Exhibit C

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.

20 Civ. 10832 (AT) ECF Case

EXPERT REBUTTAL REPORT OF KRISTINA SHAMPANIER, PH.D.

November 12, 2021

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I. QUALIFICATIONS

1. I am a Senior Vice President at Compass Lexecon, an economic consulting firm. I received a Ph.D. in Business and Management Science (with specialization in Marketing) from the MIT Sloan School of Management in 2007. Prior to that, I received a Master's degree in Mathematics from Moscow State University in 2001 and a Master's degree in Economics from the New Economic School (Moscow) in 2002, both cum laude. While at MIT, I conducted research on judgment, decision making, and consumer behavior.

2. At MIT, and subsequently in litigation consulting settings, I designed, conducted, and analyzed numerous laboratory, online, and field experiments and other "primary data" studies, including in survey format. I have extensive experience in survey development and administration, and analysis of data on consumer behavior in academic, consulting, and litigation settings. I have also taught outside audiences on survey design and published in academic journals and practitioner publications.

3. I have been retained as an expert witness in various matters, including matters relating to trademark infringement, false advertising, employment, and healthcare. In each of these matters, I was retained to design and field a survey, experiment, or another "primary data" study, or to evaluate such studies conducted by others.

4. My Curriculum Vitae is attached as Appendix A to this report, and includes all publications I have authored in the last ten years.

5. Appendix B lists the materials I have considered in forming my opinions. I reserve the right to update my opinions if additional information becomes available.

6. Compass Lexecon is compensated for my work on this matter at the rate of \$975 per hour. I receive compensation from Compass Lexecon based on my billing and billings of staff

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who have assisted me. Neither Compass Lexecon's compensation nor my compensation depends upon the outcome of this case.

II. ASSIGNMENT

7. I was retained by Kellogg, Hansen, Todd, Figel & Frederick PLLC on behalf of Ripple Labs Inc. ("Ripple") to evaluate the Expert Report of **Constant of Report**") in this matter.¹

8. I reserve the right to revise my opinions if new information becomes available.

III. SUMMARY OF OPINIONS

- 9. Mr. "analysis" suffers from the following fatal flaws:
 - a. Mr. provides no scientific basis for his causal conclusions regarding the effect of "Ripple's statements, actions, and product offerings" on the "perspective of a reasonable purchaser of XRP." Mr. does not conduct an experiment, the gold standard for a causal conclusion. Neither does he conduct any other quantitative empirical analysis, such as a survey or analysis of data accumulated in the regular course of business, or qualitative empirical analysis such as focus groups. At best, his analysis can be viewed as a highly unreliable survey of a single respondent himself.
 - b. Mr. does not evaluate whether and to what degree XRP purchasers were exposed to Ripple's statements that he "review[s] and analy[zes]." A proper analysis of the impact of such statements on potential purchasers would include such an evaluation.

¹ Expert Report of **Commission**, October 4, 2021, U.S. Securities and Exchange Commission v. Ripple Labs, Inc., Bradley Garlinghouse, and Christian A. Larson, United States District Court, Southern District of New York.

- c. Mr. "analysis" does not allow him to separate the supposed impact of Ripple's conduct on the purchaser's "perspective" from other potential influences, such as preexisting beliefs or general principles of economics.
- d. Mr. does not explain how he selected Ripple's statements that he "review[s] and analy[zes]."
- e. Mr. does not offer any market segmentation or similar analysis that would allow him to establish that the different types of XRP purchasers he describes (investment-oriented and cross-border-transfer-oriented) actually exist, or that they are the only types of XRP purchasers that exist.
- f. Mr. does not appear to possess the qualifications or experience needed to address certain aspects of the "perspective of a reasonable purchaser" or the effect of Ripple's "statements, actions, and product offerings" on those aspects of the purchaser's perspective, such as purchasers' perceptions of Ripple's at-issue statements.

IV. BACKGROUND

10. According to the operative complaint in this matter, Ripple (f/k/a Open Coin, Inc.) "is a Delaware corporation founded in September 2012, with its principal place of business in San Francisco, California, and an office in Manhattan."² Ripple characterizes itself as "a San Francisco-based, privately-held payments technology company that uses blockchain innovation (including XRP) to allow money to be sent around the world instantly, reliably, and more

² First Amended Complaint, *Securities and Exchange Commission v. Ripple Labs, Inc., Bradley Garlinghouse, and Christian A. Larsen*, 20 Civ. 10832 (AT), ECF Case, United States District Court, Southern District of New York, February 18, 2021 ("Complaint"), ¶16.

cheaply than traditional avenues of money transmission."³ The Securities and Exchange Commission ("SEC") alleges that Ripple has sold or distributed significant quantities of XRP, the digital asset at issue in this case.⁴

11. The SEC claims that XRP is an "investment contract" and thus a security.⁵ According to the SEC, "[i]nvestment contracts are instruments through which a person invests money in a common enterprise and reasonably expects profits or returns derived from the entrepreneurial or managerial efforts of others."⁶ The SEC claims that those "who purchased XRP . . . invested into a common enterprise with other XRP purchasers, as well as with Ripple," that the "common interest" was "in XRP's price increasing," and that Ripple "led investors to reasonably expect that they could reap a profit from their investment into XRP, derived from Ripple's and its agents' efforts into their common enterprise."⁷ According to the SEC, XRP has "[n]o significant [n]on-[i]nvestment [u]se."⁸ In particular, the SEC does not believe that XRP's use in crossborder payments, such as via Ripple's On-Demand Liquidity ("ODL") product, is a "use" of XRP.⁹

12. The SEC claims that Ripple sold XRP without filing a security registration statement, and therefore "never provided investors with the material information that every year hundreds of

³ Answer of Defendant Ripple Labs, Inc. to Plaintiff's First Amended Complaint, *Securities and Exchange Commission v. Ripple Labs, Inc., Bradley Garlinghouse, and Christian A. Larsen*, 20-cv-10832 (AT), United States District Court, Southern District of New York, March 4, 2021 ("Ripple's Answer"), ¶6, footnotes omitted.

⁴ Complaint, ¶1; Ripple's Answer, ¶¶1, 7. According to the SEC, "[f]rom at least 2013 through the present," Ripple "sold over 14.6 billion units" of XRP. Complaint, ¶1.

⁵ Complaint, ¶3.

⁶ Complaint, ¶31.

⁷ Complaint, ¶¶290, 302, 315.

⁸ Complaint, Section V.

⁹ Complaint, ¶131, Section V.A.

other issuers include in such statements."¹⁰ Thus, according to the SEC, Ripple engaged in an "illegal securities offering from 2013 to the present."¹¹

13. Ripple's position is that XRP is not a security and that it "performs a number of functions that are distinct from the functions of 'securities' as the law has understood that term for decades"; for example, "XRP functions as a medium of exchange — a virtual currency used today in international and domestic transactions — moving value between jurisdictions and facilitating transactions."¹² Among other things, Ripple contends that "holders of XRP cannot objectively rely on Ripple's efforts" because "Ripple has no explicit or implicit obligation to any counterparty to expend efforts on their behalf," "never explicitly or implicitly promised profits to any XRP holder," and in any event is not in control of the XRP Ledger.¹³

V. SUMMARY OF THE REPORT

14. Mr. was retained by the SEC "to independently analyze and render opinions on the perspective of a reasonable purchaser of XRP on Ripple's statements, actions, and product offerings" in connection with "purchases of XRP [that] were made . . . throughout the period that Ripple offered XRP for sale from 2013 to the filing of the SEC's Complaint on December 22, 2020."¹⁴ Mr. states that the purchasers he considers "primarily include individuals, institutional investors, and financial services companies."¹⁵ Mr. Doody performs what he calls "review and analysis of Ripple's public statements made throughout the Issuance Period,

¹⁰ Complaint, ¶2.

¹¹ Complaint, ¶3.

 $^{^{12}}$ Ripple's Answer, $\P1.$

¹³ Ripple's Answer, ¶¶7, 9, 10.

¹⁴ Report, ¶2.

¹⁵ Report, ¶2.

documents, and design decisions made by Ripple and/or its founders"¹⁶ and concludes the following with respect to the "perspective of a reasonable purchaser" of XRP:

- a. "[A] reasonable purchaser would have had an expectation of future profit derived from the efforts of Ripple."¹⁷ In particular, Mr. Doody opines that Ripple's actions "would create the hope that a purchaser could passively earn profits by owning XRP while Ripple took steps to increase the value of the coin."¹⁸
- b. "[T]here are certain elements in Ripple's and its founders' design of XRP, the XRP Ledger, and a variety of software products that appealed more to a purchaser of XRP interested in making a profit than to financial institutions seeking to embrace Ripple's stated vision of utilizing XRP as a bridge asset for cross-border asset transfers."¹⁹

¹⁶ Report, ¶7. In particular, Mr. states that his "report focuses on what Ripple communicated publicly, including its assertions that usage of its products by financial institutions would ultimately lead to greater demand for XRP." Report, footnote 25.

¹⁷ Report, ¶8.

¹⁸ Report, ¶8. In the "Summary of Findings and Conclusions" section at the end of his report, Mr. restates this conclusion as follows, "[o]ver the course of the Issuance Period a reasonable purchaser of XRP would have had an expectation of generating profit based on the efforts of Ripple and its management to accomplish the growth strategies that Ripple advertised to the public as being already achieved or planned for the future. . . . a reasonable purchaser would have closely considered many factors that were publicized by Ripple such as disclosed partnerships with financial institutions, the quality of Ripple's management team, the target addressable market for Ripple's products, and the availability of liquidity on trading platforms for XRP." Report, ¶89.

¹⁹ Report, ¶9. In the "Summary of Findings and Conclusions" section at the end of the report, Mr. restates this conclusion as "[c]ertain aspects of the design characteristics of XRP and the promotional activity of Ripple did not appeal to a pure utility use case." Report, ¶90. The rest of Mr. **Summary** of Findings" section and "Summary of Findings and Conclusions" section appear to list the reasons for which he holds these opinions about the "perspective of a reasonable purchaser" (or supposed logic of how a "reasonable purchaser" would arrive at these two "perspectives") rather than providing any incremental "perspectives."

VI. MR. OPINES ON THE "PERSPECTIVE OF A REASONABLE PURCHASER" RESULTING FROM RIPPLE'S "STATEMENTS, ACTIONS, AND PRODUCT OFFERINGS" WITHOUT EMPLOYING ANY RELIABLE METHODOLOGY

15. Mr. opinions concern the effects that Ripple's "statements, actions, and product offerings" supposedly had on the "perspectives" of reasonable purchasers of XRP. For example, he opines that actions by Ripple "would create" certain expectations for "a reasonable purchaser."²⁰ Conclusions of this sort are considered "causal," in the sense that he implies that Ripple's "statements, actions, and product offerings" caused changes in the "perspective of a reasonable purchaser."

16. There are scientifically grounded and reliable methodologies to assess whether causal relationships of this sort exist. Mr. find did not employ any such methodology. As a result, Mr. find has offered no legitimate and reliable basis for his opinions. Mr. find also offers no explanation as to why he failed to use such a methodology, and from the materials Mr. for provided, it does not appear that Mr. find has any experience or qualification that would enable him to use such a methodology to the extent that his opinions discuss perceptions of reasonable purchasers. Appendix C to this report lists examples of Mr. for unsupported causal propositions.

17. I describe the bases for my opinion below. Section VI.A describes reliable scientific methodologies that can be employed (but that Mr. failed to employ) to determine whether the sort of causal relationship that Mr. for posits actually exists. Section VI.B describes in detail Mr. freview and analysis." Section VI.C describes why the "methodology" on which Mr. freview effectively relied is invalid as a matter of well-established scientific principles.

A. The established, reliable, and supportable method for evaluating causal propositions is the experimental method

18. The gold standard for testing a causal hypothesis is an experiment. For example, Babbie (2010) states that "[e]xperiments are the primary tool for studying causal relationships"²¹ and Shadish, et al. (2002) also state that "experiments are well-suited to studying causal relationships. No other scientific method regularly matches the characteristics of causal relationships so well."²² The 2019 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel (commonly referred to as the "Nobel Prize" in economics) was awarded to Abhijit Banerjee, Esther Duflo, and Michael Kremer for their use of experiments in the field of developmental economics²³ and, similarly, the 2021 Nobel Prize in Economics was awarded to David Card, Joshua Angrist and Guido Imbens for their work related to experiments and quasi-experiments.²⁴ The Royal Swedish Academy noted that "[m]ost applied science is concerned

²¹ Babbie, Earl. *The Practice of Social Research*. Twelfth Edition. Wadsworth Cengage Learning, 2010 ("Babbie (2010)"), p. 249.

²² Shadish, William R., Thomas D. Cook, and Donald T. Campbell. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Wadsworth Cengage Learning, 2002, pp. 7-9. Shadish, et al. (2002) further state "In many correlational studies, for example, it is impossible to know which of two variables came first, so defending a causal relationship between them is precarious. . . . The unique strength of experimentation is in describing the consequences attributable to deliberately varying a treatment."

²³ The Royal Swedish Academy of Sciences. "The Prize in Economic Sciences 2019," available at https://www.nobelprize.org/uploads/2019/10/press-economicsciences2019-2.pdf, p. 1.

²⁴ The Royal Swedish Academy of Sciences. "Scientific Background on the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2021 - Answering Causal Questions Using Observational Data," available at https://www.nobelprize.org/uploads/2021/10/advanced-economicsciencesprize2021.pdf ("The Royal Swedish Academy of Sciences (2021)"), pp. 1-2. "This year's Prize in Economic Sciences rewards three scholars: David Card of the University of California, Berkeley, Joshua Angrist of Massachusetts Institute of Technology, and Guido Imbens of Stanford University. The Laureates' contributions are separate but complementary. . . . The combined contribution of the Laureates, however, is larger than the sum of the individual parts. Card's studies from the early 1990s showcased the power of exploiting natural experiments to uncover causal effects in important domains. This early work thus played a crucial role in shifting the focus in empirical research using observational data towards relying on quasi-experimental variation to establish causal effects. The framework developed by Angrist and Imbens, in turn, significantly altered how researchers approach empirical questions using data generated from either natural experiments or randomized experiments with incomplete compliance to the assigned treatment. At the core, the LATE interpretation clarifies what can and cannot be learned from such experiments. Taken together, therefore, the Laureates' contributions have played a central role in establishing the so-called design-based approach in economics. This approach – aimed at emulating a randomized experiment to answer a causal question using

with uncovering causal relationships," and that in many fields, "randomized controlled trials (RCTs) are considered the gold standard for achieving this. . . . Randomized experiments can be used to answer a broad range of causal questions."²⁵

19. Some of the most commonly discussed experiments are clinical trials, also referred to as randomized controlled trials, where patients are randomly assigned to a treatment group that receives the tested treatment, or a control group that receives a previously established treatment or a placebo.²⁶ In these experiments, if the studied health outcome of the test group (e.g., blood pressure) is statistically significantly better than in the control group, the researchers conclude that the tested treatment is effective (or more effective than the pre-existing treatment that the control group received).²⁷ That is, the researchers use a test group and a control group to establish whether and how a change in stimulus (tested treatment vs. control treatment) affects outcomes (e.g., blood pressure). Principles of this sort can be applied to measure causation in other fields as well, including economics as discussed above. Experiments are also common in marketing and consumer behavior and can be used to test whether receiving certain information affects consumers' views about a particular product.²⁸

observational data – has transformed applied work and improved researchers' ability to answer causal questions of great importance for economic and social policy using observational data."

²⁵ The Royal Swedish Academy of Sciences (2021), pp. 1, 8.

²⁶ "In the medical sciences . . . randomized experiments are often used for determining the effects of a treatment. For example, a drug and a placebo may be randomly given to patients and the health effects then compared between those receiving the drug and those given a placebo." The Royal Swedish Academy of Sciences (2021), p. 7.

²⁷ "If we observe statistically significant differences among the groups after a comparative randomized experiment, we have good evidence that the treatments actually caused these differences." Yates, Daniel, David Moore, and George McCabe. *The Practice of Statistics*. First Edition. W.H. Freeman, 1999 ("Yates, et al. (1999)"), p. 276.

²⁸ See, for example, Assael, Henry. *Consumer Behavior, A Strategic Approach.* Houghton Mifflin Company, 2004, pp. 18-19. "Researchers try to determine the effects of marketing stimuli such as alternative product characteristics, advertising themes, or price levels (the cause) on consumer responses (the effect). In trying to establish such causeand-effect relationships, the researcher must try to control all factors except the marketing stimulus being tested so that consumer responses can be attributed to that stimulus. Frito-Lay ran experiments under controlled conditions and found it could reduce oil in its light chip line (the stimulus or cause) by one-third without a decrease in consumer taste ratings (the response or effect)."

20. Here, a proper experimental methodology to support Mr. opinions – which Mr.

did not use – would test whether the particular information he points to (i.e., Ripple's "statements, actions, and product offerings") actually caused the effects he ascribes to that information (e.g., creating particular beliefs or expectations among reasonable purchasers of XRP). To do that, a well-designed experiment would compare outcomes ("perspective of a reasonable purchaser") in the actual world in which Ripple engaged in the at-issue "statements, actions, and product offerings" with outcomes in the but-for world in which the at-issue "statements, actions, and product offerings" were not present. This experiment would directly compare the "perspective of a reasonable purchaser" in the actual and the but-for worlds.

21. Academics and experts in litigation conduct similar experiments and experiment-like studies using a variety of methods involving either data accumulated in the regular course of business or by conducting new "primary data" studies.²⁹

22. Because one of the key outcomes of interest here is the beliefs held by potential XRP purchasers (e.g., whether or not the potential XRP purchasers had "an expectation of future profit"), the most direct way of measuring that outcome is through a survey of actual and potential XRP purchasers. For example, Jacoby (2013) notes surveys are "the methodological tool most often used by social scientists to probe states of mind," and are "routinely used" in litigation contexts for that reason.³⁰

²⁹ See, for example, Diamond, Shari, S. "Reference Guide on Survey Research." *Reference Manual on Scientific Evidence*. Third Edition. Federal Judicial Center, 2011, pp. 359-423 ("Diamond (2011)"), at pp. 397-401. Jacoby (2013) noted that in "[a] study of trademark cases (including applications for interim injunctions) that went to final judgment reported during a 10-year span from the mid-1990s through the mid-2000s revealed more cases where survey evidence was submitted (57.4 percent) than where surveys were not submitted." Jacoby, Jacob, and Lynda Zadra-Symes. "Legal Issues That Can Be Examined via Surveys." *Trademark Surveys: Volume 1: Designing, Implementing, and Evaluating Surveys*. Jacob Jacoby. ABA Book Publishing, 2013 ("Jacoby (2013)"), p. 7.

³⁰ Jacoby (2013), p. 6. Diamond (2011) explains that surveys "are used to describe or enumerate the beliefs, attitudes, or behavior of persons or other social units. Surveys typically are offered in legal proceedings to establish or refute claims about the characteristics of those individuals or social units (e.g., whether consumers are likely to be

23. There are multiple types of surveys that can be conducted. A traditional survey may ask respondents for information without trying to measure any causal effects. For example, a survey could simply ask respondents which political candidate they intend to vote for, or whether they have ever purchased a particular type of product, or how they understand a particular advertisement. However, as Diamond (2011) explains, "[s]urveys that merely record consumer impressions have a limited ability to answer questions about the origins of those impressions. The difficulty is that the consumer's response to any question on the survey may be the result of information or misinformation from sources other than the trademark the respondent is being shown or the commercial he or she has just watched."³¹ Surveys of this sort can be appropriate when the goal is to learn about prevalent opinions or preferences (such as which candidate is likely to win an election) rather than causal relationships (such as how new information may cause people to change their beliefs or preferences). When the purpose is to investigate such a causal relationship, a survey in the experimental form would be carried out. Diamond (2011), for example, states that "[m]any surveys are designed not simply to describe attitudes or beliefs or reported behaviors, but to determine the source of those attitudes or beliefs or behaviors. That is, the purpose of the survey is to test a causal proposition."³² Because Mr. describe a causal relationship (i.e., whether potential XRP purchasers' "perspectives" are caused by Ripple's at-issue "statements, actions, and product offerings"), an experimental form survey

misled by the claims contained in an allegedly deceptive advertisement; which qualities purchasers focus on in making decisions about buying new computer systems)." Diamond (2011), at p. 361.

³¹ Diamond (2011), at p. 397.

³² Diamond (2011) presents an example of how such a survey works: "For example, how does a trademark or the content of a commercial affect respondents' perceptions or understanding of a product or commercial? Thus, the question is not merely whether consumers hold inaccurate beliefs about Product A, but whether exposure to the commercial misleads the consumer into thinking that Product A is a superior pain reliever. Yet if consumers already believe, before viewing the commercial, that Product A is a superior pain reliever, a survey that simply records consumers' impressions after they view the commercial may reflect those preexisting beliefs rather than impressions produced by the commercial." Diamond (2011), at pp. 397-399.

would have been the appropriate methodology to use here. Mr. did not conduct such a survey.

24. A well-designed experimental-form survey would simulate the actual and the but-for world for a sample of "reasonable purchasers," half of which would be randomly assigned to the "actual world" (test group) and the other half to the "but-for world" (control group). Diamond (2011) explains:

> By adding one or more appropriate control groups, the survey expert can test directly the influence of the stimulus. In the simplest version of such a survey experiment, respondents are assigned randomly to one of two conditions. For example, respondents assigned to the experimental condition view an allegedly deceptive commercial, and respondents assigned to the control condition either view a commercial that does not contain the allegedly deceptive material or do not view any commercial. Respondents in both the experimental and control groups answer the same set of questions about the allegedly deceptive message. The effect of the commercial's allegedly deceptive message is evaluated by comparing the responses made by the experimental group members with those of the control group members. If 40% of the respondents in the experimental group responded indicating that they received the deceptive message (e.g., the advertised product has fewer calories than its competitor), whereas only 8% of the respondents in the control group gave that response, the difference between 40% and 8% (within the limits of sampling error) can be attributed only to the allegedly deceptive message. Without the control group, it is not possible to determine how much of the 40% is attributable to respondents' preexisting beliefs or other background noise (e.g., respondents who misunderstand the question or misstate their responses).³³

25. Similarly, Yates, et al. (1999) state that a great advantage of experiments is that "they can produce data that give good evidence for a cause-and-effect relationship between the explanatory

³³ Diamond (2011), at p. 398.

and response variables. We know that in general, a strong association does not imply causation. A strong association in data from a well-designed experiment does imply causation."³⁴

- 26. In this case, a well-designed experimental survey would involve the following steps:³⁵
 - a. The survey should be designed, conducted, and analyzed by an expert who is "[a]ppropriately [s]killed and [e]xperienced," which Mr.
 - b. Actual and potential purchasers of XRP (the target population) would be recruited to participate in a survey. Those could be drawn, for example, from the three types of purchasers that Mr. highlighted, "individuals, institutional investors, and financial services companies."
 - c. The "[i]dentification of the proper target population or universe is recognized uniformly as a key element in the development of a survey."³⁷

³⁴ Yates, et al. (1999), p. 275. Yates, et al. (1999) describe the "logic behind a randomized comparative design" as: "• Randomization produces groups of experimental units that should be similar in all respects before the treatments are applied. • Comparative design ensures that influences other than the experimental treatments operate equally on all groups. • Therefore, differences in the response variable must be due to the effects of the treatments. That is, the treatments not only are associated with the observed differences in the response but must actually cause them."

³⁵ A survey would be preceded by exploratory research, which may include other "primary data" collection, and a pretest. The exploratory research and the design stage would include numerous decisions such as which at-issue statements to test, and how to instrumentalize the targeted population.

³⁶ Diamond (2011), at p. 375. "Experts prepared to design, conduct, and analyze a survey generally should have graduate training in psychology (especially social, cognitive, or consumer psychology), sociology, political science, marketing, communication sciences, statistics, or a related discipline; that training should include courses in survey research methods, sampling, measurement, interviewing, and statistics. In some cases, professional experience in teaching or conducting and publishing survey research may provide the requisite background. In all cases, the expert must demonstrate an understanding of foundational, current, and best practices in survey methodology, including sampling, instrument design (questionnaire and interview construction), and statistical analysis. Publication in peerreviewed journals, authored books, fellowship status in professional organizations, faculty appointments, consulting experience, research grants, and membership on scientific advisory panels for government agencies or private foundations are indications of a professional's area and level of expertise," (footnotes omitted). While Mr. may have some training in statistics, he does not appear to have any training (e.g., in marketing or psychology) that would allow him to ask questions in an unbiased fashion.

³⁷ Diamond (2011), at p. 376, footnote 76.

Diamond (2011) further states that "One of the first steps in designing a survey or in deciding whether an existing survey is relevant is to identify the target population (or universe). The target population consists of all elements (i.e., individuals or other units) whose characteristics or perceptions the survey is intended to represent. Thus, in trademark litigation, the relevant population in some disputes may include all prospective and past purchasers of the

- d. Respondents who qualify would be randomly assigned to a test group or a control group.
- e. Test group respondents would be exposed to a set of tested statements and actions by Ripple: specifically, the "statements, actions, and product offerings" that Mr.

describes in his report. These could be presented in a form of a vignette accompanied by news articles, video interviews, or other stimuli approximating the marketplace realities.³⁸ The names "Ripple" and "XRP" could be anonymized to control for prior knowledge.

f. The control group would be exposed to the same procedure, except that the atissue elements of the statements, actions, and product offerings would be replaced

plaintiff's goods or services and all prospective and past purchasers of the defendant's goods or services.... The definition of the relevant population is crucial because there may be systematic differences in the responses of members of the population and nonmembers. For example, consumers who are prospective purchasers may know more about the product category than consumers who are not considering making a purchase. The universe must be defined carefully. For example, a commercial for a toy or breakfast cereal may be aimed at children, who in turn influence their parents' purchases. If a survey assessing the commercial's tendency to mislead were conducted based on a sample from the target population of prospective and actual adult purchasers, it would exclude a crucial relevant population. The appropriate population in this instance would include children as well as parents." Diamond (2011), at pp. 376-377.

Jacoby (2013) also notes the importance of selecting the correct survey universe in the context of trademark cases: "The rationale relied upon for identifying the relevant buyer class (the 'survey universe,' see chapter 5) is important, as courts may find the universe of relevant buyers too broad or too narrow. ... Using the wrong universe can result in the survey being given little weight or even deemed inadmissible." Jacoby (2013), pp. 11-12.

³⁸ Yates, et al. (1999) state that the "most serious potential weakness of experiments is lack of realism. The subjects or treatments or setting of an experiment may not realistically duplicate the conditions we really want to study.... Lack of realism can limit our ability to apply the conclusions of an experiment to the settings of greatest interest. Most experiments want to generalize their conclusions to some setting wider than that of the actual experiment. Statistical analysis of the original experiment cannot tell us how far the results will generalize... A convincing case that an experiment is sufficiently realistic to produce useful information is based not on statistics but on the experimenter's knowledge of the subject matter of the experiment. The attention to detail required to avoid hidden bias also rests on subject matter knowledge. Good experiments combine statistical principles with understanding of a specific field of study." Yates, et al. (1999), pp. 278-279.

by "placebo" versions that lack the content that is hypothesized to have an effect on reasonable purchasers' "perspective."³⁹

- g. "In designing a survey-experiment, the expert should select a stimulus for the control group that shares as many characteristics with the experimental stimulus as possible, with the key exception of the characteristic whose influence is being assessed."⁴⁰
- h. Both groups will then be evaluated on a "dependent measure" which would aim at gaining the unbiased "perspective of a reasonable purchaser." For example, respondents could be asked in open-ended and closed-ended formats about their perception of the digital asset described to them, whether they would expect its price to grow because of the efforts of the company discussed in the study, whether they would expect the digital asset to be usable in transactions, including cross-border transactions, and what their own intentions would be with respect to

³⁹ For example, Mr. claims that in a certain passage in an interview with Bloomberg Technology, Ripple's CEO Brad Garlinghouse contributed to certain underrating of XRP potential purchasers about XRP. Report, ¶125-26.

The passage called out by Mr. **The set of the set of th**

In the experiment, respondents in the test group could be exposed to the interview the way it occurred, while the control group respondents could be exposed to the same interview but where the passage identified by Mr. would be removed or replaced by a "placebo."

In addition to testing the causal proposition, such an approach would account for whether potential purchasers who viewed the interview would even pay attention to the passage highlighted by Mr. Additional empirical research would be needed to further investigate what percentage of the potential or actual XRP purchasers was even exposed to the interview. Mr. addressed neither of these topics.

⁴⁰ Diamond (2011), at p. 399.

the asset discussed (e.g., whether they would consider purchasing it, and what they would potentially do with it afterwards).

- i. After data are collected, statistical analysis would be carried out to assess whether the perspectives of the test and control groups differ. If the perspectives are *not* statistically significantly different, one can conclude that the perspective of a reasonable purchaser is *not* caused by the statements and actions tested in the experiment (i.e., those elements that differ in the stimuli presented to the test and control group).⁴¹ (Strictly speaking, when a researcher finds no statistically significant difference in the outcomes between the test and control groups, the researcher "fails to reject the null hypothesis" of no causal relationship.)
- j. The study would also allow a researcher to assess whether different groups respond to inputs differently. In particular, Mr. ______ opines that Ripple's actions and the design of XRP and the XRP Ledger "appealed more to a purchaser of XRP interested in making a profit than to financial institutions seeking to . . . [use] XRP as a bridge asset for cross-border asset transfers."⁴² Differences in effects observed among various subsamples in the study (e.g., individual investors vs. representatives of financial institutions) can be tested. Alternatively, data can be examined for whether participants respond in a way that makes them naturally fall into two distinct groups of "investors for profit" and "cross-border transfer users," and whether the share of "investors for profit" is statistically significantly different in the test group than in the control group. Mr. ______ makes no effort to

⁴¹ "If we observe statistically significant differences among the groups after a comparative randomized experiment, we have good evidence that the treatments actually caused these differences." Yates, et al. (1999), p. 276.

⁴² Report, ¶9.

establish that the two groups of XRP purchasers he purports exist actually exist, or to measure their relative sizes. He appears to assume that "[i]nvestment-[o]riented" purchasers are prevalent.⁴³

27. Mr. does not appear to have any training or experience in designing and performing such a study. In any event, he did not carry it out in connection with offering his opinion in this case.

28. Other, non-experimental options are also available to evaluate perceptions and expected behavior, although they are less effective in isolating causal effects than the gold-standard methodology of conducting an experiment. For example, someone interested in how reasonable purchasers understand certain information could conduct a simple survey, without a control group, or carry out a qualitative study such as focus groups or qualitative phone interviews. While these methods would not allow a researcher to test a particular causal hypothesis, they are used to develop such hypotheses for subsequent experimental testing.⁴⁴

29. Mr. does not appear to have any training or experience in designing and performing such a study, and he did not carry out such a study in connection with offering his opinion in this case.

⁴³ For example, in his Section 7 titled "Ripple Communications and Promotional Statements," Mr. Subsection 7.1, titled "Promotional Factors Considered by an Investment-Oriented Purchaser." However, he does not include a parallel subsection that would address promotional factors presumably considered by the other group of XRP purchasers that he claims exists, "[p]urchasers of XRP for cross-border payments." Report, ¶86.

⁴⁴ Assael, Henry. *Consumer Behavior, A Strategic Approach.* Houghton Mifflin Company, 2004, p. 17. "Qualitative research is designed to learn more about consumers' underlying motives by asking them questions in an unstructured manner. It allows researchers to form hypotheses regarding consumer actions and to better define research areas so as to know the kinds of questions to ask in more structured surveys or experiments. The two most frequently used qualitative approaches are focus groups interviews and projective techniques."

Hague, et al. (2016) state that focus groups can be used to "identify and explore behaviour, attitudes and processes" and can be used "to enhance alternative means of data collection. Typically this would be as a precursor to a quantitative stage – determining the issues to be covered in the structured interviewing and giving insights into the problems or opportunities that are being researched." Hague et al. *Market Research in Practice*. Kindle Edition, Third Edition. Kogan Page, 2016, p. 69.

30 It is also possible to conduct quasi-experiments using preexisting data. In fact, the 2021 Nobel Laureates in Economics received the Nobel Prize for their use of quasi-experimental designs and for their development of a "general [causal inference] framework applicable to both quasi-experimental and experimental work."45 In the current case, someone interested in testing whether the "statements, actions, and product offerings" at issue in Mr. report affected the "perspective" of "reasonable purchasers" could compare actual historical trading data for XRP (the real world) against that of other digital assets, which would serve as a proxy for the but-for world assuming that they are not affected by Ripple's "statements, actions, and product offerings." The critical element of such a study on preexisting data would be "controlling" for all other differences that are not related to the at-issue conduct. Shadish, et al. (2002) discuss that because "quasi-experimental control groups may differ from the treatment condition in many systematic (non-random) ways other than the presence of the treatment," researchers have to worry about ruling out alternative explanations for the observed effect (e.g., by controlling for all other differences) "in order to get a more valid estimate of the treatment effect."⁴⁶

31. It is not clear to me whether Mr. possesses the qualifications to conduct such a study on preexisting data, but he certainly did not carry it out.

⁴⁵ The Royal Swedish Academy of Sciences (2021), pp. 4, 27-28.

⁴⁶ Shadish, William R., Thomas D. Cook, and Donald T. Campbell. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Wadsworth Cengage Learning, 2002, p. 14. Specifically, "[i]n quasi-experiments, the cause is manipulable and occurs before the effect is measured. However, quasi-experimental design features usually create less compelling support for counterfactual inferences. For example, quasi-experimental control groups may differ from the treatment condition in many systematic (non-random) ways other than the presence of the treatment. Many of these ways could be alternative explanations for the observed effect, and so researchers have to worry about ruling them out in order to get a more valid estimate of the treatment effect."

See also Meyer, Bruce D. "Natural and Quasi-Experiments in Economics." *Journal of Business & Economic Statistics* 13(2): 151-161, April 1995, at pp. 153-156.

B. Mr. **Method** does not evaluate whether and to what degree XRP purchasers were exposed to the at-issue communications and does not attempt to empirically evaluate the causal effect, if any, of Ripple's public communications on perceptions or purchase decisions of actual or potential purchasers of XRP

32. Mr. conducts his "analysis" in three sections of his report, 5, 6, and 7.⁴⁷ The three sections have a similar structure, where initial subsections lay out Ripple's alleged conduct and theoretical discussions, while a final subsection jumps to conclusions about the "perspective of [a] reasonable purchaser" without offering any empirical support for such conclusions (some conclusions about "perspective" are also weaved into the initial subsections).

33. As a preliminary matter, I note that Mr. does not distinguish between conclusions he makes on the basis of basic economic principles and those he makes based on Ripple's communications. In his logic, it is impossible to distinguish where potential or actual purchasers would have arrived at a particular perception or purchase decision based on basic economic principles regardless of anything Ripple said or did (e.g., such as principles of demand and supply) or whether Ripple's public communication or other at-issue conduct contributed to those perceptions and purchase decisions. The experimental method discussed above would allow an expert to distinguish between these potentially confounding influences. Such distinction is generally impossible when an "expert" does not apply the experimental method, as is the case

with Mr. "analysis."

34. I address each of the three "analysis" sections of the Report in the corresponding subsections below.⁴⁸

⁴⁷ Other sections include introduction, summaries of findings and conclusions, background, Ripple platform overview, and a note on right to supplement.

⁴⁸ I discuss in more detail section 5 of the Report. The issues with sections 6 and 7 are largely similar.

a. Report Section 5 "Features of XRP Coin Economics and Suitability as a Bridge Asset"

35. In Section 5.1 of his report, Mr. and explains that "[a]ll else equal, for any digital asset with a fixed-supply cap, increased demand for the coin increases the price of the coin. This is a basic economic result of supply and demand."⁴⁹ Then he mentions that "Ripple directly and publicly made the case for this relationship between increased demand for XRP and the future price of XRP" and offers as an example Mr. Garlinghouse's interview with Bloomberg Technology in 2017.⁵⁰ Mr. Technology in 2017.⁵⁰ Mr. Technology in 2017.⁵⁰ Mr. Then concludes: "Potential purchasers of XRP would have understood the simple economics behind the message being promoted by Ripple on this subject: XRP, as designed, provided a mechanism for passive XRP owners to benefit financially from Ripple's success as a provider of financial service products built on the XRP Ledger, as a developer of the XRP ecosystem, and as a driver of demand for XRP.⁵¹

36. The critical flaw of this "analysis" is that Mr. **Constitution** does not investigate whether any XRP purchasers were exposed to the interview, paid attention to it, understood it in the way consistent with Mr. **Constitution** interpretation (i.e., did XRP purchasers believe that increased demand for XRP would increase its price, and if so, was that belief due to the particular statement in the interview or due to some other source), or were impacted by it in their purchase decisions (e.g., purchased XRP due to the particular statement in the interview). Nor does he acknowledge that XRP had been offered for several years (since 2013) before this interview took place.

⁴⁹ Report, ¶23.

⁵⁰ Report, ¶25.

⁵¹ Report, ¶26, footnote omitted.

37. Similarly, in section 5.2 of his report, Mr. describes advantages of "stablecoin" over variable-price assets (e.g., XRP) for cross-border currency transfers.⁵² In this theoretical discussion, he states that Ripple's CTO mentioned in 2016 one such supposed "shortcoming" of XRP "in a post on XRP Chat."⁵³ Mr. then concludes that the relationship between the success of the platform and price of the coin "is fantastic for investment-oriented purchasers of XRP, but not for the purchasers who are exclusively interested in the utility use of the cross-border payment product."⁵⁴

This section is flawed for similar reasons as section 5.1. Mr. does not investigate 38. whether it is the general theoretical logic that he offers that would lead to the supposed perspective of the two types of potential XRP purchasers he identifies, rather than the CTO's statement, which only touches upon one of two supposed "shortcomings." Mr. does not investigate whether any prospective purchasers were exposed to the CTO's statement, paid attention to it, understood it in the way consistent with Mr. interpretation (i.e., do XRP purchasers believe that XRP is a good investment but not a good instrument for cross-border transfers, and if so, did that belief come about due to the CTO's chat statement), or were impacted by it in their purchase or post-purchase decisions (i.e., purchased XRP as investment and not for cross-border transfers because of the CTO's chat statement). Mr. also does not acknowledge that XRP had been offered for several years before the CTO's statement. Neither does he offer any market segmentation or similar analysis to allow him to establish that the two types of purchasers he describes are actually distinct or that there are only two types of purchasers.

⁵² Report, ¶¶27-29.

Report, ¶28.

⁵⁴ Report, ¶31.

39. In section 5.3 of his report, Mr. summarizes the "Perspective of a Reasonable Purchaser with Respect to XRP's Fixed-Supply Model," again splitting the purchasers into "investment-oriented purchasers of XRP" and "purchasers who are exclusively interested in the utility use of the cross-border payment product." Again, he does not explain whether these two types of purchasers were exposed or paid attention to the specific Ripple statements, whether the perspectives (perceptions and purchase behaviors) of these two types of potential purchasers were affected by those statements or by general economic logic, why these two types of customers represent a relevant market segmentation, and whether there is any basis to say these two are the only types of potential purchasers that should be considered.

b. Report Section 6 "XRP Sale and Escrow Mechanics"

40. In sections 6.1-6-5 of his report, Mr. discusses "XRP Sale and Escrow Mechanics," again intermingling theoretical logic, statements made by Ripple, and actions taken by Ripple.⁵⁵ This intermingling is flawed for the reasons I explain above. Then, in section 6.6, Mr. describes the supposed "Perspective of a Reasonable Purchaser with Regards to Ripple's XRP Sales and Escrow," again discussing separately the perspective of "a potential investment-oriented purchaser of XRP" and "a reasonable purchaser of XRP that is exclusively considering the utility use of the coin."⁵⁶ Again, he does not explain why his segmentation into these two types of purchasers is valid, or whether these two types of purchasers were exposed or

⁵⁵ Report, ¶¶32-47. Occasionally, Mr. would interject these descriptions with what appears to be his take on purchaser "perspective." For example, he states that various aspects of institutional purchasing of XRP, "repeatedly communicated by Ripple in the XRP Markets Reports," "would appeal to an individual purchaser with a long-term investment mindset." Report, ¶37. He does not identify any basis for distinguishing between subsets of potential XRP purchasers (for example, his "individual purchaser with a long-term investment mindset" versus an individual purchaser with a short-term investment mindset, or an individual purchaser with no investment mindset, or an entity purchaser) but also makes no attempt to argue that his conclusions hold as to all subsets of potential XRP purchasers.

⁵⁶ Report, ¶¶48-49.

paid attention to the specific Ripple statements, whether they interpreted the statements the same way as Mr. **(1997)**, or whether the perspectives (perceptions and purchase behaviors) of these two types of potential purchasers are affected by those statements or by general economic logic. Each of these omissions is a critical flaw in Mr. Doody's reasoning.

c. Report Section 7 "Ripple Communications and Promotional Statements"

41. In Sections 7.2 to 7.7 of his report, Mr. discusses various Ripple

communications.⁵⁷ Then, in Section 7.8, he outlines the "Perspective of a Reasonable Purchaser with Respect to Ripple Communications," again splitting the purchasers without explanation or support for his categorization of those purchasers into "Investment-oriented purchasers" of XRP and "Purchasers of XRP for cross-border payments." For example, Mr. **Section** states, without any empirical evidence, that "Ripple's extensive public comments and reports about these topics likely served to inform and persuade investment-oriented purchasers about the potential reward of purchasing XRP for the purpose of generating a profit. Indeed, the use of terms such as 'traction,' 'market fit,' 'total addressable market,' and even 'investors' when describing Ripple's

⁵⁷ These sections also occasionally include comments about purchasers' "perspective," such as "Such communications [by Ripple executives, linking the company's efforts to increases in the price of XRP] would have appealed to potential purchasers who were interested in XRP as an investment." Report, ¶53. Similarly, Mr. occasionally infuses these sections with theoretical logic like this statement: "[o]ne of the key aspects for evaluating whether a company or project has a viable business model is whether it has 'traction', i.e., to what extent is there is 'product/market-fit' where actual customers have signed up to use the company's product or service such as to demonstrate that it solves a real problem." Report, ¶61. In another such instance, Mr. explains, "[w]hen investment-oriented purchasers evaluate a company or project as a potential investment, they want to understand how the funds collected will be deployed by management to grow the venture." Report, ¶76. Some statements appear to be somewhere in between theoretical logic and conclusions on purchaser "perspective." For example, Mr. states, "Ripple's ongoing replacement of released XRP into new escrows reinforced the positive effect of this reduction in circulating supply by showing a commitment to keeping those coins away from Report, ¶43. Another example is the statement that "Although the trading platforms for even longer." buyback activity would not have mattered to purely utility-oriented purchasers of XRP, buybacks are very important signals for investment-oriented purchasers. Open market purchases, and the public communications about those purchases, alter the potential risk and reward of an investment in XRP by increasing buying pressure on the coin and by reducing the probability and severity of a possible crash in the price of XRP. Like the escrow accounts described in Section 6.3, the buyback activities executed by Ripple would also have the effect of reducing the effective float of the coin." Report, ¶47.

progress and growth potential are words typically understood by market participants to mean that they should view buying XRP as a potentially profitable investment."⁵⁸ He concludes, "[i]t is my opinion from carefully following the digital asset space that many of Ripple's public communications conveyed to reasonable purchasers of XRP an expectation of future profit derived from the efforts of Ripple."⁵⁹

supposedly supports this conclusion in part by section 7.1, where he describes 42. Mr. which factors "a reasonable investment-oriented purchaser of XRP would consider" based on his own "experience as an investor in digital assets as well as [his] close observation of the digital asset space."⁶⁰ Thus, as with the other sections of his report, the entirety of section 7 does not include any empirical analysis (e.g., survey) that would actually evaluate whether these are the appropriate segments of purchasers, whether purchasers of either type were exposed to or paid attention to the Ripple statements, whether they interpreted them the same way as Mr. . or whether the statements had any effect on their perspectives. And, as with the other sections, he offers no support for distinguishing between the two purchaser types he chose to focus on, and no support for assuming that no other types of purchasers exist. He offers no empirical support for his opinions in this section; at most, Mr. offers the perspective of a single such himself, which is akin to conducting a survey of a purchaser or potential purchaser, Mr. single person, an egregious methodological error (discussed in greater detail in the next section).61

⁵⁸ Report, ¶85.

⁵⁹ Report, ¶87.

⁶⁰ Report, ¶50.

⁶¹ It is not clear if his perspective is solely of an "investment-oriented" purchasers or also a cross-border payment purchaser.

d. Other Flaws in Mr. "Analysis"

43. In addition to the flaws discussed above, Mr. does not explain how he made the selection of Ripple's statements that he "review[s] and analy[zes]" or how he identified the passages that he considers likely to have affected the perspectives of actual or potential XRP purchasers. I note that the statements Mr. discusses are not the same as the ones that the SEC alleged formed the basis of XRP purchasers' beliefs about Ripple's conduct. For example, the complaint identifies a statement made by Mr. Garlinghouse in 2018 in an interview with Bloomberg News as one that was likely to create expectations among XRP purchasers, while Mr.

does not address it:

"[W]e have found that part of the reason why XRP has performed well, is because people realize. . . if we work with the system to solve this problem and we can solve that problem at scale, a problem measured in the trillions of dollars, then there is a lot of opportunity to create value in XRP." Garlinghouse also speculated in the December 14, 2017 interview that, if a company created "utility" for a digital asset like XRP, "then there will be demand for the tokens, [and] the price of the tokens will go up."⁶²

Similarly, Mr. Doody identifies Mr. Garlinghouse's interview with Bloomberg Technology in

2017, discussed above, as one that was likely to create expectations among XRP purchasers,

while the complaint does not address it:

When Ripple uses XRP we're solving a payments problem. I believe that the more utility you draw, the more demand you're going to drive. And for most of these digital assets you have fixed supply. If you have fixed supply and increasing demand it's going to drive price up.⁶³

⁶² Complaint, ¶348. This statement is mentioned as part of Section IV.C "Ripple Led Investors to Reasonably Expect a Profit from Their Investment Derived from Defendants' Efforts."

⁵³ Report, ¶25.

also highlights certain terms Ripple used, such as "investor"⁶⁴ to imply that 44. Mr. Ripple itself treated purchasers of XRP as investors (even though he does not establish that a single XRP purchase was made for the purposes of investing as a result of the alleged conduct). However, Mr. elsewhere acknowledges that jargon used in a given industry or setting does not necessarily align with traditional word uses; in particular, he points out that when he uses words like "coin" and "token" in his report, he does not imply "currency."⁶⁵ Mr. offers no explanation as to why he applies this understanding selectively throughout his report. It is also worth noting that in section 7.2 of his report, Mr. states, "[t]he most 45. popular forum, by number of posts, on XRP Chat is the 'XRP Trading and Price Speculation' forum which currently has over 200,000 posts discussing issues related to the trading and investment case for XRP, as noted in its sub-header: 'Speculation about trading and price of XRP. Technical trading tips, fundamental analysis.""⁶⁶ This is the closest Mr. gets to actual empirical analysis of the XRP purchaser "perspective" in the entire report. He does not, however, articulate what percentage of actual or potential XRP purchasers contribute to the chat or read it, whether this sample is representative of all the XRP actual and potential purchasers (including institutional ones), whether any of the 200,000 posts mention using XRP for transactions (or any other systematic analysis of the content), or whether it is feasible to establish a causal relationship between the content of the posts and the alleged conduct (or whether the posts are based entirely on pre-existing beliefs and general economic principles). There is a

⁶⁴ Report, ¶¶52, 81.

⁶⁵ Report, footnote 2.

⁶⁶ Report, ¶54.

reliable analytical method that could have been applied to these posts to answer these

questions;⁶⁷ Mr. did not use it.

C. Mr. **Wreak and analysis** does not evaluate any actual or potential XRP purchaser's perspective except for his own

46. One way of characterizing Mr. analysis is that he conducted a survey of one

actual or potential XRP purchaser - himself. This interpretation highlights the inadequacy of his

method. To the best of my knowledge, no test of a causal proposition would be published in an

academic journal or accepted by a court in litigation with a sample size of one.⁶⁸ For example,

Yates, et al. (1999) state that such a study would not be trusted:

You would not trust the results of an experiment that fed each diet to only one rat. The role of chance is too large if we use two rats and toss a coin to decide which is fed the new diet. The more rats we use, the more likely it is that randomization will create groups that are alike on the average. When differences among the rats are averaged out, only the effects of the different treatments remain. Here is a third principle of statistical design of experiments, called *replication*: repeat each treatment on a large enough number of

⁶⁷ "[C]ontent analysis is a method of collecting social data through carefully specifying and counting social artifacts such as books, songs, speeches, and paintings. Without making any personal contact with people, you can use this method to examine a wide variety of social phenomena.... [C]ontent analysis is the study of recorded human communications. Among the forms suitable for study are books, magazines, web pages, poems, newspapers, songs, paintings, speeches, letters, e-mail messages, bulletin board postings on the Internet, laws, and constitutions, as well as any components or collections thereof. ... Content analysis is particularly well suited to the study of communications and to answering the classic question of communications research: 'Who says what, to whom, why, how, and with what effect?'... Common units of analysis in content analysis include elements of communications—words, paragraphs, books, and so forth. Standard probability-sampling techniques are sometimes appropriate in content analysis." Babbie (2010), pp. 229, 333, 359.

⁶⁸ Hibberts, et al. (2012) note that a key decision when conducting a research study is "deciding the appropriate sample size. The simplest answer is that the bigger the sample the better, but this assumes the sampling method is appropriate and implemented correctly. In inferential statistics, bigger is better because it results in smaller standard errors, greater statistical power or fewer Type II errors in hypothesis testing, and tighter or narrower confidence intervals in estimation. A Type II error occurs when a researcher fails to reject a false null hypothesis. (In contrast, a Type I error occurs when a researcher rejects a true null hypothesis; the null hypothesis typically states that there is no relationship in the population)." Hibberts, Mary, R. Burke Johnson, and Kenneth Hudson. "Common Survey Sampling Techniques." *Handbook of Survey Methodology for the Social Sciences*. Ed. Lior Gordon. Springer, 2012, p. 69.

See also Yates, et al. (1999), p. 276. "One important point should be made immediately, however: *experiments with many subjects are better able to detect differences among the effects of the treatments than similar experiments with fewer subjects.*" (emphasis in original).

experimental units or subjects to allow the systematic effects of the treatments to be seen." (emphasis in original)

Babbie (2010) also discusses in a general example of sample size selection how "[o]bviously, it wouldn't be a very good idea to select a sample of only one, because the chances are great that we'll miss the true mean [] by quite a bit... The progression of sampling distributions is clear. Every increase in sample size improves the distribution of estimates of the mean.... The larger the sample selected, the more accurate it is as an estimation of the population from which it was drawn."⁶⁹

47. Certain statements in the Report make clear that Mr. has effectively taken this unsupportable approach, akin to a survey of himself. For example, Mr. states, "*[b]ased on my experience investing in digital assets*, a reasonable purchaser of XRP would understand that if Ripple's ambitious cross-border payment business were successful, the ensuing demand for XRP would tremendously increase the price of XRP."⁷⁰ That opinion is not grounded in any scientifically recognized methodology.

48. Evaluating Mr. approach in this way demonstrates that it is unreliable and unscientific for a variety of reasons, some of which include:

a. Mr. **Mr.** is aware of the purpose and sponsor of the study as well as the desired outcome for the sponsor, thus the "survey" is "double-non-blind," as opposed to the gold-standard "double-blind" approach. The importance of double-blindness of a study has been well-documented in the literature:

One way to protect the objectivity of survey administration is to avoid telling interviewers who is sponsoring the survey.

⁶⁹ Babbie (2010), pp. 201-202.

⁷⁰ Report, ¶24, emphasis added. See also Report, ¶88. "*Based on my professional experience in the blockchain space, in part as an investor and trader in digital assets*, as well as my analysis of the public statements, documents, and design decisions of Ripple, I am able to reach the following findings and conclusions" (emphasis added).

Interviewers who know the identity of the survey's sponsor may affect results inadvertently by communicating to respondents their expectations or what they believe are the preferred responses of the survey's sponsor. To ensure objectivity in the administration of the survey, it is standard interview practice in surveys conducted for litigation to do double-blind research whenever possible: Both the interviewer and the respondent are blind to the sponsor of the survey and its purpose. Thus, the survey instrument should provide no explicit or implicit clues about the sponsorship of the survey or the expected responses. Explicit clues could include a sponsor's letterhead appearing on the survey; implicit clues could include reversing the usual order of the yes and no response boxes on the interviewer's form next to a crucial question, thereby potentially increasing the likelihood that no will be checked.⁷¹ (Diamond (2011))

A double-blind experiment guards against experimenter bias, because neither the experimenter nor the subject knows which subjects are in the control group(s) and which in the experimental group(s).⁷² (Babbie (2010))

Experimenters must take great care to deal with all experimental units or subjects in exactly the same way, so that the treatments are the only systematic differences present. Unequal conditions introduce bias [An] experiment should therefore be double-blind.⁷³ (Yates, et al. (1999))

With double blinding, neither the study object (e.g., a patient) nor the implementer of the treatment is aware of which group the study object is assigned to. If participants in the experiment know which treatment was given to the subjects, their behavior may be affected, which may bias the estimate of the treatment effect from the experiment.⁷⁴ (The Royal Swedish Academy of Sciences (2021))

b. The sample size of one is insufficient as discussed above.⁷⁵

⁷¹ Diamond (2011), at pp. 410-411.

⁷² Babbie (2010), p. 250.

⁷³ Yates, et al. (1999), pp. 277-278.

⁷⁴ The Royal Swedish Academy of Sciences (2021), p. 7, footnote 7.

⁷⁵ See, for example, Yates, et al. (1999), p. 276; Babbie (2010), pp. 201-202.

- c. As discussed above, the target population consists of "all elements (i.e., individuals or other units) whose characteristics or perceptions the survey is intended to represent."⁷⁶ It is not clear whether Mr.
 - i. First, he does not specify whether he ever purchased or considered purchasing XRP or sufficiently similar digital assets personally;
 - ii. Second, even if Mr. did have that experience, he provides no basis to suggest that he has any experience on which to describe how
 "institutional investors" or "financial services companies" would view at-issue "statements, actions, and product offerings."
- d. There is no control group in Mr. approach, *not* exposed to the at-issue conduct, thus it is impossible to separate the impact of the conduct on purchaser "perspective" from preexisting beliefs and other potential influences.⁷⁸ Mr.

"analysis" does not allow him to separate the supposed impact of Ripple's conduct on the purchaser "perspective" from other potential influences such as preexisting beliefs (e.g., based on general principles of economics).

e. Mr. does not mention whether he was exposed to any of the alleged Ripple conduct prior to being retained as an expert in this matter and whether he purchased XRP as an "investment" as a result of such exposure.

⁷⁶ Diamond (2011), at p. 376. (See also footnote 37 above).

⁷⁷ Report, ¶2.

⁷⁸ For example, Diamond (2011) notes that "[w]ithout the control group, it is not possible to determine how much of the [outcome] is attributable to respondents' preexisting beliefs or other background noise (e.g., respondents who misunderstand the question or misstate their responses)." Diamond (2011), at pp. 397-399.

49. Each of these defects is independently fatal to Mr. analysis from a scientific perspective. Accordingly, it is my opinion that Mr. report lacks any valid methodology, rendering its conclusions unreliable.

I declare under penalty of perjury that the foregoing is true and correct. Executed on November [2, 2021]

Kristing Shampanier

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Appendix A – Curriculum Vitae

KRISTINA S. SHAMPANIER, PH.D. Senior Vice President

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Dr. Shampanier is an expert in consumer behavior and survey and experiment design. She has over 15 years of experience in designing, conducting, and analyzing lab, field, and online studies in academic, consulting, and litigation settings, as well as evaluating studies carried out by others. She has worked on class action, false advertisement, consumer safety, trademark, trade dress, and patent infringement cases, as well as antitrust and healthcare matters. These cases span a wide variety of industries, including consumer products, banking, high tech, online retail, entertainment, hospitality, luxury, and auto industries. Dr. Shampanier has published in peer-reviewed journals in the fields of mathematics and marketing.

EDUCATION

2007	Ph.D., marketing (management science), MIT Sloan School of Management Dissertation: "Essays in Behavioral Decision Making"	
2002	M.A., economics (<i>cum laude</i>), New Economic School, Moscow, Russia <i>Thesis</i> : "Branding"	
2001	M.S., mathematics (<i>cum laude</i>), Moscow State University Specialization: Algebra Thesis: "Ranks of Subalgebras of Free Non-Associative Algebras"	

EXPERIENCE

2005-2021	Compass Lexecon			
	Senior Vice President (2021–Present)			
2005–2021	Analysis Group Inc.			
	Consultant (2020–2021)			
	Vice President (2016–2020)			
	Manager (2009–2015)			
	Associate (2007–2009)			
	Intern Associate (2005)			
2003–2007	MIT Sloan School of Management			
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	Research Assistant, Professor Dan Ariely (2003–2007)			
	Teaching Assistant, Consumer Behavior, Professor Yehoshua Tsal (2005–2006)			
	Teaching Assistant, Managerial Psychology Laboratory, Professors Tom Allen and			
	Dan Ariely (2003–2005)			
2002	New Economic School, Moscow, Russia			
	Teaching Assistant, Econometrics III, Professor Stanislav Anatoliev			

SELECTED EXPERT CASEWORK

Household chemicals false advertising class action

Conducted conjoint analysis survey and market simulations to evaluate the price premium associated with a challenged advertising claim on behalf of the defendants. Submitted a letter to counsel and expert declaration describing the methodology and results. The findings were used by counsel at mediation negotiations to evaluate potential range of damages. The case settled after one day of mediation.

Conducted similar analysis for a related case involving an allegedly omitted warning. Submitted a letter to counsel and expert declaration.

Beauty products trademark infringement

Designed an experiment/survey to test for consumer confusion in a trademark infringement matter involving a beauty product for the defendant (applicant) before the Trademark Trial and Appeal Board of the US Patent and Trademark Office. Filed an expert report, after which the opposer withdrew all oppositions.

Banking false advertising class action

Conducted an online survey in the choice experiment format on behalf of the defendant to evaluate whether the allegedly misleading omission had an impact on consumer purchase decisions.

Fast food employment litigation

Evaluated the possibility of interviewing class members and reviewed the opposing expert's approach on behalf of the defendant, a fast-food chain.

 A.R., by and through Her Next Friend, Susan Root, et al., v. Elizabeth Dudek, in Her Official Capacity as Secretary of the Agency for Health Care Administration, et al. and United States of America v. The State of Florida

US District Court, Southern District of Florida

Evaluated on behalf of the defendant a set of unscripted interviews conducted by the plaintiffs' expert in a health care case involving preferences of patients' families. Submitted rebuttal expert report and was deposed.

Hospitality business trademark infringement

Designed and fielded an "Eveready" experiment/survey to test for consumer confusion in a trademark infringement matter in the hospitality business for the defendant (registrant) before the Trademark Trial and Appeal Board of the US Patent and Trademark Office.

Electronics false advertising

Submitted three reports on behalf of the challenged party in a case considered by the National Advertising Division of the Council of Better Business Bureaus. Opined on the merits of the design of a consumer electronics product test conducted for advertising claims.

SELECTED CONSULTING EXPERIENCE

Intellectual Property

Trademark and trade dress infringement matters

Developed numerous online experimental design surveys in the "Eveready" and "Squirt" format and rebuttal analyses of "Eveready" surveys testing consumer perception and confusion with respect to wordmarks, design marks, trade dress, and an advertising slogan in a variety of cases, including in clothing, compliance, food, fashion, auto, luxury goods, entertainment, outdoor activities, and music industries. Addressed issues of materiality (via a choice experiment survey and open-ended purchase driver survey), dilution, and secondary meaning. Assisted experts in survey design, implementation, and analysis of surveys, as well as in drafting reports and preparations for depositions. Assisted counsels with preparation for depositions of opposing experts. Such cases include:

- Denimafia Inc. v. New Balance Athletic Shoe, Inc. et al. and New Balance Athletic Shoe, Inc. v. Denimafia Inc.

US District Court, Southern District of New York

Supported Professor Joel Steckel, who was retained by New Balance, the defendant and counter-claimant in a trademark infringement mater involving the "less is more" <=> symbol used on New Balance Minimus footwear. Assisted Professor Steckel in designing, fielding, and analyzing an "Eveready" survey/experiment testing for reverse confusion (i.e., confusion with respect to the source, sponsorship, or affiliation of Denimafia products), drafting report, and preparation for deposition. In its summary judgment in favor of New Balance, the court credited Professor Steckel's survey with showing "a zero percent rate of reverse confusion with respect to the source of jeans bearing the <=> mark" and discounted Denimafia's objections to the survey design. Denimafia appealed the summary judgment decision, but ultimately did not pursue the appeal and the appellate court dismissed it.

- Luxury goods trademark infringement and dilution matter

Developed an online experimental design survey to test whether consumers noticed and how they perceived a logo briefly appearing in a TV commercial. Evaluated opposing expert's survey. Assisted expert in survey design, implementation, and analysis of survey; developing rebuttal points for opposing expert's survey; drafting reports; and preparation for depositions; assisted counsel in preparation for deposition of opposing expert.

Smartphone and tablet patent infringement matters

Assisted experts in survey design, report drafting, and preparation for deposition and trial testimony. Evaluated opposing expert's surveys (including a conjoint-style survey) aimed at isolating the value to consumers of the patented features in smartphones. Assisted counsel with preparation for and at depositions of opposing expert and data witnesses. Assisted at trial.

- Hitachi Maxell, Ltd. v. ZTE Corp. and ZTE USA Inc.

US District Court, Eastern District of Texas, Texarkana Division

Supported Tülin Erdem, Professor of Business and Marketing at the NYU Stern School of Business, from case inception to trial on behalf of Maxell and Mayer Brown. Assisted in designing and implementing a survey of smartphone and tablet owners to assess the awareness and relative importance of a feature disclosed in one of the asserted patents: automatic GPS map orientation. The damages expert used the survey results to inform her analysis of reasonable royalty damages. The jury found that the asserted patents were valid and infringed by ZTE, and awarded Maxell damages of \$43.3 million.

False Advertising

• Kenneth Hobbs v. Brother International Corporation

US District Court, Central District of California

Supported Professor Joel Steckel of New York University Stern School of Business in conducting two surveys on behalf of Brother International Corporation, the defendant in a consumer class action false advertising case. The plaintiff claimed that the printers at issue did not scan complete pages, causing the edges of images to be truncated. One survey evaluated consumer awareness of a printer's alleged malfunctioning. The other, a survey/experiment, addressed the materiality of this limitation to consumers. In its order denying class certification, the court cited the experiment involving more than 450 people who had purchased or planned to purchase a printer close to the time of the survey, which found that "consumers chose the Brother printer with nearly identical frequency regardless of whether they were made aware of the unscannable margin at the time of their selection." The plaintiff agreed to dismiss his case with prejudice and waive his right to appeal. Assisted Professor Steckel with design, implementation, and analysis of the studies; drafting reports and declarations; and preparation for deposition.

E-Retailer false advertising matter

Supported Professor Joel Steckel in conducting two experiments on behalf of a major e-retailer accused of using misleading reference price terms (e.g., "Compare at"). In the first study, groups of consumers visiting the defendant's website were randomly assigned to view the reference price labels as either "MSRP" (manufacturer's suggested retail price) or "Compare" throughout their shopping session and subsequent website visits. No difference in the sales conversion rate was found. Further, a survey of consumers who made purchases during the study period showed no difference in recall of the product price, the reference price, or the term used with the reference price. The second study, conducted with an online consumer panel, found that consumers' understanding of reference prices did not depend on the label used (e.g., "was," "compare at," "compare," and "MSRP"). Assisted in design, implementation, and analysis of both studies, and in preparation of deposition and trial testimony.

Online services false advertising matter

Evaluated opposing experts' surveys testing consumer perception of charges for an online service. Assisted in drafting report and counsel's briefs, as well as in preparation for depositions. Assisted counsel in preparation for depositions of opposing experts.

Cigarette false advertising matter

Evaluated opposing counsel's survey-like methodology to evaluate consumer perception of cigarette packaging. Assisted expert in drafting declarations and report.

Corporate Acquisitions

AT&T's acquisition of DIRECTV – survey of consumer preferences

Supported Professor Ravi Dhar of the Yale School of Management in developing, conducting, and analyzing a survey examining consumer attitudes toward bundled Internet and television services, in a case widely covered by the media. AT&T and DIRECTV cited the outcome of the study in their applications to the Federal Communications Commission (FCC), pointing to the benefit to consumers

when Internet and television services are delivered by the same provider. The FCC and the Department of Justice approved the acquisition. Assisted Professor Dhar in survey design, implementation, and analysis, as well as report drafting.

Antitrust

Microsoft antitrust matters

- Jim Hood, Attorney General ex rel. State of Mississippi v. Microsoft Corporation Chancery Court of Hinds County, Mississippi
- Pro-Sys Consultants Ltd. and Neil Godfrey v. Microsoft Corporation and Microsoft Canada Co./Microsoft Canada CIE Supreme Court of British Columbia

Developed affirmative damages analysis and rebuttals of the plaintiffs' damages analysis and class certification arguments in the cases involving allegations of Microsoft's overcharging consumers for its operating systems, word processors, and spreadsheet products.

Credit cards antitrust matter

Developed an online experimental design survey to expose issues with opposing expert's survey testing consumer reaction to retailers' potential credit card policies. Assisted expert in survey design, implementation, and analysis preparation of report; and in preparation for and at deposition. Assisted counsel in preparation for deposition of opposing expert.

 High tech antitrust matters, including Advanced Micro Devices, Inc. v. Intel US District Court, District of Delaware Analyzed incremental costs for price/cost analysis. Assisted in data production and analysis, drafting reports, deposition preparation, and at deposition.

PUBLICATIONS

"Choice Experiments," with Joel Steckel, Rebecca Kirk Fair, and Anne Cai in *Legal Applications of Marketing Theory*, Cambridge University Press, Jacob Gersen and Joel Steckel, eds., 2021, forthcoming

"Patient Quality of Life and Benefits of Leptin Replacement Therapy (LRT) in Generalized and Partial Lipodystrophy (GL, PL)," with Omer Ali, Keziah Cook, Edward Tuttle, Charles Gerrits, and Rebecca Brown, *Diabetes*, Vol. 61, Supplement 1, 1331-P, 2018

"How To Interpret A Contract? Ask Those Who'd Sign It," with Omri Ben-Shahar, Lior Strahilevitz, Duo Jiang, and Rebecca Kirk Fair, *Law360*, March 21, 2018

"Survey And Real-World Data: A Winning Combination," with Peter Simon, Riddhima Sharma, and Rebecca Kirk Fair, *Law360*, July 2017

"What Consumers Really Think about Reference Price Labels," with Rebecca Kirk Fair, Laura O'Laughlin, Jesse Shea, and Joel Steckel, *Law360*, May 2017

"Probabilistic Price Promotions – When Retailing and Las Vegas Meet," with Dan Ariely and Nina Mazar, *Management Science*, Vol. 63, No. 1, pp. 250-266, 2016

"Zero as a Special Price. The True Value of Free Products," with Dan Ariely and Nina Mazar, *Marketing Science*, Vol. 26, No. 6, pp. 742-757 (lead article), 2007

"How Small Is Zero Price? The True Value of Free Products," *Advances in Consumer Research*, Vol. 33, pp. 254-255, 2006

"Algorithms Realizing Rank and Primitivity of Systems of Elements of Free Non-Associative Algebras," *Fundamental and Applied Mathematics*, Vol. 6, No. 4, pp. 1229-1238, 2000

SELECTED PRESENTATIONS, POSTERS, AND SPEAKING ENGAGEMENTS

"Discrete Choice and SF-36 Estimates of Patient Quality of Life and Benefits of Leptin Replacement Therapy (LRT) in Generalized and Partial Lipodystrophy (GL, PL)," poster with Omer Ali, Keziah Cook, Don Lee, and Edward Tuttle, 21st European Congress of Endocrinology, Lyon, France, May 2019

"Surveying the Truth: False Advertising and Trademark Litigation," with August Horvath and Joel Steckel, first webinar in the series, *Deceit and Denial: The Role Surveys Play in False Advertising and Trademark Litigation*, American Bar Association's Section of Antitrust Law Advertising Disputes & Litigation Committee, February 2016

"Listening to Customers – How to Ask the Right Question, Surveys in Litigation," recurrent lecture at Professors Jiwoong Shin and Aniko Oery's M.B.A. classes, *Listening to the Customer*, Yale School of Management, 2012, 2013, 2015, and 2016

"How Small is Zero Price? The True Value of Free Products," Association for Consumer Research, North American Conference, San Antonio, TX, and London Business School, 2005

PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS

- American Marketing Association
- Marketing Science "Ambassador" (until 2018)

ACADEMIC HONORS

2005-2006	The Zannetos Fund Fellow, Massachusetts Institute of Technology
2005-2006	The Stuart Fund Fellow, Massachusetts Institute of Technology
2006	AMA-Sheth Foundation Doctoral Consortium Fellow
2004–2005	MasterCard Fellow, Massachusetts Institute of Technology
2003	The Russell Sage Summer Institute, Trento, Italy
2002-2003	DuPont Fellow, Massachusetts Institute of Technology

LANGUAGES

Russian (native), French (intermediate)

Appendix B – Materials Considered

Court Documents

- Answer of Defendant Ripple Labs, Inc. to Plaintiff's Complaint, *Securities and Exchange Commission v. Ripple Labs, Inc., Bradley Garlinghouse, and Christian A. Larsen*, 20-cv-10832 (AT), United States District Court, Southern District of New York, January 29, 2021.
- Answer of Defendant Ripple Labs, Inc. to Plaintiff's First Amended Complaint, *Securities and Exchange Commission v. Ripple Labs, Inc., Bradley Garlinghouse, and Christian A. Larsen,* 20-cv-10832 (AT), United States District Court, Southern District of New York, March 4, 2021.
- First Amended Complaint, *Securities and Exchange Commission v. Ripple Labs, Inc., Bradley Garlinghouse, and Christian A. Larsen*, 20 Civ. 10832 (AT), ECF Case, United States District Court, Southern District of New York, February 18, 2021.
- Expert Report of **Contraction**, October 4, 2021, U.S. Securities and Exchange Commission v. Ripple Labs, Inc., Bradley Garlinghouse, and Christian A. Larson, United States District Court, Southern District of New York.
- Securities and Exchange Commission v. W. J. Howey Co. et al, No. 328 U.S. 293, Supreme Court of the United States, 1946.

Academic Articles and Books

- Assael, Henry. Consumer Behavior, A Strategic Approach. Houghton Mifflin Company, 2004.
- Babbie, Earl. *The Practice of Social Research*. Twelfth Edition. Wadsworth Cengage Learning, 2010.
- Diamond, Shari, S. "Reference Guide on Survey Research." *Reference Manual on Scientific Evidence*. Third Edition. Federal Judicial Center, 2011, pp. 359-423.
- Hague, et al. *Market Research in Practice*. Kindle Edition, Third Edition. Kogan Page, 2016.
- Hibberts, Mary, R. Burke Johnson, and Kenneth Hudson. "Common Survey Sampling Techniques." *Handbook of Survey Methodology for the Social Sciences*. Ed. Lior Gordon. Springer, 2012.
- Jacoby, Jacob, and Lynda Zadra-Symes. "Legal Issues That Can Be Examined via Surveys." *Trademark Surveys: Volume 1: Designing, Implementing, and Evaluating Surveys.* Jacob Jacoby. ABA Book Publishing, 2013.
- Meyer, Bruce D. "Natural and Quasi-Experiments in Economics." *Journal of Business & Economic Statistics* 13(2): 151-161, April 1995.
- Shadish, William R., Thomas D. Cook, and Donald T. Campbell. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Wadsworth Cengage Learning, 2002.
- Yates, Daniel, David Moore, and George McCabe. *The Practice of Statistics*. First Edition. W.H. Freeman, 1999.

Other Publicly Available Materials

• The Royal Swedish Academy of Sciences. "Scientific Background on the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2021 - Answering Causal Questions Using Observational Data," available at https://www.nobelprize.org/uploads/2021/10/advanced-economicsciencesprize2021.pdf.

• The Royal Swedish Academy of Sciences. "The Prize in Economic Sciences 2019," available at https://www.nobelprize.org/uploads/2019/10/press-economicsciences2019-2.pdf.

Appendix C – Examples of Mr. Unsupported Causal Propositions

¶	Statement (Unsupported conclusion bolded)	Section
8	Based on my experience in the digital asset space, I conclude that a reasonable purchaser would have had an expectation of future profit derived from the efforts of Ripple. Specifically, purchasers would have expected or hoped to profit by later re-selling their XRP at a higher price on a secondary market after XRP substantially increased in value []Although Ripple's development of the blockchain and broader XRP ecosystem, along with its promotion of the bull case for buying XRP , would not guarantee a profit, it would create the hope that a purchaser could passively earn profits by owning XRP while Ripple took steps to increase the value of the coin.	2. Summary of findings
9	there are certain elements in Ripple's and its founders' design of XRP, the XRP Ledger, and a variety of software products that appealed more to a purchaser of XRP interested in making a profit than to financial institutions seeking to embrace Ripple's stated vision of utilizing XRP as a bridge asset for cross-border asset transfers	2. Summary of findings
24	Based on my experience investing in digital assets, a reasonable purchaser of XRP would understand that if Ripple's ambitious cross-border payment business were successful, the ensuing demand for XRP would tremendously increase the price of XRP .	5. Features of XRP Coin Economics and Suitability as a Bridge Asset
26	Potential purchasers of XRP would have understood the simple economics behind the message being promoted by Ripple on this subject: XRP, as designed, provided a mechanism for passive XRP owners to benefit financially from Ripple's success as a provider of financial service products built on the XRP Ledger, as a developer of the XRP ecosystem, and as a driver of demand for XRP.	5. Features of XRP Coin Economics and Suitability as a Bridge Asset
31	The correlation between the success of the platform and price of the coin is fantastic for investment-oriented purchasers of XRP, but not for the purchasers who are exclusively interested in the utility use of the cross-border payment product. From the perspective of a reasonable investment-oriented purchasers, the fixed-supply and variable- price model provides a direct link between 1) the success of Ripple's efforts to build the XRP ecosystem and stimulate demand for XRP and 2) the financial performance of the purchaser's investment in XRP. From the perspective of a utility-oriented purchaser, as discussed above, the fixed-supply and variable price model of XRP presents significant disadvantages	5. Features of XRP Coin Economics and Suitability as a Bridge Asset

37	These points would appeal to an individual purchaser with a long- term investment mindset , and were repeatedly communicated by Ripple in the XRP Markets Reports.	6. XRP Sale and Escrow Mechanics
43	Although Ripple continued to sell XRP into the open market on a regular basis, this significant restriction of the XRP supply would have greatly encouraged potential investment-oriented purchasers of XRP to earn a speculative investment profit with their purchase .	6. XRP Sale and Escrow Mechanics
47	Although the buyback activity would not have mattered to purely utility-oriented purchasers of XRP, buybacks are very important signals for investment-oriented purchasers.	6. XRP Sale and Escrow Mechanics
48	The manner and mechanism of Ripple's ongoing sales, distribution, escrow, and buybacks of XRP would have been extremely important to a potential investment-oriented purchaser of XRP	6. XRP Sale and Escrow Mechanics
49	On the other hand, a reasonable purchaser of XRP that is exclusively considering the utility use of the coin would be less concerned with some of these heavily promoted sales and distribution mechanisms.	6. XRP Sale and Escrow Mechanics
65	Another type of partnership that would have appealed to a purchaser interested in the investment use case for XRP was solidified by an agreement between Ripple and a provider of retirement investment accounts. Ripple announced that purchasers could buy XRP through Bitcoin IRA's retirement accounts.	7. Ripple Communications and Promotional Statements
85	Ripple's extensive public comments and reports about these topics likely served to inform and persuade investment-oriented purchasers about the potential reward of purchasing XRP for the purpose of generating a profit. Indeed, the use of terms such as "traction," "market fit," "total addressable market," and even "investors" when describing Ripple's progress and growth potential are words typically understood by market participants to mean that they should view buying XRP as a potentially profitable investment.	7. Ripple Communications and Promotional Statements
86	Purchasers of XRP for cross-border payments would also be interested in some of these topics, but not all. For example, a money transmitter likely cares deeply about specific topics like the liquidity of the digital asset trading platforms it needs to rely on to complete an ODL transaction, but is less interested in Ripple's communications about the bull case for the price of XRP.	7. Ripple Communications and Promotional Statements
87	It is my opinion from carefully following the digital asset space that many of Ripple's public communications conveyed to reasonable purchasers of XRP an expectation of future profit derived from the efforts of Ripple.	7. Ripple Communications and Promotional Statements

89	Over the course of the Issuance Period a reasonable purchaser of XRP would have had an expectation of generating profit based on the efforts of Ripple and its management to accomplish the growth strategies that Ripple advertised to the public as being already achieved or planned for the future.	8. Summary of Findings and Conclusions
89	Given this relationship between Ripple's performance and the price of XRP, a reasonable purchaser would have closely considered many factors that were publicized by Ripple such as disclosed partnerships with financial institutions, the quality of Ripple's management team, the target addressable market for Ripple's products, and the availability of liquidity on trading platforms for XRP.	8. Summary of Findings and Conclusions
90	Certain aspects of the design characteristics of XRP and the promotional activity of Ripple did not appeal to a pure utility use case.	8. Summary of Findings and Conclusions

Exhibit D

UNITED STATES DISTRICT COURT SOUTHERN DISTRICT OF NEW YORK

SECURITIES AND EXCHANGE COMMISSION,

Plaintiff,

-against-

20 Civ. 10832 (AT)

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

Defendants.

Expert Report of

Allen Ferrell, Ph.D.

October 4, 2021

Designated Highly Confidential Pursuant to the Protective Order Filed March 9, 2021

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I. INTRODUCTION

A. QUALIFICATIONS

1. I am an economist and the Greenfield Professor of Securities Law at Harvard Law School. I received a Ph.D. in economics from the Massachusetts Institute of Technology with fields in econometrics and finance, and a J.D. from Harvard Law School. My Ph.D. dissertation concerned the relationship between stock prices and financial disclosures. After law school, I clerked for Judge Silberman of the United States Court of Appeals for the D.C. Circuit and Justice Kennedy of the Supreme Court of the United States.

2. I am also a faculty associate at the Kennedy School of Government at Harvard, a fellow at Columbia University's Program on the Law and Economics of Capital Markets, a research associate at the European Corporate Governance Institute, and a member of the editorial board of the Journal of Financial Perspectives. I formerly was a member of the Board of Economic Advisors to the Financial Industry Regulatory Authority ("FINRA"), an academic fellow at FINRA, Chairperson of Harvard's Advisory Committee on Shareholder Responsibility (which is responsible for advising the Harvard Corporate Governance, American Law Institute Project on the Application of U.S. Financial Regulations to Foreign Firms and Cross-Border Transactions, and an executive member of the American Law School section on securities regulation. My current curriculum vitae is listed in Appendix A. I am being compensated for my time on this matter at a rate of \$1,250 per hour. My compensation is not contingent on the outcome of this case.

3. The materials I have considered are listed in Appendix B.

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4. This report is subject to change or modification should additional relevant information become available which bears on the analysis, opinions, or conclusions contained herein.

B. BRIEF BACKGROUND ON LITIGATION

5. Ripple Labs, Inc. ("Ripple") is a San Francisco-based privately held payments technology company that utilizes distributed ledger technology, including the cryptocurrency XRP, in cross-border payment technology.¹ Plaintiff Securities and Exchange Commission (the "SEC") alleges that Defendants² engaged in the "unlawful offer and sale of securities in violation of Sections 5(a) and 5(c) of the Securities Act of 1933 ('Securities Act') [15 U.S.C. §§ 77e(a) and 77e(c)]."³

6. The SEC argues that XRP was offered and sold as an "investment contract" and, therefore, should have been registered under the Securities Act, at least as of 2013.⁴ The SEC relies on what has become known as the *Howey* test, from the Supreme Court's 1946 decision in *Securities and Exchange Commission v. W. J. Howey Co., et al.*, 328 U.S. 293 (1946). The Court in that case explains:

"[A]n 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

¹ Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2014 through December 31, 2020. As of September 15, 2014, Ripple Labs, Inc. has been incorporated in the State of Delaware. [Tab 29-31-DE-CA *Good Standing Certificate*, December 15, 2014, Series A, Ripple Labs Inc.pdf, at 1].

² Defendants are Ripple, Bradley Garlinghouse, and Christian A. Larsen.

³ First Amended Complaint, *Securities and Exchange Commission v. Ripple Labs, et al.*, No. 1:20-cv-10832 (S.D.N.Y. February 18, 2021) (hereinafter, the "Complaint"), at ¶ 9.

⁴ See Complaint, at ¶ 72 ("In August 2013, Ripple started making unregistered offers and sales of XRP in exchange for fiat currencies or digital assets such as bitcoin."), at ¶ 3 ("Ripple engaged in this illegal securities offering from 2013 to the present…").

expect profits solely from the efforts of the promoter or a third party, it being immaterial whether the shares in the enterprise are evidenced by formal certificates or by nominal interests in the physical assets employed in the enterprise."⁵

7. The SEC's affirmative theory in its Complaint for why XRP should be deemed an "investment contract" extensively relies upon its characterization of XRP as a "speculative" investment.⁶ The alleged speculation is supposedly driven by the hope that Ripple's efforts would somehow find a "use" for XRP at some point in the future, and that XRP's price would rise as a result of those efforts.⁷

8. In terms of the specific efforts of Ripple that purchasers of XRP allegedly relied

upon for an expectation of profit, the SEC points to:

 a. The efforts of Ripple and its Founders to distribute XRP into the marketplace. Indeed, much of the Complaint focuses on delving into the details of various distribution mechanisms, including Ripple's provision of discounts and rebates in doing so.⁸

⁵ Securities and Exchange Commission v. W. J. Howey Co., et al., 328 U.S. 293 (1946), at 298-299.

⁶ See, e.g., Complaint, at ¶ 232 ("[P]rincipal reason for anyone to buy XRP was to speculate on it as an investment."). See also, Complaint, at ¶ 66 ("Ripple began its efforts by attempting to increase speculative demand and trading volume for XRP..."), at ¶ 69 ("Ripple made it part of its 'strategy' to sell XRP to as many speculative investors as possible."), at ¶ 105 (Ripple sold XRP to "institutional and other accredited investors who are purchasing XRP for speculative purposes"), at ¶ 235 ("[I]n its official application to the NYDFS for XRP II in 2016, Ripple acknowledged that buyers were purchasing XRP for speculative purposes."), at ¶ 396 ("Ripple promoted XRP as a speculative investment when either no use case existed or, with the eventual development of the ODL product, only a small fraction of XRP arguably was being 'used' for a few moments for non-investment purposes before being sold to investors.").

⁷ See, e.g., Complaint, at ¶ 241 ("Based on these representations, Ripple's actions, and the economic reality, XRP investors in the Offering had a reasonable expectation of profiting from Ripple's efforts to deploy investor funds to create a use for XRP and bring demand and value to their common enterprise.") See also, Complaint, at ¶ 68 ("Under the plan, a future 'user' of XRP as a universal asset (*i.e.*, a bank) would use the speculative trading market to effect money transfers."), at ¶ 83 ("Ripple paid third parties to assist in its efforts to accomplish as widespread a distribution of XRP as possible and to attempt to develop a 'use' for XRP."), at ¶ 243 ("Defendants repeatedly stated publicly that they would undertake significant efforts to develop and foster 'uses' for XRP..."), at ¶ 359 ("The potential 'users' of ODL that Ripple is targeting are money transmitters.").

⁸ See, e.g., Complaint, at ¶ 73 ("Larsen orchestrated the initial stage of Ripple's Offering of XRP by approving the timing and amount of offers and sales to: (1) purchasers in the open market ('Market Sales'); (2) investment

- b. The formation of an Escrow for certain of Ripple's XRP holdings in 2017.⁹
- c. Ripple's activities in connection with the listing of XRP on third-party cryptocurrency exchanges.¹⁰
- Ripple's efforts to artificially prop up a supposedly uneconomic and inefficient
 On-Demand Liquidity ("ODL") cross-border payments product.¹¹
- e. Entrepreneurial and managerial efforts, including joint ventures focused on the development of XRP use cases.¹²
- 9. In terms of the "common enterprise" prong of the *Howey* test, the SEC argues

that, "[b]ecause XRP is fungible, the fortunes of XRP purchasers were and are tied to one

funds, wealthy individuals, or other sophisticated investors ('Institutional Sales'); and (3) others enlisted to assist Ripple's efforts to develop an XRP market (the 'Other XRP Distributions')."), at ¶ 85 ("In addition, Larsen (beginning in 2015) and Garlinghouse (beginning in 2017) directly participated in the Offering by offering and selling their own holdings of XRP into the same market as Ripple's Market Sales, typically following the same manner of sale."), at ¶ 125 ("At times, rather than directly selling XRP into the market to fund its operations, Ripple funded its dual XRP market-creating and company financing goals by transferring XRP to third parties as compensation. Ripple understood that these parties would in turn sell XRP into the public markets.").

⁹ See, e.g., Complaint, at ¶ 253 ("In an email to Ripple's equity shareholders, advisors, and others on June 5, 2017, Garlinghouse emphasized Ripple's efforts to increase XRP's liquidity and price through the XRP Escrow."). See also, Complaint, at ¶ 191 ("Defendants' efforts in this regard principally involved monitoring the timing and amount of their XRP sales and purchases, sometimes to coincide with strategic announcements about Ripple or XRP and establishing an escrow for Ripple's own XRP holdings."), at ¶ 223 ("[O]n May 16, 2017, Ripple announced that it would place 55 billion XRP (most of its current holdings) into an cryptographically-secured escrow…"), at ¶ 255 ("[I]n a December 7, 2017 post on its website, Ripple, confirming the formation of the XRP Escrow…").

¹⁰ See, e.g., Complaint, at ¶ 161 ("In 2017 and 2018, Ripple entered into agreements with at least ten digital asset trading platforms ... providing for 'listing' and trading incentives with respect to XRP."). See also, Complaint, at ¶ 158 ("To support Ripple's efforts to 'list' XRP on digital asset platforms, ..."), at ¶ 326 ("On December 14, 2017, Garlinghouse stated ... XRP is listed at about fifty exchanges around the world.").

¹¹ See, e.g., Complaint, at ¶ 365 ("Much of the onboarding onto ODL was not organic or market-driven. Rather, it was subsidized by Ripple."). See also, Complaint, at ¶ 131 ("To encourage adoption of ODL, Ripple paid XRP to both the money transmitting businesses and certain market makers that supported the product for their efforts."), at ¶ 283 ("ODL – that 'uses' XRP (which 'use' is not market-driven but subsidized by Ripple…)").

¹² See, e.g., Complaint, at ¶ 273 ("During the Offering, … made and touted extensive entrepreneurial and managerial efforts—made with proceeds from the Offering—to the market.") (emphasis in original). See also, Complaint, at ¶ 274 (In January 2016, Ripple announced a "joint venture to distribute 'Ripple's solutions' in certain countries…").

another, and each depend on the success of Ripple's XRP Strategy."¹³ To effectuate this XRP strategy, the SEC alleges that Ripple pooled the capital raised in the offering of XRP to "fund its efforts to create profits for Ripple and XRP purchasers (in the form of increased *prices* for XRP)."¹⁴ The SEC further alleges that Ripple used the pooled funds to "fund its operations, including to finance building out potential 'use' cases for XRP."¹⁵ This purported commonality supposedly included Ripple itself as "Ripple's (significant) XRP holdings were essentially its only asset."¹⁶

10. In expounding its theory of liability, the SEC repeatedly and extensively points to various contracts, including contracts entered into by Ripple for the distribution and sales of XRP, to justify its contention that XRP is an "investment contract."¹⁷

C. ASSIGNMENT AND CONCLUSIONS

11. I have been asked by counsel for Ripple to assess whether the economic evidence is consistent with the economic assertions made by the SEC in support of its ultimate conclusion that XRP is an "investment contract." My assessment of the economic evidence includes consideration of the contracts pursuant to which XRP was distributed by Ripple and the proper

¹³ Complaint, at ¶ 291.

¹⁴ Complaint, at ¶ 90 (emphasis added).

¹⁵ Complaint, at ¶ 293.

¹⁶ Complaint, at ¶ 302.

¹⁷ See, e.g., Complaint, at ¶ 3 ("Ripple engaged in this illegal securities offering ... under certain circumstances XRP could be considered an 'investment contract' and therefore a security under the federal securities laws."). See also, Complaint, at ¶ 53 ("The Legal Memos warned that there was some risk that XRP would be considered an 'investment contract' (and thus a security) under the federal securities laws depending on various factors."), and at ¶ 231 ("At all relevant times during the Offering, XRP was an investment contract and therefore a security subject to the registration requirements of the federal securities laws.").

characterization of XRP from an economic perspective. I offer no opinion on the legal question whether these XRP contracts were "investment contracts" within the meaning of Section 5 of the Securities Act.

12. In Section II, I will begin by first presenting some additional background on Ripple, and the overall landscape of its various contractual obligations. With respect to the latter, I will provide an overview of Ripple's private equity ownership contracts – which no one disputes do constitute "securities" – as well as the Ripple contracts for the distribution of XRP that, according to the SEC, support that the alleged economic substance of XRP constitute an "investment contract" and, hence, a "security." The economic substance of Ripple's private equity ownership reflects the following exchange: the pooling of capital to fund Ripple's business in exchange for a contractual right to a share of the profits if Ripple's efforts to manage and develop its business operations prove successful. In sharp contrast, as I will show, the economic substance of the Ripple XRP contracts reflects no such exchange, with no corresponding right to share in Ripple's profits and with no obligation by Ripple to expend efforts to increase the price of XRP. The fact that Ripple may have used the proceeds of its sales of XRP to help fund its own operations does not change the economic substance of the transaction or create any obligations on the part of Ripple to share its profits with the purchasers of XRP.

13. In Section III, I will address the SEC's assertion that "profit" from "speculating" on XRP's price increasing would primarily follow as a matter of "economic reality" from Ripple's efforts to manage and develop its business and promoting XRP. As an initial matter, speculative demand is not unique to investment contracts and exists for many commodities and currencies that are clearly not investment contracts. Moreover, the SEC's assertion is

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demonstrably false. My economic analysis demonstrates that XRP's long-run price returns are associated with factors outside Ripple's control, namely, price returns of non-XRP cryptocurrencies. XRP price returns are unrelated to factors over which Ripple may have control, including the various distributions of XRP extensively invoked in the SEC's Complaint.

14. Finally, in Section IV, I will document that the economic reality of XRP is that it is a virtual currency and is in fact used as a medium of exchange in applications such as Ripple's ODL platform. Ripple's ODL platform simply reflects the dual fact that XRP is a virtual currency, and that Ripple was attempting to develop a new business that would someday benefit the company and its equity shareholders (owners with a contractual right to a share in the profits of Ripple).

15. Based on my analysis, my review of the materials listed in Appendix B, and my general expertise and experience, I have concluded that:

- From an economic perspective, none of Ripple's contracts for the distribution of XRP entitles the holder of XRP to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations or otherwise require Ripple to expend ongoing efforts to increase the price of XRP.
- From an economic perspective, speculative demand is neither unique to nor indicative of an investment contract. Economists have long recognized that speculative demand is widespread among assets that are not securities, including money, foreign exchange, commodities, and virtual currencies.
- The long-run price of XRP for the period August 2013 to December 2020 has not resulted from Ripple's efforts but rather from price movements of non-XRP cryptocurrencies. Accordingly, purchasers of XRP can have no reasonable expectation of profits from the efforts of Ripple.

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- Ripple's XRP distributions increased XRP liquidity and therefore aided Ripple's efforts to provide global financial settlement solutions, such as ODL, but did not have a statistically significant effect on XRP's price.
- From an economic perspective, Ripple and purchasers of XRP are not part of a common enterprise in which proceeds of XRP sales are pooled to create profits for Ripple and XRP holders. Because of differences in both the timing and the duration of holding periods between Ripple and direct and indirect purchasers of XRP, their exposure to XRP price volatility and therefore to risk is different.
- From an economic perspective, XRP is properly viewed as a virtual currency that is used as a medium of exchange in applications such as Ripple's ODL product.

II. RIPPLE'S BUSINESS AND CONTRACTS

A. RIPPLE IS A PRIVATELY-HELD PAYMENTS TECHNOLOGY COMPANY

16. XRP is the native digital asset of the XRP Ledger, an open-source, decentralized blockchain technology.¹⁸

17. In 2011 and 2012, a group of individuals developed the XRP Ledger to improve the fundamental limitations of Bitcoin's blockchain.¹⁹ OpenCoin, now Ripple ("the Company"), was formed in 2012 in San Francisco.²⁰ Shortly after the formation of the Company, the

¹⁸ The XRP Ledger is a "record of the amount of currency in each user's account and represents the 'ground truth' of the network. The ledger is repeatedly updated with transactions that successfully pass through the consensus process." D. Schwartz, N. Youngs, and A. Britto, "The Ripple Protocol Consensus Algorithm." https://ripple.com/files/ripple_consensus_whitepaper.pdf. *See also*, "XRP: The Best Digital Asset for Global Payments," https://ripple.com/xrp/.

¹⁹ The code for the XRP Ledger was created by Arthur Britto, Jed McCaleb, and David Schwartz between 2011 and the summer of 2012—before Ripple was formed as a company.

²⁰ See XRPL's Origin: "Provide a Better Alternative to Bitcoin," http://xrpl.org/history.html.

Founders of the Company contributed 80 billion units of XRP to the Company, out of a total of 100 billion units in existence.²¹

18. Ripple's strategic objective is to provide global financial settlement solutions to enable a worldwide exchange of value akin to the existing exchange of information on the Internet.²² Ripple and its wholly-owned subsidiaries employ the XRP Ledger, an open-source, decentralized blockchain of digitized information including the cumulative purchases and sales of assets among participants.

19. Ripple's wholly-owned subsidiary, XRP II, LLC ("XRP II"), founded in 2013, has been organized as a New York limited liability company since at least 2015, and is the entity through which Ripple offered and sold most of its XRP.²³ XRP II is registered as a money service business with the United States Financial Crimes Enforcement Network ("FinCEN") and as a virtual currency business with the New York State Department of Financial Services ("NYDFS").²⁴

B. RIPPLE WAS INITIALLY FUNDED WITH AND CONTINUES TO RECEIVE FUNDING FROM PRIVATE EQUITY INVESTORS

20. Ripple conducted several rounds of traditional venture capital funding starting in 2012 when it issued "800,000 shares of Common Stock to investors for total cash proceeds of \$200,000."²⁵

²¹ The XRP Ledger developers wrote the underlying code that automatically generated a fixed supply of 100 billion units of a digital asset, which was distributed to Chris Larsen, Mr. McCaleb, and Mr. Britto, the Founders of the Company. Eighty billion XRP was subsequently transferred to Ripple. *See* Deposition Transcript of David Schwartz, May 26, 2021, at 11:4-7, 13:16-21, 14:7-21, 24:2-7, 143:8-10, and 146:16-21.

²² Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2014 (RPLI_SEC 0090938, at 945).

²³ Complaint, at ¶ 19.

²⁴ Complaint, at ¶ 19.

²⁵ Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2014 (RPLI_SEC 0090938, at 957).

21. Beginning in October 2012 and through December 2013, Ripple issued \$6.4 million in convertible notes.²⁶ In 2014 and through 2019, Ripple issued several rounds of preferred stocks and warrants.²⁷

22. Exhibit 1 shows the breakdown of Ripple's sources of private investor funds.²⁸ Investors in common and preferred Ripple stock are shareholders of Ripple and as such are entitled to cash dividends when and if declared by the Board of Directors, with priority given to preferred equity holders, *i.e.*, "holders of the [Preferred Stock] shall be entitled to receive cash dividends prior to and in preference to dividends to holders of common stock."²⁹ Ripple's shareholders also have voting rights, discussed in more detail below.

23. Not surprisingly, there is no dispute between the parties that Ripple's common stock, preferred stock, convertible notes and warrants all have the economic substance of a "security." The common stock, preferred stock, convertible notes and warrants are all funding mechanisms that enable Ripple to raise funds for its business operations with the holders of these ownership stakes enjoying certain contractual rights to the profits that Ripple might generate from its efforts in managing and developing its business operations. If Ripple is successful in its

²⁶ Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2014 (RPLI_SEC 0090938, at 953).

²⁷ Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2014 (RPLI_SEC 0090938, at 953 and 955); Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2015, at 17; Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2016, at 17 and 19; Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2018 (RPLI_SEC 0265036, at 063 and 064); Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2019 (RPLI_SEC 0301113, at 146).

²⁸ In 2012, prior to the filing of the Complaint, OpenCoin (Ripple) received bridge financing from private investors. Between October 2012 and 2013, Ripple could have borrowed up to \$1 million using this form of financing. See, e.g., OpenCoin, Inc., Amended and Restated Note Purchase Agreement, November 8, 2012 (RPLI_SEC 0321854), OpenCoin, Inc., Convertible Note Purchase Agreement, April 26, 2013 (SEC-LIT-EPROD-000092103). See also, Notes to Exhibit 1 re stock redemptions and repurchases.

²⁹ See, e.g., Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2014 (RPLI_SEC 0090938, at 955).

efforts, then the holders of these instruments will earn a return on their capital by virtue of appreciation and their contractual rights to the profits generated, such as potentially enjoying cash dividends or promised interest payments.

24. I will now provide some additional detail on these instruments.

i. Ripple Issued Common Stock

25. In 2012, Ripple issued 8,000,000 shares of common stock to Chris Larsen, Jed McCaleb, and Arthur Britto and 800,000 shares of common stock to investors for cash proceeds of \$200,000.³⁰ As of March 28, 2016, Ripple was authorized to issue 95,000,000 shares of Class A stock and 18,309,014 shares of Class B stock; both issuances would have a par value of \$0.0001.³¹

26. On July 1, 2017, Ripple effected a two-for-one stock split.³² The financial information reported after this date reflects the two-for-one stock split. As of December 20, 2019, Ripple was authorized to issue 180,000,000 shares of Class A common stock and 35,331,121 shares of Class B common stock; both issuances would have a par value of \$0.0001.³³ The holders of common stock are entitled to receive cash dividends when and if declared by the Board of Directors.³⁴

³⁰ Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2014 (RPLI_SEC 0090938, at 957).

³¹ Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2016, at 21.

³² Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2018, at 8.

³³ Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2019 (RPLI_SEC 0301113, at 149).

³⁴ Ripple Labs, Inc., *Restated Certificate of Incorporation of Ripple Labs, Inc.*, December 3, 2014, at 2; Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2014 (RPLI_SEC 0090938, at 955).

ii. Ripple Issued Convertible Notes and Preferred Stock

27. From October 2012 and through December 2013, Ripple issued convertible notes payable on demand by a majority noteholder or on the date 18 months from issuance of the notes. The interest rate on the notes ranged between 2% and 6%.³⁵ For example, the convertible note purchase agreement dated April 26, 2013 shows that OpenCoin (Ripple's predecessor) borrowed \$1 million from accredited investors, Camp One Ventures, LLC (\$250,000), BB Trust (\$200,000), Google Ventures 2013, L.P. (\$100,000) and IDG Technology Venture Investment IV, L.P. (\$450,000) between April 26, 2013 and May 6, 2013.³⁶ Lenders on these notes received 6% interest, payable on or after October 25, 2014. On November 19, 2013, Ripple issued a \$2 million promissory note to Core Innovation Capital I, L.P. ("Core").³⁷

28. Ripple converted the \$6.4 million convertible notes and the accrued and unpaid interest on these notes into Series A equity securities in December 2014. Ripple accordingly issued 7,359,045 shares at an average conversion price of \$0.92 per share and received \$6,770,422 in cash from the preferred stock issuance.³⁸

29. In December 2014, Ripple issued an additional 4,033,742 shares of Series A redeemable convertible preferred stock, at a price of \$1.7808 per share for cash proceeds of \$7,091,134 net of issuance cost.³⁹ As of December 2014, Ripple had received \$31.9 million of

³⁵ See, e.g., Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2014 (RPLI_SEC 0090938, at 953).

³⁶ OpenCoin, Inc., *Convertible Notes Purchase Agreement*, Exhibit A, Schedule of Lenders, April 26, 2013 (SEC-LIT-EPROD-000092103, at SEC-LIT-EPROD-000092120).

³⁷ Ripple Labs, Inc., *Side Letter*, Core Innovation Capital I, L.P., November 19, 2013, at 1.

³⁸ Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2014 (RPLI_SEC 0090938, at 953, 954, and 955).

³⁹ Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2014 (RPLI_SEC 0090938, at 955).

funding from these preferred stock issuances purchased by accredited investors.⁴⁰ The holders of Series A preferred stock are entitled to receive dividends from Ripple when and if declared by the Board of Directors.⁴¹ Holders of Series A preferred stock also have general voting rights.⁴²

30. Ripple continued to receive funding from stock issuances. For example, from March 2016 through August 2016, Ripple issued 14,482,502 shares of Series B preferred stock at a purchase price of \$3.8117 per share for cash proceeds of more than \$55 million, net of issuance costs.⁴³ Ripple agreed to use the proceeds from the Series B stock sales for "capital expenditures, working capital and general corporate purposes."⁴⁴ The holders of Series B preferred stock are entitled to receive dividends from Ripple when and if declared by the Board of Directors.⁴⁵ Holders of Series B preferred stock also have general voting rights.⁴⁶

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⁴⁰ Ripple Labs, Inc., Series A Preferred Stock Purchase Agreement, December 3, 2014, Schedule A, at S-1 and S-2.

⁴¹ "The holders of shares of Preferred Stock shall be entitled to receive, when, as and if declared by the Board of Directors, out of any assets of this corporation legally available therefor, any dividends as may be declared from time to time by the Board of Directors prior and in preference to any declaration or payment of the dividends to the holders of Common Stock." Ripple Labs, Inc., Class A, B and Series A, *Restated Certificate of Incorporation*, December 3, 2014, at 2.

⁴² "The holder of each share of Preferred Stock shall have the right to (1) vote for each share of Class A Common Stock or ten (10) votes for each share of Class B Common Stock…" Ripple Labs, Inc., Class A, B and Series A, *Restated Certificate of Incorporation*, December 3, 2014, at 14.

⁴³ Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2016, at 19.

⁴⁴ Ripple Labs, Inc., *Series B Preferred Stock Purchase Agreement*, March 28, 2016, at 2.

⁴⁵ "The holders of shares of Preferred Stock shall be entitled to receive, when, as and if declared by the Board of Directors, out of any assets of this corporation legally available therefor, any dividends as may be declared from time to time by the Board of Directors prior and in preference to any declaration or payment of the dividends to the holders of Common Stock." Ripple Labs, Inc., *Restated Certificate of Incorporation*, December 3, 2014, at 2.

⁴⁶ "The holder of each share of Preferred Stock shall have the right to (1) vote for each share of Class A Common Stock or ten (10) votes for each share of Class B common stock, as the case may be, into which such Preferred Stock could then be converted..." Ripple Labs, Inc., *Restated Certificate of Incorporation*, December 3, 2014, at 14.

31. In December 2019, Ripple issued 3,252,790 shares of Series C participating redeemable convertible preferred stock ("Series C") at an issuance price of \$61.4857 per share for cash proceeds of \$194.8 million, net of issuance costs.⁴⁷ Ripple agreed to use the proceeds from the Series C stock sales to "(i) fund the redemption of certain shares of the Series A Preferred Stock and Series B Preferred Stock pursuant to the Stockholders' Agreement (as herein defined), (ii) finance the acquisition of interests in third party entities, (iii) pay the transaction costs and expenses for the transactions contemplated by this Agreement and (iv) for other general corporate purposes of [Ripple] and its subsidiaries."⁴⁸ The holders of Series C preferred stock are entitled to receive dividends from Ripple: "holders of Series C shares shall be entitled to receive dividends payable in Series C shares at a rate of "% on a quarterly basis. … [Ripple] may elect to pay up to % of such dividends in cash in lieu of issuing additional shares."⁴⁹ Holders of Series C preferred stock also have general voting rights.⁵⁰

- *iii. Ripple Issued Warrants*
 - 32.

⁴⁷ Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2019 (RPLI_SEC 0301113, at 46).

⁴⁸ Ripple Labs, Inc., Series C Preferred Stock Purchase Agreement, December 20, 2019, at 6.

⁴⁹ Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2019 (RPLI_SEC 0301113, at 148). *See also*, Ripple Labs, Inc., *Restated Certificate of Incorporation*, December 20, 2019, at 2 ("Each holder of a share of Preferred Stock shall be entitled to receive, when, as and if declared by the Board of Directors, out of any assets of this corporation legally available therefor, any dividends as may be declared from time to time by the Board of Directors prior and in preference to any declaration or payment of the dividends to the holders of Common Stock.").

⁵⁰ "The holder of each share of Preferred Stock shall have the right to (1) vote for each share of Class A Common Stock into which such Preferred Stock could then be converted..." Ripple Labs, Inc., *Restated Certificate of Incorporation*, December 20, 2019, at 17. In addition to general voting rights, holders of Series A, B, and C have certain protective provisions – *e.g.*, a majority of A, B, and C have to approve any issuance of dividends or any stock repurchase.

C. RIPPLE'S XRP CONTRACTS

33. Like any private corporation, Ripple entered into a variety of contracts beyond those creating various equity and debt obligations to its investors (summarized above). For purposes of my review, I and others working under my supervision reviewed a total of 730 contracts (out of more than 1,700) and categorized this universe of contracts based on their common features and their treatment in the Complaint. I grouped Ripple's contracts according to 10 broadly defined categories referenced in the Complaint.⁵⁴ Within each of the 10 categories, I selected at least one illustrative contract. As my discussion of these contracts will show, most of these categories identify either a sales contract or specify a particular type of service contract (with several miscellaneous categories such as option contracts). For the sake of concreteness, I discuss at least one illustrative contract from each of the ten categories.

 ⁵¹ Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2016, at 21. See also, Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2017, at 29 (""").

⁵² Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2017, at 29.

⁵³ Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2017, at 29.

⁵⁴ I was informed by Counsel that distributions by Founders and the bounty program identified in the Complaint are outside the scope of my assignment. *See, e.g.*, Complaint, at ¶ 61 ("From 2013 through 2014, Ripple and Larsen made efforts to create a market for XRP by having Ripple distribute approximately 12.5 billion XRP through 'bounty programs' that paid programmers compensation for reporting problems in the XRP Ledger's code.").

34. As I will document, the economic substance of these contracts stands in sharp contrast to the economic substance of the contracts creating the various equity and debt obligations. None of Ripple's contracts for the distribution of XRP entitle the holder of XRP to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations and none of these contracts require Ripple to expend ongoing efforts to increase the price of XRP.

i. Contracts with Wholesale Purchasers

35. Ripple entered into contracts with wholesale purchasers pursuant to which Ripple (XRP II) sold XRP to these entities in return for cash (which could be subject to a discount to an XRP price as defined in the respective contract). These contracts are referenced in the Complaint, such as when the Complaint points to Ripple's XRP sales to "Institutional Investor A" at "price discounts of up to 30% below XRP market prices," and to "Institutional Investor B" at a "10% discount from XRP market prices."⁵⁵

36. Two illustrative contracts with wholesale purchasers include Ripple's contract

with		, dated September 18, 2017 and the
contract with	.56	

⁵⁵ Complaint, at ¶ 114 ("In 2017, Ripple sold approximately 14.8 million XRP for \$2.1 million to Institutional Investor A, without restricting Institutional Investor A's ability to resell this XRP into public markets in any way, at price discounts of up to 30% below XRP market prices."), at ¶ 115 ("Institutional Investor B paid Ripple approximately \$6.4 million for its XRP, the first \$500,000 of which it obtained in June 2016 at a 10% discount from XRP market prices.").

⁵⁶ and XRP II, *Letter Agreement*, September 18, 2017 (RPLI_SEC 0000861), *Amendment to Letter Agreement*, December 27, 2017 (RPLI_SEC_0000488). and XRP II, *Master XRP Purchase Agreement*, August 3, 2017 (RPLI_SEC_0000792).

37. The contract with **and the second of an experimental second of a second of a**

38. The contract with **and a** indicates that Ripple was to sell XRP at a discount of % from the specified price.⁵⁹ This contract also specifies that **a discound** would be exposed to "material risks associated with virtual currency, including XRP," such as the "volatility and unpredictability of the price of virtual currency relative to fiat currency may result in significant loss over a short period of time"⁶⁰ on their purchases of XRP.

39. Pursuant to the contract with , Ripple sold approximately XRP

to on June 9, 2016,⁶¹ and another approximately XRP on June 23, 2016.⁶²

40. These contracts include a lockup period during which the wholesale purchaser cannot sell XRP and also includes a specification on the amount that can be sold on a daily basis after the lockup period:

⁶² and XRP II, *Summary of XRP Purchase*, June 23, 2016 (RPLI_SEC 0000636, at 636).

and XRP II, *Letter Agreement*, September 18, 2017 (RPLI_SEC 0000861, at 861)
 ("Discount Factor' means a percentage equal to (i) 100% minus (ii) (a) for purchases occurring during 2017, % and (b) for purchases occurring during 2018, %.").

⁵⁸

and XRP II, Letter Agreement, September 18, 2017 (RPLI_SEC 0000861, at 867).

⁵⁹ and XRP II, *Summary of XRP Purchase*, June 9, 2016 (RPLI_SEC 0000626, at 626) and XRP II, *Summary of XRP Purchase*, June 23, 2016 (RPLI_SEC_0000636, at 636).

and XRP II, *Master XRP Purchase Agreement*, August 3, 2017 (RPLI_SEC 0000792, at 796).

⁶¹ and XRP II, *Summary of XRP Purchase*, June 9, 2016 (RPLI_SEC 0000626, at 626).

"**Transfer Restriction**: Neither the Purchased XRP nor any interest therein may be sold, pledged or otherwise transferred to any person from the Date of Purchase through July 10th, 2016 (the 'Lockup Period') unless that person also agrees not to resell or otherwise distribute the Purchased XRP to any other party during the Lockup period.

• • •

The Purchaser agrees that for sixty (60) days after the expiration of the thirty (30) day Lockup Period set forth in the paragraph immediately above (or between July 10, 2016 and September 10, 2016) the amount of Purchased XRP it may sell on a daily basis shall be limited to five (5) percent of the Average Daily Trading Volume. ... The parties agree that after September 10, 2016 Purchaser need no longer comply with the five (5) percent trading volume limitation set forth above."⁶³

41. Unlike the private equity ownership contracts, the contract with does not

give any contractual right to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations or impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP. In this sense, it is similar to an entity purchasing diamonds from De Beers or barrels of oil from Exxon Corporation.

ii. Contracts with Programmatic Sellers

42. Ripple also entered into contracts with programmatic sellers. These contracts are referenced in the Complaint, such as when the Complaint points to XRP sales that were limited so as not to exceed a percentage of XRP's daily trading volume.⁶⁴

43. For example, pursuant to the contract with

effective June 2, 2017, was to transact in XRP according to a programmatic schedule

⁶³ and XRP II, *Summary of XRP Purchase*, June 9, 2016 (RPLI_SEC 0000626, at 627) and XRP II, *Summary of XRP Purchase*, June 23, 2016 (RPLI_SEC 0000636, at 637).

⁶⁴ "At Ripple's direction, the intermediaries such as the Market Maker ensured that Market Sales were programmatically set not to exceed a certain percentage of XRP's overall daily trading volume, and Ripple referred to the Market Sales as 'programmatic sales.'" See Complaint, at ¶ 99.

("Programmatic Market Making Activity") and in return was to receive a fee that was calculated

as a percentage of XRP that was traded programmatically during a particular calendar month.⁶⁵

"Ripple may, at any time and in its sole discretion, direct **and** remit any portion of or all of the proceeds of **and** Programmatic Market Activity, as such amounts are reported in the then-current daily reporting of XRP Programmatic Market Activity required in Section 4. **and** shall promptly (i) remit **and**% of the amounts of such proceeds to Ripple in a payment method(s) directed by Ripple in its sole discretion and (ii) transfer **and**% of the amounts of such proceeds to a wallet or account of for its own benefit."⁶⁶

44. The contract includes the following termination provision:

"The Term of this Agreement shall ... continue until the earlier of: a. 12 months; b. termination by Ripple upon 180 calendar days' notice to **series**; c. upon written notice of termination by a Party if the other Party is in material breach of this Agreement, if the breaching party does not, within ten (10) calendar days after receiving written notice describing an alleged material breach of this Agreement, cure the alleged material breach; or d. upon written notice in the event that the other Party has filed or has filed against it a petition for voluntary or involuntary bankruptcy or similar relief from insolvency, makes an assignment for the benefit of its creditors, has a receiver appointed for all or a substantial part of its business or assets, or otherwise admits in writing of its inability to meet debts as they become due. Upon termination, shall return to Ripple all XRP, if any, transferred from Ripple to **set a**...⁶⁷

45. Unlike the private equity ownership contracts, the contract with does not

give any contractual right to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations or impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP. Here, we is similar to an entity selling

diamonds from De Beers or barrels of oil from Exxon Corporation for an agreed-upon fee.

and Ripple Markets Inc. ("Ripple Markets"), *Programmatic Market Activity Agreement*, June 2, 2017 (RPLI_SEC 0507300).

⁶⁶ and Ripple Markets, *Programmatic Market Activity Agreement*, June 2, 2017 (RPLI_SEC 0507300, at 301). The contract with was amended in March 2018. *See and Ripple Markets, Amendment to Programmatic Market Activity Agreement*, March 1, 2018 (RPLI_SEC 0537727).

⁶⁷ and Ripple Markets, *Programmatic Market Activity Agreement*, June 2, 2017 (RPLI_SEC 0507300, at 301-302).

iii. Contracts with Market Makers⁶⁸

46. Ripple also entered into contracts with market makers, another type of Ripple contract referenced in the Complaint.⁶⁹ For example, Ripple entered into a market making contract with **output**, effective as of February 7, 2014.⁷⁰ Pursuant to this contract, Ripple would deliver a specified number of units of XRP to the market maker that they in turn use to "promote liquidity of fiat and crypto currencies within the Ripple Network" and "to quote binding bid and offer prices for Currency Pairs…within the Ripple Network."⁷¹ For example, Ripple delivered **output** XRP units pursuant to the initial market maker contract with which **output** was obligated to use to "make binding bids and offers" in certain specified currency

pairs.⁷²

47. Starting in 2017, Ripple expanded the scope of the market maker's

responsibilities beyond the XRP Ledger to include quoting bid and offer spreads in specified

and Ripple Markets, Market Making Agreement, February 7, 2014 (RPLI_SEC 0507336);
 and Ripple Markets, RE: Renewal of Market Making Agreement between
 LLC ("Market Maker") and Ripple Markets, Inc. entered into as of February 7, 2014, April 27, 2016 (SEC-LIT-EPROD-000791045).

⁶⁸ The terminology "market maker" is used to describe "a trading firm that posts two-sided quotes in XRP pairs." See, e.g., and Ripple Markets, Market Maker and Programmatic Market Activity Agreement, February 14, 2017 (RPLI_SEC 0899145, at 145).

⁶⁹ "Ripple—through its agents, including Larsen and Garlinghouse—offered and sold XRP for investment to influential players in the digital asset space, including XRP market makers…" See Complaint, at ¶ 104. See also, Complaint, at ¶ 131 ("To encourage adoption of ODL, Ripple paid XRP to both the money transmitting businesses and certain market makers that supported the product for their efforts.").

⁷¹ and Ripple Markets, *Market Making Agreement*, February 7, 2014 (RPLI_SEC 0507336, at 336). As defined in the contract, "The Ripple Network" means the "decentralized, open source, global payment network operating on the Ripple protocol," also known as the XRP Ledger. *See Market Making Agreement*, February 7, 2014 (RPLI_SEC 0507336, at 337).

 ⁷² and Ripple Markets, *Market Making Agreement*, February 7, 2014 (RPLI_SEC 0507336, at 336).
 Pursuant to the contract, Ripple was to deliver and "if there is one – on the first day of the First Renewal Term" an additional RRP. *See* and Ripple Markets, *Market Making Agreement*, February 7, 2014 (RPLI_SEC 0507336, at 343-344).

trading pairs on cryptocurrency (digital asset) exchanges such as Bitstamp and Kraken.⁷³ The

market makers could also provide liquidity on additional exchanges.⁷⁴ The 2018 contract

between Ripple and described its purpose as:

"Pursuant to the terms and conditions of this Agreement, and for good and valuable consideration, Market Maker agrees to (1) engage in efforts to promote liquidity for the buying and selling of XRP, the asset native to the Ripple Consensus Ledger ('Market Making Activity') and (2) to transact in XRP pursuant to a programmatic schedule ('Programmatic Market Making Activity') provided by Ripple. In return for this Market Making activity, Ripple will compensate Market Maker..."⁷⁵

48. The contract also includes the following termination provision:

"The Term of this Agreement shall ... continue until the earlier of: a. 12 months; b. termination by Ripple upon 180 calendar days' notice to [**10**]; c. upon written notice of termination by a Party if the other Party is in material breach of this Agreement, if the breaching party does not, within ten (10) calendar days after receiving written notice describing an alleged material breach of this Agreement, cure the alleged material breach[.]"⁷⁶

49. Starting in 2019, Ripple entered into market making contracts with market makers

such as and to provide market making in specified

currency pairs and exchanges that support the Ripple ODL ("xRapid") cross-border payments

product.⁷⁷ Per the contract Ripple entered with , effective as of July 1, 2019,

- ⁷⁴ See, e.g., and Ripple Markets, Market Maker and Programmatic Market Making Activity Agreement, March 1, 2018 (RPLI_SEC 0537696, at 96-97) and and Ripple Markets, Market Maker and Programmatic Market Making Activity Agreement, February 14, 2017 (RPLI_SEC 0899145, at 145-146).
- ⁷⁵ and Ripple Markets, *Market Maker and Programmatic Market Making Activity Agreement*, March 1, 2018 (RPLI_SEC 0537696, at 696).
- ⁷⁶ and Ripple Markets, *Market Maker and Programmatic Market Making Activity Agreement*, March 1, 2018 (RPLI_SEC 0537696, at 699).
- ⁷⁷ See, e.g., and Ripple Payments Inc. ("Ripple Payments"), Master XRapid Market Maker Services Agreement, July 1, 2019 (RPLI_SEC 0809256); and Ripple Payments, Master XRapid Market Maker Agreement, July 29, 2019 (RPLI_SEC 0899563).

⁷³ and Ripple Markets, *Market Maker and Programmatic Market Activity Agreement*, February 14, 2017 (RPLI_SEC 0899145, at 145-146) noting that "Market Maker agrees to support subsequent XRP listings at External Digital Asset Exchanges or off-Ripple Consensus Ledger digital asset exchanges, (including, but not limited to, Kraken, CoinCheck and Bitstamp) as they become available so long as it is operationally viable to do so, and Market Maker can meet all regulatory requirements."
"shall act as a market maker for XRP in trades for specified currency pairs on (i) the Mexican digital asset exchange, Bitso ('<u>Bitso</u>') which support xRapid, (ii) the Philippines digital asset exchange, Coins.pro ('Coins'), which supports xRapid and (ii) other similar xRapid exchanges or markets as Ripple shall require..."⁷⁸

50. Further, Ripple pays a monthly exchange service fee and an XRP volume

fee.⁷⁹ The market maker is entitled to the gains (and losses) in connection with their transactions:

"Service Fees. In consideration for its Services and subject to Section 8 (Service Availability), Ripple shall pay Service Provider on a monthly basis (each calendar month, a 'Payment Period [']) (a) , and (b) (together, 'Service Fees')."⁸⁰ (emphasis in original)

51. Again, unlike the private equity ownership contracts, the contracts with market

makers do not give these entities any contractual right to a share of Ripple's profits if Ripple is

successful in its ongoing efforts to manage and develop its business operations or impose any

obligation on Ripple to expend ongoing efforts to increase the price of XRP. Regardless of

whether Ripple's efforts are ultimately successful, the market maker, such as

and , has a contractual right to the specified compensation if the market maker

performs its obligations under the agreement.

iv. Contracts with Exchanges

52. Another set of contracts that Ripple entered into and also referenced in the

Complaint are Ripple's contracts with a small subset of exchanges that trade XRP.⁸¹ Some of the

⁷⁸ and Ripple Payments, *Master XRapid Market Maker Services Agreement*, July 1, 2019 (RPLI_SEC 0809256, at 256).

⁷⁹ and Ripple Payments, *Master XRapid Market Maker Services Agreement*, July 1, 2019 (RPLI_SEC 0809256, at 258).

⁸⁰ and Ripple Payments, *Master XRapid Market Maker Services Agreement*, July 1, 2019 (RPLI_SEC 0809256, at 258).

⁸¹ See, Complaint, at ¶ 322 ("Ripple undertook extensive efforts—starting in at least late 2015—to persuade digital asset trading companies to permit investors to buy and sell XRP on their platforms, especially those that would

contracts with exchanges explicitly specify that exchanges purchase XRP "solely to resell or otherwise distribute the Purchased Ripple Currency to Purchasers, and not to use the Purchased Ripple Currency as an End User or for any other purpose."⁸² Per the guidelines of the contracts, the exchanges are not investors in Ripple. Exchanges do not purchase XRP as an investment with investment being defined as "the purchase or acquisition of [XRP] with the expectation that such [XRP] will generate income or appreciate in value in the future."⁸³ Pursuant to these contracts, the XRP does "not represent a right to make any demand on XRP Fund II…"⁸⁴

53. For example, on January 11, 2017, Ripple entered into an "XRP/EUR Volume Incentive Program" with the cryptocurrency exchange

"The Parties are entering into this Agreement in an effort to increase the liquidity of XRP ... through the application of certain XRP transaction volume incentives ... agrees to engage in efforts to promote the liquidity of XRP on its exchange platform by implementing an incentive program applicable to a selection of its qualified registered members of services. In return for services efforts intended to increase XRP liquidity, Ripple agrees to reserve certain and defined incentives..."⁸⁶

54. The contract includes the following termination provision:

and XRP Fund II, *Ripple Currency Wholesale Sales Order*, September 3, 2013 (RPLI_SEC 0304181, at 183).

⁸³ and XRP Fund II, *Ripple Currency Wholesale Sales Order*, September 3, 2013 (RPLI_SEC 0304181, at 183 and 186).

and XRP Fund II, *Ripple Currency Wholesale Sales Order*, September 3, 2013 (RPLI_SEC 0304181, at 183).

and Ripple Markets, *XRP/EUR Volume Incentive Program*, *XRP/EUR Fee Rebate Program*, January 11, 2017 (RPLI_SEC 0507279).

⁸⁶ and Ripple Markets, *XRP/EUR Volume Incentive Program*, *XRP/EUR Fee Rebate Program*, January 11, 2017 (RPLI_SEC 0507279, at 279).

make XRP tradable against the USD..."). *See also*, Complaint, at ¶ 323 ("On May 18, 2017, Ripple Agent-3 tweeted that [Platform B] introduces New Fiat Pairs for XRP Trading! USD, JPY, CAD, EUR @Ripple.").

"This Agreement shall continue until the earliest of: 1) The expiration of the Volume Incentive Program on March 31, 2017 at 11:59 pm EST; 2) Upon written notice of termination by a party if the other party is in material breach of this Agreement, if the breaching party does not, within ten (10) calendar days after receiving written notice describing an alleged material breach of this Agreement, cure the material failure; or 3) Upon the mutual agreement of the Parties to terminate this Agreement."⁸⁷

55. Ripple reserved a rebate pool pursuant to a "XRP/EUR Fee Rebate Program"

agreement that was used to pay rebates to eligible participants as a percentage rebate of fees, with the percentage of rebate to decline over the duration of the program.⁸⁸ The trading fee rebate is defined as:



56. Unlike the private equity ownership contracts, the contracts with exchanges do not give these entities any contractual right to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations or impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP. Rather, contracts with exchanges provide contractually agreed-upon compensation to the exchanges for, among other things, helping to improve liquidity in the market.

⁸⁷ and Ripple Markets, *XRP/EUR Volume Incentive Program*, *XRP/EUR Fee Rebate Program*, January 11, 2017 (RPLI_SEC 0507279, at 283). Note that the original contract with and a termination date of March 31, 2017 but the date was updated to April 30, 2017 (march and Ripple, *XRP/EUR Fee Rebate Program*, January 11, 2017 (RPLI_SEC 0507279, at 283).

and Ripple Markets, *XRP/EUR Volume Incentive Program*, *XRP/EUR Fee Rebate Program*, January 11, 2017 (RPLI_SEC 0507279, at 287-292).

⁸⁹ and Ripple Markets, *XRP/EUR Volume Incentive Program*, *XRP/EUR Fee Rebate Program*, January 11, 2017 (RPLI_SEC 0507279, at 287).

v. Contracts with On-Demand-Liquidity Customers

57. Ripple developed the ODL product to "[d]eliver instant cross-border payments without pre-funding."⁹⁰ The Complaint devotes a significant amount of attention to the ODL product.⁹¹ Ripple markets ODL primarily to companies providing cross-border transfers to their customers, commonly known as remittances, from developed countries to developing countries.⁹²

58. In 2019, Ripple entered into an agreement with MoneyGram,⁹³ the second largest remittance business.⁹⁴ Ripple gave rebates and paid other incentives to MoneyGram as part of its strategy to develop a brand awareness for its ODL product and build its reputation in this space.⁹⁵ More recently, Ripple's customers for ODL have been FinTech startups looking for fast growth and new technologies that can make young companies competitive with established

⁹⁰ "Free Working Capital with On-Demand Liquidity," https://ripple.com/ripplenet/on-demand-liquidity/.

⁹¹ See, e.g., Complaint, at ¶ 365 ("Much of the onboarding onto ODL was not organic or market-driven. Rather, it was subsidized by Ripple."). See also, Complaint, at ¶ 131 ("To encourage adoption of ODL, Ripple paid XRP to both the money transmitting businesses and certain market makers that supported the product for their efforts."); at ¶ 283 ("ODL – that 'uses' XRP (which 'use' is not market-driven but subsidized by Ripple).").

⁹² "Free Working Capital with On-Demand Liquidity," https://ripple.com/ripplenet/on-demand-liquidity/.

⁹³ "In June 2019, [MoneyGram] entered into a commercial agreement with Ripple Labs Inc. ... to utilize Ripple's On Demand Liquidity ('ODL') platform (formerly known as xRapid), as well as XRP, to facilitate cross-border non-U.S. dollar exchange settlements. The Company is compensated by Ripple for developing and bringing liquidity to foreign exchange markets, facilitated by the ODL platform, and providing a reliable level of foreign exchange trading activity." MoneyGram SEC Filing Form 10-K, Fiscal Year Ended December 31, 2019 ("MoneyGram 2019 10-K"), at 2. *See also*, Preclearance letter from MoneyGram to U.S. Securities and Exchange Commission, November 22, 2019 (SEC-LIT-EPROD-000071389, at 391) (hereinafter, "Preclearance letter").

⁹⁴ Preclearance letter (SEC-LIT-EPROD-000071389, at 393). See also, MoneyGram and Ripple, Ripple Work Order #1, June 17, 2019 (RPLI_SEC0239684); Deposition Transcript of Lawrence Angelilli, CFO of MoneyGram, August 3, 2021 ("Deposition Transcript of Lawrence Angelilli"), at 30:21-25 ("Q. What -- how do you rank as a money remitter? A. ... under any kind of public information, we're usually considered the second largest or the third largest depending on what metric you use."); "MoneyGram," https://imtconferences.com/moneygram/ ("Today MoneyGram is the second largest transfer company in the world...").

⁹⁵ Preclearance letter (SEC-LIT-EPROD-000071389, at 393-394). See also, MoneyGram and Ripple, Ripple Work Order #1, June 17, 2019 (RPLI_SEC0239684); Deposition Transcript of Lawrence Angelilli, at 211:15-212:10.

industry players (such as MoneyGram), including startup payment service providers ("PSP")⁹⁶ and digital companies, such as Azimo, TransferGo, and Nium.⁹⁷

59. Given the prominence of these contracts in the Complaint, I will discuss separate rebates and incentives to MoneyGram in more detail in Section IV.B. But, unlike the private equity ownership contracts, the contract with MoneyGram does not include any contractual right to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations or impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP.

vi. Lease and Loan Contracts

60. Yet another type of contract identified in the Complaint are lease and loan contracts.⁹⁸ For example, Ripple entered into a lease contract with

, effective June 2019.99 Per this contract, Ripple would lease XRP to

in return for a fee (such as % of monthly fair value of the lease amount).¹⁰⁰ Upon

termination of the lease contract,

returns the XRP to Ripple.¹⁰¹

⁹⁶ A PSP offers online services for accepting electronic payments by a variety of payment methods including credit card, bank-based payments such as direct debit, bank transfer, and real-time bank transfer based on online banking. *See, e.g.*, "What is Payment Service Provider," https://www.vapulus.com/en/what-is-payment-serviceprovider/.

⁹⁷ Deposition Transcript of Asheesh Birla, General Manager of RippleNet, June 23, 2021, at 237:24-25 (Azimo); "TransferGo Partners with Ripple to Offer Global Real-Time Payments Everywhere to Everyone," https://ripple.com/insights/transfergo-partners-with-ripple-to-offer-global-real-time-payments-everywhere-toeveryone/ (TransferGo); "Nium," https://ripple.com/customer-case-study/nium/ (Nium).

⁹⁸ "Another example involves RippleWorks' eventual investment into a fund that wished to invest in digital assets ('XRP Fund B') and Ripple's 'loan' of XRP to that fund so that it could engage in market-making activities." *See* Complaint, at ¶ 142.

⁹⁹ and XRP II, *Master XRP Lease Agreement*, June 24, 2019 (RPLI_SEC 0898863).
¹⁰⁰ and XRP II, *Master XRP Lease Agreement*, June 24, 2019 (RPLI_SEC 0898863, at 864).
¹⁰¹ and XRP II, *Master XRP Lease Agreement*, June 24, 2019 (RPLI_SEC 0898863, at 864).

61. The contract specifies that the purpose of the lease to

was to "enable

[**Compliance**] to conduct any activities in the virtual currency space, subject to Section 2.d (Compliance with Laws) and Section 5 (Lease Restrictions)."¹⁰² The Lease Restrictions are defined as:

"[**Interview**] agrees that its Leases with respect to the Leased XRP shall be conducted only on exchanges registered with the U.S. Financial Crimes Enforcement Network (FinCEN), and [**Interview**] shall obtain the XRP it returns to [Ripple] as provided in Section 1(f) of this Agreement only from such exchanges."¹⁰³

62. Again, unlike the private equity ownership contracts, the contract with

does not give any contractual right to a share of Ripple's profits if

Ripple is successful in its ongoing efforts to manage and develop its business operations or

impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP.

vii. Custody Arrangements

63. The Complaint also identifies Ripple's custodial contracts.¹⁰⁴ For example, Ripple

entered an XRP Purchase Agreement with , dated June 23, 2016.¹⁰⁵ Per this contract,

Ripple offers a custody service to for the XRP purchased from Ripple. The contract

describes the custody service as:

"[A]t the election of Purchaser and subject to payment in full of the Purchase Price of the Purchased XRP to be purchased by Purchaser, XRP II shall act as custodian on behalf of the Purchaser of the Purchased XRP. The Purchased XRP shall be released

and XRP II, Master XRP Lease Agreement, June 24, 2019 (RPLI_SEC 0898863, at 863).

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¹⁰³ and XRP II, *Master XRP Lease Agreement*, June 24, 2019 (RPLI_SEC 0898863, at 868).

¹⁰⁴ Complaint, at ¶ 115 ("From at least 2016 through 2019, Ripple sold approximately 115 million XRP to an entity ('Institutional Investor B') that describes itself as a 'full-service digital currency prime broker' that 'provide[s] investors with a secure marketplace to trade, borrow, lend & custody digital currencies.' Institutional Investor B paid Ripple approximately \$6.4 million for its XRP, the first \$500,000 of which it obtained in June 2016 at a 10% discount from XRP market prices.").

and XRP II, XRP Purchase Agreement, June 23, 2016 (RPLI_SEC 0000636, at 636).

to Purchaser promptly upon receipt of written instructions providing for the release of such Purchased XRP to Purchaser..."¹⁰⁶

64. The purchased XRP exposes to risks:

"Upon XRP II's transmission of the Purchased XRP to the Purchaser or its designated recipient(s) title to and risk of loss of the Purchased XRP passes to the Purchaser."¹⁰⁷

65. Unlike the private equity ownership contracts, the contract with does not give it any contractual right to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations or impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP.

viii. Marketing and Incentive Contracts

and XRP II, XRP Purchase Agreement, June 23, 2016 (RPLI_SEC 0000636, at 637).

and XRP II, XRP Purchase Agreement, June 23, 2016 (RPLI_SEC 0000636, at 638).

¹⁰⁸ Complaint, at ¶ 149 ("For example, a November 1, 2018, two-year 'Services and Marketing Agreement' with one entity promised 'certain development services to promote technologies of interest to Ripple."").

¹⁰⁹ Technologies, Inc. creates products for users that make it easier to consume premium services. For example, uses XRP and the Interledger Protocol to facilitate transacting with Internet content creators. *See*

[.] See also, and Ripple, Services and Marketing Agreement, November 1, 2018 (RPLI_00280784, at 784).

¹¹⁰ and Ripple, *Services and Marketing Agreement*, November 1, 2018 (RPLI_00280784, at 786).

xCurrent, xRapid and xVia products, or other technologies of interest to Ripple."¹¹¹ Ripple has a % investment in ¹¹². The contract terminates after 24 months.¹¹³

67. Can further engage a third party for certain projects, defined as "marketing services" in the same contract.¹¹⁴ Subject to their approval, Ripple would pay certain third parties in XRP.¹¹⁵ The contract limits the amount of XRP that can be transferred to "

of global daily XRP volume..."¹¹⁶

68. Unlike the private equity ownership contracts, the contract with does not give any contractual right to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations or impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP. Rather, simply earns fees from Ripple associated with their contractual obligations to develop services.

69. Similarly, on September 24, 2018, Ripple entered into a Marketing Incentive Agreement with **Sector Sector**, whereby Ripple incentivized **Sector** to market Ripple products to **Sector** financial institution customers.¹¹⁷ This agreement stipulates that Ripple would make incentive payments to **Sector** conditional on **Sector** customers reaching a specific level of

¹¹¹ and Ripple, *Services and Marketing Agreement*, November 1, 2018 (RPLI_00280784, at 784).

¹¹² Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2019 (RPLI_SEC 0301113, at 157).

¹¹³ and Ripple, *Services and Marketing Agreement*, November 1, 2018 (RPLI_00280784, at 786).

¹¹⁴ and Ripple, *Services and Marketing Agreement*, November 1, 2018 (RPLI_00280784, at 788-789).

¹¹⁵ and Ripple, *Services and Marketing Agreement*, November 1, 2018 (RPLI_00280784, at 788).

¹¹⁶ and Ripple, *Services and Marketing Agreement*, November 1, 2018 (RPLI_00280784, at 789).

¹¹⁷ and Ripple Services Inc. ("Ripple Services"), *Marketing Incentive Agreement*, September 24, 2018 (RPLI_SEC 0894629, at 629).

interbank cross-border fiat currency transfers using Ripple's products.¹¹⁸ For example, Ripple incentives include XRP distributions to **and** to compensate them for waiving **and** fees for customers that complete cross-border transactions, for paying a **and** to customers based on achieving certain transaction volume milestones on RippleNet, and as reimbursement for customer **and** expense.¹¹⁹ Additionally, Ripple will pay **and** an incentive for total volume of payments settled through the hosted platform **and** is developing for providing xCurrent to their customers and RippleNet Payments for all "inter-financial institution cross-border production payments between RippleNet Members over RippleNet where at least one (1) RippleNet Member is a Customer, Ripple will pay

of such cross-border volume in XRP."120 Furthermore, Ripple will payXRP based on the volume ofpayment volume.121

70. earns fees and other compensation from Ripple associated with their contractual obligations to help develop certain services with no ongoing obligations for Ripple to expend efforts to increase XRP's price. Unlike the private equity ownership contracts, the service and marketing contracts do not give these entities receiving XRP a contractual right to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations or impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP.

¹¹⁸ and Ripple Services, *Marketing Incentive Agreement*, September 24, 2018 (RPLI_SEC 0894629, at 636).

¹¹⁹ and Ripple Services, *Marketing Incentive Agreement*, September 24, 2018 (RPLI_SEC 0894629, at 629-630).

¹²⁰ and Ripple Services, *Marketing Incentive Agreement*, September 24, 2018 (RPLI_SEC 0894629, at 629-630).

¹²¹ and Ripple Services, *Marketing Incentive Agreement*, September 24, 2018 (RPLI_SEC 0894629, at 630).

ix. Employee and Executive Compensation Contracts

71. Ripple periodically grants compensation in the form of XRP. This is another type of contract referenced in the Complaint.¹²² For example, on May 9, 2018, a Ripple employee received an Employment Offer Letter pursuant to which he will receive "**Comparent** XRP annually on the anniversary of your Start Date for the years 2019, 2020, 2021 and 2022 (the 'XRP Awards') provided [he is] continuously employed full-time by the Company on such anniversary dates."¹²³ Ripple also entered into an XRP award agreement, amended in 2017 and 2018, whereby it granted an aggregate of **Comparent** XRP to Ripple's CEO.¹²⁴ The contract included provisional "vesting contingent upon meeting requirements for service, XRP price and XRP trading volume. The remaining **Comparent** XRP was fully vested in 2018."¹²⁵

72. In the second quarter of 2019, Ripple entered another agreement whereby it would grant 250 million XRP to Ripple's CEO. The XRP was "transferred to [Ripple's] CEO at the time of the grant. Of this amount, 50% vested immediately upon grant with the remainder subject to forfeiture provision lapsing quarterly over the next 4 years."¹²⁶

73. These compensation packages resulted in employees, as part of their compensation for their services, owning an asset (subject to various conditions such as vesting). Unlike the private equity ownership contracts, the compensation contracts do not give the employees any contractual right to a share of Ripple's profits if Ripple is successful in its

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¹²² See, e.g., Complaint, at ¶ 127-130.

¹²³ Ripple, *Employment Offer Letter*, May 9, 2018 (RPLI_SEC 0431814, at 814).

¹²⁴ Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2019 (RPLI_SEC 0301113, at 154).

¹²⁵ Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2019 (RPLI_SEC 0301113, at 154-155).

¹²⁶ Ripple Labs, Inc., Consolidated Financial Statements, December 31, 2019 (RPLI_SEC 0301113, at 155).

ongoing efforts to manage and develop its business operations or impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP.

x. Miscellaneous Contracts

a. Joint Ventures and Equity Investments

74. The Complaint also discuss Ripple's joint venture contract¹²⁷ and their other equity investments in third-party entities.¹²⁸ Specifically, Ripple and SBI Holdings have entered into a Joint Venture Agreement dated March 30, 2016 to establish, develop, and operate Ripple's expansion in Asia.¹²⁹As part of the contract, Ripple agreed to purchased 40% of the common stock in a newly created entity, SBI Ripple Asia Co., Ltd. SBI Holdings retained the remaining 60% of the common stock.¹³⁰ In May 2016 Ripple invested **Common** for 40% of the outstanding stock of SBI Ripple Asia Kabushiki Kaisha.¹³¹

¹²⁷ See, e.g., Complaint, at ¶ 274 ("In its 2016 'Year In Review' summary, posted on its website on December 28, 2016, Ripple reminded readers of its January 2016 announcement of a joint venture to distribute 'Ripple's solutions' in certain countries.").

¹²⁸ See, e.g., Complaint, at ¶¶ 279-280 ("On April 11, 2018, Ripple tweeted from the handle @Ripple that it 'had invested \$25 million in XRP to Blockchain Capital Parallel IV, LP' to 'support and develop additional [XRP] use cases beyond payments.")

¹²⁹ The joint venture gave SBI Holdings right of "exclusive distributor" of Ripple products in Asia, defined as "Japan, China (including Hong Kong), Taiwan, Korea, and ASEAN countries (excluding Singapore)." SBI Holdings, Inc. and Ripple Labs, Inc., *Joint Venture Agreement*, March 30, 2016 (RPLI_SEC 0163289, at 292).

¹³⁰ SBI Holdings, Inc. and Ripple Labs, Inc., *Joint Venture Agreement*, March 30, 2016 (RPLI_SEC 0163289, at 291). See also, Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2020, at 24.

¹³¹ Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2020, at 24.

75. In return for the right to "sublicense the Ripple technology, Ripple would receive a 15% royalty on any license fees charged to customers of the joint venture."¹³² The agreement may be terminated upon mutual written agreement of the parties.¹³³

76. In January 2017, Ripple and the joint venture entity, **1999**, entered a statementof-work that describes the "tasks and responsibilities to be executed by Ripple to support

for their needs to become self-sufficient in sales [and] product delivery ... [to] implement ... a cross-border payment services using the Ripple Solution."¹³⁴ markets, licenses, and sells Ripple's software licenses and services in Asia.¹³⁵

77. On October 1, 2017, Ripple entered into a contract with a venture capital fund, Blockchain Capital Parallel IV, L.P., to invest in early-stage to growth venture companies that are developing blockchain-based technologies.¹³⁶ Ripple invested XRP in the fund and in turn, Ripple shared the profits (and losses) with the other partners of Blockchain Capital Parallel IV.

78. Unlike the private equity ownership contracts, these contracts do not provide the joint venture or Blockchain Capital Parallel IV, L.P. with an XRP contractual right to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business

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¹³² Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2020, at 24.

¹³³ SBI Holdings, Inc. and Ripple Labs, Inc., *Joint Venture Agreement*, March 30, 2016 (RPLI_SEC 0163289, at 301). See also, SBI Holdings Inc., Share Purchase Agreement, May 27, 2016 (RPLI_SEC 0357972, at 975).

¹³⁴ Ripple Solutions Support, Statement of Work for SBI Ripple Asia in support of Clients, February 2017 (RPLI_SEC 0890252, at 255). Ripple support per the Statement of Work includes marketing and product sales, project management, software development, and training.

[,] *Master Reseller Agreement*, September 24, 2018 (RPLI_SEC 0874207, at 207) and , *Marketing Incentive Agreement*, September 24, 2018 (RPLI_SEC 0246681, at 681).

¹³⁶ Blockchain Capital Parallel IV, LP, *Limited Partnership Agreement*, October 1, 2017 (RPLI_SEC 0272694, at 698).

operations or impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP.

b. Option Contracts

79. The Complaint also discusses Ripple's XRP Options.¹³⁷ For example, Ripple and R3 HoldCo LLC ("R3 HoldCo") entered into a contract, dated September 3, 2018, that gives R3 HoldCo the right to purchase specified amounts of XRP at a per unit price of between September 3, 2018 and September 20, 2019. Ripple grants R3 HoldCo the right to purchase up to

units of XRP, in whole or in part, at any time during the exercise period, and up to an additional units of XRP based on specified increments and timing, subject to the terms of the contract.¹³⁸ In other words, the option constituted an option to buy an asset (XRP), rather than an option to buy a contractual right (such as stock or debt) to profits generated by Ripple if it were successful in managing and developing its business.

80. Unlike the private equity ownership contracts, options are not associated with contractual rights to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations or impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP.

XRP (the 'Restricted XRP') (in each case, subject to the applicable provisions below).").

¹³⁷ See, e.g., Complaint, at ¶ 151 ("From January 2018 through December 2019, Ripple sold at least 1.65 billion XRP with certain entities exercised options to buy XRP that Ripple had granted (the 'Option Sales').").

¹³⁸ R3 HoldCo and XRP II, Amended and Restated Option to Purchase XRP, September 3, 2018 (RPLI SEC 0863819, at 819) (R3 HoldCo is entitled "to purchase from the Company (i) up to XRP (the 'Unrestricted XRP'), and (ii) up to

c. Charitable Donations (RippleWorks)

81. Finally, the Complaint discusses Ripple's distributions to RippleWorks.¹³⁹ RippleWorks is a 501(c)(3) foundation that provides financial support for social ventures and projects in Brazil, Mexico City, Ghana, Nigeria, and the U.S.¹⁴⁰ Unlike the private equity ownership contracts, charitable donations are not associated with contractual rights to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations or impose any obligation on Ripple to expend ongoing efforts to increase the price of XRP.

III. THE SEC'S ECONOMIC ASSERTIONS IN ARGUING FOR XRP'S "INVESTMENT CONTRACT" STATUS ARE FUNDAMENTALLY FLAWED

A. ECONOMIC REALITY OF RIPPLE'S SECURITIES STANDS IN SHARP CONTRAST TO THAT OF THE ALLEGED INVESTMENT CONTRACTS

82. As documented above, the economic substance of Ripple's private equity ownership contracts stands in sharp contrast to the economic substance of the Ripple XRP contracts. The former are funding mechanisms that enable Ripple to raise funds for its business operations with the holders of these ownership stakes enjoying certain contractual rights to the profits that Ripple might generate from its efforts in managing and developing its business operations. None of Ripple's contracts for the distribution of XRP entitles the holder of XRP to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations and none requires Ripple to expend ongoing efforts to increase XRP's price.

¹³⁹ Complaint, at ¶ 281 ("At various times, Ripple publicly touted that it was making certain of the XRP distributions through xPring or RippleWorks, further making clear to potential investors that Ripple was enlisting the efforts of persons other than investors with respect to XRP.").

¹⁴⁰ "We are on a mission to help impactful ventures thrive," https://www.rippleworks.org/. "Our Story," https://www.rippleworks.org/our-story/.

The fact that Ripple may have used the proceeds of its sales of XRP to help fund its own operations does not change the economic substance of the transaction or create any obligations on the part of Ripple to share its profits with the purchasers of XRP. Moreover, as I show below, Ripple's XRP distributions do not have a statistically significant relation with long-run XRP price return after controlling for returns of other non-XRP cryptocurrencies outside of Ripple's control.

83. The SEC's claim that the "economic reality" establishes that XRP is an "investment contract" because market actors "speculated" on XRP's price and, moreover, that Ripple's efforts impacted XRP's price is equally mistaken. As I will show in Section III.B, the asserted "speculative" nature of XRP fails to further the SEC's "economic reality" argument concerning XRP. Rather, as I will show in Sections III.C and D, the economic reality is that XRP's long-run price returns are in fact associated with factors outside Ripple's control, namely, price returns of non-XRP cryptocurrencies, and that the XRP price returns are unrelated to factors under Ripple's control, including the various distributions of XRP mentioned in the SEC's Complaint.

B. SPECULATIVE DEMAND IS NOT UNIQUE TO INVESTMENT CONTRACTS

84. The SEC's affirmative theory for why XRP should be deemed an "investment contract" extensively relies upon the characterization of XRP as a "speculative" investment and that speculative demand would allegedly cause XRP's price to rise.^{141,142}

85. Economists have long recognized that speculative demand is widespread among assets that are not securities, including money, foreign currencies, commodities, and virtual currencies. Participation by speculators is anything but unique to securities markets.

86. For example, speculators in foreign currency markets routinely hope to profit from fluctuations in the market.¹⁴³ Hasselgren et al. (2020) demonstrate the importance of speculators in the foreign exchange ("FX") market by analyzing the U.S. Commodity Futures Trading Commission ("CFTC") Commitment of Traders reports, which are typically used to measure "speculative capital in the currency market."¹⁴⁴ Schreiber (2014) and Burnside (2007) similarly comment on the presence of speculators in FX markets, concluding that "speculators

¹⁴¹ See, e.g., Complaint, at ¶ 232 ("[P]rincipal reason for anyone to buy XRP was to speculate on it as an investment."). See also, Complaint, at ¶ 66 ("Ripple began its efforts by attempting to increase speculative demand and trading volume for XRP..."); at ¶ 69 ("Ripple made it part of its 'strategy' to sell XRP to as many speculative investors as possible."); at ¶ 105 (Ripple sold XRP to "institutional and other accredited investors who are purchasing XRP for speculative purposes."); at ¶ 235 ("[I]n its application to the NYDFS for XRP II in 2016, Ripple acknowledged that buyers were purchasing XRP for speculative purposes."); at ¶ 278 ("Pressed about 'speculation' in the digital asset space and XRP investor 'expectations' from Ripple, Garlinghouse explained: ... there's going to be demand for that, when you have fixed supply, ... and you see increase in demand, prices go up."); at ¶ 396 ("Ripple promoted XRP as a speculative investment when either no use case existed or, with the eventual development of the ODL product, only a small fraction of XRP arguable was being used for a few moments for non-investment purposes before being sold to investors.").

¹⁴² I am not expressing an opinion or providing an assessment of whether or not XRP is a speculative investment.

¹⁴³ Osler, C., "Macro Lessons From Microstructure," *International Journal of Finance and Economics*, Vol. 11, 55-80, 2006 (Characterizing currency speculator as "a player who focuses on change in exchange rates, in contrast to a player, such as an exporter or importer, whose activity is based on transaction needs.").

¹⁴⁴ Hasselgren, A., J. Peltomaki, and M. Graham, "Speculator activity and the cross-asset predictability of FX returns," *International Review of Financial Analysis*, Vol. 72, 2020, at 2 and 15.

have a major influence on FX markets"¹⁴⁵ and that the carry trading is "a currency speculation strategy that is widely used by practitioners."¹⁴⁶

87. Speculative activity is also well-documented in commodities and commodity futures markets. Harris (2003) observes that futures on "agricultural, industrial, and financial commodities are extremely useful to hedgers throughout the economy ... [but] also interest many speculators. ... Trading by hedgers and speculators, and trading among the dealers who serve them, generate very large volumes in many futures markets."¹⁴⁷ Smith (2009) studies the role of speculators in the oil market.¹⁴⁸ Yang and Leatham (1999) show that speculators could also improve the amount of information reflected in commodity futures prices.¹⁴⁹

88. Speculators also play an active role in virtual currencies. Lee et al. (2020) analyzes the differences in the objectives of speculators and tech-savvy investors in Bitcoin. Lee et al. (2020) explain that speculators in Bitcoin seek to profit from extrapolating the price trends, while tech-savvy investors trade based on the "prospective value of Bitcoin, which is a function

¹⁴⁵ Schreiber, B., "Identifying Speculators in the FX Market: A Microstructure Approach," *Journal of Economics and Business*, Vol. 73, 97-119, May-June 2014, at 98.

¹⁴⁶ Burnside, C., M. Eichenbaum, and S. Rebelo, "The Returns to Currency Speculation in Emerging Markets," *American Economic Review*, Vol. 97, 333-338, May 2007, at 333.

¹⁴⁷ Harris, L., <u>Trading & Exchanges: Market Microstructure for Practitioners</u>, Oxford University Press, 2003, at 46. *See also*, Hull, J., <u>Options, Futures, and Other Derivatives</u>, 10th edition, 2017, at 19 ("The success of derivatives can be attributed to their versatility. They can be used by hedgers, speculators, and arbitrageurs."); Madura, J., <u>Financial Markets and Institutions</u>, 12th edition, 2016, at 351 ("Derivatives are financial contracts whose values are derived from the values of underlying assets. They are widely used to speculate on future expectations.").

¹⁴⁸ Smith, J., "World Oil: Market or Mayhem?" *Journal of Economic Perspectives*, Vol. 23, Number 3, 145-164, Summer 2009; Knittel, C., and R. Pindyck, "The Simple Economics of Commodity Price Speculation," *American Economic Journal: Macroeconomics*, Vol. 8:2, 85-110, April 2016.

¹⁴⁹ Yang J., and D. Leatham., "Price Discovery in Wheat Futures Markets," Journal of Agricultural and Applied Economics, Vol. 31 (2), August 1999, 359-370, at 361.

of factors that capture the market demand and technical supply of Bitcoin."¹⁵⁰ According to Bolt and van Oordt (2019), speculators are prevalent holders of virtual currencies specifically observing that the high volatility of Bitcoin prices indicates sensitivity to changes in speculators' beliefs in the early-adoption phase of a virtual currency.¹⁵¹

89. As these examples illustrate, the economic substance of foreign currencies, commodities, commodity futures, and virtual currencies is not transformed into a "security" simply by virtue of the fact that market participants speculate on the price movements of these assets and may seek to earn a profit from doing so. The SEC's characterization of XRP as a "speculative" investment leads nowhere – there is speculative demand for many assets that are not "investment contracts."

C. VARIATION IN LONG-RUN XRP PRICE RETURN IS EXPLAINED BY FACTORS OUTSIDE OF RIPPLE'S CONTROL

90. The SEC alleges that Ripple distributed XRP to create profits for themselves and the purchasers "in the form of increased *prices* for XRP."¹⁵² The SEC fails to consider possible alternative explanations for the economic reality that Ripple's efforts do not impact XRP prices. Below, I assess whether XRP price return can be explained by factors that are outside the control of Ripple's alleged efforts, such as the price return of equities, commodities, currencies, or other non-XRP cryptocurrencies. In my empirical analysis of long-run XRP price return, I find that:

¹⁵⁰ Lee, A., M. Li, and H. Zheng, "Bitcoin: Speculative Asset or Innovative Technology?" Journal of International Financial Markets, Institutions & Money, Vol. 67, 101-209, 2020, at 101.

¹⁵¹ Bolt, W., and M. van Oordt, "On the Value of Virtual Currencies," *Journal of Money, Credit and Banking*, Vol. 52(4), 835-862, 2019, at 836.

¹⁵² Complaint, at ¶ 90 (emphasis added). See also, Complaint, at ¶ 60 (SEC alleges that "Ripple and Larsen embarked on a large-scale unregistered public distribution of XRP and – with the goal of immense profits.").

- Variation in long-run XRP price return can be explained by exogenous cryptocurrency market factors that are outside Ripple's control.
- Non-cryptocurrency assets (*e.g.*, equities) are not correlated with XRP price return, controlling for cryptocurrency market factors.
- On average, XRP price returns are not statistically different than zero, controlling for cryptocurrency market factors, over which Ripple has no control.

In the next section, I also analyze whether Ripple's alleged efforts – in particular, the various distributions of XRP – explain the variation in long-run XRP price return.

i. Variation in Long-run XRP Price Return Can Be Explained by Exogeneous Cryptocurrency Market Factors That Are Outside of Ripple's Control

91. I empirically examine the long-run relation between XRP price return (the

"dependent variable") and various factors, such as cryptocurrency returns, equity returns and commodity returns (the "explanatory variables"), using a well-established framework in finance often referred to as a "factor model." Factor models are supported by more than 50 years of rigorous, academic research.¹⁵³ Factor models are used to determine the factors that explain the common component of the variation in asset price returns. Some of the original factor models were applied to equities, but the same framework has since been applied successfully to other types of assets, including fiat currencies, commodities, bonds, and cryptocurrencies.¹⁵⁴

¹⁵³ See, e.g., Sharpe, W., "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," *The Journal of Finance*, Vol. 19(3), 1964; Fama, E., and K. French, "Common Risk Factors in The Returns on Stocks and Bonds," *Journal of Financial Economics*, Vol. 33, 3-56, 1993; Fama, E., and K. French, "Dissecting Anomalies with a Five-Factor Model," *The Review of Financial Studies*, Vol. 29, 69-103, 2016.

¹⁵⁴ See, e.g., Lustig, H., N. Roussanov, and A. Verdelhan, "Common Risk Factors in Currency Markets," *Review of Financial Studies*, Vol. 24(11), 2011; Szymanowska, M., F. De Roon, T. Nijman, and R. Van Den Goorbergh, "An Anatomy of Commodity Futures Risk Premia," *The Journal of Finance*, Vol. 69(1), 2014; Bai, J., T. G. Bali, and Q. Wen, "Common Risk Factors in the Cross-Section of Corporate Bond Returns," *Journal of Financial Economics*, Vol. 131, 2019; Liu, Y, and A. Tsyvinski, "Risks and Returns of Cryptocurrency," *The Review of Financial Studies*, Vol. 34 (6), 2021.

92. There is no consensus in the literature on the nature or the number of factors that should be used. For example, the capital asset pricing model ("CAPM") uses a single factor, the market return (typically a market index), to assess whether an asset's return co-moves with the return of the market.¹⁵⁵ Additional factors have since been proposed, such as the Fama-French three-factor, five-factor, and multifactor models.¹⁵⁶ In fact, more than 300 factors have been proposed in the academic literature to date.¹⁵⁷

93. Many, but not all, factor models include market indices as factors. Such indices are readily available for traditional assets, such as stocks, commodities, or currencies (see below), but not for the cryptocurrency market. I, therefore, construct cryptocurrency factors by employing a well-established mathematical method known as Principal Component Analysis ("PCA").¹⁵⁸ The PCA can be used to distill and summarize the price variation in the cryptocurrency market into a small set of factors by identifying the most "important" components – meaning that these components capture most of the variance in price returns.¹⁵⁹ The principal components ("PCS") are constructed from the price returns of non-XRP cryptocurrencies. Each PC represents a specific combination of non-XRP cryptocurrencies,

¹⁵⁵ Sharpe, W., "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," *The Journal of Finance*, Vol. 19 (3), 425-442, September 1964; Ross, S., "The Current Status of the Capital Asset Pricing Model (CAPM)," *The Journal of Finance*, Vol. 33 (3), 885-901, June 1978.

¹⁵⁶ Fama, E., and K. French, "The Cross-Section of Expected Stock Returns," *The Journal of Finance*, Vol. 47 (2), June 1992; Fama, E., and K. French, "Dissecting anomalies with a Five-Factor Model," *The Review of Financial Studies*, Vol. 29 (1), 2015; Fama, E., and K. French, "Multifactor Explanations of Asset Pricing Anomalies," *The Journal of Finance*, Vol. 51 (1), March 1996.

¹⁵⁷ See, e.g., Harvey, C., Y. Liu, and H. Zhu, "... and the Cross-Section of Expected Returns," *The Review of Financial Studies*, Vol. 29 (1), 5-68, January 2016, at 8 ("We choose a subset of papers that we suspect are in review at top journals, have been presented at top conferences, or are due to be presented at top conferences. ... We catalogue 316 different factors.").

¹⁵⁸ See, e.g., Stock, J., and M. Watson, <u>Introduction to Econometrics</u>, 4th Edition, 2019, Pearson, NY, at 490-495. Jolliffe, I., <u>Principal Component Analysis</u>, 2nd Edition, 2002, Springer, NY, at 1-9.

¹⁵⁹ Stock, J., and M. Watson, Introduction to Econometrics, 4th Edition, 2019, Pearson, NY, at 490-495.

where the weights the procedure assigns to each of these cryptocurrencies are unique to a particular PC. The PCA provides an ordered set of PCs based on how much the particular PC – or, rather, the weighted sum of the *non-XRP* cryptocurrency returns comprising the PC – contributes to explaining the variation in all the underlying cryptocurrency price returns. For example, as I show in Exhibit 2, when examining the price returns of 9 non-XRP cryptocurrencies between August 2013 and December 2020, and 91 non-XRP cryptocurrencies between August 2015 and December 2020, merely four PCs explain, respectively 94% and 98%, of the variance in the price return of the underlying non-XRP-cryptocurrencies. In turn, each of the four PCs is comprised of a unique, weighted sum of the non-XRP cryptocurrencies.

94. Principal Component Analysis has been extensively used in empirical, academic research, including in the analysis of cryptocurrencies. For example, Hu et al. (2019) analyzed the relation between Bitcoin and other coins using a principal component analysis.¹⁶⁰ Liew et al. (2019) show that "more than one principal component explains the cross-sectional variation of cryptocurrency returns."¹⁶¹ I discuss these papers in more detail in the next section.

95. I use PCA to construct the non-XRP cryptocurrency market factors and then use the PCs in a linear regression model to analyze the relation between XRP price return and the price returns of other cryptocurrencies. For the non-XRP cryptocurrencies, I select only cryptocurrencies with available price from August 6, 2013 to December 20, 2020¹⁶² and analyze

¹⁶⁰ Hu, A., C. Parlour, and U. Rajan, "Cryptocurrencies: Stylized facts on a new investible instrument," *Financial Management*, 2019, at 1061-1062.

¹⁶¹ Liew, J., R. Li, T. Budavári, and A. Sharma, "Cryptocurrency Investing Examined," *The Journal of the British Blockchain Association*, Vol. 2(2), 2019, at 1 and 6.

¹⁶² For analysis focused on the estimation period August 11, 2015 - December 20, 2020, I use cryptocurrencies with available price information during that period and further restrict the data sample to coins that have a market cap of at least \$100,000 in either August 2015 or December 2020 (or both) to avoid using small cryptocurrencies with less informative price information.

the 28-day price return (hereafter, the "monthly price return") for these coins.¹⁶³ By examining returns at a monthly frequency over a long period of time (between five and seven years, depending on the specification), I am able to reduce the effect of any short-lived movements in the cryptocurrency market and assess the long-run, common factors that explain variation in XRP prices.¹⁶⁴ I discuss the data I use in my empirical analysis in more detail in Appendix C.

96. To analyze the relation between XRP return and return of other cryptocurrencies, I estimate linear regression models where the PCs represent the non-XRP cryptocurrency factors:

$$(XRP_return - risk-free \ rate)_t = a + b_1 * PC_l_t + b_2 * PC_2_t + \dots + b_k * PC_k_t + \varepsilon_t$$

where the dependent variable is XRP price return less the risk-free rate during the 28-day period t, a is a constant term, PC_1 thru PC_k denotes k principal components (each representing a combination of non-XRP cryptocurrencies price return subtracting the risk-free rate), and ε denotes the error term.¹⁶⁵ The error term captures the difference between the dependent variable

¹⁶³ Specifically, I define the 28-day price return as: *Price (day t+28) / Price (day t) – 1*, with prices measured at midnight UTC. I use a 28-day interval rather than a calendar month and always start the 28-day period on a Tuesday to address several potential concerns. First, this ensures all periods are of equal length (28 days). Second, it allows me to analyze XRP starting in mid-August 2013, when XRP first starts trading on a public exchange. Third, I circumvent any concerns that trading on weekends is of lower volume and of a somewhat different nature, as each period will end on a Tuesday. I use Tuesday rather than Monday to reduce the number of U.S. holidays.

¹⁶⁴ Note that both the original and recent factor models by Fama and French are at the monthly frequency. See, e.g., Fama, E., and K. French, "Dissecting Anomalies with a Five-Factor Model," The Review of Financial Studies, Vol. 29 (1), 2015, p. 73 ("Our sample is the 618 months from July 1963 to December 2014 (henceforth 1963–2014). The average monthly returns []"). Liu and Tsyvinski (2021) analyze the relation between cryptocurrency returns and various factors at the monthly frequency. See Liu, Y., and A. Tsyvinski, "Risks and Returns of Cryptocurrency," The Review of Financial Studies, Vol. 34, Issue 6, June 2021, at Tables 2, 3, 4, 5, 13, and 14.

¹⁶⁵ I use the one-month U.S. Treasury bill rate as the risk-free rate. See Appendix C for further detail.

(XRP price return) and XRP price return estimated using the regression model.¹⁶⁶ The academic literature often refers to the coefficients b_1 though b_k as "betas."¹⁶⁷

I can rewrite the regression equation as:¹⁶⁸

$$(XRP \ return - risk-free \ rate)_t - \sum_k b_k * PC_{k,t} = a + \varepsilon_t$$

where the left-hand side can be interpreted as the XRP price return adjusted for the non-XRP cryptocurrency market factors. The right-hand side of the equation includes a constant term, *a*, that represents the "remaining" average return, after accounting for the exposure to the non-XRP cryptocurrency market factors.

97. Exhibit 3 shows results for the factor model for two estimation periods: August 6, 2013 – December 15, 2020 ("Estimation Period 1") and August 11, 2015 – December 20, 2020 ("Estimation Period 2"). August 6, 2013, the first date in Estimation Period 1, is the Tuesday when XRP prices are available at cryptocurrency exchanges. August 11, 2015, the first date in

¹⁶⁶ See, e.g., Kaye, D., and D. A. Freedman, "Reference Guide on Statistics," <u>Reference Manual on Scientific</u> <u>Evidence</u>, 3rd Edition, The National Academies Press, Washington DC, 211-302, 2011, at 281-282 ("[T]he difference between the estimated value and the true value is due to the action of the error term ε ... Without ε , observed values would line up perfectly with expected values, and estimated values for parameters would be exactly equal to true values. This does not happen.").

¹⁶⁷ See, e.g., Cochrane, J., <u>Asset Pricing</u>, revised edition, 2005, at 16 ("This is *a beta pricing model*. It says that each expected return should be proportional to the regression coefficient, or beta, in a regression of that return on [factors].").

¹⁶⁸ Note that, while asset pricing models are often interested in price returns for portfolios, here the focus is on only a single asset, XRP, and the average variation in its price returns over the estimation period.

Estimation Period 2, is the first Tuesday after Ethereum (ETH) started trading. Both estimation

periods end on or prior to December 20, 2020.^{169,170}

98. The results of Exhibit 3 show that, in both estimation periods, the principal components representing the non-XRP cryptocurrency price returns have a statistically significant relationship with XRP price return.¹⁷¹ For example, in Estimation Period 1, the coefficients on two (of the four) PCs are statistically significant at the 5% level.¹⁷² In Estimation Period 2, the coefficients on 9 (of the 11) PCs are statistically significant at the 5% level.¹⁷³

¹⁷¹ The PCA generates as many PCs as there are underlying coins. For each specification, I calculate the Bayesian information criterion (BIC) as $BIC = -2 \times ln(L) + ln(N) \times k$, where *L*, *N* and *k* are the estimated likelihood, number of observations, and number of parameters, respectively. I report the results for the specification for which the BIC is the lowest to the extent that any additional PC added to the model would only result in a small decrease (a decrease of less than 2 units) in the BIC criterion. *See, e.g.*, Kass, R., and A. Raftery, "Bayes Factors," *Journal of the American Statistical Association*, Vol. 90(430), 773-795, June 1995, at 777. *See also* Stock, J., and M. Watson, "Macroeconomic Forecasting Using Diffusion Indexes," *Journal of Business & Economic Statistics*, Vol. 20 (2), 147-162, 2002; and in the asset pricing setting, Ludvigson, S., and S. Ng, "The Empirical Risk-Return Relation: A Factor Analysis Approach," *Journal of Financial Economics*, Vol. 83 (1), 171-222, 2007, at 8 ("the [factors] are estimated by principal components analysis ... minimizing the BIC yields the preferred set of factors.").

¹⁷² PCA constructs PCs that do not have a unique sign. One could multiply *all* PCs by negative one and obtain an equally valid PCA decomposition. But doing so would also result in all the PC coefficients in the regression reversing their sign. Therefore, when examining PC coefficients, I will focus only on their statistical significance, not the sign of the coefficient. However, regardless of the sign of the PCA decomposition, the economic interpretation of the results would be *identical*. For example, if a one percentage point increase in the price return of Bitcoin – one of the PCs' components – were associated with a one percentage point increase in the price return of XRP, that would be true regardless of the sign of the decomposition.

¹⁷³ A 5% statistically-significant (non-zero) relationship between XRP and the non-XRP cryptocurrency-based PCs means that there is less than a 5% chance that the estimated relationship is due to random chance. *See, e.g.*, Kaye, D., and D. Freedman, "Reference Guide on Statistics," <u>Reference Manual on Scientific Evidence</u>, 3rd Edition, 2011, The National Academies Press, Washington DC, 211-302, at 250 ("The discrepancy between the observed and the expected is far too large to explain by random chance."). *See also*, at 251-252 ("In practice, statistical analysts typically use levels of 5% and 1%. The 5% level is the most common in social science ... An

¹⁶⁹ I use December 20, 2020 as the end date of my analysis period to avoid potential price effects following the SEC's complaint. The anticipation of the SEC's complaint was made public on December 21, 2020 (*See, e.g.*, Roberts, J., "Ripple says it will be sued by the SEC, in what the company calls a parting shot at the crypto industry," *Fortune*, December 21, 2020, https://fortune.com/2020/12/21/ripple-to-be-sued-by-sec-cryptocurrency-xrp/), and the initial complaint was filed on December 22, 2020.

¹⁷⁰ I use 28-day periods for Estimation Period 1 ending on December 15, 2020. The last monthly period in Estimation Period 2 has only 26 days (ending on December 20, 2020). I adjust the returns for this 26-day period to make them comparable to all the other 28-day periods.

Moreover, the adjusted R-squared shows that more than half of the variation in the long-run XRP price return can be explained by other, non-XRP cryptocurrencies.¹⁷⁴ The adjusted R-squared in Estimation Period 1, which includes a period when the cryptocurrency markets were arguably less mature,¹⁷⁵ exceeds 50%. The adjusted R-squared in Estimation Period 2 exceeds 90%.

99. Exhibit 4 shows the top 20 non-XRP cryptocurrencies by market capitalization as of August 11, 2015 (the start date of Estimation Period 2) that were used in the PCA. Bitcoin, Litecoin, and Ethereum have the highest market capitalization in this sample of coins. Bitcoin and Litecoin were also included as underlying cryptocurrencies for the analysis over Estimation Period 1. I also implemented a regression model directly using the largest cryptocurrencies (as measured by market cap) as my independent variables. Exhibit 5 shows the results of this regression, and it demonstrates that the importance of the underlying cryptocurrencies in explaining variation in XRP price return hold even if I make no use of the PCA. In both estimation periods, the coefficient for at least one cryptocurrency is statistically significant at the 5% level. The R-squared is again more than 50% in Estimation Period 1 and more than 90% in

unexplained reference to highly significant results probably means that [the probability or rejecting the null hypothesis] is less than 1%. These levels of 5% and 1% have become icons of science and the legal process.").

¹⁷⁴ The R-squared measures the percentage of the variation in the dependent variable (*e.g.*, XRP price return) that the regression model explains. *See, e.g.*, Kaye, D., and D. A. Freedman, "Reference Guide on Statistics," <u>Reference Manual on Scientific Evidence</u>, 3rd Edition, 2011, The National Academies Press, Washington DC, 211-302, at 293 ("*R-squared (R²)*. Measures how well a regression equation fits the data. R-squared varies between 0 [0%] (no fit) and 1 [100%] (perfect fit).").

¹⁷⁵ Liu, Y., and A. Tsyvinski, "Risks and Returns of Cryptocurrency," *The Review of Financial Studies*, Vol. 34 (6), 2689-2727, June 2021, at 2719 (commenting that there were "considerably more uncertainty and learning about cryptocurrency as an asset class" during the early period and that "uncertainty has decreased" over time). Pastor and Veronesi (2003) explained that it takes time for "investors to fully learn and understand emerging technologies." *See* Pastor, L., and P. Veronesi, "Stock Valuation and Learning about Profitability," *The Journal of Finance*, Vol. 68 (5), 1749-1789, October 2003; Makarov, I., and A. Schoar, "Trading and arbitrage in cryptocurrency markets," *Journal of Financial Economics*, Vol. 135 (2), 293-319, 2020, at 296 (The authors analyze trading at global, cryptocurrency exchanges and comment that prior to January 2017 the "[market] liquidity in crypto markets was significantly lower than in later periods.").

Estimation Period 2, similar to what I found when using the PC (*see* Exhibit 3). These results are not surprising given that the PCA is merely a representation of the underlying cryptocurrencies.

100. In summary, my empirical analyses show that the variation in long-run price return of XRP can be explained by exogenous, non-XRP, cryptocurrency price returns or, put differently, by factors outside Ripple's control.

ii. Non-cryptocurrency Assets Are Not Correlated with XRP Price Return Controlling for Cryptocurrency Market Factors

101. I next examine the role that other traditional assets play in explaining XRP price return. Overall, I find that other assets have little to no additional explanatory power beyond that of the cryptocurrency factors.¹⁷⁶ Specifically, I add the returns (less the risk-free rate) for 1) S&P500; 2) MCSI World Index and MCSCI Emerging Market Index; 3) Bloomberg Commodity Index; 4) Gold; and 5) U.S. Dollar Index (USDX), Japanese Yen, and Euro as factors.¹⁷⁷ Adding these returns produces a total of 10 specifications. As I show in Exhibits 6 and 7, none of the coefficients for the non-cryptocurrency assets is statistically significant at the 5% level. The adjusted R-squared for each of the estimation periods are similar, when compared to the base case of only controlling for cryptocurrency factors (column (1) in each of the two exhibits). This means that returns on the traditional assets I examined do not explain any meaningful amount of the variation in XRP price return controlling for non-XRP cryptocurrency factors. As I discuss below, my findings are consistent with the academic literature that finds

¹⁷⁶ Note that not all explanatory variables need to be PCs, as is the case in these Exhibits. *See, e.g.*, Ludvigson, S., and S. Ng, "The empirical risk–return relation: A factor analysis approach," *Journal of Financial Economics*, Vol. 83(1), 171-222, 2007, Table 2 ("Regressions of Quarterly Excess Returns on ... Variables [consumption-wealth, realized volatility, etc.] and Factors [obtained via PCA]").

¹⁷⁷ These returns are constructed similarly to the cryptocurrency price returns. I examine the 28-day returns of the indices (*e.g.*, S&P 500) and prices (*e.g.*, gold). *See* Appendix C for more detail on these measures.

little to no explanatory power for non-cryptocurrency returns when examining cryptocurrency returns.

iii. Average XRP Price Returns Are Not Statistically Different Than Zero When Controlling for Factors Outside Ripple's Control

102. The factor models and the corresponding results I present in Exhibits 3 through 7 allow me to examine whether, on average, there are additional XRP price returns after controlling for other non-XRP cryptocurrency market factors. Across all the specifications, I find that 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 Exhibits, 3-7, in all columns, none of the constants – which are estimates of the average monthly XRP price return after subtracting the risk-free rate and controlling for non-XRP cryptocurrency factors – is statistically significant at the 5% level. In other words, one cannot reject the null hypothesis that the constant – the observed average monthly XRP price return after subtracting the risk-free rate – is zero (controlling for non-XRP cryptocurrency market factors). As I explain above, a zero regression constant is consistent with the average monthly Ripple price returns (less the risk-free rate) being explained by the non-XRP cryptocurrency factors and no remaining average "excess" XRP price returns that are unexplained by the model.¹⁷⁸

103. Taken together, the results discussed in subsections III.C.i-iii and presented in Exhibits 3-7 demonstrate that the variation in long-run XRP price return can be explained by

¹⁷⁸ If the null hypothesis of the constant term equals zero are rejected (which is not the case in Exhibits 3-7), that would merely mean that the factors used in the model were insufficient to explain the average monthly XRP price return and that there were potentially additional factors that needed to be included. A rejection of the null of a zero constant term *cannot* be used to learn the nature or identify of the additional factors that should be added to the model and whether those factors are related to the cryptocurrency market, other asset markets, political sentiment, changes to regulation, *etc. See, e.g.*, an extensive discussion of a wide range of potentially relevant factors in Liu, Y., and A. Tsyvinski, "Risks and Returns of Cryptocurrency," *The Review of Financial Studies*, Vol. 34 (6), 2689-2727, June 2021.

non-XRP cryptocurrency market factors that are outside of Ripple's control, and that various measures of traditional assets do not have a statistically significant relationship with XRP price returns.¹⁷⁹

iv. The XRP Factor Model Results Are Consistent with the Findings in the Academic Literature Along Several Dimensions Including the Role of Cryptocurrency-related Factors

104. The results of the XRP price return factor model is further buttressed by academic studies of cryptocurrency markets. Overall, these studies conclude that: 1) on average, cryptocurrency prices can be explained by cryptocurrency-related factors; and 2) other assets, such as commodities, equities, or currencies, do not have any explanatory power for cryptocurrency returns. For example, Liu and Tsyvinski (2021) "establish that cryptocurrency returns are driven and can be predicted by factors that are specific to cryptocurrency markets. ... [For] currencies, commodities, stocks, and macroeconomic factors ... we find that the exposures of cryptocurrencies to these traditional assets are low."¹⁸⁰ Both of these conclusions are consistent with my findings that XRP price return can be explained by cryptocurrency factors and *not* the returns of other assets. Similarly, Liu et al. (2021) implement a three-factor cryptocurrency model, and their analysis shows that the expected cryptocurrency returns can be explained by three cryptocurrency factors (market return, size, and momentum).¹⁸¹

105. Hu et al. (2019) analyzed the relation between Bitcoin and other coins using a principal component analysis and showed that "the first principal component for monthly returns

¹⁷⁹ I assess the effect of Ripple's alleged efforts on XRP price return in Section III.D.

¹⁸⁰ Liu, Y., and A. Tsyvinski, "Risks and Returns of Cryptocurrency," *The Review of Financial Studies*, Vol. 34(6), 2689-2727, June 2021, at 2689 and 2693.

¹⁸¹ Liu, Y., A. Tsyvinski, and X. Wu, "Common Risk Factors in Cryptocurrency," *The Journal of Finance, Forthcoming*, 2021, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3379131.

explains 31.7% of daily returns" and further that "beta of Bitcoin with respect to the S&P 500 or gold is not significantly different from zero at the 10% level."¹⁸² Liew et al. (2019) show that "principal component[s] ... explain the cross-sectional variation ... of cryptocurrency returns."¹⁸³ Liew et al. (2019) also show that Bitcoin return is not correlated with traditional asset returns (S&P500 Index, US Dollar Index, MSCI World Index, Bloomberg Commodity Index, VIX Index).

106. In addition, the findings regarding XRP price returns are in line with studies in the academic literature with regards to the amount of explained variation in price returns. For example, Liu et al. (2021) examine various cryptocurrency factor models and find that, for various cryptocurrency portfolios, the amount of explained variation in price returns is similar in magnitude to the results presented above.¹⁸⁴ For example, for their (preferred) three-factor model, they find that the average R-squared for their five quintile portfolios ranges from 17.2% to 95.3% depending on the particular strategy.¹⁸⁵

D. CONTRARY TO THE SEC'S ASSERTIONS, RIPPLE'S ALLEGED EFFORTS TO DISTRIBUTE XRP DID NOT AFFECT THE LONG-RUN PRICE RETURNS OF XRP

107. The SEC also points to various efforts by Ripple that purchasers of XRP allegedly relied upon for an expectation of profit (in the form of increasing XRP's price).

¹⁸² Hu, A., C. Parlour, and U. Rajan, "Cryptocurrencies: Stylized Facts on A New Investible Instrument," *Financial Management*, 2019, at 1060-1061.

¹⁸³ Liew, J., R. Li, T. Budavári, and A. Sharma, "Cryptocurrency Investing Examined," *The Journal of the British Blockchain Association*, Vol. 48, 1049-1068, 2019, at 1049 and 1054.

¹⁸⁴ Liu, Y., A. Tsyvinski, and X. Wu, "Common Risk Factors in Cryptocurrency," *The Journal of Finance, Forthcoming*, 2021, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3379131.

¹⁸⁵ See Liu et al. (2021), Table 9, the 10 strategies denoted with (3).

108. The SEC alleges that Ripple distributed XRP "with the goal of immense profits."¹⁸⁶ The SEC then points to the increase in the market price of XRP as evidence that "Ripple's planned distributions of XRP succeeded."¹⁸⁷ The SEC argues that Ripple distributed XRP to effectuate their "dual purpose of raising funds from their XRP sales and managing the liquidity of the XRP market."¹⁸⁸ The SEC, however, fails to recognize that Ripple's efforts to improve liquidity are not equivalent to efforts to increase prices. As I discuss below, there were Ripple efforts aimed at improving market liquidity for XRP to enhance the efficacy of Ripple's product suite, including ODL. Furthermore, my empirical analysis demonstrates that Ripple's XRP distributions did not have a statistically significant effect on XRP's long-run price returns.

i. Ripple's XRP Distributions Did Not Increase XRP Price Return

109. Starting in 2013, Ripple distributed XRP to institutional investors, via the wholesale market, to market makers, to programmatic sellers at various cryptocurrency exchanges, and also to other parties. The first date the SEC alleges Ripple distributed XRP to wholesalers was in early 2013, and the first distribution to a market maker was in November 2014.¹⁸⁹ As of December 20, 2020, Ripple's aggregate distributions were approximately 25 billion XRP, and they were still holding approximately 55 billion of their original 80 billion XRP. The Founders, separately from Ripple, could also sell their original 20 billion XRP.

110. Exhibits 8 and 9 show the monthly distributions, that is, the monthly XRP outflows net of any potential inflows to Ripple, respectively in XRP and USD for the period

¹⁸⁶ Complaint, at ¶ 60 ("In other words, Ripple and Larsen embarked on a large-scale unregistered public distribution of XRP and—with the goal of immense profits.").

¹⁸⁷ Complaint, at ¶¶ 79-82.

¹⁸⁸ Complaint, at ¶ 190.

¹⁸⁹ See RPLI SEC 1100594 and RPLI SEC 1100595.

August 2013 through December 2020. The number of XRP units that were distributed varies by month, and the data shows monthly net outflows in most months.¹⁹⁰

111. Ripple publicly reports its XRP holdings on its website, which shows the total amounts of XRP held by Ripple and in Ripple's escrow.¹⁹¹ Ripple's aggregate XRP distributions and the 20 billion XRP held or distributed by Larsen, McCaleb, and Britto are combined and reported as the "XRP Total Distribution." A widely-used website, CoinMarketCap, also reports circulating supply for XRP (and many other cryptocurrencies).¹⁹² Exhibit 10 shows XRP circulating supply and the total XRP distributions. The circulating supply of approximately 45 billion XRP as of December 2020 includes the 20 billion XRP from the Founders and the 25 billion of aggregate XRP distributions from Ripple through this date.

112. As a matter of basic economics, an increase in supply should, all else equal, lead to a *decrease*, not an increase, in price. In theory, the market equilibrium price of XRP occurs at the intersection of demand and supply. A net outflow from Ripple would increase supply, which, all else equal, would lead to *lower*, not higher prices.¹⁹³ In fact, as I discuss in more detail in Sections III.E and IV, Ripple distributed XRP to improve liquidity of the XRP market, making it more useful as a virtual currency in Ripple's products. Below, I also show that there is no statistically significant relation between Ripple's XRP distributions and the long-run price return of XRP controlling for cryptocurrency market factors.

¹⁹⁰ The only two exceptions are August 2016 and June 2017, which show net inflows into Ripple.

¹⁹¹ See "Market Performance, XRP Market Metrics," https://ripple.com/xrp/market-performance. An increase in the circulating supply also means that Ripple's holdings of XRP decrease over time.

¹⁹² CoinMarketCap defined the circulating supply as "the best approximation of the number of assets that are circulating in the market and in the general public's hands." See CoinMarketCap, https://coinmarketcap.com/alexandria/glossary.

¹⁹³ Mankiw (2016) explains that an increase in supply, all else equal, would decrease, not increase prices. Mankiw, N., <u>Principles of Economics</u>, 8th edition, 2016, at 82 and Table 4.

113. To assess empirically whether there was a relation between Ripple's XRP distributions and the price return of XRP, I expand the factor model I discussed above to include two additional factors. First, I include Ripple's monthly distribution of XRP, which is the net outflows of XRP from Ripple over the last 28 days, and second, I include the one-month lagged XRP distribution to account for timing differences in XRP distributions.¹⁹⁴ By examining lag distributions, I allow for a delay in the effect of XRP distributions.

114. The regression equation with the cryptocurrency market factors I discussed before and the two factors related to Ripple's distributions are:

 $(XRP_return - risk-free \ rate)_t = a + b*Cryptocurrency \ Factors_t + c*D(t) + d*D(t-1) + \varepsilon_t$ where the dependent variable is XRP price return less the risk-free rate during the 28-day period *t*; *a* is a constant term, the Cryptocurrency Factors are the *PC_1* thru *PC_k*, *D(t)* is Ripple's aggregate distributions over the 28-day period, *D(t-1)* is Ripple's aggregate distributions over the preceding 28-day period, and ε denotes the error term.

115. Exhibit 11.A presents results for this regression model for Estimation Period 1 (August 6, 2013 – December 20, 2020) and Exhibit 11.B presents results for this regression model for Estimation Period 2 (August 11, 2015 – December 20, 2020) to include the period after Ethereum (ETH) first started trading. The results show that Ripple's XRP distributions and lagged distributions do not have a statistically significant relation with XRP price return at the 5% level. As in the case of Exhibits 3-7, the cryptocurrency factors, as summarized by the principal components, are statistically significant at the 5% level and the regression constant term is not statistically significant at the 5% level. Therefore, Ripple's XRP distributions,

¹⁹⁴ I consider net outflows of XRP from Ripple as Ripple's distributions. As I discussed in Section III some of the contracts governing the XRP distributions may have lockup periods which means that such XRP might have been held by these participants for a period of time after the distribution from Ripple.

including lagged distributions, do not affect XRP's long-run return. Rather, the long-run XRP price return is explainable by non-XRP cryptocurrency market factors.

116. I also present an alternative specification that considers the potential effects of the lagged XRP price return and the volatility of XRP prices in addition to the cryptocurrency market factors and Ripple's distributions.¹⁹⁵ Following the Griffin and Shams (2020) framework, my alternative specification includes the lagged XRP price return as an independent variable to control for the potential effects of return reversals.¹⁹⁶ I also include the lagged return interacted with the price volatility to control for the potential of larger reversals during periods of high volatility.¹⁹⁷

117. The alternative regression model decomposes XRP price return into cryptocurrency price return (captured by the PCs), Ripple's distributions, and the two Griffin and Shams (2020) factors. Exhibits 12.A and 12.B show the results for this specification for Estimation Periods 1 and 2. In the first column, I implement the Griffin and Shams' specification, which incorporates XRP price volatility and lagged XRP price returns. In the second and third columns, I also include the cryptocurrency market-related factors, using the PCA approach I discussed above. Throughout, the coefficient on distributions is not statistically significant at the 5% level, and the adjusted R-squared of the alternative specification is again

¹⁹⁵ Griffin and Shams (2020) developed a framework to assess the effect of issuance of flows from stablecoin issuance on prices of Bitcoin. Griffin, J., and A. Shams, "Is Bitcoin Really Untethered?," *The Journal of Finance*, Vol. 75(4), August 2020. *See also*, Lyons, R., and G. Viswanath-Natraj, "What Keeps Stablecoins Stable?," *Working paper*, May 2020.

¹⁹⁶ Griffin and Shams (2020), at 1936. See also, Lehmann, B., "Fads, Martingales, and Market Efficiency," *Quarterly Journal of Economics*, Vol. 105(1), 1990.

¹⁹⁷ Griffin and Shams (2020), at 1936. See also, Nagel, S., "Evaporating Liquidity," Review of Financial Studies, Vol. 25(7), 2012.

above 50% for Estimation Period 1 and above 90% for Estimation Period 2 when adding the cryptocurrency market-related factors.

118. My empirical analysis shows that Ripple's distributions of XRP do not have a statistically significant relation with long-run XRP price return controlling for cryptocurrency market factors. These results further reinforce my prior findings that the long-run XRP price return is correlated with non-XRP cryptocurrency returns. Taken together, these findings demonstrate that factors outside of Ripple's control – rather than Ripple's efforts (measured by Ripple's distributions) – explain movements in long-run XRP price return. In other words, XRP's long-run price returns are owing to non-XRP cryptocurrency market factors; none of those returns is owing to the efforts of Ripple.

ii. Ripple's Distributions Including Distributions from the Escrow Account Did Not Increase XRP's Price Return

119. Ripple announced the creation of the Escrow in May 2017¹⁹⁸ and subsequently transferred 55 billion XRP to the Escrow in December 2017.¹⁹⁹ Ripple can distribute up to 1 billion XRP from the Escrow per month, but decisions on the timing and amount of intra-month XRP distributions are determined by Ripple.²⁰⁰ The unused monthly remainder gets returned into the Escrow for another 55 months. I analyzed the monthly net outflow of XRP from Ripple divided by 1 billion XRP, the Escrow monthly limit. In the 12 months ending December 31,

¹⁹⁸ Garlinghouse, B., "Ripple to Place 55 Billion XRP in Escrow to Ensure Certainty of Total XRP Supply," *Ripple Insights*, May 16, 2017, https://ripple.com/insights/ripple-to-place-55-billion-xrp-in-escrow-to-ensure-certainty-into-total-xrp-supply/.

¹⁹⁹ Garlinghouse, B., "Ripple Escrows 55 Billion XRP for Supply Predictability," *Ripple Insights*, December 7, 2017, https://ripple.com/insights/ripple-escrows-55-billion-xrp-for-supply-predictability/.

²⁰⁰ "Bithomp," https://bithomp.com/explorer/r9NpyVfLfUG8hatuCCHKzosyDtKnBdsEN3. See also, "An On-Chain Analysis of Ripple's Escrow System," Coin Metrics, May 16, 2019, https://coinmetrics.io/an-on-chain-analysisof-ripples-escrow-system/.

2017, the monthly ratio ranged from -0.7% to 55.8% (22.3% on average). In the 12 months ending December 31, 2018, the monthly ratio ranged from 2.1% to 55.9% (17% on average). On average, the ratio is less than 100%, which shows that Ripple consistently distributed less than one billion XRP. The cap on XRP distributions introduced by the Escrow is therefore not a binding constraint on the amount that Ripple can distribute per month.

120. Starting in December 2017, Ripple's XRP distributions also included distributions from the Escrow. Ripple's XRP distributions, which included the distributions from the Escrow, did not have a statistically significant effect on the XRP price return, as I demonstrated above.

iii. Ripple's Distributions at Discounted Prices to Select Purchasers Were Economically Reasonable Compensation for Bearing Risk or Providing Services to Ripple

121. Ripple sold XRP to certain institutional investors at discounted prices, which the SEC alleges "[leads] purchasers to reasonably expect to profit on their resale of XRP into the public markets."²⁰¹ Ripple's provision of a price discount to institutional investors is economically reasonable, and moreover customized to the respective purchaser, as I explain below.

122. For example, the June 2016 contract with specifies the sale of XRP at a % discount. The contract specifies a lockup period of followed by a restriction on the amount of XRP that could sell following the lockup period.²⁰² During and following the lockup period, was exposed to the risk that the value of the XRP holdings could decrease. During the restricted sale period, the average daily price volatility of XRP over the

²⁰¹ Complaint, at ¶ 355 and ¶ 107 ("Ripple made many of the XRP Institutional Sales at a discount from XRP market prices. At least seven of the institutional investors—including some described below—bought XRP at discounts between 4% and 30% to the market price."). See also, Complaint, at ¶¶ 114-117.

²⁰², *XRP Purchase Agreement*, June 9, 2016, at 2; *XRP Purchase Agreement*, June 23, 2016, at 2. *See also*, discussion in Section I of this report.

holding period was between 4% and 5%. Ripple's discounted XRP sales price to **consistent** with **consistent** exposure to volatility of XRP prices in the cryptocurrency markets.

In another example, a December 28, 2015 contract with 123. n specifies that Ripple sold XRP to discounted by .²⁰³ The contract also specifies that these XRP cannot be sold or transferred during a lockup period starting on December 28, later.²⁰⁴ The average daily price volatility of XRP over the holding 2015 and ending period was 10%. Ripple's discounted XRP sale price to is therefore consistent with exposure to XRP price volatility. Separately, Ripple engaged as a Global Brand Ambassador to provide various services including serving as a liaison between major financial institutions, developing Ripple's business (mostly in Europe), appearing and representing Ripple at events, and serving on the Board of Ripple Luxembourg.²⁰⁵

E. RIPPLE'S EFFORTS TO FACILITATE THE GROWTH OF XRP MARKET LIQUIDITY ADVANCED RIPPLE'S STRATEGIC OBJECTIVE TO PROVIDE GLOBAL FINANCIAL SETTLEMENT SOLUTIONS

i. Market Liquidity and Trading Mechanisms

124. One of the pillars of using XRP as a medium of exchange more generally but also in cross-border remittances is the existence of a liquid market for XRP. My empirical results in subsection C.i. show that Ripple's distributions did not have a statistically significant effect on

²⁰³ Purchase Agreement with XRP II LLC, December 28, 2015 (RPLI_SEC 0609642, at 642). did not pay Ripple for the XRP as of the purchase date but entered into a promissory note with Ripple on December 28, 2015 and pledged the purchased XRP as collateral. See XRP Pledge Agreement and XRP Promissory Note with December 28, 2015 (RPLI_SEC 0609645).

²⁰⁴ Purchase Agreement with XRP II LLC, December 28, 2015 (RPLI_SEC 0609642, at 643) ("Transfer Restriction: Neither the Purchased XRP nor any interest herein may be sold, pledged or otherwise transferred to any person prior to the purchase of the Date of Purchase (the 'Lockup Period') – unless that person also agrees not to re-sell or otherwise distribute the Purchased XRP to any other party during the Lockup Period.").

 ²⁰⁵ Brand Ambassador Services Term Sheet, February 14, 2015 (RPLI_SEC 0895476, at 476) (as Global Ambassador, "shall provide the following services on a non-exclusive basis for [Ripple].").
XRP's long-run price return. I explain next that Ripple's efforts over time were concerned with improving market liquidity for XRP in order to provide global financial settlement solutions.

125. At first, Ripple focused their efforts on improving liquidity using several mechanisms on the XRP Ledger before also focusing on improving XRP liquidity at the off-ledger, cryptocurrency exchanges once such exchanges became a viable alternative, and also specifically at cryptocurrency exchanges that serve markets where the ODL transactions were occurring.²⁰⁶ The existence of a liquid market for XRP is a critical component of the ODL platform.²⁰⁷

126. Market liquidity is the ability to trade quickly in a market without having a large effect on the market price.²⁰⁸ The mechanisms through which markets successfully achieve these functions can be best understood in terms of network effects. An increase in the number of buyers and sellers for a given asset increases the flow of buy and sell trades, which decreases the cost of trading (bid-ask spread), all else equal. Reductions in the bid-ask spread lower the trading costs faced by market participants.²⁰⁹ As trading costs fall, more buyers and sellers are attracted

²⁰⁶ Madigan, B., "The Sign of a Stabilizing Market: XRP Utility," *Ripple Insights*, January 30, 2020, https://ripple.com/insights/the-sign-of-a-stabilizing-market-xrp-utility/. *See also*, Madigan, B., "Liquidity and Global Markets: 101" April 20, 2020, *Ripple Insights*, https://ripple.com/insights/liquidity-and-global-markets-101/. *See also*, Deposition Transcript of Lawrence Angelilli, at 73:18-22 (Q: "Is it true that over time Ripple did try – did arrange for an increase in market makers and liquidity in the markets in which the ODL transactions were occurring. A: Yes."); Vias, M., "Ripple Q1 2017 XRP Markets Reports," *Ripple Insights*, April 18, 2017, at 3 and 4 (Ripple commented publicly that "[i]n order for any asset to be successful it needs ample liquidity, something XRP attracted during the quarter. This was a reassuring sign of progress towards the eventual fiat liquidity XRP requires to ultimately be successful for payments, its natural use case.").

²⁰⁷ Deposition Transcript of Lawrence Angelilli, at 19:7-14 ("Q: And was the liquidity of the markets important to the product working ... A: It's essential to the product working.").

²⁰⁸ Harris, L., <u>Trading and Exchanges: Market Microstructure for Practitioners</u>, Oxford University Press, 2003, at 394 ("Liquidity is the ability to trade large size quickly, at low cost, when you want to trade."). Harris (2003) also identifies immediacy, width, and depth as the key dimension of liquidity, at 398.

²⁰⁹ The bid-ask spread reflects the typical gap between the amount that buyers are willing to pay for a contract at a given moment (the "bid") and the higher price sellers demand to sell a contract at that moment (the "ask"). The

to that market, further increasing market liquidity and resulting in a virtuous feedback whereby "liquidity demand begets liquidity supply."²¹⁰ The market becomes more attractive to participants wishing to engage in trade by reducing bid-ask spreads, increasing market depth (how much a trade affects the market price) and offering greater immediacy because it is easier to find offsetting bids and offers. Since liquidity reduces trading costs, market participants will be attracted to markets with greater liquidity, other things being equal, which further benefits market participants.

127. In practice, the mechanisms for achieving a liquid market are integrally linked to the market structure.²¹¹ Two types of market structures are relevant here: the first is the over-the-counter market where bilateral transactions are privately negotiated between the two counterparties involved in the final transaction; the second is the central limit order market where trading happens between participants on a centralized exchange/market. In the latter case, the buy and sell orders of participants are matched anonymously following the price-time priority electronic matching protocol of a particular exchange.

ii. Ripple Customized Their Efforts to Accommodate Different Trading Mechanisms for XRP

128. Consistent with its strategic objective to provide global financial settlement solutions, Ripple engaged in various efforts to improve the market liquidity of XRP on the XRP

bid-ask spread is a cost to price-taking customers (such as customers seeking to hedge). These customers buy at the prevailing (higher) "ask" price and later close a contract by selling at the (lower) "bid" price. In contrast, the bid-ask spread is a source of profits to liquidity providers such as market makers.

²¹⁰ Foucault, T., O. Kadan, and E. Kandel, "Liquidity Cycles and Make/Take Fees in Electronic Markets," *The Journal of Finance*, Vol. 68 (1), February 2013, at 303.

²¹¹ Demsetz, H., "The Cost of Transacting," *Quarterly Journal of Economics*, Vol. 82 (1), 1968; Black, F., "Toward a Fully Automated Stock Exchange," *Financial Analysts Journal*, November-December 1971; Merton, R., "A Simple Model of Capital Market Equilibrium with Incomplete Information," *The Journal of Finance*, Vol. 42(3), July 1987.

Ledger, the on-ledger decentralized exchange, the DEX,²¹² and the off-ledger, cryptocurrency exchanges. Ripple customized their liquidity enhancing efforts to the salient features and trading mechanisms of these different market structures and the needs of Ripple's ODL product.

129. Peer-to-peer trading between wallets on a blockchain, such as the XRP Ledger, resembles an OTC market. Duffie et al. (2005) explain that search cost in locating counterparties and the bargaining power of participants are critical components of market liquidity in OTC markets.²¹³ The absence of a centralized market implies that a participant who wants to buy (or sell) must search for a seller (or buyer), incurring opportunity or other cost until she finds one. Once a counterparty is located, the price is bilaterally negotiated. The execution price therefore reflects the participants' outside option to find another counterparty. Because of the difficulty in locating a counterparty, there is a need for intermediaries who could facilitate more immediate execution between counterparties.²¹⁴ Intermediaries are specialists who fulfill the role of liquidity provision. As such, intermediaries hold inventories of the assets they trade to fulfill anticipated and non-anticipated purchase and sale requests.²¹⁵ The inventory holding necessarily exposes the intermediary to the risk of price changes or loss of value in their inventories.²¹⁶

²¹² "Decentralized Exchange," https://xrpl.org/decentralized-exchange.html.

²¹³ Duffie, D., N. Gârleanu, and L. Pederson, "Over-the-Counter Markets," *Econometrica*, Vol. 73(6), 1815-1847, November 2005.

²¹⁴ Duffie, D., N. Gârleanu, and L. Pederson, "Over-the-Counter Markets," *Econometrica*, Vol. 73(6), 1815-1847, November 2005.

²¹⁵ The academic literature discusses the risks of inventory imbalances to intermediaries. *See, e.g.*, Schrimpf, A., and V. Sushko, "FX Trade Execution in Complex and Highly Fragmented," *BIS Quarterly Review*, December 2019, at 44; Moore, M, A. Schrimpf, and V. Sushko, "Downsized FX markets: causes and implications," *BIS Quarterly Review*, December 2016, at 36; Lyons, R., "A simultaneous trade model of the foreign exchange hot potato," *Journal of International Economics*, Vol. 42, 277-290, 1997.

²¹⁶ Bjønnes, G., and D. Rime, "Dealer Behavior and Trading Systems in Foreign Exchange Markets," *Journal of Financial Economics*, Vol. 75, 571-605, 2005. Amihud, Y., and H. Mendelson, "Dealership Market: Market-Making with Inventory," *Journal of Financial Economics*, Vol. 8, 31-53, 1980.

130. Ripple entered into contracts with wholesale purchasers

, and between August 2017 and July 2020.²¹⁷ These wholesale purchasers typically acted as intermediaries for XRP trading through their OTC trading desks.²¹⁸ The XRP purchased by intermediaries such as **a second second second**, and

are used to facilitate the OTC trading with their customers.²¹⁹

131. Trading on the DEX, the XRP Ledger exchange, and the off-ledger cryptocurrency exchanges occurs on the central limit order book of the particular exchange. Central limit order books ("CLOB") are well-suited to markets with demand and supply from numerous participants that want to trade the same product frequently and in relatively small size.²²⁰ Execution prices are determined using sophisticated procedures based on the time and price priority matching of orders.²²¹ The details of the CLOB trading rules are determined by the

trading/.

See also, Chaparro, F., "Crypto's Largest Over-the-Counter Trading Desks are Reporting Record Volumes," *The Block*, November 30, 2020, https://www.theblockcrypto.com/post/86020/crypto-otc-trading-bitcoin-record-volume.

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²¹⁷ ; and "OTC Crypto Trading," https://www__.io/trading/otc-

²¹⁸ See, e.g., Hobbs, J., <u>Digital Assets</u>: Your Guide to Investing and Trading in the New Crypto Market, at Thames Lane Limited, 2021. See also,

²¹⁹ Grossman, S., and M. Miller, "Liquidity and Market Structure," *The Journal of Finance*, Vol. 43(3), July 1988.

²²⁰ Burdett, K., and M. O'Hara, "Building Blocks an Introduction to Block Trading," *Journal of Banking and Finance*, Vol. 11, 1987, at 195 (who argue, when referring to continuous-auctions like order books, "[t]his continuous auction process works well in that it generally provides continuous and stable prices when there are a large number of small trades. In the case of large volume transactions, or block trades, however, this auction process falters. The problem lies in the possibility that such large trades may be information-related."); Benveniste, L., A. Marcus, and W. Wilhelm, "What's Special About the Specialist?" *Journal of Financial Economics*, Vol. 32 (1), August 1992 (who build a theoretical model where long-standing and repeated relationships are used by traders to discriminate between informed and uninformed traders, leading to lower transaction costs for uninformed trades). *See also*, Desgranges, G., and T. Foucault, "Reputation-Based Pricing and Price Improvements," *Journal of Economics and Business*, Vol. 57 (6), November-December 2005.

²²¹ Biais, B., L. Glosten, and C. Spatt, "Market Microstructure: A Survey of Micro-Foundations, Empirical Results and Policy Implications," *Journal of Financial Markets*, Vol. 8, 217-264, 2005.

particular cryptocurrency exchange. For example, Ripple distributed XRP to market makers with the explicitly stated purpose of using XRP to promote liquidity of XRP by quoting binding bid and offer prices.²²² As I discussed in Section II, Ripple entered into contracts with market makers to promote liquidity on the XRP Ledger exchange, such as the 2014 contract with **Excerct**, and on the off-ledger cryptocurrency exchanges, such as the 2017 contract with **Excerct**.²²³

132. A CLOB can fail without a sufficient volume of two-way flow between buy and sell orders. The intuition for market failure is that, if the limit order book is too thin, price elastic market order submitters will scale back their market order submissions. However, as the endogenous distribution of submitted market order quantities shifts towards zero, the probability of limit order execution falls, which, given ex ante limit order submission costs, leads to fewer limit orders and, thus, a thinner book. If market order submissions are sufficiently elastic, the limit order book may fail.²²⁴ Ripple's distributions to market makers facilitated the two-way order flow at exchanges. Ripple also distributed XRP to programmatic sellers who brokered bid-

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²²² See, e.g., Ripple delivers a specified number of units of XRP to the market maker that they then use to "promote liquidity of fiat and crypto currencies within the Ripple Network" and "to quote binding bid and offer prices for 'virtual units of value' within the Ripple Network." and "to quote binding bid and offer prices for 'virtual units of value' within the Ripple Network." and Ripple, *Market Making Agreement*, February 7, 2014 (RPLI_SEC 0507336, at 336 and 337). The Ripple Network means the "decentralized, open source, global payment network operating on the Ripple protocol." *See also*, and and Ripple Markets, *Market Making Agreement*, March 31, 2014 (RPLI_SEC 0947000, at 003), *Market Making Agreement*, May 17, 2017 (RPLI_SEC 0581494) (" agrees to engage in efforts to promote the liquidity of XRP on the market maker to increase the liquidity of XRP… through the application of certain XRP transaction volume."); *Exchange Order*, August 20, 2019 (RPLI_SEC 0899089, at 089).

and Ripple, *Market Making Agreement*, February 7, 2014 (RPLI_SEC 0507336) and *Market Maker and Programmatic Market Activity Agreement*, February 14, 2017 (RPLI_SEC 0899145).

²²⁴ Portniaguina, E., D. Bernhardt, and E. Hughson, "Hybrid Markets, Tick Size and Investor Trading Costs," *Journal of Financial Markets*, Vol. 9, 433-447, 2006.

ask trades to supplement the market liquidity for XRP. As I discussed earlier, Ripple entered into a contract with whereby transacted XRP according to a programmatic schedule.²²⁵

133. As explained in more detail below, Ripple also worked with some cryptocurrency exchanges in an effort to increase XRP liquidity.

iii. Listing XRP on Crypto Exchanges²²⁶

134. Ripple entered into contracts with six cryptocurrency exchanges, including with

18, 2017, effective May 29, 2017, effective May 17, 2017, effective May 18, 2017, effective May 29, 2017, effective June 2, 2017, and

effective October 13, 2017.²²⁷ In an effort to facilitate market liquidity at these cryptocurrency

exchanges, Ripple funded volume incentive and trading fee rebate programs at the

cryptocurrency exchanges for the duration of the respective programs.²²⁸

135. In return for receiving the distributions from Ripple, a cryptocurrency exchange would "agree to engage in efforts to promote the liquidity of XRP on its exchange platform."²²⁹

²²⁵ and Ripple, *Programmatic Market Activity Agreement*, June 2, 2017 (RPLI_SEC 0507300, at 300-301). The contract with was amended in March 2018. *See*, and Ripple Markets, *Amendment to the Programmatic Market Activity Agreement with*, March 1, 2018 (RPLI_SEC 0537727).

²²⁶ The Complaint refers to cryptocurrency exchanges as "digital asset trading platforms." Complaint, at ¶¶ 154-169.

²²⁷ Ripple entered into a contract with the exchange and a effective October 30, 2017 but never listed XRP. Ripple's Rebates and Incentive Agreements with Digital Currency Exchanges (RPLI_SEC 0303838).

²²⁸ See, e.g., and Ripple Markets, *XRP Fee Rebate Program Agreement*, October 13, 2017 (RPLI_SEC 0153866, at 867) ("Ripple, in its sole discretion, may make such payment in U.S. Dollar or XRP.") (emphasis added); and Ripple Markets, *BITBANK XRP Volume Incentive Program*, May 18, 2017 (RPLI_SEC 0507292); and Ripple Markets, *Fee Rebate Program*, May 29, 2017 (RPLI_SEC 0154338, at 338); and Ripple Markets, *SRP Volume Incentive Program*, June 2, 2017 (RPLI_SEC 0066688, at 689), and Ripple Markets, *XRP Volume Incentive Program*, June 2, 2017 (RPLI_SEC 0511334, at 335), and Ripple Markets, *XRP/EUR Volume Incentive Program*, XRP/EUR Fee Rebate Program, January 11, 2017 (RPLI_SEC 0507279, at 280).

²²⁹ See, e.g., and Ripple Markets, *XRP Fee Rebate Program Agreement*, October 13, 2017 (RPLI_SEC 0153866, at 866); and Ripple Markets, *XRP Volume Incentive*

The promotion of liquidity of XRP by exchanges took two forms. First, pursuant to these contracts, exchanges would pay a volume incentive rebate to certain eligible participants, identified by each exchange based on trading volumes.²³⁰ Second, exchanges would pay trading fee rebates to eligible participants that were calculated as a percentage of the exchanges' trading fees. For example, the percentage of the trading fee rebates decreased from 100% to 25% over the duration of the program with **100**²³¹.²³¹ The durations of the respective programs varied by exchange and typically terminated between three and 12 months from the effective date with the option of early termination "upon mutual agreement" or extension.²³²

136. Ripple's volume incentive distribution and rebates to exchanges are part of Ripple's cost of developing a liquid market for XRP. Other trading platforms also adjust fee structures to attract liquidity. For example, trading platforms pay a per-share rebate to their members to encourage them to provide ("make") liquidity in the form of resting orders. In the event that an execution occurs, the liquidity provider receives a rebate and the "taker" that

Program, May 18, 2017 (RPLI SEC 0507292, at 292); and Ripple Markets, *Fee Rebate Program*, May 29, 2017 (RPLI_SEC 0154338, at 338); and Ripple Markets, *XRP Volume Incentive Program*, June 2, 2017 (RPLI_SEC 0066688, at 688); *Agreement*, May 17, 2017 (RPLI_SEC 0511334, at 334); *Incentive Program*, *XRP/EUR Fee Rebate Program*, January 11, 2017 (RPLI_SEC 0507279, at 279).

²³⁰ See, e.g., and Ripple Markets, *XRP/EUR Volume Incentive Program*, *XRP/EUR Fee Rebate Program*, January 11, 2017 (RPLI_SEC 0507279, at 280).

²³¹ and Ripple Markets, *XRP/EUR Volume Incentive Program*, *XRP/EUR Fee Rebate Program*, January 11, 2017 (RPLI_SEC 0507279, at 286).

²³² See, e.g., and Ripple Markets, XRP Fee Rebate Program Agreement, October 13, 2017 (RPLI SEC 0153866, at 871); and Ripple Markets, XRP Volume Incentive Program, May 18, 2017 (RPLI SEC 0507292, at 293); Fee Rebate Program, May 29, 2017 (RPLI_SEC 0154338, at 340); and Ripple Markets, XRP Volume Incentive Program, June 2, 2017 (RPLI SEC 0066688, at 689-690), and Ripple Markets, XRP Listing, Volume Incentive and Rebate Agreement, May 17, 2017 (RPLI SEC 0511334, at 337); and Ripple Markets, XRP/EUR Volume Incentive Program, XRP/EUR Fee Rebate Program, January 11, 2017 (RPLI SEC 0507279, at 282); and Ripple, XRP Volume Incentive and Fee Rebate Program Agreement, October 30, 2017 (RPLI SEC 0847167, at 174).

executes against the resting order pays a fee.²³³ This type of "maker-taker" fee model has also been adopted by other platforms.²³⁴

137. Ripple contracted with only six cryptocurrency exchanges, which represents less than 4% of the more than 150 exchanges that listed XRP as of December 2020. Exhibit 13 shows the effective and termination dates for Ripple's contracts with each of the respective exchanges.²³⁵ These dates show that the majority of Ripple's rebate programs were relatively short term, with the majority of these programs terminating after less than 10 months. The number of exchanges that list XRP continued to grow even after Ripple stopped their distributions to cryptocurrency exchanges around April 2018. As Exhibit 14 shows, the number of exchanges that list XRP increased from 38 in April 2018 to more than 150 by December 2020. Trading and market liquidity at the vast majority of these exchanges has developed organically.

iv. Similar to Ripple's Efforts, It Is Common Practice for Trading Platforms to Use Efforts to Enhance Market Liquidity

138. It takes time to develop a liquid market on a particular platform or for a particular asset. Bitcoin started trading around mid-2010, but was thinly traded during the early period and the market liquidity of Bitcoin improved over time as the market matured.²³⁶ Many

²³³ "Maker-Taker Fees on Equities Exchanges," SEC Market Structure Advisory Committee, October 20, 2015, https://www.sec.gov/spotlight/emsac/memo-maker-taker-fees-on-equities-exchanges.pdf.

²³⁴ "In 1997, the Island ECN was among the first markets to adopt maker-taker fees, which it employed to attract order flow through liquidity rebates." *See*, "Maker-Taker Fees on Equities Exchanges," *SEC Market Structure Advisory Committee*, October 20, 2015, https://www.sec.gov/spotlight/emsac/memo-maker-taker-fees-on-equities-exchanges.pdf. Cardella, L., J. Hao, and I. Kalcheva, "Liquidity-Based Trading Fees and Exchange Volume," August 1, 2017, at 6, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2149302. *See also*, Hendershott, et al. (2011) finding that allowing new participants in the equity markets, such as algorithmic traders, improves liquidity. Hendershott, T., C. Jones, and A. Menkveld, "Does Algorithmic Trading Improve Liquidity?" *The Journal of Finance*, Vol. 66(1), February 2011.

²³⁵ Ripple's Rebate & Incentive Agreements with Digital Currency Exchanges (RPLI_SEC 0303838).

²³⁶ See, e.g., Scharnowski, S., "Understanding Bitcoin Liquidity," *Finance Research Letters*, Vol. 38, 2021, at 3, and Badev, A., and M. Chen, "Bitcoin: Technical Background and Data Analysis," *Finance and Economics*

cryptocurrency exchanges have fee structures designed to incentivize liquidity. For example, Bitstamp's exchange has a tiered fee structure based on a participant's trading volume whereby the exchange discounts the trading fees for participants with higher average volume. Participants with lower average trading volume will pay higher exchange-based fees than other participants with higher average trading volume.²³⁷ Cryptocurrency exchanges also make it cheaper to add liquidity than to take it from the market. For example, exchanges Coinbase and Gemini have no fees for market maker volume.²³⁸ Maker-taker fee structures are also used by other electronic markets in an effort to increase liquidity on their platforms.²³⁹

139. Other trading platforms also engage in efforts to improve market liquidity for a particular product or a particular platform. For example, the electronic inter-dealer broker ("IDB") market for on-the-run U.S. Treasury securities changed the minimum bid-ask spread (known as the "tick size") on the two-year note in November 2018, which improved market liquidity and price discovery for these notes.²⁴⁰ Other trading platforms, such as the Chicago Mercantile Exchange ("CME") or Swaps Execution Facilities ("SEFs"), also adopted fee

Discussion Series Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board, Washington, D.C., October 2014, at 22 ("Although trading of the virtual currency began around mid-2010, much of this trading was fairly sparse up until 2013."). *See also*, Figure 20 for low weekly trading volumes at cryptocurrency exchanges during the early period.

²³⁷ "Unified Fee Schedule," https://www.bitstamp.net/fee-schedule/.

²³⁸ Coinbase fee schedule: "What are the fees on Coinbase Pro?," https://support.pro.coinbase.com/customer/en/portal/articles/2945310-fees; Gemini fee schedule: "API Fee Schedule," https://gemini.com/api-fee-schedule/#overview.

²³⁹ Foucault, T., O. Kadan, and E. Kandel, "Liquidity Cycles and Make/Take Fees in Electronic Markets," *The Journal of Finance*, February 2013, at 305.

²⁴⁰ Fleming, M., G. Nguyen, and F. Ruela, "Minimum Price Increment, Competition for Liquidity Provision, and Price Discovery," *Federal Reserve Bank of New York*, Staff Report No. 886, February 2021, at 28 ("Overall, we conclude that a smaller tick size in the Treasury market improves market quality, encourages more competition in liquidity provision and pricing from dealers relative to HFTs, and enhances high-frequency price discovery.").

structures and trading rules to improve market efficiency and attract participants to their platforms.²⁴¹ The CME has adjusted the minimum bid-ask spread to ensure efficient trading on their platform.²⁴² A minimum tick size that is too high will make spreads too high and create costs that deter liquidity, but a minimum tick size that is too low will discourage participation by liquidity providers. Similarly, margin requirements set by exchange-directed clearinghouses must be sufficiently high to credibly convince market participants of the integrity of the clearinghouse, but low enough to encourage trading activity.

F. ECONOMIC ASSERTIONS FOR COMMONALITY ARE FUNDAMENTALLY FLAWED

140. The SEC argues that the "fortunes" of XRP purchasers depend on Ripple successfully executing their "XRP Strategy."²⁴³ According to the SEC, the success or failure of Ripple's XRP Strategy was contingent on Ripple "propelling trading of XRP [that] drives demand for XRP, which will dictate investors' profits (recognized in increased prices at which they could sell XRP) or losses."²⁴⁴ The SEC also argues that the "fortunes" of XRP purchasers

²⁴¹ Harris (2003) explains that "trading rules [in order-driven markets] are very important. They affect how traders behave, and they determine who has power and privilege in the market. Since these rules affect how traders form their order submission strategies, they greatly influence whether traders decide to supply or take liquidity." *See* Harris, L., <u>Trading & Exchanges: Market Microstructure for Practitioners</u>, Oxford University Press, 2003, at 137.

²⁴² The CME reduced the tick size for some FX products, "[i]n 2014, 2015 and 2016 CME Group successfully reduced the Minimum Price Increment (MPI) in our JPY/USD, MXN/USD, EUR/USD, and CAD/USD contracts to provide more granular pricing and actionable liquidity – to reduce execution costs." *See* Chicago Mercantile Exchange, "FX Products: Minimum Price Increments: Tighter Spreads, Same Trusted Markets," https://www.cmegroup.com/trading/fx/mpi.html#.

²⁴³ Complaint, at ¶ 291 ("Because XRP is fungible, the fortunes of XRP purchasers were and are tied to one another, and each depend on the success of Ripple's XRP Strategy.").

²⁴⁴ Complaint, at ¶ 317 ("Throughout the Offering ... Defendants repeatedly told investors that Ripple's XRPrelated efforts were meant to spur "demand" for XRP. Ripple at times even explicitly tied the hope for an increase in demand to what any reasonable investor would understand an increase in demand to entail: an increase in XRP's market price.").

were aligned with each other and with Ripple because Ripple "pooled the funds it raised in the Offering."²⁴⁵ As I explain below, the SEC's claims are flawed as a matter of economic substance.

141. There was no pooling of the funds. Specifically, Chris Larsen, Jed McCaleb, and Arthur Britto collectively held the remaining 20 billion XRP units and gave 80 billion XRP units to Ripple. Furthermore, Chris Larsen, Jed McCaleb, and Arthur Britto did not pool their XRP holdings and were free to behave independently from each other and independently from Ripple.

142. In Section II, I discuss the categories of contracts identified by the Complaint and show that these contracts do not have any contractual rights entitling these counterparties to a share of Ripple's profits if Ripple is successful in its ongoing efforts to manage and develop its business operations. There are no such contractual rights and no ongoing obligations for Ripple to expend efforts to increase XRP's price. My empirical analyses in Section III further show that the variation in long-run price return of XRP can be explained by exogenous cryptocurrency price returns or put differently, by factors outside Ripple's control; and further that Ripple's XRP distributions do not have a statistically significant relation with long-run XRP price return after controlling for returns of other cryptocurrencies outside of Ripple's control.

143. Distributions of XRP increase the circulating supply, but the demand for XRP is not controlled by Ripple. As such, XRP purchasers are free to behave independently from each other and independently from Ripple. Ripple's sales of XRP represent a fraction of the overall purchases of XRP. In fact, a majority of XRP are not purchased directly from Ripple but are traded anonymously at the cryptocurrency exchanges. Since at least the second quarter of 2017, Ripple's monthly XRP distributions have been under 1% of the overall XRP trading volume reported by CryptoCompare.

²⁴⁵ Complaint, at ¶ 291 and ¶ 293.

144. Some parties that received XRP directly from Ripple sell rather than hold XRP. For example, market makers use their XRP to quote bids and offers, and improve market liquidity, and ODL customers purchase XRP at exchanges to effectuate cross-border transfers. Indirect purchasers of XRP also hold XRP for only short time periods. I demonstrate this empirically by calculating the ratio of XRP trading volume to the circulating supply.²⁴⁶ This ratio, referred to as "velocity," typically measures the frequency with which one unit of a particular currency is used for purchases.²⁴⁷ A higher velocity means that the asset is traded ("turned-over") or "used" more often. As I show in Exhibit 15, the velocity of XRP using the average 28-day XRP trading volume across all cryptocurrency exchanges reported by CryptoCompare increases over time and volume exceeds the XRP circulating supply, particularly after 2017.

145. In contrast, Ripple holds XRP over a long-term horizon. Because of the differences in both the timing and the duration of holding periods between Ripple and direct and indirect purchasers of XRP, their exposure to XRP price volatility and therefore to risk is different. ²⁴⁸ Exhibit 16 shows the monthly XRP price volatility, measured as the standard

²⁴⁶ I use the trading volume across all cryptocurrency exchanges tracked and reported by CryptoCompare and separately also, the trading volume across only the Top Tier cryptocurrency exchanges reported by CryptoCompare. I explain the data I used in my analyses in more detail in Appendix C.

²⁴⁷ Fisher, I., <u>The Purchasing Power of Money: Its Determination and Relation to Credit, Interest and Crises</u>, New York: Macmillan, 1911, at 17 ("Velocity of circulation, or rapidity of turnover, is simply the quotient obtained by dividing the total money payments for good in the course of a year by the average amount of circulation by which those payments are effected."). *See also*, Hakkio, C., "Exchange Rate Volatility and Federal Reserve Policy," *Federal Reserve Bank of Kansas City*, 1984. Velocity has been used to analyze cryptocurrencies. *See, e.g.*, Lyons, R., and G. Viswanath-Natraj, "What Keeps Stablecoins Stable?" *Working paper*, May 2020.

²⁴⁸ Academic research by Leirvik (2021) shows that time-variation in the volatility of market liquidity exposes investors to risks that varies over time. *See* Leirvik, T. "Cryptocurrency Returns and the Volatility of Liquidity," *Finance Research Letters* (forthcoming), 2021.

deviation of the daily closing price of XRP over the 28-day period, varied between a low of less than 1.5% and a high of over 35%.

IV. XRP IS A VIRTUAL CURRENCY

A. CRYPTOCURRENCIES, INCLUDING XRP, ARE VIRTUAL CURRENCIES

146. Economists often define money based on what can be done with it. Economists often argue that money (or currency) serves three complementary roles – it can be used as a store of value, a medium of exchange, and a unit of account.²⁴⁹ Fiat currency is issued, usually, by a nation's government. For example, in the United States, the U.S. Treasury, through the U.S. Mint and the Bureau of Engraving and Printing, produces the coins and bills we spend. Fiat money has no intrinsic value – that is, its value is not backed by gold or some other commodity.²⁵⁰ Instead, its value comes from its general acceptance as money. In other words, U.S. dollars are useful as money because of the way people use them in the economy. Currency, such as the U.S. dollar, is designated as legal tender, circulates, and is customarily used and accepted as a medium of exchange in the country of issuance. The CFTC defines a virtual currency as a "digital representation of value that functions as a medium of exchange, a unit of account, and/or a store of value."²⁵¹ But, for example, virtual currencies do not have legal tender status in any U.S.

²⁴⁹ See, e.g., Mankiw, N., Macroeconomics, 8th edition, 2018, at 82-83.

²⁵⁰ Money has no intrinsic value. In contrast, gold can be made into jewelry or the commodity corn can be used to make bread. *See, e.g.*, Ball, L., <u>Money Banking and Financial Markets</u>, 2nd edition, Worth Publishers, 2012, at 31.

²⁵¹ Lab CFTC, A CFTC Primer of Virtual Currencies, October 17, 2017, at 4, https://www.cftc.gov/sites/default/files/idc/groups/public/%40customerprotection/documents/file/labcftc_prime rcurrencies100417.pdf.

jurisdiction.²⁵² The CFTC regulates virtual currencies such as Bitcoin as commodities per Section 1a(9) of the Commodity Exchange Act.²⁵³

147. Cryptocurrencies, including XRP, are not fiat currencies, but as I explain below,

XRP has the same *function* as money albeit as a virtual currency. My assessment of XRP is consistent with the Department of Justice ("DOJ") and Financial Crimes Enforcement Network (FinCEN) determination that XRP is a virtual currency.²⁵⁴ In 2020, FinCEN restated its finding that XRP is a virtual currency.²⁵⁵

148. The first feature of money that economists often discuss is store of value. Money

is a convenient way to store wealth. For example, a textbook by Prof. Mankiw explains:

"As a store of value, money is a way to transfer purchasing power from the present to the future. If I work today and earn \$100, I can hold the money and spend it tomorrow, next week, or next month."²⁵⁶

In a 2017 speech, then-Chairman of the SEC Jay Clayton explained that cryptocurrencies also

serve as a store of value:

"Cryptocurrencies: Speaking broadly, cryptocurrencies purport to be items of inherent value (similar, for instance, to cash or gold) that are designed to enable purchases, sales, and other financial transactions. They are intended to provide many of the same functions as long-established currencies such as the U.S. dollar, euro or Japanese yen but do not have the backing of a government or other body.

²⁵² "Virtual Currencies," IRS, https://www.irs.gov/businesses/small-businesses-self-employed/virtual-currencies.

²⁵³ See In the Matter of: Coinflip, Inc., d/b/a Derivabit, and Francisco Riordan, CFTC Docket No. 15-29, September 17, 2015,

 $http://www.cftc.gov/idc/groups/public/@lrenforcementactions/documents/legalpleading/enfcoinfliprorder09172\ 015.pdf.$

²⁵⁴ Department of the Treasury Financial Crimes Enforcement Network Guidance, FIN-2013-G001, March 18, 2013. See also, Office of Foreign Assets Control Frequently Asked Questions, No. 559, March 19, 2018, https://home.treasury.gov/policy-issues/financial-sanctions/faqs/559.

²⁵⁵ United States Department of Justice, Cryptocurrency Enforcement Framework, Report of the Attorney General's Cyber Digital Task Force, October 8, 2020, at 25 (describing XRP as a "virtual currency"), https://www.justice.gov/ag/page/file/1326061/download.

²⁵⁶ Mankiw, N., <u>Macroeconomics</u>, 8th edition, 2018, at 82.

Although the design and maintenance of cryptocurrencies differ, proponents of cryptocurrencies highlight various potential benefits and features of them, including (1) the ability to make transfers without an intermediary and without geographic limitation, (2) finality of settlement, (3) lower transaction costs compared to other forms of payment and (4) the ability to publicly verify transactions. Other often-touted features of cryptocurrencies include personal anonymity and the absence of government regulation or oversight. Critics of cryptocurrencies note that these features may facilitate illicit trading and financial transactions, and that some of the purported beneficial features may not prove to be available in practice."²⁵⁷

149. The second useful feature of money is a unit of account -i.e., a convenient way to

measure and communicate amounts such as prices. For example, Prof. Mankiw notes that:

"As a unit of account money provides the terms in which prices are quoted and debts are recorded. Microeconomics teaches us that resources are allocated according to relative prices – the prices of goods relative to other goods – yet stores post their prices in dollars and cents. A car dealer tells you that a car costs \$20,000, not 400 shirts (even though it may amount to the same thing). Similarly, most debts require the debtor to deliver a specified number of dollars in the future, not a specified amount of some commodity. Money is the yardstick with which we measure economic transactions."²⁵⁸

150. XRP can be used as a common base to express the price of a unit of XRP on the

XRP Ledger but also to express prices at cryptocurrency exchanges. XRP can also be used to pay

for services. For example, *Hotsailer* accepts XRP as payments.²⁵⁹ Another example is the travel

site Travala, which quotes the price of a hotel room in XRP and accepts XRP as payment.²⁶⁰

²⁵⁷ Chairman Jay Clayton, "Statement on Cryptocurrencies and Initial Coin Offerings," U.S. Securities and Exchange Commission, Public Statement, December 11, 2017, https://www.sec.gov/news/publicstatement/statement-clayton-2017-12-11.

²⁵⁸ Mankiw, N., <u>Macroeconomics</u>, 8th edition, 2018, at 82. See also, Ball, L., <u>Money Banking and Financial</u> <u>Markets</u>, 2nd edition, at 28-29.

²⁵⁹ "How to pay with cryptocurrencies?," https://hostsailor.com/how-to-pay-with-cryptocurrencies/.

²⁶⁰ "What is XRP (XRP)?," https://www.travala.com/payment/xrp.

151. The third feature of money that economists often note is that money serves as a

"medium of exchange." In other words, it can be used to get goods and services (in exchange for

money). For example, Prof. Mankiw explains that:

"As a medium of exchange, money is what we use to buy goods and services....When we walk into stores, we are confident that the shopkeepers will accept our money in exchange for the items they are selling. The ease with which an asset can be converted into the medium of exchange and used to buy other things – goods and services – is sometimes called the asset's liquidity. Because money is the medium of exchange, it is the economy's most liquid asset."²⁶¹

Similarly, the Bank of International Settlements Annual Economic Report, 2018:

"Money has three fundamental and complementary roles. It is ... a medium of exchange: a seller accepts it as a means of payment, in the expectation that somebody else will do the same."²⁶²

152. XRP can be used as a medium of exchange in peer-to-peer exchange, for

example, between wallets on the blockchain, and can also be exchanged for fiat currency (USD,

Euro, Japanese Yen, etc.) or other cryptocurrencies at the cryptocurrency exchanges.

B. RIPPLE'S ON-DEMAND-LIQUIDITY PLATFORM USES XRP AS A MEDIUM OF EXCHANGE

153. Ripple's ODL product uses XRP as a medium of exchange in the transfer of

international payments. The growth in ODL volume, as I discuss in more detail below, reinforces

XRP's role as virtual currency. The ODL product was unique in terms of on-demand liquidity

provisions, as MoneyGram's CFO Angelilli testified that ODL delivered on its promise of near

instantaneous money transfers and 24/7 trading.²⁶³

²⁶¹ Mankiw, N., <u>Macroeconomics</u>, 8th edition, 2018, at 82.

²⁶² Bank for International Settlements, *Annual Economic Report*, 2018, at 82.

²⁶³ Deposition Transcript of Lawrence Angelilli, at 46:12-47:10, and at 63. ("A. ...What Ripple did was provide the ability to cash trades after noon, and then what it did was extended the window for cash trades in those markets because we didn't have a new deadline. Q. And so Ripple's ability to do those trades 24/7 was a major plus of the ODL product. A. That was what was particularly interesting to us in the beginning was that it was 24/7, and for a while, we were doing trades on Saturdays and Sundays and holidays when the banks were closed ... the

154. In June 2019, MoneyGram, the second largest U.S. remittance company after Western Union, entered into a partnership with Ripple to use ODL in its cross-border payments.²⁶⁴ Using the actual MoneyGram payments data, I demonstrate that the failure rate of payments and cost efficiencies of ODL improved over time as the market for XRP became more liquid.

i. MoneyGram Transferred a Significant Amount of XRP Across Many Corridors Using ODL

155. Between July 2019 and December 2020, MoneyGram transferred approximately \$2.3 billion using ODL. My analysis of the actual MoneyGram transfers shows that MoneyGram made more than 200,000 separate transfers, with an average size of approximately \$12,000.²⁶⁵

156. I summarize MoneyGram's transfers over time by remittance corridor in Exhibit 17. Initially, Ripple focused on the more active USD-MXN corridor. By November 2020, MoneyGram expanded its use of ODL to five corridors, including, USD-MNX, EUR-USD, AUD-USD, USD-PHP, and AUD-PHP. MoneyGram's use of ODL increased over time, reaching a high of \$410 million transferred in April 2020. MoneyGram ODL transactions were

blockchain was extremely effective in getting those trades through when -- on seven days a week. I -- Q. I think that answers the question. A. Okay. Q. So the ODL product did work in terms of the speed that it promises; is that fair? A. Correct. Q. And it did work in terms of the 24/7 ability to do trades? A. Yes.").

²⁶⁴ The partnership with MoneyGram was terminated in December 2020 after the filing of the initial SEC Complaint. During his deposition, MoneyGram CFO explained the reason for the termination. *See* Deposition Transcript of Lawrence Angelilli, at 182:10-20 ("Q. And why did you terminate the agreement with Ripple? A. We were unable to trade XRP on any U.S. exchange. And in our conversations with Ripple to find an alternative, they were ultimately unsuccessful. And so -- so it became clear that we really couldn't use the product anymore. Q. And why were you unable to trade XRP on any U.S. exchange? A. U.S. exchanges stopped trading the token after the SEC filed suit.").

²⁶⁵ Detailed ODL transaction data received from MoneyGram. SEC-LIT-EPROD-000077198, SEC-LIT-EPROD-000075518, SEC-LIT-EPROD-000073620, SEC-LIT-EPROD-000075553, SEC-LIT-EPROD-000075486, SEC-LIT-EPROD-000075476, SEC-LIT-EPROD-000071477, MONEYGRAM_SEC_0017277.

substantial, not just in absolute terms but also relative to MoneyGram's overall payments transfer activity, which constitutes approximately \$65 billion annually.²⁶⁶

157. My analysis shows that MoneyGram, a brand name customer for ODL, made extensive use of ODL, as demonstrated by the number of transfers, the aggregate size of transfers, and the development of five different remittance corridors across the globe.

ii. The On-Demand-Liquidity Product Is Technically Feasible and Efficiency Improved Over Time

158. ODL technical efficiency improved over MoneyGram's tenure. For example, during MoneyGram's tenure, the percentage of failed transactions decreased: approximately 11% of transfers failed during the first month of operation of the USD-MXN corridor, and no transfers failed during December 2020. Across all corridors, approximately 10% of transactions failed in May 2019, but the number and percentage of failed transactions decreased. By December 2019, the failure rate was on average below 1% across all corridors. I show the number of failed, completed, and total transfers across all corridors used by MoneyGram in Exhibit 18.

iii. The Cost of Using ODL Decreased Over Time as the XRP Market Liquidity Improved

159. As with traditional remittances, MoneyGram incurred a cost when using ODL in their cross-border remittances. The ODL costs are comprised of three components: two exchange-related fees, charged respectively by the sending and the receiving exchanges, and a foreign currency (FX) spread. Following the MoneyGram convention as reported in their

²⁶⁶ Deposition Transcript of Lawrence Angelilli, at 30:4-7.

transactions, I show the MoneyGram FX disadvantage for each corridor in Exhibit 19.²⁶⁷ The MoneyGram data shows that, on average, the cost disadvantage of ODL decreased over time. The data also shows that the cost disadvantage is relatively lower for the more liquid, active corridors such as EUR-USD and USD-MNX than for the less liquid AUD-PHP corridor.

160. I show the change in the components of the ODL cost during MoneyGram's usage in Exhibit 20. The exchange fees for all the relevant corridor exchanges either decreased or remained constant during MoneyGram's ODL transfers.²⁶⁸ The data importantly also shows that, on average, the FX spread decreased between 2 bps and 4 bps over time as the liquidity of the XRP market improved. ODL's effectiveness depends critically on having two-way flow for XRP at cryptocurrency exchanges (*i.e.*, market liquidity). It therefore took time to develop sufficient liquidity at the relevant cryptocurrency exchanges: "liquidity around the digital asset XRP is the lifeblood of Ripple's On-Demand Liquidity [...]. As a bridging tool in ODL, the greater the liquidity of XRP, the less cost and risk in each transaction."²⁶⁹

161. Ripple explained that there needs to be a two way flow of purchases and sales for XRP before ODL becomes efficient. Therefore, ODL can achieve economies of scale only if the market reaches a sufficient level of market liquidity. I develop a stylized example to show the break-even levels of liquidity and transfer size at which the costs of using ODL would be on par with using traditional means of cross-border remittances. Exhibit 21 compares the cost disadvantage of using ODL versus traditional means for different remittance sizes. The cost of

²⁶⁷ The FX disadvantage indicates the average percentage cost increase in sending money via ODL when compared to the Reuters FX Benchmark. A positive FX disadvantage means that ODL is more costly than a hypothetical transfer at the Reuters benchmark rate.

²⁶⁸ The corridors receiving PHP have no receiving exchange fee (Coinsphere) and use the same sending exchange (Bitstamp) as the other corridors.

²⁶⁹ Madigan, B., "Liquidity and Global Markets 101," *Ripple Insights*, April 20, 2020.

using ODL is on par with traditional means for a remittance of approximately \$2,200. Exhibit 22 shows the same sizes but with lower costs of using ODL to be more commensurate with smaller FX spreads in more liquid XRP markets. For transactions below approximately \$7,500, the cost of using ODL is on par with that of MoneyGram's traditional FX system.²⁷⁰

iv. Ripple's Rebates and Incentives to MoneyGram Is Not Unique and Generally Used to Encourage the Adoption of New Technology/Products

162. Ripple's partnership with MoneyGram gave them brand awareness for ODL.²⁷¹

Ripple paid transaction volume incentives and rebates to MoneyGram as part of the cost for launching a new product, as I explain in more detail below. Ripple agreed to make three types of payments tied to MoneyGram's use of ODL: rebate fees, transaction fees, and performance bonuses.²⁷² Rebate fees were designed to bring MoneyGram's cost of using ODL to 5 basis points relative to a transfer at a hypothetical benchmark rate. For example, if the cost of a particular ODL transaction that involved converting USD \$100 to MXN with a benchmark FX rate of 20 MXN/USD was 1% or 100 basis points,²⁷³ then Ripple would rebate to MoneyGram an amount needed to bring the cost down to 5 basis points.²⁷⁴ Transaction fees were a reward for

²⁷⁰ Note that MoneyGram's business model involves using the traditional FX system to preposition sufficient amounts to fulfill one or several days of anticipated customer transactions, and it chose to use the ODL product in the same vein – as opposed to using it "on demand" as its customers initiated transactions. ("We preposition cash in various countries and currencies to facilitate settlement of transactions.") MoneyGram 2019 10-K, at 37.

²⁷¹ MoneyGram's CFO Angelilli testified that simply having MoneyGram as a partner was a "positive" for Ripple and a "global news story." He agreed that obtaining a "big headline customer" would have influenced whether Ripple would have offered MoneyGram incentives to use ODL. He believed that "lead[ing] with a low price or even los[ing] money in the initial phase of [a] growth curve" happens "all the time" in Internet commerce. Deposition Transcript of Lawrence Angelilli, 2021, at 83:12-24, 85:3-13.

²⁷² Preclearance letter, September 26, 2019 (SEC-LIT-EPROD-000071389, at 393). See also, MoneyGram and Ripple, Work Order #1, June 17, 2019 (RPLI_SEC0239684).

²⁷³ Implying that ODL returned 1,980 MXN (=99.00% x 100 x 20) rather than 2,000 MXN.

²⁷⁴ As if ODL returned 1,999 MXN (=99.95% x 100 x 20). The rebate would be 19 MXN or USD \$0.95.

MoneyGram for using ODL, running from a high of 2.5% of MoneyGram's ODL volume to a low of 0.75%, depending on the overall volume achieved.²⁷⁵ Additionally, Ripple would pay MoneyGram a performance bonus if MoneyGram hit an ODL volume target. MoneyGram was an early adopter, and incentives encouraged MoneyGram to send significant volume with ODL, which in turn helped make the product more efficient.

163. The use of rebates and incentives to attract customers and gain market share is a common business practice. For example, payment processors like Visa, Mastercard, and Alibaba provide rebates to customers to promote their payment products.

Each year Visa pays billions in "[c]lient incentives [that] consist of incentives provided in contracts with financial institution clients, merchants and strategic partners for various programs designed to grow payments volume, increase Visa product acceptance, win merchant routing transactions over our network and drive innovation. These incentives are primarily accounted for as reductions to revenues."²⁷⁶

Visa paid \$5.5 billion in client incentives in fiscal year 2018, and more than \$6 billion in fiscal

years 2019 and 2020.²⁷⁷ Mastercard similarly pays incentives for marketing purposes of

approximately \$8 billion per year in 2019 and 2020:

"In order to increase transaction volumes, enter new markets and expand our Mastercard-branded cards and enabled products and services, we seek to enter into business agreements with customers through which we offer incentives, pricing discounts and other support that promote our products. In order to stay competitive, we may have to increase the amount of these incentives and pricing discounts."²⁷⁸

Alibaba, as part of its "merchant incentive program," provides preferential commission rates for

merchants within their program if they hit certain metrics:

²⁷⁵ Preclearance letter, September 26, 2019 (SEC-LIT-EPROD-000071389, at 394 and 408). See also, MoneyGram and Ripple, Work Order #1, June 17, 2019 (RPLI_SEC0239684).

²⁷⁶ Visa 2020 Annual Report, at 45, 47.

²⁷⁷ Visa 2020 Annual Report, at 47.

²⁷⁸ Mastercard 2020 Annual Report, at 25, 48.

"Commission revenue did not grow in proportion to the growth of Tmall online physical goods GMV (excluding unpaid orders) primarily because of the revenue mix shift within Tmall Supermarket from commission-based revenue towards direct sales, which is classified as 'Others' revenue under China commerce retail business, and also because more merchants under our merchant incentive program achieved annual GMV targets and received preferential commission rates."²⁷⁹

164. Another example of such incentives can be found in trading platforms. Trading

platforms may subsidize market makers to foster liquidity,²⁸⁰ offer volume discounts to attract

the most active traders, subside investment in costly technology,²⁸¹ and structure trading fee

models to reward liquidity providers.²⁸²

165. In addition, conditional rebates – that is, rebates that apply if certain conditions

are met, such as quantity purchased, type of payment used, or customer loyalty - can have

significant pro-competitive effects, one of which is achieving economies of scale:

"In industries with high fixed costs, such as for instance innovative industries (information technology, pharmaceutical research, etc.) rebates allow suppliers to increase output and, in turn, recover their fixed costs more rapidly (since they will be

²⁷⁹ Alibaba Group Fiscal 2020 Annual Report, at 136.

²⁸⁰ Foucault, T., O. Kadan, and E. Kandel, "Liquidity Cycles and Make/Take Fees in Electronic Markets," *The Journal of Finance*, 2013, 299-341, at 305 ("In this setting, as shown below, it is optimal for the trading platform to charge a lower fee on the side that has the lowest aggregate monitoring intensity. In this way, the platform maximizes the trading rate by optimally balancing the rates at which liquidity is consumed and supplied. For instance, subsidizing market makers is optimal when they are outnumbered by market takers or when their monitoring cost is large. Indeed, they will monitor the market more closely to capture the rebate and as a result new liquidity is supplied faster after each trade.").

²⁸¹ Hendershott, T., and R. Riordan "Algorithmic Trading and the Market for Liquidity," *Journal of Financial and Quantitative Analysis*, 2013, 1001-1024, at 1002, 1006 ("Most markets offer volume discounts to attract the most active traders. During our sample period the German competition authority did not allow for generic volume discounts, but rather required that discounts have a cost-sensitive component. The DB [Deutsche Bourse] successfully asserted that algorithm-generated trading is lower cost and highly sensitive to fee reductions and, therefore, could receive quantity discounts... The fee rebate program also subsidized the investment in costly technology, encouraging more investors to automate and boosting trading volume and liquidity at the DB.").

²⁸² "Trading Fee Models and Their Impact on Trading Behavior," *International Organization of Securities Commissions*, 2013, 1-29, at 5, 6.

able to achieve economies of scale by spreading their fixed costs over larger volumes) resulting in lower average total costs and prices for consumers..."²⁸³

166. Cryptocurrencies in general and ODL in particular are examples of innovative technology and products, where speeding up adoption could drive significant consumer benefits in the future.

²⁸³ Geradin, D., "A Proposed Test for Separating Pro-competitive Conditional Rebates from Anti-competitive Ones," *World Competition*, Vol. 32(1), 2009, 41-70, at 64-65.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 4, 2021

2

Exhibit 1 Summary of Ripple's Funding From Private Investors

Year	Funding Type	Shares	Proceeds	Notes
2012	Common Stock	800,000	\$200,000	
2014	Series A	7,359,045	\$6,770,422	Related to the Convertible Notes Payable
2014	Series A	4,033,742	\$7,091,134	Series A Preferred stock
2015	Series A	13,866,966	\$24,443,190	Series A Preferred stock
2016	Series B	14,482,502	\$55,014,394	One of the investors of the Series B is SBI Holdings, which Ripple entered a joint venture agreement with.
2019	Series C	3,252,790	\$194,823,000	Series C Redeemable Convertible Preferred stock
2014				
2015				

Sources: Ripple Labs, Inc., Consolidated Financial Statements, 2013-2019.

Notes: On July 1, 2017, Ripple effected a two-for-one stock split to stockholders. Share and per share information for periods after July 1, 2017 have been adjusted to reflect the impact of the stock split. In April 2018, Ripple repurchased and constructively retired 70,000 shares of Class A common stock from an investor at a price of \$20 per share for a total purchase price of \$1,400,000. Shares reported prior to this date do not account for this repurchase.

During fiscal years ended Dec 31, 2018 and 2019, Ripple repurchased and constructively retired 1,563,372 and 2,380,000 shares of Series A stock. In addition, during the year ended Dec 31, 2019, Ripple repurchased and constructively retired 1,436,628 shares of Series B. Shares reported prior to these dates do not account for these repurchases.

As of December 20, 2019, Ripple was authorized to issue 180,000,000 shares of Class A common stock and 35,331,121 shares of Class B common stock. The shares info in this note reflects the two-for-one stock split.

On February 18, 2020, pursuant to its Series C financing, Ripple paid \$163.9 million to redeeem 1.3 million shares of Series A and 1.4 million of Series B. Original reported shares for Series A and B do not account for this redemption.

	Estimatio 8/6/2013 -	n Period 1 12/15/2020	Estimation Period 2 8/11/2015 - 12/20/2020	
	Proportion of Variance		Proportion of Variance	
	Explained	Cumulative	Explained	Cumulative
Principal Component 1	80.7%	80.7%	91.1%	91.1%
Principal Component 2	6.8%	87.5%	5.5%	96.6%
Principal Component 3	3.8%	91.3%	1.3%	97.9%
Principal Component 4	2.8%	94.1%	0.6%	98.4%

Exhibit 2 Most of the Variance in Non-XRP Price Returns Can Be Explained with Four PCs

Note: Reports only the first four principal components.

	Estimation Period 1 8/6/2013 - 12/15/2020	Estimation Period 2 8/11/2015 - 12/20/2020
Constant	0.058	-0.022
	(0.042)	(0.041)
Principal Component 1	0.217*	-0.001*
	(0.018)	(0.000)
Principal Component 2	-0.002	-0.003*
	(0.055)	(0.001)
Principal Component 3	0.135	0.129*
	(0.146)	(0.004)
Principal Component 4	0.577*	0.052*
	(0.280)	(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)
Observations	96	70
Adjusted R-squared	0.541	0.923
Non-XRP Coins used in PCA	9	91

Exhibit 3 Regression of XRP Price Return on Principal Components of Other Cryptocurrencies

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.

Rank	Name	Symbol	Market Cap	Price
1	Bitcoin*	BTC	\$3,917,142,819	\$269.03000
2	Litecoin*	LTC	\$173,045,227	\$4.08300
3	Ethereum	ETH	\$64,569,288	\$1.05900
4	Dash	DASH	\$17,913,487	\$3.17500
5	Dogecoin	DOGE	\$16,454,876	\$0.00016
6	Bytecoin	BCN	\$13,568,003	\$0.00007
7	Stellar	XLM	\$11,598,046	\$0.00224
8	BitShares	BTS	\$11,597,738	\$0.00464
9	Peercoin*	PPC	\$10,520,136	\$0.46430
10	Nxt	NXT	\$10,280,170	\$0.01024
11	Namecoin*	NMC	\$6,794,901	\$0.55802
12	Monero	XMR	\$5,359,598	\$0.60320
13	Counterparty	XCP	\$4,049,815	\$1.50900
14	Clams	CLAM	\$2,851,185	\$3.44900
15	MonaCoin	MONA	\$2,561,511	\$0.11680
16	Startcoin	START	\$2,424,392	\$0.07856
17	BlackCoin	BLK	\$2,040,558	\$0.02685
18	NovaCoin*	NVC	\$1,397,991	\$1.24000
19	MintCoin	MINT	\$1,358,500	\$0.00006
20	Rimbit	RBT	\$1,260,632	\$0.01113

Exhibit 4 Twenty Largest Cryptocurrencies Used in Estimation Period 2's PCA August 11, 2015

Notes:

[1] The table reports the largest 20 cryptocurrencies used in Estimation Period 2's PCA, by market cap, as of August 11, 2015.

[2] * Denotes a cryptocurrency also used in Estimation Period 1 (Aug. 2013 - Dec. 2020) PCA regressions.

[3] Estimation Period 1 PCA uses 9 cryptocurrencies, not all of which are reported above, as their market cap on

August 11, 2015 was outside of the top-20 cryptocurrencies.

[4] XRP market cap on August 11, 2015 was \$274 million (less than Bitcoin and more than Litecoin).

	Estimation Period 1 8/6/2013 - 12/15/2020	Estimation 8/11/2015 - 1	Period 2 2/20/2020
Constant	0.076	Constant	-0.016
	(0.051)		(0.039)
BTC Return	-0.393	BTC Return	-0.661*
	(0.373)		(0.263)
LTC Return	0.760*	LTC Return	0.775*
	(0.370)		(0.207)
NMC Return	-0.056	ETH Return	0.082
	(0.107)		(0.110)
PPC Return	0.172	DASH Return	0.080
	(0.201)		(0.118)
FTC Return	0.053	DOGE Return	0.209
	(0.063)		(0.142)
		BCN Return	0.478*
			(0.156)
		XLM Return	0.636*
			(0.028)
		BTS Return	-0.277*
			(0.077)
		PPC Return	-0.553*
			(0.268)
		NXT Return	-0.008
			(0.049)
Observations	96		70
Adjusted R-squar	red 0.540		0.941

Exhibit 5 Regression of XRP Returns on Returns of Largest Market-Cap Coins

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] Five (Estimation Period 1) or ten (Estimation Period 2) largest coins by market cap as of the start date of the respective estimation period $\frac{1}{2} \frac{1}{2} \frac{1$

(8/6/2013 for Estimation Period 1 and 8/11/2015 for Estimation Period 2).

	Cryptocurrency Factors	Cryptocurrency and S&P 500	Cryptocurrency and Equity Indices	Cryptocurrency and Commodity Index	Cryptocurrency and Gold	Cryptocurrency and Fiat Currencies
Constant	0.058	0.063	0.062	0.052	0.055	0.061
	(0.042)	(0.044)	(0.044)	(0.039)	(0.043)	(0.043)
Principal Component 1	0.217*	0.218*	0.220*	0.216*	0.219*	0.216*
	(0.018)	(0.019)	(0.020)	(0.018)	(0.019)	(0.019)
Principal Component 2	-0.002	-0.001	-0.005	0.008	-0.008	-0.004
	(0.055)	(0.057)	(0.056)	(0.054)	(0.049)	(0.053)
Principal Component 3	0.135	0.137	0.139	0.126	0.146	0.145
	(0.146)	(0.149)	(0.144)	(0.147)	(0.151)	(0.143)
Principal Component 4	0.577*	0.581*	0.588*	0.584*	0.572*	0.568*
	(0.280)	(0.286)	(0.287)	(0.285)	(0.275)	(0.281)
S&P 500 Return		-0.629				
		(1.025)				
MCSI World Index Return			-2.025			
			(2.438)			
MCSI Emerging Market Index Return			1.922			
			(2.135)			
Bloomberg Commodity Index Return				-1.158		
				(1.810)		
Gold Return					0.760	
					(1.506)	
U.S. Dollar Index (USDX) Return						-3.691
						(15.875)
Japanese Yen Return						-1.532
						(3.515)
Euro Return						0.355
						(14.525)
Observations	96	96	96	96	96	96
Adjusted R-squared	0.541	0.536	0.535	0.538	0.537	0.531

Exhibit 6 Regression of XRP Returns on Principal Components of Other Cryptocurrencies and Returns of Other Assets Estimation Period 1 - 8/6/2013 - 12/15/2020

Sources: CryptoCompare; CoinMarketCap; Bloomberg.

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.

	Cryptocurrency	Cryptocurrency	Cryptocurrency	Cryptocurrency and Commodity	Cryptocurrency	Cryptocurrency and Fiat
	Factors	and S&P 500	and Equity Indices	Index	and Gold	Currencies
Constant	-0.022	-0.024	-0.022	-0.018	-0.023	-0.032
	(0.041)	(0.041)	(0.041)	(0.039)	(0.043)	(0.043)
Principal Component 1	-0.001*	-0.001*	-0.001*	-0.001*	-0.001*	-0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Principal Component 2	-0.003*	-0.003*	-0.003*	-0.003*	-0.004*	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Principal Component 3	0.129*	0.128*	0.128*	0.128*	0.128*	0.127*
	(0.004)	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)
Principal Component 4	0.052*	0.052*	0.051*	0.051*	0.051*	0.053*
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.007)
Principal Component 5	0.058*	0.057*	0.054*	0.058*	0.057*	0.056*
	(0.012)	(0.013)	(0.014)	(0.012)	(0.012)	(0.010)
Principal Component 6	0.384*	0.383*	0.381*	0.383*	0.385*	0.376*
	(0.031)	(0.033)	(0.033)	(0.031)	(0.031)	(0.031)
Principal Component 7	-0.149*	-0.148*	-0.146*	-0.148*	-0.151*	-0.144*
	(0.017)	(0.017)	(0.017)	(0.018)	(0.017)	(0.018)
Principal Component 8	-0.229*	-0.232*	-0.235*	-0.232*	-0.232*	-0.241*
	(0.028)	(0.032)	(0.033)	(0.028)	(0.030)	(0.028)
Principal Component 9	-0.041	-0.042	-0.043	-0.043	-0.043	-0.045
	(0.036)	(0.037)	(0.038)	(0.038)	(0.039)	(0.037)
Principal Component 10	0.022	0.022	0.023	0.021	0.023	0.016
	(0.033)	(0.033)	(0.034)	(0.032)	(0.033)	(0.027)
Principal Component 11	-0.231*	-0.235*	-0.238*	-0.241*	-0.235*	-0.238*
	(0.045)	(0.049)	(0.050)	(0.045)	(0.047)	(0.042)
S&P 500 Return		0.398				
		(0.820)				
MCSI World Index Return			0.028			
			(1.201)			
MCSI Emerging Market Index Return			0.624			
			(1.132)			
Bloomberg Commodity Index Return				0.945		
· ·				(1.119)		
Gold Return					0.623	
					(1.205)	
U.S. Dollar Index (USDX) Return						-14.888
× ,						(9.626)
Japanese Yen Return						-3.193
·						(2.149)
Euro Return						-7.289
						(7.561)
Observations	70	70	70	70	70	70
Adjusted R-squared	0.923	0.921	0.920	0.922	0.922	0.925

Exhibit 7 Regression of XRP Returns on Principal Components of Other Cryptocurrencies and Returns of Other Assets Estimation Period 2 - 8/11/2015 - 12/20/2020

Sources: CryptoCompare; CoinMarketCap; Bloomberg.

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.



Sources: RPLI_SEC 0304724-RPLI_SEC 0304726; RPLI_SEC 1100594-RPLI_SEC 1100596.

Notes:

[1] For December 2020, reports distributions thru Dec. 20, 2020.

[2] Large flows of XRP include: (1) 1.08B XRP to Custody account in November 2015; (2) 3.5B XRP into the initial Reserved account in March 2016; (3) 2B XRP into Jed [McCaleb's] Custody account in June 2016. There are additional large flows in 2015-2016.

[3] Total monthly net outflows are negative (i.e., inflows into Ripple) in August 2016 (240M XRP) and June 2017 (7M XRP).



Exhibit 9 Monthly Net Outflows From Ripple (in U.S. Dollars) Aug. 4, 2013 - Dec. 20, 2020

Sources: RPLI_SEC 0304724-RPLI_SEC 0304726; RPLI_SEC 1100594-RPLI_SEC 1100596; CoinMarketCap; CryptoCompare.

Notes:

[1] Large flows of XRP in 2015-2016 include, for example: (1) 1.08B XRP to custody account in November 2015; (2) 3.5B XRP into the initial Reserved account in March 2016; (3) 2B XRP into Jed [McCaleb's] Custody account in June 2016. There are additional large flows.

[2] Dollar amounts calculated using the daily midpoint USD price of XRP on the date of distribution for inflows and outflows. Midpoint is equal to 1/2(open price + closing price). Uses CryptoCompare prices for Jan. 21, 2015-Dec. 20, 2020; CoinMarketCap prices prior to Jan. 21, 2015.

[3] For December 2020, reports distributions thru Dec. 20, 2020.

[4] Total monthly net outflows are negative (i.e., inflows into Ripple) in August 2016 (1.5M USD) and June 2017 (1.7M USD).

[5] Prices are the monthly weighted XRP price (monthly net outflows in USD divided by monthly XRP net outflows).

Exhibit 10 XRP Total Distributions and Circulating Supply



Sources: CoinMarketCap (Circulating Supply) and Ripple's publicly-available API ("Total XRP Distribution").

Notes: Large increase in circulating supply in August 2014 is about 20 billion XRP. Daily Circulating Supply is smoothed by multiplying CoinMarketCap's circulating supply by the daily ratio of opening and closing prices.

			Both Distributions and
	Distributions	Lag Distributions	Lag Distributions
Constant	0.048	0.068	0.057
	(0.066)	(0.058)	(0.067)
Distributions (\$ Million)	< 0.001		0.001
	(0.001)		(0.002)
Lag Distributions (\$ Million)		< 0.001	-0.001
		(0.001)	(0.001)
Principal Component 1	0.217*	0.216*	0.216*
	(0.018)	(0.018)	(0.019)
Principal Component 2	-0.001	-0.004	-0.004
	(0.054)	(0.055)	(0.055)
Principal Component 3	0.134	0.125	0.112
	(0.149)	(0.150)	(0.167)
Principal Component 4	0.570	0.579*	0.563
	(0.298)	(0.282)	(0.305)
Observations	96	95	95
Adjusted R-squared	0.536	0.536	0.533

Exhibit 11A Regression of XRP Returns on Ripple XRP Distributions Estimation Period 1 - 8/6/2013 - 12/15/2020

Sources: CryptoCompare; CoinMarketCap; RPLI_SEC 0304724-RPLI_SEC 0304726; RPLI_SEC 1100594-RPLI_SEC 1100596. 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] Lagged measures are over the 28-day period preceding the 28-day period over which the dependent variable (XRP return minus risk-free return) is measured.

[5] Distributions are total net outflows from Ripple over the 28-day period.

			Both Distributions and Lag
	Distributions	Lag Distributions	Distributions
Constant	-0.046	-0.086	-0.079
	(0.060)	(0.060)	(0.066)
Distributions (\$ Million)	0.001		< 0.001
	(0.001)		(0.001)
Lag Distributions (\$ Million)		0.002	0.002
		(0.001)	(0.001)
Principal Component 1	-0.001*	-0.001*	-0.001*
	(0.000)	(0.000)	(0.000)
Principal Component 2	-0.003*	-0.003*	-0.003*
	(0.001)	(0.001)	(0.001)
Principal Component 3	0.128*	0.131*	0.131*
	(0.004)	(0.004)	(0.004)
Principal Component 4	0.054*	0.054*	0.053*
	(0.008)	(0.007)	(0.008)
Principal Component 5	0.060*	0.063*	0.063*
	(0.013)	(0.011)	(0.012)
Principal Component 6	0.384*	0.383*	0.383*
	(0.031)	(0.031)	(0.031)
Principal Component 7	-0.147*	-0.154*	-0.155*
	(0.018)	(0.016)	(0.018)
Principal Component 8	-0.228*	-0.228*	-0.229*
	(0.028)	(0.027)	(0.028)
Principal Component 9	-0.039	-0.042	-0.043
	(0.035)	(0.035)	(0.035)
Principal Component 10	0.024	0.034	0.034
	(0.032)	(0.034)	(0.035)
Principal Component 11	-0.230*	-0.234*	-0.235*
	(0.045)	(0.045)	(0.046)
Observations	70	70	70
Adjusted R-squared	0.922	0.925	0.923

Exhibit 11B **Regression of XRP Returns on Ripple XRP Distributions** Estimation Period 2 - 8/11/2015 - 12/20/2020

Sources: CryptoCompare; CoinMarketCap; RPLI SEC 0304724-RPLI SEC 0304726; RPLI SEC 1100594-RPLI SEC 1100596.

Notes:

Standard errors, in parentheses, are robust to heteroskedasticity (Huber/White).
* indicates statistical significance at the 5% level.

[3] All return variables are 28-day returns.

[4] Lagged measures are over the 28-day period preceding the 28-day period over which the dependent variable (XRP return minus risk-free return) is measured.

[5] Distributions are total net outflows from Ripple over the 28-day period.

[6] The number of Principal Components are selected by the BIC criteria.
	Not Controlling for Cryptocurrency-Market Factors	Adding PCs of Cryptocurrency Factors
Constant	0.140	0.217
	(0.116)	(0.122)
Lag Distributions (\$ Million)	-0.001	-0.001
	(0.001)	(0.001)
Lag XRP Volatility	0.238	-2.822
	(1.020)	(1.457)
Lag XRP Return	-0.368	-0.072
	(0.219)	(0.189)
Lag XRP Return x Lag XRP Volatility	2.870*	1.852*
	(0.630)	(0.691)
Principal Component 1		0.216*
		(0.016)
Principal Component 2		0.008
		(0.057)
Principal Component 3		0.096
		(0.108)
Principal Component 4		0.567
		(0.290)
Observations	95	95
Adjusted R-squared	0.154	0.627

Exhibit 12A Regression of XRP Returns on Ripple XRP Distributions - Accounting for Volatility Estimation Period 1 - 8/6/2013 - 12/15/2020

Sources: CryptoCompare; CoinMarketCap; RPLI_SEC 0304724-RPLI_SEC 0304726; RPLI_SEC 1100594-RPLI_SEC 1100596. 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] Lagged measures are over the 28-day period preceding the 28-day period over which the dependent variable (XRP return minus risk-free return) is measured.

[5] Lagged distributions are total net outflows from Ripple over the preceding 28-day period.

[6] Volatility calculated as standard deviation of daily returns over 28 days.

[7] The number of Principal Components are selected by the BIC criteria.

	Not Controlling for Cryptocurrency-Market Factors	Adding PCs of Cryptocurrency Factors
Constant	0.297	-0.035
	(0.189)	(0.083)
Lag Distributions (\$ Million)	-0.002	0.001
	(0.002)	(0.001)
Lag XRP Volatility	-2.391	-0.960
	(1.863)	(1.575)
Lag XRP Return	-1.277*	-0.593*
	(0.140)	(0.182)
Lag XRP Return x Lag XRP Volatility	9.354*	4.192*
	(0.938)	(1.461)
Principal Component 1		< 0.001
		(0.003)
Principal Component 2		-0.001
		(0.002)
Principal Component 3		0.125*
		(0.005)
Principal Component 4		0.049*
		(0.006)
Principal Component 5		0.025
		(0.016)
Principal Component 6		0.218*
		(0.076)
Principal Component 7		-0.093*
		(0.028)
Principal Component 8		-0.150*
		(0.040)
Principal Component 9		-0.011
		(0.033)
Principal Component 10		0.034
		(0.028)
Principal Component 11		-0.132*
		(0.057)
Observations	70	70
Adjusted R-squared	0.644	0.942

Exhibit 12B Regression of XRP Returns on Ripple XRP Distributions - Accounting for Volatility Estimation Period 2 - 8/11/2015 - 12/20/2020

Sources: CryptoCompare; CoinMarketCap; RPLI SEC 0304724-RPLI SEC 0304726; RPLI SEC 1100594-RPLI SEC 1100596.

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] Lagged measures are over the 28-day period preceding the 28-day period over which the dependent variable (XRP return minus risk-free return) is measured.

[5] Lagged distributions are total net outflows from Ripple over the preceding 28-day period.

[6] Volatility calculated as standard deviation of daily returns over 28 days. [7] The number of Principal Components are selected by the BIC criteria.

Exchange	Effective Date	Termination Date	Duration (Months)
	01/11/17	04/30/17	4
	06/02/17	12/31/17	7
	05/17/17	08/31/17	3
	05/18/17	08/18/17	3
	05/29/17	11/30/17	6
	10/13/17	04/13/18	6
	10/30/17	10/30/18	12
Sources: and and Rip 2017; and Ripple Markets, 2 Note: *Ripple Market listed XRP.	d Ripple Markets, <i>XRP/EUR Fee Res</i> and Ripple Markets, <i>XRP Fee</i> ople Markets, <i>MRP Volum</i> and Ripple Markets, <i>XRP Volum</i> and Ripple Markets, <i>XRP Listin</i> and Ripple Markets, <i>XRP Listin</i> <i>XRP Volume Incentive and Fee Reba</i> ts entered into a contract with	bate Program, January 11, 2017 (F e Rebate Program Agreement, Oct in Incentive Program, June 2, 2017 FeeRebate Program g, Volume Incentive and Rebate A P Volume Incentive Program, May ite Program Agreement, October 30, 20	RPLI_SEC 0507279); tober 13, 2017; 7; m, May 29, 2017; greement, May 17, 18, 2017; 0, 2017. 017, but never

Exhibit 13 Effective and Termination Dates of Ripple's Contracts with Exchanges



Exhibit 14 Number of Exchanges Where XRP Trades According to CryptoCompare August 4, 2013 - December 20, 2020

Source: CryptoCompare.

Notes: Number of exchanges according to CryptoCompare based on the earlier of date first listed and first non-zero XRP trading volume and the later of the date last listed and the last date with non-zero XRP trading volume. Only exchanges with positive volume on some date included. CryptoCompare determines whether an exchange is classified as "Top Tier" - exchanges with grades of "B" thru "AA." See, e.g., https://data.cryptocompare.com/reports/exchange-benchmark-july-2020.

Exhibit 15 XRP Velocity January 21, 2015 - December 20, 2020



Sources: CoinMarketCap (circulating supply); CryptoCompare (trading volume).

Notes: Velocity is defined as the prior 28 day trading volume divided by the average circulating supply over the prior 28 days. CryptoCompare volume data are available starting in January 21, 2015 (so the first 28 day period is available in February 2015). CryptoCompare determines whether an exchange is classified as "Top Tier" - exchanges with grades of "B" thru "AA." See, e.g., https://data.cryptocompare.com/reports/exchange-benchmark-july-2020.



Exhibit 16 XRP Price and Volatility

Notes:

[1] Price is price as of midnight UTC ("close").

[2] Volatility is the standard deviation of daily returns over the prior 28 days.

[3] Prior to January 21, 2015, XRP price data are based on CoinMarketCap.

Total ODL Traffic in USD	1	AUD-PHP	AUD-USD	EUR-USD		USD-MXN	USD-PHP		Total
2019 July	\$	-	\$ -	\$ -	\$	138,220	\$ -	\$	138,220
2019 August	\$	-	\$ -	\$ -	\$	7,807,605	\$ -	\$	7,807,605
2019 September	\$	-	\$ -	\$ -	\$	11,758,388	\$ -	\$	11,758,388
2019 October	\$	-	\$ -	\$ -	\$	25,399,274	\$ 40	\$	25,399,313
2019 November	\$	58,840	\$ 547,450	\$ 1,494,706	\$	43,942,594	\$ 470,050	\$	46,513,641
2019 December	\$	1,933,266	\$ 4,670,588	\$ 12,965,466	\$	61,749,097	\$ 6,779,159	\$	88,097,576
2020 January	\$	5,075,082	\$ 9,981,819	\$ 30,201,800	\$	89,433,828	\$ 19,457,884	\$	154,150,413
2020 February	\$	14,254,244	\$ 23,877,443	\$ 72,785,063	\$	107,356,161	\$ 35,351,853	\$	253,624,764
2020 March	\$	16,804,238	\$ 26,492,307	\$ 100,498,331	\$	107,748,321	\$ 40,186,614	\$	291,729,810
2020 April	\$	12,162,601	\$ 75,618,666	\$ 121,216,291	\$	160,873,650	\$ 40,682,366	\$	410,553,573
2020 May	\$	-	\$ 80,390,127	\$ 126,306,888	\$	155,595,243	\$ 47,231,500	\$	409,523,758
2020 June	\$	-	\$ 23,519,202	\$ 40,470,366	\$	50,331,417	\$ 13,279,600	\$	127,600,585
2020 July	\$	-	\$ 9,447,010	\$ 28,396,155	\$	31,081,112	\$ 4,644,642	\$	73,568,919
2020 August	\$	-	\$ 8,418,192	\$ 26,003,744	\$	30,652,076	\$ 4,275,753	\$	69,349,766
2020 September	\$	-	\$ 9,205,588	\$ 29,082,888	\$	33,386,777	\$ 4,467,384	\$	76,142,637
2020 October	\$	-	\$ 8,864,469	\$ 33,577,390	\$	37,549,751	\$ 4,487,514	\$	84,479,124
2020 November	\$	-	\$ 9,730,977	\$ 41,241,107	\$	45,937,307	\$ 4,423,126	\$	101,332,517
2020 December	\$	-	\$ 3,364,530	\$ 14,162,499	\$	14,200,715	\$ 1,434,120	\$	33,161,864
Total per Corridor	\$	50,288,270	\$ 294,128,368	\$ 678,402,696	\$ 1	1,014,941,537	\$ 227,171,604	\$2	2,264,932,476

Exhibit 17 MoneyGram's Use of ODL Showing Remittances by Corridor

Source: Detailed ODL transaction data received from MoneyGram. SEC-LIT-EPROD-000077198, SEC-LIT-EPROD-000075518, SEC-LIT-EPROD-000075620, SEC-LIT-EPROD-000075553, SEC-LIT-EPROD-000075486, SEC-LIT-EPROD-000075476, SEC-LIT-EPROD-000071477, MONEYGRAM_SEC_0017277.

Notes: A November 25, 2019 transfer in the AUD-PHP corridor appears to have an errant Reuters Benchmark figure, which results in an FX Disadvantage of 4942 BPS. As a result, this transfer was omitted from this analysis.

Exhibit 18 MoneyGram ODL Percentage of Failed Transfer by Corridor July 2019 - December 2020

Corridor		All Cor	ridors		USD-MXN	AUD-PHP	AUD-USD	EUR-USD	USD-PHP
	Failed	Completed	Total						
	Transfers	Transfers	Transfers	Ratio	Ratio	Ratio	Ratio	Ratio	Ratio
	[A]	[B]	[C]	[A] / [C]					
July 2019	6	47	53	11.32%	11.32%	-	-	-	-
August 2019	14	430	444	3.15%	3.15%	-	-	-	-
September 2019	63	599	662	9.52%	9.52%	-	-	-	-
October 2019	163	1753	1916	8.51%	8.51%	-	-	-	-
November 2019	128	1828	1956	6.54%	4.92%	13.16%	6.25%	0.00%	42.86%
December 2019	122	7771	7893	1.55%	1.79%	5.17%	2.28%	0.00%	1.77%
January 2020	303	16831	17134	1.77%	1.57%	4.01%	4.26%	0.10%	0.70%
February 2020	396	13164	13560	2.92%	6.51%	2.85%	3.72%	0.26%	1.36%
March 2020	82	17001	17083	0.48%	0.81%	0.70%	0.08%	0.00%	0.76%
April 2020	19	18757	18776	0.10%	0.36%	0.04%	0.02%	0.00%	0.06%
May 2020	27	15458	15485	0.17%	0.72%	-	0.00%	0.00%	0.00%
June 2020	0	15545	15545	0.00%	0.00%	-	0.00%	0.00%	0.00%
July 2020	40	16240	16280	0.25%	1.01%	-	0.00%	0.00%	0.00%
August 2020	1	14891	14892	0.01%	0.03%	-	0.00%	0.00%	0.00%
September 2020	31	15821	15852	0.20%	0.77%	-	0.00%	0.00%	0.00%
October 2020	11	15263	15274	0.07%	0.28%	-	0.00%	0.00%	0.00%
November 2020	19	12656	12675	0.15%	0.54%	-	0.00%	0.00%	0.00%
December 2020	0	4135	4135	0.00%	0.00%	-	0.00%	0.00%	0.00%
Total	1425	188190	189615	0.75%	1.64%	1.98%	0.52%	0.03%	0.37%

Source: Detailed ODL transaction data received from MoneyGram. SEC-LIT-EPROD-000077198, SEC-LIT-EPROD-000075518, SEC-LIT-EPROD-000073620, SEC-LIT-EPROD-000075553, SEC-LIT-EPROD-000075486, SEC-LIT-EPROD-000075476, SEC-LIT-EPROD-000071477, MONEYGRAM_SEC_0017277.

Notes: This table calculates the ratio of Failed Transfers to (Failed+Completed) Transfers. It ignores transactions labeled as "PREPARED" or "EXECUTED."

Exhibit 19
Average Monthly FX Disadvantage by Corrido
(Basis Points)

Average FX Disadvantage (BPS)	AUD-PHP	AUD-USD	EUR-USD	USD-MXN	USD-PHP
2019 July	-	-	-	-	-
2019 August	-	-	-	53.1	-
2019 September	-	-	-	66.0	-
2019 October	-	-	-	65.2	-
2019 November	-	72.8	74.2	70.7	96.8
2019 December	117.9	72.2	59.5	67.7	81.0
2020 January	101.7	56.4	50.0	62.9	77.4
2020 February	103.8	66.4	76.7	70.5	72.1
2020 March	108.4	71.9	77.1	59.7	71.7
2020 April	96.2	64.0	51.7	59.9	61.3
2020 May	-	58.4	41.8	42.5	49.0
2020 June	-	49.5	30.8	32.3	42.2
2020 July	-	37.9	35.4	32.7	43.6
2020 August	-	52.7	34.7	26.9	62.6
2020 September	-	62.6	34.3	8.7	48.8
2020 October	-	26.9	22.2	12.0	55.7
2020 November	-	25.4	22.8	19.5	62.1
2020 December	-	47.4	27.0	32.8	70.6
Average per Corridor	105.6	54.6	45.6	46.1	63.9

Source: Detailed ODL transaction data received from MoneyGram. SEC-LIT-EPROD-000077198, SEC-LIT-EPROD-000075518, SEC-LIT-EPROD-000073620, SEC-LIT-EPROD-00007553, SEC-LIT-EPROD-000075486, SEC-LIT-EPROD-000075476, SEC-LIT-EPROD-000071477, MONEYGRAM_SEC_0017277.

Notes:

1. The FX Disadvantage is the difference between the Reuters Benchmark and the Ripple Exchange Rate expressed as a percentage of the Ripple Exchange Rate, including the impact of the exchange fees.

2. Average Monthly FX Disadvantage is only calculated for months with over \$200,000 in notional USD volume for a particular corridor.

Exhibit 20 Average Monthly Cost Reductions by Corridor August 2019 - December 2020

Average Monthly Cost Reduction (BPS)	AUD-PHP	AUD-USD	EUR-USD	USD-MXN	USD-PHP
FX Spread ^[1]	-3.67	-2.77	-3.76	-3.21	-2.10
Originating Exchange Cost	0.00	0.00	-0.14	-0.37	-0.13
Receiving Exchange Cost	0.00	-0.13	-0.14	-0.01	0.00
FX Disadvantage ^[2]	-3.67	-2.90	-4.04	-3.59	-2.23

Source: Detailed ODL transaction data received from MoneyGram. SEC-LIT-EPROD-000077198, SEC-LIT-EPROD-000075518, SEC-LIT-EPROD-000073620, SEC-LIT-EPROD-00007553, SEC-LIT-EPROD-000075486, SEC-LIT-EPROD-000075476, SEC-LIT-EPROD-000071477, MONEYGRAM_SEC_0017277.

Notes:

1. The FX Spread is the difference between the Reuters Benchmark and the Ripple Exchange Rate expressed as a percentage of the Ripple Exchange Rate, before accounting for exchange fees.

2. The FX Disadvantage is the difference between the Reuters Benchmark and the Ripple Exchange Rate expressed as a percentage of the Ripple Exchange Rate, including the impact of the exchange fees.

3. All metrics are calculated using only months with over \$200,000 in notional USD volume for a particular corridor.

Exhibit 21 Stylized Break-Even Analysis of ODL versus Traditional Remittance Assuming Lower Market Liquidity Based on Estimated, Average Numbers

	Average					
	Percentage					
	Fees		Notional Am	ount of Remitta	nce in USD	
		[1]**	[2]	[3]	[4]	[5]
Notional Amount		\$2,184.18	\$10,000.00	\$22,477.95	\$50,000.00	\$1,000,000.00
Transfer using ODL						
Bitstamp Fee ^[1]	0.10%	\$2.18	\$10.00	\$22.48	\$50.00	\$1,000.00
Bitso Fee ^[1]	0.05%	\$1.09	\$5.00	\$11.24	\$25.00	\$500.00
Average ODL FX Spread ^[2]	0.55%	\$11.94	\$54.68	\$122.90	\$273.38	\$5,467.58
ODL Notional (with fees)		\$2,199.39	\$10,069.68	\$22,634.57	\$50,348.38	\$1,006,967.58
Total Cost Incurred (ODL)		\$15.22	\$69.68	\$156.62	\$348.38	\$6,967.58
Transfer using Traditional						
Notional Amount		\$2,184.18	\$10,000.00	\$22,477.95	\$50,000.00	\$1,000,000.00
Bank Transfer Fee ^[3]		\$15.00	\$15.00	\$15.00	\$15.00	\$15.00
Average FX Spread ^[2]	0.01%	\$0.22	\$1.00	\$2.25	\$5.00	\$100.00
Traditional Notional (with fees)		\$2,199.39	\$10,016.00	\$22,495.20	\$50,020.00	\$1,000,115.00
Total Cost Incurred (Traditional)		\$15.22	\$16.00	\$17.25	\$20.00	\$115.00
Cost Difference (ODL - Traditional)		\$0.00	\$53.68	\$139.37	\$328.38	\$6,852.58

Source: SEC preclearance letter dated November 22, 2019, SEC-LIT-EPROD-000071389.

Notes:

[1] Percentage exchange fees based on figures in Preclearance letter, Exhibit 1, p. 21.

[2] Average FX spread is based on discussion in Preclearance letter, Exhibit 1, p. 18.

[3] Bank transfer fee is a flat fee at \$15.

** Stylized example of break-even size analysis assuming no reduction in costs of using ODL versus traditional remittances.

Exhibit 22 Stylized Break-Even Analysis of ODL versus Traditional Remittance Assuming Higher Market Liquidity Based on Estimated, Average Numbers

	Average Percentage					
	Fees	Notional Amount of Remittance in USD				
		[1]**	[2]	[3]	[4]	[5]
Notional Amount		\$7,494.82	\$10,000.00	\$22,477.95	\$50,000.00	\$1,000,000.00
Transfer using ODL						
Originating Exchange Fee ^[1]	0.05%	\$3.76	\$5.01	\$11.27	\$25.07	\$501.38
Receiving Exchange Fee ^[1]	0.05%	\$3.75	\$5.00	\$11.24	\$25.00	\$500.00
Average ODL FX Spread ^[1]	0.11%	\$8.24	\$11.00	\$24.73	\$55.00	\$1,100.00
ODL Notional (with fees)		\$7,510.57	\$10,021.01	\$22,525.18	\$50,105.07	\$1,002,101.38
Total Cost Incurred (ODL)		\$15.75	\$21.01	\$47.23	\$105.07	\$2,101.38
Transfer using Traditional						
Notional Amount		\$7,494.82	\$10,000.00	\$22,477.95	\$50,000.00	\$1,000,000.00
Bank Transfer Fee ^[2]		\$15.00	\$15.00	\$15.00	\$15.00	\$15.00
Average FX Spread ^[3]	0.01%	\$0.75	\$1.00	\$2.25	\$5.00	\$100.00
Traditional Notional (with fees)		\$7,510.57	\$10,016.00	\$22,495.20	\$50,020.00	\$1,000,115.00
Total Cost Incurred (Traditional)		\$15.75	\$16.00	\$17.25	\$20.00	\$115.00
Cost Difference (ODL - Traditional)		\$0.00	\$5.01	\$29.99	\$85.07	\$1,986.38

Sources:

SEC preclearance letter dated November 22, 2019, SEC-LIT-EPROD-000071389.

Detailed ODL transaction data received from MoneyGram. SEC-LIT-EPROD-000077198, SEC-LIT-EPROD-000075518, SEC-LIT-EPROD-000073620, SEC-LIT-EPROD-000075553, SEC-LIT-EPROD-000075486, SEC-LIT-EPROD-000075476, SEC-LIT-EPROD-000071477, MONEYGRAM_SEC_0017277.

Notes:

[1] Percentage exchange fees and ODL FX Spread are the average of the USD-MXN fees over the period October through December 2020.

[2] Bank transfer fee is a flat fee at \$15.

[3] Average FX spread is based on discussion in Preclearance letter, Exhibit 1, p. 18.

** Stylized example of break-even size analysis assuming no reduction in costs of using ODL versus traditional remittances.

Appendix A

October 2021

Allen Ferrell Harvard Law School

Cambridge, Massachusetts 02138

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)

"Socially Responsible Firms," with Hao Liang and Luc Renneboog, 122 *Journal of Financial Economics* 586-606 (2016) (winner of Moskowitz Prize for outstanding quantitative research)

"Price Impact, Materiality, and *Halliburton II*" with Drew Roper, 93 *Washington University Law Review* 553 (2016)

"Introducing the CFGM Corporate Governance Database: Variable Construction and Comparison" with Cremers, Gompers and Andrew Metrick, Working Paper

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"Rethinking *Basic*," with Lucian Bebchuk, 69 *Business Lawyer* 671 (2014)

"Calculating Damages in ERISA Litigation," with Atanu Saha, 1 Journal of Financial Perspectives 93 (2013)

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

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"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)

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"If We Understand the Mechanisms, Why Don't We Understand the Output?", 37 Journal of Corporation Law 503 (2003)

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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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"A Comment on Electronic versus Floor-Based Securities Trading," *Journal of Institutional and Theoretical Economics* (Spring 2002)

"Much Ado About Order Flow," Regulation Magazine (Spring 2002)

"On Takeover Law and Regulatory Competition," with Lucian Bebchuk, 57 *Business Lawyer* 1047 (2002)

"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

In re Robinhood Litigation, 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

Securitized Asset Funding 2011-2 v. CIBC, Case Index No. 653911/2015, Expert report and deposition on July 30, 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

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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. 1:20cv-10832 (S.D.N.Y. February 18, 2021)

Securities and Exchange Commission v. W. J. Howey Co., et al., 328. U.S. 293 (1946)

In the Matter of: Coinflip, Inc., d/b/a Derivabit, and Francisco Riordan, CFTC Docket No. 15-29, September 17, 2015

<u>Ripple Company Documents</u>

Financial Statements

Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2014 (RPLI_SEC 0090938) Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2015 (RPLI_SEC0302366) Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2016 (RPLI_SEC0302336) Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2017 (RPLI_SEC0296631) Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2018 (RPLI_SEC 0265036) Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2019 (RPLI_SEC 0265036) Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2019 (RPLI_SEC 0301113) Ripple Labs, Inc., *Consolidated Financial Statements*, December 31, 2020 (RPLI_SEC 0920429) *Other*

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Ripple, *Employment Offer Letter*, May 9, 2018 (RPLI_SEC 0431814)

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Ripple Labs, Inc., *Series C Preferred Stock Purchase Agreement*, December 20, 2019 (SEC-LIT-EPROD-000227818)

Ripple Labs, Inc., *Restated Certificate of Incorporation*, December 20, 2019 (RPLI_SEC0317757)

Securities and Exchange Commission Filings

MoneyGram SEC Filing Form 10-K, Fiscal Year Ended December 31, 2019 Alibaba Group Fiscal 2020 Annual Report Mastercard 2020 Annual Report

Visa 2020 Annual Report

Deposition Transcripts

Deposition Transcript of David Schwartz, May 26, 2021

Deposition Transcript of Asheesh Birla, June 23, 2021

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and XRP Fund II, *Ripple Currency Wholesale Sales Order*, September 3, 2013 (RPLI_SEC 0304181)

and Ripple Markets, *XRP Fee Rebate Program Agreement*, October 13, 2017 (RPLI_SEC 0153866)

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Brand Ambassador Services Term Sheet, February 14, 2015 (RPLI_SEC 0895476)

and Ripple, Services and Marketing Agreement, November 1, 2018 (RPLI_00280784)

and Ripple Markets, *XRP Volume Incentive Program*, June 2, 2017 (RPLI_SEC 0066688)

and Ripple Payments, *Master XRapid Market Maker Agreement*, July 29, 2019 (RPLI_SEC 0899563)

Exchange Order, August 20, 2019 (RPLI_SEC 0899089)

and XRP II, Master XRP Lease Agreement, June 24, 2019 (RPLI_SEC 0898863)

and XRP II, Summary of XRP Purchase, June 9, 2016 (RPLI_SEC 0000626)

and XRP II, Summary of XRP Purchase, June 23, 2016 (RPLI_SEC 0000636)

and XRP II, Master XRP Purchase Agreement, August 3, 2017 (RPLI_SEC 0000792)

and Ripple Markets, *Programmatic Market Activity Agreement*, June 2, 2017 (RPLI_SEC 0507300)

and Ripple Markets, *Amendment to Programmatic Market Activity Agreement*, March 1, 2018 (RPLI_SEC 0537727)

and Ripple Payments Inc., *Master XRapid Market Maker Services Agreement*, July 1, 2019 (RPLI SEC 0809256)

and Ripple Markets, *Market Making Agreement*, March 31, 2014 (RPLI_SEC 0947000)

XRP Market Making Agreement, May 17, 2017 (RPLI_SEC 0581494)

, Purchase Agreement with XRP II LLC, December 28, 2015 (RPLI_SEC

0609642)

MoneyGram and Ripple, *Ripple Work Order* #1, June 17, 2019 (RPLI_SEC0239684)

OpenCoin, Inc., *Amended and Restated Note Purchase Agreement*, November 8, 2012 (RPLI_SEC 0321854)

OpenCoin, Inc., *Convertible Note Purchase Agreement*, April 26, 2013 (SEC-LIT-EPROD-000092103)

and Ripple Markets, *XRP Listing, Volume Incentive and Rebate Agreement*, May 17, 2017 (RPLI_SEC 0511334)

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S Capital Solutions Private Limited and Ripple Markets, *BTCXINDIAXRP Fee Rebate Program*, May 29, 2017 (RPLI_SEC 0154338)

SBI Holdings, Inc. and Ripple Labs, Inc., *Joint Venture Agreement*, March 30, 2016 (RPLI_SEC 0163289)

SBI Holdings, Inc., Share Purchase Agreement, May 27, 2016 (RPLI_SEC 0357972)

, Master Reseller Agreement, September 24, 2018 (RPLI_SEC 0874207)

, *Marketing Incentive Agreement*, September 24, 2018 (RPLI_SEC 0246681)

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and XRP II, Letter Agreement, September 18, 2017 (RPLI_SEC

0000861)

and Ripple Markets, *Market Making Agreement*, February 7, 2014 (RPLI_SEC 0507336)

and Ripple Markets, *RE: Renewal of Market Making Agreement between Trading Group, LLC ('Market Maker') and Ripple Markets, Inc. entered into as of February 7,* 2014, April 27, 2016 (SEC-LIT-EPROD-000791045)

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Data

ODL Data:

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SEC-LIT-EPROD-000075518

SEC-LIT-EPROD-000073620

SEC-LIT-EPROD-000075553

SEC-LIT-EPROD-000075486 SEC-LIT-EPROD-000075476 SEC-LIT-EPROD-000071477 MONEYGRAM_SEC_0017277 Data: RPLI_SEC 0304724 RPLI_SEC 0304725 RPLI_SEC 0304726 RPLI_SEC 1100594 RPLI_SEC 1100595 RPLI_SEC 1100596

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Federal Reserve Economic Data (FRED), https://fred.stlouisfed.org/

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APPENDIX C

DATA USED IN EMPIRICAL ANALYSIS

A. CRYPTOCURRENCY MARKET INFORMATION

1. I use two data sources for cryptocurrency prices, trading volume, circulating supply, and market capitalization: CryptoCompare¹ and CoinMarketCap.² Both sources have been used in the academic literature.³ I use information from CryptoCompare for prices, XRP trading volume, and the number of exchanges on which XRP trades. I use information from CoinMarketCap for prices, market capitalization, and XRP's circulating supply. For cryptocurrency prices, when available, I use CryptoCompare price information, and CoinMarketCap price information otherwise.⁴ The table below summarizes the main cryptocurrency variables used in my various analyses.

¹ See https://www.cryptocompare.com/.

² See https://coinmarketcap.com/.

³ See, e.g., Liu, Y., A. Tsyvinski, and X. Wu, "Common Risk Factors in Cryptocurrency," Journal of Finance, Forthcoming, 2021, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3379131 at 7 ("We collect trading data of all cryptocurrencies available from Coinmarketcap.com. Coinmarketcap.com is a leading source of cryptocurrency price and volume data."); Lyons, R., and G. Viswanath-Natraj, "What keeps stablecoins stable?" Working paper, May 2021 at 50 ("CryptoCompare: Price and trading volume data for currencies (based on a representative list of crypto exchanges).").

⁴ For example, for XRP, I use CryptoCompare for January 21, 2015-December 20, 2020, and CoinMarketCap for August 6, 2013-January 20, 2015.

Variable	Description	Source	Field Name(s) in Dataset
Cryptocurrency Price	Price (in U.S. dollars) as of midnight UTC	CryptoCompare when available, otherwise CoinMarketCap	<pre>close (CryptoCompare); close_usd (CoinMarketCap)</pre>
XRP Trading Volume	XRP volume in previous 24 hours (in U.S. dollars)	CryptoCompare	total_volume_total; top_tier_volume_total
Cryptocurrency Market Cap	"The total market value of a cryptocurrency's circulating supply." [1]	CoinMarketCap	marketcap_usd
XRP Circulating Supply	"The amount of coins that are circulating in the market and are in public hands." [2]	CoinMarketCap	circulating_supply
Number of Exchanges on Which XRP Trades	Count of exchanges for which CryptoCompare has information on XRP trading	CryptoCompare	histo_minute_start; volume (for determining day with positive volume)

Exhibit C.1 Cryptocurrency Variables Used in Analyses

Notes:

[1] See description of "Market Cap" at https://coinmarketcap.com/

[2] See description of "Circulating Supply" at https://coinmarketcap.com/

B. ESTIMATION PERIODS

2. As I explained in Section III, I implemented my regression analyses for two estimation periods: August 6, 2013 - December 15, 2020 ("Estimation Period 1") and August 11, 2015 - December 20, 2020 ("Estimation Period 2"). August 6, 2013, the first date in Estimation Period 1, is the first Tuesday for which XRP prices are available at cryptocurrency exchanges. August 11, 2015, the first date in Estimation Period 2, is the first Tuesday after Ethereum (ETH) started trading. Both estimation periods end on or shortly prior to December 20, 2020.⁵

3. I use 28-day periods for Estimation Period 1 ending on December 15, 2020. The last monthly period in Estimation Period 2 has only 26 days (ending on Dec. 20, 2020). I adjust the returns for this last 26-day period to make it comparable to all the other 28-day periods by multiplying the returns by the ratio of 28/26.

⁵ I use December 20, 2020 as the end date of my analysis period to avoid potential price effects following the SEC's complaint. The anticipation of the SEC's complaint was made public on December 21, 2020 (*see, e.g.*, https://fortune.com/2020/12/21/ripple-to-be-sued-by-sec-cryptocurrency-xrp/), and the complaint was filed on December 22, 2020.

C. CRYPTOCURRENCY PRICE RETURNS USED IN REGRESSION ANALYSIS

4. The price returns of cryptocurrencies are used in my analysis of long-run XRP price returns both as a dependent variable (the price return of XRP) and in the construction of the cryptocurrency factors (non-XRP cryptocurrencies). As I explained in Section III, I define the 28-day price return as: *Price (day t+28) / Price (day t) – 1*, with prices measured at midnight UTC.

5. In all my regression analyses, cryptocurrency price returns are based on cryptocurrency coins (*i.e.*, excluding tokens⁶) with available price data throughout the relevant estimation period at every 28-day endpoint.⁷ For example, for Estimation Period 1 (Tuesday, August 6, 2013 to Tuesday, December 15, 2020), I examine all non-token cryptocurrencies with available price data every 28 days (August 6, 2013, September 3, 2013, ... and December 15, 2020).

6. In addition, for Estimation Period 2, given the large number of potential coins – many of which are small and may include less reliable price information and/or are affected by different factors than large coins such as XRP – I further restrict the sample of coins to those which had a market capitalization of at least \$100,000 according to CoinMarketCap on August 7, 2015 and/or December 21, 2020.⁸ For comparison, on those two days, XRP market capitalization far exceeded that cutoff and was \$260 million and \$23 billion, respectively. My regression

⁶ I use the CoinMarketCap designation of "token." See, https://coinmarketcap.com/tokens/.

⁷ I also require at each 28-day endpoint that the coin have a non-zero market capitalization because zero or missing market capitalization may be related to less reliable pricing information. This additional restriction results in one less available coin during Estimation Period 1, and 20 less available coins during Estimation Period 2.

⁸ My decision to restrict the sample based on market capitalization is also supported by the academic literature. *See*, for example, Liu et al. (2021) who restrict the coins in their sample to those with a market cap of over \$1 million. Liu, Y., A. Tsyvinski, and X. Wu, "Common Risk Factors in Cryptocurrency," *Journal of Finance, Forthcoming*, 2021, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3379131.

analyses use 10 coins for Estimation Period 1 (August 6, 2013 to December 15, 2020),⁹ and 92 coins for Estimation Period 2 (August 11, 2015 to December 20, 2020),¹⁰ including XRP, which are the coins that comprise my dataset for analysis.¹¹

D. THE RISK-FREE RATE AND OTHER FINANCIAL INDICES

7. In my regression analysis, I examine all 28-day price returns relative to the risk-

free rate of return. I calculate the risk-free rate of return using the 1-Month Treasury Rate from Federal Reserve Economic Data (FRED).¹² I then pro-rate the monthly treasury rate to a 28-day rate of return and subtract it from all return variables (*i.e.*, for XRP, for non-XRP coins used to construct cryptocurrency factors, and for the non-cryptocurrency 28-day returns).

8. I also incorporate non-cryptocurrency financial indices and commodity prices into my analysis. I used Bloomberg as a source for these measures. I examined the S&P 500 Index,¹³ the MCSI World Index,¹⁴ and Emerging Markets equity indices;¹⁵ the Bloomberg Commodity Index (BCOM);¹⁶ the price of gold; and information for three major fiat currencies: U.S. Dollar

⁹ The 10 coins' (including XRP) market cap represent more than 99% and 76% of the market cap of all coins (tokens excluded) on August 4, 2013 and December 21, 2020, respectively.

¹⁰ The 92 coins' (including XRP) market cap represent more than 98% and 90% of the market cap of all coins (tokens excluded) on August 7, 2015 and December 21, 2020, respectively.

¹¹ See a list of the 20 largest 20 coins on August 11, 2020 in Exhibit 4, the first day of Estimation Period 2.

¹² Series DGS1MO, available at https://fred.stlouisfed.org/series/DGS1MO.

¹³ An index of large capitalization equities. For more details on the index, *see* the Factsheet available at https://www.spglobal.com/spdji/en/indices/equity/sp-500/.

¹⁴ "The MCSI World Index captures large and mid-cap representation across 23 Developed Market countries. With 1,559 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in each country." For more details on the index's construction, *see* the Factsheet available at: https://www.msci.com/documents/10199/149ed7bc-316e-4b4c-8ea4-43fcb5bd6523.

¹⁵ "The MCSI Emerging Markets Index captures large and mid-cap representation across 27 Emerging Markets countries. With 1,406 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in each country." For more details on the index's construction, *see* the factsheet available at: https://www.msci.com/documents/10199/c0db0a48-01f2-4ba9-ad01-226fd5678111.

¹⁶ "The index is made up of 23 exchange-traded futures on physical commodities..." For more details on the index's construction, *see* the factsheet available at: https://data.bloomberglp.com/professional/sites/10/BCOM-Fact-Sheet-2.pdf.

Index (USDX), Euro (price denominated in U.S. Dollars), and Japanese Yen (price denominated in U.S. Dollars). I constructed these 28-day returns in an analogous way to the cryptocurrency returns and subtracted from each the same risk-free rate.¹⁷ The table below summarizes the main non-cryptocurrency variables used in my various analyses.

Variable	Description	Source	Field Name in Dataset
Price of Gold	Gold spot price (in U.S. dollars)	Bloomberg	XAU
Bloomberg Commodity Index (BCOM)	Index of commodity futures	Bloomberg	BCOM
S&P 500 Index	S&P 500 Index	Bloomberg	SPX
MCSI World Index	Index of equities in Developed Markets countries	Bloomberg	MXWO
MCSI Emerging Markets Index	Index of equities in Emerging Markets countries	Bloomberg	MXEF
Euro	Price of Euro in U.S. dollars	Bloomberg	EURUSD
Japanese Yen	Price of Japanese Yen in U.S. dollars	Bloomberg	JPYUSD
US Dollar Index (USDX)	The value of the U.S. dollar relative to a basket of major currencies	Bloomberg	USDX
1-Month Treasury Rate	1-Month U.S. Treasury Constant Maturity Rate	Federal Reserve Economic Data (FRED)	DGS1MO

Exhibit C.2 Non-Cryptocurrency Variables Used in Analyses

E. PRINCIPAL COMPONENTS ANALYSIS (PCA) IMPLEMENTATION

9. I constructed the cryptocurrency market factors by using the principal components of the *non-XRP* returns of the coins. The PCA decomposition is based on the covariance of the returns of 9 and 91 coins during Estimation Period 1 and Estimation Period 2, respectively.¹⁸

¹⁷ When constructing the 28-day returns for traditional assets and the risk-free rate, in instances where information was missing for a particular date, I used the preceding date on which information was available. For example, I used July 3, 2017 prices and indices for July 4, 2017 prices and indices that were unavailable on July 4, 2017.

¹⁸ Specifically, I used the covariance decomposition option is *Stata*'s built-in *pca* routine. *Stata* is a commonly-used statistical package. *See* https://www.stata.com/manuals/mvpca.pdf.

F. DATA ON XRP FLOWS FROM/TO RIPPLE

10. The calculation of Ripple's net XRP distributions – *i.e.*, for any given period flows of XRP from Ripple less flows of XRP into Ripple – are based on Ripple's reporting files for January 2013 – December 2020.¹⁹ The main source of data within each of these files is record-level data. The record-level data includes information about date, amount of XRP transferred, and for many (but not all) records, the "Name" and "Account ID" for the source and destination of the XRP transfer. In addition, the files also include monthly account balances for Ripple's accounts, and monthly changes in balances are used to reconcile and supplement the record-level data, as detailed below.

11. In the record-level data, the field "Delivered Amount" records the amount of XRP transferred. Throughout, a negative delivered amount is considered an outflow *from* a Ripple account while a positive amount is considered an inflow *into* a Ripple account. However, the data also include information on transfers between various types of Ripple accounts. Overall, there are three types of accounts in the data: 1) Ripple's "Main Balance" accounts; 2) "Reserved" accounts; and 3) "Custody" accounts. I understand the Main Balance consist of Escrow and other Ripple accounts over which Ripple has control. I understand that Reserved accounts are XRP funds set aside by Ripple following an agreement with another party or plan to distribute XRP. I understand Custody accounts are administrated by Ripple on behalf of the entity which has control of the funds in the Custody account, and Ripple is merely providing an administrative service. As such, in the data there are four types of transactions: 1) between a Ripple (Main Balance) and a non-Ripple entity; 2) between two Ripple accounts, both of which

¹⁹ The files and the range of dates used from each file are as follows: *RPLI_SEC 1100595* (January 2013 – September 2014); *RPLI_SEC 1100594* (October 2014 – December 2015); *RPLI_SEC 1100596* (January 2016 – December 2017); *RPLI_SEC 0304726* (January – December 2018); *RPLI_SEC 0304724* (January – December 2019); and *RPLI_SEC 0304725* (January – December 2020).

are part of Ripple's Main Balance; 3) between a Custody or Reserved account and a non-Ripple entity; and 4) between a Custody or Reserved account and an account which is part of Ripple's Main Balance.

12. To avoid double counting, transfers between Ripple's Main Balance accounts are ignored, and are often designated in the data as "Internal." Note that the data include records, for example, of a transfer from Ripple's Main Balance to a Custody account, and then from that Custody account to a non-Ripple entity. As such, it's imperative to avoid double counting the two records in the above example, as I understand they represent only a single distribution from Ripple to the non-Ripple entity (via the Custody account).

13. The date of each distribution in the data is calculated as follows. For transfers involving Ripple's Main Balance, the date on which the transfer occurred is used. For transfers and adjustments (further discussed below) missing an exact date, the first date of the month on which the distributions occurred is used.²⁰ For transfers involving a Reserved or Custody account, the date on which the transfer first occurred is used.²¹ I understand this is also consistent with how Ripple reports its data.²² For example, Ripple may set up and transfer to a Custody account 1 million XRP on Jan. 1, 2015. The funds may stay in that account until the relevant non-Ripple entity directs Ripple to withdraw the XRP funds from the Custody account on May 1, 2015. In the distribution data used for the analyses, the XRP are considered distributed on Jan. 1, 2015, as I understand they were available for the non-Ripple entity since that day.

²⁰ Note that my analyses involving distributions are focused on the monthly frequency and as the exact timing during the month is not as crucial.

²¹ If the information is not available for a specific Reserved or Custody account transfer, the month in which we see the balance changes from Ripple's Main Balance and subsequent increase in the Reserved or Custody account is used.

²² See, e.g., https://ripple.com/xrp/market-performance/ ("Total [XRP distributed] includes business development agreements that are still pending.").

Last, in calculating net distributions for use in the analyses, the record-level data 14. were adjusted by:²³ 1) converting values in fiat currencies to XRP (for a small set of the data); 2) resolving any discrepancies between the total distributions for the month and the change between the end-of-month balances (in most months there is no discrepancy); 3) for Custody accounts involving multiple records, ensuring the distribution was attributed to the (earlier) date on which the account was set up and ensuring a transaction is not double counted; 4) incorporating any additional needed information contained in Ripple's internal data files listed above. Some notable adjustments are detailed in Exhibit C.3 below:

Exhibit C.3 Adjustments in Ripple XRP Distributions Data

Date	Amount (XRP)	Description
March 2015	10,000,000	Flow related to Fidor Custody Account. ^[1]
November 2015	1,088,862,713	Flow related to Custody Account. ^[1]
March 2016	-3,500,000,000	Reserved account set up in March 2016 resulting in an outflow of 3.5 billion XRP to Reserved account ('Custody - RW &
March 2016	2,000,000,000	"Transfer in as part of the Jed Settlement." ^[3]
June 2016	-2,000,000,000	Four transactions related to "Custody wallets for Jed DAF." ^[4]
January 2018 - February 2019	259,999,900	Inflows from Reserved accounts into Ripple Main Balance reconciling information related to options settlement. ^[5]

Notes: [1] See Note B in "Monthly" tab, *RPLI_SEC 1100596.xlsx.* [2] See Note E in "Monthly" tab, *RPLI_SEC 1100596.xlsx.* [3] See Note D in "Monthly" tab, *RPLI_SEC 1100596.xlsx.* [4] See Note G in "Monthly" tab, *RPLI_SEC 1100596.xlsx.* [5] See Row 13 in "Monthly" tab, *RPLI_SEC 0304726.xlsx.* and Row 56 in "Month" tab, *RPLI_SEC 0304724.xlsx.*

²³ Minor discrepancies involving monthly discrepancies of less than 1,000 XRP per month were ignored.
Exhibit E

UNITED STATES DISTRICT COURT SOUTHERN DISTRICT OF NEW YORK

SECURITIES AND EXCHANGE COMMISSION,

Plaintiff,

v.

20-cv-10832 (AT)

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

Defendants.

Expert Report of Prof. Carol Osler

I. Background and Qualifications

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

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

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

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

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

II. Expert Assignment and Opinions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

⁶ Kusimba (2008), op. cit.

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

12. Economists also highlight two additional functions of a currency: unit of account and store of value.⁷ A <u>unit of account</u> is a measure of value. To disentangle this concept from a medium of exchange, it helps to recognize the following: British pounds and shillings had no physical form until they were first minted around 1500.⁸ Instead, pounds and shillings existed as concepts, and were used to measure castle inventories and the like, as early as the eighth century C.E. During the eight centuries from the 700s to the 1500s, the main medium of exchange in Britain was the silver penny (worth 1/12 shilling), and other coins of relatively small value such as the groat (worth four pence), first issued in 1361. A <u>store of value</u> is an asset that will still be valuable in the future.

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

⁷ Federal Reserve Bank of St. Louis. Functions of money. *The Economic Lowdown Podcast Series*.

https://www.stlouisfed.org/education/economic-lowdown-podcast-series/episode-9-functions-of-money. Virtually any standard economics textbook will list the same three functions of money. *See, e.g.*, Mankiw, N. Gregory (2008). *Principles of Economics* 5th ed., (Southwestern Cengage Learning, Ohio): p. 642.

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

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

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

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



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

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

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

acceptability, and limited supply.¹¹ Other economists often include low storage costs on this list.¹² An ideal currency would have all these attributes, but no single attribute is individually necessary and many objects have succeeded as currencies with only a few. Cows were a very early form of money in societies from Egypt¹³ to Ireland¹⁴ and remain "the preferred form of currency" in South Sudan even today.¹⁵ However, cows are not portable, divisible, or uniform, their durability is limited, and they are costly to store. For many centuries boulders have served as currency on the Micronesian island of Yap, though they are extraordinarily difficult to transport and divide.¹⁶

17. Cowrie shells, depicted in Figure 2, were a highly successful currency across Africa, Asia, Australia, Oceana, and parts of Europe from the 13th century BCE to the early 20th century.¹⁷ They were once so widely used in China that the symbol for cowrie shell can be found within many Chinese words involved with money.¹⁸ Cowrie shells succeeded as a currency because they have the helpful attributes identified by economists. <u>Durability</u>: Cowrie shells can last for centuries and are not attractive to pests. They do not tarnish. <u>Portability</u>: Cowrie shells are small and light. In China they were strung into groups of 20; in Bengal they were carried in baskets of roughly 12,000.¹⁹ <u>Divisibility</u>: The length of an individual cowrie shell ranges from a quarter inch to six inches and they are valued proportionately. <u>Uniformity</u>: As can be seen in Figure 2, cowries of a given species are remarkably consistent in shape.²⁰ <u>Acceptability</u>: Cowrie shells were accepted by common consent across much of the globe. <u>Low storage costs</u>: Beyond a

¹³ Federal Reserve Bank of Atlanta. The story of money: 02 – Cows as a form of money.

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¹¹ Federal Reserve Bank of St. Louis, op. cit.

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

https://www.atlantafed.org/about/tours/story-of-money/02-common-products-as-money/cows-as-money.aspx. ¹⁴ Carmody, Isolde (22 July 2012). Cows as currency. *StoryArcheology.com*. https://storyarchaeology.com/cows-as-currency/.

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

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

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

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

¹⁹ Van Damme, op. cit.

²⁰ Van Damme, op. cit.

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

Figure 2: Cowrie shells



XRP has all of the attributes that economists agree to be valuable in a currency. Durability: 18. Units of XRP do not rot, hold no appeal to animals, and do not tarnish. Portability: Units of XRP are effectively portable insofar as they can be accessed anywhere one finds an internet connection. Divisibility: Units of XRP are divisible because, like Bitcoin, they can be traded in decimal fractions. Uniformity: Unlike a shell, a bead, or a silver coin that must be stamped by a craftsperson and will naturally vary slightly, units of XRP are identical by construction. Each XRP comprises precisely 1 million drops, the smallest sub-unit.²² Acceptability: XRP can be traded on myriad exchanges around the world. Low storage costs: XRP is stored in "wallets," which effectively "cost" 10 XRP (to satisfy a reserve requirement) for on-Ledger electronic repositories²³ and can be stored in hardware wallets that cost roughly the same range as a medium-quality physical wallet: \$50 to \$200.²⁴ Wallet security is high because transaction ledgers are maintained on many independent servers around the world and updated frequently. This means that the underlying record of XRP ownership is robust to physical or electronic disasters. Limited supply: The long-term supply of XRP is limited to the 100 billion already in existence. No additional units of XRP can be created without changing the XRP Ledger itself.

²¹ Kusimba, *op. cit.*

²² https://xrpl.org/xrp.html.

²³ https://xrpl.org/reserves.html.

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

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

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

A. Cross-border payments

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

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

21. Ripple has stated that its main business strategy in the short-to-medium term is remittance payments. Worldwide remittance flows were small and largely ignored by economists and policymakers until the early 1990s, when workers began moving across borders en masse to support their families at home. By 2020, 170 million expatriate workers around the world²⁶ were formally remitting \$540 billion to low- and middle-income economies.²⁷ For perspective, this is more than three times total foreign aid from all official donors, \$161 billion, in that same year.²⁸

²⁵ Larsen presentation at the May 2013 "Finovate" conference:

https://www.youtube.com/watch?app=desktop&v=t06YEtQjVvU.

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

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

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

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

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

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

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

but-more-effort-needed.htm.

²⁹ World Bank (2021), op. cit.

 ³⁰ Cronje, Jan (10 May 2017). High bank charges force immigrants to send money home "hand-to-hand." *Ground Up*. https://www.groundup.org.za/article/high-bank-charges-force-immigrants-send-money-home-hand-hand/.
 ³¹ Freund, Caroline and Nikola Spatafora (2008). Remittances, transaction costs, and informality. *Journal of*

Development Economics 86: 346-366.

³² Cronje (2017), op. cit.

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

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

Figure 3: Average cost to remit \$200³⁶

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



³³ In selecting "smart" choices among remittance providers, the World Bank accepts any delay of five days or less. World Bank (March 2021). *Remittance prices worldwide quarterly*.

https://remittanceprices.worldbank.org/sites/default/files/rpw_main_report_and_annex_q121_final.pdf. ³⁴ *Ibid*,

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

³⁶ Ibid.

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

Figure 4: SWIFT bank identification system³⁹



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

³⁷ Source: World Bank (March 2021). Remittance prices worldwide quarterly: p. 14.

 $https://remittanceprices.worldbank.org/sites/default/files/rpw_main_report_and_annex_q121_final.pdf.$

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

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



Figure 5: Correspondent chain for international payment⁴⁰

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

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

⁴⁰ Yang, Eric, and Wim Grosemans (28 November 2016). An Introduction to SWIFT GPI.

https://www.slideshare.net/BNPPCMCC/an-introduction-to-swift-gpi.

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

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

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

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

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

32. Remittance flows also promote financial development⁴⁷ and financial inclusion.

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

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

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

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

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

⁴⁸ Global Partnership for Financial Inclusion (November 2018). 2018 Update to Leaders on Progress Towards the G20 Remittance Target.

https://www.gpfi.org/sites/gpfi/files/documents/2018%20Update%20to%20Leaders%20on%20Progress%20Toward s%20the%20G20%20Remittance%20Target.pdf.

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

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

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

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

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

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

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

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

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

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

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

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



Figure 6: Market shares among U.S. stock exchanges⁵⁴

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

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

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



Figure 7: Average total cost of remittances, 13 of the G20 countries⁵⁵

40. Ripple is not the only firm to recognize the potential for profits from using a blockchain platform for remittance processing, though it was among the first. Other start-ups pursuing this market segment include Currency Cloud⁵⁶ and Earthport⁵⁷ (now owned by Visa).⁵⁸

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

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

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

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

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

⁵⁸ PYMNTS (15 May 2019). Why Visa brought Earthport into its orbit.

https://www.pymnts.com/visa/2019/earthport-acquisition-cross-border-payments/.

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

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

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

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

⁶⁰ Tranglo (9 April 2021). Tranglo levels up with Ripple to power cross-border payments in Southeast Asia. https://tranglo.com/blog/tranglo-levels-up-with-ripple-to-power-cross-border-payments-in-southeast-asia/.

⁶¹ Ripple (25 February 2020). Ripple on full-scale to tap into South Korean market. https://ripple.com/ripplepress/ripple-on-full-scale-to-tap-into-south-korean-market/.

⁶² https://ripple.com/company.

⁶³ Statista. Trends in global export value of trade in goods from 1950 to 2020.

https://www.statista.com/statistics/264682/worldwide-export-volume-in-the-trade-since-1950/.

⁶⁴ IBM. What are smart contracts on blockchain? https://www.ibm.com/topics/smart-contracts.

⁶⁵ https://instex-europe.com/about-us/.

⁶⁶ https://www.cips.com.cn/cipsen/7052/7057/index.html.

⁶⁷ http://www.cbr.ru/eng/psystem/fin_msg_transfer_system/.

⁶⁸ https://ripple.com/ripplenet/on-demand-liquidity/.

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

B. Innovative technology

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

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

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

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

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

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

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

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

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

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

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

Figure 8: Bitcoin Average Confirmation Time⁷²







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

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

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

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

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

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

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

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

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

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

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

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

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

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

55. A further advantage of the XRP Ledger relative to the Bitcoin proof-of-work ledger is **scalability**, meaning the ability to handle a high number of transactions per period. On average just 4.6 transactions per second can be processed on the Bitcoin ledger, a limit that is essentially programmed into the ledger. The goal of the limit is important: protecting the system against the possibility that someone with ill intent might spam the system by sending a massive number of transactions through the system at once, slowing the system down, and effectively crowd out other transactions. Ether can handle 30 transactions per second.⁸¹ The XRP Ledger has had far greater capacity for years – it could handle 500 transactions per second in 2015.⁸² By now it can readily process 1,500 transactions per second.⁸³

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

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

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

https://www.thestreet.com/crypto/ethereum/ethereum-2-upgrade-what-you-need-to-know.

⁸⁴ Coinbase, op. cit.

⁸¹Conway, Luke (1 September 2021). What is Ethereum 2.0? *The Street*.

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

 ⁸³ Bhalla, Anshika. Top cryptocurrencies with their high transaction speeds. *The Blockchain Council*.
 https://www.blockchain-council.org/cryptocurrency/top-cryptocurrencies-with-their-high-transaction-speeds/.
 ⁸⁴ Coiphase on *ait*

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

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

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

⁸⁵ United Nations. UN Operational Rates of Exchange.

https://treasury.un.org/operationalrates/OperationalRates.php.

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

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

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

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





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

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

⁸⁷ Daly, Neil (May 2010). International remittance service providers. *GSMA Mobile Money Transfer*: p. 7. https://www.gsma.com/mobilefordevelopment/wp-

content/uploads/2012/03/gsmaremittances ervice provider white paper 182.pdf.

⁸⁸ Source: Statista. Number of cryptocurrencies worldwide from 2013 to August 2021.

https://www.statista.com/statistics/863917/number-crypto-coins-tokens/. Accessed August 24, 2021.

business days⁸⁹ during which each counterparty contacts the other, verifies trade specifics, and exchanges information about bank accounts and the like. This makes fiat currencies unsuitable for payments that are designed to process in real time, meaning settlement happens within minutes of the initial trade (the initial agreement to exchange certain assets at a certain price). In contrast, the XRP Ledger is designed to achieve real-time settlement, and XRP is the native currency of the XRP Ledger.

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

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

D. Disruptive innovation

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

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

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

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

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

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

68. Ripple's actions conform to the disruptive innovation strategy. The firm has focused on remittances, which is not a core business for most banks, and has avoided challenging the dominant payments systems head-on. It has collaborated with big banks on prototype digital payment systems rather than compete directly with SWIFT. Likewise, Ripple has intentionally avoided any direct challenge to the dominant money transfer operator, Western Union, as stated explicitly by David Schwartz, Ripple's Chief Technology Officer, in 2016.⁹¹

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

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

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

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

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

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

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

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

⁹³ *Ibid.,* p. 65.

⁹⁴ Amended Complaint, ¶ 374.

Young technology-driven firms that must build networks often take many years to reach profitability. Airbnb, established in 2008, did not become profitable until 2020 and then returned to losses in 2021.⁹⁵ Uber, founded in 2009, is not yet profitable.⁹⁶ Pinterest, also established in 2009, may have finally reached profitability in 2021.⁹⁷ However, the viability of a start-up is not evaluated according to its profitability: Airbnb is currently worth \$105 billion, Uber is worth \$89 billion, and Pinterest is worth \$34 billion. Indeed, profitability eluded over 80% of the firms that launched initial public offerings during the first three quarters of 2018.⁹⁸

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

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

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

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

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

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

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

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

Executed on October 4, 2021and Of

Exhibit A

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BIO

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

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

EDUCATION

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

PROFESSIONAL EXPERIENCE

ACADEMIC ENGAGEMENTS

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

EXPERT RETENTIONS

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

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

- 2017-PRESENT Julius di Filippo and David Caron v. Bank of Nova Scotia et al., Ontario Superior Court of Justice (Gold)
- 2017-PRESENT Maurice Blackburn Pty Ltd., Melbourne, Australia. Economic consultant on FX antitrust suit (FX).
- 2018 Axiom Investment Advisors, LLC, v. Deutsche Bank AG. US Southern District of New York.
- 2018 *James Contant, et al., v. Bank of America Corporation, et al.,* US District Court, Southern District of New York (Indirect FX)
- 2016-PRESENT Chris Staines v. Royal Bank of Canada et al., Defendants, Ontario Superior Court of Justice (FX)
- 2018 Axiom Investment Advisors, L.L.C. v. Deutsche Bank AG, US District Court, Southern District of New York (FX: Last look)
- 2015-2016 U.S. Department of Justice action on price-fixing conspiracy in FX markets
- 2014 Lovell Stewart Halebian Jacobson L.L.P. Preliminary work towards class-action complaint on price-fixing conspiracy in FX markets
- 2011-2012 Consultant for Charles River Associates in their support of State Street Bank in *People of the State of California v. State Street et al.,* Superior Court of the State of California County of Sacramento.

ADMINISTRATION

2021-2022: Chair, Brandeis Faculty Senate

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

2020 – 2021: Library Advisory Committee

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

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

2015: Chair, Provost Search Committee, Brandeis University

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

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

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

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

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

RESEARCH

PUBLICATIONS

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

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

- The Market Microstructure Approach to Foreign Exchange: Looking Back and Looking Forward, joint with Michael King and Dagfinn Rime (2013). *Journal of International Money and Finance* 38 (November): 95-119.
- The Microstructure of Currency Markets: Market Microstructure in Emerging and Developed Markets (2013), with Xuhang Wang. Chapter 5 in: Ed. Kent Baker and Halil Kiymaz, Eds. (John Wiley, Inc.: New York and London).
- Currency Market Microstructure and the Profitability of Currency Trading (2012). Annual Review of Financial Economics 4: 469-495.
- Noise Trading and Illusory Correlations in US Equity Markets, joint with Jennifer Bender and David Simon (2012). *Review of Finance* 17(2): 625-652.
- Survival of Overconfidence in Currency Markets, joint with Thomas Oberlechner (2012). *Journal of Financial and Quantitative Analysis* 47(1): 92-113.
- Foreign Exchange Market Structure, Players, and Evolution (2012), with Michael King and Dagfinn Rime. In: James, J., Marsh, I., Sarno, L. (Eds), *Handbook of Exchange Rates*. (Wiley and Sons: New York and London).
- Price Discovery in Currency Markets, joint with Alexander Mende and Lukas Menkhoff (2011). *Journal of International Money and Finance* 30 (8): 1696-1718.
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- The Exchange Rate in a Behavioral Finance Framework (2007). Book Review: *Journal of International Economics* 72: 265-270.
- Macro Lessons from Microstructure (2006). International Journal of Finance and Economics 11: 55-80.
- Stop-Loss Orders and Price Cascades in Currency Markets (2005). *Journal of International Money and Finance* 24: 219-241.
- Currency Orders and Exchange-Rate Dynamics: Explaining the Success of Technical Analysis (2003). Journal of Finance 58: 1791-1819.
- The Changing Landscape of the Financial Services Industry: What Lies Ahead? (2000). *Economic Policy Review* 6 no. 4: 39-54. www.ny.frb.org/rmaghome/econ_pol/900lown.pdf
- Support for Resistance: Technical Analysis and Intraday Exchange Rates (2000). *Economic Policy Review* 6, no. 2: 53-67. http://www.newyorkfed.org/research/epr/00v06n2/0007osle.html
- Rapidly Rising Corporate Debt: Are Firms Now Vulnerable to an Economic Slowdown? (2000). *Current Issues in Economics and Finance* 6, no. 7: 1-6.
- Rational Speculators and Exchange Rate Volatility with John Carlson (2000). *European Economic Review* 44: 231-253.
- Methodical Madness: Technical Analysis and the Irrationality of Exchange-Rate Forecasts, with Kevin Chang (1999). *Economic Journal* 109: 636-661.
- Second District House Prices: Why So Weak in the 1990s? joint with Matthew Higgins and Anjeli Sridhar (1999). Federal Reserve Bank of New York *Current Issues in Economics and Finance* 5(January).

- Short-Term Speculators and the Puzzling Behavior of Exchange Rates (1998). *Journal of International Economics* 43(1): 37-58.
- Is More Always Better? Head-and-Shoulders and Filter Rules in Foreign Exchange Markets, joint with P.W. Kevin Chang (1998). In: E. Acar and S. Satchell, eds., *Advanced Trading Strategies and Tactics*. (Irwin-Probus: London).
- Asset Market Hangovers and Economic Growth: U.S. Housing Markets, joint with Matthew Higgins (1998). In: *The Role of Asset Prices in the Formulation of Monetary Policy*, BIS Conference Papers Vol. 5 (Bank for International Settlements, Basle).
- Asset Market Hangovers and Economic Growth: The OECD During 1984-1993, join with Matthew Higgins (1997). Oxford Review of Economic Policy 13(3): 110-34.
- Charting : Chaos Theory in Disguise? joint with William Clyde (1997). *Journal of Futures Markets* 17(August): 489-514.
- Exchange Rate Dynamics and Speculators' Horizons (1995). *Journal of International Money and Finance* 14: 695-719.
- The Credit Slowdown Abroad, joint with S. Hickok (1994). In: *Studies on Causes and Consequences of the 1989-92 Credit Slowdown* (Federal Reserve Bank of New York): 429-73.
- High Real Interest Rates and Investment in the 1990s (1994). Federal Reserve Bank of New York *Quarterly Review* 19(1): 38-44.
- Interest Rate Term Premiums and the Failure of Uncovered Interest Rate Parity (1992). Journal of International Financial Markets, Institutions and Money 2(2): 1-26.
- Factor Prices Under Integrated Markets for Risky Capital, (1991). *European Economic Review* 35: 1311-40.
- Explaining the Absence of International Factor-Price Convergence (1991). *Journal of International Money and Finance* 10: 89-107.
- Optimal Growth Under Uncertainty (1991). Economic Letters 36: 31-35.

OTHER PUBLICATIONS

- Greece Illustrates the Importance of Staying Within Economic Limits (2015). *European Politics and Policy* (London School of Economics) September 1. http://blogs.lse.ac.uk/europpblog/2015/09/01/greece-illustrates-the-importance-of-staying-within-economic-limits/
- Reading Between the Lines of Greece's Bailout: Debt Relief is Inevitable Just Not Yet (2015). *The Conversation*. July 20. http://theconversation.com/reading-between-the-lines-of-greeces-bailout-debt-relief-is-inevitable-just-not-yet-44744
- The Fix Is In (2014). *The Conversation*. November 13. http://theconversation.com/the-fix-is-in-how-banks-allegedly-rigged-the-us-5-3-trillion-foreign-exchange-market-33828.

WORKING PAPERS

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

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

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

Private Non-fundamental Information and Adverse-Selection in Cryptocurrencies, November 2019, joint with Shuran Zhang.
Information Content of Marketable Limit Orders, November 2019, joint with Shuran Zhang. Short-Run Exchange-Rate Dynamics: Theory and Evidence, with J. A. Carlson and C. Dahl.

WORK IN PROGRESS

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

OTHER ACADEMIC ENGAGEMENTS

THESIS ADVISING

Current Ph.D. Neophitos Kathitziotis (Hamburg Univ.) Karen Smith **Completed Masters Theses** Olzas Kuramazov Damir Ćosić

Completed Ph.D., Chair	Completed Ph.D., Committee
Shuran Zhang	Henok Tewolde
Ly Tran	Siri Valseth (Norwegian Schl.Mgmt.)
Rawley Heimer	Kjell Jorgenson (Norwegian Schl.Mgmt.)
David Simon	Tyler Hull Gotham George
Rimma Yusim Sherman	Ritti Bumiputra
Vitaliy Vandrovych	Eskandar (Sandro) Tooma
Prasandjeet (Vinay) Nundlall	Xia Meng
Tanseli Savaser	Ma Gang
Jennifer Chu Bender	Heidi Zhao

TEACHING

Courses taught since 2002

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

Past teaching expertise

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

FELLOWSHIPS AND AWARDS

Brandeis University International Business School Teaching Award, 2018.

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

Brandeis Teaching Innovation Grant, 2015

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

Brandeis University International Business School Teaching Award, 2008.

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

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

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

REFEREE

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

SEMINARS AND CONFERENCE PRESENTATIONS

- Discussant: Locked-in at home: Female Analysts' Attention at Work During the COVID-19 Pandemic. Mengqiao Du. Northern Finance Association Annual Meeteings, September 2021.
- Presenter: Workplace Bullying in Economics: Nature, Consequences, and Recommended Policies, Southern Economic Association Annual Meetings, 2020.
- Presenter: Dealer Trading at the Fix. December, 2019. 3rd Sydney Banking and Stability Conference, Sydney, Australia. Also: discussant.

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

- Presenter: Dealer Trading at the Fix. June 12, 2018. Infiniti Conference on International Finance, Poznan, Poland. Also: discussant.
- Presenter: Dealer Trading at the Fix. December 15, 2017. Second annual Conference on High Frequency Exchange Rate Dynamics: Econophysics and Econometric Analysis Based on the EBS data sets. Tokyo, Japan.

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

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

- Discussant: Puzzles in the Tokyo Fixing in the Forex Market: Order Imbalances and Bank Pricing? By Takatoshi Ito. March 2017: International Conference on High Frequency Exchange Rate Dynamics: Econophysics and Econometric Analysis Based on the EBS data sets. Tokyo, Japan
- Presenter: Dealer Trading at the Fix. December 2016: 6th Workshop on Financial Determinants of Foreign Exchange Rates, Cass Business School, London.

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

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

- Presenter: Exchange-Rate Effect of Multi-Currency Arbitrage, Harald Hau, Discussion, Sixth Annual Central Bank Workshop on the Microstructure of Financial Markets, Zurich, Switzerland, October 8, 2009.
- Presenter: Hedge Funds and the Origins of Private Information in Foreign Exchange Markets, Bank for International Settlements, Basel, October 7, 2009.
- Presenter: Extreme Returns Without News: The Case of Currencies, Financial Economics Research Center Conference on Microstructure, September 23, 2009.
- Discussant, Crash Risk in Currency Markets, Romain Ranciere, Xavier Gabaix, Adrien Verdelhan, Emmanuel Farhi, Discussant, Western Finance Association Meetings, San Diego, June 17-20, 2009.
- Presenter: Hedge Funds and the Origins of Private Information in Foreign Exchange Markets, Third Annual Microstructure Workshop, Emerging Markets Group, Cass Business School, London, May 1, 2009.
- Panelist, Causes and Consequences of the Financial Crisis, Jean Beer Center for Ethics, Philosophy Department, Georgia State University, Atlanta, GA, March 18, 2009.
- Presenter: Extreme Returns Without News: The Case of Currencies, State Street Advanced Research Center, March 11, 2009.
- Presenter: Extreme Returns Without News: The Case of Currencies, International Federation of Technical Analysts, Paris, November 6-8, 2008.
- Presenter: Extreme Returns Without News: The Case of Currencies, Midwest Finance Association meetings, Dallas, Texas, October 2008.
- Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, Infiniti Conference, Dublin, Ireland, June 2008.
- Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, Seminar at UNH Durham, October 2007.
- Presenter: Asymmetric Information in the Interbank Foreign Exchange Market, Joint with Geir Bjønnes and Dagfinn Rime, *Third Annual Conference on Market Microstructure*, Budapest, Hungary, September 15, 2007.
- Presenter: Extreme Returns: The Case of Currencies, joint with Tanseli Savaser. *Third Annual Conference* on Market Microstructure, Budapest, Hungary, September 15, 2007
- Presenter: Price Discovery in Currency Markets, Seminar Presentation at the NBER Conference on Microstructure, May 11, 2007.
- Presenter: Price Discovery in Currency Markets, Seminar Presentation at Acadian Asset Management, April 4, 2007.
- Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, Seminar at Williams College, April 2, 2007.
- Presenter: Price Discovery in Currency Markets, Seminar presentation at Rutgers University, November 28, 2006.
- Presenter: Price Discovery in Currency Markets, Seminar at State Street Global Research Advanced Research Center, December 2007.
- Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, seminar presentation at Hannover University, Hannover, Germany, November 15, 2006.
- Presenter: Price Discovery in Currency Markets, seminar presentation at the University of Copenhagen, Copenhagen, Denmark, November 13, 2006.
- Presenter: Price Discovery in Currency Markets, Bank of Canada/Norges Bank Conference on the Microstructure of Equity and Foreign Exchange Markets, Ottawa, Canada. October 20-21, 2006.
- Presenter: Price Discovery in Currency Markets, Seminar presentation at the Federal Reserve Bank of St. Louis, October 4, 2005.

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

- Presenter: Head-and-Shoulders: Not Just a Flaky Pattern, Conference on Forecasting Financial Markets, London, April 1995.
- Presenter: Head-and-Shoulders: Not Just a Flaky Pattern, Eastern Economic Association Meetings, New York, NY, March 1995.
- Presenter: Origins of Near-Random Walk Exchange Rate Behavior, American Economic Association Annual Meeting, Anaheim, California, January 1993.
- Presenter: Origins of Near-Random Walk Exchange Rate Behavior, European Economic Association Annual Meeting, Dublin, Ireland, August 1992.
- Presenter: Origins of Near-Random Walk Exchange Rate Behavior, Eastern Economic Association Annual Meeting, New York, New York.