these announcements and compares it with the average BTC price path. The series appear very similar, and XRP prices do not appear to react to such announcements.

[89] I exclude a March 17, 2018 Newsroom Article which repeats the March 8 announcement that Cory Johnson was joining Ripple as its chief market strategist. *See* Ari Levy, "Ripple hires Bloomberg TV's Cory Johnson as chief marketing strategist," CNBC, March 8, 2018, accessed September 29, 2021, https://www.cnbc.com/2018/03/08/ripple-hires-bloomberg-tvs-cory-johnson-as-chief-market-strategist.html?__source=twitter%7Cmain; *see also,* Daniel Roberts, "Ripple's new chief market strategist: Crypto regulation will 'separate the wheat from the chaff'," Yahoo! Finance, March 17, 2018, accessed September 29, 2021, https://finance.yahoo.com/news/ripples-new-chief-market-strategist-crypto-regulation-will-separate-wheat-chaff-114110796.html.

FIGURE 29: AVERAGE NORMALIZED PRICE BEFORE AND AFTER OFFICE AND STAFF ANNOUNCEMENTS



Note: Day labels indicate the beginning of the specified day. News Day shaded in gray. News is released at some point between Day 0 and 1.

96. This observation is confirmed statistically. Figure 30 presents the results of my event study and statistical analysis on Office and Staff Announcements. Not a single test indicates a statistically significant correlation between these announcements and XRP prices.[90]

[90] I note that this result does not preclude the possibility that "management quality" is of general interest to investors in Ripple Labs or, possibly, to holders of XRP tokens.

FIGURE 30: XRP PRICES DO NOT REACT TO OFFICE AND STAFF ANNOUNCEMENTS

Model Number	Parametric	Nonparametric
1		
2		
3		
4		
5		
6		
7		
8	**NO SIGNIFICANT RESULTS**	
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Notes:

✓	Indicates significance at the 5% level.
	Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly positive returns are identified at the 5% one-sided level. See Appendix E.

97. In summary, XRP price increases are significantly correlated with key milestones for Ripple Labs, with news of new trading platform listings, with customer and product announcements, and with major initiatives from Ripple Labs including those designed to generate proposed XRP use cases. They do not appear to react to more mundane office and staff announcements or to Ripple's other initiatives not directly tied to Ripple's Commercialization Initiatives.

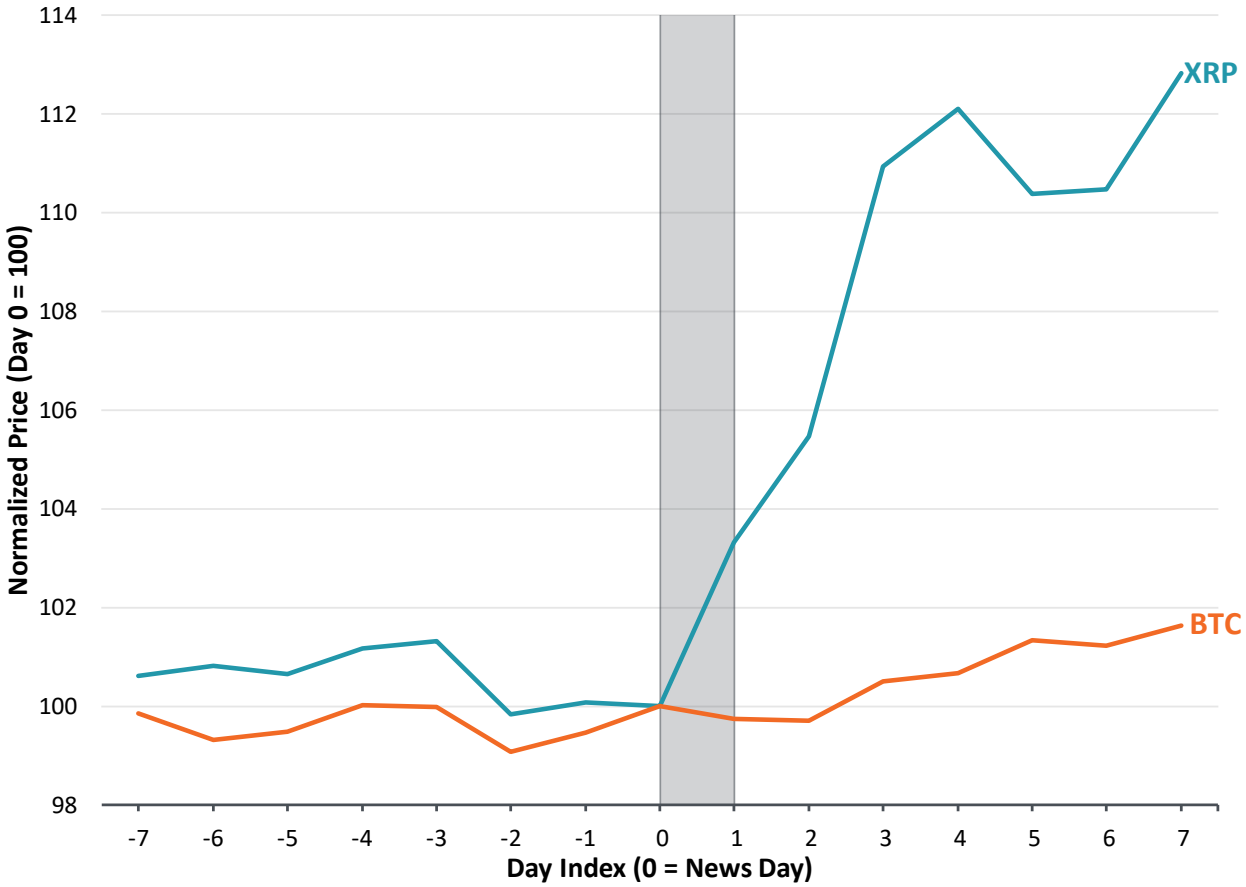
F. Days with Ripple News Are Associated with Significant Abnormal XRP Returns and the Association Is Unlikely to Be Explained by Random Chance

98. As a final analysis I combine all the following categories: Milestones, Trading Platform Listings, Customer & Product, Acquisitions & Investments, and the Ripple Commercialization Initiatives described above in Section VI.D.[91] By combining these events, how I categorize among them becomes irrelevant. It will not matter if a particular event is thought of as a "Milestone" or as a "Customer & Product" announcement. Together these comprise 113 unique, relevant events on 105 unique days.

99. Figure 31 plots the average XRP price path for the week leading up to and the week following these announcements and compares it with the average BTC price path. XRP prices (and Bitcoin prices) appear essentially flat for the week leading up to these events. But while Bitcoin prices remain nearly flat, XRP prices increase sharply, jumping 3% on the day of the announcement and ending about 13% higher one week later.

[91] I had not previously presented the Acquisitions & Investments category. I find 11 Acquisitions & Investments events in my data, listed in Appendix C. I mark one event, the completion of Ripple's investment in MoneyGram on November 25, 2019, as stale, since this investment had been previously announced on June 17, 2019 (*see* Daniel Phillips, "Ripple Completes $50 million investment in MoneyGram," Decrypt, November 25, 2019, accessed 10/3/2021, https://decrypt.co/12038/ripple-completes-50-million-investment-in-moneygram and Paul Vigna, "Ripple to Invest up to $50 Million in MoneyGram," Wall Street Journal, June 17, 2019, accessed 10/3/2021, https://www.wsj.com/articles/ripple-to-invest-up-to-50-million-in-moneygram-11560803556). I do not find a statistically significant relationship with this category in isolation. *See* Appendix E.

FIGURE 31: AVERAGE NORMALIZED PRICE BEFORE AND AFTER MILESTONES, TRADING PLATFORM LISTINGS, CUSTOMER & PRODUCT ANNOUNCEMENTS, ACQUISITIONS & INVESTMENTS, AND RIPPLE COMMERCIALIZATION INITIATIVES



Note: Day labels indicate the beginning of the specified day. News Day shaded in gray. News is released at some point between Day 0 and 1.

100. These 105 event days span 2,369 trading days. Again using the Constant Mean Return Model as an example, it flags 199 days as significantly positive, or 8.4%. Drawing 105 days at random, the single most likely outcome is to draw eight significant market days. Instead, in my sample of 105 event days there are 24 market days. The odds of there being 24 or more market days by random chance are about 1 in 360,000. Recall that the typical standard for scientific research is 1 in 20.

101. Figure 32 presents the results of my event study and statistical analysis on all milestones, trading platform listings, customer & product announcements, acquisitions & investments, and Ripple commercialization initiatives. Every case of every model indicates a statistically significant correlation between these Ripple actions and XRP prices.

FIGURE 32: XRP PRICES REACT TO MILESTONES, TRADING PLATFORM LISTINGS, CUSTOMER & PRODUCT ANNOUNCEMENTS, ACQUISITIONS & INVESTMENTS, AND RIPPLE COMMERCIALIZATION INITIATIVES

Model Number	Parametric	Nonparametric
1	✓	✓
2	✓	✓
3	✓	✓
4	✓	✓
5	✓	✓
6	✓	✓
7	✓	✓
8	✓	✓
9	✓	✓
10	✓	✓
11	✓	✓
12	✓	✓
13	✓	✓
14	✓	✓
15	✓	✓
16	✓	✓
17	✓	✓
18	✓	✓
19	✓	✓
20	✓	✓

Notes:

✓ Indicates significance at the 5% level.

Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly positive returns are identified at the 5% one-sided level. See Appendix E.

102. The hypothesis that XRP prices are independent of Ripple's news about its business and activities can be rejected at any reasonable significance level. As a further demonstration of this, I apply the generalized rank test also found in Joo, Nishikawa, and Dandapani (2020). This is a test of the joint significance of these 105 event days: is the XRP return of this group events, taken together, statistically significant? Figure 33 indicates the statistical significance of these results. Every model indicates a significant reaction in the XRP market at the 5% level.

FIGURE 33: SIGNIFICANCE OF GENERALIZED RANK TEST APPLIED TO MILESTONES, TRADING PLATFORM LISTINGS, CUSTOMER & PRODUCT ANNOUNCEMENTS, ACQUISITIONS & INVESTMENTS, AND RIPPLE COMMERCIALIZATION INITIATIVES

Model Number	Minimum T-Statistic	Maximum T-Statistic
1	✓	✓
2	✓	✓
3	✓	✓
4	✓	✓
5	✓	✓
6	✓	✓
7	✓	✓
8	✓	✓
9	✓	✓
10	✓	✓
11	✓	✓
12	✓	✓
13	✓	✓
14	✓	✓
15	✓	✓
16	✓	✓
17	✓	✓
18	✓	✓
19	✓	✓
20	✓	✓

Notes:

✓	Indicates significance at the 5% level.
	Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. See Appendix E.

1. There Is No Relationship between Ripple News and Negative XRP Returns

103. As my first robustness check, I investigate whether the Ripple events described above are significantly associated with negative XRP returns. Such an association could be construed as evidence against the proposition in question.

104. Figure 34 reports instances of statistically significant correlations between these news events and XRP price *decreases*. Not a single instance indicates a significant correlation with negative returns.

FIGURE 34: THERE IS NO SIGNIFICANT RELATIONSHIP BETWEEN NEGATIVE XRP RETURNS AND MILESTONES, TRADING PLATFORM LISTINGS, CUSTOMER & PRODUCT ANNOUNCEMENTS, ACQUISITIONS & INVESTMENTS, AND RIPPLE COMMERCIALIZATION INITIATIVES

Model Number	Parametric	Nonparametric
1		
2		
3		
4		
5		
6		
7		
8	**NO SIGNIFICANT**	
9		
10		
11	**RESULTS**	
12		
13		
14		
15		
16		
17		
18		
19		
20		

Notes:

✓	Indicates significance at the 5% level.
	Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly negative returns are identified at the 5% one-sided level. See Appendix E.

2. There Is No Relationship between Ripple News and XRP Returns Just before the News Is Released

105. I next investigate whether Ripple news events are announced or released during periods of time when XRP prices are simply increasing for "other reasons." I apply my analytical framework not to the news

day itself, but to three days before the news day. If I continue to find evidence of significant correlation between XRP prices days before the news, this would suggest that something else, something other than the news itself, is driving the price growth. To associate the price increases with the news, and setting aside the possibility of rumors and leakage, I should not find any correlation if I look "too early."

106. Figure 35 reports incidents of statistically significant correlations between these news announcements and XRP prices three days before the news is released. Not a single instance indicates a significant correlation at the 5% significance level.

FIGURE 35: THERE IS NO SIGNIFICANT RELATIONSHIP BETWEEN XRP RETURNS AND MILESTONES, TRADING PLATFORM LISTINGS, CUSTOMER & PRODUCT ANNOUNCEMENTS, ACQUISITIONS & INVESTMENTS, AND RIPPLE COMMERCIALIZATION INITIATIVES 3 DAYS BEFORE EVENT

Model Number	Parametric	Nonparametric
1		
2		
3		
4		
5		
6		
7		
8	NO SIGNIFICANT RESULTS	
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Notes:

✓	Indicates significance at the 5% level.
	Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly positive returns are identified at the 5% one-sided level. See Appendix E.

3. Results Are Robust to Misclassifying Events

107. Classifying news is necessarily a subjective exercise. As a final robustness check, I consider the possibility that I may have misclassified events. There are two types of misclassification errors. First, I may have incorrectly included events in my set of "important" events which do not belong – meaning,

some of these 113 events should not have been considered. This first type of error is called "over-classification error." Second, I may have incorrectly excluded events – meaning, some of the 400 or so excluded events should have been included. This second type of error is called "under-classification error." I investigate both types of error below.

108. First I consider whether some of the events I have included in the set of Milestones, Trading Platform Listings, Customer & Product Announcements, Acquisitions & Investments and Ripple Commercialization Initiatives should be excluded. I randomly select 10% of the events and remove them from the analysis. I do this ten times. Figure 36 reports the average results. All cases of all models continue to indicate a significant correlation with XRP prices at any reasonable level of confidence. This indicates that my results are robust up to at least a 10% over-classification error rate.

FIGURE 36: CORRELATION BETWEEN XRP RETURNS AND MILESTONES, TRADING PLATFORM LISTINGS, CUSTOMER & PRODUCT ANNOUNCEMENTS, ACQUISITIONS & INVESTMENTS, AND RIPPLE COMMERCIALIZATION INITIATIVES IS ROBUST TO A RANDOM EXCLUSION OF EVENTS

Model Number	Parametric	Nonparametric
1	✓	✓
2	✓	✓
3	✓	✓
4	✓	✓
5	✓	✓
6	✓	✓
7	✓	✓
8	✓	✓
9	✓	✓
10	✓	✓
11	✓	✓
12	✓	✓
13	✓	✓
14	✓	✓
15	✓	✓
16	✓	✓
17	✓	✓
18	✓	✓
19	✓	✓
20	✓	✓

Notes:

✓	Indicates significance at the 5% level.
	Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly positive returns are identified at the 5% one-sided level. See Appendix E.

109. Next, I consider whether some of the events I have excluded from this set of events should be included. I randomly select 10% of all excluded events and add them to the analysis. I do this ten times. Figure 37 reports the average results. All cases continue to indicate a significant correlation with XRP prices at the 5% level. My results are robust up to at least a 10% under-classification error rate.

FIGURE 37: CORRELATION BETWEEN XRP RETURNS AND MILESTONES, TRADING PLATFORM LISTINGS, CUSTOMER & PRODUCT ANNOUNCEMENTS, ACQUISITIONS & INVESTMENTS, AND RIPPLE COMMERCIALIZATION INITIATIVES IS ROBUST TO A RANDOM INCLUSION OF EVENTS

Model Number	Parametric	Nonparametric
1	✓	✓
2	✓	✓
3	✓	✓
4	✓	✓
5	✓	✓
6	✓	✓
7	✓	✓
8	✓	✓
9	✓	✓
10	✓	✓
11	✓	✓
12	✓	✓
13	✓	✓
14	✓	✓
15	✓	✓
16	✓	✓
17	✓	✓
18	✓	✓
19	✓	✓
20	✓	✓

Notes:

✓ Indicates significance at the 5% level.

Indicates not significant at the 5% level.

Reports cases which are significant at the 5% level. Significantly positive returns are identified at the 5% one-sided level. See Appendix E.

VII. Correlation of XRP Returns with Other Digital Tokens Changes over Time

110. Event studies applied to traditional equity securities usually include controls for the "broad market" as well as the "industry sector" appropriate to the case at hand.[92] These specifications are supported by a great deal of theoretical research which suggests that there are likely common factors which would be expected to impact equity securities in a broadly similar way, and industry factors which would be expected to impact a subset of equity securities in a broadly similar way. As an example, during the pandemic equities were generally negatively impacted, but "airline" or "hotel" securities as a group might be impacted differently from "pharmaceuticals" as a group.

111. The idea that a particular market price might be affected both by idiosyncratic events as well as broader market drivers is therefore standard in the event study literature. In this section I investigate the relationship between XRP returns and those of other leading digital tokens to determine to what extent there may be common "digital token" factors driving correlated returns.

A. Security Prices Are Often Related to Common Factors

112. Financial economists have proposed a number of methods for modelling prices of securities. One general method is called the factor model,[93] where security prices are modelled to be related to the returns of some factors. Typically, these factors are returns of portfolios of other traded securities.[94] The market model is an example of a one-factor model,[95] which relates securities returns to the return of the broad market portfolio.

113. Because Bitcoin is by far the largest and most well-known digital token—especially in the earlier periods—financial economists have sometimes used Bitcoin as a proxy for the broader digital token

[92] A. Craig MacKinlay, "Event Studies in Economics and Finance," *Journal of Economic Literature* Vol. 35, 1997, pp. 13-39 at p. 18.

[93] A. Craig MacKinlay, "Event Studies in Economics and Finance," *Journal of Economic Literature* Vol. 35, 1997, pp. 13-39 at p. 18.

[94] A. Craig MacKinlay, "Event Studies in Economics and Finance," *Journal of Economic Literature* Vol. 35, 1997, pp. 13-39 at p. 18.

[95] A. Craig MacKinlay, "Event Studies in Economics and Finance," *Journal of Economic Literature* Vol. 35, 1997, pp. 13-39 at p. 18.

market. For example, Liu and Tsyvinski (2021) use Google searches for the word "Bitcoin" to proxy for investor attention of the broader digital token market.[96]

114. Consistent with that, financial economists have found that returns of other digital tokens are correlated with BTC returns.[97] As discussed below, I also find that during the period from 2014 to the end of 2020, XRP returns are correlated with Bitcoin returns, although the magnitude of that correlation fluctuates over time. More importantly, XRP returns can only be partially explained by BTC returns, and sometimes are explained more by ETH returns.

B. XRP Returns Are Only Partially Explained by Bitcoin Returns, and Sometimes Can Be Better Explained by Ether Returns

115. Figure 38 plots the 180-day rolling correlation between XRP returns and BTC returns. Correlation ranges from -1 to 1; a value of "1" means that two series are perfectly correlated while a value of "0" means they are uncorrelated. In this case, a correlation of "1" would mean that XRP returns and BTC returns move in the same direction in a one-to-to manner: when one increased, the other increased, and vice versa. Knowing the return of one token would immediately tell you the return of the other. A correlation of "-1" would mean that when one increased, the other decreased, and vice versa; again, knowing the return of one would tell you the return of the other (it would just be the opposite). If knowing what happened to one token would not tell you anything about what happened to the other, then the correlation would be "0." Intermediate correlations are informative but not decisive: a correlation of, say, 50% means that knowing the return of one token gives you some information about the return of the other, but only limited information.

116. Figure 38 illustrates that, except for some short periods of near-zero or even negative correlation, XRP returns and BTC returns are positively correlated, but only partially, with an average value of 0.42. Importantly, Figure 38 illustrates the historical correlation between XRP and BTC returns fluctuates over time and does not have a clear trend or pattern.

[96] Yukun Liu and Aleh Tsyvinski, "Risks and Returns of Cryptocurrency," *The Review of Financial Studies* Vol. 34, 2021, pp. 2689-2727 at pp. 2707-2708.

[97] *See*, e.g., Albert S. Hu, Christine A. Parlour, and Uday Rajan, "Cryptocurrencies: Stylized Facts on a New Investible Instrument," *Financial Management* Vol. 48, 2019, pp. 1049-1068 at Abstract.

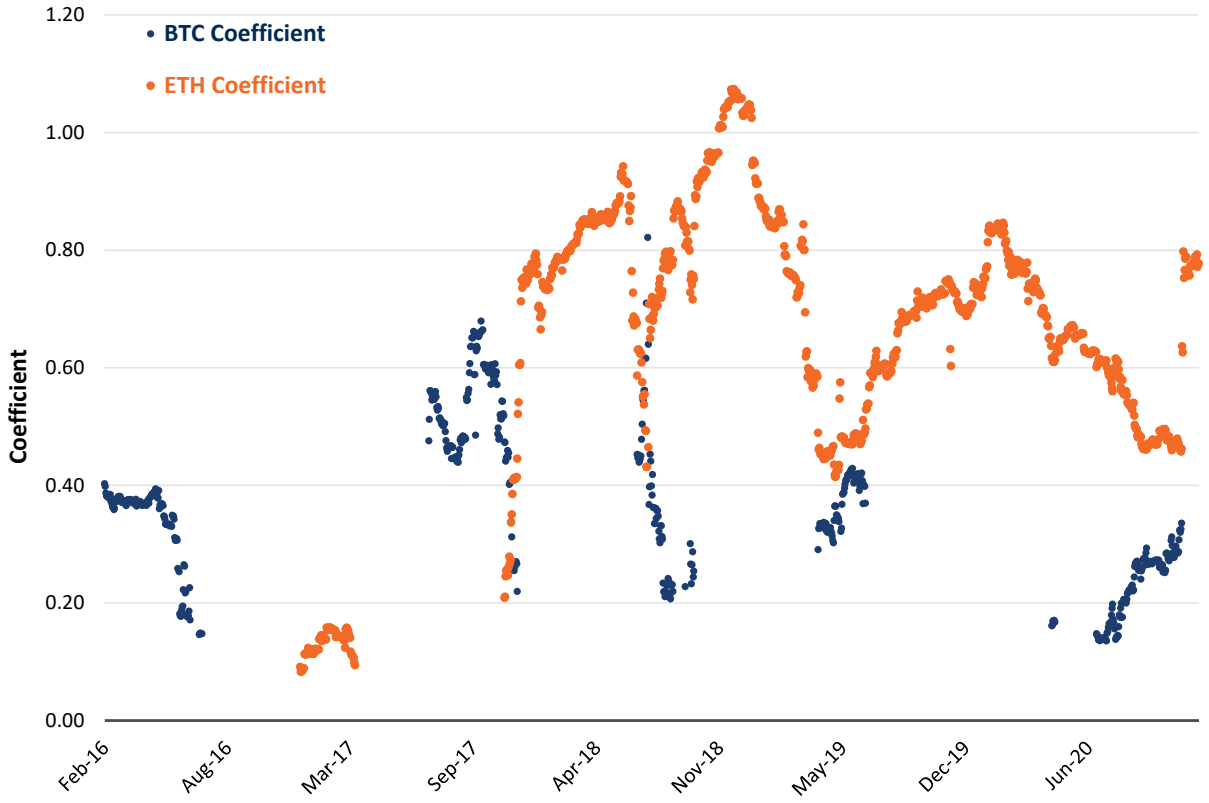
FIGURE 38: 180-DAY ROLLING CORRELATION BETWEEN XRP AND BTC RETURNS

Source: CoinMarketCap.

117. As discussed in Section V.B, I implement 20 regression models for XRP returns, each controlling for different sets of explanatory variables that could explain returns of XRP. Most of the models control for BTC; Model 5, in particular, controls for both BTC returns and ETH returns. Results from this model indicate that XRP returns are often explained more by ETH returns than by BTC returns. In addition, the relationship among returns of XRP, BTC, and ETH fluctuates over time.

118. Figure 39 plots the coefficients on BTC returns (dark blue) and the coefficients on ETH returns (orange) from 180-day rolling regressions. Only coefficients that are significant at least at the 10% level are plotted; gaps in Figure 39 therefore correspond to days when those coefficients do not achieve at least that level of significance. When ETH returns are not statistically related to XRP returns, there is a gap in the orange dots; when BTC returns are not statistically related to XRP returns, there is a gap in the dark blue dots.

FIGURE 39: REGRESSION COEFFICIENTS FROM MODEL 5



Source: CoinMarketCap.

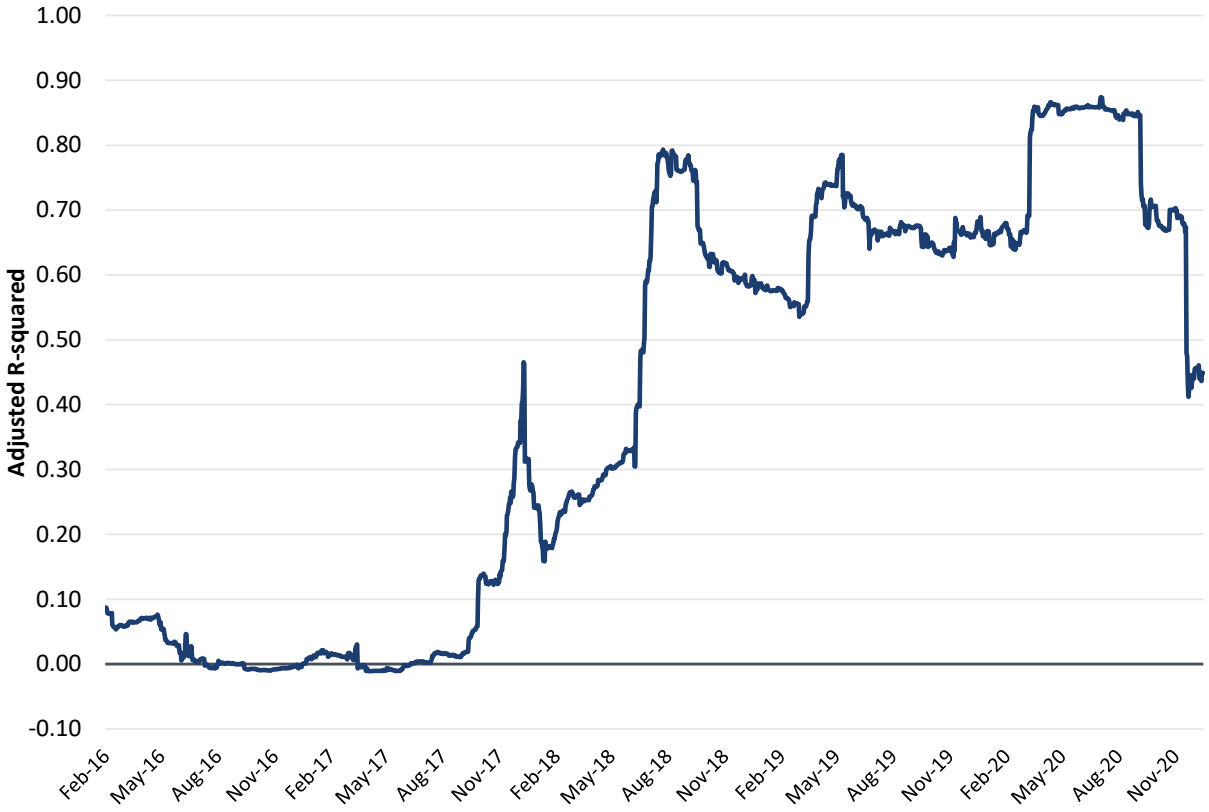
119. As illustrated in Figure 39, for both ETH and BTC there are times when they have no statistically significant relationship with XRP returns (i.e., there are gaps in the chart). More recently, ETH returns have "crowded out" BTC returns: there are more gaps in the dark blue dots than in the orange dots. This means, in more recent periods, ETH returns can explain XRP returns more than BTC returns can.

120. Figure 39 also illustrates that the magnitude of the relationships—measured by the coefficients—between XRP returns and ETH returns and the relationship between XRP returns and BTC returns fluctuate over time. A coefficient of 1 on ETH returns means that a 1% change in ETH's price is expected to be associated with a 1% change in XRP's price. Figure 39 illustrates that the coefficient on ETH returns ranges from about 0.10 to above 1.00, whereas the coefficient on BTC returns ranges from about 0.10 to about 0.70.

121. Consistent with the fluctuating pattern illustrated in Figure 39, when taken together, ETH returns and BTC returns can explain XRP returns in varying degrees over time. The adjusted R-squared of Model 5, plotted in Figure 40, illustrates this point. The R-squared measures how well a given set of control variables can explain the independent variable. An R-squared of 1 means that the control variables, taken together, can explain 100% of the variation in XRP returns. As illustrated in Figure 40, while BTC and ETH returns can explain as much as almost 90% of XRP returns during Q2 and Q3 of 2020, they

provide little explanatory power for XRP returns before late 2017. On average, these two factors explain only about 40% of the variation in XRP returns.[98]

FIGURE 40: ADJUSTED R-SQUARED IN MODEL 5



Source: CoinMarketCap.

[98] 40% calculated as the average of the adjusted R-squared series plotted in Figure 40.

A

[redacted]
Senior Consultant

New York, NY [redacted] [redacted]

[redacted] Dr. [redacted] worked for 15 years at [redacted] specializing in corporate, financial institution, sovereign and structured finance credit research and analysis. Most recently he was [redacted], a group of nearly 100 professionals with responsibility for developing credit models and methodologies for all asset classes across all lines of business. Dr. [redacted] also worked to create the [redacted], a team dedicated to leveraging machine learning and data mining techniques. Prior to that Dr. [redacted] was the [redacted], including Default Research, Model Development and Verification, and Technology. Dr. [redacted] frequently met with regulators and policy makers to discuss credit risk, credit ratings performance, risk modeling, and anti-trust and other policy questions.

Dr. [redacted] main areas of specialization are econometrics and statistics, finance, institutional and consumer credit, real estate, risk modeling and assessment, and numerical methods. He is the author of copyrighted and patented models. In addition to credit risk, his experience also includes work in asset pricing, real estate, and government. His work has been featured in the media such as the *Wall Street Journal*, *The Financial Times, The Economist, CNNMoney, CNBC, Forbes, Bloomberg, Fox Business, Business Week, Washington Post, Huffington Post,* and *Reuters,* among others.

Since becoming a consultant in 2018, Dr. [redacted] has testified as an expert witness on behalf of the U.S. Securities and Exchange Commission on event studies and market efficiency. He has worked as the case manager for the U.S. Department of Justice on behalf of [redacted] to assist in establishing liability and estimating damages in a case involving fraudulent mortgage servicing practices. Much of his work has been on collusion and manipulation of various markets, including commodities and fixed income securities such as corporate bonds, agency securities, sovereign and supranational bonds, variable rate demand obligations and other debt derivatives.

Dr. [redacted] has also worked on behalf of defendants on issues of class certification in the health insurance market. He has also worked on mergers and acquisitions in the telecommunications industry. Dr. [redacted] has worked extensively on cases involving multi-sided platforms for private plaintiffs, defendants and the U.S. government.

Dr. [redacted] has developed several models of corporate and consumer credit, financial risk contagion, real estate market performance measures, and pharmaceutical drug development, to name a few. He has developed patented models of default and credit rating transitions and trademarked models of regional real estate prices. Dr. [redacted] has developed models of residential mortgage default, prepayment and loss which have been used to assess the credit risk of hundreds of billions of dollars in securitizations. He has contributed to books on emerging markets and sovereign risk.

In pharmaceuticals, he co-developed a model to estimate the likelihood of drugs failing and succeeding each of the clinical stages of the Food and Drug Administration, and their expected durations in each of these phases. This model has become one of the two most used by industry analysts to assist in valuing pharmaceutical and biotechnology pipelines. His research on pharmaceuticals has been discussed in books on how to value pharmaceutical and biotechnology companies, and on publications pertaining to health care, intellectual property and cartels.

Dr. [redacted] has been at the forefront of the empirical detection of some conspiracies and manipulations. In 2008 he flagged the possibility of collusion in LIBOR prior to the launch of large scale investigations. He has also flagged the possibility of manipulation and collusion in gold markets in 2013.

Dr. [redacted] has co-authored several articles and papers on econometric methods and screens for conspiracies, manipulations and fraud. He has published in peer-reviewed journals such as the Journal of Pharmaceutical Finance, Economics and Policy, and the Journal of Banking and Finance. His work has also appeared in trade publications including The Antitrust Source, and The Competition Policy International Antitrust Chronicle.

Dr. [redacted] holds a PhD and a Masters in Economics from [redacted] where he was awarded Distinction in the field of Econometrics. He also holds a Bachelor of Arts in Economics from [redacted] where he graduated summa cum laude.

PROFESSIONAL EXPERIENCE

[redacted] (New York) **2020–Present**

Senior Consultant

- Credit Risk
- Securities fraud and manipulation
- Multi-sided platforms
- Mergers and acquisitions
- Event studies
- Valuation
- Collusion

[redacted] (New York) **2018–2020**

Managing Director. Consulting experience includes:

- Class certification
- Multi-sided platforms
- Mergers and acquisitions
- Event studies
- Securities fraud

- Valuation
- Collusion
- Market Manipulation

[redacted] [redacted] (New York) 2003–2018

Managing Director of the [redacted], managing a team of about 100 analysts. Research and technical responsibilities included:

- Development of credit rating methodologies and models for all produce lines, including corporate, financial institutions, sovereign, sub-sovereign, municipal and structured finance
- Default and ratings performance research for all product lines, including corporate, financial institutions, sovereign, sub-sovereign, municipal and structured finance
- Model verification and version control
- Regulatory reporting

Managing Director of [redacted], a group of 40 analysts. Research and technical responsibilities included:

- Default and ratings performance research for all product lines, including corporate, financial institutions, sovereign, sub-sovereign, municipal and structured finance
- Rating methodology and credit model development
- Rating methodology and credit model validation
- Model verification and version control
- Regulatory reporting

Research Economist, [redacted], as Vice President and Senior Vice President

- Published research primarily on corporate default and ratings performance
- Represented [redacted] at industry conferences
- Built a patented default and rating transition model
- Built a credit rating predictor model
- Select modeling and methodology development projects include:
- US Residential Mortgages: lead developer of mortgage default and loss severity models using data for nearly 1.4 million private label mortgages. These models represent the core of [redacted] new US residential methodology. The models provide the monthly term structure of default and prepayment risks as well as the first and second moments of the borrower's loss-given-default distribution. Easily permits stressing a portfolio of mortgage exposures based on macroeconomic scenarios.
- Global Bank Stress Testing: lead the effort to develop a new, consistent framework for stress-testing the asset portfolio of banks globally. A reduced from approach, it applies stress multiples to expected losses of different asset classes.
- Global Bank Credit Scorecard: developed an innovative credit scorecard for the Baseline Credit Assessments of global banks. The scorecard is based on a regression analysis of

bank failures during the recent financial crisis and incorporates bank balance sheet information, macroeconomic variables and assessments of sovereign credit risk.

- Corporate Defaults: lead developer of the patented Credit Transition Model, [redacted] propriety model of corporate (financial and non-financial) credit rating transitions and default. The model forecasts all rating transitions, including upgrades, downgrades, default and withdrawal at the individual issuer level by conditioning on issuer-specific information and macroeconomic drivers. Easily permits a coherent stress-test of corporate exposures based on macroeconomic scenarios. These scenarios could consider not just default, but transitions across rating boundaries (such as falling from investment-grade into speculative-grade) which may be critical to a portfolio manager.
- Credit Rating Prediction: lead developer of [redacted] proprietary Rating Predictor Model which maps credit ratios to implied credit ratings. The model significantly outperforms standard approaches such as linear regression and ordered Probit models. The model allows counter-factual analysis to determine how credit ratings might change given changes in underlying balance sheet metrics.

[redacted] (Washington, DC) **2002–2003**

Principal Analyst in the Microeconomics and Finance Division. Research and policy projected included:

- Econometric Modeling:
  - Developed a model to forecast bank deposits, assessable and insured, for use by the Budget Analysis Division
  - Estimated a discrete time, multiple-destination mixed proportional hazards model of pharmaceutical development
  - Estimated Logistic regressions of first stages of the FHA loss mitigation program
  - Specified a two-stage Probit model of additional stages of FHA loss mitigation program to correct for endogenous selection

- Financial Analysis:
  - Used derivative pricing theory to estimate the market value of risk born by the government through various contingent programs

[redacted] (Chicago) **1998–2002**

Chief Economist of the real estate investment company. Research projects included:

- Commercial Property Rent and Occupancy: developed proprietary forecasting models of rent and occupancy levels for multifamily, office, retail and warehouse properties at the MSA level.

- Optimal Property Location: developed location models for the Assisted Living and Self-Storage sectors in the U.S. and Europe. The models informed asset acquisition/disposition decisions.

EDUCATION

[redacted]
PhD, Department of Economics (2002)
Primary Fields: Econometrics, Macroeconomics and Monetary Economics, Numerical Methods
Secondary Fields: Asset Pricing, Public Finance
Awards: Award of Distinction in Econometrics, 2000
First Ever Student Awarded this Distinction in the Economics Department
MA, Economics (1997)

[redacted]
BA, Economics (1994)
Awards: Summa cum laude / Phi Beta Kappa junior year / College Honors Senior Comprehensive Distinction / *Wall Street Journal* Award for excellence in economics

EXPERT TESTIMONY

[redacted]
United States District Court, Southern District of New York
[redacted]

- Report Filed [redacted]
- Rebuttal Report Filed [redacted]
- Deposition Testimony [redacted]
- Declaration Filed [redacted]

SELECTED PUBLICATIONS, WORKING PAPERS, AND PRESENTATIONS

- [redacted] with [redacted] book chapter included in [redacted] published by [redacted], 2021 (forthcoming)
- [redacted] with [redacted] (forthcoming)

- [redacted] with [redacted], Working Paper, June 2021
- [redacted] with [redacted], Working Paper, June 2021
- [redacted] with [redacted], Working Paper, June 2021
- [redacted] with [redacted], [redacted], November 2020
- [redacted] with [redacted], [redacted], August 2020
- [redacted], with [redacted], [redacted], November 2019
- [redacted] with [redacted], [redacted] January 2019
- [redacted], with [redacted], [redacted], July 2018
- [redacted], with [redacted], December 18, 2014
- Contributed book chapter to [redacted], edited by [redacted], December 2014
- [redacted] Special Comment, July 2014
- [redacted] Special Comment, July 2014
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[818] "Cryptocurrency Sustainability: The Path Forward," Ripple Insights, April 8, 2021
[819] "Mercury to Boost Remittance Time and Money Savings to South Africa Using ODL," Ripple Insights, March 30, 2021
[820] "Ripple Acquires 40% Stake in Asia's Leading Cross-Border Payments Specialist, Tranglo," Ripple Insights, March 29, 2021
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[824] "Accelerating Financial Inclusion Through Technology," Ripple Insights, January 11, 2021
[825] "Our Statement On Recent Market Participant Activity," Ripple Insights, December 29, 2020
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[831] "Building the Value Web with Open Standards," Ripple Newsroom, April 28, 2015
[832] "Top Five Trends for Payments in 2015," Ripple Newsroom
[833] "Why Do Banks Prefer Ripple Over Bitcoin?," Ripple Newsroom
[834] "Cross-Border Payments Due For Disruption," Ripple Newsroom
[835] "Bitcoin Makes Gains With Merchants," Ripple Newsroom
[836] "Ripple for Good Supports Education and Financial Inclusion with $100 Million Commitment," Ripple Insights, September 27, 2018

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[1]	[2]	[3]	[4]	[5]	[6]
Acquisition & Investment	1/16/2018	287	1/16/2018	7766	Ripple turns investor as execs lead $25M round for storage and rental startup Omni
	4/11/2018	318	4/11/2018	7555	Ripple Invests $25M in Blockchain Capital's Latest Fund
	4/11/2018	318	4/11/2018	8409	Ripple Invests $25 Million to Drive Innovation in Blockchain and Digital Assets
	2/5/2019	402	2/5/2019	7675	Investing in Dharma
	2/5/2019	401	2/5/2019	7676	Former BMG Head Zach Katz Launches Music and Tech Investment Group With Scooter Braun's Ithaca Holdings
	3/12/2019	407	3/12/2019	7674	A Big Bet on Blockchain and Gaming: Ripple and Forte Announce $100 Million Fund
	6/17/2019	418	6/17/2019	7539	Ripple Announces Strategic Partnership with Money Transfer Giant, MoneyGram
	6/17/2019	418	6/17/2019	7668	Ripple to Invest Up to $50 Million in MoneyGram
	9/27/2019	426	9/27/2019	7664	Ripple's Xpring Looks to Build XRP DeFi Products With New Acquisition
	9/30/2019	427	9/30/2019	8341	Ripple Continues Acquisition Streak, Expands European Operations to Iceland
	10/14/2019	433	10/14/2019	8337	Our Investment in Bitso
	10/14/2019	433	10/14/2019	7659	Ripple invests in Mexican broker Bitso, targets Brazil and Argentina
	11/25/2019	444	11/25/2019	7653	Ripple completes $50 million investment in MoneyGram
	10/28/2020	507	10/28/2020	7616	Ripple to Invest in Japan's SBI Subsidiary MoneyTap
Case Study	12/13/2014	28	12/13/2014	7901	Small Bank in Kansas Is a Financial Testing Ground
	6/27/2016	155	6/27/2016	7820	Canada to Germany Ripple bank transfer breakthrough for banking industry
	6/27/2016	155	7/12/2016	7819	Sent in Seconds, Not Days: Canadian Bank Tries Distributed Ledger
	7/15/2016	158	7/15/2016	8521	Watch Real Money Cross Borders in Real Time
	2/1/2017	206	2/1/2017	8479	National Bank of Abu Dhabi: First Middle East Bank to Use Ripple for Cross-Border Payments
	7/10/2017	231	7/10/2017	8460	Results of the Bankof England/Ripple Proof of Concept Published Today
	12/18/2017	262	12/18/2017	8430	Krungsri Collaborates with Petrochemical Company to Expedite Cross-border Payments and Retain Customers
	1/29/2018	293	1/29/2018	7761	In Their Own Words: Real Companies Talk Ripple XRP Pilots
	5/10/2018	328	5/10/2018	7553	Ripple Reports Positive Results From xRapid Pilots
	5/10/2018	328	5/10/2018	8402	First Pilot Results for xRapid
	5/10/2018	328	5/10/2018	7715	Ripple: XRP Pilot Cuts Payment Fees Up to 70%
	5/10/2018	328	5/10/2018	7716	Ripple Reveals Results Of First Pilot Tests Using XRP Cryptocurrency
	6/29/2018	345	6/29/2018	7700	Santander, Ripple Use Blockchain To Settle Global Payments
	10/1/2018	368	10/1/2018	8376	Swell 2018: How Banco Santander Launched a Payment App for Millions
	10/2/2018	370	10/2/2018	8373	TransferGo On Solving for Real-Time Cross-Border Settlement at Swell 2018
	10/18/2018	375	10/18/2018	8370	How Payments Improved InstaReM and BeeTech's Customer Experience
	11/15/2018	385	11/15/2018	8361	Swell 2018: Siam Commercial Bank Seeks a Payments Vendor, Finds a Business Partner in Ripple
	11/21/2018	386	11/21/2018	8360	Swell 2018: How Bloackchain Can Learn from eBay, the Original Digital Cross Border Payments Company
	12/10/2018	388	12/10/2018	8358	Coinone Transfer Offers South Korea's First Blockchain-Powered Remittance Service
	11/8/2019	443	11/8/2019	8331	Swell 2019: MoneyGram CEO Says 10% of Transactions Between Mexico and U.S. Use On-Demand Liquidity
	12/12/2019	447	12/12/2019	8330	SendFriend Uses On-Demand Liquidity to Save Customers Up to 80% In Remittance Fees
	1/29/2020	452	1/29/2020	8326	goLance Leverages On-Demand Liquidity to Deliver Faster, Cheaper Payments to Their Global Marketplace of Freelancers
	2/12/2020	454	2/11/2020	8324	Amendments: Ensuring Sensible Evolution of the XRP Ledger
	3/5/2020	459	3/5/2020	8320	Bitso and Ripple Are Delivering Friction-Free Exchange Across Latin America
	3/26/2020	462	3/26/2020	8319	Siam Commercial Bank Drives Innovation and Customer Growth With Help From Ripple
	4/2/2020	464	4/2/2020	7642	Money transfer service Azimo partners with Siam Commercial Bank for faster payments to Thailand
	4/2/2020	464	4/9/2020	8318	Azimo and SCB Runs on Ripple for Instant Payments Into Thailand
	4/29/2020	469	4/29/2020	8315	TPBank Uses RippleNet to Drive Transparent Global Payments Between Vietnam and The World
	5/7/2020	473	5/7/2020	8312	BTC Markets Drives Sustainable Growth of Its Exchange with XRP
	5/27/2020	476	5/27/2020	8311	Tapping the Power of RippleNet Cloud
	6/8/2020	478	6/8/2020	8310	Staying the Course in Remittances and SME Payments
Charity	4/23/2015	61	4/23/2015	8585	RippleWorks Launches to Support Global Entrpreneurs Building Paths out of Poverty
	10/16/2017	246	10/16/2017	8444	Ripple & the Gates Foundation Team Up to Level the Economic Playing Field for the Poor
	12/26/2017	268	12/26/2017	8425	The Season for Giving: Auctioning Off Ripple-Branded Patagonia Jackets for Charity
	3/27/2018	315	3/27/2018	8411	Ripple and Its Executives Proud to Support America's Public Schools with $29 Million XRP Donation to DonorsChoose org
	3/27/2018	315	3/28/2018	7727	Bay Area startup donates $29 million to classrooms all over U.S.

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Charity	3/27/2018	315	3/28/2018	7728	Ripple donates $29 million after nonprofit's founder 'dared' himself to ask
	3/27/2018	315	3/28/2018	7729	Ripple gives away $29 million of its cryptocurrency to public schools
	3/27/2018	315	3/28/2018	7730	Cryptocurrency Company's $29 Million Donation Funds Thousands Of Classroom Projects
	3/27/2018	315	3/29/2018	7724	A $29 Million Cryptocurrency Donation Just Funded Every Project On DonorsChoose.Org
	3/27/2018	315	3/29/2018	7725	San Francisco based Ripple donates $29M to schools across country
	3/27/2018	315	3/29/2018	7732	Bonanza for schools as SF crypto king Ripple gives $29M to DonorsChoose.org
	3/27/2018	315	4/2/2018	7726	Every single teacher on a crowd-funding site just got their wishes fulfilled
	5/23/2018	332	5/23/2018	7713	Ellen DeGeneres Gets Emotional After Ashton Kutcher Surprises Her With $4 Million Donation to Wildlife Fund
	7/30/2018	350	7/30/2018	8389	Ripple and Raising Malawi Launch Campaign to Sponsor Children in Need
	7/30/2018	350	7/31/2018	7697	Ripple Partners With Madonna to Fundraise for Orphans in Malawi
	9/27/2018	364	9/27/2018	7547	Ripple Announces Ripple for Good, Social Giving Will Top $100 Million
	9/27/2018	364	9/27/2018	7689	'Ripple for Good': Ripple Commits $100 Million to Social Giving Program
	3/7/2019	406	3/7/2019	8348	Ripple Partners with Tipping Point to Improve Economics Mobility for Bay Area Workers and Families
	4/16/2020	465	4/16/2020	8317	Giving in Place: Ripple Is Proud to Be Part of the Tech Community's Response to COVID-19
	4/16/2020	465	4/25/2020	7639	Blockchain firm Ripple donates $5 million to Bay Area food banks
	5/22/2020	475	5/22/2020	7637	Ripple And Chris Larsen Make Waves With Covid-19 Donations In Bay Area
	10/15/2020	503	10/15/2020	8297	Mercy Corps: Leveraging the Potential of Fintech To Accelerate Financial Inclusion in Emerging Markets
	12/20/2020	514	12/20/2020	8292	Our Commitment To Combating Food Scarcity With Eat. Learn. Play.
Corporate Activity & Announcement	6/19/2014	4	6/19/2014	7933	Creating Faster Foundations
	10/20/2014	15	10/20/2014	7593	21 Top Bitcoin and Digital Currency Companies Endorse New Digital Framework for Digital Identity, Trust and Open Data
	10/20/2014	15	10/20/2014	7920	Manifesto Vows to Give Consumers Control of Digital Identities
	10/20/2014	15	10/21/2014	7918	Why 20 Bitcoin Companies Are Backing a New Deal for Digital Identity
	12/24/2014	30	12/24/2014	7899	The 10 Most Influential People in Bitcoin 2014
	2/9/2015	42	2/9/2015	7590	Ripple Labs Named Fourth Most Innovative Company in Money for 2015 by Fast Company
	2/9/2015	42	2/9/2015	8589	Ripple Labs Makes Fast Company's 2015 Most Innovative Companies List
	2/9/2015	42	2/9/2015	7881	The World's Top 10 Most Innovative Companies Of 2015 In Money
	3/30/2015	55	3/30/2015	7871	EBAday attracts titans of transaction banking
	4/30/2015	63	4/30/2015	8583	European Payments Council: Ripple for Inter-bank Payments
	5/1/2015	65	5/1/2015	7861	An infrastructure approach to improving Financial Inclusion
	8/5/2015	90	8/5/2015	7582	Ripple Labs Awarded as Technology Pioneer by World Economic Forum
	8/5/2015	90	8/5/2015	8571	Ripple Labs Named a Technology Pioneer by World Economic Forum
	12/9/2015	110	12/9/2015	7830	The Fintech 50: The Complete List 2015
	12/21/2015	114	12/21/2015	8557	Looking Forward to Davos 2016
	1/16/2016	121	1/16/2016	7648	The 35 Best Small and Medium Workplaces in the Bay Area
	2/2/2016	130	2/2/2016	8545	Join the Interledger Community Meeting
	2/22/2016	133	2/22/2016	8541	Looking Forward to the W3C Interledger Payments Community Group Meeting
	3/16/2016	137	3/16/2016	8537	Chris Larsen to Guest Lecture for MIT Future Commerce
	4/15/2016	142	4/15/2016	8534	Looking Forward to NACHA #PAYMENTS2016
	4/26/2016	144	4/26/2016	8532	Nilesh Dusane Recognized as BAFT Future Leader
	7/29/2016	161	7/29/2016	8518	Looking Forward to Sibos 2016
	9/26/2016	175	9/25/2016	8508	Sibos 2016: Ripple Has Arrived
	9/27/2016	176	9/27/2016	8507	Ripple Executive Marcus Treacher Appointed to CHAPS Board
	10/17/2016	183	10/17/2016	8499	Interledger.js Joins the JavaScript Foundation
	1/18/2017	204	1/18/2017	8480	Ryan Zagone Recognized as BAFT Future Leader
	7/21/2017	234	7/21/2017	8456	Federal Reserve Task Force: Ripple Improves Speed and Transparency of Global Payments
	8/24/2017	236	8/24/2017	8454	Announcing Swell by Ripple
	10/15/2017	237	10/15/2017	8445	A Rising Tide of Anticipation Builds for Swell
	2/21/2018	304	2/21/2018	8415	Continued Decentralization & the XRP Ledger Consensus Protocol
	3/2/2018	306	3/2/2018	7556	Ripple Applauds Mexico's Lower House of Congress for Passing FinTech Rules
	3/23/2018	313	3/23/2018	8412	Tour de Schwartz
	4/17/2018	320	4/17/2018	7720	Ripple's Brad Garlinghouse and Michael Arrington to talk cryptocurrency at Disrupt SF

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Corporate Activity & Announcement	4/24/2018	321	4/24/2018	8407	XRP Community Comes Together for Blockchain Week
	5/15/2018	331	5/15/2018	8399	Growing Support for an XRP Symbol
	5/23/2018	333	5/23/2018	8398	Schwartz Rides Again: Tour de Schwartz EU
	7/31/2018	351	7/31/2018	7551	President Bill Clinton Keynotes Ripple's Swell Conference 2018
	7/31/2018	351	7/31/2018	8388	President Bill Clinton Keynotes Swell 2018
	9/7/2018	359	9/7/2018	8385	President Bill and Counting Crows Headline Swell 2018
	9/30/2018	366	9/30/2018	8379	Swell 2018 Kicks Off Tomorrow
	10/3/2018	373	10/3/2018	8372	Swell 2018: Wrapping Up a Historic Year for Ripple
	10/19/2018	376	10/19/2018	8369	Ripple Leadership Front and Center at Money20/20
	12/18/2018	390	12/18/2018	8357	Ask Me Anything with Brad Garlinghouse and Monica Long
	4/8/2019	410	4/8/2019	7672	World Changing Ideas 2019: All the winners, finalists, and honorable mentions
	4/16/2019	412	4/16/2019	7671	Blockchain 50: Billion Dollar Babies
	8/19/2019	422	8/19/2019	8344	A New Reality Unfolds: Announcing Swell 2019 Keynote Speakers
	9/4/2019	423	9/4/2019	7665	Top Startups To Work For In 2019 According To LinkedIn
	9/12/2019	424	9/12/2019	8343	Ambassador Chan Heng Chee to Highlight U.S.-China Politics and Geoeconomics at Swell 2019
	9/25/2019	425	9/25/2019	8342	DBS Group CEO Piyush Gupta to Discuss the Future of Digital Banking at Swell 2019
	10/4/2019	429	10/4/2019	8339	Academia, Take the Wheel: UBRI Enters Its Sophomore Year in High Gear
	10/16/2019	435	10/16/2019	8336	MoneyGram CEO to Highlight the Impact of Digital Assets and Blockchain Technology at Swell 2019
	2/19/2020	456	2/19/2020	7646	Forbes Blockchain 50
	4/28/2020	468	4/28/2020	7631	World Changing Ideas Awards 2020: Experimental Finalists and Honorable Mentions
	5/5/2020	471	5/5/2020	8313	Block Stars: How Digital Assets Will Help Create a Sustainable Global Economy
	5/29/2020	477	5/29/2020	7636	Meet the Most Influential Women in Bay Area Business 2020
	6/16/2020	481	6/16/2020	7635	DISRUPTOR 50 202028. Ripple
	7/29/2020	486	7/29/2020	7629	100 Best Workplaces for Innovators
	7/31/2020	488	7/31/2020	7628	Top Bay Area Corporate Philanthropists
	8/3/2020	490	8/3/2020	7627	Annual Inc5000 2020
	9/15/2020	494	9/15/2020	8302	The World Economic Forum's Sheila Warren Keynotes Ripple Swell Global 2020
	10/22/2020	505	10/22/2020	8295	Creating a More Inclusive Financial System With Crypto
Customer & Product	5/5/2014	1	5/5/2014	7598	Ripple Labs Announces Fidor Bank AG as First Bank to Use the Ripple Protocol
	6/12/2014	2	6/12/2014	7597	AstroPay Launches First Latin American Money Service Business on Ripple Protocol
	6/12/2014	2	6/13/2014	7935	Ripple LatAm Looks To Streamline Remittences and Cross-Border Payments
	7/21/2014	7	7/21/2014	7930	Ripple Labs Unveils Proposal for New Smart Contract System
	7/29/2014	9	7/29/2014	7596	Anyone Can Now Trade, Send and Spend Physical Gold Online via GBI's Ripple Gateway
	7/29/2014	9	7/30/2014	7926	You Can Now Use Ripple to Buy, Spend and Trade Gold
	7/29/2014	9	7/30/2014	7927	The Bitcoin Crowd Reaches Out to the Gold Bugs
	9/24/2014	11	9/24/2014	7594	Hundred-Year-Old CBW Bank One of the First U S. Banks to Integrate Ripple as Transformational Money Transfer Protocol
	9/24/2014	12	9/24/2014	7595	Cross River Bank to Integrate Ripple for Real-Time International Payments
	9/24/2014	13	9/24/2014	7923	Two US banks are ready to embrace the Ripple protocol, allowing instant global money transfers
	9/24/2014	13	9/24/2014	7924	Ripple Signs First Two U.S. Banks to Bitcoin-Inspired Payments Network
	9/24/2014	13	9/25/2014	7919	US Banks: Why We Embraced Ripple
	9/24/2014	13	9/25/2014	7925	Ripple Brings Real Time Payments To The U.S.
	10/27/2014	17	10/27/2014	7916	Ripple Ecosystem Expands with British Startup Ripula
	11/4/2014	21	11/4/2014	7912	Ripple protocol integrated into risk management system from Yantra
	12/3/2014	26	12/3/2014	7592	Earthport and Ripple Labs Announce Global Partnership to Improve the Efficiency and Speed of Cross-Border Payments
	12/3/2014	26	12/4/2014	7903	BitBeat: Ripple Partners With Global Payments Service Earthport
	12/3/2014	26	12/4/2014	7904	Ripple Labs, Earthport Cut Open Source Deal
	12/3/2014	26	12/4/2014	7905	Earthport and Ripple Bring Crypto Tech to Cross-Border Payments
	12/3/2014	26	12/4/2014	7906	Ripple to plug into Earthport payment network
	12/3/2014	26	12/4/2014	7907	Ripple Labs Partnership Brings Real-Time Transactions to Global Payments Hub
	4/29/2015	62	4/29/2015	8584	Milken Institute: Bringing Financial Inclusion to the Underserved
	4/29/2015	62	4/29/2015	7864	New Moves by Coinbase, Ripple Advance Digital Money Tech

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Customer & Product	4/29/2015	62	4/29/2015	7865	Western Union Will Give Ripple a Chance
	6/9/2015	77	6/9/2015	7853	Westpac, ANZ trial Ripple payments, but big four reluctant on bitcoin
	10/6/2015	97	10/6/2015	7579	New Ripple Settlement and FX Solutions Lower the Total Cost of Settlement for Banks and Their Customers
	10/13/2015	98	10/13/2015	7837	D+H adopts Ripple distributed ledger to reduce costs
	12/16/2015	112	12/16/2015	8558	Distributed Ledger Technology Offers Solutions for Trade Finance in Asia
	1/12/2016	119	1/12/2016	8554	Earthport Launches Distributed Ledger Hub
	4/12/2016	141	4/12/2016	7575	MIT Adopts Ripple Validator to Advance Consensus and Blockchain Research
	4/12/2016	141	4/12/2016	8535	MIT Running a Ripple Validator
	4/19/2016	143	4/19/2016	8533	Introducing CGI's Ripple-Enabled Intelligent Gateway
	5/26/2016	148	5/26/2016	8528	Santander Becomes the First U.K. Bank to Use Ripple for Cross-Border Payments
	5/26/2016	148	5/26/2016	7833	Santander first UK bank to do blockchain-based international payments using Ripple
	6/22/2016	154	6/22/2016	7574	More Financial Institutions Join Ripple's Global Network
	6/22/2016	154	6/22/2016	8523	Seven Leading Banks Join Ripple's Global Network
	6/22/2016	154	6/22/2016	7823	Banks trial Ripple blockchain to make money transfers 'like sending an iMessage'
	6/22/2016	154	6/22/2016	7825	Banks to use cutting-edge blockchain technology to speed up transactions
	6/22/2016	154	6/23/2016	7827	More Banks Are Trying Out Blockchains For Fund Transfers
	6/22/2016	154	7/2/2016	7828	Seven banks kick-off Ripple's blockchain network including Santander, UBS and UniCredit - '90 more in the pipeline'
	6/22/2016	154	6/22/2016	7822	Banks claim blockchain breakthrough in money transfer
	7/18/2016	159	7/18/2016	8520	Mizuho to Pilot Ripple for Cross-Border Payments
	8/16/2016	165	8/16/2016	8514	Multi-Signing in Ripple: A Q&A with David Schwartz
	8/19/2016	169	8/19/2016	8513	SBI Ripple Asia Announces Japanese Bank Consortium
	9/15/2016	171	9/15/2016	7572	Ripple Adds Several New Banks to Global Network
	9/15/2016	171	9/15/2016	8511	Several Globl Banks Join Ripple's Growing Network
	9/28/2016	177	9/28/2016	8506	Sibos Day 2: Standard Chartered and CGI Share News
	9/28/2016	177	9/28/2016	8505	Live from Sibos: Bankers Talk Ripple
	10/20/2016	185	10/20/2016	7570	R3 Trials Interbank Cross-Border Payments With Ripple's Digital Asset XRP
	10/20/2016	185	10/20/2016	8497	Ripple and R3 Team Up with 12 Banks to trial XRP for Cross-Border Payments
	10/20/2016	185	10/20/2016	7806	U S. start-up R3, banks test Ripple's cross-border payments technology
	10/20/2016	185	10/20/2016	7807	Ripple and R3 Achieve Breakthrough in Cross-Border Bank Payments
	11/16/2016	191	11/16/2016	8492	Ripple Announces An Upgrade to RippleCharts
	12/12/2016	197	12/12/2016	8486	FlashFX Uses Ripple and XRP
	1/9/2017	199	1/9/2017	7801	Axis Bank becomes third lender to offer block chain service
	2/15/2017	209	2/15/2017	8477	BitGo Builds Enterprise Wallet for XRP
	2/28/2017	212	2/28/2017	8474	Ripple Consensus Ledger Can Sustain 1000 Transactions per Second
	3/2/2017	213	3/1/2017	8473	Forty Seven Japanese Banks Move Towards Commercial Phase Using Ripple
	3/2/2017	213	3/1/2017	7797	Ripple takes money transfers to the cloud
	3/7/2017	214	3/7/2017	8472	Ripple Can Help Banks Evaluate Their Cross-Border Payment Costs
	3/17/2017	216	3/17/2017	8470	Ripple Selected to Participate in the Bank of England FinTech Accelerator
	3/31/2017	219	3/31/2017	8468	New Features Increase XRP Ledger Transaction Throughput to Same Level as Visa
	4/26/2017	222	4/26/2017	7568	Ten More Financial Institutions Join Ripple's Global Payments Network
	4/26/2017	222	4/26/2017	8465	Ten New Customers Join Ripple's Global Payment Network
	5/11/2017	224	5/11/2017	8464	How We Are Further Decentralizing the XRP Ledger to Bolster Robustness for Enterprise Use
	6/29/2017	229	6/29/2017	7566	SCB, Ripple Launch First Blockchain-Powered Payment Service Between Japan and Thailand
	6/29/2017	229	6/29/2017	8461	It's Now Faster and Easier to Send Money Between Japan and Thailand
	7/10/2017	230	7/10/2017	8459	Sumitomo Mitsui Banking Corporation and Japan Post Bank Join SBI Ripple Asia's Bank Consortium
	7/17/2017	232	7/17/2017	8458	XRP Ledger Decentralizes Further With Expansion to 55 Validator Nodes
	9/11/2017	241	9/11/2017	8450	SBI Ripple Asia partners with DAYLI Financial Group to bring Ripple to South Korea
	10/10/2017	244	10/10/2017	7565	Ripple's Blockchain Network Is Now More Than 100 Strong
	10/10/2017	244	10/10/2017	8447	RippleNet Grows to More Than 100 Financial Institutions
	11/16/2017	252	11/16/2017	7564	American Express Introduces Blockchain-enabled, Cross-border Payments
	11/16/2017	252	11/16/2017	8438	American Express Joins RippleNet - Giving Visibility and Speed to Global Commercial Payments
	11/22/2017	255	11/22/2017	8436	Ripple-powered Instant Payment Services Now Live with Axis Bank, RAKBANK, and Standard Chartered

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Customer & Product	11/22/2017	255	11/22/2017	7790	Standard Chartered, Axis Launch Payments Service With Ripple Tech
	12/5/2017	258	12/5/2017	8434	Japan Bank Consortium Moves to Become Production-ready
	12/12/2017	261	12/14/2017	8431	Top Korean Banks Work with Japan Banks Consortium to Modernize Cross-border Payments
	1/11/2018	284	1/11/2018	7562	Ripple and MoneyGram Partner to Modernize Payments
	1/11/2018	284	1/11/2018	8422	MoneyGram to Use XRP for Faster International Payments
	1/11/2018	284	1/11/2018	7768	MoneyGram shares jump on partnership with bitcoin rival Ripple
	1/11/2018	284	1/11/2018	7769	MoneyGram Signs Deal to Work With Currency Startup Ripple
	1/11/2018	284	1/11/2018	7770	Ripple surges after news of deal with MoneyGram
	1/11/2018	284	1/14/2018	7767	MoneyGram teams up with cryptocurrency Ripple on 'payment flow' project
	1/24/2018	290	1/24/2018	8420	More Global Payment Providers, IDT and MercuryFX, Sign Up to Use XRP
	1/24/2018	290	1/24/2018	7763	Ripple Adds New Partners in Push to Make Case for XRP
	1/29/2018	292	1/29/2018	7760	MoneyGram CEO Plans Waves With Ripple
	2/7/2018	296	2/7/2018	7561	Ripple Partners with LianLian International to Power Instant Payments to China
	2/7/2018	296	2/7/2018	8418	LianLian International Joins RippleNet to Provide Faster Payments into China
	2/7/2018	296	2/7/2018	7758	Ripple Blockchain Network Adds China Payments Provider
	2/8/2018	297	2/10/2018	7560	UAE Exchange Partners with Ripple for Instant Cross-Border Payments
	2/8/2018	297	2/11/2018	7757	Ripple Signs International Payment Deal with Foreign Exchange Giant UAE Exchange
	2/8/2018	297	2/12/2018	7755	UAE Remittance Firm Partners With DLT Startup Ripple
	2/8/2018	297	2/12/2018	7756	UAE Exchange Partners With Ripple
	2/13/2018	299	2/13/2018	7752	Western Union Says It's Testing Transactions With Ripple
	2/13/2018	299	2/14/2018	7751	Western Union says it's testing transactions using Ripple technology
	2/13/2018	299	2/14/2018	7753	Western Union Is Testing Ripple and XRP for Money Transfers
	2/14/2018	300	2/14/2018	7559	Ripple and Saudi Arabian Monetary Authority (SAMA) Offer Pilot Program for Saudi Banks
	2/14/2018	300	2/14/2018	8417	Ripple and Saudi Arabian Monetary Authority (SAMA) Offer Pilot Program for Saudi Banks
	2/14/2018	300	2/14/2018	7754	Saudi Central Bank to Test Ripple Payments Tech
	2/14/2018	300	2/15/2018	7749	Saudi Arabia's central bank signs blockchain deal with Ripple
	2/21/2018	302	2/21/2018	7558	Ripple Extends its Reach into Emerging Markets With Five New Customers
	2/21/2018	302	2/21/2018	8416	RippleNet Strengthens Emerging Markets Access into India, Brazil and China
	2/21/2018	302	2/21/2018	7745	Ripple Adds 5 New Clients Across 4 Countries
	2/21/2018	302	2/21/2018	7746	Ripple Adds Top Latin America Bank to Its Cash-Transfer Network
	2/21/2018	303	2/21/2018	7747	Ripple Papers Pledge New Start for $40 Billion XRP
	3/1/2018	305	3/1/2018	7557	FLEETCOR & Ripple Team Up to Modernize Payments Using Blockchain
	3/1/2018	305	3/1/2018	8414	Cambridge to Use XRP for Faster Global Payments
	3/1/2018	305	3/1/2018	7744	Payment Provider Fleetcor to Pilot Ripple's XRP Cryptocurrency
	3/6/2018	308	3/6/2018	8413	Ripple Powered Mobile App to Provide On-Demand Domestic Payments in Japan
	3/6/2018	308	3/7/2018	7739	Japanese Banks to Harness Ripple DLT for Consumer Payments App
	3/6/2018	308	3/7/2018	7741	Ripple Develops Blockchain Payments App With 61 Japanese Banks
	3/6/2018	308	3/7/2018	7742	Ripple develops blockchain-powered payment app with 61 banks to speed up transactions in Japan
	3/24/2018	314	3/24/2018	7734	Santander is set to launch an international money transfer app with Ripple
	4/12/2018	319	4/12/2018	8408	Santander Launches First Mobile App for Global Payments Using Ripple's xCurrent
	4/12/2018	319	4/12/2018	7721	Blockchain dreams do come true: A big Spanish bank's customers can now use it to transfer money
	4/12/2018	319	4/12/2018	7723	Santander launches a blockchain-based foreign exchange service that uses Ripple's technology
	4/12/2018	319	4/12/2018	7722	Santander launches blockchain-based foreign exchange service
	4/26/2018	324	4/26/2018	7554	Ripple Grows Its Global Payments Network With Five New xVia Customers
	4/26/2018	324	4/26/2018	8404	xVia Opens New Doors in Emerging Markets
	5/7/2018	327	5/8/2018	8403	Korea's Coinone Transfer Joins RippleNet
	5/7/2018	327	5/9/2018	7717	Crypto Exchange Coinone Taps Ripple for New Remittance Service
	5/14/2018	329	5/14/2018	8400	Mitsubishi Corporation, Krungsri and Standard Chartered Pilot Payments from Thailand to Singapore on RippleNet
	5/26/2018	335	5/31/2018	7709	Money Transfer Firms Join Ripple's Payment Network
	6/27/2018	344	6/27/2018	8394	Ripple Improves Access to India with Kotah Mahindra Bank
	9/5/2018	358	9/5/2018	7692	TransferGo Opens Payments Corridor to India Using Ripple Tech
	9/13/2018	361	9/13/2018	8384	National Commercial Bank of Saudi Arabia Joins RippleNet

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Customer & Product	9/19/2018	362	9/19/2018	7548	PNC Treasury Management Joins RippleNet
	9/19/2018	362	9/19/2018	8382	PNC Bank Embraces Blockchain and Join RippleNet
	9/19/2018	363	9/19/2018	8383	RippleNet Now Reaches 40 Countries Improving Remittances and SME Payments
	9/19/2018	362	9/19/2018	7690	Blockchain startup Ripple signs up PNC as a customer for its payment tech
	9/28/2018	365	9/28/2018	8380	Siam Commercial Bank Drives Pioneers RippleNet's "Multi-hop" Feature
	10/1/2018	367	10/1/2018	7546	Ripple Highlights Record Year, xRapid Now Commercially Available
	10/1/2018	367	10/1/2018	8378	Ripple Highlights Record Year, xRapid Now Commercially Available
	10/1/2018	367	10/1/2018	7684	Ripple says 3 clients are putting xRapid into full commercial use
	10/1/2018	367	10/1/2018	7685	Ripple is Real, as Global Money Transfers Fueled by XRP Go Live Today
	10/1/2018	367	10/1/2018	7686	Startup Ripple signs up payments firms for crypto-based platform
	10/1/2018	367	10/1/2018	7687	Ripple Debuts XRP-Based Cryptocurrency Product for International Payments
	10/1/2018	367	10/1/2018	7688	Ripple's cryptocurrency product goes live for the first time with three financial firms
	11/14/2018	384	11/14/2018	7545	CIMB Group Joins RippleNet to Power Instant Payments Across ASEAN
	11/14/2018	384	11/14/2018	8362	CIMB Group Joins RippleNet to Power Instant Payments Across ASEAN
	12/13/2018	389	12/13/2018	7682	Finablr's UAE Exchange, Ripple to begin blockchain payments by first quarter
	1/8/2019	392	1/8/2019	8355	RippleNet Surpasses 200 Customers Worldwide
	1/8/2019	394	1/8/2019	7680	Could Ripple's XRP replace correspondent banks? This bank says yes
	1/8/2019	392	1/9/2019	7544	RippleNet Reaches Milestone, Surpasses 200 Customers
	10/9/2019	431	10/9/2019	7537	Ripple to Bring Blockchain Technology to Finastra's Banking Customers
	10/9/2019	431	10/9/2019	8338	Ripple to Bring Blockchain Technology to Finastra's Banking Customers
	10/9/2019	431	10/16/2019	7658	Finastra taps Ripple for real-time payments across borders
	11/6/2019	441	11/6/2019	7535	Ripple Announces More Than 300 Customers, RippleNet Growth
	11/6/2019	441	11/6/2019	8332	RippleNet Growth: Announcing More Than 300 Customers
	11/6/2019	441	11/6/2019	7654	Ripple Surpasses 300 Customers As Swell 2019 Kicks Off In Singapore
	12/10/2019	445	12/10/2019	7651	Xpring Releases New XRP Tools, XRPL 1.4.0 Released
	1/21/2020	450	1/21/2020	8328	How Blockchain and Crypto Meet Growing SME Demand
	2/4/2020	453	2/4/2020	8325	Enabling Faster Cross-Border Payments Between the U.S. and Mexico
	2/25/2020	457	2/25/2020	7534	Ripple on Full-Scale to Tap into South Korean Market
	2/25/2020	457	2/25/2020	8322	Sentbe, Hanpass, WireBarley and More Leverage RippleNet to Improve Remittances in Korea
	2/26/2020	458	2/26/2020	7533	Azimo and Ripple Partner to Deliver Faster, Cheaper Payments to the Philippines
	2/26/2020	458	2/26/2020	8321	Azimo Uses On-Demand Liquidity for Faster International Payments Into the Philippines
	2/26/2020	458	2/26/2020	7645	Ripple claims a big win in the elusive quest to use cryptocurrency in banking
	3/19/2020	460	3/18/2020	7532	DeeMoney Partners with Ripple to Power Faster and Cheaper Cross-Border Money Transfers
	4/27/2020	467	4/27/2020	7531	SCB Partners with Ripple Extending SCB Global Payment Strategy
	6/15/2020	480	6/15/2020	7530	RippleNet Cloud Reaches New Milestone, Signs First Bank Customer
	6/15/2020	480	6/15/2020	8308	Banco Rendimento Runs on RippleNet Cloud
	10/6/2020	498	10/6/2020	7528	Lemonway Joins RippleNet to Power Instant, Cost-Effective Euro-to-Euro Payments
	10/6/2020	498	10/6/2020	8299	Lemonway Leverages RippleNet To Unlock Faster Euro-To-Euro Payments
Litigation	5/5/2015	66	5/6/2015	7862	What Ripple's Fincen Fine Means for the Digital Currency Industry
	9/10/2018	360	9/10/2018	7549	Ripple and R3 Reach Settlement
	4/21/2020	466	4/21/2020	8316	Enough Is Enough: It's Time to Protect the Community
	4/21/2020	466	4/21/2020	7640	Ripple sues YouTube over cryptocurrency scams
	4/21/2020	466	4/21/2020	7641	Covid Scammers Are Taking Advantage of Big Tech Platforms, Says Ripple CEO
Market Commentary & Company Overview	6/13/2014	3	6/13/2014	7934	Cryptocurrency News Round-Up: Bitcoin Auction, Dogecoin Hacked & Ripple Swells
	7/9/2014	6	7/9/2014	7932	30 Innovators to Watch: Key Executives Shaping the Industry in 2014
	7/14/2014	5	7/14/2014	7931	Cross Border Remittance Ripe for Startups as Bank Abandon Business
	7/22/2014	8	7/22/2014	7929	Bitcoin for the Underbanked
	7/29/2014	10	7/29/2014	7928	BankThink Bank Payment Systems Still Operate Like CompuServe and AOL
	9/27/2014	14	9/27/2014	7922	The Internet's Missing Link
	10/22/2014	16	10/22/2014	7917	Apple's Mobile Buzz Impacts Bitcoin, but Regs Still Unclear

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Market Commentary & Company Overview	10/28/2014	18	10/28/2014	7915	When We Don't Own Who We Are
	11/3/2014	19	11/3/2014	7913	Money20/20 Day 1: Regulators, Finance Giants Forecast Bitcoin's Future
	11/3/2014	20	11/3/2014	7914	Ripple Labs CEO looks to revolutionise online payments
	11/20/2014	23	11/20/2014	7910	Why banks fear Bitcoin
	11/24/2014	24	11/24/2014	7909	Susan Athey On How Digital Currency Could Transform Our Lives
	12/2/2014	25	12/2/2014	7908	MasterCard Seeks 'Level Playing Field' for Bitcoin Regulation
	12/10/2014	27	12/10/2014	7902	Bitcoin for Rockstars
	12/21/2014	29	12/21/2014	7900	Why Bitcoin's Erratic Price Doesn't Matter
	12/29/2014	31	12/29/2014	7898	Rethink Identity So Personal Data Can Stay Personal
	1/6/2015	32	1/6/2015	7896	Block Chain 2.0: The Renaissance of Money
	1/8/2015	33	1/8/2015	7895	The magic of mining
	1/13/2015	34	1/13/2015	7894	There's a blockchain for that!
	1/14/2015	35	1/14/2015	7893	Did we solve a payments problem that no longer exists?
	1/18/2015	36	1/18/2015	7892	Federal Reserve Bank VP: We're a Protocol Just Like Bitcoin
	1/21/2015	38	1/21/2015	7887	Bill Gates on Mobile Banking, Connecting the World and AI
	1/21/2015	38	1/22/2015	7884	Bill Gates: Bitcoin Alone Won't Solve Global Payments Challenges
	1/22/2015	39	1/22/2015	7885	5 ways digital currencies will change the world
	1/26/2015	40	1/26/2015	7883	The Fed Has a Vision for Faster Payments; Does It Have the Will?
	1/29/2015	41	1/29/2015	7882	Fed's Payments Leaders Show Interest in Cryptocurrency, Privacy Tech
	2/11/2015	44	2/11/2015	7880	The Fed's Unexpectedly Bold Payments Idea
	2/16/2015	46	2/16/2015	7879	Policy Experts Talk Transparency in Bitcoin at Foreign Affairs Event
	2/23/2015	47	2/23/2015	7876	Digital-Only German Bank to Enter U.S. Market, Court Millennials
	2/25/2015	48	2/25/2015	7878	Heads and Tails: How Can Cryptocurrencies Enable Legal Cross-Border Money Transfers?
	3/3/2015	49	3/3/2015	7874	Welcome to the Internet of Value
	3/3/2015	50	3/3/2015	7875	Cryptocurrency Technology Set to Shake Up Correspondent Banking
	3/11/2015	52	3/11/2015	7873	Goldman Sachs Report Says Bitcoin Could Shape 'Future of Finance'
	3/15/2015	53	3/15/2015	7872	Coolest Brands 2015: Ripple Labs
	4/7/2015	57	4/7/2015	7870	Banks Can Cherry-Pick the Best Bits from Bitcoin: Report
	4/8/2015	58	4/8/2015	7868	What's missing from Facebook's digital payments plan
	4/15/2015	59	4/15/2015	8586	Ripple Labs and Aite Group Host Webinar on Global Payments
	5/1/2015	64	5/1/2015	8582	CGAP: Why an Open Payments Infrastructure Matters for Financial Inclusion
	5/1/2015	64	5/1/2015	7859	The 'Ripple' Effect: Why an Open Payments Infrastructure Matters
	5/7/2015	67	5/7/2015	7860	The next big thing
	5/13/2015	68	5/13/2015	7858	EBAday: banks still best placed for payments
	5/14/2015	70	5/14/2015	8581	European Banking Association Emphasizes Promise of Distributed Ledgers
	5/14/2015	69	5/14/2015	7857	Blockchain manoeuvres: applying Bitcoin's technology to banking
	5/19/2015	72	5/20/2015	8579	NACHA Banks Approve Same-Day Settlement in U S.
	5/29/2015	73	5/28/2015	8578	McKinsey: Why Banks Should Invest in Payments Infrastructure
	6/2/2015	75	6/2/2015	8577	Gates Foundation: Lessons Learned About Payments Systems
	6/4/2015	76	6/4/2015	8576	Daily Fintech: Real-time Payments is a Game-changer
	6/16/2015	79	6/16/2015	8574	Santander: Distributed Ledger Tech Could Save Banks $20 Billion a Year
	6/19/2015	80	6/19/2015	7849	The Sea Change Ripple Labs Sees For FinTech
	6/19/2015	81	6/19/2015	7851	RBS pledges to boost resilience spend after latest IT failure
	7/2/2015	82	7/2/2015	8573	World Economic Forum Report: The Rise of Non-Traditional Payment Systems
	7/6/2015	83	7/6/2015	7850	Ravi Menon: A smart financial centre
	7/13/2015	84	7/13/2015	7848	FinTech: Will Blockchain Enable Better Banking?
	7/20/2015	85	7/20/2015	8572	McKinsey: New Partnership Models in Transaction Banking
	7/23/2015	86	7/23/2015	7847	BankThink Ripple's Overlooked Path to Decentralization
	8/1/2015	88	8/1/2015	7844	Ripple Labs: Opening Access to Finance
	8/3/2015	89	8/3/2015	7845	Ripple's Chris Larsen adds up savings for banks using distributed ledgers
	8/5/2015	90	8/5/2015	7842	49 Technology Pioneers to watch in 2015
	8/7/2015	91	8/7/2015	7843	Ripple Labs: smoothing the path to better payments

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Market Commentary & Company Overview	8/13/2015	92	8/13/2015	7841	Ripple well-placed for global adoption
	8/27/2015	93	8/27/2015	7840	Internet of Value: New Protocol Could Usher in Real-time Payments
	9/3/2015	95	9/3/2015	7839	Why we need a common standard for moving e-money
	9/22/2015	96	9/22/2015	8570	WEF Report: Distributed Financial Technology Goes Mainstream by 2027
	10/26/2015	100	10/26/2015	8569	BIS Describes Peak Correspondent Banking
	10/29/2015	101	10/29/2015	8568	Needham Report: Welcome to the Internet of Value
	10/30/2015	102	10/30/2015	8567	McKinsey: The Powerful Forces Reshaping the Payments Landscape
	11/2/2015	103	11/2/2015	8566	Money 20/20: How Banks Can Leverage Distributed Financial Technology
	11/5/2015	104	11/5/2015	8565	Blockchain Investment By Financial Institutions in One Chart
	11/10/2015	105	11/10/2015	8564	Correspondent Banking's Steady Decline
	11/12/2015	106	11/12/2015	8562	What the Blockchain Means for Banks
	11/12/2015	107	11/12/2015	8563	Financial Inclusion Can Generate $380 Billion in Revenues for Banks
	11/19/2015	108	11/19/2015	8561	Why Banks Are Abandoning Traditional Cross-Border Paymnets in One Chart
	12/3/2015	109	12/3/2015	8560	Accenture Report: APAC Fintech Investments Signal Major Opportunity in Payments
	12/11/2015	111	12/11/2015	8559	Capgemini: Blockchain Tech Can Transform Global Financial Network
	12/17/2015	113	12/17/2015	7829	Ripple chief Chris Larsen: Sorting out payments will aid innovation in securities settlements
	1/4/2016	115	1/4/2016	8556	Every Business is a Payments Business
	1/6/2016	116	1/6/2016	8555	Wired: A Global Standard for Payments
	1/6/2016	117	1/6/2016	7836	The Plan to Unite Bitcoin With All Other Online Currencies
	1/12/2016	118	1/12/2016	7835	Blockchains Poised To Be The Hot Tech For Moving Money In 2016
	1/14/2016	120	1/14/2016	8553	Mike Hearn: Bitcoin Has Failed
	1/20/2016	122	1/20/2016	8551	IMF at Davos: Distributed Ledger Technology is Extremely Beneficial
	1/20/2016	123	1/20/2016	8552	Vermont Realizes They Don't Need the Blockchain
	1/22/2016	124	1/22/2016	8550	Chris Larsen at Davos: The Merging of the Web, the Physical Web and the Value Web
	1/25/2016	125	1/25/2016	8549	New DTCC White Paper Gets Real About Blockchain Hype
	1/27/2016	126	1/26/2016	8548	Highlights from the World Economic Forum 2016
	1/28/2016	128	1/28/2016	8547	Bank of England: How Our Modern Payment System Began at a Bar
	2/2/2016	129	2/2/2016	8544	Fed Releases Faster Payments Progress Report
	2/12/2016	131	2/12/2016	8543	The Block Chain Conference 2016: Highlights
	2/16/2016	132	2/16/2016	8542	Accenture on Ethics: Banks Could Boost Earnings by $500 Million a Year
	2/23/2016	134	2/23/2016	8540	Ripple and XRP Can Cut Banks' Global Settlement Costs Up to 60 Percent
	3/11/2016	136	3/11/2016	8538	White & Case: the Blockchain Revolution in Financial Services
	4/7/2016	139	4/7/2016	7834	Ripple Aims to Put Every Transaction on One Ledger
	5/6/2016	145	5/6/2016	8531	Highlights from Consensus 2016
	5/10/2016	146	5/10/2016	8530	ECB Weighs in on Distributed Ledger Tech
	5/23/2016	147	5/23/2016	8529	Interledger: Beyond Blockchain
	6/2/2016	149	6/2/2016	7832	Meet the Real Bank of Mom and Dad
	6/14/2016	151	6/14/2016	8526	Japan Explores the Future of Blockchain
	6/16/2016	152	6/16/2016	8525	Goldman Sachs: Blockchain Billions
	6/27/2016	156	6/27/2016	7821	These are the 5 Hottest Companies in Fintech
	7/11/2016	157	7/11/2016	8522	Citi Reseach: Blockchain Tech Could Remake Payments Infrastructure
	7/20/2016	160	7/20/2016	8519	Bain: Distributed Ledger Tech Will Make Winners and Losers in Banking
	8/8/2016	162	8/8/2016	8517	Credit Suisse: Solving the Problems of Cross-Border Payments
	8/9/2016	163	8/9/2016	8516	SEPA in the Age of Real-Time Payments
	8/15/2016	164	8/15/2016	8515	WEF: Distributed Ledgers Are the Foundation of New Financial Infrastructure
	8/18/2016	166	8/18/2016	7818	Man Who Introduced Millions to Bitcoin Says Blockchain Is a Bust
	8/19/2016	167	8/19/2016	7816	Google and Apple like Ripple's Interledger Protocol for interoperability - and because it's not Visa
	8/19/2016	168	8/19/2016	7817	Overseas remittances' costs to reduce with new system
	9/15/2016	172	9/15/2016	7814	It Might Take Longer Than You Think For The Future Of Banking To Arrive
	9/21/2016	173	9/21/2016	8510	Chris Larsen on the Internet of Value
	10/5/2016	178	10/5/2016	8504	Three Key Takeaways from the Capgemini World Payments Report
	10/6/2016	179	10/6/2016	8503	Clearing Away the Debris With Distributed Ledger Technology

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Market Commentary & Company Overview	10/7/2016	180	10/7/2016	8502	Ovum Report: Corporate Treasurers Need More From Banks
	10/14/2016	182	10/14/2016	8500	McKinsey Report: By 2020, Payments Will Generate $400 Billion More Per Year
	10/18/2016	184	10/18/2016	8498	Bank of England: Scaling Real-Time Gross Settlement
	11/10/2016	188	11/10/2016	8494	Keep Calm and Blockchain On
	11/14/2016	190	11/14/2016	8493	BNY Mellon: Reinventing Payments
	11/14/2016	189	11/14/2016	7802	Where Finance and Technology Come Together
	11/22/2016	192	11/22/2016	8491	KPMG: Future Bright for Next-Generation Payment Solutions
	11/28/2016	193	11/28/2016	8490	Santander and Reisebank Both Recognized for Innovation
	12/6/2016	195	12/6/2016	8488	Fed Distributed Ledger Tech Report Singles Out Interledger
	12/7/2016	196	12/7/2016	8487	McKinsey: Corporates Need Faster Payments, Too
	12/14/2016	198	12/14/2016	8485	Key Strengths of Distributed Ledger Tech from the Hong Kong Monetary Authority
	1/9/2017	200	1/9/2017	8484	Three Forces Shaping Payments: BCG Global Report
	1/12/2017	202	1/12/2017	8482	SWIFT GPI Part 3: the Empire Strikes Back
	1/13/2017	203	1/13/2017	8481	XRPに関する６つの迷信 (English translation follows)
	1/27/2017	205	1/27/2017	7799	Will Tech Titans Enter Payment Industry?
	2/6/2017	207	2/6/2017	8478	BAFT Europe Bank to Bank Highlights
	2/15/2017	208	2/15/2017	7798	Why Blockchain and Asia are A Perfect Match
	3/9/2017	215	3/9/2017	8471	Discussing Trends in Global Payments at the GCC Financial Forum
	3/20/2017	217	3/20/2017	7796	Sending Money Overseas to Get Faster Once Banks Pick a Winner
	5/4/2017	223	5/4/2017	7795	Financial technology is proving less of a battleground than feared
	6/14/2017	228	6/14/2017	7792	Inside Ripple's plan to make money move as fast as information
	7/31/2017	235	7/31/2017	8455	Ripple's Product Suite is Growing
	10/6/2017	243	10/6/2017	8448	10 Things You Need to Know About XRP
	10/17/2017	247	10/17/2017	8443	Swell Day 1: A former Fed Chair Speaks, The Practical Applications of Digital Assets, Blockchain and More
	10/18/2017	248	10/18/2017	8442	Swell Day 2: Words of Wisdom from the Inventor of the Web and Industry Leaders Discuss Which Blockchain Should Rule Them All
	10/26/2017	250	10/26/2017	8440	Top 3 Takeaways From Swell
	11/13/2017	251	11/13/2017	8439	Ripple Hosts World's Central Banks to Explore Next Generation of Payments
	11/17/2017	253	11/17/2017	7787	Ripple boss predicts central bank adoption of blockchain
	11/17/2017	253	11/17/2017	7791	Why the CEO behind one of the largest cryptocurrencies left AOL and Yahoo for blockchain
	12/5/2017	257	12/5/2017	7788	What will next year bring for cryptocurrencies? Ask our banking editor and Daniel Aranda, managing director for Europe at Ripple.
	12/7/2017	260	12/7/2017	8433	Internet of Value Depends on Interoperability, Not Blockchain Alone
	12/21/2017	267	12/21/2017	8427	Happy 5th Anniversary, XRP Ledger!
	12/22/2017	265	12/21/2017	7785	Bitcoin Is So 2017 as Ripple Soars at Year End: Chart
	12/26/2017	269	12/26/2017	7784	The Death of the ICO (And 4 Other 2018 Predictions)
	12/28/2017	270	12/28/2017	8424	The Most Popular Ripple Insights Posts of 2017
	12/28/2017	271	12/28/2017	7783	What is ripple, and what is XRP?
	12/29/2017	273	12/29/2017	7781	What the heck is Ripple? A brief look at the hottest cryptocurrency of the moment.
	12/29/2017	272	12/29/2017	7780	Ripple cryptocurrency surges as Japanese groups agree to use it
	12/30/2017	274	12/30/2017	7782	Digital currency ripple soars nearly 56 percent, becomes second-largest cryptocurrency by market cap
	12/31/2017	275	12/31/2017	7779	Ripple: cryptocurrency enjoys end-of-year surge – but will it endure?
	1/1/2018	276	1/1/2018	7777	Here are the top 10 cryptoassets of 2017 (and bitcoin's 1,000% rise doesn't even make the list)
	1/2/2018	277	1/2/2018	7776	These 3 Cryptos Have A Bigger Market Cap Than Exxon
	1/3/2018	278	1/3/2018	7775	Bitcoin May be King, but Ripple Dark Horse in Crypto Race
	1/4/2018	279	1/4/2018	7774	Cryptocurrency boom: Why everyone is talking about ripple
	1/5/2018	280	1/5/2018	7773	Ripple Steals Bitcoin's Thunder, Surges 1,135% in a Month
	1/9/2018	281	1/9/2018	8423	Who Really Cares About Real-time Payments?
	1/10/2018	283	1/10/2018	7772	Ripple, the Company behind Cryptocurrency XRP, is betting big on Asia
	1/10/2018	282	1/10/2018	7771	Ripple's XRP is the Hot New Cryptocurrency - Here's How You Buy It
	1/11/2018	285	1/11/2018	7778	Looking To Start A Blockchain Business? Ripple Founder Chris Larsen Has One Piece Of Advice
	1/16/2018	286	1/16/2018	7765	Ripple is sitting on close to $80 billion and could cash out hundreds of millions per month — but it isn't
	1/18/2018	288	1/18/2018	8421	Top 9 Frequently Asked Questions About Ripple and XRP
	1/20/2018	289	1/20/2018	7764	Ripple Founder Chris Larsen Talks About The Many Use Cases For Blockchain

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Market Commentary & Company Overview	1/26/2018	291	1/26/2018	7762	Ripple Drops More Than 30% In A Week As Hype Fades
	2/13/2018	298	2/13/2018	7750	Ripple CEO Favors More Regulation of the Crypto Market
	2/16/2018	301	2/16/2018	7748	Is it Ripple or Bitcoin Bringing Life To Cryptos?
	3/4/2018	307	3/4/2018	7743	How XRP Fits Into Ripple's Payments Products Explained
	3/7/2018	309	3/7/2018	7737	Ripple CEO Brad Garlinghouse on Fast Money
	3/7/2018	309	3/7/2018	7738	Ripple CEO tells cryptocurrency industry to 'work with the regulators'
	3/7/2018	310	3/7/2018	7740	Data Sheet—How Ripple Wants to Enhance, Not Kill, the Global Payments System
	4/25/2018	322	4/25/2018	8405	Ask Me Anything with Brad and Cory
	4/27/2018	325	4/27/2018	7719	7 Facts You Might Not Know About Ripple
	5/4/2018	326	5/4/2018	7718	The battle for the remittances market
	5/30/2018	334	5/30/2018	7710	Bitcoin's influence over cryptocurrency prices could end soon, says Ripple CEO
	5/30/2018	334	5/30/2018	7711	Momentum for Ripple continues to build: Ripple CEO
	6/4/2018	337	6/4/2018	7703	Brad Garlinghouse explains the difference between Ripple and XRP
	6/5/2018	340	6/5/2018	8396	Ripple CEO at Money20/20 Europe: Blockchain Hype Outpaces Reality
	6/5/2018	338	6/5/2018	7704	Bitcoin is not the 'panacea' people thought it would be, Ripple CEO says
	6/5/2018	339	6/5/2018	7705	Ripple and Swift slug it out over cross-border payments
	6/7/2018	341	6/7/2018	8395	American Express and Ripple at Money20/20 Europe: Changing the Cross-Border Payments Experience for SMEs
	6/18/2018	342	6/18/2018	7702	Everything you need to know about the blockchain
	7/13/2018	347	7/13/2018	8391	Ask Me Anything with David Schwartz and Asheesh Birla
	7/26/2018	349	7/26/2018	7698	Bitcoin is slow when you talk about moving money: Cory Johnson
	8/15/2018	352	8/15/2018	7696	Ripple 'definitely' wants to target China with its blockchain-based payments tech, exec says
	8/16/2018	354	8/16/2018	7695	Ripple's CTO invented a distributed computer system 20 years before blockchain – ask him about it
	8/22/2018	355	8/22/2018	8386	Ask Me Anything with Brad and Cory
	8/29/2018	356	8/29/2018	7693	Ripple's Chris Larsen: The Richest Person In Cryptocurrency
	9/5/2018	357	9/5/2018	7691	Ripple's Trillion-Dollar Man
	10/1/2018	369	10/1/2018	8377	CEO Brad Garlinghouse Talks Internet of Value and Customer Traction at Swell 2018
	10/2/2018	371	10/2/2018	8374	Swell 2018: Report Finds Tipping Point for Mass Adoption of Blockchain Is Near
	10/2/2018	372	10/2/2018	8375	Global Regulatory Policies Took Center Stage On Day One of Swell 2018
	10/11/2018	374	10/11/2018	8371	Crypto Regulation Around the World
	10/23/2018	377	10/23/2018	8368	David Schwartz Makes the Case for Blockchain in Payments at Money20/20 USA
	10/24/2018	378	10/24/2018	8367	Chris Larsen Reflects on Disruption, Regulation and the Internet of Value at Money20/20
	10/29/2018	380	10/29/2018	8365	The Ripple Drop - Episode 6
	11/7/2018	381	11/7/2018	8364	The 800 Pound Gorilla: Digital Asset Adoption
	11/12/2018	382	11/12/2018	8363	Blockchain and Digital Asset Use in ASEAN: CEO Brad Garlinghouse in Convo with IMF's Ross Leckow at Singapore Fintech Festival
	11/13/2018	383	11/13/2018	7683	Ripple Is Aiming to Overtake Swift Banking Network, CEO Says
	11/30/2018	387	11/30/2018	8359	The Ripple Drop - Episode 7
	12/26/2018	391	12/26/2018	8356	The Ripple Drop - Episode 8
	1/8/2019	393	1/8/2019	7681	Ripple wants a piece of the global payment system while it fights a cryptocurrency 'holy war'
	1/17/2019	395	1/17/2019	8354	A Global Look at the Future of Blockchain and Fintech Innovation
	1/30/2019	399	1/30/2019	7678	Ripple CEO: Decentralized payment systems are likely to win
	1/31/2019	400	1/31/2019	8352	The Ripple Drop - Episode 9
	2/8/2019	404	2/8/2019	8350	What's on the Regulatory Horizon for Digital Assets in the E.U.?
	2/28/2019	405	2/28/2019	8349	The Ripple Drop - Episode 10
	3/26/2019	408	3/26/2019	8347	Southeast Asia's Perfect Payments Storm
	3/28/2019	409	3/28/2019	8346	The Ripple Drop: Episode 11
	5/20/2019	415	5/20/2019	7670	Ripple CEO Brad Garlinghouse explains why big banks should get into cryptocurrencies
	5/30/2019	416	5/30/2019	7669	Ripple courting banks, paytech and big fintech to beat Swift to emerging markets
	7/29/2019	419	7/29/2019	7667	Ripple's Senior VP on the U S. Senate Cryptocurrency Hearing
	8/7/2019	421	8/7/2019	7666	The current state of crypto regulation is hurting US companies
	10/7/2019	430	10/7/2019	7662	Ripple CEO Not Bullish on Facebook's Ability to Launch Libra Cryptocurrency
	10/8/2019	434	10/14/2019	7661	Brad Garlinghouse, CEO of Ripple: One on One with the Man Running Ripple and XRP
	10/10/2019	432	10/10/2019	7660	Altcoins: Ahead of Libra, XRP cryptocurrency gains toehold in commerce

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Market Commentary & Company Overview	10/20/2019	437	10/20/2019	7657	XRP Is Up 30% On September As Bitcoin Flatlines—Ripple Sees It Going Even Higher
	10/23/2019	439	10/23/2019	7656	Ripple CEO: Facebook has a 'trust deficit'
	11/5/2019	440	11/5/2019	8333	Blockchain in Payments Report 2019: Flywheel Set in Motion
	11/6/2019	442	11/6/2019	7655	Ripple CEO Expects Volatility in Cryptocurrencies to Continue
	12/10/2019	446	12/10/2019	7652	Selling Blockchain To Enterprises: How Ripple And Others Make Money
	1/5/2020	449	1/5/2020	7649	Cross-border transactions key to connecting a fragmented region | Opinion
	3/27/2020	463	3/27/2020	7643	"XRP is Not Centralized": Ripple SVP Addresses Crypto Community Criticism
	5/7/2020	472	5/7/2020	7638	The financial world's nervous system is being rewired
	5/16/2020	474	5/16/2020	7632	Navigating payments: emerging markets, COVID-19 and M&As
	6/18/2020	483	6/18/2020	8307	Policy Framework for Digital Assets in India
	6/20/2020	484	6/20/2020	7633	Ripple suggests a regulatory framework to keep India from banning cryptocurrencies — yet again
	7/28/2020	485	7/28/2020	7630	The Ripple Story: CTO David Schwartz on the Founding, Ledger & XRP
	7/30/2020	487	7/30/2020	8305	How the U S. Can Pave the Way for Global Digital Asset Regulation - And Why It Should
	8/21/2020	491	8/21/2020	7626	The tech cold war is here — and the US isn't winning
	9/11/2020	493	9/11/2020	7624	Your Next Bank Will Be a Tech Giant
	10/1/2020	496	10/1/2020	7622	Blockchain Management Styles At 3 Systemically Important Financial Institutions Show A Diversity Of Strategies
	10/5/2020	497	10/5/2020	8300	Ripple's Mission in Action
	10/14/2020	501	10/14/2020	7619	'China is well ahead' of every country on global financial infrastructure: Ripple CEO
	10/15/2020	502	10/15/2020	8296	Blockchain in Payments Report 2020: From Adoption To Growth
	10/21/2020	504	10/21/2020	7618	Pandemic Put Tailwind Behind Crypto Markets: Ripple Labs
	11/13/2020	510	11/13/2020	7614	Brad Garlinghouse explains how regulatory uncertainty around XRP has affected Ripple
	11/19/2020	511	11/19/2020	7613	Bitcoin bulls and bears: Tech execs discuss what's in store for cryptocurrency
	12/2/2020	512	12/2/2020	7612	Ripple CEO on what's driving cryptocurrency
Markets Report	4/18/2017	221	4/18/2017	8466	Q1 2017 XRP Markets Report
	7/20/2017	233	7/20/2017	8457	Q2 2017 XRP Markets Report
	10/19/2017	249	10/19/2017	8441	Q3 2017 XRP Markets Report
	4/25/2018	323	4/25/2018	8406	Q1 2018 XRP Markets Report
	7/24/2018	348	7/24/2018	8390	Q2 2018 XRP Markets Report
	10/25/2018	379	10/25/2018	8366	Q3 2018 XRP Markets Report
	1/24/2019	397	1/24/2019	8353	Q4 2018 XRP Markets Report
	4/24/2019	413	4/24/2019	8345	Q1 2019 XRP Markets Report
	10/18/2019	436	10/18/2019	8335	Q3 2019 XRP Markets Report
	1/22/2020	451	1/22/2020	8327	Q4 2019 XRP Markets Report
	4/30/2020	470	4/30/2020	8314	Q1 2020 XRP Markets Report
	8/3/2020	489	8/3/2020	8304	Q2 2020 XRP Markets Report
	11/5/2020	509	11/5/2020	8294	Q3 2020 XRP Markets Report
Milestone	5/18/2015	71	5/18/2015	7585	Ripple Labs Closes $28 Million Series A Funding Round
	5/18/2015	71	5/18/2015	8580	Ripple Labs Raises $28 Million From IDG Capital Partners, CME Group, Seagate, and Others
	5/18/2015	71	5/19/2015	7855	Ripple Labs Closes $28 Million in Funding
	5/18/2015	71	5/19/2015	7856	BitBeat: NYSE Launches Bitcoin Index, Ripples Gets $28 Million
	10/6/2015	99	10/6/2015	7580	Ripple Adds Santander InnoVentures Fund as Series A Investor
	10/6/2015	99	10/6/2015	7838	Ripple Gets $4M From Santander Arm, Inks Partnership With Accenture
	10/6/2015	99	10/22/2015	7831	Santander plans to become 'Ripple evangelist'
	1/29/2016	127	1/28/2016	7578	Ripple Strikes Multi-National Deal with SBI Holdings to Meet Growing Demand for Ripple Solutions Across Asia
	1/29/2016	127	1/28/2016	8546	Ripple's Deal With Japanese Multinational Opens Door for Rapid Asian Expansion
	6/13/2016	150	6/13/2016	8527	Ripple Receives New York's First BitLicense for an Institutional Use Case of Digital Assets
	6/13/2016	150	6/13/2016	7824	Ripple Wins BitLicense from New York Regulator
	9/15/2016	170	9/15/2016	7573	Ripple Raises $55 Million in Series B Funding
	9/15/2016	170	9/15/2016	8512	Ripple Raises $55 Million in Series B Funding
	9/15/2016	170	9/15/2016	7809	Fintech Firm Ripple Gets $55 Million In Funding

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Milestone	9/15/2016	170	9/15/2016	7810	Blockchain payments startup Ripple raises $55 million
	9/15/2016	170	9/15/2016	7811	Ripple Just Raised $55 Million and Signed on These Major Bank Partners
	9/15/2016	170	9/15/2016	7812	StanChart invests in blockchain startup Ripple
	9/15/2016	170	9/15/2016	7813	Google-backed blockchain start-up Ripple raises $55 million from big banks
	9/15/2016	170	9/15/2016	7815	Ripple Raises $55 Million, Adds Seven More Banks to Its Network
	5/16/2017	225	5/16/2017	8463	Ripple to Place 55 Billion XRP in Escrow to Ensure Certainty of Total XRP Supply
	5/26/2017	227	5/26/2017	7793	Bitcoin rival Ripple is suddenly sitting on billions of dollars worth of cryptocurrency
	12/8/2017	259	12/7/2017	8432	Ripple Escrows 55 Billion XRP for Supply Predictability
	12/20/2019	448	12/20/2019	8329	Ripple Caps Record Year With $200 Million Series C Funding
	12/20/2019	448	12/20/2019	7650	Ripple Raises $200 Million as Part of Bid for XRP Adoption
Miscellaneous	11/17/2014	22	11/17/2014	7911	RBS embraces crypto-currencies in hackathon challenge
	11/28/2017	256	11/28/2017	8435	TechCrunch Founder Michael Arrington Launches $100M Crypto Fund with XRP
	11/28/2017	256	11/28/2017	7789	Michael Arrington Has a New $100 Million Hedge Fund That Will Be Valued in Ripple's XRP
	6/27/2018	343	6/27/2018	7701	Coinbase CEO Launches Crypto Charity Fund, Aims to Raise $1 Billion
	10/6/2020	499	10/6/2020	7621	Ripple threatens to leave U S. over crypto regulation
	10/23/2020	506	10/23/2020	7617	$10 billion crypto firm Ripple considers relocating to London over U.S. regulation
Office & Staff	1/20/2015	37	1/20/2015	7591	Former Chief White House Advisor Gene Sperling Joins Ripple Labs Board of Directors
	1/20/2015	37	1/20/2015	7890	Ripple Labs Names Former Obama Advisor to Board of Directors
	1/20/2015	37	1/20/2015	7891	Ripple Labs appoints ex-White House advisor Gene Sperling to board of directors
	1/20/2015	37	1/21/2015	7888	Transition: Sperling Joins Ripple Labs Board
	1/20/2015	37	1/20/2015	7889	Bitcoin company Coinbase lands $75m investment from NYSE and BBVA
	3/18/2015	54	3/18/2015	7588	Ripple Labs Names Former State Department Official Anja Manuel as Advisor
	4/6/2015	56	4/6/2015	7587	Ripple Labs Expands to Asia Pacific to Serve Regional Demand for Ripple's Real-Time Settlement Protocol
	4/6/2015	56	4/8/2015	7869	Asia-Pacific's Heating Up for U.S. Payment Expansion Plays
	4/16/2015	60	4/16/2015	7586	Brad Garlinghouse Joins Ripple Labs as Company's First Chief Operating Officer
	4/16/2015	60	4/16/2015	7866	Ripple Labs Hires Brad Garlinghouse As Its COO
	4/16/2015	60	4/16/2015	7867	Garlinghouse, Former Yahoo Executive, Joins Startup Ripple Labs
	6/1/2015	74	6/1/2015	7584	Ripple Labs Names Donald Donahue as Advisor
	6/1/2015	74	6/1/2015	7854	Ripple Labs names former DTCC boss Donahue as an advisor
	7/29/2015	87	7/29/2015	7583	Ripple Labs Names Michael S. Barr as Advisor
	7/29/2015	87	7/29/2015	7846	Ripple Labs names Michael Barr as advisor
	8/31/2015	94	8/31/2015	7581	Bret Allenbach Joins Ripple Labs as Chief Financial Officer
	3/21/2016	138	3/21/2016	7577	Ripple Continues Global Growth With New London Office to Serve European Bank Demand
	4/11/2016	140	4/11/2016	7576	HSBC Executive and SWIFT Board Member Joins Ripple to Support Continued Global Growth
	4/11/2016	140	4/11/2016	8536	HSBC Executive and SWIFT Board Member Joins Ripple
	6/20/2016	153	6/20/2016	8524	Ripple Continues Global Growth with New Luxembourg Office to Support Protocol Neutrality
	11/1/2016	187	11/1/2016	7569	Amid High Growth, Ripple's Chris Larsen Appoints Brad Garlinghouse Chief Executive Officer
	11/1/2016	187	11/1/2016	8495	A New Chapter for Ripple
	11/1/2016	187	11/1/2016	7804	Bitcoin-Technology Pioneer Chris Larsen to Step Down as Ripple CEO
	11/1/2016	187	11/1/2016	7805	Brad Garlinghouse takes over as CEO of payments startup Ripple
	11/30/2016	194	11/30/2016	8489	CME Group Executives Miguel Vias Joins Ripple
	2/23/2017	211	2/23/2017	8475	Ripple Welcomes Ken Kurson to its Board of Directors
	4/12/2017	220	4/12/2017	8467	Ripple Hires Former Business Director at SWIFT gpi Marjan Delatinne
	8/25/2017	238	8/25/2017	8453	Former State Department Official Anja Manuel Joins Ripple's Board of Directors
	9/5/2017	240	9/5/2017	8451	Ripple Launches New Mumbai Office to Serve India's Digital Economy
	9/25/2017	242	9/25/2017	8449	Ripple Supports Singapore's Fintech Hub Aspirations With New Office
	11/21/2017	254	11/21/2017	7563	Ripple Appoints Former New York State Superintendent of Financial Services Benjamin Lawsky to Its Board and Ron Will as CFO
	11/21/2017	254	11/21/2017	8437	Ripple Welcomes New Board Member Benjamin Lawsky
	12/19/2017	264	12/19/2017	8429	Zoe Cruz Joins Ripple's Board of Directors
	3/8/2018	311	3/8/2018	7736	Ripple hires Bloomberg TV's Cory Johnson as chief market strategist

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Office & Staff	3/17/2018	312	3/17/2018	7735	Ripple's new chief market strategist: Crypto regulation will 'separate the wheat from the chaff'
	7/11/2018	346	7/11/2018	8392	Ripple Welcomes Kahina Van Dyke as Senior Vice President in Business and Corporate Development
	7/11/2018	346	7/11/2018	8393	Two Big Changes to Our Leadership Team
	7/11/2018	346	7/11/2018	7699	Ripple Hires Facebook Payments Exec and Names New CTO
	1/30/2019	398	1/30/2019	7543	Stuart Alderoty Joins Ripple as General Counsel
	1/30/2019	398	1/30/2019	7677	Ripple Hires General Counsel from Lending Giant CIT Group
	4/8/2019	411	4/8/2019	7673	Ripple aims to make a splash in Asia with expansion of Singapore office
	4/25/2019	414	4/25/2019	7541	Yoshitaka Kitao Joins Ripple Board of Directors
	6/11/2019	417	6/11/2019	7540	Provider of Solutions for Global Payments from Silicon Valley Officially Launches Operations in Brazil
	10/22/2019	438	10/22/2019	7536	Craig Phillips Joins Ripple Board of Directors
	10/22/2019	438	10/22/2019	8334	Ripple Expands Global Regulatory Team in D.C. and Joins the Blockchain Association
	3/18/2020	461	3/18/2020	7644	Ripple Taps Senior Exec for Regional Expansion
	12/15/2020	513	12/14/2020	8293	Ripple Adds Sandie O'Connor To Board of Directors
	12/15/2020	513	12/15/2020	7527	Ripple Adds Sandie O'Connor to Board of Directors
	12/15/2020	513	12/15/2020	7611	Ripple Board Lands JPMorgan Veteran and Regulatory Expert Sandie O'Connor
Other Initiatives	2/10/2015	43	2/10/2015	8588	Ripple Labs joins the Center for Financial Services Innovation
	2/12/2015	45	2/12/2015	7589	Ripple Labs Joins W3C Web Payment Interest Group to Help Set Standards for the Value Web
	3/4/2015	51	3/4/2015	8587	Ripple Labs Joins International Payments Framework Association
	6/15/2015	78	6/15/2015	8575	Ripple Labs Elected to Fed Steering Committee for Faster Payments
	6/15/2015	78	6/19/2015	7852	Ripple Labs' Ryan Zagone Joins Fed's Faster Payment Task Force
	1/30/2018	294	1/30/2018	7759	SBI Ripple Asia Forms Consortium to Bring DLT to Securities
	3/28/2018	316	3/28/2018	7733	Ripple Joins Hyperledger Blockchain Consortium
	6/4/2018	336	6/4/2018	7552	Ripple Announces $50M University Blockchain Research Initiative
	6/4/2018	336	6/4/2018	8397	Ripple Introduces the University Blockchain Research Initiative
	6/4/2018	336	6/4/2018	7706	Ripple Pumps $50 Million Into Academic Research on Blockchain
	6/4/2018	336	6/4/2018	7707	Why Classes on Cryptocurrency, Blockchain, and Bitcoin Are About to Boom at Colleges
	6/4/2018	336	6/4/2018	7708	Crypto start-up Ripple donates $50 million to top universities to boost blockchain adoption
	1/23/2019	396	1/23/2019	7679	Ripple Partners With Chinese University for Blockchain Research Program
	2/7/2019	403	2/7/2019	8351	University Blockchain Research Initiative Expands Global Footprint with 11 New Partners
	2/7/2019	403	2/8/2019	7542	Ripple Announces New University Blockchain Research Initiative Partners, Expands to China and Singapore
	7/30/2019	420	7/30/2019	7538	Ripple Expands University Blockchain Research Initiative Program to Japan, Supports 33 University Partners Across 14 Countries
	6/10/2020	479	6/10/2020	8309	ISO 20022: Shaping the Future of Cross-Border Payments
	6/18/2020	482	6/18/2020	8306	Why Ripple Supports PayString
	6/18/2020	482	6/18/2020	7634	Ripple launches PayID allowing users to send digital payments across different platforms
	8/26/2020	492	8/26/2020	8303	UBRI Expands To New Global Markets With More Than 35 University Partners
	9/30/2020	495	9/30/2020	7529	Ripple Leads Sustainability Agenda to Achieve Carbon Neutrality By 2030
	9/30/2020	495	9/30/2020	8301	Leading the Way on Global Crypto and FinTech Sustainability
	9/30/2020	495	9/30/2020	7623	Energy Web Is Starting With Ripple in Its Bid to Make Crypto Provably Green
	11/2/2020	508	11/2/2020	7615	Cryptocurrency's carbon footprint is massive and not sustainable
Ripple Commercialization Initiatives	9/23/2016	174	9/23/2016	7571	Major Banks Launch Global Payments Steering Group
	9/23/2016	174	9/23/2016	8509	Announcing Ripple's Global Payments Steering Group
	3/30/2017	218	3/30/2017	8469	MUFG Joins Ripple's Global Payments Steering Group
	10/13/2017	245	10/13/2017	8446	Ripple Rolls Out $300M RippleNet Accelerator Program to Grow Volume and XRP Utility
	12/19/2017	263	12/19/2017	8428	Exploring Innovation in Payment System Infrastructures
	12/19/2017	263	12/21/2017	7786	Ripple Ramps Up Focus On Blockchain Infrastructure
	5/14/2018	330	5/14/2018	8401	Welcome to Xpring
	5/14/2018	330	5/14/2018	7714	Ripple is going after startups to build an ecosystem around the XRP cryptocurrency
	5/14/2018	330	5/24/2018	7712	Ripple's Xpring Isn't Quite a Venture Fund—It's More
	10/2/2019	428	10/2/2019	8340	Announcing the Next Chapter of Xpring, Ripple's Developer Platform
	10/2/2019	428	10/2/2019	7663	Ripple's Xpring Releases Technology To Bring XRP To The Internet

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Category	Event Date	Event ID	Document Date	Document ID	Headline
[1]	[2]	[3]	[4]	[5]	[6]
Ripple Commercialization Initiatives	10/8/2020	500	10/8/2020	8298	Fund Instant Cross-Border Payments With a Line of Credit From RippleNet
	10/8/2020	500	10/8/2020	7620	Ripple Enters Lending With XRP Credit Lines to Fund Global Payments
Trading Platforms	2/29/2016	135	2/29/2016	8539	Ripple Partners with Crypto Facilities for XRP Derivatives
	10/9/2016	181	10/10/2016	8501	Ripple Announces XRP Futures Trading on Crypto Facilities
	10/27/2016	186	10/27/2016	8496	Coincheck Lists XRP on Its Digital Asset Exchange
	1/10/2017	201	1/10/2017	8483	Bitstamp Now Trading XRP with 0% Fees
	1/10/2017	201	1/10/2017	7800	Bitstamp adds Ripple currency XRP to trading platform
	2/16/2017	210	2/16/2017	8476	XRP/BTC Now Available on Bitstamp
	5/18/2017	226	5/18/2017	7567	XRP Liquidity to Increase With Listings on Six New Exchanges
	5/18/2017	226	5/18/2017	8462	XRP Liquidity to Deepen with Listings on Six New Exchanges
	8/31/2017	239	8/31/2017	8452	It's Never Been Easier to Access and Store XRP
	12/21/2017	266	12/21/2017	8426	XRP Now Available on 50 Exchanges Worldwide
	1/30/2018	295	1/30/2018	8419	SBI Virtual Currencies to Exclusively List XRP at Launch
	3/28/2018	317	3/28/2018	7731	Ripple's XRP now available from US-based crypto bank Uphold
	3/28/2018	317	3/29/2018	8410	XRP Ecosystem Grows with New Listing on Uphold
	8/16/2018	353	8/16/2018	7550	xRapid Brings on Three New Exchange Partners
	8/16/2018	353	8/16/2018	8387	xRapid Brings on Three New Exchange Partners
	8/16/2018	353	8/16/2018	7694	Ripple Endorses 'Preferred' Crypto Exchanges for XRP Payments
	2/12/2020	455	2/12/2020	8323	BRD Supports XRP and Launches Enterprise Expansion

Notes:
[1]: Assigned news classification.
[2]: Identification number assigned to event.
[3]: Date assigned to event in UTC time.
[4]: Identification number assigned to document.
[5]: Document date of publication expressed in local time.
[6]: Headline of document.

APPENDIX D

ADDITIONAL DETAILS OF THE ANALYTICAL METHODOLOGY

1. In this Appendix I provide additional details on certain aspects of the analytical methodology. I begin with a detailed primer on event studies in general, and then proceed to discuss my method for dating the events identified in my news sources.

A. THE EVENT STUDY METHODOLOGY

2. An event study is conducted by first specifying a model of *expected* price movements and then testing the extent to which *actual* price movements differ from those expectations. The key question an event study answers is whether the differences between actual and expected price movements are sufficiently large that, from a statistical standpoint, such differences are unlikely to be explained by randomness. In this context, "randomness" refers to the tendency for *actual* outcomes (in this case, the actual price movement) to deviate from the *expected* outcomes in ways which appear random in nature. Below is a simple example to illustrate these ideas.

3. Suppose that Company X flips a coin 100 times each day, and the stock return of Company X is equal to the percentage of times the coin comes up Heads. Suppose that we know that the coin is fair, meaning there is a 50/50 chance of getting Heads. This means we expect to record 50 Heads out of 100 flips. However, in practice, we will not always record 50. Some days we will record a few more, and some days a few less. The *actual* outcomes will often differ from the *expected* outcome in any particular case (though, by definition, not "on average").

4. Figure 1 below presents some simulated data of this process: 100 random flips each day for 120 days, each flip having a 50% chance of generating a "Head." In this set of simulated data, the average number of Heads per day is 49.95. However, only 10 out of the 120 days resulted in an outcome of exactly 50 Heads. Statisticians have a well-developed understanding of this problem and use what are called "confidence intervals" to describe the likelihoods of different outcomes. Figure 1 plots the expected number of Heads (50) and the statistical 95% confidence interval (indicated by the dotted lines). The "95% confidence interval" means that there is only a 5% chance (based on pure randomness) of observing an outcome which is outside the interval. Figure 1 shows that 95% of the time the number of Heads will range between 40 and 60, and only 5% of the time will it be less than 40 or more than 60, *if the coin is fair*. In other words, "random variation" can account for approximately 95 percent of outcomes ranging from 40 to 60 Heads from Company X flipping a fair coin 100 times.

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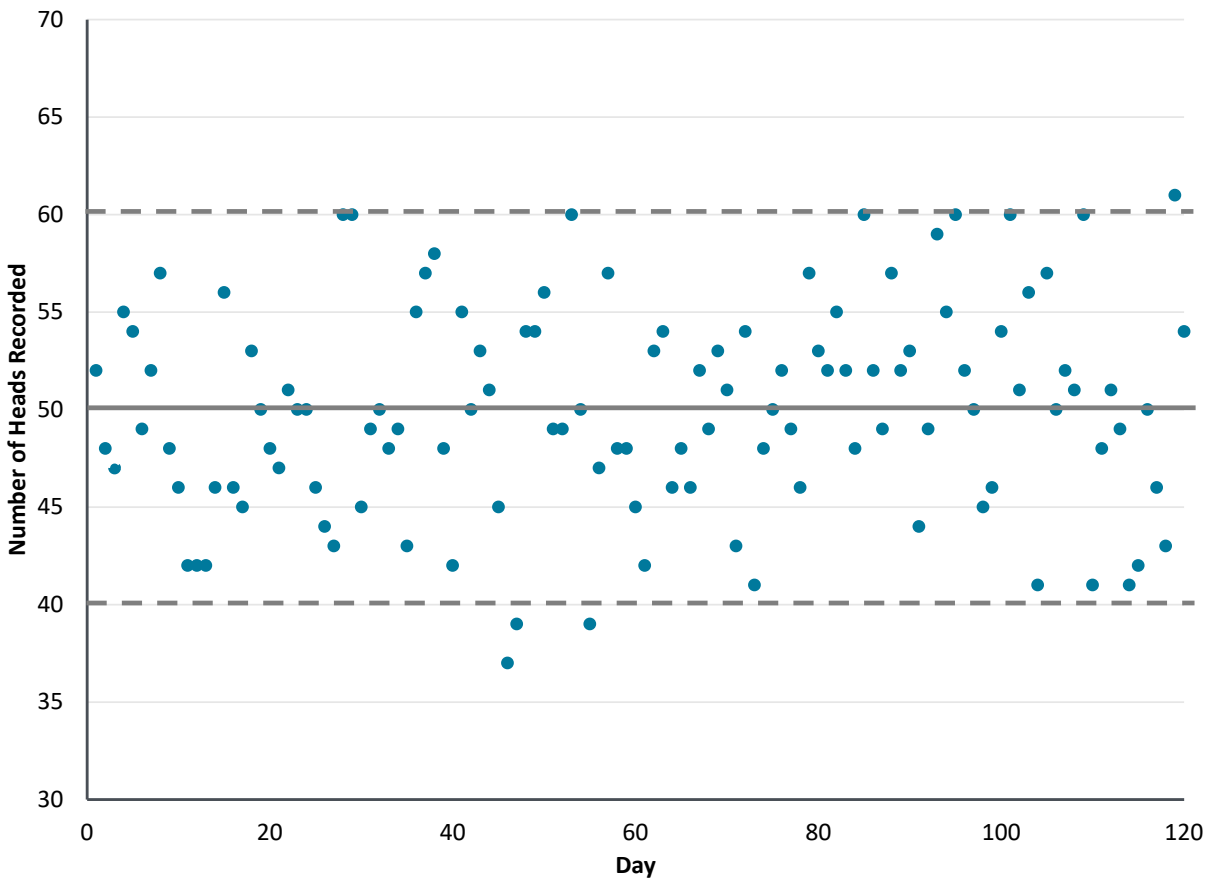
FIGURE 1: DISTRIBUTION OF REPORTED HEADS WITH 95% CONFIDENCE INTERVAL
(Expected Value = 50, 100 Tosses)



5. Now suppose that tomorrow, Company X will purchase a new coin which might (or might not) be a fair coin. If tomorrow we record 42, or 58, or 47, or indeed any number of Heads between 40 and 60, we would not regard such an outcome as unusual for flipping a fair coin. In other words, we could not reject the hypothesis that Company X was still using a fair coin in order to generate returns.

6. But what if instead we record 65 Heads? That represents a deviation of 15 away from our expectation of 50 and is well outside the "95% confidence interval." Statistically we can say that the likelihood of observing an *actual* outcome which is 15 or more away from our expected outcome is less than 0.5% (i.e., this would occur approximately once in 300 days).[1] While such an outcome is not impossible from a fair coin, we can say that it is highly unlikely. Instead, it is more likely that the weight of the coin has changed. Suppose further that we find news reports indicating that Company X was hoping to purchase a heavier coin designed to produce more Heads. This qualitative information, combined with our statistical observation, suggests that the outcome of 65 Heads was most likely caused by a new coin that is not a fair coin. This is the basic logic applied in an event study methodology.

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[1] The cumulative probability of observing 65 or more Heads or 35 or fewer Heads across 100 tosses of a fair coin is 0.35%, which is approximately equal to 1/300 = 0.33%.

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7. Returning to the matter at hand, I specify several models of expected XRP price movements and then test the extent to which actual price movements differ from those expectations. A well-accepted method for performing such a statistical analysis is to estimate a regression model over some period of time (an "estimation window") to quantify the typical relationship between the market price of the relevant instrument on the one hand and explanatory factors (often other market prices) on the other.

8. I consider several regression models using data from the prior 180 trading days (roughly six months) up to four days prior to the date of interest.[2] In each model, I regress the XRP return on a set of explanatory factors. As an example, one of the models (Model 7) I consider may be written as ("**Equation 1**"):

$$XRP_t = \alpha + \beta_1 BTC_t + \beta_2 ETH_t + \beta_3 XLM_t + \varepsilon_t$$

9. Here, XRP_t is the XRP return on date *t*, BTC_t, ETH_t, XLM_t are the return on Bitcoin, Ether, and Lumens on date *t*, respectively, α is the average difference, and ε_t is the random factor on date *t*.[3]

10. In the framework above, the estimation window (i.e., the 180-day window used to estimate the regression) will change with different dates of interest. This is typically referred to as a "rolling estimation window" (since the estimation window is "rolled forward" for each subsequent date of interest and the length of the estimation window remains the same). By using a rolling estimation window, I allow for the relationship between the XRP prices and the explanatory factors, as well as the volatility of the random factor, ε_t, to change over time. Use of a rolling model to account for changing volatility and evolving relationships among factors is well accepted in practice and peer-reviewed literature.[4]

11. I then use the model to estimate the expected XRP return on each date, and measure the corresponding unexpected or abnormal return, i.e., the difference between the actual XRP return and the expected XRP return predicted by the model. The estimates from the regression model are also used to form a measure of the "statistical significance" of that abnormal return.

12. For example, the return on XRP on May 17, 2018 (a day selected at random) is -6.8%. My analysis examines whether this return is statistically significantly different from expectations where "expectations" are based on the model I described above. Applying the model yields an expected (or "predicted") return of -5.7% for XRP for May 17, 2018.[5] The excess or abnormal return is then calculated as the difference between the actual return and the predicted return, which equates to -1.1%.

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[2] A. Craig MacKinlay, "Event Studies in Economics and Finance," Journal of Economic Literature Vol. 35, 1997, pp. 13-39 at p. 15: "For example, in an event study using daily data and the market model, the market model parameters could be estimated over the 120 days prior to the event." For traditional securities, 120 trading days corresponds to about six calendar months, or about 180 trading days for a digital token such as XRP which trades every day.

[3] Following standard practice, I calculate the return to any instrument on date *t* as the difference in log prices of dates *t* and *t* – 1.

[4] Phillip A. Braun, Daniel B. Nelson, & Alain M. Sunier, "Good News, Bad News, Volatility, and Betas," *The Journal of Finance* Vol. 50 (5), 1995, pp. 1575-1603 at pp. 1575, 1597.

[5] The returns on BTC, ETH, and XLM on the same day are -3.3%, -5.0%, and -6.5% respectively. The predicted return is found as follows: -5.7% = -0.14 * -3.34% (Coefficient on BTC *times* BTC return) + 0.56 * -4.99% (Coefficient on ETH *times* ETH return) + 0.49 * -6.54% (Coefficient on XLM *times* XLM return) - 0.15% (constant term from regression).

13. To test whether an abnormal return value of -1.1% falls within a statistically defined confidence interval, or whether it is statistically unusual, I need a measure of the statistical variation of the abnormal return. The test for whether randomness alone can account for an abnormal return of -1.1%, or whether some other factor not currently controlled for in the regression likely contributed to such a return, is often based on what is known as the "t-statistic." The t-statistic is the value of the abnormal return divided by its standard deviation and represents the number of standard deviations between the actual return and the predicted return. Under fairly general conditions, one would expect that 95% of the time, a value drawn at random would fall within +/-1.96 standard deviations of its expected value, or that 95% of the time, the value would be less than +1.6649 standard deviations of its expected value.[6] Values further away become statistically unlikely if the underlying model of the data remains valid. Returning to the coin-flipping example, it's similar to saying that an outcome of 65 Heads is unlikely *if Company X is continuing to flip a fair coin*. Instead, it becomes more likely that some other factor, outside the model is, is driving the abnormal return that day (e.g., Company X has purchased a new coin that is not a fair coin).

14. In this example of the XRP return on May 17, 2018, an abnormal return of -1.1% is within the range of "typical" values; its t-statistic is just -0.13. In other words, there is no statistical evidence to suggest that anything beyond the usual random variation is affecting XRP returns on May 17, 2018.

15. The regression methodology I apply in this matter thus provides a scientific basis to test whether the actual XRP returns will fall within a reasonable distance of the predicted return unless there is some non-random explanation. Such a non-random explanation could be the influence of company-specific news revealed to the market on the event day.

B. IDENTIFYING THE DATE OF THE NEWS

16. The universe of documents comprised of Ripple Press Releases, Insight Articles, and Newsroom Articles identifies a set of events. To incorporate an event into my event study, it is necessary to assign a Coordinated Universal Time ("UTC") date to that event since my data on digital token prices are measured in UTC-defined days.

17. For example, for a Ripple press release dated January 1 PT, it is possible that its UTC date is January 2. To account for time zone differences, I may review the published time indicated in the html code of the web page presenting the document if my statistical conclusions would be sensitive to such a difference.

18. It is also possible that a party other than Ripple, or a party other than the source Ripple linked to in its Newsroom, reported the news of the event earlier than my source would indicate. In some cases I conduct a broader search including Factiva, LexisNexis, and internet searches to determine if the event was reported earlier through some other news channel. I also consider the time stamps on related Tweets issued by the official Ripple account. I date an event by the earliest day I am aware of that the information was released to the market.

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[6] This is the case when data are distributed according the Gaussian or "Normal" distribution. The cutoff point of 1.96 is known as the "critical value" for a "two-sided" test. The critical value of the t-test may be adjusted from 1.96 if there is reason to believe the abnormal returns are not Normally distributed, or if a different level of significance is sought, or if a one-sided test is appropriate. The critical value of 1.6449 corresponds to the 5% one-sided test.

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements: Milestone Events

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	0.00***	0.00***	0.01***	5.70*
2	0.01***	0.04***	0.82***	4.52**
3	0.02***	0.06***	0.01***	0.05***
4	0.19***	0.42***	0.07***	0.04***
5	0.02***	0.06***	0.01***	0.16***
6	0.26***	0.74***	0.12***	0.08***
7	0.01***	0.05***	0.00***	0.00***
8	0.21***	0.77***	0.10***	0.06***
9	0.02***	0.00***	0.01***	0.69***
10	0.23***	0.06***	0.05***	0.51***
11	0.00***	0.00***	0.00***	0.60***
12	0.22***	0.55***	0.82***	0.64***
13	0.02***	0.05***	0.01***	0.07***
14	0.24***	0.60***	0.08***	0.06***
15	0.02***	0.06***	0.01***	0.19***
16	0.38***	0.91***	2.57**	2.57**
17	0.02***	0.05***	0.00***	0.00***
18	0.32***	1.00**	0.12***	2.57**
19	0.02***	0.00***	0.00***	0.00***
20	0.02***	0.07***	0.08***	0.07***

Notes:

Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements

* Indicates significance at the 10% level

** Indicates significance at the 5% level

*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements: Milestone Events Excluding Escrow Events

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	0.07***	0.14***	0.46***	3.26**
2	0.05***	0.11***	0.32***	2.57**
3	1.12**	1.96**	0.55***	0.27***
4	0.78***	1.40**	0.36***	0.23***
5	1.99**	3.13**	1.21**	0.89***
6	1.26**	2.55**	0.74***	0.57***
7	1.48**	3.09**	0.83***	0.66***
8	1.10**	2.62**	0.64***	0.47***
9	1.14**	0.20***	0.46***	3.71**
10	0.89***	0.16***	0.30***	3.04**
11	0.08***	0.16***	0.40***	0.23***
12	0.05***	0.14***	0.32***	0.25***
13	1.06**	1.84**	0.49***	0.35***
14	0.92***	1.81**	0.40***	0.31***
15	1.90**	3.13**	1.11**	1.01**
16	1.62**	2.93**	0.83***	0.83***
17	1.68**	2.89**	0.74***	0.85***
18	1.45**	3.13**	0.76***	0.83***
19	1.06**	0.18***	0.41***	0.33***
20	0.07***	0.20***	0.39***	0.36***

Notes:

Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements

* Indicates significance at the 10% level

** Indicates significance at the 5% level

*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements: New Trading Platform Listings

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	0.13***	0.26***	0.32***	0.17***
2	0.60***	1.32**	0.16***	0.09***
3	0.14***	0.40***	0.47***	0.19***
4	0.58***	1.39**	0.21***	0.14***
5	0.14***	0.38***	3.35**	2.30**
6	0.51***	1.70**	1.82**	1.31**
7	0.67***	0.37***	2.02**	1.58**
8	0.40***	1.79**	1.47**	0.97***
9	1.00**	0.40***	0.30***	0.18***
10	0.65***	1.83**	0.14***	0.11***
11	0.15***	0.34***	0.28***	0.18***
12	0.09***	0.26***	0.01***	0.01***
13	0.13***	0.35***	0.39***	0.32***
14	0.09***	0.31***	0.02***	0.02***
15	1.00**	0.38***	3.00**	2.68**
16	0.09***	0.33***	0.23***	0.23***
17	0.84***	2.10**	0.20***	0.26***
18	0.07***	0.38***	0.02***	0.02***
19	0.12***	0.33***	0.30***	0.22***
20	0.12***	0.37***	0.02***	0.02***

Notes:

Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements

* Indicates significance at the 10% level

** Indicates significance at the 5% level

*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements: New Trading Platform Listings Indicating Ripple Action

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	0.07***	0.12***	0.39***	0.24***
2	0.65***	1.21**	0.23***	0.15***
3	0.07***	0.18***	0.54***	0.27***
4	0.63***	1.27**	0.29***	0.20***
5	0.07***	0.17***	5.71*	4.39**
6	0.57***	1.49**	3.75**	2.98**
7	0.71***	0.17***	4.02**	3.39**
8	0.48***	1.55**	3.22**	2.43**
9	0.97***	0.18***	0.38***	0.26***
10	0.69***	1.58**	0.21***	0.17***
11	0.07***	0.15***	0.36***	0.25***
12	0.05***	0.12***	0.01***	0.01***
13	0.07***	0.16***	0.46***	0.39***
14	0.05***	0.14***	0.02***	0.01***
15	0.97***	0.17***	5.29*	4.88**
16	0.05***	0.15***	0.31***	0.31***
17	0.84***	1.77**	0.28***	0.33***
18	0.04***	0.17***	0.01***	0.01***
19	0.06***	0.15***	0.38***	0.30***
20	0.06***	0.17***	0.02***	0.01***

Notes:

Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements

* Indicates significance at the 10% level

** Indicates significance at the 5% level

*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements: Customers & Product Developments (Select)

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	1.77**	1.19**	8.26*	3.04**
2	0.31***	0.35***	5.14*	0.61***
3	2.52**	0.17***	3.14**	9.64*
4	3.13**	1.28**	0.57***	3.61**
5	0.50***	0.85***	0.24***	0.05***
6	0.07***	0.11***	0.01***	0.01***
7	0.15***	0.28***	0.25***	0.34***
8	0.06***	0.48***	0.02***	0.10***
9	1.28**	0.09***	2.05**	2.02**
10	1.59**	0.17***	0.41***	1.45**
11	0.83***	0.71***	7.27*	1.45**
12	0.15***	0.07***	2.20**	1.38**
13	2.20**	1.98**	2.60**	2.61**
14	3.94**	0.96***	0.76***	5.14*
15	0.40***	0.35***	0.17***	0.07***
16	0.20***	0.09***	0.01***	0.03***
17	1.96**	0.23***	0.21***	0.06***
18	0.48***	0.37***	0.05***	0.04***
19	2.12**	0.99***	1.89**	6.81*
20	0.83***	0.61***	0.63***	3.20**

Notes:

Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements

* Indicates significance at the 10% level

** Indicates significance at the 5% level

*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements: Customer & Product Developments (All)

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	3.43**	2.56**	12.39	4.88**
2	0.70***	0.34***	7.97*	1.11**
3	4.75**	0.49***	5.41*	13.84
4	5.60*	2.74**	1.13**	5.73*
5	1.09**	1.90**	0.51***	0.12***
6	0.17***	0.30***	0.02***	0.02***
7	0.34***	0.71***	0.51***	0.65***
8	0.14***	0.42***	0.06***	0.20***
9	2.64**	0.29***	3.64**	3.44**
10	3.09**	0.49***	0.84***	2.53**
11	1.77**	1.66**	11.02	2.53**
12	0.37***	0.21***	3.74**	2.41**
13	4.19**	4.09**	4.55**	4.39**
14	6.92*	2.17**	1.50**	7.97*
15	0.89***	0.86***	0.37***	0.16***
16	0.47***	0.25***	0.03***	0.08***
17	3.61**	0.58***	0.44***	0.13***
18	1.00**	0.35***	0.12***	0.10***
19	4.05**	2.25**	3.37**	10.36
20	1.77**	1.50**	1.25**	5.31*

Notes:

Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements

* Indicates significance at the 10% level

** Indicates significance at the 5% level

*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements: Ripple Commercialization Initiatives

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	1.68**	2.74**	0.60***	0.43***
2	8.45*	12.84	4.20**	3.37**
3	1.91**	3.41**	1.02**	0.43***
4	9.46*	13.82	6.06*	4.09**
5	2.07**	3.47**	1.10**	0.66***
6	8.59*	14.99	5.81*	4.20**
7	1.34**	3.36**	6.44*	5.21*
8	8.17*	15.83	32.34	27.79
9	1.83**	3.52**	0.70***	5.57*
10	10.05	15.83	31.65	29.92
11	1.87**	3.41**	0.56***	0.43***
12	1.31**	2.69**	4.42**	4.64**
13	1.87**	3.09**	0.91***	0.60***
14	1.57**	3.04**	0.75***	0.53***
15	1.91**	3.41**	0.96***	0.72***
16	10.80	17.39	6.06*	5.69*
17	1.57**	3.09**	6.06*	6.44*
18	10.05	18.27	35.01	34.68
19	1.72**	3.14**	0.70***	0.54***
20	1.75**	3.41**	0.66***	0.56***

Notes:

Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements

* Indicates significance at the 10% level

** Indicates significance at the 5% level

*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements: Other Initiatives

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	70.83	77.24	58.49	100.00
2	67.16	75.26	54.40	100.00
3	71.90	78.58	100.00	100.00
4	68.58	75.08	59.39	100.00
5	100.00	100.00	100.00	100.00
6	100.00	100.00	100.00	100.00
7	100.00	100.00	100.00	100.00
8	100.00	100.00	100.00	100.00
9	72.93	79.69	100.00	100.00
10	70.17	78.58	100.00	100.00
11	71.90	79.22	57.27	100.00
12	30.53	77.75	54.40	100.00
13	71.69	43.32	100.00	100.00
14	32.88	43.56	100.00	100.00
15	100.00	100.00	100.00	100.00
16	100.00	100.00	100.00	100.00
17	100.00	100.00	100.00	100.00
18	100.00	67.94	100.00	100.00
19	100.00	79.22	100.00	100.00
20	100.00	19.23	100.00	100.00

Notes:
Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements
* Indicates significance at the 10% level
** Indicates significance at the 5% level
*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements: New Office & Staff

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	22.32	55.90	53.58	42.25
2	64.76	76.14	79.80	72.28
3	71.89	80.49	87.07	78.35
4	90.25	93.74	83.82	100.00
5	58.86	68.44	80.22	73.47
6	79.96	88.40	100.00	100.00
7	51.48	67.86	39.09	69.51
8	79.44	89.43	70.64	100.00
9	73.55	82.68	56.77	80.88
10	91.54	95.52	82.89	100.00
11	24.03	59.98	51.93	45.43
12	39.25	55.90	79.52	77.44
13	71.61	80.49	86.32	81.15
14	69.55	80.28	85.33	79.80
15	57.12	69.05	79.20	38.68
16	83.51	90.76	100.00	71.39
17	54.18	66.70	38.25	37.37
18	82.86	91.70	73.82	72.81
19	71.89	82.11	55.59	81.41
20	72.17	83.79	54.79	82.41

Notes:

Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements

* Indicates significance at the 10% level

** Indicates significance at the 5% level

*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements: Acquisitions & Investments, Customer & Product Developments, Milestone Events, Trading Platform Listings, and Ripple Commercialization Initiatives

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	0.00***	0.00***	0.00***	0.00***
2	0.00***	0.00***	0.00***	0.00***
3	0.00***	0.00***	0.00***	0.00***
4	0.01***	0.00***	0.00***	0.00***
5	0.00***	0.00***	0.00***	0.00***
6	0.00***	0.00***	0.00***	0.00***
7	0.00***	0.00***	0.00***	0.00***
8	0.00***	0.00***	0.00***	0.00***
9	0.00***	0.00***	0.00***	0.00***
10	0.00***	0.00***	0.00***	0.00***
11	0.00***	0.00***	0.00***	0.00***
12	0.00***	0.00***	0.00***	0.00***
13	0.00***	0.00***	0.00***	0.00***
14	0.00***	0.00***	0.00***	0.00***
15	0.00***	0.00***	0.00***	0.00***
16	0.00***	0.00***	0.00***	0.00***
17	0.00***	0.00***	0.00***	0.00***
18	0.00***	0.00***	0.00***	0.00***
19	0.00***	0.00***	0.00***	0.00***
20	0.00***	0.00***	0.00***	0.00***

Notes:
Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements
* Indicates significance at the 10% level
** Indicates significance at the 5% level
*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Decreases and Announcements: Acquisitions & Investments, Customer & Product Developments, Milestone Events, Trading Platform Listings, and Ripple Commercialization Initiatives

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	56.73	58.84	42.28	15.37
2	25.74	44.21	33.66	19.76
3	67.77	52.71	66.48	28.49
4	50.55	74.10	54.46	36.66
5	44.85	36.62	51.64	9.99*
6	30.48	47.50	24.83	23.91
7	71.18	73.54	56.77	61.68
8	70.09	90.93	39.48	78.41
9	32.37	90.39	58.83	79.61
10	67.14	93.67	73.01	88.64
11	39.81	65.32	38.68	17.50
12	21.18	32.73	11.97	23.36
13	42.06	49.34	59.03	29.15
14	33.86	73.23	49.36	40.84
15	34.23	20.88	42.01	56.11
16	43.36	47.58	13.93	25.46
17	75.90	74.16	94.10	67.75
18	95.63	85.96	76.31	73.56
19	24.54	78.79	79.33	50.61
20	67.77	92.82	89.17	66.49

Notes:
Tables report p-values of the hypothesis that significant XRP price decreases are independent of the indicated announcements
* Indicates significance at the 10% level
** Indicates significance at the 5% level
*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements Measured 3 Days Early: Acquisitions & Investments, Customer & Product Developments, Milestone Events, Trading Platform Listings, and Ripple Commercialization Initiatives

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	70.51	77.44	54.48	38.30
2	39.21	61.43	45.26	34.43
3	86.47	94.30	72.75	58.53
4	58.52	70.66	61.80	68.60
5	58.31	58.31	40.38	26.78
6	58.31	58.31	40.38	19.92
7	58.31	63.38	46.77	26.78
8	58.31	38.09	46.77	26.78
9	78.98	90.13	76.59	58.53
10	60.66	82.41	70.57	53.77
11	68.52	82.19	63.92	55.79
12	58.03	63.06	45.26	42.78
13	82.61	93.72	82.21	77.60
14	74.25	92.02	59.42	58.53
15	58.59	43.49	40.62	33.89
16	58.59	63.66	40.62	33.89
17	58.59	68.25	53.04	33.89
18	58.59	72.38	47.03	40.62
19	86.47	85.26	83.72	75.09
20	83.98	84.97	72.75	66.26

Notes:
Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements
* Indicates significance at the 10% level
** Indicates significance at the 5% level
*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements (90 Day Estimation Window): Acquisitions & Investments, Customer & Product Developments, Milestone Events, Trading Platform Listings, and Ripple Commercialization Initiatives

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	0.00***	0.00***	0.00***	0.00***
2	0.00***	0.00***	0.00***	0.00***
3	0.00***	0.00***	0.00***	0.00***
4	0.00***	0.00***	0.00***	0.00***
5	0.00***	0.01***	0.00***	0.00***
6	0.00***	0.00***	0.00***	0.00***
7	0.00***	0.00***	0.00***	0.03***
8	0.00***	0.00***	0.00***	0.00***
9	0.00***	0.00***	0.00***	0.01***
10	0.00***	0.00***	0.00***	0.01***
11	0.00***	0.00***	0.00***	0.00***
12	0.00***	0.00***	0.00***	0.00***
13	0.00***	0.00***	0.00***	0.00***
14	0.00***	0.00***	0.00***	0.00***
15	0.01***	0.01***	0.01***	0.01***
16	0.01***	0.02***	0.00***	0.00***
17	0.00***	0.00***	0.00***	0.00***
18	0.00***	0.00***	0.01***	0.00***
19	0.00***	0.00***	0.00***	0.00***
20	0.00***	0.00***	0.00***	0.00***

Notes:
Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements
* Indicates significance at the 10% level
** Indicates significance at the 5% level
*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements (360 Day Estimation Window): Acquisitions & Investments, Customer & Product Developments, Milestone Events, Trading Platform Listings, and Ripple Commercialization Initiatives

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	0.00***	0.00***	0.00***	0.00***
2	0.00***	0.00***	0.01***	0.01***
3	0.00***	0.00***	0.00***	0.00***
4	0.00***	0.00***	0.00***	0.01***
5	0.00***	0.00***	0.00***	0.00***
6	0.00***	0.00***	0.00***	0.02***
7	0.00***	0.00***	0.00***	0.01***
8	0.01***	0.00***	0.00***	0.02***
9	0.00***	0.00***	0.00***	0.00***
10	0.00***	0.00***	0.00***	0.00***
11	0.00***	0.00***	0.00***	0.00***
12	0.00***	0.00***	0.00***	0.00***
13	0.00***	0.00***	0.00***	0.00***
14	0.00***	0.00***	0.00***	0.00***
15	0.00***	0.00***	0.00***	0.00***
16	0.00***	0.00***	0.00***	0.00***
17	0.00***	0.00***	0.01***	0.00***
18	0.00***	0.00***	0.00***	0.00***
19	0.00***	0.00***	0.00***	0.00***
20	0.00***	0.00***	0.00***	0.00***

Notes:
Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements
* Indicates significance at the 10% level
** Indicates significance at the 5% level
*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements (1 Day Event Window): Acquisitions & Investments, Customer & Product Developments, Milestone Events, Trading Platform Listings, and Ripple Commercialization Initiatives

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	0.00***	0.00***	0.00***	0.02***
2	0.00***	0.00***	0.01***	0.01***
3	0.00***	0.00***	0.00***	0.00***
4	0.00***	0.01***	0.00***	0.00***
5	0.00***	0.01***	0.00***	0.00***
6	0.00***	0.01***	0.00***	0.00***
7	0.00***	0.01***	0.01***	0.01***
8	0.00***	0.01***	0.00***	0.00***
9	0.01***	0.00***	0.00***	0.01***
10	0.01***	0.02***	0.01***	0.03***
11	0.00***	0.00***	0.00***	0.01***
12	0.00***	0.00***	0.01***	0.00***
13	0.00***	0.00***	0.00***	0.00***
14	0.00***	0.00***	0.00***	0.00***
15	0.00***	0.00***	0.00***	0.00***
16	0.00***	0.00***	0.00***	0.00***
17	0.00***	0.01***	0.01***	0.00***
18	0.00***	0.00***	0.00***	0.00***
19	0.00***	0.00***	0.00***	0.00***
20	0.00***	0.00***	0.00***	0.01***

Notes:
Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements
* Indicates significance at the 10% level
** Indicates significance at the 5% level
*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements (7 Day Event Window): Acquisitions & Investments, Customer & Product Developments, Milestone Events, Trading Platform Listings, and Ripple Commercialization Initiatives

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	0.04***	0.01***	0.10***	0.18***
2	0.01***	0.00***	0.13***	0.01***
3	0.00***	0.00***	0.00***	0.03***
4	0.04***	0.00***	0.01***	0.01***
5	0.00***	0.01***	0.00***	0.00***
6	0.00***	0.01***	0.00***	0.00***
7	0.00***	0.00***	0.00***	0.00***
8	0.00***	0.02***	0.00***	0.01***
9	0.02***	0.00***	0.01***	0.05***
10	0.09***	0.01***	0.04***	0.05***
11	0.01***	0.01***	0.08***	0.04***
12	0.00***	0.00***	0.00***	0.00***
13	0.00***	0.00***	0.00***	0.01***
14	0.00***	0.00***	0.00***	0.00***
15	0.01***	0.02***	0.00***	0.00***
16	0.00***	0.00***	0.00***	0.00***
17	0.00***	0.00***	0.00***	0.00***
18	0.00***	0.01***	0.00***	0.00***
19	0.02***	0.03***	0.02***	0.00***
20	0.01***	0.00***	0.00***	0.00***

Notes:
Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements
* Indicates significance at the 10% level
** Indicates significance at the 5% level
*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Random Exclusion of Events From: Acquisitions & Investments, Customer & Product Developments, Milestone Events, Trading Platform Listings, and Ripple Commercialization Initiatives

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	0.00***	0.00***	0.00***	0.01***
2	0.00***	0.00***	0.01***	0.00***
3	0.00***	0.00***	0.00***	0.00***
4	0.01***	0.00***	0.00***	0.00***
5	0.00***	0.00***	0.00***	0.00***
6	0.00***	0.00***	0.00***	0.00***
7	0.00***	0.00***	0.00***	0.00***
8	0.00***	0.01***	0.00***	0.00***
9	0.00***	0.00***	0.00***	0.00***
10	0.00***	0.00***	0.00***	0.01***
11	0.00***	0.00***	0.00***	0.00***
12	0.00***	0.00***	0.00***	0.00***
13	0.00***	0.00***	0.00***	0.00***
14	0.00***	0.00***	0.00***	0.00***
15	0.00***	0.00***	0.00***	0.00***
16	0.00***	0.00***	0.00***	0.00***
17	0.00***	0.00***	0.00***	0.00***
18	0.00***	0.00***	0.00***	0.00***
19	0.00***	0.00***	0.00***	0.00***
20	0.00***	0.00***	0.00***	0.00***

Notes:
Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements
* Indicates significance at the 10% level
** Indicates significance at the 5% level
*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Random Inclusion of Events To: Acquisitions & Investments, Customer & Product Developments, Milestone Events, Trading Platform Listings, and Ripple Commercialization Initiatives

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	0.00***	0.00***	0.02***	0.04***
2	0.00***	0.00***	0.04***	0.01***
3	0.00***	0.00***	0.00***	0.01***
4	0.03***	0.01***	0.00***	0.01***
5	0.00***	0.00***	0.00***	0.00***
6	0.00***	0.00***	0.00***	0.00***
7	0.00***	0.00***	0.00***	0.00***
8	0.00***	0.02***	0.00***	0.00***
9	0.01***	0.00***	0.00***	0.01***
10	0.03***	0.01***	0.01***	0.02***
11	0.00***	0.00***	0.01***	0.01***
12	0.00***	0.00***	0.01***	0.00***
13	0.00***	0.00***	0.00***	0.00***
14	0.00***	0.00***	0.00***	0.00***
15	0.00***	0.00***	0.00***	0.00***
16	0.00***	0.00***	0.00***	0.00***
17	0.00***	0.00***	0.00***	0.00***
18	0.00***	0.02***	0.00***	0.00***
19	0.00***	0.00***	0.00***	0.00***
20	0.00***	0.00***	0.00***	0.00***

Notes:
Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements
* Indicates significance at the 10% level
** Indicates significance at the 5% level
*** Indicates significance at the 1% level

APPENDIX E

Significance of Correlation Between XRP Price Increases and Announcements: Acquisitions & Investments

Model Number	One-Sided 5%		Two-Sided 5%	
	Parametric	Nonparametric	Parametric	Nonparametric
1	100.00	15.66	100.00	100.00
2	11.70	3.17**	32.32	27.80
3	50.44	20.22	41.18	26.45
4	50.44	3.91**	40.62	31.05
5	52.31	58.78	100.00	34.79
6	48.00	59.58	100.00	33.57
7	100.00	59.18	100.00	100.00
8	100.00	60.76	100.00	100.00
9	54.12	61.90	100.00	35.40
10	52.77	61.14	100.00	36.00
11	100.00	19.56	100.00	100.00
12	12.28	4.14**	32.32	32.32
13	48.99	18.57	100.00	32.95
14	13.79	5.00**	41.73	34.79
15	47.50	59.18	100.00	36.00
16	49.48	61.90	38.92	36.59
17	52.31	59.98	100.00	100.00
18	52.31	63.02	100.00	100.00
19	51.38	57.55	100.00	33.57
20	51.85	5.52*	40.62	36.59

Notes:

Tables report p-values of the hypothesis that significant XRP price increases are independent of the indicated announcements

* Indicates significance at the 10% level

** Indicates significance at the 5% level

*** Indicates significance at the 1% level

APPENDIX E

Significance of Generalized Rank Test Applied to Milestones, Trading Platform Listings, Customer & Product Announcements, Acquisitions & Investments, and Ripple Commercialization Initiatives

Model Number	Minimum T-Statistic	Maximum T-Statistic
1	3.06***	3.25***
2	2.48**	2.82***
3	4.04***	4.24***
4	3.47***	3.89***
5	3.74***	3.99***
6	3.17***	3.28***
7	3.28***	3.81***
8	2.75***	3.48***
9	3.83***	4.35***
10	3.33***	4.12***
11	3.08***	3.30***
12	2.41**	2.76***
13	4.15***	4.43***
14	3.45***	3.85***
15	3.80***	3.90***
16	3.01***	3.43***
17	3.33***	3.97***
18	2.87***	4.03***
19	3.74***	4.44***
20	3.01***	4.02***

Notes:

* Indicates significance at the 10% level

** Indicates significance at the 5% level

*** Indicates significance at the 1% level

APPENDIX F

INFORMATIONAL EFFICIENCY OF XRP PRICES

1. In this Appendix I provide additional discussion on the informational efficiency of XRP prices during the period from February 1, 2014 to December 31, 2020. In the literature of economics and finance, in an informationally efficient market, prices "fully incorporate the expectations and information of all market participants."[1] There are three forms of efficiency:[2]
   a. Weak Form Efficiency: Prices reflect past prices;
   b. Semi-Strong Form Efficiency: Prices reflect all public information; and
   c. Strong Form Efficiency: Prices reflect all private information.

2. This taxonomy represents an order. Since "all private information" includes "all public information" which includes "past prices," if a market is not weak-form efficient, then it cannot be semi-strong and hence cannot be strong.

3. A key implication of weak form efficiency is that returns must be unpredictable based on past returns alone, meaning that intertemporal correlation of an asset's returns—called "autocorrelation"—must be zero.[3] Finding a counter example, that is, establishing that an asset's return at t is correlated with its returns at $t - s$, effectively establishes that the market for that asset is not weak form efficient, which establishes that it is not semi-strong or strong.

4. As discussed in my report, academic researchers have found that the digital token markets, including the XRP market, are generally less informationally efficient than the stock market, though there is evidence that efficiency is increasing over time.[4]

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[1] See, e.g., John Y. Campbell, Andrew W. Lo, and A. Craig MacKinlay, "*The Econometrics of Financial Markets*," 2nd Edition, p. 20 ("In an informationally efficient market…price changes must be unforecastable if they are properly anticipated, i.e., if they fully incorporate the expectations and information of all market participants.").

[2] See, e.g., John Y. Campbell, Andrew W. Lo, and A. Craig MacKinlay, "*The Econometrics of Financial Markets*," 2nd Edition, p. 22 ("The classic taxonomy of information sets, due to Roberts (1967), distinguishes among Weak-form Efficiency: The information set includes only the history of prices or returns themselves. Semistrong-Form Efficiency: The information set includes all information known to all market participants (*publicly available* information). Strong-Form Efficiency: The information set includes all information known to any market participant (*private* information).").

[3] See, e.g., Zvi Bodie, Alex Kane, and Alan J. Marcus, "*Investments*," 9th Edition, 2010, p. 358 ("Weak-Form Tests: Patterns in Stock Returns … Early tests of efficient markets were tests of the weak form. Could speculators find trends in past prices that would enable them to earn abnormal profits? ... One way of discerning trends in stock prices is by measuring the *serial correlation* of stock market returns. Serial correlation refers to the tendency for stock returns to be related to past returns. Positive serial correlation means that positive returns tend to follow positive returns (a momentum type of property). Negative serial correlation means that positive returns tend to be followed by negative returns (a reversal or 'correction' property).").

[4] See, e.g, Andrew Urquhart, "The Inefficiency of Bitcoin," *Economics Letters* Vol. 148, 2016, p. 5 ("…we do show that Bitcoin may becoming more efficient with some of the tests for market efficiency suggesting that Bitcoin returns are random in the second subsample. … Since it is a relatively new investment asset and still in its infancy, it is similar to an emerging market and therefore the inefficiency finding is not surprising.

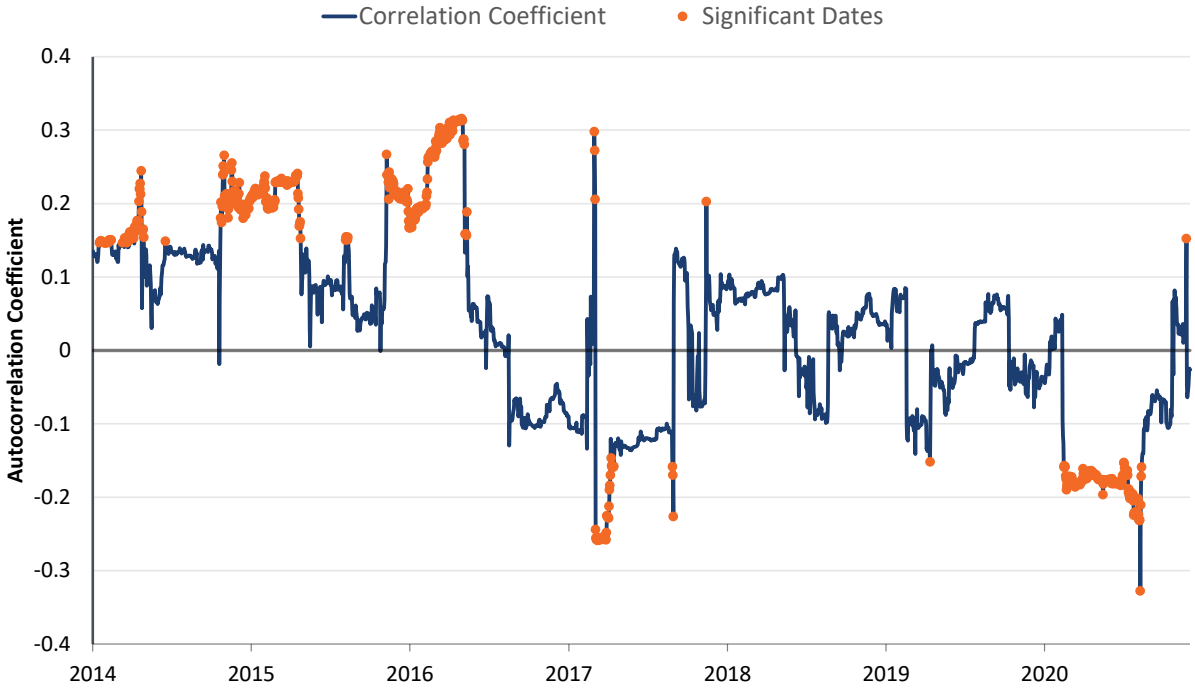
5. I examined the autocorrelation of XRP returns and my findings are consistent with this literature. Figure 1 below plots the autocorrelation of XRP returns from February 1, 2014 to December 31, 2020. Specifically, I examine the correlation between XRP's daily returns and its previous day's returns over a 180-day rolling window, a measure of "first-order autocorrelation."

6. Figure 1 shows that XRP returns exhibit both positive and negative autocorrelation between February 1, 2014 and December 31, 2020 (the blue line). Days where the autocorrelation is statistically significantly different from 0 are identified by orange dots. For both positive and negative autocorrelation, there are periods where such autocorrelation is statistically significant. During these periods, I can reject the hypothesis that XRP prices are even weak form efficient.

Consistent with this argument is that Bitcoin will become more efficient over time as more investors analyse and trade Bitcoin."); Aurelio F. Bariviera, "The Inefficiency of Bitcoin Revisited: A Dynamic Approach," *Economics Letters* Vol. 161, 2017, Abstract ("…daily returns exhibit persistent behavior in the first half of the period under study, whereas its behavior is more informational efficient since 2014."); Aviral Kumar Tiwari, R.K. Jana, Debojyoti Das, and David Roubaud, "Informational Efficiency of Bitcoin—An Extension," *Economics Letters* Vol. 163, 2018, Abstract ("We report that the market is informational efficient as consistent to recent findings of Urquhart (2016), Nadarajah and Chu (2017) and Bariviera (2017).") and pp. 6-7 ("We observe that the market is largely efficient with some exception to the period of April-August, 2013 and August-November, 2016."); and Ahmet Sensoy, "The Inefficiency of Bitcoin Revisited: A High-Frequency Analysis with Alternative Currencies," *Finance Research Letters* Vol. 28, 2019, Abstract ("We find that BTCUSD and BTCEUR markets have become more informationally efficient at the intraday level since the beginning of 2016, and BTCUSD market is slightly more efficient than BTCEUR market in the sample period.").

APPENDIX F

FIGURE 1: AUTOCORRELATION OF XRP RETURNS BETWEEN FEBURARY 1, 2014 AND DECEMBER 31, 2020



7. Not finding significant first-order autocorrelation, as holds during some periods, is not sufficient to establish that this market is semi-strong or strong form efficient. However, I note that my statistical conclusions hold even at a one-day test window, as shown in Appendix E. Even if one were to believe that this market is informationally efficient in the semi-strong sense and hence believe that prices should fully reflect all public information "quickly," the hypothesis that the XRP market is independent of news of actions of Ripple Labs can be rejected at any reasonable significance level.

Exhibit 16

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

SECURITIES AND EXCHANGE COMMISSION, Plaintiff, RIPPLE LABS INC., BRADLEY GARLINGHOUSE, AND CHRISTIAN A. LARSEN, Defendants.	20 Civ. 10832 (AT)

EXPERT REBUTTAL REPORT OF DANIEL R. FISCHEL

November 12, 2021

I. QUALIFICATIONS

1. I am President of Compass Lexecon, a consulting firm that specializes in the application of economics to a variety of legal and regulatory issues. I am also the Lee and Brena Freeman Professor of Law and Business Emeritus at The University of Chicago Law School. I have served previously as Dean of The University of Chicago Law School, Director of the Law and Economics Program at The University of Chicago, and as Professor of Law and Business at The University of Chicago Graduate School of Business, the Kellogg School of Management at Northwestern University, and the Northwestern University Law School.

2. Both my research and my teaching have concerned the economics of corporate law and financial markets. I have published approximately fifty articles in leading legal and economics journals and am co-author, with Judge Frank Easterbrook of the Seventh Circuit Court of Appeals, of the book *The Economic Structure of Corporate Law* (Harvard University Press, 1991). Courts of all levels, including the Supreme Court of the United States, have cited my articles as authoritative. I have written and testified extensively about uses of event studies. My curriculum vitae, which contains a list of my publications, is attached hereto as Appendix A.

3. I have served as a consultant or adviser on economic issues to, among others, the United States Department of Justice, the United States Securities and Exchange Commission, the National Association of Securities Dealers, the New York Stock Exchange, the Chicago Board of Trade, the Chicago Mercantile Exchange, the New York Mercantile Exchange, the United States Department of Labor, the Federal Deposit Insurance Corporation, the Resolution Trust Corporation, the Federal Housing Finance Agency, and the Federal Trade Commission.

4. I am a member of the American Economic Association and the American Finance Association. I am also a former Trustee of the Becker Friedman Institute, a former member of the Board of Directors of the Center for the Study of the Economy and the State at The University of Chicago, and former Chairman of the American Association of Law Schools' Section on Law and Economics. I have testified as an expert witness in multiple proceedings in federal and state courts across the country, as detailed in Appendix A.

II. BACKGROUND

5. I understand that the relevant background is as follows. The XRP Ledger is a public blockchain technology that was developed by David Schwartz, Jed McCaleb, and Arthur Britto between 2011 and June 2012.[1] XRP is the native digital asset of the XRP Ledger.[2] In September 2012, the technology company n/k/a Ripple Labs Inc. ("Ripple" or the "Company"), was founded to "build use cases for the digital asset" XRP.[3] Shortly after the formation of the Company, the founders contributed 80 billion units of XRP to the Company, or 80% of the 100 billion units in existence.[4]

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1 See https://xrpl.org/xrp-ledger-overview.html and https://xrpl.org/history.html.

2 See https://xrpl.org/xrp-overview.html and https://xrpl.org/history.html.

3 See https://xrpl.org/history.html. I understand that the Company was initially named NewCoin and then OpenCoin before changing its name to Ripple in 2013. I also understand that the term "Ripple" initially stood for "the open-source project, the unique consensus ledger (Ripple Consensus Ledger), transaction protocol (Ripple Transaction Protocol or RTXP), the network (Ripple network), and the digital asset (known as 'ripples')" and that "[f]or clarity, the community simply started calling the digital asset by its currency code, 'XRP'." *Id.*

4 See https://xrpl.org/xrp-overview.html and https://xrpl.org/history.html. In December 2017, Ripple placed 55 billion units of XRP, or 55% of the 100 billion units in existence, into a series of escrows, which provided an upper limit on the amount of new XRP that could be brought into circulation. See https://ripple.com/insights/explanation-ripples-xrp-escrow/.

6. The Securities and Exchange Commission ("SEC") has brought this action against Ripple, Bradley Garlinghouse, and Chris Larsen ("Defendants") for alleged violations of Section 5(a) and (c) of the Securities Act of 1933 (the "Securities Act").[5] Specifically, the SEC argues that "XRP was an investment contract and therefore a security subject to the registration requirements of the federal securities laws"[6] and, therefore, Ripple engaged in "a years-long unregistered offering of securities […] by selling XRP without providing the type of financial and managerial information typically provided in registration statements and subsequent period and current filings."[7, 8]

7. In *SEC v. W. J. Howey Co.*, the Supreme Court ruled that "an investment contract for purposes of the Securities Act means a contract, transaction or scheme whereby a person invests his money in a common enterprise and is led to expect profits solely from the efforts of

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5 See *Securities and Exchange Commission v. Ripple Labs, et al.*, First Amended Complaint filed February 18, 2021 ("Amended Complaint"), p. 1 and ¶ 9.

6 Amended Complaint, ¶ 231.

7 Amended Complaint, ¶ 5.

8 I understand that "security" is defined in Section 2(a)(1) of the Securities Act as follows: "The term 'security' means any note, stock, treasury stock, security future, security-based swap, bond, debenture, evidence of indebtedness, certificate of interest or participation in any profit-sharing agreement, collateral-trust certificate, preorganization certificate or subscription, transferable share, **investment contract**, voting-trust certificate, certificate of deposit for a security, fractional undivided interest in oil, gas, or other mineral rights, any put, call, straddle, option, or privilege on any security, certificate of deposit, or group or index of securities (including any interest therein or based on the value thereof), or any put, call, straddle, option, or privilege entered into on a national securities exchange relating to foreign currency, or, in general, any interest or instrument commonly known as a 'security', or any certificate of interest or participation in, temporary or interim certificate for, receipt for, guarantee of, or warrant or right to subscribe to or purchase, any of the foregoing." (Emphasis added.)

the promoter or a third party."[9] I understand that this decision is commonly referred to as the *Howey* Test.[10]

8. The SEC submitted the initial report of Dr. [redacted] on October 4, 2021.[11] In his report, Dr. [redacted] states that he "understand[s] that the XRP token is not a claim on the assets or earnings of Ripple Labs and that Ripple Labs maintains that market participants do not view Ripple Labs' efforts as relevant to the XRP market price."[12] He also states that he "[has] been asked by the SEC's litigation counsel to test whether news about Ripple Labs and its actions is associated with statistically significant XRP price changes."[13]

9. Dr. [redacted] uses an event study methodology to "test whether XRP returns are associated with news about Ripple,"[14] specifically whether news about Ripple coincide with statistically significant price changes in XRP "more frequently than random chance could explain."[15] Dr. [redacted] argues that "[i]f there is a relationship between Ripple's actions and XRP returns," then he "would expect that (presumptively positive) news would be significantly associated with positive returns" and "that such news would [not] be significantly associated with negative returns[.]"[16]

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9 *SEC v. W. J. Howey Co.*, 328 U.S. 293 (1946).

10 "The test is whether the scheme involves an investment of money in a common enterprise with profits to come solely from the efforts of others. If that test be satisfied, it is immaterial whether the enterprise is speculative or non-speculative or whether there is a sale of property with or without intrinsic value." *SEC v. W. J. Howey Co.*, 328 U.S. 293 (1946).

11 See Expert Report of [redacted] Ph.D., October 4, 2021 ("[redacted] Report").

12 [redacted] Report, ¶ 30.

13 [redacted] Report, ¶ 30.

14 [redacted] Report, ¶ 28.

15 [redacted] Report, ¶ 31.

16 [redacted] Report, ¶ 64.

10. To identify "pertinent" news to test, Dr. [redacted] collects "news which Ripple Labs has identified to be important by virtue of (i) having issued a press release about the event, or (ii) having written about it on its Insights/News page, or (iii) having linked to a third-party news outlet in its curated Newsroom page."[17] He then classifies these announcements into various categories based on his own "judgment."[18] In total, Dr. [redacted] identifies 514 events[19] but focuses his analysis on "news announcements in [] categories related more directly to XRP[.]"[20, 21]

11. Specifically, Dr. [redacted] tests for statistically significant correlation between XRP price increases and the following categories of announcements that he assumes are more directly related to XRP: (1) Milestones ("key event[s] in the history of Ripple Labs not related to products or customers"); (2) Trading Platform Listings ("announcement[s] that XRP is available for trading on a new digital asset trading platform"); (3) Customer & Product Developments ("announcement[s] related to new customer relationship[s] … or products, including enhancements to the XRP ledger protocol"); (4) Ripple Commercialization Initiatives ("initiative[s] launched by Ripple Labs primarily described as being related to the commercialization or promotion of Ripple's products or technology in the XRP ecosystem"); and (5) "Select Categories," which combines announcements in the forgoing categories and

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17 [redacted] Report, ¶ 48.a.

18 See [redacted] Report, ¶ 48.b.

19 See [redacted] Report, ¶ 49. See also, [redacted] Report, Appendix C.

20 [redacted] Report, ¶ 50.

21 Dr. [redacted] also excludes announcements from his analysis if "the announcement may substantially repeat a previous announcement" or "the nature of the announcement may not have a particular directional implication for XRP prices, even assuming the hypothesis of independence is false." [redacted] Report, ¶ 48.c.

Acquisitions & Investments ("announcement[s] of an acquisition or investment made by Ripple Labs, including through its development arm Xpring").[22, 23]

12. To test for significant correlation between XRP price increases and these announcements, Dr. [redacted] uses an event study analysis, which has four steps:

(i) First, Dr. [redacted] specifies the regression model of XRP returns. He considers 20 different regression models and estimates each model using 180-day estimation windows.[24]

(ii) Second, Dr. [redacted] specifies the window over which to measure the changes in XRP prices following a news event, i.e., the "event window." He considers a 1-day event window (date t), a 2-day event window (dates t and t+1), and a 3-day event window (dates t, t+1, and t+2).[25]

(iii) Third, Dr. [redacted] estimates the (cumulative) abnormal returns for each trading day over the corresponding event window and then determines which are statistically

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[22] [redacted] Report, ¶ 48.b. See also, [redacted] Report, Figure 1 (p. 3) and Appendix E, pp. 1-7, 10.

[23] Dr. [redacted] also tests the significance of correlation between XRP price increases and the two other categories of announcements, which he assumes are less related to XRP: (i) Other Initiatives and (ii) Office & Staff Announcement. See [redacted] Report, ¶¶ 48.b, 91-97 and Appendix E, pp. 8-9. Additionally, I note that Dr. [redacted] identifies but does not analyze announcements in the following categories, presumably because he assumes these announcements are even less related to XRP: (i) Case Study; (ii) Charity; (iii) Corporate Activity & Announcement; (iv) Litigation; (v) Market Commentary & Company Overview; (vi) Markets Report; and (vii) Miscellaneous. See [redacted] Report, ¶¶ 48.b, 50. "For certain other categories, such as general market commentary (often written by third parties and which does not break new information), it seems self-evident that there should be no meaningful connection with the XRP market in any case, hence testing such categories is not informative." *Id.*, ¶ 50.

[24] See [redacted] Report, ¶ 60. See also, *id.*, Section V.B (¶¶ 39-43) and Figure 7 (p. 19).

[25] See [redacted] Report, ¶ 61. Dr. [redacted] states that he "conservatively limit[s] [his] analysis to a three day window – meaning, [he] associate[s] price reactions to a news event on date t only if [he] find[s] evidence of statistically significant price movements in the first three days." *Id.*, ¶ 38.

significant using a parametric approach and a nonparametric approach.[26] He evaluates the statistical significance of abnormal returns at the 5% significance level in a one-sided test and a two-sided test.[27] Dr. [redacted] classifies date t as "significantly positive" if any of its cumulative returns over the 1-, 2-, or 3-day event windows are statistically significant and positive and none of its cumulative returns over those windows are statistically significant and negative.[28]

(iv) Finally, Dr. [redacted] examines the interaction between the set of news days he identified and the set of days with significantly positive XRP returns.[29]

13. In other words, Dr. [redacted] analysis "selects different categories of news event, determines how many of those correspond to significantly positive XRP returns according to different regression models [he] consider[s], and then calculates how likely that outcome is."[30] Based on his analysis, Dr. [redacted] concludes that "XRP prices react to certain news and public statements about Ripple's actions," particularly "important milestones in the history of [Ripple] and [] announcements more directly related to XRP."[31]

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[26] See [redacted] Report, ¶ 62. Dr. [redacted] parametric approach "assesses the abnormal return against the significant thresholds from the t-distribution (approximately 1.64 for a one-sided test and 1.96 for a two-sided test)," while his nonparametric approach "assesses the abnormal return against the distribution of standardized abnormal returns observed over the 180 days used to estimate the regression model." [redacted] Report, ¶¶ 62.a-62.b.

[27] "The 'one-sided' test classifies a return as significant if there is only a 5% probability of drawing a greater (more positive) return. The 'two-sided' test classifies a return as significant if there is only a 5% probability of drawing a more extreme (whether positive or negative) return. When using the 'two-sided' standard, I continue to restrict myself only to positive returns, unless otherwise noted." [redacted] Report, note 65.

[28] See [redacted] Report, ¶ 63.

[29] See [redacted] Report, ¶ 64.

[30] [redacted] Report, ¶ 58.

[31] [redacted] Report, ¶ 12.a.

III. ASSIGNMENT AND SUMMARY OF CONCLUSIONS

14. I have been asked by counsel for Ripple to review, evaluate, and respond to Dr. [redacted] event study methodology from an economics perspective. Based on my review of the economic evidence, I have concluded that Dr. [redacted] analysis is fundamentally flawed for multiple reasons and provides no support for the SEC's claim that XRP is a security:

(i) First, the findings of Dr. [redacted] event study methodology do not demonstrate that XRP holders profit solely or primarily from the efforts of Ripple.

(ii) Second, Dr. [redacted] misinterprets his own findings by failing to recognize that many of the announcements that he finds to be statistically significant are confounded.

(iii) Third, Dr. [redacted] fails to appreciate the significance of his own admission that XRP did not trade in an efficient market.

(iv) Fourth, Dr. [redacted] fails to provide any explanation as to why his event study methodology would shed any light on whether XRP holders are engaged in a "common enterprise" with Ripple.

15. I elaborate upon and provide the bases for my opinions in Section IV of this report. In performing this work, I have received assistance from Compass Lexecon personnel working under my supervision. Compass Lexecon is being compensated for the time spent by Compass Lexecon personnel at their customary hourly rates. My current hourly rate is $1,750. My compensation is not contingent on the analyses we conducted or the opinions I offer in this report. A list of materials we have relied upon in connection with the preparation of this report is attached as Appendix B.

IV. DR. [redacted] ANALYSIS IS FUNDAMENTALLY FLAWED AND PROVIDES NO SUPPORT FOR THE SEC'S CLAIM THAT XRP IS A SECURITY

16. From an economics perspective, holders of a security issued by a company have a claim on some of the cash flows generated by a set of assets or, in certain states of the world, a claim on the assets themselves.[32] For example, stock and bond holders have a claim on the cash flows and assets of the underlying company. However, as Dr. [redacted] acknowledges, and the SEC has admitted,[33] holders of XRP do not have a claim on any of Ripple's cash flows or assets in any state of the world.[34] Instead, Dr. [redacted] uses an event study methodology to "test whether XRP returns are associated with news about Ripple,"[35] and, based on his analysis, concludes that XRP had statistically significant returns following some (but not all) announcements[36] made by Ripple.[37] For the reasons discussed below, I have concluded that Dr. [redacted] analysis is

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[32] See e.g., Aswath Damodaran, "Approaches to Valuation," in *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* (3rd Ed., John Wiley & Sons, 1996), Chapter 2, pp. 11-26. "[D]iscounted cash flow valuation … is the foundation on which all other valuation approaches are built …. This approach has its foundation in the present value rule, where the value of any asset is the present value of expected future cash flows on it." *Id.*, p. 11.

[33] See Plaintiff's Answers and Objections to Defendants' First Set of Requests for Admission, dated July 16, 2021, pp. 19-20: "[T]he Commission admits that holders of XRP are not entitled to receive any return of principal, dividend, interest, rent, royalties, license payments, lease payments, or any other payment or consideration from Ripple, based solely on their status as a holder of XRP …. [T]he Commission admits that Ripple is not obligated to share any return of principal, dividend, rent, royalties, license payments, lease payments, or any other payment or consideration to any holder of XRP, based solely on his or her status as a holder of XRP."

[34] See [redacted] Report, ¶ 30: "I understand that the XRP token is not a claim on the assets or earnings of Ripple Labs."

[35] [redacted] Report, ¶ 28.

[36] See *infra*, Section IV.A.

[37] [redacted] Report, ¶ 12.a.

fundamentally flawed and provides no support for the SEC's claim that XRP is a security under the *Howey* Test.

A. The Findings of Dr. [redacted] Event Study Methodology Do Not Demonstrate that XRP Holders Profit Solely or Primarily from the Efforts of Ripple

17. Dr. [redacted] claims that "across major milestones in the history of Ripple Labs and across those categories of news more directly related to XRP's proposed use cases, there is statistically significant evidence that the price of XRP reacts to news of Ripple's actions."[38] While I do not agree with Dr. [redacted] identification and categorization of event days, for brevity's sake, in this section, I refer to the event days with announcements analyzed in Dr. [redacted] "Select Categories" test as "days with news about Ripple's efforts" and to all other days as "days with no news about Ripple's efforts."[39]

18. Even if one were to assume that the event days analyzed in Dr. [redacted] "Select Categories" test were solely or primarily related to the efforts of Ripple—which, as I discuss in Section IV.B *infra*, they are not—the findings of his event study methodology do not demonstrate that XRP holders profit solely or primarily from the efforts of Ripple. In fact, taken at face value, Dr. [redacted] analysis finds that (i) most days with significantly positive XRP returns

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[38] [redacted] Report, ¶ 65.

[39] As discussed above, Dr. [redacted] identifies other categories of announcements but does not analyze those announcements in his "Select Categories" test—presumably because Dr. [redacted] assumes those categories of announcements are not directly related to XRP and/or do not disclose new information about Ripple's efforts. See *supra*, note 20. Moreover, as I discuss in Section IV.B *infra*, even the announcements that Dr. [redacted] analyzes in his "Select Categories" test confound information about Ripple's efforts with information about market conditions for XRP.

had no news about Ripple's efforts and (ii) most days with news about Ripple's efforts did not have significantly positive XRP returns.

19. In his "Select Categories" test, Dr. [redacted] analyzes 105 event days[40] with announcements in any of the following categories: (1) Milestones, (2) Trading Platform Listings, (3) Customer & Product Developments, (4) Ripple Commercialization Initiatives, and (5) Acquisitions & Investments.[41] Between May 5, 2014 (the first event day tested by Dr. [redacted] and October 28, 2020 (the last event day tested by Dr. [redacted] there were 2,369 total trading days.[42] Dr. [redacted] estimates abnormal returns for each of these 2,369 trading days using 20 regression models and then evaluates the abnormal returns at the 5% significance level using a parametric and nonparametric approach.[43, 44]

20. Using his event study methodology, Dr. [redacted] "Select Categories" test identifies 76 to 267 days with significantly positive XRP returns and 15 to 31 event days where news about Ripple's efforts corresponded with significantly positive XRP returns. See Exhibit 1. As the exhibit shows, these findings demonstrate that (i) 76.3% to 89.5% of days with significantly positive XRP returns had no news about Ripple's efforts analyzed by Dr. [redacted] and (ii) 70.5% to 84.8% of days with news about Ripple's efforts analyzed by Dr. [redacted] did not have significantly

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40 See *infra*, note 44.

41 See [redacted] Report, Figure 1 (p. 3) and ¶ 98. See also [redacted] Report, Appendix E, p. 10.

42 See *infra*, note 44.

43 See [redacted] Report, ¶¶ 42, 54, 60-63. For both the parametric and nonparametric approach, Dr. [redacted] uses a one-sided test and two-sided test.

44 In eight out of 20 regression models, Dr. [redacted] controls for the returns of Ether (ETH), which only has pricing data beginning on August 7, 2015. For these models, Dr. [redacted] cannot estimate abnormal returns for earlier trading days and, therefore, he cannot test some of the earlier event days. See [redacted] Report, note 46. Using these models, Dr. [redacted] estimated abnormal returns for 1,725 to 1,726 trading days (depending on the model specification) and tested 90 event days. See Exhibit 1.

positive XRP returns. See Exhibit 1. In other words, taken at face value, the findings of Dr. [redacted] event study methodology do not demonstrate that XRP holders profit solely or primarily from the efforts of Ripple.

B. Dr. [redacted] Misinterprets His Own Findings by Failing to Recognize That Many of the Announcements That He Finds to Be Statistically Significant are Confounded

21. Dr. [redacted] claims that his "results indicate that the price of XRP reacts to the news about actions of Ripple Labs" and, therefore, he "reject[s] the hypothesis that XRP prices are independent of Ripple Labs."[45, 46] However, the announcements that Dr. [redacted] analyzed confound information about Ripple's efforts with information about market conditions for XRP. Such confounding information include information related to the expected supply and demand for XRP and information about the decisions and expectations of market participants other than Ripple, none of which is solely or primarily related to Ripple's efforts or under Ripple's direct or indirect control. In other words, Dr. [redacted] analysis erroneously assumes that statistically significant XRP returns following these announcements are always (and only) related to information about Ripple's efforts and never related to information about market conditions for XRP.

22. The fact that statistically significant XRP returns are correlated with announcements relating to the expected supply and demand for XRP or other market conditions does not establish that XRP is a security. Companies can and routinely do make announcements

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45 [redacted] Report, ¶ 67.

46 Specifically, Dr. [redacted] concludes that significantly positive XRP returns are correlated with the following categories of announcements: (1) Milestones, (2) Trading Platform Listings, (3) Customer & Product, (4) Ripple Commercialization Initiatives, and (5) "Select Categories," which combines announcements in the forgoing categories and Acquisitions & Investments. See e.g., [redacted] Report, Figure 1 (p. 3) and Sections VI.A-VI.D, VI.F.

that relate to the supply and demand for a commodity or good that then affect the price of the commodity or good. For example, if an oil producer announces a new oil pipeline, one could imagine that the local oil prices would be affected at the start of the pipeline (due to increased demand) and at the end of the pipeline (due to increased supply). These announcements contain information about the company's efforts as well as information about market conditions for a commodity or good, but this correlation does not make the commodity or good a security. While Ripple (because it holds a substantial amount of XRP) and holders of XRP can both simultaneously gain or lose from XRP price changes, an oil producer and oil investors (both of which hold oil) could likewise gain or lose at the same time due to oil price movements. But it is clear that an oil producer and oil investors are not in a common enterprise and oil is not a security.

23. It is evident that the "news announcements in [] categories related more directly to XRP"[47] that Dr. [redacted] analyzes provide information relating to the expected supply and demand for XRP and/or information about the decisions and expectations of market participants unaffiliated with Ripple, neither of which is solely nor primarily related to Ripple's efforts.

(i) "Milestones," such as early financing rounds for equity investments in Ripple, provide information about the expectations of Ripple's sophisticated institutional investors about the state of the market for XRP, since Ripple holds a large quantity of XRP. They also provide information about the expected supply of XRP, to the extent that market participants would expect Ripple to sell fewer XRP tokens to fund its business operations after completing an equity financing round. Similarly, announcements relating to Ripple's decision to escrow 55 billion XRP tokens, which Dr. [redacted] categorizes as milestone events, provide information

[47] [redacted] Report, ¶ 50.

about the expected supply of XRP.[48] Ripple's receiving a "New York's First BitLicense for an Institutional Use Case of Digital Assets" provides information about the expected demand for XRP and about the decisions and expectations of cryptocurrency regulators.

(ii) "Trading Platform Listings" often occurred without any involvement by Ripple, as Dr. [redacted] acknowledges,[49] and provide information about the expected supply and demand for XRP from cryptocurrency market participants currently active on those platforms and those that will be active on those platforms in the future. Moreover, the fact that a platform decides to list XRP provides positive signals about the platform's expectation of future market conditions for XRP and is not solely or primarily due to Ripple's efforts. Indeed, other cryptocurrencies such as bitcoin are listed on platforms without the effort of a company like Ripple.[50]

(iii) "Customers & Product Developments" are announcements about banks and other financial companies intending to use Ripple software.[51] These events again provide information about the decisions and expectations of market participants, as well as information about the expected supply and demand for XRP from users of the XRP Ledger. Indeed, Dr. [redacted] admits that "it is not always clear if Ripple is an active participant or not"[52] regarding these announcements, let alone whether the action is solely or primarily due to Ripple's efforts.

(iv) "Ripple Commercialization Initiatives" are announcements about Ripple launching initiatives "described as commercializing or promoting its technology and payment solutions, including some described as creating use-cases for XRP."[53] As with customers and product developments, these events provide information about the market conditions for XRP and, when these announcements

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48 [redacted] Report, Figure 13 (p. 30).

49 Of the 11 announcements identified by Dr. [redacted] he acknowledges that only six announcements involved Ripple actions. See [redacted] Report, Figure 16 (p. 34).

50 [redacted] Report, Figure 16 (p. 34).

51 See [redacted] Report, ¶¶ 48.b, 83-85.

52 [redacted] Report, ¶ 83.

53 [redacted] Report, ¶ 88.

relate to partnerships with other market participants, provide information about the decisions and expectations of those market participants.[54]

24. In contrast, when Dr. [redacted] analyzes categories of announcements that are less likely to confound information about supply and demand for XRP and/or market conditions for XRP, his event study methodology does not find a statistically significant correlation between XRP price increases and those announcements. As discussed above, Dr. [redacted] tests the significance of correlation between XRP price increases and two categories of announcements that he assumes are less related to XRP: (i) Other Initiatives ("initiative[s] not primarily described as being related to the commercialization or promotion of Ripple's products or technology in the XRP ecosystem"[55]) and Office & Staff Announcements ("announcement[s] of executive staff changes or the opening of a new office"[56]).[57] Unsurprisingly, Dr. [redacted] finds that XRP prices do not react significantly to these announcements, because these announcements are unlikely to provide information about market conditions for XRP and Ripple is not engaged in a common enterprise to share cash flows or assets with holders of XRP.

25. The announcements that Dr. [redacted] analyzes and finds to be correlated with significantly positive XRP returns may be further confounded by other announcements that fall on or near the event day, which may not be related to Ripple's efforts. As shown in Exhibit 2, for the 105 event days that Dr. [redacted] analyzes in his "Select Categories" test, on average,

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54 For example, announcement about banks launching a "Global Payments Steering Group." [redacted] Report, ¶ 88 and note 80.

55 [redacted] Report, ¶ 48.b.

56 [redacted] Report, ¶ 48.b.

57 See *supra*, note 22. See also, [redacted] Report, ¶¶ 91-97.

Dr. [redacted] has identified 5 other announcements within 10 days of the event day,[58] 4 other announcements within 7 days of the event day, and 2 other announcements within 3 days of the event day. In other words, Dr. [redacted] event study methodology cannot disentangle the impact of contemporaneous announcements on XRP prices, especially since, as Dr. [redacted] acknowledges, XRP did not trade in an efficient market.[59]

26. In summary, Dr. [redacted] analysis cannot establish that XRP prices reacted solely or primarily to information about Ripple's efforts[60] because the announcements that Dr. [redacted] analyzed (i) confound information about Ripple's efforts with information about market conditions for XRP and/or (ii) may be confounded by other contemporaneous announcements.

C. Dr. [redacted] Fails to Appreciate the Significance of His Own Admission That XRP Did Not Trade in an Efficient Market

27. In financial economics, capital markets are called "efficient" if market prices fully reflect available information.[61] When an event study is used to measure the impact of certain events on market prices, it is explicitly assumed that the market is efficient, at least with respect to publicly available information.[62] In other words, it is assumed that market prices adjust to

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58 One of the articles Dr. [redacted] cites regarding event studies in cryptocurrency markets use a 20-day event window. See [redacted] Report, note 42.

59 As discussed in more detail below, Dr. [redacted] fails to appreciate the significance of his own admission that XRP did not trade in an efficient market. See *infra*, Section IV.C.

60 As discussed above, the *Howey* Test's definition of an investment contract is "a contract, transaction or scheme whereby a person invests his money in a common enterprise and is led to expect profits solely from the efforts of the promoter or a third party." See *supra*, ¶ 7.

61 See e.g., Eugene Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 The Journal of Finance Economic Literature (May 1970), pp. 383-417.

62 This assumption is widely discussed in academic literature on event studies, including the literature cited by Dr. [redacted] See [redacted] Report, note 31, citing John J. Binder, *The Event Study Methodology Since 1969*, 11 Review of Quantitative Finance and Accounting (1995),

new information quickly and without bias. However, as Dr. [redacted] acknowledges, cryptocurrency markets, including the XRP market, are less efficient than many capital markets and incorporate new information into prices more slowly;[63] therefore, his event study methodology is unreliable. Indeed, Dr. [redacted] fails to establish over what time period, if ever, information is fully incorporated into XRP prices without bias.

28. Dr. [redacted] acknowledges that "[a]cademic researchers have found that the digital token markets, including the XRP market, are generally less informationally efficient than the stock market" and that his own analysis "is consistent with the academic literature in that, by one common measure of efficiency (serial correlation), the XRP market is not fully efficient during the period of interest."[64] He further acknowledges that, to account for the lack of market efficiency, academic researchers often use multi-day event windows when conducting event studies on cryptocurrency prices.[65]

29. Although the use of longer event windows allows more time for new information to be fully incorporated into XRP prices, it also introduces the potential impact from other new information, as well as noise. Different types of information may take different amounts of time to be fully incorporated into prices. For example, if price reactions to certain announcements overshoot during the first few days before ultimately correcting, an event window that is too

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pp. 111-137 at p. 111. "In practice, event studies have been used for two major reasons: 1) to test the null hypothesis that the market efficiently incorporates information … and 2) under the maintained hypothesis of market efficiency, at least with respect to publicly available information, to examine the impact of some event on the wealth of the firm's security holders." *Id.*, p. 111. (Emphasis added.)

63 See [redacted] Report, ¶ 35.

64 [redacted] Report, ¶ 35.

65 See [redacted] Report, ¶ 37. The academic literature that Dr. [redacted] cites uses event windows as long as 20 days (ten before and after the event being analyzed). See *id.*, note 42.

short and only includes the overshooting but not the correction will result in a biased estimate of price reaction.

30. For his analysis, Dr. [redacted] uses a 3-day window, with 1-day and 7-day window sensitivities. Dr. [redacted] does not, however, establish over what time period, if ever, information is fully incorporated into XRP prices without bias. As a result, his entire event study methodology is unreliable.

D. Dr. [redacted] Fails to Provide Any Explanation As to Why His Event Study Methodology Would Shed Any Light On Whether XRP Holders are Engaged in a "Common Enterprise" with Ripple

31. Dr. [redacted] has not explained the relationship between his conclusion that "XRP prices react to certain news and public statements about Ripple's actions"[66] and the SEC's claim that XRP is a security under the *Howey* Test. That is not surprising because the event study methodology used by Dr. [redacted] cannot and does not establish whether XRP holders are engaged in a "common enterprise" with Ripple, much less whether those holders were led to expect profits or returns generated solely or primarily from the entrepreneurial or managerial efforts of Ripple.

32. An event study is simply a statistical method that identifies when information about an asset is released and measures the contemporaneous market price response.[67] There are two primary reasons to use an event study: 1) to test the null hypothesis that a market is

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66 [redacted] Report, ¶ 12.a.

67 See e.g., Eugene Fama, Lawrence Fisher, Michael Jensen, and Richard Roll, *The Adjustment of Stock Prices to New Information*, 10 International Economic Review (1969), pp. 1-21; A. Craig MacKinlay, *Event Studies in Economics and Finance*, 35 Journal of Economic Literature (1997), pp. 13-39.

semi-strong efficient (i.e., to test whether market prices efficiently incorporate publicly available information); and 2) under the hypothesis of a semi-strong efficiency, to measure the impact of certain events on market prices.[68] However, an event study cannot establish whether an asset is a security because, in an efficient market, asset prices will react to publicly available information about the asset—regardless of whether or not the asset is a security.[69] Although Dr. [redacted] claims that "[a]cademic researchers have applied the event study methodology to digital token markets,"[70] none of the literature that he cites to attempts to use an event study methodology to establish whether or not digital tokens are securities.[71]

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[68] See e.g., John J. Binder, *The Event Study Methodology Since 1969*, 11 Review of Quantitative Finance and Accounting (1995), pp. 111-137 at p. 111: "In practice, event studies have been used for two major reasons: 1) to test the null hypothesis that the market efficiently incorporates information … and 2) under the maintained hypothesis of market efficiency, at least with respect to publicly available information, to examine the impact of some event on the wealth of the firm's security holders." See also, Ronald J. Gilson and Bernard S. Black, "Event Studies: Measuring the Impact of Information," in *The Law and Finance of Corporate Acquisitions* (2nd Ed., The Foundation Press, 1995), Chapter 6, pp. 185-187.

[69] See e.g., Eugene Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 Journal of Finance (1970), pp. 383-417. In my academic publications, I have discussed how all available information about a firm will be reflected in the firm's stock price in efficient capital markets. See e.g., Daniel R. Fischel, *Use of Modern Finance Theory in Securities Fraud Cases Involving Actively Traded Securities*, 38 The Business Lawyer (1982), pp. 1-20 at p. 4: "In an efficient capital market, such as American stock markets, […] the market price of a firm's stock will reflect all available information about the firm's prospects."

[70] [redacted] Report, ¶ 36.

[71] In fact, the literature that Dr. [redacted] cites is primarily concerned with testing whether digital token markets are efficient. See e.g., Wenjun Feng, Yiming Wang, and Zhengjun Zhang, "Informed Trading in the Bitcoin Market," *Finance Research Letters* Vol. 26, 2018, pp. 63-70 at p. 68: "In this study, we use transaction-level data to investigate informed trading prior to Bitcoin events … we find evidence of informed trading in the Bitcoin market ahead of cryptocurrency-related negative Bitcoin market events, and ahead of large positive events." See also, Mohammad Hashemi Joo, Yuka Nishikawa, and Krishnan Dandapani,

33. From an economics perspective, the reasons why an event study cannot establish whether an asset is a security are easily demonstrated via simple thought experiments:

(i) Companies can issue multiple types of securities, e.g., stocks and bonds. Numerous event studies have been conducted on stocks and bonds, and it is well established that (in most states of the world) stocks are more sensitive to new information about their issuers than bonds, given their position in the capital structure of a firm.[72] It is completely possible to conduct an event study where certain news about a company is significantly correlated with stock price changes but is not significantly correlated with bond price changes. However, if one were to follow the flawed logic of Dr. [redacted] event study methodology and the SEC's position that XRP is a security, the company's bonds would be misclassified as non-securities.

(ii) Companies can make announcements about their activities that provide

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"Announcement effects in the cryptocurrency market," *Applied Economics* Vol. 52, No. 44, 2020, pp. 4794-4808 at p. 4794: "The aims of this study are twofold. First, we examine market reactions during major event announcement periods using event study methodology. Second, we further investigate if the information diffusion allows arbitragers to have an opportunity to make positive profits even after the event announcement."

[72] See e.g., Larry Y. Dann, "Common Stock Repurchases: An Analysis of Returns to Bondholders and Stockholders," *J. Financial Economics* Vol. 9 (1981), pp. 113-138 ("In contrast with the returns to common stock and convertible senior securities, no significant announcement date returns are experienced by owners of straight debt and straight preferred stock."); Paul Asquith and E. Han Kim, "The Impact of Merger Bids on the Participating Firms' Security Holders," *J. Finance* Vol. 37, No. 5 (December 1982), pp. 1209-1228 ("The results show that while the stockholders of target firms gain from a merger bid, no other securityholders either gain or lose."); Narayanan Jayaraman and Kuldeep Shastri, "The Valuation Impacts of Specially Designated Dividends," *J. Financial and Quantitative Analysis* Vol. 23, No. 3 (September 1988), pp. 301-312 ("[W]e find that stock prices react positively to the announcements of specially designated dividends. In addition, our empirical evidence indicates that bond prices are not affected by SDD announcements."); Chris Veld and Yulia V. Veld-Merkoulova, "An Empirical Analysis of the Stockholder-Bondholder Conflict in Corporate Spin-Offs," *Financial Managements* (Spring 2008), pp. 103-124 ("Over a three-day event window, we find statistically significant abnormal returns of 3.07% for stocks and 0.11% for straight bonds.").

information about other companies.[73] Consider a hypothetical scenario where Company A and Company B generally have correlated earnings and where Company A typically releases earnings announcements before Company B. In such a scenario, an event study might find that Company A's earnings announcements are significantly correlated with price changes in Company B's stock. It might even show that Company B's stock price changes are more correlated with Company A's earning announcements than its own earnings announcements. However, that event study would not prove that investors in Company B stock are engaged in a common enterprise to share profits from the efforts of Company A.

(iii) Companies routinely make announcements about their activities that provide information about overall market conditions. Such information may lead to statistically significant changes in the prices of assets held by third-party investors even though those investors have no claims on the cash flows or assets of the company. In other words, even though both the company and investors are affected by the change in asset prices, the parties are not engaged in a common enterprise to share profits or returns, so the asset is not a security. For example:

[73] See e.g., Michael Firth, "The Impact of Earnings Announcements on the Share Price Behavior of Similar Type Firms," *The Economic Journal* 86 (June 1976), pp. 296-306 ("[I]nvestors use the information contained in the announcement of financial results to re-evaluate the share prices not only of the company whose results are being announced, but also of the closely competing companies.") and Stephen P. Baginski, "Intraindustry Information Transfers Associated with Management Forecasts of Earnings," *J Accounting Research* Vol. 25, No. 2 (Autumn 1987), pp. 196-216 ("[T]he management forecast of one firm (discloser) generates unexpected price reactions for firms (nondisclosers) similar to the forecaster.").

- Suppose that DeBeers announces a new advertising campaign promoting diamonds and, following this announcement, the price of diamonds on the secondary market increases by a statistically significant amount. That price reaction would not establish that diamonds are a security issued by DeBeers because DeBeers is not engaged in a common enterprise to share profits or returns with holders of diamonds.

- Suppose that Exxon announces a new oil pipeline, which leads to statistically significant changes in the price of oil at each end of the pipeline. That price reaction would not demonstrate that oil is a security issued by Exxon because Exxon is not engaged in a common enterprise with third-party holders of oil.

(iv) Consumer goods are not securities and yet, it is possible for news about a producer to result in price changes in the secondary market for its consumer goods. In such instances, those price reactions do not demonstrate that the owners of consumer goods are in a common enterprise to share profits from the efforts of producers.

- For example, when professional sports teams win games, there is often an increase in the price of tickets to future games on the secondary market.[74]

- Similarly, news about financial distress at an automobile manufacturer can impact the secondary market price for that manufacturer's used cars.[75]

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[74] See e.g., Joris Drayer, Daniel A. Rascher & Chad D. McEvoy, "An examination of underlying consumer demand and sport pricing using secondary market data," *Sport Management Review* 15:4, pp. 448-460.

[75] See e.g., Ali Hortaçsu, Gregor Matvos, Chad Syverson, and Sriram Venkataraman, "Indirect Costs of Financial Distress in Durable Goods Industries: The Case of Auto Manufacturers," *The Review of Financial Studies* Vol. 26, No. 5, May 2013, pp. 1248-1290.

34. In summary, even if Dr. [redacted] analysis demonstrates that XRP prices reacted around the time of certain announcements made by Ripple,[76] such a finding cannot and does not establish whether XRP holders are engaged in a "common enterprise" to share profits or returns generated solely or primarily by the entrepreneurial or managerial efforts of Ripple.

[76] As discussed above, Dr. [redacted] analysis cannot establish that XRP prices reacted solely or primarily to information about Ripple's efforts because the announcements that Dr. [redacted] analyzed are confounded. See *supra*, Section IV.B.

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

Executed on November 12, 2021.

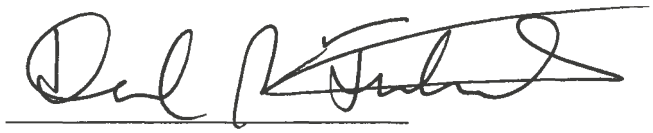

Exhibit 1

The Findings of Dr. [redacted] "Select Categories" Test Do Not Imply that XRP Holders Profit Solely or Primarily from the Efforts of Ripple

	# of Trading Days			# of Event Days			# of Non-Event Days			% of Trading Days w/ Significant Returns		% of Event Days	
	Total [A]	With Significant Returns [B]	Without Significant Returns [C]	Total [D]	With Significant Returns [E]	Without Significant Returns [F]	Total [G]	With Significant Returns [H]	Without Significant Returns [I]	Event Days [J]	Non-Event Days [K]	With Significant Returns [L]	Without Significant Returns [M]
Range for All 20 Models Used by Dr. [redacted]													
Minimum	1,725	76	1,540	90	15	64	1,635	61	1,474	10.5%	**76.3%**	15.2%	**70.5%**
Maximum	2,369	267	2,259	105	31	89	2,264	236	2,171	23.8%	**89.5%**	29.5%	**84.8%**
Range for 12 Models Without ETH Returns													
Minimum	2,369	110	2,102	105	16	74	2,264	93	2,028	10.5%	**84.5%**	15.2%	**70.5%**
Maximum	2,369	267	2,259	105	31	89	2,264	236	2,171	15.5%	**89.5%**	29.5%	**84.8%**
Range for 8 Models With ETH Returns													
Minimum	1,725	76	1,540	90	15	64	1,635	61	1,474	12.9%	**76.3%**	16.7%	**71.1%**
Maximum	1,726	185	1,650	90	26	75	1,636	161	1,575	23.8%	**87.1%**	28.9%	**83.3%**

Exhibit 1

The Findings of Dr. [redacted] "Select Categories" Test Do Not Imply that XRP Holders Profit Solely or Primarily from the Efforts of Ripple

	# of Trading Days			# of Event Days			# of Non-Event Days			% of Trading Days w/ Significant Returns		% of Event Days	
	Total [A]	With Significant Returns [B]	Without Significant Returns [C]	Total [D]	With Significant Returns [E]	Without Significant Returns [F]	Total [G]	With Significant Returns [H]	Without Significant Returns [I]	Event Days [J]	Non-Event Days [K]	With Significant Returns [L]	Without Significant Returns [M]
Model 1: Constant Mean Return													
1-Sided Parametric	2,369	199	2,170	105	24	81	2,264	175	2,089	12.1%	**87.9%**	22.9%	**77.1%**
1-Sided Nonparametric	2,369	236	2,133	105	28	77	2,264	208	2,056	11.9%	**88.1%**	26.7%	**73.3%**
2-Sided Parametric	2,369	147	2,222	105	19	86	2,264	128	2,136	12.9%	**87.1%**	18.1%	**81.9%**
2-Sided Nonparametric	2,369	120	2,249	105	16	89	2,264	104	2,160	13.3%	**86.7%**	15.2%	**84.8%**
Model 2: Account Growth													
1-Sided Parametric	2,369	181	2,188	105	24	81	2,264	157	2,107	13.3%	**86.7%**	22.9%	**77.1%**
1-Sided Nonparametric	2,369	228	2,141	105	27	78	2,264	201	2,063	11.8%	**88.2%**	25.7%	**74.3%**
2-Sided Parametric	2,369	133	2,236	105	17	88	2,264	116	2,148	12.8%	**87.2%**	16.2%	**83.8%**
2-Sided Nonparametric	2,369	110	2,259	105	17	88	2,264	93	2,171	15.5%	**84.5%**	16.2%	**83.8%**
Model 3: BTC Returns													
1-Sided Parametric	2,369	209	2,160	105	25	80	2,264	184	2,080	12.0%	**88.0%**	23.8%	**76.2%**
1-Sided Nonparametric	2,369	258	2,111	105	31	74	2,264	227	2,037	12.0%	**88.0%**	29.5%	**70.5%**
2-Sided Parametric	2,369	167	2,202	105	22	83	2,264	145	2,119	13.2%	**86.8%**	21.0%	**79.0%**
2-Sided Nonparametric	2,369	127	2,242	105	18	87	2,264	109	2,155	14.2%	**85.8%**	17.1%	**82.9%**
Model 4: BTC Returns + Account Growth													
1-Sided Parametric	2,369	191	2,178	105	21	84	2,264	170	2,094	11.0%	**89.0%**	20.0%	**80.0%**
1-Sided Nonparametric	2,369	238	2,131	105	26	79	2,264	212	2,052	10.9%	**89.1%**	24.8%	**75.2%**
2-Sided Parametric	2,369	150	2,219	105	21	84	2,264	129	2,135	14.0%	**86.0%**	20.0%	**80.0%**
2-Sided Nonparametric	2,369	124	2,245	105	18	87	2,264	106	2,158	14.5%	**85.5%**	17.1%	**82.9%**
Model 5: BTC Returns + ETH Returns													
1-Sided Parametric	1,726	151	1,575	90	24	66	1,636	127	1,509	15.9%	**84.1%**	26.7%	**73.3%**
1-Sided Nonparametric	1,726	182	1,544	90	25	65	1,636	157	1,479	13.7%	**86.3%**	27.8%	**72.2%**
2-Sided Parametric	1,726	120	1,606	90	20	70	1,636	100	1,536	16.7%	**83.3%**	22.2%	**77.8%**
2-Sided Nonparametric	1,726	100	1,626	90	20	70	1,636	80	1,556	20.0%	**80.0%**	22.2%	**77.8%**

Exhibit 1

The Findings of Dr. [redacted] "Select Categories" Test Do Not Imply that XRP Holders Profit Solely or Primarily from the Efforts of Ripple

	# of Trading Days			# of Event Days			# of Non-Event Days			% of Trading Days w/ Significant Returns		% of Event Days	
	Total [A]	With Significant Returns [B]	Without Significant Returns [C]	Total [D]	With Significant Returns [E]	Without Significant Returns [F]	Total [G]	With Significant Returns [H]	Without Significant Returns [I]	Event Days [J]	Non-Event Days [K]	With Significant Returns [L]	Without Significant Returns [M]
Model 6: BTC Returns + ETH Returns + Account Growth													
1-Sided Parametric	1,726	121	1,605	90	21	69	1,636	100	1,536	17.4%	**82.6%**	23.3%	**76.7%**
1-Sided Nonparametric	1,726	164	1,562	90	23	67	1,636	141	1,495	14.0%	**86.0%**	25.6%	**74.4%**
2-Sided Parametric	1,726	97	1,629	90	19	71	1,636	78	1,558	19.6%	**80.4%**	21.1%	**78.9%**
2-Sided Nonparametric	1,726	80	1,646	90	19	71	1,636	61	1,575	23.8%	**76.3%**	21.1%	**78.9%**
Model 7: BTC Returns + ETH Returns + XLM Returns													
1-Sided Parametric	1,726	131	1,595	90	22	68	1,636	109	1,527	16.8%	**83.2%**	24.4%	**75.6%**
1-Sided Nonparametric	1,726	180	1,546	90	26	64	1,636	154	1,482	14.4%	**85.6%**	28.9%	**71.1%**
2-Sided Parametric	1,726	103	1,623	90	18	72	1,636	85	1,551	17.5%	**82.5%**	20.0%	**80.0%**
2-Sided Nonparametric	1,726	90	1,636	90	17	73	1,636	73	1,563	18.9%	**81.1%**	18.9%	**81.1%**
Model 8: BTC Returns + ETH Returns + XLM Returns + Account Growth													
1-Sided Parametric	1,726	118	1,608	90	20	70	1,636	98	1,538	16.9%	**83.1%**	22.2%	**77.8%**
1-Sided Nonparametric	1,726	170	1,556	90	22	68	1,636	148	1,488	12.9%	**87.1%**	24.4%	**75.6%**
2-Sided Parametric	1,726	92	1,634	90	17	73	1,636	75	1,561	18.5%	**81.5%**	18.9%	**81.1%**
2-Sided Nonparametric	1,726	76	1,650	90	15	75	1,636	61	1,575	19.7%	**80.3%**	16.7%	**83.3%**
Model 9: Equal-Weighted Crypto Index													
1-Sided Parametric	2,369	214	2,155	105	25	80	2,264	189	2,075	11.7%	**88.3%**	23.8%	**76.2%**
1-Sided Nonparametric	2,369	267	2,102	105	31	74	2,264	236	2,028	11.6%	**88.4%**	29.5%	**70.5%**
2-Sided Parametric	2,369	156	2,213	105	21	84	2,264	135	2,129	13.5%	**86.5%**	20.0%	**80.0%**
2-Sided Nonparametric	2,369	133	2,236	105	18	87	2,264	115	2,149	13.5%	**86.5%**	17.1%	**82.9%**
Model 10: Equal-Weighted Crypto Index + Account Growth													
1-Sided Parametric	2,369	196	2,173	105	22	83	2,264	174	2,090	11.2%	**88.8%**	21.0%	**79.0%**
1-Sided Nonparametric	2,369	258	2,111	105	27	78	2,264	231	2,033	10.5%	**89.5%**	25.7%	**74.3%**
2-Sided Parametric	2,369	144	2,225	105	19	86	2,264	125	2,139	13.2%	**86.8%**	18.1%	**81.9%**
2-Sided Nonparametric	2,369	126	2,243	105	17	88	2,264	109	2,155	13.5%	**86.5%**	16.2%	**83.8%**

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	Total [A]	With Significant Returns [B]	Without Significant Returns [C]	Total [D]	With Significant Returns [E]	Without Significant Returns [F]	Total [G]	With Significant Returns [H]	Without Significant Returns [I]	Event Days [J]	Non-Event Days [K]	With Significant Returns [L]	Without Significant Returns [M]
Model 11: Lagged XRP Returns													
1-Sided Parametric	2,369	203	2,166	105	25	80	2,264	178	2,086	12.3%	**87.7%**	23.8%	**76.2%**
1-Sided Nonparametric	2,369	246	2,123	105	29	76	2,264	217	2,047	11.8%	**88.2%**	27.6%	**72.4%**
2-Sided Parametric	2,369	143	2,226	105	19	86	2,264	124	2,140	13.3%	**86.7%**	18.1%	**81.9%**
2-Sided Nonparametric	2,369	126	2,243	105	18	87	2,264	108	2,156	14.3%	**85.7%**	17.1%	**82.9%**
Model 12: Account Growth + Lagged Variables													
1-Sided Parametric	2,369	188	2,181	105	26	79	2,264	162	2,102	13.8%	**86.2%**	24.8%	**75.2%**
1-Sided Nonparametric	2,369	239	2,130	105	30	75	2,264	209	2,055	12.6%	**87.4%**	28.6%	**71.4%**
2-Sided Parametric	2,369	135	2,234	105	19	86	2,264	116	2,148	14.1%	**85.9%**	18.1%	**81.9%**
2-Sided Nonparametric	2,369	125	2,244	105	19	86	2,264	106	2,158	15.2%	**84.8%**	18.1%	**81.9%**
Model 13: BTC Returns + Lagged Variables													
1-Sided Parametric	2,369	205	2,164	105	25	80	2,264	180	2,084	12.2%	**87.8%**	23.8%	**76.2%**
1-Sided Nonparametric	2,369	251	2,118	105	28	77	2,264	223	2,041	11.2%	**88.8%**	26.7%	**73.3%**
2-Sided Parametric	2,369	162	2,207	105	21	84	2,264	141	2,123	13.0%	**87.0%**	20.0%	**80.0%**
2-Sided Nonparametric	2,369	139	2,230	105	20	85	2,264	119	2,145	14.4%	**85.6%**	19.0%	**81.0%**
Model 14: BTC Returns + Account Growth + Lagged Variables													
1-Sided Parametric	2,369	198	2,171	105	24	81	2,264	174	2,090	12.1%	**87.9%**	22.9%	**77.1%**
1-Sided Nonparametric	2,369	254	2,115	105	29	76	2,264	225	2,039	11.4%	**88.6%**	27.6%	**72.4%**
2-Sided Parametric	2,369	156	2,213	105	23	82	2,264	133	2,131	14.7%	**85.3%**	21.9%	**78.1%**
2-Sided Nonparametric	2,369	133	2,236	105	20	85	2,264	113	2,151	15.0%	**85.0%**	19.0%	**81.0%**
Model 15: BTC Returns + ETH Returns + Lagged Variables													
1-Sided Parametric	1,725	147	1,578	90	23	67	1,635	124	1,511	15.6%	**84.4%**	25.6%	**74.4%**
1-Sided Nonparametric	1,725	184	1,541	90	26	64	1,635	158	1,477	14.1%	**85.9%**	28.9%	**71.1%**
2-Sided Parametric	1,725	115	1,610	90	20	70	1,635	95	1,540	17.4%	**82.6%**	22.2%	**77.8%**
2-Sided Nonparametric	1,725	104	1,621	90	20	70	1,635	84	1,551	19.2%	**80.8%**	22.2%	**77.8%**

Exhibit 1

The Findings of Dr. [redacted] "Select Categories" Test Do Not Imply that XRP Holders Profit Solely or Primarily from the Efforts of Ripple

	# of Trading Days			# of Event Days			# of Non-Event Days			% of Trading Days w/ Significant Returns		% of Event Days	
	Total [A]	With Significant Returns [B]	Without Significant Returns [C]	Total [D]	With Significant Returns [E]	Without Significant Returns [F]	Total [G]	With Significant Returns [H]	Without Significant Returns [I]	Event Days [J]	Non-Event Days [K]	With Significant Returns [L]	Without Significant Returns [M]
Model 16: BTC Returns + ETH Returns + Account Growth + Lagged Variables													
1-Sided Parametric	1,725	136	1,589	90	22	68	1,635	114	1,521	16.2%	**83.8%**	24.4%	**75.6%**
1-Sided Nonparametric	1,725	179	1,546	90	25	65	1,635	154	1,481	14.0%	**86.0%**	27.8%	**72.2%**
2-Sided Parametric	1,725	99	1,626	90	20	70	1,635	79	1,556	20.2%	**79.8%**	22.2%	**77.8%**
2-Sided Nonparametric	1,725	95	1,630	90	19	71	1,635	76	1,559	20.0%	**80.0%**	21.1%	**78.9%**
Model 17: BTC Returns + ETH Returns + XLM Returns + Lagged Variables													
1-Sided Parametric	1,725	138	1,587	90	21	69	1,635	117	1,518	15.2%	**84.8%**	23.3%	**76.7%**
1-Sided Nonparametric	1,725	176	1,549	90	25	65	1,635	151	1,484	14.2%	**85.8%**	27.8%	**72.2%**
2-Sided Parametric	1,725	101	1,624	90	19	71	1,635	82	1,553	18.8%	**81.2%**	21.1%	**78.9%**
2-Sided Nonparametric	1,725	101	1,624	90	20	70	1,635	81	1,554	19.8%	**80.2%**	22.2%	**77.8%**
Model 18: BTC Returns + ETH Returns + XLM Returns + Account Growth + Lagged Variables													
1-Sided Parametric	1,725	131	1,594	90	21	69	1,635	110	1,525	16.0%	**84.0%**	23.3%	**76.7%**
1-Sided Nonparametric	1,725	185	1,540	90	24	66	1,635	161	1,474	13.0%	**87.0%**	26.7%	**73.3%**
2-Sided Parametric	1,725	100	1,625	90	19	71	1,635	81	1,554	19.0%	**81.0%**	21.1%	**78.9%**
2-Sided Nonparametric	1,725	98	1,627	90	18	72	1,635	80	1,555	18.4%	**81.6%**	20.0%	**80.0%**
Model 19: Equal-Weighted Crypto Index + Lagged Variables													
1-Sided Parametric	2,369	204	2,165	105	25	80	2,264	179	2,085	12.3%	**87.7%**	23.8%	**76.2%**
1-Sided Nonparametric	2,369	255	2,114	105	28	77	2,264	227	2,037	11.0%	**89.0%**	26.7%	**73.3%**
2-Sided Parametric	2,369	154	2,215	105	21	84	2,264	133	2,131	13.6%	**86.4%**	20.0%	**80.0%**
2-Sided Nonparametric	2,369	141	2,228	105	20	85	2,264	121	2,143	14.2%	**85.8%**	19.0%	**81.0%**
Model 20: Equal-Weighted Crypto Index + Account Growth + Lagged Variables													
1-Sided Parametric	2,369	203	2,166	105	25	80	2,264	178	2,086	12.3%	**87.7%**	23.8%	**76.2%**
1-Sided Nonparametric	2,369	266	2,103	105	30	75	2,264	236	2,028	11.3%	**88.7%**	28.6%	**71.4%**
2-Sided Parametric	2,369	152	2,217	105	23	82	2,264	129	2,135	15.1%	**84.9%**	21.9%	**78.1%**
2-Sided Nonparametric	2,369	144	2,225	105	21	84	2,264	123	2,141	14.6%	**85.4%**	20.0%	**80.0%**

Exhibit 1

The Findings of Dr. [redacted] "Select Categories" Test Do Not Imply that XRP Holders Profit Solely or Primarily from the Efforts of Ripple

# of Trading Days			# of Event Days			# of Non-Event Days			% of Trading Days w/ Significant Returns		% of Event Days	
Total	With Significant Returns	Without Significant Returns	Total	With Significant Returns	Without Significant Returns	Total	With Significant Returns	Without Significant Returns	Event Days	Non-Event Days	With Significant Returns	Without Significant Returns
[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]

<u>Notes and Sources</u>: In this exhibit, days with "significant returns" refers to days that Dr. [redacted] classifies as "significantly positive." In his analysis, Dr. [redacted] classifies date t as "significantly positive" if any of its cumulative returns over the 1-, 2-, or 3-day event windows are statistically significant and positive and none of its cumulative returns over those windows are statistically significant and negative. <u>See</u> [redacted] Report, ¶ 63. In Models 5-8 and 15-18, Dr. [redacted] controls for the return of Ether (ETH), which only has pricing data beginning on August 7, 2015. For these models, Dr. [redacted] cannot estimate abnormal returns for earlier trading days and, therefore, he cannot test some of the earlier event days. <u>See</u> [redacted] Report, note 46. Dr. [redacted] equal-weighted cryptocurrency index in Models 9-10 and 19-20 is an equal-weighted index across the returns of ADA, BNB, BTC, ETH and XLM subject to data availability. <u>See</u> [redacted] Report, ¶ 39. In Models 11-20, Dr. [redacted] regresses "XRP returns on date t on the control variables measured at t and one lag of XRP returns and the control variables" to "correct for [] autocorrelation[.]" [redacted] Report, note 50.

[A] - [B]: Per Dr. [redacted] backup production, <u>see</u> "Model Results.xlsx" at tab 7-1.
[C] = [A] - [B] (Except for min-max ranges).
[D] - [E]: Per Dr. [redacted] backup production, <u>see</u> "Model Results.xlsx" at tab 7-1.
[F] = [D] - [E] (Except for min-max ranges).
[G] = [A] - [D] (Except for min-max ranges).
[H] = [B] - [E] (Except for min-max ranges).
[I] = [C] - [F] (Except for min-max ranges).
[J] = [E] / [B] (Except for min-max ranges).
[K] = [H] / [B] (Except for min-max ranges).
[L] = [E] / [D] (Except for min-max ranges).
[M] = [F] / [D] (Except for min-max ranges).

Exhibit 2
Event Days Analyzed in Dr. [redacted] "Select Categories" Test May Be Confounded by Other Announcements On or Near the Event Day

	# of Other Announcements Identified by Dr. [redacted] On or Near the Event Days Analyzed in the "Select Categories" Test			
	Minimum	Maximum	Median	**Average**
[1] Within +/- 10 Days of the Event Day	0	14	4	**5**
[2] Within +/- 7 Days of the Event Day	0	9	4	**4**
[3] Within +/- 3 Days of the Event Day	0	8	1	**2**

Notes and Sources: Dr. [redacted] identifies 514 events in total, but focuses his analysis on "news announcements in [] categories related more directly to XRP[.]" See Fischel Report, ¶ 10. In his "Select Categories" test, Dr. [redacted] analyzes 105 event days with announcements in any of the following categories: (1) Milestones, (2) Trading Platform Listings, (3) Customer & Product Developments, (4) Ripple Commercialization Initiatives, and (5) Acquisitions & Investments. See Fischel Report, ¶ 19. For each of the 105 event days analyzed in Dr. [redacted] "Select Categories" test, we count the number of other announcements on or near the event day that were identified in Dr. [redacted] Appendix C, which includes (a) any announcements on the same event day that were not analyzed in Dr. [redacted] "Select Categories" test (for example, announcements that Dr. [redacted] categorized as Market Commentary & Company Overview) and (b) any announcements on the specified days before and after the event day.

APPENDIX A

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PROFESSIONAL EXPERIENCE

Lee and Brena Freeman Professor of Law and Business, University of Chicago Law School (1/84 – 12/2005, chair awarded in 7/89, emeritus as of 1/1/2006); Dean of Law School (1/99 – 2/01); Visiting Professor of Law, University of Chicago Law School (7/82 - 6/83).

Professor of Law and Business, Northwestern University School of Law (1/1/2006 – 5/2011); Professor, Kellogg School of Management (courtesy appointment, 1/1/2006 – 5/2011).

Jack N. Pritzker Distinguished Visiting Professor of Law, Northwestern University School of Law (6/02-6/03).

Professor of Law and Business, University of Chicago Graduate School of Business (7/87 - 6/90).

Director, Law and Economics Program, University of Chicago (1/84 - 6/91).

Assistant Professor of Law, Northwestern University School of Law (6/80 - 6/81); Associate Professor of Law, Northwestern University School of Law (6/81 - 6/82); promoted to full professor in 6/82.

Attorney with Levy and Erens, Chicago, Illinois (7/79 - 6/80).

Law Clerk for Associate Justice Potter Stewart of the United States Supreme Court (1978 - 1979).

Law Clerk for Judge Thomas E. Fairchild, Chief Judge of the Seventh Circuit Court of Appeals (1977 - 1978).

CONSULTING EXPERIENCE

President and Chairman, Compass Lexecon (formerly Lexecon).

AREAS OF SPECIALIZATION

Securities and Financial Markets, Valuation and Financial Analysis, Bankruptcy and Financial Distress Litigation, ERISA Litigation, Class Certification, Damages, Corporate Governance.

PUBLICATIONS

Payback: The Conspiracy to Destroy Michael Milken and His Financial Revolution, Harper Business (1995).

The Economic Structure of Corporate Law, Harvard University Press (1991) (with Frank H. Easterbrook).

ARTICLES

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EDUCATION

University of Chicago Law School, Chicago, Illinois; J.D. 1977, cum laude; Order of the Coif; Comment Editor, Vol. 44, University of Chicago Law Review; Approximately top 1% of the Class. Awarded Casper Platt Award for best paper written by a student of the University of Chicago Law School; awarded Jerome N. Frank Prize for excellence in legal writing while a member of the University of Chicago Law Review, 1975 - 1977. Studied law and economics with Richard Posner and other members of the faculty.

Brown University, Providence, Rhode Island; M.A. 1974 in American History.

Cornell University, Ithaca, New York; major-American History; minor-Economics; B.A. 1972

TESTIMONY

Deposition of Daniel R. Fischel In Re: Straight Path Communications Inc. Consolidated Stockholder Litigation, In the Court of Chancery of the State of Delaware, C.A. No. 2017-0486-SG, (October 21, 2021).

Deposition of Daniel R. Fischel In Re: Abu Dhabi Investment Authority vs. Mylan N.V. and Mylan Inc., In the United States District Court, Southern District of New York, Civil Action No. 1:20-cv-01342-JPO, (August 18, 2021).

Deposition of Daniel R. Fischel In Re: Mylan N.V. Securities Litigation, In the United States District Court, Southern District of New York, Case No. 1:16-CV-07926 (JPO), (August 17, 2021).

Deposition of Daniel R. Fischel In Re: Hawaii Structural Ironworkers Pension Trust Fund, Individually and on Behalf of All Others Similarly Situated vs. AMC Entertainment Holdings, Inc., et al., In the United States District Court, Southern District of New York, Case No.1:18-cv-00299-AJN-SLC, (August 12, 2021).

Deposition of Daniel R. Fischel In Re: Sjunde Ap-Fonden, et al, vs. General Electric, et al., In the United States District Court, Southern District of New York, Index No. 17-cv-08457 (JMF), (August 9, 2021).

Testimony of Daniel R. Fischel In Re: United States of America vs. Edward Bases and John Pacilio, In the United States District Court, Northern District of Illinois, Eastern Division, Docket No. 18 CR 48, (July 29, 2021).

Testimony of Daniel R. Fischel In Re: Ahmed D. Hussein vs. Sheldon Razin, Steven Plochocki, Quality Systems, Inc., And Does 1-10, Inclusive, In the Superior Court of California, County of Orange, NO. 30-2013-00679600, CU-NP-CJC (July 27, 2021).

Testimony of Daniel R. Fischel In Re: Tesla Motors, Inc. Stockholders Litigation, In the Court of Chancery of the State of Delaware, Consolidated Civil Action No. 12711-VCS (July 23, 2021).

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Deposition of Daniel R. Fischel In Re: Matthew Sciabacucchi and Hialeah Employees' Retirement System vs. John Malone, et al., and Charter Communications, Inc., In the Court of Chancery for the State of Delaware, C.A. No. 11418-VCG, (April 16, 2021).

Deposition of Daniel R. Fischel In Re: Jeld-Wen Holdings, Inc. Securities Litigation, In the United States District Court for The Eastern District of Virginia, Richmond Division, Civil Action No. 3:20-cv-00112-JAG, (February 26, 2021).

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Deposition of Daniel R. Fischel In Re: SH 130 Concession Company, LLC, Zachry Toll Road – 56 LP Cintra Texas 56 LLC et al. vs. Central Texas Highway Constructors, LLC, et al., In the United States Bankruptcy Court, Western District of Texas, Austin Division, Case No. 16-10262-TMD, Adversary No. 18-01030, (November 5, 2020).

Deposition of Daniel R. Fischel In Re: Ahmed D. Hussein versus Sheldon Razin, Steven Plochocki, Quality Systems, Inc., et al., In the Superior Court of the State of California, County of Orange, Case No. 302013-00679600 CUNPCJC, (October 22, 2020).

Deposition of Daniel R. Fischel In Re: Deutsche Bank National Trust Company, Solely in its Capacity as Trustee of the Harborview Mortgage Loan Trust Mortgage Loan Pass-Through Certificates, Series 2006-9, In the Supreme Court of the State of New York County of New York, Index No. 654208/2018 (September 25, 2020).

Testimony of Daniel R. Fischel In Re: Fairstone Financial Holdings Inc., J.C. Flowers IV L.P. and VP Canada Acquisition, L.P. vs. Duo Bank of Canada, Court File No. CV-20-00641857-00CL and Duo Bank of Canada vs. Fairstone Financial Holdings Inc., J.C. Flowers IV L.P. and VP Canada Acquisition, L.P., Court File No. CV-20-00643629-00CL, In the Ontario Superior Court of Justice, (September 11, 2020).

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Deposition of Daniel R. Fischel In Re: Willis Towers Watson PLC Proxy Litigation, In the United States District Court for the Eastern District of Virginia, Alexandria Division, Master File No. 1:17-cv-1338-AJT-JFA (August 12, 2020).

Deposition of Daniel R. Fischel In Re: Forescout Technologies, Inc. et al. vs. Ferrari Group Holdings, LP, and Ferrari Merger Sub, Inc., et al., In the Court of Chancery of the State of Delaware, Civil Action No. 2020-0385-SG (July 13, 2020).

Deposition of Daniel R. Fischel In Re: Brigade Leveraged Capital Structures Fund Ltd. et al. vs. Kindred Healthcare, Inc., et al., In the Circuit Court of Chancery of the State of Delaware, Case No. 2018 0165 (February 5, 2020).

Testimony of Daniel R. Fischel In Re: Gannaway Entertainment, Inc. et al vs. Frankly Inc. et al., In the United States District Court, Northern District of California, San Francisco Division, Case No. 3:17-cv-04169-RS (December 17, 2019).

Deposition of Daniel R. Fischel In Re: The Official Committee of Unsecured Creditors of Allied Systems Holdings, Inc. and its affiliated debtors et al. v. Yucaipa, et al., In the U.S. Bankruptcy Court for the District of Delaware, Bankr., D. Del., Proc. Nos. 13-50530-KBO, 14-50971-KBO (December 16, 2019).

Testimony of Daniel R. Fischel In Re: Nord Anglia Education, Inc., In the Grand Court of The Cayman Islands, Financial Services Division, Cause No. FSD 235 of 2017 (IKJ). (December 6, 9, 10 and 11, 2019).

Deposition of Daniel R. Fischel In Re: Lindie L. Banks and Erica LeBlanc, individually and on behalf of all others similarly situated vs. Northern Trust Corporation and Northern Trust Company, In the United States District Court, Central District of California, Case No. 2: 16-cv-09141-JFK (JCx) (November 22, 2019).

Deposition of Daniel R. Fischel In Re: Tesla Motors, Inc. Stockholder Litigation, In the Court of Chancery of the State of Delaware, C.A. No. 12711-VCS (November 19, 2019).

Deposition of Daniel R. Fischel In Re: Melina N. Jacobs, On Behalf of Herself and All Others Similarly Situated vs. Verizon Communications, Inc., et al., In the United States District Court for the Southern District of New York, Civil Action No. 1:16-cv-01082 (August 28, 2019).

Deposition of Daniel R. Fischel In Re: American Realty Capital Properties, Inc. Litigation, In the United States District Court, Southern District of New York, Civil Action No. 1:15-mc-00040-AKH Class Action (July 25, 2019).

Deposition of Daniel R. Fischel In Rajesh M. Shah, et al vs. Zimmer Biomet Holdings, Inc., et al, In the United States District Court, Northern District of Indiana, South Bend Division, Case No. 3:16-cv-815-PPS-MGG (May 17, 2019).

Testimony of Daniel R. Fischel In Colonial Chevrolet Co., Inc., et al., Alley's of Kingsport, Inc., et al., and Union Dodge, Inc., et al. vs. The United States (Nos. 10-647C, 11-100C, and 12-900L – Consolidated), In the United States Court of Federal Claims (May 8, 2019).

Testimony of Daniel R. Fischel In Anthem, Inc. vs. Cigna Corporation, In the Court of Chancery of the State of Delaware, C.A. No. 2017-0114-JTL (March 8, 2019).

Deposition of Daniel R. Fischel In Re: Nine West holdings, Inc., et al., Debtors, United States Bankruptcy Court, Southern District of New York, Chapter 11 Case No. 18-10947 (SCC) (January 16, 2019).

Deposition of Daniel R. Fischel In Re: Sandisk LLC Securities Litigation, United States District Court, Northern District of California, San Francisco Division, Case No. 3:15-cv-01455-VC (November 16, 2018).

Deposition of Daniel R. Fischel In Re: Colonial Chevrolet Co., Inc., Alley's of Kingsport, Inc. and Union Dodge, Inc., et al vs. The United States, In the United States Court of Federal Claims, Nos. 10-647C, 11-100C and 12-900L (Consolidated) (November 15, 2018).

Testimony of Daniel R. Fischel In Re: United States of America, et al., vs. J-M Manufacturing Co., Inc., United States District Court, Central District of California – Western Division, No. CV 6-55 GW (November 5, 2018).

Deposition of Daniel R. Fischel In Re: Appraisal of Air Methods Corp., In the Court of Chancery of the State of Delaware, C.A. No.: 2017-0317-JRS (September 27 and 28, 2018).

Testimony of Daniel R. Fischel In Re: Akorn, Inc., v. Fresenius Kabi, AG, et al., In the Court of Chancery of the State of Delaware, C.A. No. 2018-0300-JTL (July 13, 2018).

Deposition of Daniel R. Fischel In Re: Starz Stockholder Litigation, In the Court of Chancery of the State of Delaware, Consolidated C.A. No. 12584-VCG (July 12, 2018).

Deposition of Daniel R. Fischel In Re: Akorn, Inc. vs. Fresenius Kabi AG, Quercus Acquisition, Inc. and Fresenius SE & Co. KGaA, In the Court of Chancery of the State of Delaware, Index No. 2018-0300 (June 30, 2018).

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Deposition of Daniel R. Fischel In Re: JWP, Inc. Securities Litigation, in the United States District Court, Southern District of New York, Master File No. 92 Civ. 5815 (CLB); AUSA Life Insurance Company, et al. v. Ernst & Young, in the United States District Court, Southern District of New York, Master File No. 94 Civ. 3116 (CLB) (November 30, 1995; November 9, 1995; October 18 and 19, 1995; September 28, 1995).

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Testimony of Daniel R. Fischel In Re: American Continental Corporation/Lincoln Savings & Loan Securities Litigation - Lexecon Inc. v. Milberg Weiss Bershad Hynes & Lerach and Kevin P. Roddy, in the United States District Court, District of Arizona, Civ-93-1087-PHX-JMR (July 25 and 26, 1995).

Deposition of Daniel R. Fischel In Re: Keith C. Bogard, et al., v. National Community Bank Inc., et al., in the United States District Court, District of New Jersey, No. 90-5-32 (HAA) (December 20, 1994).

Deposition of Daniel R. Fischel In Re: Harvey Rosen, Ben Rogers and Julie Rogers v. Deloitte & Touche, Elias Zinn, Julius Zinn, Dennis Lamm, and Ronald Begnaud, in the 268th Judicial District Court, of Fort Bend County, Texas, Cause No. 84-482 (November 9, 1994).

Testimony of Daniel R. Fischel In Re: PPM America, Inc., et al. v. Marriott Corporation et al., in the United States District Court, for the District of Maryland, Civil Docket No. H-92-3068 (October 12, 1994).

Deposition of Daniel R. Fischel In Re: Browning-Ferris Industries, Inc., Securities Litigation, United States District Court, for the Southern District of Texas, Houston Division, Civil Action H-903477 (September 1, 1994).

Testimony of Daniel R. Fischel In Re: Computer Associates International Inc. Securities Litigation, United States District Court, Eastern District of New York, CV-90-2398 (JBW) (May 26 and 27, 1994).

Deposition of Daniel R. Fischel In Re: PPM America, Inc., et al. v. Marriott Corporation et al., United States District, for the District of Maryland, H-92-3068 (May 10, 1994 and March 8, 1994).

Deposition of Daniel R. Fischel In Re: Securities and Exchange Commission v. Shared Medical Systems Corporation, R. James Macaleer, James C. Kelly and Clyde M. Hyde, United States District Court, for the Eastern District of Pennsylvania, Civil Action - Law: No. 91- CV-6549 (February 22, 1994).

Testimony of Daniel R. Fischel In Re: Peter M. Schultz and Pamela A. Schultz v. Rhode Island Hospital Trust National Bank, N.A., et al., United States District Court, District of Massachusetts, Civil Action No. 88-2870-T (February 16, 1994).

Deposition of Daniel R. Fischel In Re: Henry T. Endo, et al. v. John M. Albertine, et al., United States District Court, Northern District of Illinois, Eastern Division, No. 88 C 1815 (November 11 and 12, 1993; October 28, 1993).

Deposition of Daniel R. Fischel In Re: Computer Associates International Inc. Securities Litigation, United States District Court, Eastern District of New York, CV 90-2398 (JBW) (November 2, 1993 and February 4, 1993).

Affidavit of Daniel R. Fischel In Re: Peter M. Schultz and Pamela A. Schultz v. Rhode Island Hospital Trust National Bank, N.A. et al., United States District Court, District of Massachusetts, Civil Action No. SS-2870-T (October 28, 1993).

Deposition of Daniel R. Fischel In Re: Alpheus John Goddard, III, etc. v. Continental Bank N.A., etc., State of Illinois, County of Cook, Circuit Court of Cook County, County Department- Chancery Division, No. 89 CH 1081 (September 10, 1993).

Deposition of Daniel R. Fischel In Re: Taxable Municipal Bond Section "G" Securities Litigation, United States District Court, Eastern District of Louisiana, MDL No. 863 (September 2, 1993).

Reply Affidavit of Daniel R. Fischel In Re: Columbia Securities Litigation, United States District Court Southern District of New York, 89 Civ. 6821 (LBS) (August 30, 1993).

Affidavit of Daniel R. Fischel In Re: Consumers Gas & Oil, Inc. v. Farmland Industries, Inc., et al., United States District Court, for the District of Colorado, Civil Action No. 92-F-1394 (August 26, 1993).

Declaration of Daniel R. Fischel In Re: Equitec Rollup Litigation, United States District Court for the Northern District of California, Master file No. C90 2064 CAL (July 28, 1993).

Deposition of Daniel R. Fischel In Re: United Telecommunications, Inc. Securities Litigation, United States District Court for the District of Kansas, No. 90-2251-0 (July 22, 1993, April 21 and 22, 1993).

Deposition of Daniel R. Fischel In Re: Consumers Gas & Oil, Inc., a Colorado farm cooperative in liquidation, on behalf of itself and others similarly situated v. Farmland Industries, Inc., a Kansas farm cooperative, et al., United States District Court, District of Colorado, 92-F- 1394 (June 18, 1993).

Deposition of Daniel R. Fischel In Re. Rosalind Wells v. HBO & Company, United States District Court, Northern District of Georgia, Atlanta Division, 8-87-CV-657A (JTC) (June 10, 1993 and May 24, 1993).

Deposition of Daniel R. Fischel In Re: Equitec Rollup Litigation, United States District Court, Northern District of California, No. C-90-2064 CAL (June 2 and 3, 1993).

Supplemental Declaration of Daniel R. Fischel In Re: Oracle Securities Litigation, United States District Court, Northern District of California, Master File No. C 90 0931 VRW (May 20, 1993).

Affidavit of Daniel R. Fischel and Kenneth R. Cone In Re: Raymond P. Hayden, et al. v. Jeffrey L. Feldman, et al., United States District Court, Southern District of New York No. 88 Civ. 8048 (JES) (May 12, 1993).

Testimony of Daniel R. Fischel In Re: Melridge, Inc., Securities Litigation, United States District Court for the District of Oregon, CV No. 87-1426-FR (May 4 and 5, 1993).

Declaration of Daniel R. Fischel In Re: Oracle Securities Litigation, United States District Court, Northern District of California, Master File No. C 90 0931 VRW (April 20, 1993).

Deposition of Daniel R. Fischel In Re: Gillette Securities Litigation, United States District Court, District of Massachusetts, No. 88-1858-K (April 1, 1993).

Affidavit of Daniel R. Fischel In Re: Columbia Securities Litigation, United States District Court, Southern District of New York, 89 Civ. 6821 (LBS) (March 25, 1993).

Deposition of Daniel R. Fischel In Re: Westinghouse Securities Litigation, United States District Court, Western District of Pennsylvania, CV No. 91 354 (March 23, 1993).

Declaration of Daniel R. Fischel In Re: Oracle Securities Litigation, United States District Court, Northern District of California, Master File No. C 90-0931 VRW (March 22, 1993).

Deposition of Daniel R. Fischel In Re: Kroy, Inc., a Minnesota corporation et al. v. Bankers Trust New York Corporation, et al., Superior Court of the State of Arizona in and for the County of Maricopa, No. CV 89-35680 (March 18, 1993).

Deposition of Daniel R. Fischel In Re: Amos M. Ames, Helen M. Ames, Robert F. Bourke, Louise L. Bourke, Leo E. Corr, April C. Corr, Wence M. Horak, Ruth Horak, Robert T. Freas, Maurita Freas, Bruce Fink, Jr., William H. Jones, Candace A. Jones, Richard Paul, William L. Paul, Carole Paul, Steven J. Paul, Best Power Technology, Incorporated, and Best Power Technology Sales Corporation, in the State of Wisconsin, Circuit Court, Juneau County, Consolidated Case Nos. 92-CV-31, 92-CV-32 (January 26, 1993).

Deposition of Daniel R. Fischel In Re: Federal Express Corporation Shareholder Litigation, in the United States District Court, Western District of Tennessee, Master File No. 90-2359- 4B (December 3, 1992).

Deposition of Daniel R. Fischel In Re: Raymond Snyder, Individually and on behalf of all those similarly situated v. Oneok, Inc., et al., in the United States District Court, Northern District of Oklahoma, Civil Action No. 88 C 1500 E (October 15 and 16, 1992).

Deposition of Daniel R. Fischel In Re: Melridge, Inc. Securities Litigation, Consolidated Actions, United States District Court, District of Oregon, Master File No. CV87-1426-JU and Nos. 387-06589-P11, 88-05-JU, 88-221-JU, 88-0699-PA, 88-1266-JU (September 17, 1992; July 25 and 26, 1991).

Deposition of Daniel R. Fischel In Re: Maxus Corporate Company v. Kidder, Peabody & Co. Incorporated, Martin A. Siegel and Ivan F. Boesky, in the District Court Dallas County, Texas, 298th Judicial District, No. 87-15583-M (September 11, 1992; August 18 and 19, 1992).

Deposition of Daniel R. Fischel In Re: Jennifer A. Florin and Alan L. Mundt, on behalf of themselves and all others similarly situated v. Wesray Capital Corp., Citizens and Southern Trust Company, a subsidiary of Citizens and Southern Corporation, Robert K. Barton, Leonard S. Gaby, Allen G. Lacoe, Robert A. Magnusson, Anthony A. Saliture, Harlan B. Smith, Thomas F. Stutzman, Raymond G. Chambers, Frank E. Richardson, E. Burke Ross, Jr., William E. Simon and Frank W. Walsh, Jr., in the United States District Court, Western District of Wisconsin, Civil Action No. 91C-0948 (August 12, 1992).

Deposition of Daniel R. Fischel In Re: Pearl Newman, Shanna Lehmann & Athanasios Tsivelekidis, on their own behalf and on behalf of all other persons similarly situated v. On- Line Software International, Inc. Jack M. Berdy, John C. Crocker, Richard A. Granger, Richard R. Holtmeier, Michael S. Juceam, Edward J. Siegel, Howard P. Sorgen and Richard Ward, United States District Court, District of New Jersey, Consolidated Civil Action Nos. 88-3247, 88-3411 (July 28 and 29, 1992).

Deposition of Daniel R. Fischel In Re: Crazy Eddie Securities Litigation, Oppenheimer-Palmieri Fund, I.P., et al. v. Peat Marwick Main & Co., et al., United States District Court for the Eastern District of New York, 87 Civ. 0033 (EHN), 88 Civ. 3481 (EHN) (June 11, 1992; March 26 and 27, 1992).

Testimony of Daniel R. Fischel In Re: American Continental Corporation/Lincoln Savings and Loan Securities Litigation, in the United States District Court, for the District of Arizona MDL Docket No. 834 (June 4, 1992; May 26, 27 and 28, 1992).

Testimony of Daniel R. Fischel In Re: State of West Virginia v. Morgan Stanley & Co. Incorporated, in the Circuit Court of Kanawha County, State of West Virginia, Civil Action No. 89-C-3700 (April 27, 1992).

Affidavit of Daniel R. Fischel In Re: William Steiner, on behalf of himself and all others similarly situated v. Tektronix, Inc., et al., in the United States District Court, District Court of Oregon, Civil No. 90-587-JO (March 23, 1992).

Deposition of Daniel R. Fischel In Re: Martin Kaplan and Selma Kaplan, on Behalf of Themselves and All Others Similarly Situated v. VICORP Restaurants, Inc., Charles R. Frederickson, Robert S. Benson,

Emerson B. Kendall, Robert T. Marto and Johyn C. Hoyt, United States District Court, District of Colorado, Civil Action No. 90-C-2182 (February 11, 1992).

Deposition of Daniel R. Fischel In Re: Interco Incorporated v. Wasserstein, Perella & Co., Inc., United States District Court, Eastern District of Missouri, Eastern Division, No. 91-0151-C- 6 (February 3, 1992 and December 12, 1991).

Statement of Daniel R. Fischel In Re: Far West Federal Bank, S.B., et al. v. Director, Office of Thrift Supervision, et al., United States District Court for the District of Oregon, Civil Action No. 90-103 PA (February 3, 1992).

Deposition of Daniel R. Fischel In Re: Capital Bank of California v. Morgan Stanley & Co., Incorporated, United States District Court, Central District of California, No. 91-1650-R (January 24, 1992).

Deposition of Daniel R. Fischel In Re: Trinity Ventures, et al. v. Federal Deposit Insurance Corporation, in its own capacity and as successor to the Federal Savings and Loan Insurance Corporation, United States District Court, for the District of Oregon, No. 90-103- PA (January 6, 1992).

Deposition of Daniel R. Fischel In Re: First Republicbank Securities Litigation, United States District Court, Northern District of Texas, Dallas Division, Civil Action No. 3-88-0641-H (January 2, and 3, 1992; November 26, 1991).

Deposition of Daniel R. Fischel In Re: State of West Virginia v. Morgan Stanley & Co. Incorporated; Salomon Brothers Inc.; and Goldman Sachs & Co., in the Circuit Court of Kanawha County, State of West Virginia, Civil Action No. 89-C-3700 (December 19 and 20, 1991).

Deposition of Daniel R. Fischel In Re: The Regina Company, Inc. Securities Litigation, United States District Court, District of New Jersey, Civil Action No. 88-4149 (HAA) (October 31, 1991).

Affidavit of Daniel R. Fischel In Re: Gillette Securities Litigation, United States District Court, District of Massachusetts, Civil Action No. 88-1858-K (October 7, 1991)

Deposition of Daniel R. Fischel In Re: Capital Maritime Corporation v. Amfels, Inc., Far East Levingston Shipbuilding Ltd., John B. Allison and Patrick A. McDermid, United States District Court for the Southern District of Texas Houston Division, C.A. No. H-90-3417 (September 12, 1991).

Deposition of Daniel R. Fischel In Re: Thomas J. Caldarone, Jr. v. Isidore Brown, et al., and John E. Washburn, et al. v. Isidore Brown, et al., United States District Court, Northern District of Illinois, Eastern Division, Docket Nos. 80 C 6251 and 81 C 1475 (August 28, 29, and 30, 1991).

Testimony of Daniel R. Fischel In Re: Apple Securities Litigation, United States District Court, Northern District of California, Northern Division, Docket No. C-84-20148 (May 20 and 21, 1991).

Testimony of Daniel R. Fischel In Re: The Stuart-James Co., Inc., et al. Litigation, United States of America before the Securities & Exchange Commission, in Denver, Colorado, Administrative Proceeding File No. 3-7164 (May 6, 1991).

Deposition of Daniel R. Fischel In Re: Jennie Farber on behalf of herself and all others similarily situated v. Public Service Company of New Mexico; Jerry D. Geist; John P. Bundrant and Albert J. Robison, United States District Court for the District of New Mexico, CIV 89-456 JB WWD (April 17 and 18, 1991).

Affidavit of Daniel R. Fischel In Re: Moise Katz, Frederick Rand, Elias Weissman, Richard D. Morgan, Marion R. Morgan and Mortimer Schulman v. Raymond A. Hay, United States District Court, Southern District of New York, No. 86 Civ. 5640 (JES) (March 29, 1991).

Deposition of Daniel R. Fischel In Re: Standard Chartered PLC., a United Kingdom corporation, et al. v. Price Waterhouse, a general partnership, Superior Court of the State of Arizona, in and for the County of Maricopa, CV 88-34414 (March 13 and 14, 1991).

Affidavit of Daniel R. Fischel In Re: United States of America v. AVX Corporation, and Commonwealth of Massachusetts v. AVX Corporation, United States District Court, District of Massachusetts, Civil Action Nos. 83-3882-Y and 83-3899-Y (January 29, 1991).

Deposition of Daniel R. Fischel In Re: Apple Computer Securities, United States District Court Northern District of California, San Jose Division, No. C-84-20148 (a) JW (December 13 and 14, 1990).

Deposition of Daniel R. Fischel In Re: Polycast Technology Corporation, and Uniroyal Plastics Acquisition Corp. v. Uniroyal, Inc., et al., United States District Court Southern District of New York, No. 87 Civ. 3297 (December 6, 1990 and November 28, 1990).

Deposition of Daniel R. Fischel In Re: Ellen Rudd, on behalf of herself and all others similarly situated, and Mayer Corporation on behalf of themselves, and all others similarly situated, and Louis Brandt, and Israel Baker, Jay R. Kuhne, Pininfarina Corp., and American Transfer Co., on behalf of themselves and all others similarly situated v. Kirk Kerkorian, et al., Superior Court of the State of California, County of Los Angeles, Nos. CA 000980, CA 000981, CA 001017, CA 620279 (June 21, 1990).

Testimony of Daniel R. Fischel In Re: City of San Jose v. Paine, Webber, Jackson & Curtis, Incorporated, et al., and related counter- and Third-Party Claims, United States District Court, Northern District, No. C-84-20601 RPA (May 23 and 24, 1990).

Deposition of Daniel R. Fischel In Re: City of San Jose v. Paine, Webber, Jackson & Curtis, Incorporated, et al., and related counter- and Third-Party Claims, United States District Court, Northern District, No. C-84-20601 RPA (May 22, 1990), No. RPA 84-20601 (November 16, 1989 and September 8, 1989).

Testimony of Daniel R. Fischel In Re: Kulicke and Soffa Industries, Inc. Securities Litigation, United States District Court for the Eastern District of Pennsylvania, No. 86-1656 (March 20 and 21, 1990).

Deposition of Daniel R. Fischel In Re: Kulicke and Soffa Industries, Inc. Securities Litigation, United States District Court for the Eastern District of Pennsylvania, No. 86-1656 (March 9, 1990; December 19 and 21, 1989).

Affidavit of Daniel R. Fischel In Re: Viacom International Inc. v. Carl C. Icahn, et al., v. Ralph M. Baruch, et al., United States District Court, Southern District of New York, No. 86 Civ. 4215 (RPP) (March 8, 1990).

Deposition of Daniel R. Fischel In Re: Technical Equities Coordination Litigation, Superior Court of the State of California for the County of Santa Clara, Master File No. 1991, Santa Clara County Superior No. 600306 (March 1, 1990).

Deposition of Daniel R. Fischel In Re: Amalgamated Clothing and Textile Workers Union, AFL-CIO, et al. v. David A. Murdock, et al., United States District court for the Central District of California, No. CV-86-6410 IH (February 8, 1990).

Deposition of Daniel R. Fischel In Re: Connecticut National Life Insurance Company, et al. v. Peter A. Sprecher and Laventhol & Horwath, United States District Court, Central District of California, No. CV 87-1945 WJR (Tx) (January 30, 1990).

Deposition of Daniel R. Fischel In Re: Consolidated Capital Securities Litigation, United States District Court, Northern District of California, No. C-85-7332 AJZ (January 22, 1990).

Declaration of Daniel R. Fischel In Re Plaintiffs' Damages in Re: Liquidity Fund, et al. v. Southmark Corporation, et al. in the Superior Court of the State of California for the County of San Mateo, No. 332435 (January 18, 1990).

Deposition of Daniel R. Fischel In Re: Norman Kamerman, Shirley Brown, Edward Rosen, Lexim Investors Corp., and Dohsa Anstalt, on behalf of themselves and all others similarly situated, and Barnett Stepak v. Saul Steinberg, Reliance Group Holdings, Inc., Reliance Group, Inc., Reliance Financial Services corp., and Reliance Insurance Company, United States District Court, Southern District of New York, No. 84 Civ. 4440 (September 13, 1989).

Affidavit of Daniel R. Fischel In Re: Edward A. Taylor, et al. v. A. O. Smith Corporation et al., Circuit Court for Lincoln County, Tennessee, No. 098-84 (August 11, 1989).

Deposition of Daniel R. Fischel In Re: Container Products Inc. v. Pace Industries, United States District Court, Southern District of New York, No. 88-CIV. 3549 (KMW) (July 19, 1989).

Deposition of Daniel R. Fischel In Re: Joseph B. Moorman, et al. v. Southmark Corporation, et al., Liquidity Fund, et al. v. Southmark Corporation, et al., Superior Court of the State of California for the County of San Mateo, Nos. 322135 and 332435 (July 11, 1989).

Testimony of Daniel R. Fischel In Re: Tessie Wolfson, et al. v. Frederick S. Hammer, and Meritor Financial Group, United States District Court for the Eastern District of Pennsylvania, Civil Action No. 87-8471 (June 20, 1989).

Deposition of Daniel R. Fischel In Re: Richard J. Heckmann, et al. v. C. L. Ahmanson, et al., and Consolidated Cases, Superior Court of the State of California for the County of Los Angeles, Nos. CA000851 and C642081 (June 8, 1989).

Deposition of Daniel R. Fischel In Re: Tessie Wolfson, et al. v. Frederick S. Hammer, United States District Court for the Eastern District of Pennsylvania, Civil Action No. 87-8472 (May 11, 1989).

Testimony of Daniel R. Fischel In Re: Tessie Wolfson, et al. v. Frederick S. Hammer, United States District Court for the Eastern District of Pennsylvania, Civil Action No. 87-8472 (April 13, 1989).

Deposition of Daniel R. Fischel In Re: National Union Fire Insurance Company of Pittsburgh, PA v. Wells Fargo Bank, N.A., District Court of Harris County, Texas, 125th Judicial District, No. 88-49246 (April 10 and 11, 1989).

Deposition of Daniel R. Fischel In Re: Susan Rothenberg, as Custodian for Stephen J. Rothenberg v. Charles E. Hurwitz, United Financial Corporation, United Savings Association of Texas, et al., United States District Court for the Southern District of Texas, Houston Division, Civil Action No. H-86-1435 (March 30, 1989).

Deposition of Daniel R. Fischel In Re: Jose Nodar, et al. v. William Weksel, Albert Bromberg, Henry B. Turner, IV, Frank L. Bryant, Leo Kuperschmid, Bennett S. Lebow, Ernst & Whinney and Oppenheimer & Co., Inc., United States District Court, Southern District of New York, No. 84 Civ. 3870 (VLB) and consolidation case No. 84 Civ. 5132 (VLB) (December 15 and 16, 1988).

Deposition of Daniel R. Fischel In Re: William Steiner, et al. v. Whittaker Corporation, et al., Superior Court of the State of California for the County of Los Angeles, No. CA000817 (December 7, 1988).

Deposition of Daniel R. Fischel In Re: Arnold I. Laven, et al. v. Western Union Corporation, et al., United States District Court for the District, Western District of Washington, MDL No. 551 (August 30 and 31, 1988).

Deposition of Daniel R. Fischel In Re: Washington Public Power Supply System Securities Litigation, United States District Court, Western District of Washington, MDL No. 551 (August 16 and 22, 1988).

Affidavit of Daniel R. Fischel In Re: District Business Conduct Committee for District No. 3 v. Blinder, Robinson & Company Inc., et al., National Association of Securities Dealers, Inc. National Business Conduct Committee, Complaint No. DEN-666 (July 21, 1988).

Deposition of Daniel R. Fischel In Re: Joseph Seidman, et al. v. Stauffer Chemical Company, et al, United States District Court for the District of Connecticut, No. B 84-543 (TFGD) (June 10, 1988 and May 5, 1987).

Deposition of Daniel R. Fischel In Re: Edlin Cattle Co., Inc., and James Edlin v. A. O. Smith Harvestore Products, Inc., et al., United States District Court for the Northern District of Texas, Amarillo Division, No. CA-2-86-0122 (May 12, 1988).

Deposition of Daniel R. Fischel In Re: MicroPro Securities Litigation, United States District Court for the Northern District of California, No. C-85-7428-EFL (A) (May 2, 1988).

Affidavit of Daniel R. Fischel In Re: Pizza Time Theatre Securities Litigation, United States District Court for the Northern District of California, Civil File No. 84-20048-(A)-RPA (March 25, 1988).

Affidavit of Daniel R. Fischel and Robert A. Sherwin In Re: First National Bank of Louisville v. Brooks Farms, and George C. Brooks, et al., Third-Party Plaintiffs v. A. O. Smith Corporation, et al., Circuit Court for Maury County, Tennessee, No. 2058 (March 3, 1988).

Testimony of Daniel R. Fischel In Re: Nucorp Energy Securities Litigation, United States District Court for the Southern District of California, M.D.L. 514 (March 15, 16, 17, and 18, 1988).

Deposition of Daniel R. Fischel In Re: Nucorp Energy Securities Litigation, United States District Court for the Southern District of California, M.D.L. 514 (January 27, 1988).

Deposition of Daniel R Fischel In Re: Anheuser-Busch Companies, Inc. v. W. Paul Thayer, et al., United States District Court for the Northern District of Texas, Dallas Division, No. CA- 3-85-0794-R (January 21, 1988; December 4, 1987; and November 5, 1987).

Testimony of Daniel R. Fischel In Re: Securities and Exchange Commission v. First City Finance Corporation Ltd., and Marc Belzberg, United States District Court for the District of Columbia, Civil Action No. 86-2240 (December 18, 1987).

Testimony of Daniel R. Fischel In Re: The Irvine Company v. Athalie Irvine Smith and Athalie R. Clarke, Trustee, State of Michigan Circuit Court for the county of Oakland, Civil Action No. 8327011-CZ (December 14, 15, and 16, 1987).

Deposition of Daniel R. Fischel In Re: Securities and Exchange Commission v. First City Finance Corporation, Ltd. and Marc Belzberg, United States District Court for the District of Columbia, Civil Action No. 86-2240 (December 11, 1987).

Affidavit of Daniel R. Fischel In Re: Gerald D. Broder and Constance D. Broder v. Alphonse H. Bellac and William B. Weinberger v. Combustion Equipment Associates, Inc., et al., and William B. Weinberger v. Coopers & Lybrand, United States District Court for the Southern District of New York, 80 CIV 6175 (CES) 80 CIV 6839 (CES) 84 CIV 8217 (CES) (July 22, 1987).

Deposition of Daniel R. Fischel In Re: The Irvine Company v. Athalie Irvine Smith and Athalie R. Clarke, Trustee, State of Michigan, Circuit Court for the County of Oakland, Civil Action No. 83270011-CZ (June 1, 1987).

Deposition of Daniel R. Fischel In Re: Fortune Systems Securities Litigation, United States District for the Northern District of California, Master File No. 83-3348A-WHO (May 7, 1987).

Deposition of Daniel R. Fischel In Re: Victor Technologies Securities Litigation, United States District Court for the Northern District of California, Master File No. C-83-3906(A)-RFP (FW) (January 8, 1987 and October 30, 1986).

Reply Declaration of Daniel R. Fischel in Support of the Motion by the Activision Defendants for Summary Judgment In Re: Activision Securities Litigation, United States District Court for the Northern District of California, Master File No. C-83-4639(A)-MHP (October 27, 1986).

Testimony of Daniel R. Fischel In Re: NVHomes, L.P. v. Ryan Homes, Inc.; and Ryan Homes, Inc. v. NVHomes, L.P., et al., United States District Court for the Western District of Pennsylvania, Civil Action No. 86-2139 (October 24, 1986).

Supplemental Affidavit of Daniel R. Fischel In Re: NVHomes, L.P. v. Ryan Homes, Inc.; and Ryan Homes, Inc. v. NVHomes, L.P. and NVAcquisition L.P., et al., United States District Court the Western District of Pennsylvania, Civil Action No. 86-2139 (October 24, 1986).

Affidavit of Daniel R. Fischel in Support of the Motion by the Activision Defendants for Summary Judgment In Re: Activision Securities Litigation, United States District Court for the Northern District of California, Master File No. C-86-2139 (October 20, 1986).

Declaration of Daniel R. Fischel in Support of the Motion by the Activision Defendants for Summary Judgment In Re: Activision Securities Litigation, United States District Court for the Northern District of California, Master File No. C-83-4639(A)-MHP (October 2, 1986).

Affidavit in Support of Defendants Motion for Summary Judgment In Re: MCorp Securities Litigation, United States Court for the Southern District of Texas, Civil Action No. H-85- 5894 (September 25, 1986).

Deposition of Daniel R. Fischel In Re: Activision Securities Litigation, United States District Court for the Northern District of California, No. C 83 4639 (August 18 and 19, 1986).

Deposition of Daniel R. Fischel In Re: John Mancino v. James A. McMaqhan, et al., United States District Court for the Northern District of California, Civil No. C-84-0407-TEH (August 14, 1986).

Testimony of Daniel R. Fischel In Re: Charles W. Leigh, et al. and George Johnson, et al. v. Clyde William Engle, et al., United States District Court for the Northern District of Illinois, Eastern Division, Case No. 78 C 3799 (August 1, 1986).

Reply Affidavit of Daniel R. Fischel In Re: The Amalgamated Sugar Company v. NL Industries, United States District Court for the Southern District of New York, 86 Civ. 5010 (VLB) (July 28, 1986).

Affidavit of Daniel R. Fischel In Re: The Amalgamated Sugar Company v. NL Industries, United States District Court for the Southern District of New York, 86 Civ. 5010 (VLB) (July 18, 1986).

Deposition of Daniel R. Fischel In Re: Charles W. Leigh, et al. and George Johnson, et al. v. Clyde William Engle, et al., United States District Court for the Northern District of Illinois, Eastern Division, Case No. 78 C 3799 (July 1, 1986).

Deposition of Daniel R. Fischel In Re: Seafirst Corporation v. William M. Jenkins, et al.; and Seafirst Corporation v. John R. Boyd, et al., United States District Court for the Western District of Washington at Seattle, Case No. C83-771R (February 27, 1986).

Deposition of Daniel R. Fischel In Re: Kreindler v. Sambo's Restaurants, Inc., United States District Court for the Southern District of New York, Case No. 79 Civ. 4538 (December 17, 1985).

Affidavit of Daniel R. Fischel In Re: United States of America v. S. Richmond Dole and Clark J. Matthews II (March 19, 1985).

Deposition of Daniel R. Fischel In Re: Craig T. McFarland, et al. v. Memorex Corporation, United States District Court for the Northern District of California, No. C 79-2926-WAI, C 79-2007-WAI, C 79-241-WAI (February 26, 1985; January 29 and 30, 1985).

Testimony of Daniel R. Fischel In Re: Robert J. Lawrence v. Grumman Corp. Pension Plan, et al., United States District Court for the Eastern District of New York, No. CV-81-3530 (December 19, 1983).

Testimony of Daniel R. Fishel In Re: Telvest, Inc. v. Junie L. Bradshaw, et al. and American Furniture Company, United States District Court, for the Eastern District of Virginia Richmond Division, No. CA-79-0722-R (December 4, 1981).

OTHER ACTIVITIES

Member, American Economic Association, American Finance Association.

Former Member of the Board of Overseers of the Becker-Friedman Institute at the University of Chicago.

Former Advisor to the Harvard Program on Corporate Governance at Harvard University. Former

Member, Board of Directors, Center for the Study of the Economy and the State. Former Member,

Mid-America Institute Task Force on Stock Market Collapse.

Have acted as a consultant and/or advisor to the New York Stock Exchange, the National Association of Securities Dealers, the Chicago Board of Trade, the Chicago Board Options Exchange, the Chicago Mercantile Exchange, the New York Mercantile Exchange, the Federal Trade Commission, the Department of Labor, the Securities and Exchange Commission, the Canadian Securities and Exchange Commission, the United States Department of Justice, the Federal Deposit Insurance Corporation, the Resolution Trust Corporation, the Federal Housing Finance Agency, and the Office of Thrift Supervision.

Referee, Journal of Financial Economics, Journal of Law and Economics, Journal of Legal Studies.

Participant and speaker at multiple conferences on the Economics of Corporate, Securities and Commodities Law and the Regulation of Financial Markets.

Former Chairman, American Association of Law Schools' Section on Law and Economics.

APPENDIX B
Materials Relied Upon

Legal Documents & Expert Reports

Expert Report and Exhibits of [redacted] Ph.D., October 4, 2021

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