

# ARTICLE

## THE FUTURE OF BITCOIN FUTURES

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### ABSTRACT

Although bitcoin emerged as a cryptocurrency relying on new blockchain technology in 2009, it is still unclear how to regulate it. The recent emergence of bitcoin futures poses a new level of risk to the economy, again raising questions of regulation. This Article examines the potential regulatory regime for bitcoin futures.

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## I. INTRODUCTION

A bit of science fiction became reality with the emergence of cryptocurrencies. Bitcoin has dominated this landscape, developing as a currency and, more recently, a futures product.<sup>1</sup> The Chicago Board Options Exchange (CBOE)<sup>2</sup> launched trading in bitcoin futures on December 10, 2017, and the Chicago Mercantile Exchange Group (CME Group) did so a week later.<sup>3</sup> Other exchanges are also considering offering bitcoin futures.<sup>4</sup>

Bitcoin, as both a currency and a technology, has captivated many people's attention and imagination since its emergence in 2009. As a result, much of the scholarship and debate have focused on these aspects of bitcoin,<sup>5</sup> but not much has been said

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1. See *infra* Parts II & III. However, the U.S. Securities and Exchange Commission (SEC) rejected an application for a \$100 million cryptocurrency Exchange Traded Fund (ETF) in March 2017 and again in 2018 amid concerns, such as the lack of regulation. Stan Higgins, *Winklevoss Bitcoin ETF Offering Expands to \$100 Million*, COINDESK (Feb. 9, 2017, 6:20 PM), <https://www.coindesk.com/winklevoss-bitcoin-etf-100-million/> [<https://perma.cc/DYW5-23M9>]; Asjylyn Loder, *Bitcoin ETFs Keep Trying, Despite Regulators' Rejections*, WALL ST. J. (Sept. 23, 2018, 10:05 PM), <https://www.wsj.com/articles/bitcoin-etfs-keep-trying-despite-regulators-rejections-1537754701> [<https://perma.cc/4SJF-U9WW>]; Kate Rooney & Bob Pisani, *Winklevoss Twins Bitcoin ETF Rejected by SEC*, CNBC (July 26, 2018, 4:48 PM), <https://www.cnbc.com/2018/07/26/winklevoss-twins-bitcoin-etf-rejected-by-sec.html> [<https://perma.cc/6HYU-W9UD>]. Only “[a] half-century ago, checks held an overwhelmingly dominant role in facilitating payments without cash.” Mark Edwin Burge, *Apple Pay, Bitcoin, and Consumers: The ABCs of Future Public Payments Law*, 67 HASTINGS L.J. 1493, 1494 (2016).

2. *XBT-Cboe Bitcoin Futures*, CBOE, <http://cfe.cboe.com/cfe-products/xbt-cboe-bitcoin-futures> [<https://perma.cc/G89G-7EZX>] (last visited Jan. 20, 2019).

3. *CME Bitcoin Futures Frequently Asked Questions*, CME GROUP (Dec. 15, 2017), <http://www.cmegroup.com/education/cme-bitcoin-futures-frequently-asked-questions.html> [<https://perma.cc/2GUV-6G7P>].

4. Silvia Amaro & Arjun Kharpal, *Nasdaq 'Investigating' Bitcoin Futures that Are Different from Rivals, CEO Says*, CNBC: THE SANCTUARY (Jan. 23, 2018, 7:23 PM), <https://www.cnbc.com/2018/01/23/nasdaq-looking-into-bitcoin-futures-different-to-rivals-ceo.html> [<https://perma.cc/85LU-WZP3>].

5. See, e.g., Reuben Grinberg, *Bitcoin: An Innovative Alternative Digital Currency*, 4 HASTINGS SCI. & TECH. L.J. 159 (2012) (reviewing the literature on whether Bitcoin can be regulated as a commodity or security); Sarah Jane Hughes & Stephen T. Middlebrook, *Advancing a Framework for Regulating Cryptocurrency Payments Intermediaries*, 32 YALE J. ON REG. 495 (2015) (proposing a model for regulating cryptocurrency transactions in which intermediaries play a role); Christina Martin, *The Rise of Cryptocurrency: What Is It and How Should It Be Regulated?*, U. BALT. L. REV. (Sept. 22, 2017), <https://ubaltlawreview.com/2017/09/22/the-rise-of-cryptocurrency-what-is-it-and-how-should-it-be-regulated-by-christina-martin/> [<https://perma.cc/CR6T-CC4R>] (describing the regulatory framework for cryptocurrency after describing it as a currency and technology but not as a futures product); Christopher Burks, Comment, *Bitcoin: Breaking Bad or Breaking Barriers?*, 18 N.C. J.L. & TECH. ONLINE 244 (2017), [http://ncjolt.org/wp-content/uploads/2017/04/Burks\\_Final-copy.pdf](http://ncjolt.org/wp-content/uploads/2017/04/Burks_Final-copy.pdf) [<https://perma.cc/2NL8-AE4Y>] (examining the various bitcoin regulations).

about bitcoin futures given their newness and risk to the market.

Futures generally contribute to systemic risk,<sup>6</sup> but distinctive features of bitcoin futures heighten concerns. Indeed, the Futures Industry Association (FIA)—a trade organization representing major banks and brokers—has protested the introduction of bitcoin futures to the market without much scrutiny, given their potential to disrupt the economy.<sup>7</sup> This demonstrates a public gulf between institutional traders and the clearinghouses that facilitate trading and mitigate systemic risk.

Bitcoin futures are still relatively few in number, which keeps their risk to the economy limited.<sup>8</sup> Their growth, however, may cause severe risk to the financial markets.<sup>9</sup>

The Commodity Futures Trading Commission (CFTC) responded to the FIA's concerns with heightened review for cryptocurrency futures.<sup>10</sup> Now, the question is how to minimize the systemic risk caused by bitcoin futures. This Article explores

6. Griffith notes on systematic risk that:

Systemic risk refers to the linkages and interdependencies between participants in the financial market, such that a significant loss initially touching only a small number of participants can spread and threaten to engulf the entire system, ultimately causing a contraction in the real economy. Systemic risk is an appropriate target for regulatory attention because private actors lack adequate incentives to control it.

Sean J. Griffith, *Substituted Compliance and Systemic Risk: How to Make a Global Market in Derivatives Regulation*, 98 MINN. L. REV. 1291, 1296 (2014) (footnotes omitted). “Derivatives are all about risk. They are, at their core, nothing more than a contractual means by which parties allocate the risk of a fluctuation in price of an underlying reference asset.” *Id.* at 1295.

7. Walt Lukken, CEO, FIN. INDUS. ASS'N, *Open Letter to CFTC Chairman Giancarlo Regarding the Listing of Cryptocurrency Derivatives*, FIA (Dec. 7, 2017, 9:15 AM), <https://fia.org/articles/open-letter-cftc-chairman-giancarlo-regarding-listing-cryptocurrenc-y-derivatives> [<https://perma.cc/QD29-4Z23>].

8. Stan Higgins, *Moody's: Bitcoin Volatility (Likely) Won't Hurt CME's Risk Rating*, COINDESK (Feb. 14, 2018, 5:50 PM), <https://www.coindesk.com/moodys-bitcoin-volatility-likely-wont-hurt-cmes-risk-rating/> [<https://perma.cc/58C6-AD6D>]. This is one of the reasons that credit rating service Moody's does not believe that the launch of bitcoin futures will hurt the creditworthiness of either CME or CBOE. *Id.*

9. Hilary J. Allen, *§=€=BITCOIN?*, 76 MD. L. REV. 877, 902, 919 (2017). “If Bitcoin, or any other virtual currency, were to become widely used (and to become truly transformative, it would need to be widely used), it could pose a threat to financial stability in a way that transactions consummated in United States dollars (‘USD’) do not.” *Id.* at 879.

10. David Felsenthal et al., *Clifford Chance Discusses the Role of the CFTC in the Regulation of Bitcoin*, CLS BLUE SKY BLOG (Feb. 16, 2018), [http://clsbluesky.law.columbia.edu/2018/02/16/clifford-chance-discusses-the-role-of-the-cftc-in-the-regulation-of-bitcoin/#\\_ftnref13](http://clsbluesky.law.columbia.edu/2018/02/16/clifford-chance-discusses-the-role-of-the-cftc-in-the-regulation-of-bitcoin/#_ftnref13) [<https://perma.cc/E9CJ-YDDL>]. “The CFTC has emerged as the primary federal regulator of virtual currency markets but its jurisdiction is surprisingly limited, particularly with respect to spot markets. As the markets grow, and if disruptions occur, the CFTC and other federal regulators may feel pressure to expand their supervision of these markets.” *Id.*

the regulatory options for bitcoin futures to avoid undue risk. Accordingly, Part II examines bitcoin, while Part III turns to bitcoin futures. Part IV considers whether to regulate bitcoin futures and explores potential regulatory options.

## II. BITCOIN

Satoshi Nakamoto, a pseudonym for an unknown person or group, designed bitcoin.<sup>11</sup> Nakamoto introduced bitcoin in a 2008 white paper titled “Bitcoin: A Peer-to-Peer Electronic Cash System.”<sup>12</sup>

At its essence, bitcoin is a cryptocurrency, which is a digital currency.<sup>13</sup> This is different from fiat money, which is declared to be legal tender by a government but is not necessarily backed by a physical commodity.<sup>14</sup> While fiat money is issued by a country’s central bank, bitcoin is issued electronically by a computer program that has a predetermined cap of twenty-one million bitcoins.<sup>15</sup>

There are two ways to get bitcoin—either to buy it on an exchange such as Coinbase<sup>16</sup> or to earn it by processing bitcoin transactions, called “mining.”<sup>17</sup> Owners store their bitcoin in a

11. Klint Finley, *The WIRED Guide to Bitcoin*, WIRED (Feb. 1, 2018, 9:26 AM), <https://www.wired.com/story/guide-bitcoin/> [<https://perma.cc/CD45-SRHS>]. Nakamoto’s identity is unknown, but it has been investigated by the National Security Agency (NSA) in case bitcoin is a form of sabotage from a foreign country. Alexander Muse, *How the NSA Identified Satoshi Nakamoto*, MEDIUM (Aug. 26, 2017), <https://medium.com/cryptomuse/how-the-nsa-caught-satoshi-nakamoto-868affcef595> [<https://perma.cc/72C3-6R7X>].

12. Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System 1* (Oct. 31, 2008) (unpublished manuscript), <https://bitcoin.org/bitcoin.pdf> [<https://perma.cc/43VR-CVZ4>].

13. *Id.*

14. David Groshoff, *Kickstarter My Heart: Extraordinary Popular Delusions and the Madness of Crowdfunding Constraints and Bitcoin Bubbles*, 5 WM. & MARY BUS. L. REV. 489, 507–09 (2014).

15. *Id.* at 512.

16. Sean McLeod, Note, *Bitcoin: The Utopia or Nightmare of Regulation*, 9 ELON L. REV. 553, 568 (2017) (“Coinbase was opened in January 2014 and allows for legal trading of digital currencies. It was heralded as the first regulated Bitcoin exchange.” (footnotes omitted)). For ideas on how to regulate Coinbase and similar exchanges, see Jerry Markham, *Regulating the Moneychangers*, 18 U. PA. J. BUS. L. 789, 790 (2016).

17. As explained on a bitcoin website:

Bitcoin Mining is a peer-to-peer computer process used to secure and verify bitcoin transactions—payments from one user to another on a decentralized network. Mining involves adding bitcoin transaction data to Bitcoin’s global public ledger of past transactions. Each group of transactions is called a block. Blocks are secured by Bitcoin miners and build on top of each other forming a chain. This ledger of past transactions is called the blockchain. The blockchain serves to confirm transactions to the rest of the network as having taken place. Bitcoin nodes use the blockchain to distinguish legitimate Bitcoin transactions

“digital wallet,” which exists either in the cloud or on a user’s computer.<sup>18</sup> Hackers have occasionally stolen bitcoin from such digital wallets.<sup>19</sup>

Bitcoin has occupied a unique role in society. Illegal businesses and criminals have used bitcoin because of its anonymity;<sup>20</sup> although, this may have declined with the popularity of bitcoin.<sup>21</sup> A few mainstream businesses have also accepted bitcoin as an alternative payment, raising the trust level in its functionality.<sup>22</sup> Finally, some people are predisposed toward bitcoin given its independence from government.<sup>23</sup>

Bitcoin has several shortcomings as well. It is arguable whether bitcoin comports with the basic functions required of a

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from attempts to re-spend coins that have already been spent elsewhere.

*Bitcoin Mining*, BITCOIN.COM, <https://www.bitcoin.com/bitcoin-mining> [<https://perma.cc/MAP7-83U8>] (last visited Jan. 20, 2019).

18. Catherine Martin Christopher, *Whack-A-Mole: Why Prosecuting Digital Currency Exchanges Won’t Stop Online Money Laundering*, 18 LEWIS & CLARK L. REV. 1, 14 (2014); *How to Store Your Bitcoin*, COINDESK, <https://www.coindesk.com/information/how-to-store-your-bitcoins/> [<https://perma.cc/EG94-6SUU>] (last updated Jan. 20, 2018); Noelle Acheson, *How to Store Your Bitcoin*, COINDESK (last updated Jan. 20, 2018) <https://www.coindesk.com/information/how-to-store-your-bitcoins> [<https://perma.cc/Y9D6-M3KV>].

19. Christopher, *supra* note 18, at 21 (explaining how “[h]ackers can obtain a Bitcoin user’s private key and use it to transfer some or all of the bitcoins in the user’s wallet to another location” and noting examples of such hacking (citation omitted)).

20. Sean Foley et al., *Sex, Drugs, and Bitcoin: How Much Illegal Activity is Financed Through Cryptocurrencies?*, REV. FIN. STUD. (forthcoming 2019) (manuscript at 34–35), <https://ssrn.com/abstract=3102645> [<https://perma.cc/QZ9B-U99F>]. “[A]pproximately one-quarter of bitcoin users and one-half of bitcoin transactions are associated with illegal activity. Around \$72 billion of illegal activity per year involves bitcoin, which is close to the scale of the US and European markets for illegal drugs.” *Id.* (manuscript at abstract).

21. *Id.* (manuscript at 2–3). Criminals’ movement away from bitcoin is attributed to two primary factors:

The first is an increase in mainstream and speculative interest in bitcoin. For example, we find that the proportion of illegal activity in bitcoin is inversely related to the Google search intensity for the keyword “bitcoin.” . . . The second factor is the emergence of alternative cryptocurrencies that are more opaque and better at concealing a user’s activity (e.g., Dash, Monero, and ZCash).

*Id.* However, “[d]espite these two factors affecting the use of bitcoin in illegal activity, as well as numerous darknet marketplace seizures by law enforcement agencies, the amount of illegal activity involving bitcoin at the end of our sample in April 2017 remains close to its all-time high.” *Id.* (manuscript at 3).

22. Kevin V. Tu & Michael W. Meredith, *Rethinking Virtual Currency Regulation in the Bitcoin Age*, 90 WASH. L. REV. 271, 273 (2015). “At its peak in March of 2014, the daily volume of Bitcoin transactions in United States dollars exceeded \$575,000,000. The growing mainstream acceptance of Bitcoin, however, is best illustrated by the growing number of leading merchants that have decided to accept Bitcoin payments.” *Id.* at 271.

23. “Nakamoto’s writings acknowledge the attractiveness of Bitcoin to libertarians, but they do not specifically support any view of his own politics.” Shawn Bayern, *Of Bitcoins, Independently Wealthy Software, and the Zero-Member LLC*, 108 NW. U. L. REV. ONLINE 257, 260 n.13 (2014).

currency: stored value and fungibility.<sup>24</sup> Bitcoin is neither intrinsically valuable, like gold, nor is it rooted in a commodity.<sup>25</sup> There might be some value resulting from its scarcity, but it is an artificial scarcity.<sup>26</sup> Nobel-winning economist Paul Krugman has suggested that, unlike gold or fiat currencies, bitcoin derives its value solely from a self-fulfilling expectation that others will accept it as payment.<sup>27</sup>

Bitcoin as a currency is not regulated like other currencies, which increases the risk of price manipulation.<sup>28</sup> Bad actors can manipulate the price of cryptocurrencies and then cash out before other investors discover the scheme.<sup>29</sup> There are also concerns about a bitcoin bubble.<sup>30</sup> Additionally, without a central bank underlying cryptocurrencies, the trustworthiness of bitcoin has been questioned.<sup>31</sup> These factors contribute to the volatility of

24. See generally Allen, *supra* note 9, at 889 (noting that “important attributes of money are its ability to function as a store of value (meaning that it ‘can be saved and retrieved in the future’), and that it is widely accepted as a means of exchange” (footnotes omitted)). See also Adam Chodorow, *Bitcoin and the Definition of Foreign Currency*, 19 FLA. TAX REV. 365, 373 (2016) (“Bitcoin poses a problem for the tax system because it is designed to function as a currency, but it does not fit within the traditional understanding of foreign currency.”); Ralph E. McKinney, Jr. et al., *The Evolution of Financial Instruments and the Legal Protection Against Counterfeiting: A Look at Coin, Paper, and Virtual Currencies*, 2015 U. ILL. J.L. TECH. & POL’Y 273 (reviewing the characteristics of currencies in the context of bitcoin).

25. Nicholas A. Plassaras, Comment, *Regulating Digital Currencies: Bringing Bitcoin Within the Reach of the IMF*, 14 CHI. J. INT’L L. 377, 390–91 (2013).

26. Only 21 million bitcoins can be mined per bitcoin’s protocol as set by Satoshi Nakamoto. See *supra* note 15 and accompanying text.

27. Gola Yashu, *Paul Krugman Takes Another Potshot at Bitcoin*, NEWS BTC (July 16, 2015, 1:00 PM), <https://www.newsbtc.com/2015/07/16/paul-krugman-takes-another-potshot-at-bitcoin/> [<https://perma.cc/EL9E-WJWX>].

28. See, e.g., Jerry W. Markham, *Manipulation of Commodity Futures Prices—The Unprosecutable Crime*, 8 YALE J. ON REG. 281, 283, 311 (1991) (describing commodity manipulation and the difficulties of prosecuting it).

29. Matt Robinson & Tom Schoenberg, *U.S. Launches Criminal Probe into Bitcoin Price Manipulation*, BLOOMBERG (May 24, 2018, 3:41 AM), <https://www.bloomberg.com/news/articles/2018-05-24/bitcoin-manipulation-is-said-to-be-focus-of-u-s-criminal-probe> [<https://perma.cc/6M6H-7RKN>].

30. CFTC Chairman Giancarlo stated:

Others, however, argue that this is all hype or technological alchemy and that the current interest in virtual currencies is overblown and resembles wishful thinking, a fever, even a mania. They have declared the 2017 heightened valuation of Bitcoin to be a bubble similar to the famous “Tulip Bubble” of the seventeenth century.

Press Release, Commodities Futures Trading Comm’n, Written Testimony of Chairman J. Christopher Giancarlo Before the U.S. Senate Agric., Nutrition, and Forestry Comm. (Feb. 15, 2018), <https://www.cftc.gov/PressRoom/SpeechesTestimony/opagiancarlo> 38 [<https://perma.cc/HN8A-RAVS>].

31. See, e.g., Jeff Kearns, *Greenspan Says Bitcoin a Bubble Without Intrinsic Currency Value*, BLOOMBERG (Dec. 4, 2013, 4:37 PM), <https://www.bloomberg.com/news/ar>

bitcoin's price.<sup>32</sup>

In addition to the lack of consumer protection, there is the possibility that bitcoin could be used to launder money and finance terrorism.<sup>33</sup> As a result, anti-money-laundering laws have been applied to bitcoin.<sup>34</sup> A common tool used to prosecute bitcoin business operators is 18 U.S.C. § 1960, which prohibits operation of an “unlicensed money transmitting business.”<sup>35</sup> In *United States v. Faiella*, for example, the defendant was charged with selling over \$1 million of bitcoin for illegal use on the illicit online marketplace, Silk Road.<sup>36</sup> The Treasury Department has also applied a regulatory scheme to bitcoin as a currency.<sup>37</sup>

In addition to being a currency, bitcoin relies on a new technology. To implement bitcoin, Nakamoto devised the first blockchain to solve the double-spending problem for digital currency so that people cannot spend the same money twice.<sup>38</sup> “At its root, a blockchain is a . . . public ledger that everyone can inspect, but which no single user controls. The participants in a given blockchain system work together to keep the ledger updated;

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ticles/2013-12-04/greenspan-says-bitcoin-a-bubble-without-intrinsic-currency-value [https://perma.cc/KN93-6WQW]. *But see* Catherine Martin Christopher, *The Bridging Model: Exploring the Roles of Trust and Enforcement in Banking, Bitcoin, and the Blockchain*, 17 NEV. L.J. 139, 172–75 (2016). “Bitcoin has long been touted as a currency and a payment system that relies on cryptography and mathematics rather than trust.” *Id.* at 139.

32. “In 2013, the market price of a bitcoin fluctuated between \$13 and \$1200 USD.” Matthew Kien-Meng Ly, Note, *Coining Bitcoin’s “Legal-Bits”: Examining the Regulatory Framework for Bitcoin and Virtual Currencies*, 27 HARV. J.L. & TECH. 587, 590–91 (2014) (citation omitted).

33. “The two most important issues that concern governments about Bitcoin are (1) the lack of consumer protection, and (2) the possibility that bitcoins could be used to launder money and finance terrorism.” Ian A. Holcomb, *Bitcoin’s Standing Within the Global Regulatory and Economic Marketplace*, 23 CURRENTS, no. 1, 2016, at 56, 62–63.

34. *United States v. Faiella*, 39 F. Supp. 3d 544, 545–46 (S.D.N.Y. 2014) (“If there were any ambiguity in this regard—and the Court finds none—the legislative history supports application of Section 1960 in this instance. Section 1960 was passed as an anti-money laundering statute, designed ‘to prevent the movement of funds in connection with drug dealing.’” (citations omitted)).

35. 18 U.S.C. § 1960 (2012).

36. *Faiella*, 39 F. Supp. 3d at 545; *see also* Lawrence Trautman, *Virtual Currencies; Bitcoin & What Now After Liberty Reserve, Silk Road, and Mt. Gox?*, 20 RICH. J.L. & TECH., no. 4, 2014, at 1, 97–98.

37. *See* U.S. DEP’T OF THE TREASURY, FIN. CRIMES ENF’T NETWORK, FIN-2013-G001, GUIDANCE: APPLICATION OF FINCEN’S REGULATIONS TO PERSONS ADMINISTERING, EXCHANGING, OR USING VIRTUAL CURRENCIES (2013), <https://www.fincen.gov/resources/statutes-regulations/guidance/application-fincens-regulations-persons-administering> [https://perma.cc/Q36E-GJ49].

38. Scott J. Shackelford & Steve Myers, *Block-By-Block: Leveraging the Power of Blockchain Technology to Build Trust and Promote Cyber Peace*, 19 YALE J.L. & TECH., no. 1, 2017, at 334, 342.

it may be amended only by strict rules and consensus.”<sup>39</sup> These ledger updates are made by people on the internet with appropriate software who solve cryptography puzzles for payment in bitcoin.<sup>40</sup> “Using algorithms, the system can verify if a transaction will be approved and added to the blockchain and once it is on the blockchain it is extremely difficult to change or remove that transaction.”<sup>41</sup>

While bitcoin relies on blockchain technology to validate transactions, the technology can be used in other mainstream contexts to also record transactions. The banking sector is among the leading industries with blockchain patents.<sup>42</sup> The blockchain technology underlying bitcoin can also be used to record property deeds and contracts,<sup>43</sup> but it operates with significant resource

39. *Id.* (citations omitted).

40. S.H. Spencer Compton & Diane Schottenstein, *Questions and Answers About Using Blockchain Technology in Real Estate Practice*, 33 PRAC. REAL EST. L., no. 5, 2017, at 5, 5–6.

41. *Id.* at 5.

In a blockchain, there is no third-party intermediary verifying the veracity of the transaction, rather it is verified by “nodes.” A “node” is a transaction between computers. Each node contains the history of a transaction down to the “genesis block” or beginning block. Once a command is made to execute a transaction, the node will trace through the history of the blockchain all the way to the genesis block to confirm that the new transacting party is “cleared” to join the block. The new block can then be added to the chain, which creates an indelible and transparent record of transactions.

In theory, blockchain is tamper-proof because it is decentralized and not controlled by one party. All the nodes maintaining the same database will be involved in verifying the transaction which is a check on the veracity of the system.

*Id.* at 6.

42. Lee stated when examining blockchain patents that:

We identified 1,045 US patents and published, pending applications specifically related to blockchain and distributed ledger technologies. Please note that our analysis does not include general cryptographic or encryption-related patents, such as for security and authorization, which do not involve a distributed ledger or decentralized concurrency methods.

Based on our analysis, the major patent holders in this space are Bank of America, IBM, Mastercard, FMR LLC, World Award Foundation, TD Bank, Coinbase, 402 Technologies, Accenture, and Dell. The list includes entities from the financial services, traditional technology, patent holding and consulting industries.

Alex Lee, *Blockchain Patent Filings Dominated by Financial Services Industry*, PATENTVUE (Jan. 12, 2018, 2:09 PM), <http://patentvue.com/2018/01/12/blockchain-patent-filings-dominated-by-financial-services-industry/> [<https://perma.cc/SMC3-WYKJ>].

43. Shackelford & Myers, *supra* note 38, at 336 (“From making businesses more efficient to recording property deeds to engendering the growth of ‘smart’ contracts . . . blockchain technology is now being investigated by a huge range of organizations and is attracting billions in venture funding.”).



demands.<sup>44</sup>

In sum, because of its utilization of blockchain, bitcoin has developed both as a currency and as a forerunner of a new technology over the last decade. Bitcoin futures emerged most recently, raising a new set of issues.

### III. BITCOIN FUTURES

Futures are contracts to buy or sell a specific quantity of an asset at a specified price and date in the future.<sup>45</sup> In other words, futures are simply contracts for the future delivery of the underlying asset at a certain price—they permit producers and consumers of a commodity to insure themselves against price movements.<sup>46</sup> However, delivery is not always sought, and the futures contract can be settled with money instead, serving as an investment and hedging vehicle in itself.<sup>47</sup> Futures are therefore derivatives, with their value deriving from the underlying asset, and they trade on exchanges.<sup>48</sup>

The Commodity Futures Trading Commission (CFTC) exercises exclusive jurisdiction and regulatory authority over

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44. See Lawrence J. Trautman & Alvin C. Harrell, *Bitcoin Versus Regulated Payment Systems: What Gives?*, 38 CARDOZO L. REV. 1041, 1061–62 (2017) (describing the vast computational distribution effort that powers the bitcoin transaction verification system). Trautman and Harrell note that:

By way of comparison, with a hash rate of less than one percent the current rate, Kröll, Davey, and Felten stated that taken as a whole, the Bitcoin transaction verification network is more powerful than the combined computing power of the top 500 supercomputers in the world, giving pause to anyone concerned about whether the costs of transaction verification in Bitcoin are acceptable.

*Id.* at 1062 (citing Joshua A. Kröll et al., *The Economics of Bitcoin Mining or Bitcoin in the Presence of Adversaries* 8 (June 11–12, 2013) (unpublished manuscript), <http://www.econinfosec.org/archive/weis2013/papers/KrollDaveyFeltenWEIS2013.pdf> [<https://perma.cc/VES8-3JLF>]).

45. Dean Zimmerli, *Something Old, Something New: Relying on the Traditional Agricultural Cooperative to Help Farmers Solve the Power Imbalance in Modern Meatpucker Production Contracts*, 24 SAN JOAQUIN AGRIC. L. REV. 59, 71 (2015).

46. FED. RESERVE BD., BANK HOLDING COMPANY SUPERVISION MANUAL sec. 2130.0 (Sept. 2017), 2017 WL 6373175 (providing an overview of futures, forward, and option contracts).

47. Henry Ordower, *Revisiting Realization: Accretion Taxation, the Constitution, Macomber, and Mark to Market*, 13 VA. TAX REV. 1, 64–65 (1993) (“While the buyer and seller may discharge their contractual obligations under the futures contract by accepting delivery and delivering respectively an approved grade of commodity as the terms of the contract require, delivery of the physical commodity rarely occurs.”).

48. Zachary T. Knepper, *Examining the Merits of Dual Regulation for Single-Stock Futures: How the Divergent Insider Trading Regimes for Federal Futures and Securities Markets Demonstrate the Necessity for (and Virtual Inevitability of) Dual CFTC-SEC Regulation for Single-Stock Futures*, 3 PIERCE L. REV. 33, 34 (2004).

futures contracts under the Commodities Exchange Act (CEA).<sup>49</sup> The CFTC seeks to ensure financially sound markets and works to avoid systemic risk “from fraud, manipulation, and abusive practices related to derivatives . . . .”<sup>50</sup>

While the Dodd-Frank Act did not contemplate bitcoin futures,<sup>51</sup> it did consider systemic risk to the financial system.<sup>52</sup>

49. Knepper writes:

In the 1970s, this was a point of contention between the CFTC and the Securities Exchange Commission, which is responsible for regulating the securities markets. Conflict over the regulation of securities futures came to a head in 1982 in *Board of Trade of the City of Chicago v. SEC*, wherein the Seventh Circuit Court of Appeals determined that securities futures regulation was properly the province of the CFTC by the terms of the Commodities Exchange Act. In response to this ruling and to settle jurisdictional questions over securities futures, the SEC and the CFTC approached Congress with a proposed regulatory agreement known as the Shad-Johnson Accord, which was enacted into law in 1982. Shad-Johnson trifurcated securities futures and options regulation: the SEC would regulate securities-based options, the CFTC would regulate futures of broad-based stock indexes and government securities, and futures on single stocks and narrow-based stock indexes would be prohibited. This prohibition on single-stock futures and narrow-based stock index futures was intended to be temporary.

*Id.* at 34–35 (footnotes omitted).

50. *Mission & Responsibilities*, U.S. COMMODITY FUTURES TRADING COMM’N, <http://www.cftc.gov/About/MissionResponsibilities/index.htm> [https://perma.cc/EK27-KTT R] (last visited Jan. 20, 2019).

51. Tarbert writes about the Dodd-Frank Act:

[O]n July 21, 2010, President Obama signed into law a package of financial regulatory reforms unparalleled in scope and depth since the New Deal: The Dodd-Frank Wall Street Reform and Consumer Protection Act (Act or Dodd-Frank Act) was a sweeping reaction to perceived regulatory failings revealed by the most severe financial crisis since the Great Depression. The Dodd-Frank Act was intended to restructure the regulatory framework for the United States financial system, with broad and deep implications for the financial services industry where the crisis started.

Heath P. Tarbert, *The Dodd-Frank Act—Two Years Later*, 66 CONSUMER FIN. L.Q. REP. 373, 373 (2012) (footnotes omitted).

52. Ordower writes:

Each commodity exchange in the United States has an associated clearinghouse. The clearinghouse insures the integrity of trades by becoming substituted for each buyer and seller following confirmation of a trade, so that each party to a trade looks only to the clearinghouse for performance. In order to protect its central position, the clearinghouse requires margin deposits and continuously marks positions to market to provide some assurance that its members will be able to fulfill their contractual obligations. In addition, the clearinghouse generally establishes a security or guarantee fund which is intended to permit the clearinghouse to meet its obligations as the substituted counterparty to contracts initiated by an insolvent clearing member despite the failure of the insolvent clearing member to honor its contracts. Further, the clearinghouse imposes net limits on the number of positions that a member (representing a customer or itself) may hold overnight and establishes financial minimums that clearing members must maintain.

Ordower, *supra* note 47, at 69 (footnotes omitted).

The legislation therefore calls on clearinghouses—or central counterparties—to reduce systemic risk that caused the 2008 financial crisis.<sup>53</sup> As a result, many trades must go through a clearinghouse, which spreads the risk of default among clearing members by mutualizing risk.<sup>54</sup> In other words, “[t]he fundamental purpose of the clearinghouse is to amass risk in hopes of containing it.”<sup>55</sup> The clearinghouses and their members have their own regulations,<sup>56</sup> but “[t]he fundamentals of clearinghouse risk-management procedures consist of the following: (1) strict membership criteria, (2) robust margining, and (3) a predetermined default management process.”<sup>57</sup>

Despite their function to reduce risk, some clearinghouses are now allowing bitcoin futures trading, undeterred by the inherent risks. Perhaps this is not surprising given that clearinghouses are for-profit institutions with an incentive to introduce new products

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53. See Julia Lees Allen, Note, *Derivatives Clearinghouses and Systematic Risk: A Bankruptcy and Dodd-Frank Analysis*, 64 STAN. L. REV. 1079, 1091–92 (2012); see also Griffith, *supra* note 6, at 1292, 1317–18 (“The conventional wisdom is that the global financial crisis of 2007–2008 revealed faults in the ability of international financial regulation to contain the problem of systemic risk. Further conventional wisdom suggests that the failure to regulate complex financial instruments, especially derivatives, contributed significantly to the crisis.” (footnotes omitted)); Lucy McKinstry, Note, *Regulating a Global Market: The Extraterritorial Challenge of Dodd-Frank’s Margin Requirements for Uncleared OTC Derivatives & A Mutual Recognition Solution*, 51 COLUM. J. TRANSNAT’L L. 776, 794–96 (2013).

54. Onnig H. Dombalagian, *Requiem for the Bulge Bracket?: Revisiting Investment Bank Regulation*, 85 IND. L.J. 777, 812 (2010) (“Clearinghouses and guarantee funds, much like insurance companies, mutualize the risk of localized defaults among all members or contributors.”).

Financial institutions regularly trade risky investments. If one major trading institution fails to make good on its obligations to another, the first’s failure could be contagious, spreading outward through the interconnected financial system, inducing interconnected financial institutions to collapse one after another, like a row of dominoes, unless regulators can prop up one of the early dominoes before contagion knocks down the entire row. One strategically-placed financial institution’s failure puts the entire financial system at risk of malfunctioning, rendering it unable to channel funds through the economy. As a result, economic activity weakens.

Mark J. Roe, *Clearinghouse Overconfidence*, 101 CAL. L. REV. 1641, 1643–44 (2013). For example, “[d]uring its lifetime, [LCH.Clearnet, Ltd., a clearinghouse that specializes in interest rate swaps,] has handled five defaults, with [a \$9 trillion default of Lehman Brothers Special Financing, Inc.] constituting the largest default.” Allen, *supra* note 53, at 1091 n.50.

55. Griffith, *supra* note 6, at 1350.

56. See Allen, *supra* note 53, at 1085–87 (describing how a clearinghouse functions); but see Dombalagian, *supra* note 54, at 779 (“I question whether any regulatory agency or collection of agencies can possess the authority, independence, and incentive to combat the inherent procyclicity of the systemic risk inherent in the financial services industry.” (footnote omitted)).

57. Allen, *supra* note 53, at 1087 (footnotes omitted).

to trade.<sup>58</sup> Some commentators suggest that clearinghouses are the new “too big to fail” institutions.<sup>59</sup>

A new futures contract can be listed by an exchange either after: “1) the exchange submits a written self-certification to the CFTC that the contract complies with CEA and CFTC regulations, or 2) the exchange voluntarily submits the contract for CFTC approval.”<sup>60</sup> Self-certification is a process in which the exchange verifies that a new contract complies with CEA requirements.<sup>61</sup> If the CFTC does not object to the findings of the self-certification, the exchange may list the new product one to two days after submitting the self-certification.<sup>62</sup>

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58. Kristin N. Johnson, *Commentary on the Abraham L. Pomerantz Lecture: Clearinghouse Governance: Moving Beyond Cosmetic Reform*, 77 BROOK. L. REV. 681, 701 (2012) (“Influenced by conflicts and self-interested incentives, clearinghouse members’ decisions may ironically engender—rather than reduce—risk.”); *see also* Allen, *supra* note 53, at 1091 n.51 (“Analysts at Barclays Capital recently expressed concern as to whether clearinghouses will maintain the strict collateral requirements necessary to prevent systemic risk given that they are for-profit enterprises.”).

59. *See, e.g.*, Mark J. Roe, *The Derivatives Market’s Payment Priorities as Financial Crisis Accelerator*, 63 STAN. L. REV. 539, 587 (2011) (“[A] clearinghouse ups the ante on ‘too big to fail,’ because the clearinghouse will itself be too big to fail. That’s fine, but only if it doesn’t fail.”).

While a clearinghouse can be useful in important dimensions, it is unlikely to be anywhere near as helpful as the consensus in Washington came to believe during the reform discussions. Deep weaknesses afflict the clearinghouse, making it unwise to rely on it primarily, as Dodd-Frank has. First, it’s unclear whether the exchange would itself be properly incentivized to handle counterparty risk, particularly if the major derivatives dealers themselves control the clearinghouse. *Id.* at 586–87; *see also* Griffith, *supra* note 6, at 1350 (“Even the rumor of a clearinghouse failure, Ben Bernanke has warned, could be a source of contagion [throughout the economy].”). However, “[f]inancial clearinghouses have failed in France (the Caisse de Liquidation, in 1974), Kuala Lumpur (the Commodity Clearing House, in 1983), and in Hong Kong (the Futures Guarantee Corporation, in 1987).” *Id.* at 1350 n.285 (citing Bob Hills et al., *Central Counterparty Clearing Houses and Financial Stability*, FIN. STABILITY REV., June 1999, at 122, 129). “The Chicago Mercantile Exchange survived failure in 1987 thanks to a last minute government bailout of its constituent members.” *Id.* (citation omitted).

60. Lee Reiners, *Bitcoin Futures Are a Bad Idea*, FINREG BLOG (Dec. 13, 2017), <https://sites.duke.edu/thefinregblog/2017/12/13/bitcoin-futures-are-a-bad-idea/> [https://perma.cc/32XX-EEM2].

61. Saule T. Omarova, *License to Deal: Mandatory Approval of Complex Financial Products*, 90 WASH. U. L. REV. 63, 109 (2012).

Among other things, the CFMA repealed section 5a(a)(12) of the CEA and eliminated the requirement of prior approval by the CFTC of exchanges’ rules and products. The new law allowed regulated exchanges to list futures contracts upon a written self-certification that such products complied with the requirements of the CEA, as amended.

*Id.*

62. *CFTC Backgrounder on Oversight of and Approach to Virtual Currency Futures Markets*, U.S. COMMODITY FUTURES TRADING COMM’N 2–3 (Jan. 4, 2018), <https://www.cftc.gov/sites/default/files/idc/groups/public/@newsroom/documents/file/backgr>

Self-certification was used to approve new cryptocurrency derivatives products.<sup>63</sup> The CME and the CBOE also voluntarily provided information regarding their bitcoin futures contracts months before filing their self-certifications.<sup>64</sup> Specifically,

[CFTC] staff held rigorous discussions with CME over the course of six weeks, CFE over the course of four months, and had numerous calls with [the Cantor Exchange]. CME, CFE and Cantor agreed to significant enhancements to contract design and settlement, and CME to margining, at the request of Commission staff, as well as more information sharing with the underlying cash bitcoin exchanges to assist CME, CFE, Cantor and the CFTC in surveillance.<sup>65</sup>

Despite the questionability of self-certification of bitcoin futures, the CFTC has not ultimately condemned the practice.<sup>66</sup> Self-certification requires the exchange to prove that the new contract is not readily susceptible to manipulation, but this is one of the main concerns regarding bitcoin.<sup>67</sup>

After self-certifying, CBOE launched trading in bitcoin futures on December 10, 2017, while CME Group did so a week

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ounder\_virtualcurrency01.pdf [https://perma.cc/4PX6-Y2FP] [hereinafter *CFTC Backgrounder*]; see also Reiners, *supra* note 60; Listing Products for Trading by Certification, 17 C.F.R. § 40.2 (2018).

63. *CFTC Backgrounder*, *supra* note 62, at 2; see also Christopher Bowen, CHI. MERCANTILE EXCHANGE INC., *CFTC Regulation 40.2(a) Certification, Notification Regarding the Initial Listing of the Bitcoin Futures Contract, CME Submission No. 17-417S* (Dec. 1, 2017), <http://www.cmegroup.com/market-regulation/rule-filings/2017/12/17-417S.pdf> [https://perma.cc/78DF-8XQR]; *Cboe Futures Exchange, LLC Product Certification for Bitcoin Futures Submission Number CFE-2017-018*, CBOE (Dec. 1, 2017), [http://cfe.cboe.com/framed/pdf/framed?content=/publish/CFERulefilings/SR-CFE-2017-018.pdf&section=ABOUT%20CFE&title=Cboe+Bitcoin+\(USD\)+Futures](http://cfe.cboe.com/framed/pdf/framed?content=/publish/CFERulefilings/SR-CFE-2017-018.pdf&section=ABOUT%20CFE&title=Cboe+Bitcoin+(USD)+Futures) [https://perma.cc/F2RB-9MW9].

64. Press Release, U.S. Commodity Futures Trading Comm'n, CFTC Statement on Self-Certification of Bitcoin Products by CME, CFE and Cantor Exchange (Dec. 1, 2017), <http://www.cftc.gov/PressRoom/PressReleases/pr7654-17> [https://perma.cc/TX7G-ARFX].

65. *Id.*

66. *CFTC Backgrounder*, *supra* note 62, at 2. ("The product self-certification process was deliberately designed by Congress and prior Commissions to give initiative to [designated contract markets] to certify new products. This is consistent with a [designated contract market's] role as a self-regulatory organization (SRO) and the CFTC's principles-based approach to regulation.")

67. Reiners notes about bitcoin manipulation:

Because the price of Bitcoin futures are [sic] based on the price of Bitcoin, a manipulator could place a large trade in the Bitcoin spot market in order to have the price of the futures contract move in her favor. This is referred to as banging-the-settlement, and it typically only occurs when the futures contract is cash settled, which Bitcoin futures are. The potential for manipulation has focused attention on CBOE's and CME's choice of Bitcoin reference rate. If the reference rate can be easily manipulated, so too can the price of the futures contract.

Reiners, *supra* note 60.

later.<sup>68</sup> Other exchanges are also considering offering bitcoin futures.<sup>69</sup> Bitcoin futures are settled in dollars, not in bitcoin, which trades at different dollar prices in different places.<sup>70</sup> CBOE settlements, for example, are based on bitcoin's value on the Gemini Exchange.<sup>71</sup>

A few days after CME Group and CBOE announced that they would launch bitcoin futures contracts, Walt Lukken, CEO and President of the FIA, wrote that FIA and its members were worried about having to pay for outstanding contracts caused by bitcoin's price changes.<sup>72</sup> "As the principal members of derivatives clearinghouses worldwide, FIA's 64 clearing members play a critical role in the reduction of systemic risk by guaranteeing their customers' trades, contributing to the guarantee funds of clearinghouses and committing to assessment obligations during clearinghouse shortfalls."<sup>73</sup>

The FIA said a public discussion should have occurred before allowing either CME Group or the CBOE to complete self-certification procedures because bitcoin is a non-standard product.<sup>74</sup>

[W]e believe that the launch of new exchange-traded derivatives in cryptocurrencies deserves a healthy dialogue between regulators, exchanges, clearinghouses and the clearing firms who will be absorbing the risk of these volatile, emerging instruments during a default. Unfortunately, the launching of these innovative products through the 1-day self-certification process did not allow for proper public transparency and input. Under law, exchanges may self-certify a product for trading by the close of business one day and then list the product for trading the next day. This process does not require CFTC approval or input and allows little or no time for public review. While suited for standardized products, this process does not distinguish for a product's risk profile or unique nature. We believe that this expedited self-certification process for these novel

68. See *supra* notes 2–3 and accompanying text.

69. Amaro & Kharpal, *supra* note 4; Marie Huillet, *Confirmed: Nasdaq's Bitcoin Futures Will Launch in 'First Half' of 2019*, COINTELEGRAPH (Dec. 4, 2018), <https://cointelegraph.com/news/confirmed-nasdaq-bitcoin-futures-will-launch-in-first-half-of-2019> [<https://perma.cc/D925-JJZW>].

70. *Bitcoin Futures Contract Specs*, CME GROUP, [https://www.cmegroup.com/trading/equity-index/us-index/bitcoin\\_contract\\_specifications.html](https://www.cmegroup.com/trading/equity-index/us-index/bitcoin_contract_specifications.html) [<https://perma.cc/Z6CW-64XX>] (last visited Jan. 20, 2019).

71. *XBT-Cboe Bitcoin Futures*, *supra* note 2.

72. Lukken, *supra* note 7.

73. *Id.*

74. *Id.*

products does not align with the potential risks that underlie their trading and should be reviewed.<sup>75</sup>

FIA concluded that it “remain[ed] apprehensive with the lack of transparency and regulation of the underlying reference products on which these futures contracts are based and whether exchanges have the proper oversight to ensure the reference products are not susceptible to manipulation, fraud, and operational risk.”<sup>76</sup>

The FIA suggests that speculation in bitcoin futures is unique.<sup>77</sup> Indeed, bitcoin experiences relatively wild price volatility<sup>78</sup> and frequent hacks.<sup>79</sup> Bitcoin futures are also comparatively easier to manipulate.<sup>80</sup> Thus, bitcoin futures are riskier than other futures, with losses only multiplied.<sup>81</sup>

Following the FIA’s protest, the CFTC stated that it gave bitcoin futures heightened review and that all future applications by derivatives exchanges to list virtual currency derivatives will receive the same treatment.<sup>82</sup> The CFTC’s heightened review means that the agency will request voluntary compliance by applicant derivatives exchanges with several criteria, including “substantially high” initial and maintenance margins, information sharing agreements, and product launches coordinated with the CFTC’s market surveillance branch to enable the CFTC to monitor “minute-by-minute developments.”<sup>83</sup>

The CFTC thus developed a “heightened review” process for cryptocurrency futures that includes monitoring the markets for virtual currency derivatives.<sup>84</sup> However, there are several other

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75. *Id.*

76. *Id.*

77. *Id.*

78. *See Market Price (USD)*, BLOCKCHAIN.INFO, <https://www.blockchain.com/charts/market-price?> [<https://perma.cc/VV98-WFMV>] (last visited Jan. 20, 2019) (providing historical and real-time price data).

79. “A massive hacker attack on Mt. Gox in June 2011 resulted in the theft of 25,000 bitcoins, valued at the time at approximately \$8.75 million, and drove the exchange value of a bitcoin from \$17.50 to a single penny.” Christopher, *supra* note 18, at 21.

80. *See supra* note 67.

81. *See infra* Part IV.

82. *CFTC Backgrounder*, *supra* note 62, at 2–3.

83. *Id.* at 3.

84. The CFTC provided:

At the heart of the CFTC’s heightened review is extensive visibility and monitoring of markets for virtual currency derivatives and underlying settlement reference rates. Virtual currency self-certification under heightened review means that the CFTC not only has clear legal authority, but now also will have the means to police certain underlying spot markets for fraud and manipulation.

*Id.*

regulatory options, considered next.

#### IV. REGULATING BITCOIN FUTURES

The entry of bitcoin futures into the market opens it to regulation in a way that bitcoin as a currency and the blockchain technology did not. There are several factors to consider regarding the regulation of bitcoin futures.

##### A. *Whether to Regulate*

In the bitcoin context, the threshold question is whether to regulate. There may be several drawbacks inherent to regulation. For example, critics have raised concerns about bias in the enforcement of regulatory schemes.<sup>85</sup> Furthermore, there are separate critiques regarding over-regulation of the business environment.<sup>86</sup>

On the other hand, regulation would legitimize bitcoin to a certain extent, which is important given bitcoin's background as an anonymous cryptocurrency for criminals.<sup>87</sup> Historically, the legitimizing effect of regulation has brought some value.<sup>88</sup>

Regulation of bitcoin futures may also be particularly helpful due to their unique characteristics. Futures markets multiply losses and rewards by allowing leveraging,<sup>89</sup> which differs from

85. Joan Macleod Heminway, *Save Martha Stewart? Observations About Equal Justice in U.S. Insider Trading Regulation*, 12 TEX. J. WOMEN & L. 247, 263 (2003).

86. See, e.g., Karen Woody, *Conflict Minerals Legislation: The SEC's New Role as Diplomatic and Humanitarian Watchdog*, 81 FORDHAM L. REV. 1315, 1324 (2012) (noting that Dodd-Frank even extends to regulating conflict minerals for moral and political reasons). For the argument that tax incentives might be better solutions to certain corporate issues than regulation, see Margaret Ryznar & Karen Woody, *A Framework on Mandating Versus Incentivizing Corporate Social Responsibility*, 98 MARQ. L. REV. 1667, 1681 (2015).

87. See Foley et al., *supra* note 20, at 2 (“[A]pproximately one-quarter of all users (25%) and close to one-half of bitcoin transactions (44%) are associated with illegal activity.”). Around \$72 billion of illegal activity per year involves bitcoin, which is close to the scale of the US market for illegal drugs. *Id.*

88. John C. Coffee Jr., *Racing Towards the Top?: The Impact of Cross-Listings and Stock Market Competition on International Corporate Governance*, 102 COLUM. L. REV. 1757, 1814–16 (2002) (suggesting that issuers are willing to migrate to U.S. exchanges because even if they voluntarily subject themselves to the United States' higher disclosure standards and greater threat of enforcement (both by public and private enforcers), they partially compensate for weak protection of minority investors under their own jurisdictions' laws and thereby achieve a higher market valuation).

89. Ordover writes:

The commodities industry involves products far less familiar to the investing public than those available in the securities markets. Rather than the mundane, stable world dominated by blue chip stocks and bonds, this exotic realm of futures, forwards and options suggests risk, volatility and the potential for vast rewards



stocks.<sup>90</sup> This risk is multiplied further by bitcoin's volatility.<sup>91</sup>

Moreover, the rapid growth and anonymity of bitcoin and other cryptocurrencies present challenges.<sup>92</sup> There are several possible approaches, each with advantages and disadvantages, but the main factor focuses on risk management.<sup>93</sup> A default on a bitcoin futures contract poses a major risk to clearinghouses that clear these contracts.<sup>94</sup> This is especially a concern following the financial crisis in 2008 when clearinghouses became responsible for managing the risks created in trading.<sup>95</sup>

The importance of clearinghouses to economic stability was clear even earlier, when the stock market fell over 500 points and resulted in a credit crisis that almost destroyed the major U.S. clearinghouses in 1987 on Black Monday.<sup>96</sup>

More than a dozen clearing members of the Chicago Mercantile Exchange ("CME") fell out of compliance with capital requirements, and half a dozen more faced margin calls that exceeded their capital. The largest clearing member of the Options Clearing Corporation ("OCC"), First Options of Chicago, appeared unlikely to satisfy margin calls, potentially threatening all of the traders on the OCC-affiliated Chicago Board Options Exchange ("CBOE"). Both CME and CBOE temporarily halted trading, lest the

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and devastating losses. . . . Regulatory distinctions, margin restrictions, and the nature of the underlying products all contribute to these differences [between commodities such as futures and securities markets involving stock].

Ordower, *supra* note 47, at 62.

90. *Background of Federal Regulation of Futures Trading*, Comm. Fut. L. Rep. (CCH) ¶ 104, 2015 WL 6854612 (2018).

91. *See supra* Part II.

92. *See* Foley et al., *supra* note 20, at 1, 6, 30–31.

93. *But see* Wulf A. Kaal & Richard W. Painter, *Initial Reflections on an Evolving Standard: Constraints on Risk Taking by Directors and Officers in Germany and the United States*, 40 SETON HALL L. REV. 1433, 1438 (2010) ("[T]he concepts of . . . whether there is any such thing as excessive risk, and if so, how excessive risk is to be defined, is another issue. Viewpoints on these questions will have a substantial impact on how a policy maker—or a group of policy makers in a particular country—approaches regulation of risk in the banking sector.").

94. "In providing a means for this transfer of risk, however, derivatives create a second risk—the risk of default on the contract. This second risk—counterparty credit risk—is inherent in derivatives transactions, and is the basic way in which derivatives contribute to systemic risk." Griffith, *supra* note 6, at 1295–96 (footnote omitted).

95. James E. Kelly, *Transparency and Bank Supervision*, 73 ALB. L. REV. 421, 423–24 (2010) (noting that following the 2008 financial crisis, attention has focused on the role of systemic risk in financial institutions and markets). *See also supra* note 54 and accompanying text.

96. Jeremy C. Kress, *Credit Default Swaps, Clearinghouses, and Systemic Risk: Why Centralized Counterparties Must Have Access to Central Bank Liquidity*, 48 HARV. J. ON LEGIS. 49, 49–50 (2011); *see also supra* note 59.

financial condition of the markets—and their clearinghouses—deteriorate further.<sup>97</sup>

To avert a further crisis, the Federal Reserve provided liquidity to commercial banks so that they would loan to CME clearing members and even “lent directly to the parent company of First Options, enabling the OCC to continue operations.”<sup>98</sup> Hong Kong did not take the same precautions to protect its main clearinghouse, whose guarantee fund then collapsed and caused deeper crisis in the region.<sup>99</sup>

Thus, bitcoin futures cannot risk bankrupting or financially weakening clearinghouses because they must manage risk for significant parts of the financial sector: “The two main mechanisms through which a derivatives clearinghouse could become insolvent would be (1) insufficient collateral and capital requirements or ineffective default management procedures, and (2) multiple-member defaults.”<sup>100</sup>

Accordingly, it is essential that clearinghouses effectively manage the risks caused by bitcoin futures. There are several ways to do so that are considered next.

### B. *How to Regulate*

There are numerous safeguards already implemented for protecting the clearinghouses and the greater financial markets. However, because of the uniqueness of bitcoin futures, some additional measures might be introduced to manage risk.<sup>101</sup>

1. *Prohibition.* Some banks and governments have outright banned bitcoin futures. For example, Merrill Lynch blocked clients and financial advisers who trade on their behalf from

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97. Kress, *supra* note 96, at 50 (footnotes omitted).

98. *Id.*

99. *Id.*

100. Allen, *supra* note 53, at 1092. “The first problem arises from the potential for regulators to create clearinghouse rules that include insufficient minimum collateral or capital requirements for derivatives clearinghouses, or that do not effectively regulate the default management procedures.” *Id.*

101. Griffith notes:

The best approach to systemic risk, however, may be one that understands and anticipates that regulators and policymakers are not infallible and are likely to make mistakes in the future, as indeed they have done in the past. In this environment, a diversity of regulatory approaches to the same underlying problem may provide greater protection against contagion and an outbreak of systemic risk . . . .

Griffith, *supra* note 6, at 1372–73.

buying bitcoin products.<sup>102</sup> South Korea has not enabled the trading of bitcoin futures,<sup>103</sup> and neither has the Japanese regulator.<sup>104</sup>

The CFTC can ban bitcoin futures as well, but a general rule prohibiting trading in bitcoin futures can also be considered after other regulatory methods have failed.<sup>105</sup> If the concern regarding bitcoin futures is risk, there are other ways to address it.

2. *Position Limits.* One risk management option is to put a limit on the number of positions that may be held by any person. Position limits serve “(i) to diminish excessive speculation . . . ; (ii) to deter and prevent market manipulation, squeezes, and corners; (iii) to ensure sufficient market liquidity for bona fide hedgers; and (iv) to ensure that the price discovery function of the underlying market is not disrupted.”<sup>106</sup>

Title VII, Section 737 of Dodd-Frank allowed the CFTC to establish position limits for certain commodity-based derivatives, such as futures.<sup>107</sup> The clearinghouse and clearing members can also set position limits. For example, CME designed its contract with professional traders in mind, and each contract is equal to five bitcoin, compared to CBOE’s contracts that are only one bitcoin in size.<sup>108</sup> These sorts of limits curtail the amount of risk

102. Elizabeth Dilts et al., *Merrill Lynch Bans Clients from Investing in Silbert Bitcoin Fund*, REUTERS (Jan. 3, 2018, 6:55 PM), <https://www.reuters.com/article/us-bank-of-america-merrill-lynch-bitcoin/merrill-lynch-bans-clients-from-investing-in-silbert-bitcoin-fund-idUSKBN1ET02N> [<https://perma.cc/S5GU-GUXX>]. The ban applied to all accounts and precludes the firm’s roughly 17,000 advisers from trying to sell bitcoin-related investments. *Id.*

103. Evelyn Cheng & Cheang Ming, *Bitcoin Briefly Falls 11% After South Korea Moves to Ban New Cryptocurrency Trading Accounts*, CNBC (Dec. 28, 2017, 2:47 AM), <https://www.cnbc.com/2017/12/28/bitcoin-drops-11-percent-as-south-korea-moves-to-regulate-cryptocurrency-trading.html> [<https://perma.cc/8R5N-A4YG>].

104. Gareth Allan & Yuki Hagiwara, *Bitcoin Futures Get Cold Shoulder from Japanese Regulator*, BLOOMBERG (Jan. 24, 2018), <https://www.bloomberg.com/news/articles/2018-01-24/bitcoin-futures-get-cold-shoulder-from-japan-financial-regulator> [<https://perma.cc/WU6H-UF64>].

105. Excessive regulation or an outright ban of bitcoin would not serve an overarching goal of continual technological innovation. Stuart Minor Benjamin & Arti K. Rai, *Fixing Innovation Policy: A Structural Perspective*, 77 GEO. WASH. L. REV. 1, 1, 8 (2008).

106. 7 U.S.C. § 6a(a)(3)(B)(i)–(iv) (2012).

107. Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. 111–203, § 737(a)(4), 124 Stat. 1376, 1723 (2010) (codified as amended at 7 U.S.C. § 6a(a)(2)(A)) (“[T]he commission shall by rule . . . establish limits on the amount of positions, as appropriate, other than bona fide hedge positions, that may be held by any person with respect to contracts of sale for future delivery or with respect to options on the contracts or commodities traded . . .”).

108. Gregory Meyer, *Bitcoin Futures Will Be a ‘Slow Grower’ and That’s Okay, Says CME Chief*, FIN. TIMES (Feb. 1, 2018), <https://www.ft.com/content/44893d1e-0763-11e8->

each trader can carry when it comes to bitcoin futures.

3. *Margins.* Futures are highly leveraged because traders can put down a deposit that is a low percentage of the total value of the assets being traded, which magnifies gains or losses.<sup>109</sup> The deposit—also known as the initial margin—is set for each type of futures contract by the exchange or clearinghouse.<sup>110</sup>

To control the risk of default, clearinghouses maintain a margining regime that includes not only initial margin but also variation margin. Both are collateral generally consisting of cash or securities posted by a clearing member to protect the clearinghouse in case of default.<sup>111</sup> Initial margin covers the estimate of potential future losses in managing a default in normal market conditions.<sup>112</sup> “The variation margin is the daily debit and credit of profit and loss on the existing trades,” keeping the clearinghouse’s risk current and preventing it from accumulating.<sup>113</sup>

Bitcoin’s volatility led CME to require traders to post margin deposits of more than forty percent on their bitcoin futures.<sup>114</sup> Most futures contracts have margin in the single digits.<sup>115</sup> Reducing margin would make bitcoin less expensive to trade and thus more appealing, but it might also mean introducing risks to CME’s clearing system. Therefore, margin requirements can offset the risk of default.

4. *Guarantee Funds.* Further financial buffers exist in the guarantee funds of the clearinghouses, which are drawn upon to cover bad trades.<sup>116</sup> These clearinghouses require such funds from

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9650-9c0ad2d7c5b5 [https://perma.cc/XWY8-S38C]; see also *supra* text accompanying note 70.

109. Anita K. Krug, *Uncertain Futures in Evolving Financial Markets*, 93 WASH. U. L. REV. 1209, 1259 & n.271 (2016).

110. *Id.* at 1213, 1230.

111. See Allen, *supra* note 53, at 1088 n.30.

112. *Id.* at 1088–89.

113. *Id.*

114. John McCrank et al., *Bitcoin Futures Contracts at CME and Cboe*, REUTERS (Dec. 15, 2017, 1:10 PM), <https://www.reuters.com/article/uk-bitcoin-futures-contracts/bitcoin-futures-contracts-at-cme-and-cboe-idUSKBN1E92K9> [https://perma.cc/ZXN9-SLRT].

115. Gregory Meyer et al., *Bitcoin Futures Face Safeguards to Tackle Wild Gyration*, FIN. TIMES (Nov. 16, 2017), <https://www.ft.com/content/4bbf1ef6-ca4a-11e7-ab18-7a9fb7d6163e> [https://perma.cc/GJ8D-UHN9].

116. Allen writes:

In the case of [LCH] member default, the order of funds used to cover the default is the following: the initial margin, the member’s default fund contribution, LCH’s own capital (up to £20 million), the remaining default fund, SwapClear contributions (in the case of a member of one specific product,

their clearing members.<sup>117</sup> Often, clearinghouses design “the default fund to cover potential market risk over and above initial margin in stressed conditions following a clearing member default.”<sup>118</sup>

“[I]f the clearinghouse is not sufficiently capitalized, the chances of insolvency increase.”<sup>119</sup> Setting appropriate collateral and capital requirements is thus an important process that ultimately determines the clearinghouse’s ability to contain a member default.<sup>120</sup> It will remain to be seen “[w]hether existing derivatives clearinghouses will continue to maintain sufficient collateral, capital, and default fund requirements” in light of the riskiness of bitcoin futures.<sup>121</sup> There is also a moral hazard problem with using the same guarantee fund for bitcoin futures as other futures, with the incentive for bitcoin futures to take advantage of the safety net by taking excessive risk.<sup>122</sup>

To minimize the risk of clearinghouse insolvency stemming from bitcoin futures, separate guarantee funds can be introduced for these trades. This would ensure that only parties that trade bitcoin futures would be financially responsible for contributing to

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SwapClear, which clears interest rates swaps, LCH has the right to request £50 million from each remaining SwapClear member on a nonvoluntary basis), and finally the remainder of LCH’s capital.

Allen, *supra* note 53, at 1089 n.36 (footnote omitted).

117. Jerry Markham, *Custodial Requirements for Customer Funds*, 8 BROOK. J. CORP. FIN. & COM. L. 92, 128 (2013). In addition, “[e]xchanges that earn revenues in excess of costs typically invest these surpluses in guarantee funds or the exchange clearinghouse to be used only in the event of a default on futures contracts. Exchange assets are distributed to members only upon dissolution of the exchange.” Craig Pirrong, *A Theory of Financial Exchange Organization*, 43 J. L. & ECON. 437, 459 (2000).

118. Allen, *supra* note 53, at 1089. There could also be an insurance scheme or self-insurance scheme, and there have even been discussions of third-party reinsurers. See, e.g., Jeffrey Manns, *Insuring Against a Derivative Disaster: The Case for Decentralized Risk Management*, 98 IOWA L. REV. 1575, 1606, 1611–24 (2013). Although this has been rejected before, it could serve a role given the riskiness of bitcoin futures.

In 1985, the CFTC staff found that failures by FCMs had increased since the CFTC’s prior report on account insurance. Twenty-four FCMs failed during that period with losses averaging \$2 million annually. Nevertheless, the estimated losses from FCM bankruptcies between 1938 and 1985 amounted to less than \$10 million, and no action was taken by the CFTC to seek additional legislation for account insurance.

Markham, *supra* note 117, at 127–28 (footnotes omitted).

119. Allen, *supra* note 53, at 1092. See Yesha Yadav, *Clearinghouses and Regulation by Proxy*, 43 GA. J. INT’L & COMP. L. 161, 165 (2014).

120. Allen, *supra* note 53, at 1092.

121. *Id.*

122. *Id.* at 1087 n.25 (“Scholars have also expressed concern about incentive problems resulting from mandatory clearing of financial products, distinct from those explained in this Note, relating to moral hazard and excessive risk taking.” (citation omitted)).

its guarantee fund.<sup>123</sup> This risk-minimizing approach would address clearing members' concern that even if they do not deal in bitcoin futures, they will be forced to cover any losses should a counterparty to a bitcoin futures contract default.

CME Clearing already has two independent guarantee funds and financial safeguard waterfalls: one for Interest Rate Swaps (IRS), and one for futures and cleared OTC products other than IRS (the Base Guaranty Fund).<sup>124</sup> This structure precludes commingling because “[t]he contributions from one waterfall cannot be used to cure losses in a different waterfall.”<sup>125</sup> Bitcoin futures are currently part of the Base waterfall, but to minimize risk and contagion, they can be separated from the existing waterfalls to minimize risk.

5. *Stress Testing.* The idea of stress testing, a category of regulation, is not new.<sup>126</sup> The health of much of the financial sector, including banks, has been left to stress testing.<sup>127</sup> Stress

123. Markham notes:

Presumably, a customer guaranty fund would operate in much the same manner but would be in addition to the clearinghouse funds. What is unanswered is whether the customer guaranty fund would be firm-specific or industry-wide. It would, in any event, probably be financed through transaction fees paid by customers as they trade.

Markham, *supra* note 117, at 128.

124. CHI. MERCANTILE EXCH. GRP., CME CLEARING RISK MANAGEMENT AND FINANCIAL SAFEGUARDS 3, 12 (2018), <http://www.cmegroup.com/clearing/files/financialsafeguards.pdf> [https://perma.cc/23CC-LKGB].

125. *Id.* at 3.

126. Weber writes about stress testing:

Although stress analysis is a parvenu in the bank regulatory regime, it has a long history in the engineering field from as early as the sixteenth century. These early stress testing methodologies evolved into professional norms on the part of engineers to remain focused on worst-case scenarios when designing and building structures, materials, and systems. Financial firms have adopted an extensive suite of stress testing techniques alongside their risk management systems.

Robert Weber, *A Theory for Deliberation-Oriented Stress Testing Regulation*, 98 MINN. L. REV. 2236, 2324–25 (2014).

127. Behzad Gohari & Karen E. Woody, *The New Global Financial Regulatory Order: Can Macroprudential Regulation Prevent Another Global Financial Disaster?*, 40 J. CORP. L. 403, 420–22 (2015). However, there are criticisms of stress testing. For example:

First, the various capital adequacy and liquidity ratio scenarios that were used in the initial round of stress tests were criticized as being too lenient and thus able to produce a false positive. Second, the macroeconomic indicator assumptions about the scenarios that these entities may face were also criticized as too optimistic, further exacerbating the problem of test validity. Third, choosing which institutions need to be tested is a tacit admission of their importance to the macroeconomic health of the country, and, as such, enshrines their status as “too big to fail.”

*Id.* at 432–33. Methodological issues include claims that the tests are not adverse enough

testing examines the performance of the regulated entity in hypothetical, challenging circumstances.<sup>128</sup>

Bank stress testing is performed under the authority of the Dodd-Frank Act and is based on hypotheticals set by government regulators.<sup>129</sup> Specifically, financial system modeling allows the introduction of variables that approximate various adverse economic developments, allowing an assessment of results if the system were under stress.<sup>130</sup>

There have been several issues regarding stress testing since its rise as a major indicator of a financial institution's health. For example, one commentator has criticized the regulation-by-hypothetical regime, namely by stress tests and living wills,<sup>131</sup> and others have suggested it must be either abandoned or strengthened because of its current flaws.<sup>132</sup> Methodological issues include whether the tests are adverse enough or too

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and are too narrowly focused both on a single static point in time and single data point. Mehrsa Baradaran, *Regulation by Hypothetical*, 67 VAND. L. REV. 1247, 1251, 1297, 1299 (2014).

128. "LCH's stress testing for the default fund creates a concrete example of the complexity involved in managing risk." Allen, *supra* note 53, at 1091.

LCH uses a stress-testing model that uses around sixty scenarios representing stressed conditions in the key contracts cleared by LCH. The scenarios are mostly based on historical events, such as Hurricane Katrina and the largest moves historically both up and down in specific contracts; however, the model also includes some theoretical scenarios.

*Id.* at 1089 n.34.

129. Clark and Ryu write about stress tests:

[T]he genesis of the current supervisory stress tests and CCAR dates back to early 2009, when supervisors conducted simultaneous stress tests of the 19 largest U.S. BHCs (the Supervisory Capital Assessment Program or SCAP) in the midst of the financial crisis.

. . . . [T]he SCAP stress test assessed potential losses and capital shortfalls at the 19 large BHCs under a uniform scenario that was, by design, even more severe than the expected outcome at that time.

Tim P. Clark & Lisa H. Ryu, *CCAR and Stress Testing as Complementary Supervisory Tools*, BOARD GOVERNORS FED. RES. SYS., <http://www.federalreserve.gov/bankinfo/ccar-and-stress-testing-as-complementary-supervisory-tools.htm> [<https://perma.cc/8P42-3YMV>] (last updated June 24, 2015).

130. Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. 111–203, § 165, 124 Stat. 1376, 1430 (2010) (codified as amended at 12 U.S.C. § 5365(i) (2012)); Margaret Ryznar et al., *Implementing Dodd-Frank Act Stress Testing*, 14 DEPAUL BUS. & COM. L.J. 323, 329–30 (2016).

131. Nizan Geslevich Packin, *The Case Against the Dodd-Frank Act's Living Wills: Contingency Planning Following the Financial Crisis*, 9 BERKELEY BUS. L.J. 29, 66, 75–76 (2012).

132. Baradaran, *supra* note 127, at 1325–26. See also Jonathan C. Lipson, *Against Regulatory Displacement: An Institutional Analysis of Financial Crises*, 17 U. PA. J. BUS. L. 673, 723–24 (2015) ("While stress tests and living wills are laudable, they seem unlikely to overcome the uncertainty and complexity of Dodd-Frank's resolution regime, and the incentive effects it will have on potential pre-failure negotiations.").

narrowly focused both on a single static point in time and single data point.<sup>133</sup> There have been some concerns caused by the consistently positive results delivered by stress tests.<sup>134</sup>

When the government conducts what it claims to be a rigorous stress test of a bank and then gives that bank a clean bill of health, the market receives a signal not only that the bank's risks are well managed but also that the government itself will stand behind the bank if the assessment proves incorrect.<sup>135</sup>

There is an additional risk in these stress tests that the model used does not accurately reflect all possible outcomes. Any sort of model requires justification of why certain variables are in the model and what values are used for the variables.<sup>136</sup> Otherwise, the model does not accurately reflect reality, which is called "model risk."<sup>137</sup> Model risk is managed by model validation, which is the effective and independent challenge of each model's conceptual soundness and control environment.<sup>138</sup>

Despite these drawbacks, stress testing can be used in the bitcoin context by stress testing bitcoin-futures positions at the clearinghouses.<sup>139</sup> A failed stress test would raise concerns about whether a firm or clearinghouse has enough capital to stay solvent in case of a default.

6. *Hacking Concerns.* The essence of cryptocurrency is its digital nature, which raises cybersecurity issues such as the theft of bitcoin and software hacking.<sup>140</sup> In 2014, Bitcoin hacking bankrupted a leading exchange in Japan called Mt. Gox, with approximately half-a-billion dollars in bitcoin (850,000 bitcoin) stolen.<sup>141</sup> While 200,000 bitcoin were recovered within six months,

133. Baradaran, *supra* note 127, at 1297–99.

134. *See id.* at 1287–88, 1297–99.

135. *Id.* at 1252.

136. *See* Edward L. Pittman, *Quantitative Investment Models, Errors, and the Federal Securities Laws*, 13 N.Y.U. J.L. & BUS. 633, 719 (2017); Ryznar et al., *supra* note 130, at 326.

137. Pittman, *supra* note 136, at 648, 653–54, 713.

138. *See id.*

139. *See* Press Release, U.S. Commodity Futures Trading Comm'n, CFTC Announces Clearinghouse Liquidity Stress Test Results (Oct. 16, 2017), <http://www.cftc.gov/PressRoom/PressReleases/pr7630-17> [<https://perma.cc/C4S2-W55K>].

140. *See* Angela Walch, *The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk*, 18 N.Y.U. J. LEGIS. & PUB. POL'Y 837, 855–58 (2015) (exploring the risks generated by Bitcoin's most basic features, which include its status as software, its decentralized structure, its open-source software development process, and its expertise problem).

141. Misha Tsukerman, *The Block Is Hot: A Survey of the State of Bitcoin Regulation*



their dollar value sunk by the revelation of weak security, and the incident showed that hacks impact bitcoin's trading price. Exchange customers had no remedy.<sup>142</sup>

Bitcoin is susceptible to hacking because its anonymity obscures its custody and ownership. In contrast, it is harder to steal stock because it has more of an ownership record.<sup>143</sup> Furthermore, there is no central ownership or management of bitcoin that will address any problems.<sup>144</sup> This increases the risk level related to bitcoin futures, with the potential to impact the broader financial market. As a result, cybersecurity issues surrounding bitcoin should be considered in any potential regulatory scheme.

## V. CONCLUSION

The recent emergence of bitcoin futures poses unique risks to the economy, raising questions of regulation. The potential regulatory regime for bitcoin futures includes position limits and stress testing.

Some observers think bitcoin will fail before a regulatory approach can develop. Indeed, bitcoin has its shortcomings that might slow its growth, including the length to process transactions, high fees, and volatility. Perhaps new products will replace bitcoin.

The future is unclear about what new products will be coming next, but lessons from bitcoin apply to other cryptocurrencies and similar ventures.<sup>145</sup> While products may be new, their risks are old. These familiar risks should be addressed in order to minimize the chance of a financial crisis.

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and *Suggestions for the Future*, 30 BERKELEY TECH. L.J. 1127, 1149–50 (2015).

142. Jason S. Seligman, *Cyber Currency: Legal and Social Requirements for Successful Issuance Bitcoin in Perspective*, 9 OHIO ST. ENTREPREN. BUS. L.J. 263, 264 (2015).

143. See *supra* Part II.

144. See *id.*

145. Annie Massa, *CME Takes Cautious Stance Toward Crypto-Futures Besides Bitcoin*, BLOOMBERG (Feb. 1, 2018), <https://www.bloomberg.com/news/articles/2018-02-01/cme-takes-cautious-stance-toward-crypto-futures-besides-bitcoin> [<https://perma.cc/VQ9U-SJMJ>] (“CME Group Inc. doesn’t plan to offer futures based on cryptocurrencies other than Bitcoin any time soon, in contrast to rival Cboe Global Markets Inc.’s openness to the idea.”). Indeed, bitcoin is currently the most dominant currency among over 500 virtual currencies. Trautman & Harrell, *supra* note 44, at 1097.

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