A Middle-Ground for Cryptocurrency Regulation: Using Delaware's Incentive-Driven Private-Ordering Model

Elizabeth Davidson

I. INTRODUCTION

Proposals for domestic regulation of cryptocurrency have been numerous.[1] From these proposals questions emerge: should prudential agencies such as the Office of the Comptroller of the Currency (OCC) establish jurisdiction? Or should states adopt a uniform act, much like the Uniform Commercial Code (UCC)?[2] Or else, have states' customized regulations that are already in effect, such as New York's BitLicenses, worked?[3]

Then what is the ideal silhouette for cryptocurrency regulation? Where "emerging technologies . . . place great strain on extant regulatory systems,"[4] this Note outlines the current regulatory landscape for the cryptocurrency space and recommends, based on a preferred structure of private ordering, the necessity for incentive-driven regulation. In filling the gaps where legislation has not empowered regulators, insiders are partial to a low regulatory ceiling;[5] yet, classically, regulators err on the side of more stringent standards.[6] The cryptocurrency space is no exception to the unnecessary "assumption that

1. The Securities and Exchange Commission (SEC) has started to regulate periphery aspects of cryptocurrencies, the Office of the Comptroller of the Currency (OCC) has proposed a national charter for fintech companies, Financial Crimes Enforcement Network (FinCEN) has been involved in the cryptocurrency money transfer space, and some state proposals for regulation have been adopted. Additionally, the Commodity Futures Trading Commission has permitted some futures products on cryptocurrency as well as the LabCFTC, a fintech division of the agency. *See* U.S. COMMODITY FUTURES TRADING COMMISSION, CFTC BACKGROUNDER ON SELF-CERTIFIED CONTRACTS FOR BITCOIN PRODUCTS (2017), https://www.cftc.gov/sites/default/files/idc/groups/public/@newsroom/documents/file/bitcoin_factsheet120117.pdf.

2. Kristen Peters Watson, *Uniform Regulation of Virtual-Currency Businesses Act Offers States Regulatory Framework for the Virtual Currency Industry*, LEXOLOGY (Jan. 11, 2018), https://www.lexology.com/library/detail.aspx?g=35b99670-7c77-4db6-8b69-53ce4ec21410.

3. N.Y. STATE DEP'T OF FIN. SERVS., *Virtual Currency Business*, N.Y. ST. DEP'T FIN. SERVS., https://www.dfs.ny.gov/apps_and_licensing/virtual_currency_businesses (last visited Mar. 21, 2019) [hereinafter *N.Y. BitLicenses*].

4. Gregory N. Mandel & Gary E. Marchant, *Evolving Technology Regulation: Governance at a Temporal Distance*, *in* BRIDGING DISTANCES IN TECHNOLOGY AND REGULATION 17 & 31 (Ronald Leenes & Eleni Kosta eds., 2013) (noting that such technology disrupts regulation, not fitting "neatly into their historically created schemes" and the lack of "impetus for major statutory overhaul" in such cases).

5. *See* Matthew Field, *Bitcoin Companies Form First UK Trade Body as Regulators Circle*, TELEGRAPH (Feb. 13, 2018, 12:01 AM), http://www.telegraph.co.uk/technology/2018/02/13/bitcoin-exchanges-form-first-uk-trade-body-regulators-circle/ (highlighting a self-regulatory trade group in the United Kingdom where members follow a code of conduct, promoting due diligence).

6. *See* Luis Urbina, *CFPB Issues Principles for Consumer-Authorized Access of Financial Data*, NAT'L L. REV. (Oct. 25, 2017), https://www.natlawreview.com/article/cfpb-issues-principles-consumer-authorized-access-financial-data (noting that the Consumer Financial Protection Bureau (CFPB) stresses that, for fintech

the [regulatory] choice . . . is between bottom-up solutions and top-down prescriptions, regulation versus deregulation, the administrative state versus the private market actor."[7] Technology law scholar Lawrence Lessig has instead taught a nuanced understanding of regulation, claiming that governments self-evidently possess the ability to prudently regulate through mechanisms beyond *ex post* legal enforcement measures.[8] Reasonably presuming the ability for the government to be thoughtful, and not merely reactive, this Note discusses a framework just one conceptual step beyond Lessig's regulatory architecture insights.[9]

Therefore, a Delaware-inspired private ordering model would provide a sustainable and alternative system that incentivizes technologists to privately reinforce policy interests. Corporate law concepts applied to the cryptocurrency space could mitigate against the threat of insider positions to the detriment of the consumer. Private actors enforce policy goals, filling the regulatory gaps to aid in advancing innovation while also strengthening public confidence.[10] This kind of "soft law"[11] enables the government to facilitate correct incentives with a thoughtful regulatory architecture.[12] Yet, the past is often a map to the future. Therefore, success in shaping an effective cryptocurrency regulation template depends on a clear perspective of the history of financial regulation.[13]

The 2008 crisis is a useful guide, and accordingly this Note will shed light on lessons to be learned from the obstructive incentive structures of the financial regulatory scheme pre-2008. The Financial Crisis Inquiry Commission has concluded that the "crisis was avoidable," because insiders "ignored warnings and failed to question, understand, and manage evolving risks."[14] The traditional financial system maintained faulty mechanisms of insider control, for example, a trust in self-interested banks to dictate the London Interbank Offered Rate (LIBOR).[15] Thus, as exhibited with the crisis, private actors unremittingly find ways through financial innovations, regulatory arbitrage, or otherwise, to circumvent rule-based regulation.[16] Computer scientists are arguably even more astute at avoiding stifling regulation than the insiders of traditional high finance.[17]

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companies, "consumer interests must be the priority of all stakeholders").

7. Zachary J. Gubler, *The Financial Innovation Process: Theory and Application*, 36 DEL. J. CORP. L. 55, 112 (2011).

8. *See generally* Lawrence Lessig, *The Constitution of Code: Limitations on Choice-Based Critiques of Cyberspace Regulation*, 5 COMMLAW CONSPECTUS 181 (1997); *see also infra* Part III.C.ii.

9. *Id.*

10. Mandel & Marchant, *supra* note 4, at 32.

11. *Id.* at 34.

12. *See* LAWRENCE LESSIG, CODE: AND OTHER LAWS OF CYBERSPACE, VERSION 2.0 (2d ed. 2006); *see also* PRIMAVERA DE FILIPPI & AARON WRIGHT, BLOCKCHAIN AND THE LAW: THE RULE OF CODE 174–75 (2018).

13. This Note presumes that a domestic regulatory response is unavoidable. Cryptocurrency regulation is necessary for agencies to remain consistent within their mandates, such as to prevent fraud and manipulation.

14. PHIL ANGELIDES ET AL., THE FINANCIAL CRISIS INQUIRY REPORT: FINAL REPORT OF THE NATIONAL COMMISSION ON THE CAUSES OF THE FINANCIAL AND ECONOMIC CRISIS IN THE UNITED STATES xvii (2011), http://fcic-static.law.stanford.edu/cdn_media/fcic-reports/fcic_final_report_full.pdf.

15. *See* Robert C. Hockett & Saule T. Omarova, *Systemically Significant Prices*, 2 J. FIN. REG. 1, 9 (2016).

16. *See generally* Pierre C. Boyer & Hubert Kempf, *Regulatory Arbitrage and the Efficiency of Banking Regulation*, J. FIN. INTERMEDIATION, Sept. 22, 2017, https://doi.org/10.1016/j.jfi.2017.09.002 (noting that financial integration creates de facto competition between national regulatory jurisdictions); *see also Regulatory Arbitrage*, *in* A DICTIONARY OF FINANCE AND BANKING (Jonathan Law & John Smullen eds., 4th ed. 2008), http://www.oxfordreference.com/view/10.1093/acref/9780199229741.001.0001/acref-9780199229741-e-5079.

17. Sarah Butcher, *Another Study Discovered That People in Finance Aren't Especially Intelligent*,

It is generally not "a good idea to permit judges to have a material interest in the cases they hear, to let students grade their own exams, or to allow referees to place bets on the sporting events they officiate,"[18] so how then is insider self-regulation in finance much different? Those involved with shaping the regulatory schema should not hide from, but rather magnify, potential conflicts of interests that occur with self-regulation.[19] Private ordering is not self-regulation[20] and, as seen in the Delaware corporate law courts, has the potential to provide robust private measures to achieve policy goals.[21] Thus, this Note does not claim to "offer a fully elaborated and adoption-ready blueprint for regulatory action."[22] Nonetheless, private ordering is ideal in this space because it is consistent with cryptocurrency's decentralization attribute, reduction of transaction costs, and ubiquity.

II. BACKGROUND

A. Cryptocurrency Emerges as an Alternative

Cryptocurrencies, as popularly known today,[23] gained traction during the 2008 financial crisis.[24] An unknown group or individual by the pseudonym "Satoshi Nakamoto" published *Bitcoin: A Peer-to-Peer Electronic Cash System*.[25] The white paper offered a solution to prevent market vulnerabilities which caused the banking blunder.[26] As Nakamoto saw it, insider bank personnel had excessive control over the custody and

EFINANCIALCAREERS (Mar. 5, 2018), https://news.efinancialcareers.com/be-en/309892/how-intelligent-do-you-need-to-be-to-work-in-banking-and-finance (noting that "the share of people with the very highest level of intelligence ('level 9') was twice as high in computing and in the combined professions of law, consulting and accounting as in finance"); *see also* Gregory Zuckerman & Bradley Hope, *The Quants Run Wall Street Now*, WALL ST. J. (May 21, 2017), https://www.wsj.com/articles/the-quants-run-wall-street-now-1495389108 (noting the use of algorithms to avoid certain regulatory measures aimed at investors).

18. Dan Awrey, *The Limits of Private Ordering Within Modern Financial Markets*, 34 REV. BANKING & FIN. L. 183, 253 (2014).

19. *See* Brian J.M. Quinn, *The Failure of Private Ordering and the Financial Crisis of 2008*, 5 N.Y.U. J.L. & BUS. 549, 551 (2009) (stating that without "sufficient contractual safeguards in the form of private ordering . . . markets will be vulnerable to opportunistic behavior" that perpetuated the market failure).

20. *Id.*

21. CHARLES M. NATHAN & PAUL F. KUKISH, AM. BAR ASS'N COMM. ON FED. REGULATION OF SEC., PRIVATE ORDERING UNDER STATE LAW IN THE BRAVE NEW WORLD OF PROXY ACCESS (2010), https://www.americanbar.org/content/dam/aba/publications/blt/2011/02/inside-buslaw-private-ordering-201102.authcheckdam.pdf (discussing how proxy materials empower shareholders, a form of private ordering).

22. Hockett & Omarova, *supra* note 15, at 4.

23. Ken Griffith, *A Quick History of Cryptocurrencies BBTC — Before Bitcoin*, BITCOIN MAG. (Apr. 16, 2014, 5:10 PM), https://bitcoinmagazine.com/articles/quick-history-cryptocurrencies-bbtc-bitcoin-1397682630/ (noting that Bitcoin was not the first attempt at creating a digital currency).

24. Nick Mathiason, *Three Weeks That Changed the World*, THE GUARDIAN (Dec. 27, 2008, 7:01 PM), https://www.theguardian.com/business/2008/dec/28/markets-credit-crunch-banking-2008 (describing the hope of the public and "weary politicians" who "knew they still faced a long, tough battle to prevent the world lurching into a new Great Depression" to be an "abyss").

25. SATOSHI NAKAMOTO, BITCOIN: A PEER-TO-PEER ELECTRONIC CASH SYSTEM 1 (2008), https://bitcoin.org/bitcoin.pdf.

26. *Id.*

accounting of funds.[27] Where personnel are driven by natural human desires,[28] a trust-based financial system is inevitably poised for problems—self-interest finds its way through cracks of even the most robust internal risk and compliance measures.[29] As a way to combat the insider problem, the Bitcoin proposal outlined a trust-less system, so rather optical transparency becomes the *de facto* regulator.[30] Nakamoto's solution is thus "electronic cash [that] would allow online payments to be sent directly from one party to another without going through a financial institution."[31]

The first widely used cryptocurrency, Bitcoin, is "a digital token—with no physical backing—that can be sent electronically from one user to another, anywhere in the world."[32] Bitcoin's publicly available accounting system displays the transaction, embodying a communal electronic payment system.[33] Compared to the centralized banking, this alternative eliminates transaction costs and, in combating the propensity for insider to inappropriately take advantage of their accessibility, increases transparency.[34] A number of cryptocurrencies are now available, such as Ripple, Litecoin, and Dash.[35] The relevance of this emerging financial innovation is clear: Bitcoin itself has soared in price since its inception, at one point with total market capitalization of over $100 billion dollars.[36]

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27. François Velde, *Money and Payments in the Digital Age: Innovations and Challenges*, 20 FIN. STABILITY REV. 103, 110 (2016), https://publications.banque-france.fr/sites/default/files/medias/documents/financial-stability-review-20_2016-04.pdf#page=17 (suggesting that "the autonomy of bitcoin from political pressures and human error and its money-supply rule enshrined in the code seemed to promise incorruptible stability").

28. This is an assumption made by this Note. *See generally* RICHARD DAWKIN, THE SELFISH GENE (4th ed., Oxford Univ. Press 2016) (1976).

29. NAKAMOTO, *supra* note 25, at 1.

30. CHARBEL CHEDRAWI & PIERRETTE HOWAYECK, AUDIT IN THE BLOCKCHAIN ERA WITHIN A PRINCIPAL AGENT APPROACH 3 (2018), https://www.researchgate.net/profile/Charbel_Chedrawi/publication/323987299_Audit_in_the_Blockchain_era_within_a_principal-agent_approach/links/5ab628a60f7e9b68ef4d7401/Audit-in-the-Blockchain-era-within-a-principal-agent-approach.pdf (outlining the development of the agency problem, in that "[t]he Wealth of the Nations, written by Adam Smith in 1776, is the first book to highlight the agency problem. [Smith says that] . . . 'if an organization is managed by a person or a group of persons who are not the real owners, then there is a chance that they may not work for the owners' benefit.'") (quoting Brahmadev Panda & N.M. LeepSa, *Agency Theory: Revival Theory and Evidence on Problems and Perspectives*, 10 IND. J. CORP. GOVERNANCE 74, 77 (2017)).

31. *Id.*

32. Nathaniel Popper, *What is Bitcoin, and How Does it Work?*, N.Y. TIMES (Oct. 1, 2017), https://www.nytimes.com/2017/10/01/technology/what-is-bitcoin-price.html (iterating that "a Bitcoin can be divided out to eight decimal places, so you can send someone 0.00000001 Bitcoins").

33. These trust-centric routines are unattractive because they create large transaction costs. *See* Susan Woodward, *A Transaction Cost Analysis of Banking Activity and Deposit Insurance*, 7 CATO J. 683, 687, 692 (1988).

34. *Id.*

35. *What is Cryptocurrency: Everything You Must Need to Know!*, BLOCKGEEKS, https://blockgeeks.com/guides/what-is-cryptocurrency/ (last updated Sept. 13, 2018); *Top 50 Cryptocurrency Prices*, COINBASE, https://www.coinbase.com/price (last visited Mar. 10, 2019).

36. Matthew Sparkes, *The Coming Digital Anarchy*, TELEGRAPH (June 9, 2014, 2:26 PM), www.telegraph.co.uk/technology/news/10881213/The-coming-digital-ararchy.html; Charles Bovaird, *Bitcoin's Market Cap is Now More than $100 Billion*, FORBES (Oct. 20, 2017), https://www.forbes.com/sites/cbovaird/2017/10/20/bitcoins-market-cap-is-now-more-than-100-billion/#64fd4ea92b8b (noting that now Bitcoin is worth more than many U.S. companies); *Bitcoin*,

Transactions are displayed on the digital "blockchain," which works like a publicly viewable ledger.[37] Bitcoin and other cryptocurrencies run by "blockchain" enabling technology.[38] Here, all payments are made online, where anyone can access and view anonymous transactions after a group of transactions has been made.[39] Thus, unlike private traditional banking transactions, all users on the network may access an immutable digital copy of the ledger.[40] The technological beauty starts with the fact that every new transaction is grouped with other transactions.[41] The groups are called "blocks."[42] Once the computer program protocol creates a group of the transactions as block it is then added to the ledger and the block contains a timestamp and a link.[43] In grouping these blocks, the correct fit of the mathematical puzzle prevents illegal alteration retroactively, after the formation of a block.[44] The transparency of this entire process structure thus makes the blockchain resistant to transaction modification.[45]

B. The Necessity, Still, for Regulation

Thus, cryptocurrencies limit human error within capital transactions, providing a value proposition unlike traditional banking—yet, as with every solution, Bitcoin does not exist without its own set of problems.[46] These problems include, but are not limited to hacks, illegal use, bugs, and a blockchain-specific problem called the "fifty-one percentage

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COINMARKETCAP, https://coinmarketcap.com/currencies/bitcoin/ (last visited Mar. 10, 2019).

37. *Id.*

38. *See* ETHEREUM, https://ethereum.org/ (last visited Mar. 10, 2019) (many organizations are starting to use blockchain to build infrastructure to support decentralized applications beyond currency-related functions, such as the Ethereum Foundation); Mike Orcutt, *Hate Lawyers? Can't Afford One? Blockchain Smart Contracts Are Here to Help*, MIT TECHNOLOGY REV. (Jan. 11, 2019), https://www.technologyreview.com/s/612748/hate-lawyers-cant-afford-one-blockchain-smart-contracts-are-here-to-help/ (noting that "Blockchains might let us move assets around the globe securely and instantaneously").

39. Judith Alison Lee, *Blockchain* 101, *in* PAYMENT SYSTEMS AND ELECTRONIC FUND TRANSFERS GUIDE 100:100 (2018) (describing an open-source blockchain).

40. Julie A. Maupin, *Mapping the Global Legal Landscape of Blockchain and Other Distributed Ledger Technologies* 1, 2 (CICI, Paper No. 149, 2017), https://www.cigionline.org/publications/mapping-global-legal-landscape-blockchain-and-other-distributed-ledger-technologies (labeling blockchains as "shared digital ledgers that employ cryptographic algorithms to verify the creation and/or transfer of digital assets or content over a peer-to-peer network").

41. *Id.*

42. *See* Gareth W. Peters & Efstathios Panayi, *Understanding Modern Banking Ledgers Through Blockchain Technologies: Future of Transaction Processing and Smart Contracts on the Internet of Money* 1 (2015). *See also* Lawrence J. Trautman, *Is Disruptive Blockchain Technology the Future of Financial Services?*, 69 CONSUMER FIN. L. Q. REP. 232, 237 (2016), https://ssrn.com/abstract=2786186 (describing Aaron Wright and Primavera Deilippi's interpretations that the "blockchain is a distributed, shared, encrypted-database that serves as an irreversible and incorruptible public repository of information" and that "[i]t enables, for the first time, unrelated people to reach consensus on the occurrence of a particular transaction or event without the need for a controlling authority").

43. Maupin, *supra* note 40.

44. Trautman, *supra* note 42, at 238 (noting an "immutable" ledger).

45. *Id.*

46. Raja Raman & Mahesh Mangnaik, *Blockchain Can Transform the World, but is it Fool-Proof?*, HUFFINGTON POST (Jan. 23, 2017, 4:28 PM), http://www.huffingtonpost.in/raja-raman/blockchain-can-transform-the-world-but-is-it-fool-proof_a_21660586/ (describing a "group of hackers called, '51 Crew' attacked blockchain clones Shift and Krypton. The group took control of more than 51% of the network." Additionally, the group of hackers were responsible for "the online theft of $65 million of bitcoin from Hong Kong-based exchange Bitfinx").

attack."[47]

The popularity of Bitcoin makes it a "massive target" for hackers.[48] Even businesses supporting cryptocurrencies are subject to attacks: the DAO, a $150 million blockchain-based venture capital fund lost much of its value due to a hacking incident.[49] Additionally, criminals use cryptocurrencies to facilitate drug trade transactions and other illicit activity.[50] Furthermore, like other systems built on code, bugs infect Bitcoin code,[51] sometimes even seriously enough to keep the infection a secret from the public.[52]

Lastly, the most serious exposure for cryptocurrencies could occur when one party controls more than half of the network, albeit only executed with access to hundreds of the fastest supercomputers.[53] This 51% capability would enable the perpetrator to reverse transactions.[54] By controlling the majority of the Bitcoin network's computing power, the attacker has the ability to interfere with the process of recording new blocks.[55] Hackers thus prevent transactions from gaining ledger confirmation and forming a block, making the transactions invalid.[56] The attacker then monopolizes the mining of new blocks to earn the reward, which is a large portion of the cryptocurrency.[57] Bitcoin relies on the impossibility of this occurring, despite the fact that the 51% attack has actually already occurred on less popular cryptocurrency platforms.[58]

Despite the inability to prevent every harm, legislatures nonetheless have mandated[59] mitigation of future cryptocurrency problems[60] because the United States has historically

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47. *Id.*

48. Kevin Werbach, *Trust, But Verify: Why the Blockchain Needs the Law*, 33 BERKELEY TECH. L.J. 489, 514 (2018). *See* Yogita Khatri, *Nearly $1 Billion Stolen In Crypto Hacks So Far This Year: Research*, COINDESK (Oct. 11, 2018), https://www.coindesk.com/nearly-1-billion-stolen-in-crypto-hacks-so-far-this-year-research.

49. Antonio Madeira, *The DAO, the Hack, the Soft Fork and the Hard Fork*, CRYPTOCOMPARE (July 26, 2016), https://www.cryptocompare.com/coins/guides/the-dao-the-hack-the-soft-fork-and-the-hard-fork/.

50. Maupin, *supra* note 40, at 3–4 (mentioning the Silk Road incident as a key example of illegal drug trade. Due to "the inherent transparency of data within the Bitcoin network, Silk Road and its early successors were shut down and their operators prosecuted by authorities."); Maria Perez, *NYC Federal Officials Confiscate $48 Million from Silk Road Creator*, NEWSWEEK (Sept. 30, 2017), https://www.newsweek.com/nyc-federal-officials-confiscate-48-million-silk-road-creator-675012.

51. Maupin, *supra* note 40, at 10.

52. Alyssa Hertig, *The Latest Bitcoin Bug Was So Bad, Developers Kept Its Full Details a Secret*, COINDESK (Sept. 21, 2018), https://www.coindesk.com/the-latest-bitcoin-bug-was-so-bad-developers-kept-its-full-details-a-secret; Julia Magas, *The Anatomy of Bitcoin Core's Recent Bug*, COINTELEGRAPH (Sept. 27, 2018), https://cointelegraph.com/news/the-anatomy-of-bitcoin-cores-recent-bug.

53. *Id.*

54. *51% Attack*, LEARN CRYPTOGRAPHY, https://learncryptography.com/cryptocurrency/51-attack (last visited Mar. 10, 2019).

55. *Id.*

56. *Id.*

57. *51% Attack*, INVESTOPEDIA (July 5, 2018), http://www.investopedia.com/terms/1/51-attack.asp#ixzz4uJlTSgck.

58. *Id.*

59. For example, the stated mission of the Commodity Futures Trading Commission (CFTC) is essentially "to foster open, transparent, competitive, and financially sound markets . . . [and] to protect market users." *Mission & Responsibilities*, U.S. COMMODITY FUTURES TRADING COMMISSION, https://www.cftc.gov/About/MissionResponsibilities/index.htm (last visited Mar. 10, 2019). This mission, derived from the Commodity Exchange Act, mandates the agency's continuous improvement. 7 U.S.C. § 5 (2018). The changing nature of the market cannot be addressed in any way without a comprehensive understanding of emerging market-influencing innovations. *Id.*

60. Jim Saksa, *House to Take Up Three Bills to Curb Cryptocurrency Abuses*, ROLL CALL (Jan. 23, 2019),

maintained a consumer-focused regulatory scheme.[61] Due to the obligation for regulation to protect consumers, regulators use surveillance tools and industry knowledge, positioned to protect those who may not be able to protect themselves.[62] In a similar vein, professor and practitioner, Kevin Werbach asserts "the blockchain needs law" to thrive and be trusted.[63] What kind of law is up for debate and is the subject of this Note.

C. Present Manifestations of Regulation

In maneuvering through the treacherous sea of cryptocurrency regulatory proposals, the United States financial regulatory scheme upholds some key islands, or legal mandates, that already extend to regulate the new technology.[64] In this sense, all of the many cryptocurrency regulatory efforts employ prescriptive regulation, leaving some gaps open for future regulatory development.[65]

While "there is no certainty that the U.S. [] will strike the appropriate balance between flexibility and protection in its regulatory approaches,"[66] the evolving nature of these innovations may ultimately call for an alternate regulatory paradigm. By contrast, specific regulatory motivations beyond those which "promote innovation"[67] are yet to be well-defined. In attempting to find a solution to the sea of prescriptive regulation, practitioners, called "technologists," support a "sandbox" model, a catalyst for regulatory innovation.[68] In the sandbox, cryptocurrency experts partner with regulators to incubate cutting-edge regulatory solutions suitable for the emerging technology.[69] Here, though, tension between

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https://www.rollcall.com/news/congress/house-cryptocurrency-abuses (explaining a proposal that would even establish a congressional fund to pay a maximum reward of $450,000 for information that leads to the conviction of someone who uses cryptocurrency for terrorism).

61. *See* Will Kenton, *Dodd-Frank Wall Street Reform and Consumer Protection Act*, INVESTOPEDIA (May 23, 2018), https://www.investopedia.com/terms/d/dodd-frank-financial-regulatory-reform-bill.asp (explaining one example of this policy). *See also Government Regulation of Business*, ENCYCLOPEDIA.COM, https://www.encyclopedia.com/history/dictionaries-thesauruses-pictures-and-press-releases/government-regulation-business (last visited Mar. 10, 2019) (explaining the historical relevance of a consumer-focused regulatory scheme because of the United States' reasons for independence, that the "U.S. economy became more industrialized" and a "world power in the nineteenth century," and that "the federal government passed "business laws that favored social reforms over the interests of big business").

62. For example, per Dodd-Frank, "[t]he Consumer Financial Protection Bureau (CFPB) regulates the offering and provision of consumer financial products or services under the federal consumer financial laws and educates and empowers consumers to make better informed financial decisions." *About Us*, CONSUMER FINANCIAL PROTECTION BUREAU, https://www.consumerfinance.gov/about-us/ (last visited Mar. 10, 2019).

63. *See generally* Werbach, *supra* note 48.

64. For some examples, see *supra* note 1.

65. For examples of these regulatory developments, see *supra* note 1.

66. FIN. STABILITY OVERSIGHT COUNCIL, 2018 ANNUAL REPORT 87–91 (2018), https://home.treasury.gov/system/files/261/FSOC2018AnnualReport.pdf.

67. *Id.*

68. *Regulatory Sandbox*, FIN. CONDUCT AUTHORITY (Oct. 22, 2018), https://www.fca.org.uk/firms/regulatory-sandbox (explicating a regulatory sandbox that "allows businesses to test innovative propositions in the market, with real consumers"). The United States maintains unofficial networks like the Blockchain Alliance and a new segment of the OCC to operate as a sandbox. *See* BLOCKCHAIN ALLIANCE, http://blockchainalliance.org/ (last visited Mar. 10, 2019).

69. Sujha Sundararajan, *ECB President: Bitcoin Not 'Mature' Enough to be Regulated*, COINDESK (Oct. 20, 2017, 8:17 AM), https://www.coindesk.com/ecb-president-bitcoin-not-mature-enough-to-be-regulated (describing the sentiment of technologists who believe that regulation never should occur). However, this Note's Background will show instances of emerging regulation for the cryptocurrency space. *See generally* Part II.

self-regulation and effective regulation persists; where even limited regulation within the sandbox might promote innovation but not prevent undesired outcomes.[70]

i. Regulation of Cryptocurrency Funding by the Securities and Exchange Commission

Federal agencies have gained some traction in infiltrating the cryptocurrency regulatory scene. For example, the Securities and Exchange Commission (SEC) has begun regulating the funding of cryptocurrency companies, similar to a process behind a company's initial public offering (IPO).[71] Capital is raised through an initial coin offering (ICO), where a new cryptocurrency token is offered for sale to the public.[72] Therefore, to correct the information imbalance between company insiders and investors, the SEC requires the funding of the company to meet regulatory hoops similar to that of an IPO securities offering.[73]

Furthermore, the SEC has determined that the digital tokens, or coins, are not securities under the Securities Exchange Act of 1934.[74] Cryptocurrencies are not held in any third party "bank," so the SEC cannot apply some of its traditional rules.[75] Where the SEC traditionally fights securities fraud by forcing companies to file disclosure materials, currently, the intermediaries that facilitate this procedure (banks) are not directly involved within the cryptocurrency space.[76] Most recently, the SEC has considered regulating not only the funding process of cryptocurrency companies, but also the exchanges.[77] With this addition, past Chairman Clayton had articulated that federal oversight can foster innovation while also protecting investors.[78]

ii. Commodities Per the Commodities Futures Trading Commission

The Commodities Futures Trading Commission (CFTC) has designated

70. *See* Quinn, *supra* note 19, at 549 (sharing skepticism with self-regulation where no government-facilitated incentive exists, but where institutions are supposedly "self-correcting").

71. Tama Churchouse, *The SEC is Finally Starting to Regulate Bitcoin and Other Cryptocurrencies*, BUS. INSIDER (July 29, 2017), http://www.businessinsider.com/bitcoin-price-security-equity-sec-2017-7.

72. *Id.*

73. *See id.* The regulation is disclosure-focused, where the SEC issues the results of an investigative report into the details surrounding a cryptocurrency ICO. *Id.*

74. Statement by Jay Clayton, Chairman of the SEC, on Cryptocurrencies and Initial Coin Offerings (Dec. 11, 2017), https://www.sec.gov/news/public-statement/statement-clayton-2017-12-11*; contra* Frances Coppola, *Digital Coins and Tokens Are Just Another Kind of Security*, FORBES (July 31, 2017), https://www.forbes.com/sites/francescoppola/2017/07/31/sec-tells-digital-coin-and-tokens-issuers-to-comply-with-securities-laws/#6bef832d3bb1.

75. Maupin, *supra* note 40, at 4.

76. *Id.*

77. *Cryptocurrency Exchanges Explained*, CRYPTOCURRENCYFACTS https://cryptocurrencyfacts.com/what-is-a-cryptocurrency-exchange/ (last visited Mar. 10, 2019) (defining cryptocurrency exchanges as online platforms where you can exchange one cryptocurrency for another cryptocurrency (or for fiat currency)); *Testimony on Virtual Currencies: The Oversight Role of the U.S. Securities and Exchange Commission and the U.S. Commodity Futures Trading Commission: Before the Committee on Banking, Housing and Urban Affairs*, 115th Cong. (2018) (Statement of Jay Clayton, Chairman, Securities and Exchange Commission), https://www.banking.senate.gov/imo/media/doc/Clayton%20Testimony%202-6-18.pdf.

78. Josiah Wilmoth, *'Open' to Regulation of Cryptocurrency Exchanges: US SEC Chairman to Testify*, CCN (May 2, 2018), https://www.ccn.com/sec-chairman-to-testify-they-are-open-to-federal-regulation-of-cryptocurrency-exchanges/.

cryptocurrencies as commodities under its authority by the Commodity Exchange Act.[79] Fraud and manipulation involving cryptocurrency traded in interstate commerce are appropriately within the purview of the CFTC, as are futures financial products tied directly to cryptocurrency.[80] Per the mandate to catch fraud and manipulation in the spot markets, the agency has addressed the increasing mass of retail investors in cryptocurrency by creating consumer advisories.[81] The CFTC has also taken action against unregistered Bitcoin futures exchanges, issued proposed guidance describing a derivative market and a spot market in the virtual currency context, issued warnings about valuations and volatility in spot virtual currency markets, and addressed virtual currency Ponzi schemes.[82]

iii. Treasury Part I: Fintech Charter with the Office of the Comptroller of the Currency

The OCC has added to its regulatory scheme a fintech company charter.[83] Traditionally, the OCC has authority to supervise "all national banks and federal savings associations as well as federal branches and agencies of foreign banks."[84] Due to the increasing prevalence of cryptocurrencies, this department evaluated the "agency's authority to grant special purpose national bank charters to fintech companies."[85] Questions accompanying this new authority include, "[s]hould a nonbank company that offers banking-related products have a path to become a bank? And, what conditions should apply if a nonbank becomes a national bank?"[86] Ultimately, the OCC determined that it would be in the public interest to grant a special purpose national bank charter to fintech companies.[87] A fintech charter by the OCC requires companies to submit a "detailed business plan," governance strategy, liquidity, compliance and risk management plans, and enact recovery and resolution planning.[88]

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79. Statement of J. Christopher Giancarlo, Chairman, on Virtual Currencies (Jan. 4, 2018), https://www.cftc.gov/PressRoom/SpeechesTestimony/giancarlostatement010418.

80. Press Release, CFTC Statement on Self-Certification of Bitcoin Products by CME, CFE and Cantor Exchange (Dec. 1, 2017), https://www.cftc.gov/PressRoom/PressReleases/pr7654-17; CFTC, *supra* note 1.

81. *Customer Advisories*, U.S. COMMODITY FUTURES TRADING COMMISSION, https://www.cftc.gov/Bitcoin/index.htm (last visited Mar. 10, 2019) (listing topics such as "Beware Virtual Currency Pump-and-Dump Schemes" and "Risk of Virtual Currency Trading").

82. *Id.*

83. *See* Elizabeth A. Khalil, *Acting Comptroller of the Currency Appointed; Long-Term Outlook for OCC Leadership Remains Unclear*, LEXOLOGY (May 3, 2017), https://www.lexology.com/library/detail.aspx?g=a59c0426-7a27-4b1c-b119-0eafdca036cc; *see also OCC Begins Accepting National Bank Charter Applications From Financial Technology Companies*, U.S. DEP'T TREASURY (July 31, 2018), https://www.occ.gov/news-issuances/news-releases/2018/nr-occ-2018-74.html.

84. *About the OCC*, OFFICE OF THE COMPTROLLER OF THE CURRENCY, https://www.occ.treas.gov/about/what-we-do/mission/index-about.html (last visited Mar. 10, 2019).

85. Thomas J. Curry, Comptroller of the Currency, Remarks at Georgetown University Law Center Regarding Special Purpose National Bank Charters for Fintech Companies (Dec. 2, 2016), https://www.occ.treas.gov/news-issuances/speeches/2016/pub-speech-2016-152.pdf.

86. *Id.* This question is posed with intention for the fintech entity to potentially participate as the non-bank entity. *Id.*

87. The New York State Department of Financial Services filed a lawsuit, countering such a novel proposal. Chelsea Lamb et al., *Federal Court Dismisses Challenge to OCC Fintech Charter Proposal*, TROUTMAN SANDERS CONSUMER FIN. SERVS. (Dec. 13, 2017), https://www.consumerfinancialserviceslawmonitor.com/2017/12/federal-court-dismisses-challenge-to-occ-fintech-charter-proposal/ (noting that the dismissal was due to lack of standing and ripeness).

88. *Id.*

iv. Treasury Part II: Financial Crimes Enforcement Network

The agency that works exclusively with criminal activity, FinCEN, has adopted some guidelines for virtual currencies.[89] FinCEN's inspector general assumed jurisdiction, working to prevent and punish cryptocurrency practices related to money laundering and terrorism financing.[90] FinCEN states that cryptocurrency "is a medium of exchange that operates like a currency in some environments, but does not have all the attributes of real currency."[91]

According to FinCEN, certain cryptocurrency businesses are nonetheless "money services businesses" (MSB) and have registration requirements and a range of anti-money laundering, recordkeeping, and reporting responsibilities.[92] FinCEN has issued interpretive guidance to clarify the applicability of the regulations implementing the Bank Secrecy Act to persons creating, obtaining, distributing, exchanging, accepting, or transmitting virtual currencies.[93] The guidance deems a user of virtual currency to not be subject to FinCEN's MSB designation.[94] By contrast, an exchanger is an MSB under FinCEN's regulations, and is "specifically, a money transmitter."[95]

v. New York's State-Sponsored Regulation: The BitLicense

In comparison, some states have created their own regulatory schemes, such as that by New York's Department of Financial Services (DFS).[96] This "BitLicense" requires anyone engaged in a list of cryptocurrency-related activities to register with DFS.[97] Any business must obtain a BitLicense if it engages in any cryptocurrency activity involving New York residents or if the business is located in or conducts business in New York.[98]

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89. *Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies*, FIN. CRIMES ENFORCEMENT NETWORK (Mar. 18, 2013), https://www.fincen.gov/resources/statutes-regulations/guidance/application-fincens-regulations-persons-administering.

90. Stan Higgins, *US Treasury to Audit FinCEN's Cryptocurrency Practices*, COINDESK (Nov. 7, 2017, 9:00 AM), https://www.coindesk.com/us-treasury-audit-fincens-cryptocurrency-practices/.

91. In particular, as of 2013 guidance, cryptocurrency does not have legal tender status in any jurisdiction. *Application of FinCEN's Regulations*, *supra* note 89.

92. Press Release, Fin. Crimes Enforcement Network, FinCEN Issues Guidance on Virtual Currencies and Regulatory Responsibilities (Mar. 18, 2013), https://www.fincen.gov/news/news-releases/fincen-issues-guidance-virtual-currencies-and-regulatory-responsibilities.

93. *Id.*

94. *Id.*

95. *Id.*

96. *See generally N.Y. BitLicenses*, *supra* note 3; *see also* Marc Press & Joseph B. Doll, *New York Virtual Currency Business License: What to Know*, LEXOLOGY (Sept. 25, 2017), https://www.lexology.com/library/detail.aspx?g=94062ab1-8453-4122-8226-498f92d61933 (explaining New York's state regulatory scheme).

97. *BitLicense Frequently Asked Questions*, N.Y. ST. DEP'T FIN. SERVS., https://www.dfs.ny.gov/apps_and_licensing/virtual_currency_businesses/bitlicense_faqs (last visited Mar. 6, 2019) (outlining the qualifying businesses as businesses involved with: virtual currency transmission, storing, holding, or maintaining custody or control of virtual currency on behalf of others, buying and selling virtual currency as a customer business, performing exchange services as a customer business, controlling, administering, or issuing a virtual currency).

98. *Id.*

Despite its benefits,[99] the BitLicense has been overtly rejected.[100] There have been numerous threats from companies to move out of New York state or the United States in order to avoid the costly process of registering for the required BitLicense.[101] Even prior to this law's final form, technologists responded with outrage[102] and predictable criticism: it costs startups too much to license and comply with disclosure measures and compliance plans, which hinders innovation.[103] However, DFS engaged with a sandbox-like openness by welcoming and responding to feedback.[104] The final rules were published in June 2015 and, to date five business have registered.[105] Since the passage of BitLicense legislation, several "prominent bitcoin companies have ceased operations in New York,"[106] or have simply eliminated New York participants from their customer base.[107] Since New York is an international financial hub and home to many cryptocurrency companies, the BitLicense was viewed by others as an appropriate step towards a regulatory solution.[108]

vi. Uniform Regulation of Virtual Currency Businesses Act

In comparison, in July 2017, the Uniform Law Commission passed the Uniform Regulation of Virtual Currency Businesses Act (URVCBA),[109] to fill regulatory gaps

99. Issie Lapowsky, *New York's Bitcoin Regulations May Not Kill Startups After All*, WIRED (Oct. 15, 2014), https://www.wired.com/2014/10/bitlicense/ (attesting that regulation could reduce the environment that "enabled hives of criminal activity, like the infamous Silk Road, to operate").

100. *See* Andrea Castillo, *Hey, New York: Bitcoin Doesn't Need a BitLicense*, FOUND. ECON. FREEDOM (Aug. 15, 2015), https://fee.org/articles/hey-new-york-bitcoin-doesn-t-need-a-bitlicense/ (discussing how the BitLicense language is vague and places large burdens on cryptocurrency startups).

101. Yessi Bello Perez, *The Real Cost of Applying for a New York BitLicense*, COINDESK (last updated Oct. 23, 2015), https://www.coindesk.com/real-cost-applying-new-york-bitlicense/ (noting the $5,000 non-refundable application fee and estimated $100,000 total cost for one company to comply); Daniel Roberts, *New York's Bitcoin Business Policy has Arrived*, FORTUNE (June 5, 2015), http://fortune.com/2015/06/05/new-york-bitcoin-business-policy/ (describing the competition among states that the New York scheme has evoked, where New Jersey legislatures proposed tax cuts for cryptocurrency businesses).

102. Clay Michael Gillespie, *Bruce Fenton Does Not Want You to Engage on BitLicense*, CRYPTOCOINS NEWS (July 20, 2014), https://www.cryptocoinsnews.com/bruce-fenton-want-engage-bitlicense/; Kaja Whitehouse, *'Bitlicense' Rules Regulating Bitcoin Released*, USA TODAY (June 3, 2015), https://www.usatoday.com/story/tech/2015/06/03/bitcoin-bitlicense-lawsky-rules-final/28405317/.

103. *Stop the BitLicense*, ELECTRONIC FRONTIER FOUND., https://act.eff.org/action/stop-the-bitlicense (last visited Mar. 10, 2019).

104. *BitLicense Frequently Asked Questions*, N.Y. ST. DEP'T FIN. SERVS., https://www.dfs.ny.gov/apps_and_licensing/virtual_currency_businesses/bitlicense_faqs (last visited Mar. 28, 2019).

105. Michael del Castillo, *Bitcoin Exchange Coinbase Receives New York BitLicense*, COINDESK (Jan. 17, 2017), https://www.coindesk.com/bitcoin-exchange-coinbase-receives-bitlicense/ (noting that the DFS received 22 applications but only three have since been approved); Press Release, Dep't of Fin. Servs., DFS Grants Virtual Currency License To Coinbase, Inc.: Five Virtual Currency Entities have Received Approval by DFS to Operate in New York (Jan. 17, 2017), https://www.dfs.ny.gov/reports_and_publications/press_releases/pr1701172.

106. Perez, *supra* note 101.

107. *Bitlicense Restrictions*, BITFINEX, https://www.bitfinex.com/legal/bitlicense (last visited Mar. 10, 2019) (announcing that "[a]ll New York Residents must withdraw all cryptocurrency balances currently held on Bitfinex by 4:00 pm EDT on August 15, 2015 . . . [f]ailure to [do so] . . . will result in the automatic liquidation of future deposits").

108. *See* DAVIS POLK, NEW YORK'S FINAL "BITLICENSE" RULE: OVERVIEW AND CHANGES FROM JULY 2014 PROPOSAL, DAVIS POLK & WARDWELL LLP (2015), https://www.davispolk.com/files/2015-06-05_New_Yorks_Final_BitLicense_Rule.pdf.

109. Dan Cummings, *ULC Approves Proposal for the Regulation of Virtual Currency Businesses*,

across states.[110] The Commission deems that with "the absence of an overarching federal payments regulatory framework, these state laws need to be harmonized to the extent possible."[111] The URVCBA addresses licensing requirements, reciprocity, consumer protection, cybersecurity, anti-money laundering, and supervision of licensees.[112] Any business that has the "power to execute unilaterally or prevent indefinitely a virtual currency transaction" must (1) obtain a license and (2) create procedures to prevent fraud, money laundering, and funding of terrorist activity.[113] Nonetheless, because state legislatures would need to adopt the Model Act, questions regarding the cohesiveness across the United States persevere.[114]

vii. The Sandbox as a Place to Play

The novel nature of fintech innovations boost regulatory risk, yet also make it difficult to create regulation "within existing regulatory regimes without destroying [the invention's] core value proposition."[115] Instead, in the "sandbox," unique rules are put in place that enable testing between technology and the proposed regulation for a limited period of time.[116] The sandbox pairs regulators with cryptocurrency entrepreneurs "to create innovative ways of satisfying important regulatory prerogatives across multiple industries on a global scale."[117]

Thus, the sandbox is essentially an incubator for regulation, a space for government and technologists to work to create regulatory solutions.[118] Companies apply to operate in the sandbox and, if approved, test with pilot projects, without strict regulatory sanctions.[119] These companies see it as "a 'safe space' in which businesses can test innovative products,

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ETHNEWS (July 20, 2017), https://www.ethnews.com/ulc-approves-proposal-for-the-regulation-of-virtual-currency-businesses.

110. This Act is intended to function like the widely-adopted Uniform Commercial Code; however, it is much less extensive. UNIFORM REGULATION OF VIRTUAL-CURRENCY BUS. ACT (UNIF. LAW COMM'N 2017), https://www.uniformlaws.org/viewdocument/final-act-no-comments-64?CommunityKey=e104aaa8-c10f-45a7-a34a-0423c2106778&tab=librarydocument [hereinafter UNIFORM REGULATION OF VIRTUAL-CURRENCY].

111. *Id.*; *see also*, Letter from Perianne Boring, Founder and President, Chamber of Dig. Commerce, to Richard T. Cassidy, President, Unif. Law Comm'n (July 17, 2017), https://digitalchamber.org/wp-content/uploads/2016/12/Chamber_ULC-Letter-0717171.pdf (describing the "world's largest trade association representing the blockchain industry['s] . . . belie[f] that a federal solution to the patchwork of approaches taken by the states is the most appropriate regulation of this activity").

112. UNIFORM REGULATION OF VIRTUAL-CURRENCY, *supra* note 110.

113. *Id.*

114. Letter from Peter Van Valkenburgh to Sarah Jane Hughes, Members, and Observers; ULC Regulation of Virtual Currency Businesses Act Committee on behalf of Coin Center 2 (Mar. 29, 2016), https://coincenter.org/wp-content/uploads/2016/03/ULCCoinCenterResponsetoTFFCcomment-1.pdf; *see* Joshua Althauser, *UK vs. US: Liberalization of Fintech vs. More Regulation*, THE COINTELEGRAPH (July 24, 2017), https://cointelegraph.com/news/uk-vs-us-liberalization-of-fintech-vs-more-regulation;

115. Maupin, *supra* note 40, at 1 (describing the key value proposition of cryptocurrencies to be the lack a centralized control center, the existence of which would significantly decrease the comparative advantage of cryptocurrencies).

116. Staff Writer, *How the Reserve Bank's Bitcoin Sandbox Could Lead to Etherium and Other Cryptocurrency Regulations*, S. AFR. BUS. TECH (Oct. 8, 2017), https://businesstech.co.za/news/banking/203174/how-the-reserve-banks-bitcoin-sandbox-could-lead-to-etherium-and-other-cryptocurrency-regulations-in-sa/ [hereinafter *Bitcoin Sandbox*].

117. Maupin, *supra* note 40, at 1

118. *Id.*

119. *Id.*

services, business models, and delivery mechanisms in a live environment while ensuring that consumers are appropriately protected."[120] The desert state of Arizona was the first to put up some parameters around the sand.[121] This model is deemed to provide business with "limited access to Arizona's market to test innovative financial products or services without first obtaining full state licensure" avoiding the regulatory uncertainty which was once thought as inevitable for startups and inventions.[122]

In this way, the sandbox avoids the potential for the government to preemptively establish regulations at the computer code protocol level.[123] Doing so "could interfere with active private sector experimentation," a catalyst for even better regulation.[124] Rather than imposing creativity-stifling anticipatory regulation, the sandbox arguably encourages innovation.[125] Thus, the sandbox method moderates the reality that technology advances faster than regulators can adjust policies.[126] It also provides an opportunity to experiment with new products, providing a safe place for consumers to expose themselves to the cutting edge of fintech in order to decide if "products and services are useful to them" or if they pose too much risk.[127]

Due to its flexibility and adaptability, the sandbox is the regulatory model of choice for technologists who succumb to the belief that the cryptocurrency space needs regulation.[128] Nonetheless, the sandbox has its own limits; for example, the fact that participating in the sandbox is not mandatory for entities who otherwise participate in cryptocurrency exchange.[129] Had DAO's creators vetted their idea to the global sandbox, the "team of experienced regulators" would have categorically required the developers to address the "obvious risks" which were overlooked by the DAO's management.[130] Instead, the regulators might have suggested a fund limit to reduce the risk to the novel mechanism or required an analogy of a prototype "dry run" for participants.[131] Therefore, the sandbox is one of the man-made regulatory islands: not only helpful in adapting regulation to fit the unique nature of fintech solutions, but it also provides an environment for managers to

120. *Id.*

121. H.B. 2434, 53rd Leg., 2d Sess. (Ariz. 2018), https://www.azleg.gov/legtext/53leg/2R/bills/HB2434H.pdf.

122. *Welcome to Arizona's Fintech Sandbox*, ARIZONA OFFICE OF THE ATTORNEY GENERAL, https://www.azag.gov/fintech (last visited Mar. 10, 2019).

123. Cryptocurrency protocol are the programming directions and decisions created to automatically enforce specific actions within the blockchain. *See Protocol Rules*, BITCOIN WIKI, https://en.bitcoin.it/wiki/Protocol_rules (last visited Mar. 6, 2019).

124. Maupin, *supra* note 40, at 6.

125. *Id.* at 5.

126. Werbach *supra note* 48, at 542.

127. FinTech Futures, *Fintech in the US: Where is Regulation Headed?*, BANKING TECH. (Apr. 19, 2017), http://www.bankingtech.com/752532/fintech-in-the-us-where-is-regulation-headed/.

127. *Id.* The CFTC's LabCFTC has emerged as one of such organizations. *LabCFTC Overview*, COMMODITY FUTURES TRADING COMMISSION, http://www.cftc.gov/LabCFTC/Overview/index.htm (last visited Oct. 23, 2017).

128. *Bitcoin Sandbox, supra* note 116.

129. *See* Dan Cummings, *Regulatory Sandboxes: A Practice for Innovation That Is Trending Worldwide*, ETHNEWS (Feb. 28, 2017), https://www.ethnews.com/regulatory-sandboxes-a-practice-for-innovation-that-is-trending-worldwide.

130. Maupin, *supra* note 40, at 10.

131. *Id.*

eliminate obvious business model risks which are blurred by their insider perspective.[132] Despite its promises, empirical evidence backing up the effectiveness of these frameworks "is scant."[133]

D. Private Ordering as a Regulatory Middle-Ground

In contrast, private ordering has the potential to do "the work that might be done by law" to fulfill policies.[134] Legal scholars define private ordering in a variety of ways, ranging from the least effective form—simply private industry's *involvement* in the industry[135]—to more robust forms. There need not be the strict dichotomy between a laissez-faire approach and strict, rule-based law in this space.[136] Instead, private ordering is an effective regulatory architecture when it is structured to "provid[e] incentives and arrangements to monitor behavior."[137] One of the more comprehensive private ordering forms describes a system where mechanisms that are set up *by* government to create an incentive-based circumstance for the acting parties to act in their best interest, which is also the desired public policy interest.[138] This latter kind of private ordering is the kind that this Note advocates is a solution to the cryptocurrency regulatory dilemma.[139]

i. Private Ordering in the Financial Sector: Traditional Financial Innovation as a Cautionary Tale

Financial innovation is the act of creating new financial instruments, technologies, institutions, and markets.[140] The term describes "a process of change, a change in the type and variety of available financial products to be sure, but also a change in financial intermediaries (such as banks) and in markets, themselves."[141] The array of financial innovations attributed to the 2008 crisis includes mortgage-backed securities and collateralized debt obligations (CDOs).[142]

In response to business limitations regulation poses, private actors will continually find ways to skirt existing regulation.[143] Due to insiders' evasion of this fact, private

132. *Id.*

133. NICK BOURKE, PEW RESEARCH CTR, HOW CAN REGULATORS PROMOTE FINANCIAL INNOVATION WHILE ALSO PROTECTING CONSUMERS? INTERNATIONAL LESSONS SHOULD INFORM THE U.S. APPROACH 13 (2018), https://www.pewtrusts.org/-/media/assets/2018/08/financial-innovation_report.pdf.

134. Robert B. Thompson, *Corporate Law Criteria: Law's Relation to Private Ordering*, 2 BERKELEY BUS. L.J. 95, 98 (2005).

135. *See* Tehila Sagy, *What's So Private About Private Ordering?*, 45 L. & SOC'Y REV. 923, 924 (2011).

136. *See supra* Part II.C. *See also* DE FILIPPI & WRIGHT, *supra* note 12, at 173–80.

137. Thompson, *supra* note 134, at 98.

138. *See generally* Scott Hirst, *The Case for Investor Ordering*, 8 HARV. BUS. L. REV. 227 (2018); Oliver E. Williamson, *The Lens of Contract: Private Ordering*, 92 AM. ECON. REV. 438, 438 (2002) (describing private ordering to be "efforts by the parties, to realign incentives and embed transactions in more protective governance structures" to "have the purpose and effect of mitigating the contractual problems that would otherwise arise").

139. *See infra* Part IV.A.

140. *See infra* note 151.

141. *See* Gubler, *supra* note 7, at 55.

142. Robert E. Litan, *In Defense of Much, but Not All, Financial Innovation*, BROOKINGS INST. (Feb. 17, 2010), https://www.brookings.edu/wp-content/uploads/2016/06/0217_financial_innovation_litan.pdf.

143. *See* Quinn, *supra* note 19, at 552; Charles W. Calomiris, *Financial Innovation, Regulation, and Reform* 29 CATO J. 65, 65 (2009) (stating that "financial innovations often respond to regulation by sidestepping regulatory restrictions that would otherwise limit activities in which people wish to engage").

ordering in the financial sector has been unsuccessful. Here, misaligned incentives in over-the-counter derivatives,[144] credit rating agencies,[145] and interbank lending benefit insiders at the expense of systemic failure.[146]

Where the financial crisis of 2008 was associated with substantial financial innovations,[147] a trust in the private parties to protect the consumer of these innovations failed.[148] Now, financial innovations must pass through regulators such as the CFTC, for example, for with previously unregulated over-the-counter swaps.[149] Scholars suggest that an attempt of private ordering perpetuated the 2008 financial crisis where sophisticated participants instead "engage[d] in an orgy of reckless lending and ill-advised risk-taking."[150] Thus, blindly allowing the market to "take care of itself" is a position not advised by this Note.[151]

ii. Private Ordering in Corporate Law

In contrast, private ordering occurs differently in corporate law.[152] Echoing Lessig, *ex post* enforcement is only one effective constraint on human behavior.[153] In corporate law doctrine, instead of a government imposing regulations on companies, private measures such as company bylaws and forum-selection clauses enforce public policies.[154]

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144. Quinn, *supra* note 19, at 591 (stating that "[t]he prospect of generating a steady stream of income without the requirement of putting collateral at risk translates into a strong incentive for sellers of default swaps to over-leverage" at the expense of the consumer).

145. *Id.* at 611 (alluding to the conclusion that "the sheer number of AAA rated structured finance products" made the ratings essentially meaningless).

146. Gubler, *supra* note 7, at 112.

147. GERALD P. DWYER, FED. RES. BANK OF ATLANTA, FINANCIAL INNOVATION AND THE FINANCIAL CRISIS OF 2007-2008 (2011), http://www.jerrydwyer.com/pdf/innovation.pdf. Dwyer explains that

> Banks substantially increased their securitization of loans, changing from "originating to hold loans" to "originating to distribute loans" to others. Instead of issuing plain-vanilla securities based on the loans' cash flows, some of the securities created were tranched securities with the tranches having different rights to cash flows and credit ratings. In addition, credit default swaps became important derivative securities for transferring credit risk. While these securities can transfer credit risk that exists for other reasons such as an underlying loan, credit default swaps also can be used to lay off or assume credit risk that has not arisen in the course of other business.

Id.

148. *See* Gubler, *supra* note 7, at 57 (stating that the "role that these products played in the financial crisis has generated a vigorous debate about the value of financial innovation and the proper regulatory response to the development of novel financial products").

149. *Commodity Futures Trading Commission – CFTC*, INVESTOPEDIA, http://www.investopedia.com/terms/c/cftc.asp (last updated Mar. 6, 2018).

150. Quinn, *supra* note 19, at 549.

151. The term "financial innovation" may appropriately apply to cryptocurrencies; but, for the purpose of this Note, the term applies only to traditional, non-blockchain-associated financial products and not cryptocurrencies. This is in order to distinguish the two groups of inventions. *See Definition of Financial Innovation*, FIN. TIMES, http://lexicon.ft.com/Term?term=financial-innovation&mhq5j=e7 (last visited Mar. 11, 2017).

152. Mark R. Levin, *What is Private Ordering?*, ACTIVIST INV. BLOG (Sept. 29, 2015), http://www.theactivistinvestor.com/The_Activist_Investor/Blog/Entries/2015/9/29_What_is_Private_Ordering.html.

153. Thompson, *supra* note 134, at 98.

154. James D. Cox, *Corporate Law and the Limits of Private Ordering*, 93 WASH. U. L. REV. 257, 257 (2015); Levin, *supra* note 152.

Majority voting, the ability to convene shareholder meetings, and nomination and removal of directors are all private ordering measures designed to promote correct incentives by private actors.[155] Governance strategies focus on shareholder empowerment to address the "inherent power disparity between shareholders and the board of directors by granting shareholders specific legal rights."[156] Where the law uses the fiduciary responsibility to fill gaps in prescriptive law, such duties enable the shareholder to be a private enforcement mechanism and deter director misconduct with this enforcement threat. The standard of duty by a fiduciary is high and fact-specific, that which is "most sensitive" to the shareholder. Therefore, this form of regulatory governance is a strong and effective type of private ordering.[157]

iii. Private Ordering Already Present Within the Cryptocurrency Space

Some legal scholars have already suggested private ordering to be the solution to the cryptocurrencies' regulatory needs.[158] Strong private ordering, where private actors are incentivized to facilitate policy goals, is already inherent within cryptocurrency governance and protocol.[159] For example, the external verification system for blockchain transactions is private ordering as regulation. According to Bitcoin founder Satoshi Nakamoto, a principal objective for the innovation of cryptocurrencies is the transfer of capital without centralized intermediaries, such as banks.[160]

Without these banks, who would validate the transactions? Nakamoto's answer is *mining*.[161] Where transactions are grouped together in a block, the blockchain structure is constructed to require private parties to solve a math problem in order to verify the group of transactions. These private parties are called *miners*, and work as a private verification system, replacing banks' necessity.[162] Miners are the private actors who enforce the policy goal—accurate cryptocurrency transactions. Before a group of transactions is put on the public ledger, the miners ensure the output is correct.[163] The mining group that solves the block's answer receives Bitcoin, the mechanism to incentivize the verification.[164]

Thus, miners work as the properly incentivized governance structure. Instead of the

155. *See* Jennifer G. Hill, *The Trajectory of American Corporate Governance: Shareholder Empowerment and Private Ordering Combat* 1, 8 (Euro. Corp. Governance Inst., Working Paper No. 343, 2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2921692.

156. *Id.* at 4.

157. Meinhard v. Salmon, 164 N.E. 545, 564 (N.Y. 1928) (stating famously that "[a] trustee is held to something stricter than the morals of the market place. Not honesty alone, but the punctilio of an honor the most sensitive, is then the standard of behavior . . . the level of conduct for fiduciaries [has] been kept at a level higher than that trodden by the crowd").

158. Mark Edwin Burge, *Apple Pay, Bitcoin, and Consumers: The ABCs of Future Public Payments Law*, 67 HASTINGS L.J. 1493, 1548 (2016) (stating that "private ordering should aid development of non-fiat currencies, as well").

159. *See* L.S., *How Bitcoin Mining Works*, ECONOMIST (Jan. 20, 2015), https://www.economist.com/blogs/economist-explains/2015/01/economist-explains-11 (illuminating that miners' role in the transaction verification process is a private ordering protocol).

160. *Id.*

161. *Id.*

162. *Id.*

163. *What is Bitcoin Mining?*, BITCOIN MINING, https://www.bitcoinmining.com/ (last visited Mar. 11, 2019).

164. *Id*.

status quo banks' internal auditing system, the cryptocurrencies maintain a verification system within themselves. In this way, the essential function of ensuring that the correct transactions are part of the block on the public ledger is a form of voluntary cooperation to produce the stated policy goal.[165] Therefore, Bitcoin and other cryptocurrencies have set a foundation for additional private ordering regulatory structures.[166]

III. ANALYSIS

This Analysis will show that a private ordering system that allows insiders to take advantage of their positions has failed, as seen in the financial system prior to the 2008 crisis.[167] In reporting the interbank lending rates and financial product ratings, the legal structures had not effectively mitigated insiders from acting at the expense of consumers.[168] The financial sector's private measures instead perpetuated the 2008 financial crisis.[169] By contrast, effective private ordering occurs when a system's incentive structures not only promote general policy goals but also mitigate actions taken by insiders at the expense of the consumer.[170] Private ordering has been effective in corporate law because this area maintains checks and balances, preventing insiders from acting in gross detriment of the consumer.[171] For example, if "stockholders are displeased with the action of their elected representatives, the powers of corporate democracy are at their disposal to turn the board out."[172] In this way, the private shareholders enforce the policy goals of prudent business judgement, while the government merely facilitates and enforces the *structure* empowering the private parties.

Despite any limits to private ordering,[173] it is the ideal form of regulation for the

165. *See generally* Lynn Stout & Sergio Gramitto, *Corporate Governance as Privately-Ordered Public Policy: A Proposal*, HARV. L. SCH. F. CORP. GOVERNANCE & FIN. REG. (Nov. 21, 2017), https://corpgov.law.harvard.edu/2017/11/21/corporate-governance-as-privately-ordered-public-policy-a-proposal/.

166. Balázs Bodó et al., *Blockchain and Smart Contracts: The Missing Link in Copyright Licensing?*, 26 INT'L. J. L. & INFO. TECH. 311, 334 (2018) (comparing blockchain to the private ordering structure of copyright laws: "blockchain-based smart contracts are a form of private ordering not tied to a particular jurisdiction").

166. *See* Quinn, *supra* note 19, at 552 (explaining that a system with too much trust in actors to not act in a way that in inappropriate conflict of outsiders instead "understands markets to be sustainable and self-correcting institutions, which require little if any regulatory oversight").

167. *See* Awrey *supra* note 18, at 239–40 (describing the lack of checks and balances as "power imbalances").

168. *See* Quinn, *supra* note 19, at 549, 552 (noting that "[s]ecuritization and credit derivatives, which were intended to be private ordering innovations adding to market resilience, became sources of information asymmetries and general market instability").

169. Quinn, *supra* note 19, at 549.

170. CHEDRAWI & HOWAYECK, *supra* note 30, at 3 (illuminating the constant trend that "agents tend to use the property of the firm for their own end which will generate a conflict between principal and agents," where the "principal take the risk in order to generate an economic gain whereas [*sic*] the agent is risk averse and its main goal is maximizing his own gains").

171. Hill, *supra* note 155, at 20 (stating that "private ordering can [also] be used to change to the allocation of power between the board of directors and shareholders through either amendment to the corporate charter or the Bylaws" and that in the United Kingdom and Australia, private ordering "permit[s] shareholders to initiate and effect changes to the corporate constitution without board approval").

172. *See, e.g.*, Unocal Corp. v. Mesa Petrol. Co., 493 A.2d 946, 959 (Del. 1985).

173. *See generally* Awrey, *supra* note 18.

cryptocurrency space because it caters to the decentralized[174] aspect of cryptocurrencies and provides an environment for insiders to address problems that warrant nimble regulatory mechanisms. Cryptocurrency leaders have espoused a similar dialog regarding their policy positions, to those leaders' dialog regarding the permissive regulatory environment of the financial sector prior to the 2008 crisis. Further, the cryptocurrency markets and the modern financial sector have similar attributes, despite the former being an alternative to the latter. Therefore, despite any dissimilarities between these two environments, the lessons learned about financial innovations from the crisis are informative for a cryptocurrency policy structure.

A. Similarities Between the Financial Sector and the Cryptocurrency Space

The cryptocurrency and financial markets have similar and distinguishable attributes; and, although the markets are not replicas of one another, these similarities warn regulators to pay attention to financial trends.[175] The cryptocurrency market is similar to the modern banking system because both are: 1) digital, 2) subject to speculation, 3) globally interconnected, and 4) capable of significantly affecting consumers if they contain flaws. This Part will briefly highlight the similarities of dialog and attributes between the two markets to inform proposals for cryptocurrency regulation.[176]

i. Similar Features

First, like derivatives and other complicated and opaque financial innovations,[177] cryptocurrencies exist within a digital landscape.[178] Although the value of the entity can be brought out of the digital realm and liquidated with cash, its pure form is digital. The nonphysical nature potentially makes it easier to evade necessary precautions. Opaqueness in the system's sum and its parts has been noted to be one cause of the crisis: the "complex" nature of the financial products paired with products that were essentially insurance contracts without appropriate insurance regulation enabled the non-tangible nature of this system to perpetuate.[179] Likewise, it is pervasive for lay people to mention a lack of understanding about the cryptocurrency space, particularly due to the digital nature of these mechanisms.[180]

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174. *See* Rainer Böhme et al., *Bitcoin: Economics, Technology, and Governance*, 29 J. ECON. PERSP. 213, 219 (2015) (explaining that Bitcoin's decentralization has been praised by commentators).

175. *See generally* NAKAMOTO, *supra* note 25. As mentioned above, the cryptocurrency market is not a perfect allegory to the financial innovation based on existing banking structures. More obviously, the kind of crisis embodied in the banking sector's 2008 events is certainly not identical to the potential catastrophe that could occur in the cryptocurrency space. Economists say that Bitcoin is not a bubble because it has healthy fluctuations. Sam Dallyn, *Cryptocurrencies as Market Singularities: The Strange Case of Bitcoin*, 10 J. CULTURAL ECON. 462, 462 (2017); *contra* Eng-Tuck Cheah & John Fry, *Speculative Bubbles in Bitcoin Markets? An Empirical Investigation into the Fundamental Value of Bitcoin*, 130 ECON. LETTERS 32, 32 (2015).

176. *See infra* Part.III.C.ii.

177. *Heavy Lifting: Efforts to Reform a Vast and Opaque Market Are Showing Results*, ECONOMIST (Aug. 17, 2013), https://www.economist.com/news/finance-and-economics/21583698-efforts-reform-vast-and-opaque-market-are-showing-results-heavy-lifting.

178. *See, e.g.*, Adam Davidson, *What Is the Nature of a Digital Coin? Paris Hilton Might Know, but the S.E.C. Doesn't,* NEW YORKER (Nov. 2, 2017), https://www.newyorker.com/business/currency/what-is-the-nature-of-a-digital-coin-paris-hilton-might-know-but-the-sec-doesnt.

179. *See* ANGELIDES, *supra* note 14, at 129–50.

180. Preston Miller, *Chapter One: The Cryptocurrency Enigma*, *in* DIGITAL FORENSICS: THREATSCAPE AND

Potentially related to the digital nature of these spaces is the manner in which cryptocurrencies and financial innovations are purchased—more often than not, speculatively.[181] Speculation is making an investment with a "substantial risk of losing all value but with the expectation of a significant gain."[182] While technically there is some level of speculation with every kind of investment, buyers of cryptocurrencies are typically speculators.[183] The same is true of financial innovations.[184] Thus, popularity and hype could be the reason that these innovations have risen in value, rather than actual value, creating an increased risk of loss.[185] Additionally, there is a similarity to the modern banking system in that anyone on earth can buy a cryptocurrency and will be affected by the fluctuations of the value of the currency. This interconnectedness is also present in the modern banking system with many financial products.

Lastly the consumer is at risk. In banking, the inflated price of financial innovations could be the product of bankers' exaggerations.[186] For cryptocurrencies, a hacking attack, such as the 51% possibility, could cause Bitcoins to simply disappear.[187] Due to these four similarities, the kind of regulation that should be adopted to regulate cryptocurrency should be in part guided by the conclusion that insufficient government oversight and regulatory mechanisms led to the 2008 crisis.

ii. Similar Policy Dialog

On the other end of the spectrum to that of the rule-based regulation outlined above in the Background,[188] where mandates do not explicitly regulate parts of cryptocurrency, the government has encouraged broad flexibility towards the regulation of cryptocurrencies.[189] It would be difficult to deny that a cold shower of some additional regulation is just what this space needs. Some robust privately-ordered regulation would not only protect the consumer, but also distill superfluous businesses so that the smartest outfits are those to survive. Thus, regulators are challenged to re-examine policy mandates

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BEST PRACTICES (John Sammons ed., 2015) (noting that Bitcoin has been "a source of innovation and mystery").

181. WILLIAM A. KLEIN & JOHN C. COFFEE, BUSINESS ORGANIZATION AND FINANCE, LEGAL AND ECONOMIC PRINCIPLES 404 (11th ed. 2010) (defining speculation as taking on "increased risk, with the expectation, or at least the hope, of increased return").

182. James Chen, *Speculation*, INVESTOPEDIA, https://www.investopedia.com/terms/s/speculation.asp (last updated July 30, 2018).

183. *See generally* John Fry, *Booms, Busts and Heavy-tails: The Story of Bitcoin and Cryptocurrency Markets?*, 171 ECON. LETTERS 225 (2018).

184. Alp Simsek, *Speculation and Risk Sharing with New Financial Assets* 7 (NBER, Working Paper No. w17506, 2011), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1944004 (noting that "new [traditional financial market] assets would be directed towards increasing the opportunities for speculation"). "Financial innovation also always increases the speculative variance." *Id.* at 1.

185. Similarly, the perceived value of the CDO was markedly less than the actual value of the innovation. Charles Schorin & Steven Weinrich*, Introduction to Collateralized Debt Obligations*, *in* INVESTING IN COLLATERALIZED DEBT OBLIGATIONS 30 (Frank J. Fabozzi & Laurie S. Goodman eds., 2001).

186. *See generally* John Y. Campbell et al., *Consumer Financial Protection*, 25 J. ECON. PERSP. 91–114 (2011), https://www.aeaweb.org/articles?id=10.1257/jep.25.1.91.

187. *See* Jennifer J. Xu, *Are Blockchains Immune to All Malicious Attacks?*, FIN. INNOVATION, Dec 10, 2016, at 1, 5 (discussing hacking risks).

188. *Supra*, Part II.B.

189. Weizhen Tan, *Cryptocurrency Regulation Requires a "Do No Harm" Approach, US Regulator Says*, CNBC (Sept. 14, 2018, 2:34 AM), https://www.cnbc.com/2018/09/14/do-no-harm-in-regulating-cryptocurrencies-but-be-vigilant-cftc.html.

as the tendency to preserve existing mores in the face of new technological possibilities persists.[190] Thus, cryptocurrency regulation should also not mirror the policy dialog displayed just prior to the 2008 crisis. Where mere principle-based regulation appears attractive on its face, the cryptocurrency sector needs some hearty measures, despite the tendency to "dampen[] innovation."[191]

Prior to the crisis, it was a commonly held belief among sophisticated firms that counterparties had sufficient incentive to protect themselves from the risks of financial innovation.[192] At the dawn of the 2008 financial crisis, Federal Reserve Chairman Ben Bernanke advocated for a principle-based approach to financial innovation in his *Regulation and Financial Innovation* presentation.[193] Principles-based regulation refers to a broad set of standards dedicated toward desired outcomes,[194] rather than an ad-hoc "specific regulation."[195] Bernanke outlined three principles for these policy objectives: financial stability, investor protection, and market integrity.[196] He noted that despite "the challenges and the risks that financial innovation may create," a flexible, principles-based scheme is worth "the enormous economic benefits that flow from a[n] . . . innovative financial sector."[197] In hindsight, while the cause of the financial crisis has been debated at length for a decade, most policy makers and scholars agree on the need for some robust prescriptive-based regulatory measures, such as Basel III[198] and the Volcker Rule.[199]

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190. Lyria Bennet Moses, *Bridging Distances in Approach: Sharing Ideas About Technology Regulation*, *in* BRIDGING DISTANCES IN TECHNOLOGY AND REGULATION 37, 39 (Ronald Leenes & Eleni Kosta eds., 2013).

191. Michael Lavere, *Crypto Exchange Gemini Pushing for Regulation in New Ad*, ETHEREUM WORLD NEWS (Jan. 5, 2019), https://ethereumworldnews.com/gemini-bitcoin-cryptocurrency-regulation-ad-2019/ (sharing a slogan of a popular exchange: "The Revolution Needs Rules").

192. *See* Quinn, *supra* note 19, at 560.

193. Ben S. Bernanke, Chairman, Federal Reserve, Speech to the Federal Reserve Bank of Atlanta's 2007 Financial Markets Conference (May 15, 2007), https://www.federalreserve.gov/newsevents/speech/bernanke20070515a.htm.

194. Anita I. Anand, *Rules v. Principles as Approaches to Financial Market Regulation*, 49 HARV. INT'L L.J. ONLINE 111, 111 (2008) (describing that these standards are at times accompanied by more specific guidelines about how to achieve the outcomes in contrast to mandatory "tick-the-box" requirements, as seen in rules-based regulation).

195. Bernanke, *supra* note 193. This approach is "not to be confused with the policy of laissez-faire."

196. *Id.*

197. *Id.*

198. "Basel III is an internationally agreed [upon] set of measures developed by the Basel Committee on Banking Supervision in response to the financial crisis of 2007-09." *Basel III: International Regulatory Framework for Banks*, BANK INT'L. SETTLEMENTS, https://www.bis.org/bcbs/basel3.htm (last visited Mar. 11, 2019) (describing very specific measure for banks capital requirements using ratio formulas).

199. The Volcker Rule regulates against banks from using the depositor's money to make risky investments. Paul Volcker, past Chairman of the Federal Reserve, highlighted that a failed bank is very different from another failed company because banks are subsidized by the government. The Volcker Rule applies to banks with over $50 billion in capital and stops banks from investing in private equity or hedge funds beyond 3% of their capital. *One of Dodd-Frank's Most Controversial Rules Explained*, CNN MONEY (Aug. 22, 2016), https://money.cnn.com/video/news/economy/2016/08/22/the-volcker-rule-explained.cnnmoney/index.html. Additionally, the Rule stops a bank from proprietary trading when the bank makes trades with its own profits, which are subject to huge losses. *The Volcker Rule*, SKADDEN, ARPS, SLATE, MEAGHER & FLOM LLP, https://files.skadden.com/newsletters%2FFSR_The_Volcker_Rule.pdf (last visited Mar. 12, 2019). Detractors of the Volcker Rule say, like those detractors of specific regulation in the cryptocurrency market, that this Rule makes U.S. banks less attractive and less competitive in the international market. *See One of Dodd-Frank's Most Controversial Rules Explained*, *supra*; *see also* C-Span, *Dodd-Frank Wall Street Reform Financial Law Implementation*, YOUTUBE (2013), https://www.youtube.com/watch?v=xqBAB0y_q04 (providing an example of

Likewise, the conversations in the cryptocurrency space among regulators and technologists ring a similar tone to the principles-based approach, signaling a potential lesson to be learned.[200] For example, prior CFTC Commissioner J. Christopher Giancarlo worthily assumed an approach to "do no harm" to cryptocurrency-related innovators.[201] Like Chairman Bernanke, Commissioner Giancarlo seeks a "set of simple . . . principles," one that mirrors the regulatory environment which was the catalyst for the "exponential growth of the Internet."[202] However, the cryptocurrencies embody complex functionalities,[203] and work in a way similar to *both* the internet and the banking sector.[204] Therefore, a completely hands-off approach might be insufficient to effectively regulate the cryptocurrency space.[205]

iii. Analogous Principals and Agents

This Note also addresses the conflicts of interest that are inevitable due to the agency problem, specifically, within finance.[206] Where two parties exist in one situation, they will, without exception, possess a variance in objectives.[207] The two broad categories of parties in the financial sectors are 1) insiders such as institutional investors, banks, and rating agencies and 2) outsiders, or retail investors and the average consumer.[208] Governments step in when the agency costs between the insiders' power to harm the outsider on both an individual and macro level exceeds the level at which fraud and manipulation cannot be spotted by the average outsider.[209] In finance as well as in cryptocurrency, the insider parties have the power to manipulate numbers—or, as in the cryptocurrency space, the

where policy makers ask regulators about these specific measures post-2008); John C. Coffee, *What Went Wrong? An Initial Inquiry Into the Causes of the 2008 Financial Crisis*, J. CORP. L. STUD. 1, 1 (2009); Awrey *supra* note 18, at 255.

200. *See* Quinn, *supra* note 19, at 552 (stating the view that "private parties [are] best placed to determine the nature and the limits of the[ir] risk[s]").

201. J. Christopher Giancarlo, CFTC Commissioner, Special Address Before the Depository Trust & Clearing Corporation 2016 Blockchain Symposium: Regulators and the Blockchain: First, Do No Harm (Mar. 29, 2016), https://www.cftc.gov/PressRoom/SpeechesTestimony/opagiancarlo-13.

202. *Id.*

203. The main aspect, inherent in the purpose of cryptocurrencies, is that they hold value for consumers. In contrast, ownership of the digital space was not an apparent conception at the time of the budding internet.

204. *See* JUAN ANTONIO KETTERER & GABRIELA ANDRADE, INTER-AMERICAN DEVELOPMENT BANK, DIGITAL CENTRAL BANK MONEY AND THE UNBUNDLING OF THE BANKING FUNCTION 4–8 (2016), https://publications.iadb.org/en/publication/12439/digital-central-bank-money-and-unbundling-banking-function.

205. Serena Graham, *Ad Campaign – Crypto Needs Regulation*, FINTELEGRAM PEOPLE MAG. (FEB. 16, 2019), https://people.fintelegram.com/ad-campaign-crypto-needs-regulation (highlighting the exchange's marketing advertisements to identity it as the "regulated" exchange, implying regulation is desirable).

206. *See Agency Theory*, *in* A DICTIONARY OF ECONOMICS (Black et al. eds., 3d ed. 2009), http://www.oxfordreference.com/view/10.1093/acref/9780199237043.001.0001/acref-9780199237043-e-3418.

207. *See Agency Problem*, *in* ENCYCLOPEDIA OF FINANCE 12 (Cheng-Few Lee ed. 2006).

208. The agency problem was systematically identified in the corporate setting by Jensen and Meckling in 1976, described as the problem that arises when the shareholders of a firm and its managers have different interests. *Id.*

209. For example, the CFTC has legislative permission to pursue action when such fraud and manipulation exist as stated in Rule 180.1. *See* COMMODITY FUTURES TRADING COMMISSION, ANTI-MANIPULATION AND ANTI-FRAUD FINAL RULES, https://www.cftc.gov/sites/default/files/idc/groups/public/@newsroom/documents/file/amaf_factsheet_final.pdf (last visited Mar. 12, 2019).

blockchain protocol—to serve their own ends.[210] Each instance has the potential to occur without awareness from the principal.[211] In both settings, not only does the principal risk individual harm, but insider misbehavior may lead to critical systemic effects.[212] By contrast, Delaware corporate law has been structured in a way that incentivizes agents to work in the best interest of the principal.[213] Where insiders still maintain an informational and power advantage, trends leading to principal and systemic failure due to insiders' fraudulent behavior is illuminated.[214]

B. Private Ordering Lessons in the Financial Sector Pre-2008

Due to the similarity between the cryptocurrency and financial markets, cryptocurrency regulators have the opportunity to apply lessons learned from the crisis. Many believe that "an over-reliance on private ordering has systematically failed to generate robust responses to market failures."[215] However, this Part will show that it is the *type* of private ordering that has not been robust enough to mitigate against illicit insiders' actions. By avoiding what in retrospect seem to be obvious errors, productive regulation provides a structure to prevent conflicts of interest, the pervasive agency problem.[216]

i. Unchecked Private Ordering

Private ordering was not successful in either of the following instances because the insiders had incentives to manipulate the system in a way that harmed the consumer; thus, effective mechanisms were not structured to prevent conflicts of interest. The conflict of interest was present here because if banks reported inaccurate numbers they would be rewarded for it,[217] and the lack of a ramification for the credit agencies' inaccurate reporting created agency costs.[218] All the while, the outsider relied on faulty numbers to their detriment.[219] The interest of the consumer was forfeited; and, due to private facilitation, banks reported false numbers that supported their interests alone.[220]

Due to this problem, many scholars and policymakers have agreed that this kind of private ordering, where there is no check on a reporting entity, is not effective.[221] The natural drive to compete gives way to temptation to manipulate numbers when possible.[222] Human nature shows that insiders will almost always take advantage of their insider position "[u]nless there are sufficient contractual safeguards in the form of private ordering or formal regulatory structures."[223] The LIBOR and rating agencies systems simply trusted

210. *See supra* Part III.A.i.
211. *Id.*
212. *Id.*
213. *Supra* Part II.D.ii.
214. *Id.*
215. *See* Quinn, *supra* note 19, at 550.
216. *See infra* Part III.C.
217. Calomiris, *supra* note 143.
218. Quinn, *supra* note 19, at 550–52.
219. Hockett & Omarova, *supra* note 15, at 7 (describing LIBOR as a ubiquitous price index).
220. *Id.* at 11 (noting the collusive insider behavior exhibited with setting the LIBOR rate).
221. *See* James McBride, *Understanding the Libor Scandal*, COUNCIL ON FOREIGN REL., https://www.cfr.org/backgrounder/understanding-libor-scandal (last updated Oct. 12, 2016).
222. *Id.*
223. Quinn, *supra* note 19, at 551.

the entities to report the correct numbers; and, without a more nuanced incentive structure, private ordering failed.

ii. LIBOR

The unattractive type of private ordering occurred when banks were trusted to report their interbank lending rates but, instead, reported inaccurate numbers. A small panel of banks in the United Kingdom was tasked with reporting the projected cost of their borrowing money on a short-term basis.[224] The British Banking Association (BBA) collected these numbers on a routine basis and published the mean as the "London Interbank Offered Rate," or LIBOR.[225] This is the base rate for almost all financial practitioners, and dictates markets worth more than $350 trillion, comprising of various financial products that include interest rate swaps, forward rate agreements, and commercial loans.[226] On the retail level, home and credit card loan rates were even derived from LIBOR.[227]

Over time, it became clear that about 20 banks had been colluding, submitting false rates in order to portray greater financial stability.[228] Prior to the 2008 crisis, most consumers, and even bankers, believed that this rate was a true reflection of interbank loans.[229] Banks were, however, incentivized to report inaccurate risk levels for lending money to each other.[230] Problems with this model became apparent when Barclays was accused of submitting manipulated rates designed to skew the overall market rate to benefitting its derivative market.[231] The intention behind the malpractice was to bump up traders' profits who held positions in LIBOR-based securities.[232] Eventually, all of the banks were discovered to have been colluding by submitting artificially low LIBOR rates.[233]

Yet, the entire purpose of LIBOR is to report numbers so that other parties can rely on the accuracy for informed investment decisions.[234] The opaque interconnected nature

224. Richard S. Grossman, *The Trouble with Libor*, OXFORD U. PRESS BLOG (Sept. 4, 2013), https://blog.oup.com/2013/09/libor-financial-conspiracy-economics/.

225. McBride, *supra* note 221 (describing that "a representative panel of global banks submit an estimate of their borrowing costs to the Thomson Reuters data collection service each morning at 11:00 a.m. The calculation agent throws out the highest and lowest 25 percent of submissions and then averages the remaining rates").

226. Julia Kagan, *LIBOR*, INVESTOPEDIA, https://www.investopedia.com/terms/l/libor.asp (last updated Dec. 11, 2018) (noting that the proliferation of LIBOR occurred with the need for a base rate for interest rate-based financial products: in "the 1980s, new products like interest rate swaps, currency derivatives and forward rate agreements started gaining popularity. A need emerged to have a uniform measure of interest rates which could be used across various financial institutes and entities for unified trading in the international market").

227. Grossman, *supra* note 224.

228. If the LIBOR was high, that would mean that banks are less confident in getting their money back from one another, indicating a serious problem with the financial markets. Grossman, *supra* note 224.

229. *See Libor Scandal: Can We Ever Trust Bankers Again?*, BBC (May 8, 2013), http://www.bbc.com/news/business-22382932.

230. Grossman, *supra* note 224 (describing that "banks have an incentive to alter submissions to improve their profitability: raising submissions when they are net lenders; lowering them when they are net borrowers. Even small movements in Libor can lead to millions in extra profits—or losses").

231. As mentioned, the institutions only need to skew the rates a very small bit to make a very large profit in the derivatives market. *Id.*

232. Kagan, *supra* note 226.

233. *Id.*

234. MCGRAW HILL FIN., GUIDE TO CREDIT RATING ESSENTIALS: WHAT ARE CREDIT RATINGS AND HOW

of the financial system sought to use LIBOR as a benchmark.[235] LIBOR's goal was to provide clarity.[236] When banks intentionally manipulated LIBOR, consumers buying homes and cars believed that the interest rate at which the banks loaned the money represented an accurate level of risk of an investment.[237] The lack of true numerical indicators to represent the health of investments ultimately contributed to the systemic financial crash.[238]

Where inherent conflicts of interests were not mitigated, private insiders' self-dealing supervened.[239] Private ordering as private involvement had failed due to insufficient checks and balances—essentially the BBA "had asked the foxes whether they thought the henhouse was adequately protected."[240] Due to the strong indication that the LIBOR rate has not carried out its sole purpose, there has been a significant decline in the number of products for which LIBOR has been calculated.[241] A global effort led by the Federal Reserve Board proposes an Alternative Reference Rate, an objective base rate that is not subject to manipulation.[242] Additionally, the U.K. government has since completely taken control of setting rates.[243] From these changes, it is clear that the global financial community understands the devastating systemic effects of insider mishandlings.[244]

iii. Fitch, Moody's, and Standard & Poor's

Financial insiders also unethically took advantage of their position to the detriment of the entire system when rating agencies did not perform with due diligence at their best,[245]

DO THEY WORK? STANDARD & POOR'S RATINGS SERVICES 1 (2014), https://www.spratings.com/documents/20184/760102/SPRS_Understanding-Ratings_GRE.pdf/298e606f-ce5b-4ece-9076-66810cd9b6aa.

235. Awrey *supra* note 18, at 225 (stating that "principal benefit of Libor stems from its use as a benchmark rate of interest in connection with a wide range of financial contracts" for example where interest rate swaps are calculated at 2% additional percentage from LIBOR). *See also* Kagan, *supra* note 226.

236. Kagan, *supra* note 226.

237. *See* CREDIT RATING ESSENTIALS, *supra* note 234, at 2 (explaining that the rating indicates "one aspect of an investment decision—credit quality—and, in some cases, may also address what investors can expect to recover in the event of default"); *see also* Awrey, *supra* note 18, at 162–89 (concluding that "panel banks have been able to exploit the structural weaknesses of Libor").

238. *See* CREDIT RATING ESSENTIALS, *supra* note 234, at 2.

239. Quinn, *supra* note 19, at 550 (describing the "failure of private ordering mechanisms to protect markets during the Financial Crisis of 2008 and suggest[ing] that our collective mistake has been in designing a regulatory structure that adopted the assumptions of an overly ideological vision of the market model that ignores market failures").

240. Awrey, *supra* note 18, at 227.

241. Kagan, *supra* note 226.

242. *Alternative Reference Rates*, AM. BANKERS ASS'N, https://www.aba.com/Tools/Function/RiskMgmt/Pages/alternative-reference-rates.aspx (last visited Mar. 12, 2019); *Alternative Reference Rate Committee*, AARC, https://www.newyorkfed.org/arrc (last visited Mar. 12, 2019).

243. Ben Mohinsky, *The Bank of England Is Taking over the Replacement for Libor*, BUS. INSIDER (Oct. 16, 2017), https://www.businessinsider.com/sonia-timeline-alternative-to-libor-2017-10.

244. Hockett & Omarova, *supra* note 15, at 7–9. It is "commonplace that financial markets are more than mere sums of their institutional parts" *Id.* at 1.

245. KLEIN & COFFEE, *supra* note 181, at 421 (noting a hornbook account that "[e]ven when their models were sound, a second basic problem was that the rating agencies did not engage in any factual verification (or 'due diligence' in lawyers' vernacular) of the factual information provided to them").

and performed with fraud and misrepresentation at their worst.[246] Despite rating agencies' "financial incentives to use unreasonable and inaccurate assumptions and models,"[247] theoretically, the very purpose of the rating agency is to be the source responsible for the evaluation of financial products, companies, and entire countries.[248] Essentially, the agencies work as auditors of creditworthiness for these entities[249] and as a "screening tool" for investors.[250] The ratings reflect the ability of the borrower to repay debts.[251] The value the agencies add is to the retail investor, who does not have the ability to assess non-public information supposedly conveyed within an agency rating.[252] This dynamic is another example of how an inadequate method of private ordering has failed because of insufficient checks and balances, and how this failure led to the 2008 crisis.[253]

An unsatisfactory regulatory architecture enabled at least two detrimental conflicts of interest.[254] The first conflict of interest arises when issuers pay for credit ratings.[255] The client of the agency wants the most favorable rating, which affects objectivity of this job.[256] When ratings are downgraded, issuers are impacted because borrowing becomes expensive, causing unexpected losses.[257] The second irresponsible conflict of interest persisted when the agencies started evaluating their own complicated financial products. Both conflicts tended to result in sugar-coated ratings.[258] Despite the fact that these agencies are private businesses, albeit with a huge influence on the global economic system,[259] they intrinsically have flexibility in product design and delivery. Yet, the Chairman and CEO of Moody's, a key player in this problem, self-proclaimed a "conflict of interest . . . because the parties who are willing to pay fees for ratings have an interest in the outcome of those ratings," which he deems to essentially be unavoidable.[260]

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246. Mortgage-related securities "at the heart of the crisis could not have been marketed and sold without their seal of approval" from the rating agencies. Investors relied on the ratings, often blindly, and were obligated to use them, and regulatory capital standards were hinged on the ratings. ANGELIDES ET AL., *supra* note 14, at xxv.

247. KLEIN & COFFEE, *supra* note 181 at 421. Further, "SEC investigation of the credit rating agencies found that the struggled to adapt to the complexity of mortgage-backed structured finance deals." *Id.* at 455.

248. ANGELIDES ET AL., *supra* note 14, at 71.

249. The ratings were not just a private opinion that businesses could or could not respect. The credit ratings had "the force of law with respect to regulated financial institutions' abilities and incentives . . . to invest in these bonds." Lawrence J. White, *Markets: The Credit Rating Agencies*, 24 J. ECON. PERSP. 211, 220 (2010).

250. MARIDA BERTOCCHI ET AL., EURO BONDS: MARKETS, INFRASTRUCTURE AND TRENDS 107–08 (2013).

251. Investors do not have the resources or ability to assess public and non-public information conveyed by a rating.

252. MOHAMMED HEMRAJ, CREDIT RATING AGENCIES: SELF-REGULATION, STATUTORY REGULATION AND CASE LAW REGULATION IN THE UNITED STATES AND EUROPEAN UNION 1 (2015).

253. *Id.*

254. Maurice Mullard, *The Credit Rating Agencies and Their Contribution to the Financial Crisis*, 83 POL. Q. 77, 77 (2012) (stating that "[t]he legal framework did not provide a context for CRAs to be taken to court for lack of diligence and for error in the ratings of bonds. CRAs were therefore exempt from legal accountability for their performance").

255. *Id*. at 78.

256. Clients use the fact that there is an oligopoly of credit agencies to their advantage, threatening to go elsewhere for a rating. BERTOCCHI ET AL., *supra* note 250, at 109.

257. HEMRAJ, *supra* note 252, at 3.

258. *See generally id.*

259. BERTOCCHI ET AL, *supra* note 250, at 109.

260. VPrO Documentary, *The Power of the Credit Rating Agencies*, YOUTUBE (Dec. 2, 2017), https://www.youtube.com/watch?v=eyiy9TQNQYQ [hereinafter *The Power of the Credit Rating Agencies*].

This is again an over-confidence in insider personnel to do the right thing,[261] despite an incentive to make inaccurate reports.[262] Major firms and investors "blindly relied on credit rating agencies as their arbiters of risk."[263] Trust in the accuracy of these agency reports lingered until the crisis.[264] Again, like LIBOR, the entire purpose of the rating agencies is to set accurate metrics from which to evaluate investment opportunities.[265] When the agencies deployed a practice that skewed the assumptions of institutional and retail investors alike, prudently effectuated investment opportunities were less feasible.[266] Moody's CEO notes that the ratings are provided to the general public for free, so this is a "public good" provided by the rating agencies.[267] Yet, if the agencies produce faulty numbers, is the information even good at all?[268] Where the Financial Crisis Inquiry Commission notes that "this crisis could not have happened without the rating agencies,"[269] the financial system's unsuccessful trust in insiders to do the right thing should be a lesson for the future of cryptocurrency regulation.

iv. Hypothetically Applied to the Cryptocurrency Space

Both of these examples show insiders manipulating numbers where these metrics effectively influenced the global financial system. In turn, the financial crisis problems expounded into international monetary policy complications and a global economic recession.[270] As policymakers think through regulatory solutions for cryptocurrencies, government control of cryptocurrencies is not ideal, nor even possible.[271] Though, at the least, a regulatory scheme should mitigate conflicts of interests like those above.

For example, the consensus mechanism for LIBOR seems to be a rough allegory to

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261. Insiders, such as Warren Buffet of Moody's, claim that the rating agencies are private businesses, so they have the freedom to report ratings with wide discretion. This Note, however, assumes that the "right thing" is not inaccurate and unlimited discretion in reporting. The clients of the rating agencies are, in fact, those who are rated. However, inaccurate assessments, though favorable, are not a true service to the clients. Numbers cannot lie indefinitely. The rating agencies are partially liable for defaults such as Enron and Greece, both of which were rated at the highest possible score, AAA, just weeks before their demise. *Id.*

262. Where the Dodd-Frank Act attempts to a higher standard of accountability for their ratings by providing incentives for agencies to be objective. Stephen Harper, *Credit Rating Agencies Deserve Credit for the 2007-2008 Financial Crisis: An Analysis of CRA Liability Following the Enactment of the Dodd-Frank Act*, 68 WASH. & LEE L. REV. 1925, 1935–72 (2011).

263. ANGELIDES ET AL., *supra* note 14, at xvii.

264. *Id.*

265. ANGELIDES ET AL., *supra note* 14, at 71.

266. KLEIN & COFFEE, *supra* note 181, at 420 (explaining that "the failure of the credit rating agencies can be seen as an example of the failure more generally of financial market gatekeepers, including investment bankers, accountants, and lawyers").

267. *The Power of the Credit Rating Agencies*, *supra* note 260.

268. Clearly not. The SEC also found that "[r]ating agencies made 'out of model' adjustments and did not document the rationale for the adjustment." Joseph R Mason & Joshua Rosner, *Where Did the Risk Go? How Misapplied Bond Ratings Cause Mortgage Backed Securities and Collateralized Debt Obligation Market Disruptions* (Working Paper, 2007), http://ssrn.com/abstract=1027475.

269. ANGELIDES ET AL., *supra* note 14, at xxv.

270. *See generally* Martin NEIL BAILY, TESTIMONY PREPARED FOR THE HEARING: PERSPECTIVES ON THE ECONOMY: THE SEVERITY OF THE ECONOMIC CRISIS AND THE DIRECTION OF AMERICA'S RECOVERY (2010), https://www.brookings.edu/wp-content/uploads/2016/06/0701_economic_perspectives_baily-1.pdf.

271. *See* Wiefix, *Is It Possible for Governments to Start Regulating Cryptocurrency Exchanges?*, COIN PRESS.IO (Jan. 6, 2018), https://coinpress.io/governments-cryptocurrency/.

the consensus mechanism on the blockchain.[272] Each of the banks are required to submit the response to a submission question directly linked to rates that they are using. The panel banks are asked precisely: "[a]t what rate could you borrow funds, were you to do so by asking for and then accepting interbank offers in a reasonable market size just prior to 11 am (GMT)?"[273] The systemic "manipulation danger[]" conceived at the BBA level occurred at this consensus point: one party's manipulation would seem extra-ordinary, so many banks worked together to report inaccuracies.[274] In comparison, on January 5, 2019, a predominate cryptocurrency, Ethereum Classic, suffered a similar collusive effect.[275] Where a majority of miners worked together to manipulate the transactions, a 51% attack occurred.[276] The currency lost $1 million to hackers.[277] Therefore, as they did with LIBOR, what if insiders collude? This kind of "selfish mining"[278] has been deemed by developers to be less of a threat than imagined because the nature of selfish mining dilutes the value of the stolen cryptocurrency.[279] With such insider manipulation, systemic effects do not only dilute the value for the insiders but affect outsider holders of the currency.

v. The Sandbox Alone is Insufficient

Although the prevailing innovative paradigm to cryptocurrency regulation is that of the sandbox, it is insufficient on its own. While a sandbox idea is a creative regulatory solution, a sandbox alone is not robust enough to guarantee the kind of effective regulation ideal for the consumers. The sandbox does not mitigate the inherent conflicts of interests seen in the financial sector. If the sandbox is fully controlled by private parties, allowing it to suffice as regulation would enable similar conflicts of interests to persist to that of LIBOR or the rating agencies. For example, technologists' incentives might be to promote the use of a currency, while also being fully aware of a fatal problem associated with the currency. With no other structure in place, technologists could nonetheless be incentivized to promote and facilitate the currency, with a plan to sell out.[280] Thus, it is unclear how the different interests among parties will be assumed, and how a situation of competing interests, say between the government and consumers, would be handled.[281] While the

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272. For the blockchain, though, it is even more organically accurate because the consensus is based on true and past transactions, not simply a prediction of a rate. The transactions are also mathematically confirmed by mining.

273. Kagan, *supra* note 226.

274. Hockett & Omarova, *supra* note 15, at 10.

275. Reuben Yap, *Ethereum Classic's 51 Percent Attack Highlights the Challenges of Proof-of-Work Coins*, CRYPTO SLATE (Feb. 2, 2019), https://cryptoslate.com/ethereum-classics-51-percent-attack-highlights-challenges-proof-work-coins/.

276. *Id.*

277. *Id.*

278. Jake Frankenfield, *Selfish Mining*, INVESTOPEDIA (Feb. 11, 2018), https://www.investopedia.com/terms/s/selfish-mining.asp. Selfish mining was first proposed by Cornell researchers in a 2013 paper showing that miners earn more by hiding newly-generated blocks and creating a separate fork. *Id.*

279. Rosemary Bigmore, *What Affects the Price of Cryptocurrencies?*, THE TELEGRAPH (May 25, 2018, 4:00 PM), https://www.telegraph.co.uk/technology/digital-money/what-affects-the-price-of-cryptocurrency/ ("Every major hack into the system, or into cryptocurrency exchanges or wallets, has provoked a price crash.").

280. *Customer Advisories*, *supra* note 81.

281. *See* FINANCIAL CONDUCT AUTHORITY, REGULATORY SANDBOX 17–20 (2015), https://www.fca.org.uk/your-fca/documents/regulatory-sandbox.

sandbox is a starting point in discovering effective means to promote desired policy goals for cryptocurrencies, it is, therefore, not an end in itself.

C. A Better Option: Private Ordering as Seen in Corporate Law

In contrast to the approach described above, a more effective example of private ordering exists within corporate law. Corporate law's basic mechanism which incentivizes behavior of managers (insiders) is the derivative suit.[282] The purpose of a derivative suit is to hold corporate insiders to account.[283] Injuries to the corporation resulting from negligence, mismanagement, or fraud are brought by private shareholders (outsiders) on behalf of the corporation.[284] Thus, Delaware corporate law has architected a system in which private actors—the shareholders—work as enforcement mechanisms and act out of self-interested incentives to regulate the company.[285]

Further, this Note does not necessarily advocate for a level of specificity in requesting additional rights, duties, and causes of action as the ideal regulatory solution. What this Note does seek to highlight is the ingenuity of the Delaware courts to structure a system in such a way where incentives exist for private parties to enforce policy goals. As a sustainable incentive structure, such private ordering model is appropriate for cryptocurrency regulation.

i. Chipotle's Reputational Divesture

The recent instance of Chipotle's shareholders' suit provides an example for how this private ordering legal mechanism works for Delaware corporate law.[286] The chain restaurant received reports of over 100 total customers infected from eating its food at a particular location.[287] In response, the food chain was criminally investigated by the Food and Drug Administration.[288] In addition, the private ordering measures enabled shareholders to also initiate suit since the "[d]efendants' wrongful acts and omissions" caused "precipitous decline in the market value of the Company's securities," a civil wrong that can be punished by private citizens.[289] These suits "arise when a shareholder sues the corporation's directors for a 'wrong' that the directors have inflicted upon the corporation itself, and only indirectly or 'incidentally' upon the shareholders solely by virtue of their relation to the directors through the corporation."[290] Although government involvement

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282. For examples of these derivative suits, see, e.g., Dodge v. Woolsey, 59 U.S. 331, 339 (1855); Stevens v. Lowder, 643 F.2d 1078, 1079–80 (5th Cir. 1981).

283. JAMES D. COX & THOMAS LEE HAZEN, BUSINESS ORGANIZATIONS LAW 427–28 (4th ed. 2016).

284. *Id.*

285. Grossman, *supra* note 224.

286. *See* Whitney Filloon, *Chipotle Is Being Sued by Its Shareholders—Again*, EATER (July 21, 2017), https://www.eater.com/2017/7/21/16011298/chipotle-shareholder-lawsuit-deception.

287. Julie Jargon, *Over 100 Report Being Sickened at Virginia Chipotle*, WALL ST. J. (July 20, 2017), https://www.wsj.com/articles/over-100-report-being-sickened-at-virginia-chipotle-1500559449.

288. *See* Melvin S. Drozen & Daniel C. Rubenstein, *FDA's Strict Criminal Liability Standard Has Far-Reaching Consequences*, KELLER & HECKMAN, LLP (Apr. 18, 2013), https://www.khlaw.com/6314 (noting that a strict standard of criminal liability for corporate officers is possible and the officers may be found strictly liable for the criminal actions of others within the organization).

289. Complaint at 5, Kelley v. Chipotle Mexican Grill, Inc., No. 1:17-cv-01760 (D. Colo. July 20, 2017), https://www.scribd.com/document/354382836/Chipotle-Shareholders-Lawsuit#download&fromembed.

290. *See* Lindsay C. Llewellyn, *Breaking Down the Business-Judgment Rule*, 14 COM. & BUS. LITIG. 16,

obviously adds an extra incentive for officers to behave responsibly, it is worth noting that Delaware corporate law's private ordering structure is a threat beyond criminal sanctions.[291]

The incentive structure in the Chipotle derivative suit is relatively straightforward: If the food-chain produces products that make people sick, the system provides a private action remedy based on the direct damage to those who fall ill not only by the government but by the shareholder.[292] Here, the policy goals of acting in the shareholders' interest are maintained, not through the sole enforcement of the government, but by encouraging correct behavior through a private ordering structure.[293] The obvious incentive for Chipotle to avoid criminal prosecution might cause the company to behave well, *i.e.*, keep their food safe. Yet, the huge potential losses of a derivatives suit alone have the effect of influencing managers to make better decisions.[294] Such a system is not void of law but is set up in such a way that empowers private actors to enforce publicly cherished goals.[295] Delaware courts mitigate the inherent conflicts of interests because many of insiders' interests are arguably aligned with outsider stakeholders' interests.[296]

ii. Applied to Lessig's Hope

Lawrence Lessig's ideas inspired this Note's genesis.[297] As Primavera de Filippi has done with *Blockchain and the Law: The Rule of Code*, this Note extends Lessig's regulatory insights from two decades ago to apply to technology that is ready to accept Lessig's vision.[298] In particular, the crux of the *Code Is Law*[299] vision is applied to cryptocurrency regulation here, while noting that corporate law is a way that the business law sector has effectively adopted Lessig's principles, as well as an effective method of private ordering. The discussion of the financial sector only works to bolster the claim regarding what kind of private ordering does work, so that cryptocurrency regulators do not make similar mistakes.

In *Code*, Lessig claims first that governments should proactively think about what the

16–20 (citing Jones v. Ahmanson, 1 Cal. 3d 93, 105–08 (1969)).

291. *See id.* (noting that "[i]n the wake of . . . the economic downturn of 2008, shareholders are increasingly turning to derivative suits in an effort to hold someone responsible for their financial losses").

292. *Id*. (illustrating the mechanics of a derivative suit).

293. *See id.*

294. Kevin LaCroix, *Target Directors and Officers Hit with Derivative Suits Based on Data Breach*, THE D&O DIARY (Feb. 3, 2014), https://www.dandodiary.com/2014/02/articles/cyber-liability/target-directors-and-officers-hit-with-derivative-suits-based-on-data-breach/ (relaying that in the Target data breach "derivative suit complaints allege that the class action lawsuits threaten the possibility of hundreds of millions of dollars of damages to the company").

295. COX & HAZEN, *supra* note 283, at 223 (noting one primary motivation for the derivatives suit is the "duty of management to sue for the protection of all concerned").

296. Janis Berzins et. al., *Shareholder Conflicts and Dividends*, 22 REV. FIN. 1807, 1807 (2018) (highlighting one example of private ordering in corporate law where a "dividend policy is used to mitigate potential conflicts of interest between majority and minority shareholders"); Llewellyn, *supra* note 290 (highlighting that "shareholders seek to impose liability on corporate directors for failing to carry out their corporate duties in accordance with this standard of care").

297. *See supra* text accompanying notes 8–9.

298. *See generally* DE FILIPPI & WRIGHT, *supra* note 12.

299. Lawrence Lessig, *Code Is Law*, HARV. MAG. (Jan. 1, 2000), https://harvardmagazine.com/2000/01/code-is-law-html.

government wants to regulate and harness the ingenuity to do so.[300] The objective is to attend the power to influence regulatory "*architecture* . . . [by identifying the] structures and constrains social and legal power."[301] Here, Lessig believes the government has the ability to act not only to be reactionary but "beyond the compromises of ordinary politics," to devise innovative effective policy solutions, such as has been accomplished in the Delaware corporate courts.[302] Then, Lessig states that the intangible nature of the cyber world "presents something new for those who think about regulation and freedom," demanding a "new understanding of how regulation works."[303] One modern manifestation of this new understanding to a regulatory architecture in corporate law is the "man-made" law of directors' limited liability.[304] In this sense, the government regulates the broad discretion of directors' business decisions by creating a ceiling of liability.

So too does this ideal-driven framework exist in the nation's founding. This even earlier project exemplifying thoughtful government structuring occurred after setting independence from Great Britain.[305] The founders first identified values with which best facilitate a democratically-themed government. Then they thought hard about how to create a system in which the government structure could effectuate these values.[306] For example, as a reaction to the tyrannical English king, citizen empowerment was a desired value.[307] In order to maintain a sustainable system in this regard, the founders created a system of government employing checks and balances among its branches.[308]

A system of private ordering that enables some checks and balances is described above with the derivatives suit.[309] The "key is *incentives*: systems built on the incentives" to voluntarily accomplish the policy goal.[310] Compared to the two described cases in the financial sector, policy makers did share and express values,[311] but they skipped the next step, where a little thoughtfulness, honesty, and ingenuity could have enabled productive regulatory regimes.

IV. RECOMMENDATION

A key challenge for prospective regulators is how to facilitate the incentives for productive private ordering.[312] Despite the limits of some private ordering systems, a

300. *Id.*

301. LAWRENCE LESSIG, CODE: AND OTHER LAWS OF CYBERSPACE 5 (1999).

302. *Id.*

303. LESSIG, *supra* note 12, at 6.

304. *Id.* at 10.

305. THE FEDERALIST NO. 51, at 319 (James Madison) (Clinton Rossiter ed., 2003). Madison notes that "It may be a reflection on human nature, that [checks and balances] should be necessary to control the abuses of government." *Id.*

306. THE FEDERALIST NO. 70 (Alexander Hamilton), *supra* note 305, at 428 (contrasting the unconstricted power of a King to "a republic where every magistrate ought to be personally responsible for his behavior in office, the reason which in the British Constitution dictates the propriety of a council not only ceases to apply, but turns against the institution. . . . In the American republic, it would serve to destroy, or would greatly diminish, the intended and necessary responsibility of the Chief Magistrate himself.").

307. LESSIG, *supra* note 12, at 7.

308. *Id.*

309. *Supra* Part III.C.

310. LESSIG, *supra* note 12, at 41.

311. *Supra* Part II.A.ii.

312. *See* Böhme et al., *supra* note 174, at 233 (noting the need for regulation to have "[i]ncentive-

regulatory structure *set up by* governments, but *enforced by* insiders is the solution to regulation of virtual currencies.[313] In contrast to the 2008 catastrophe, the corporate law private ordering structure provides a model that mitigates inherent conflicts of interests that arise when insiders influence a system with proper checks and balances.

A middle ground alternative goes one step beyond Lessig's suggestions: a principle-based structure, where proper incentive structures and private party empowerment underlies government intervention. Likely suspect principles could be consumer protection, decentralization, and efficiency. An oversight authority, such as the OCC, would facilitate the construction of the regulatory structure. Instead of a chaotic sandbox playtime, innovators and technologists would be provided with a more structured approach, for example in a playground. The specific markers such as swings and slides then direct efforts for a specific kind of fun.

A. Private Ordering Fits the Mold for Cryptocurrency Regulation

Effective private ordering measures are the solution for the cryptocurrency space because of the decentralized aspect of cryptocurrencies.[314] Secondly, private ordering provides an environment for insiders to address problems that impose highly technical solutions which demand a response not feasible by government bureaucracy.[315] Governments typically do not have a first-mover advantage in technological solutions. Lastly, private ordering is the only kind of regulation that can be imposed on the cryptocurrency itself. The digital nature of coins, the blockchain ledger, and the underlying code present an impossible question concerning jurisdiction, making attempts at traditional regulation futile.[316]

i. Decentralized Regulation for a Decentralized System

If the government seeks to manipulate the cryptocurrency space to serve its own interest,[317] the United States will lose due to regulatory arbitrage.[318] Decentralization is at the heart of a cryptocurrency's value proposition.[319] A centralized regulatory scheme would fail because eliminating the need for centralized authorities was the "very purpose

compatibility in [b]itcoin [p]rotocols").

313. *See generally* NAKAMOTO, *supra* note 25 (describing technologists' wish for limited regulation: the purpose of Satoshi Nakamoto's Bitcoin project was to avoid some of the problems present in the financial sector and its ineffective trust-based structure).

314. *See* Sarah Jane Hughes & Stephen T. Middlebrook, *Regulating Cryptocurrencies in the United States: Current Issues and Future Directions*, 40 WM. MITCHELL L. REV. 813, 830 (2014) (describing the unessential existence of a third party, but where in a "decentralized arrangement, a person who creates units of the virtual currency (a 'miner' in Bitcoin parlance) and uses it to purchase real or virtual goods" from the seller, with no intermediary but the public, verifiable blockchain).

315. *See* Yuji Nakamura, *After $65 Million Hack, Questions of Whether Bitcoin can be Safe*, CHI. TRIB. (Aug. 18, 2016), http://www.chicagotribune.com/business/ct-bitcoin-security-20160818-story.html (highlighting resistance from the technology community for state-imposed regulation and that technologists contribute to the self-regulatory solution by punishing thieves).

316. *Infra* Part IV.A.iii.

317. A centralized regulatory scheme is different from government facilitating a structure that incentivizes private actors to help maintain policy goals.

318. *See* Moses, *supra* note 190, at 39.

319. Böhme et al., *supra* note 174, at 219.

of the Bitcoin network."[320] The founder of Bitcoin says the currency is "completely decentralized, with no central server or trust parties," compared to the Federal Reserve Bank that needs to be "trusted not to debase the currency."[321] Nonetheless, central banks have little accountability—with no checks and balances of their own. Instead of trusting central banks to maintain a currency's integrity,[322] cryptocurrency seeks to eliminate the middle man to conduct peer-to-peer transactions.[323]

ii. Technological Agility Stems from the Private Sector

Insiders need to be part of the regulatory solution because they are more effective than an *ex post* deterrence structure. The cryptocurrency space necessitates solutions crafted by those who understand the space. For example, an investigation into the Mt. Gox hacking might bring retribution to those responsible but catching the criminal "will ultimately be a fruitless exercise in state power," because those who lost their funds cannot get them back.[324] However, with proper incentive structures for insiders (technologists) to help spot and facilitate hacking, some private enforcement measures would have helped to potentially *prevent* the loss.

iii. No Clear Jurisdiction

Roughly speaking, *jurisdiction* is based on the "boundaries . . . [and is] the power of a particular court to exercise its authority."[325] In the cryptocurrency space, jurisdiction is complex where "minimum contacts"[326] and "sliding scale"[327] approaches could apply to a traceable cryptocurrency transaction. The Department of Justice has successfully found illicit activity through tracing cryptocurrency transactions.[328] Therefore, the supposed anonymity is not necessary. Yet, the open source nature of cryptocurrency protocol makes the possibility of jurisdiction for a perpetrator ubiquitous though not untraceable.

Some states and national governments have found success in regulating the virtual

320. Primavera De Filippi & Benjamin Loveluck, *The Invisible Politics of Bitcoin: Governance Crisis of a Decentralised Infrastructure*, 5 INTERNET POL'Y REV. 1, 19 (2016).

321. Satoshi Nakamoto, *Bitcoin Open Source Implementation of P2P Currency*, P2P FOUND. (Feb. 11, 2004), http://p2pfoundation.ning.com/forum/topics/bitcoin-open-source.

322. *See* Jean-Michel Paul, *The Unintended Consequences of Quantitative Easing*, BLOOMBERG (Aug. 22, 2017), https://www.bloomberg.com/view/articles/2017-08-22/the-unintended-consequences-of-quantitative-easing (discussing the impact of asset inflation).

323. Of course, individuals can invest in financial or other assets. Cryptocurrencies provide a liquidated solution to the problem of devalued fiat currencies.

324. Hiro Nakamura, *Does the Mt. Gox Investigation Actually Matter?*, CRYPTOCOINS NEWS (May 8, 2015), https://www.cryptocoinsnews.com/mt-gox-investigation-actually-matter/.

325. Rosario Girasa, REGULATION OF CRYPTOCURRENCIES AND BLOCKCHAIN TECHNOLOGIES: NATIONAL AND INTERNATIONAL PERSPECTIVES 57 (2018).

326. *See generally* Int'l Shoe Co. v. Washington, 326 U.S. 310 (1945) (establishing the minimum contacts framework for personal jurisdiction).

327. *See generally* Zippo Mfg. Co. v. Zippo Dot Com, Inc., 952 F. Supp. 1119 (W.D. Pa. 1997).

328. Press Release, Department of Justice, Irish Man Who Helped Run The "Silk Road" Website Pleads Guilty in Manhattan Federal Court (Oct. 5, 2018), https://www.justice.gov/usao-sdny/pr/irish-man-who-helped-run-silk-road-website-pleads-guilty-manhattan-federal-court; Cyrus Farivar, *The Silk Road Takedown Shows How the Feds Can Get Around Crypto*, PRI (July 14, 2016), https://www.pri.org/stories/2016-07-14/silk-road-takedown-shows-how-feds-can-get-around-crypto.

currency companies,[329] but cryptocurrency itself is without jurisdiction. Bitcoin and other currencies "are completely decentralized peer-to-peer systems. There is no central server to shut down."[330] In contrast, if a bank suddenly lost a large portion of the customer's money, it "would be liable for their customers[']s funds, if lost, which would be paid to either them personally . . . or to an existing offline wallet linked to their account."[331] However, since currencies like Bitcoin have no known founding headquarters or actual individuals responsible for the code, traditional jurisdiction and enforcement concepts are inapplicable.

B. Specifications

i. The Shape of the Regulating Institutions

Responsible innovation must be metered by checks, but these checks should not be as numerous as the 53 territories.[332] Instead of the state-by-state licensing, the United States should adopt a nationally-based regulatory scheme. Nationally-based regulation makes sense for this realm because cryptocurrencies can be purchased anywhere in the world.[333]

ii. A Centralized Facilitator

The OCC has traditionally been a more "hands-off" regulator[334] and is positioned to facilitate a private ordering model for cryptocurrency regulation. This agency has a mission: "[t]o ensure that national banks and federal savings associations operate in a safe and sound manner, provide fair access to financial services, treat customers fairly, and comply with applicable laws and regulations."[335] The Comptroller of the Currency established an Office of Innovation to serve as the central point of contact and clearinghouse for requests and information related to innovation.[336] Therefore, since the mission of the OCC is nationally-based and open to innovation, it can aid in facilitation of regulatory solutions. By no means does this mean the OCC maintains centralized enforcement, but the OCC could effectively aid in setting up the environments from which insiders would be correctly incentivized to act in accordance with stated policy goals.

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329. *Supra* note 1.

330. Ariel Deschapell, *Why Regulating Bitcoin Won't Work*, COINDESK (Feb. 25, 2014, 2:00 PM), https://www.coindesk.com/why-regulating-bitcoin-will-not-work/.

331. *Id.*

332. For example, a broad-overarching model, like in the United Kingdom, where all financially related activity is regulated under one organization has attracted fintech entrepreneurs. FIN. CONDUCT AUTHORITY, https://www.fca.org.uk/ (last visited Mar. 12, 2019).

333. *How to Buy Bitcoin Anywhere! Most Comprehensive Guide Ever!*, BLOCKGEEKS, https://blockgeeks.com/guides/how-to-buy-bitcoin/ (last visited Mar. 12, 2019).

334. Kristen Haunss, *US Federal Agencies Open Door to More Aggressive Buyout Loans*, REUTERS (Sept. 28, 2018, 1:06 PM), https://www.reuters.com/article/reg-buyoutloans/us-federal-agencies-open-door-to-more-aggressive-buyout-loans-idUSL2N1WC1AO (noting that the OCC has gradually taken a more hands-off approach to the market).

335. *About the OCC*, OFF. OF THE COMPTROLLER OF THE CURRENCY, https://www.occ.treas.gov/about/what-we-do/mission/index-about.html (last visited March 28, 2019).

336. Lydia Beyoud, *With Fintech Charter on Hold, OCC Wants More Dialogue with Firms*, BLOOMBERG BNA (Nov. 29, 2017), https://www.bna.com/fintech-charter-hold-n73014472585/.

iii. Scope of the Regulation

What would private ordering cryptocurrency regulation be regulating? It is difficult to regulate the cryptocurrency itself because many of the currencies are not associated with a company or entity.[337] Simply, there are programmers who develop an ability to hold cryptocurrencies,[338] in comparison to the financial sector, where there are established businesses to regulate. This absence of a tangible business entity causes many to conclude that we cannot regulate cryptocurrencies.[339] Yet, the threats that consumers face are not limited to the powers within established legal business entities.[340] Peter Van Valkenburgh of the Coin Center maintains that it does not make sense to regulate these individuals who manage the code but are not in legal custody of the cryptocurrency, stating that "[it is] like trying to stop speeding by requiring costly licensing for highway construction personnel. It [does not] make sense and it [will] only mean that fewer highways get built."[341] However, private ordering and code-based regulations can play a part in maintaining a safe environment for consumers. The proposed "safe harbor" for noncustodial developers could be maintained by OCC,[342] limiting the need for individuals to jump through potentially costly licensing hoops.

C. Practical Ideas

i. Programming Auditors

The OCC could establish a government-funded team of programmers to audit cryptocurrency governance and protocol. Privately-based audits already occur on a less official scale when programmers fix bugs.[343] With the DAO and Mt. Gox hacks, there are enough technologists convinced of the necessity to actively mitigate negative effects of future events like these. In keeping an aspect of the sandbox, the technologists' involvement and autonomy can be achieved by the government providing an environment for private code developers to solve protocol problems. This solution maintains the private-actors' influence and self-serving interest. It also maintains an absence of government

337. Jamie Redman, *Can Bureaucrats Really Regulate Bitcoin?*, BITCOIN.COM (Jan. 3, 2017), https://news.bitcoin.com/can-bureaucrats-really-regulate-bitcoin/.

338. Euny Hong, *How Does Bitcoin Mining Work?*, INVESTOPEDIA (Feb. 17, 2019), http://www.investopedia.com/tech/how-does-bitcoin-mining-work/#ixzz4wRSBNES9 (explaining that miners are getting paid for their work as auditors of bitcoin to verify the previous Bitcoin transactions, where "[t]his convention is meant to keep Bitcoin users honest, and was conceived by Bitcoin's founder, Satoshi Nakamoto").

339. Deschapell, *supra* note 330 (delineating that cryptocurrencies are completely decentralized peer-to-peer systems so, "[t]here is no central server to shut down, no one to catch and, crucially, no one prosecute—no one that will cause the currencies to crumble, at least").

339. Where most of the hacking issues are related to individuals gaming the *system* as a whole, not infiltrating any one particular entity or individual. *Id.*

340. *Id.*

341. Coin Center, *Coin Center Testimony – House Energy & Commerce*, YOUTUBE 4:30 (June 8, 2017), https://www.youtube.com/watch?v=owmC4yda2RU.

342. *Id.*

343. Lester Coleman, *Ex-Ethereum Developer: How the DAO Hack Happened And What Comes Next*, CCN (July 30, 2016), https://www.ccn.com/ex-ethereum-developer-dao-hack-happened-comes-next (describing a white knight counter-attack in response to the DAO hack: "developers . . . spammed the network with dust transactions, allowing them to find the same exploit used to withdraw funds from the original DAO. They were able to drain the hacker's smart contract").

direct control interference, another private-ordering criterion and ideal for those within the cryptocurrency community. This idea is a solution that is technologist-driven, an aspect of the popular-sandbox model, and creates specific, accurate, and conflict of interest-free regulation.

ii. Insurance

Alternative means of private ordering are viable in the cryptocurrency space. Instead of ignoring the threat of insufficient assets backing the coins, private entities, like banks or even non-banks, could create an insurance policy for those who maintain a cryptocurrency wallet. This system would incentivize the continued use and reliance of, say, Bitcoin.[344] The insurers would retrieve customer data for transactions, because the cost of insurance payments would obviously be dependent on the amount insured. In this way, the banks' incentive to be even more open and maintain a record of customer identity and their correspondingly-enhanced level of due diligence protects the consumer. Because the bank or insuring company has no proprietary interest in the cryptocurrency itself, the conflict of interest problem is also not present. This is just one idea where correct incentive-driven private ordering, compared to a centralized regulatory scheme, just might be better—at least better suited for cryptocurrencies.

V. CONCLUSION

Cryptocurrencies have been the center of many hopes and dreams since the financial crisis of 2008.[345] Since that time, rule-based domestic regulatory schemes have been adopted to mitigate negative consequences towards consumers, such efforts from the Uniform Law Commission. Yet there is still a gap in robust measures to mitigate the inevitable consequences of insiders who take advantage of their position, which can have devastating results, as displayed by LIBOR. It is typical "to characterize the history of financial regulation as a pendulum swinging back and forth between [the] two regulatory poles," of rule-based regulation or self-regulation.[346] Instead, the cryptocurrency space should adopt a middle-ground regulatory model to prevent, *ex ante*, detrimental harm due to the agency problem. The private ordering model is the regulatory solution for the cryptocurrency space because it is consistent with the values of decentralized enforcement mechanisms, provides an environment for insiders to address problems that impose highly technical solutions, and solves the jurisdiction problem. Through an incentive-based system, innovation is instead encouraged, and, prudently regulated. As an example of a generally effective private ordering model, this Note described an incentive-driven approach in corporate law. Likewise, in the cryptocurrency space, a government agency should *facilitate* a private ordering approach—for example, by insurance on the crypto-assets—and thus direct incentives, much like the Delaware courts have done.

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344. *See* Ian Allison, *The Crypto Insurance Market May Total $6 Billion. That's Nowhere Near Enough*, COINDESK (Nov 21, 2018), https://www.coindesk.com/the-crypto-insurance-market-may-total-6-billion-thats-nowhere-near-enough/.

345. *See generally* David Lee Kuo Chuen et al., *Cryptocurrency: A New Investment Opportunity?*, 20 J. ALTERNATIVE INV. 16 (2018).

346. Zachary J. Gubler, *supra* note 7, at 112.