# Blockchain Disruption: Digital Assets Are Changing How We Do Business

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## ABSTRACT

Digital assets are changing the way businesses think about equity, labor, business models, and business organization. Digital assets, like Bitcoin or Ethereum, provide incredible opportunities to further align shareholders with the objectives of the entity.

Each time humanity advances its technology for ledgers, markets explode, and we witness immense wealth creation. Digital assets like Bitcoin and Ethereum are the next great step forward for ledger technology.

While there are incredible opportunities to leverage this new technology, there are also incredible risks. There are many public examples of "hacks" of prominent blockchains like Ethereum and Solana. Blockchain technology has captured the imagination of the public. Blockchain, therefore, must develop a robust security system and intelligently distribute and limit liability for institutional and retail investors to reap the rewards of public attention.

Part of the risk that comes from digital assets is its newness. Blockchains that run smart contracts have many incredible uses that could eliminate middlemen in many industries. But courts are yet to develop case law surrounding smart contracts. The way that smart contracts self-execute presents a new question which courts must address: how should a court allocate risk between two smart-contracting parties?

No matter how the courts decide, the market needs an answer. This article attempts to explore some of the opportunities in digital assets and how these opportunities are fundamentally different from their traditional equivalents.

## I. INTRODUCTION

What if Marriot could offer discounted hotel rooms to investors with over $100,000 worth of Marriot stock, VIP Lounge Access to investors who held Marriot stock for at least ten years, or free meals at Marriot properties to investors who referred a friend to invest? The blockchain and digitization of ownership will allow entities to engage in various manners of new and exciting incentives.[1] Digitization will bring ownership and the underlying asset

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1.    *See* Baxter Hines, Digital Finance, Security Tokens and Unlocking the Real Potential of Blockchain 63 (2020).

closer together than ever before.[2] Plus, ownership transfer through the blockchain is cheaper, more secure, and faster than any Wall Street transaction.[3]

In March of 2022, Bitcoin's market cap surpassed the Russian Ruble to make it a "top 15 currency" in the world.[4] Solidifying this position, "[i]nstitutional investments in digital assets" surged throughout 2021.[5] The discussion in the blockchain community has shifted from how to attract institutional investment to how to build infrastructure to retain institutional investment.[6] Protecting this institutional money on the blockchain will require a massive and coordinated effort from cybersecurity engineers, financial coordinators, and lawyers.[7]

Cryptocurrency is an encrypted and decentralized currency that internet users can exchange, much like ordinary currency, for services and items.[8] Encryption is the "technical processes of converting plaintext into ciphertext."[9] While "decentralization refers to the transfer of control and decision-making from a centralized entity . . . to a distributed network."[10]

In 1989, Tim Berners-Lee, a scientist at CERN, invented the World Wide Web as a tool for "automated information-sharing between scientists in universities and institutes around the world."[11] The first era of the internet,

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2.    *Id.*

3.    *Id.*

4.    Oluwapelumi Adejumo, *Bitcoin is now a top 15 currency as it surpasses Russian Ruble*, CRYPTOSLATE (Mar. 1, 2022, 9:11 PM), https://cryptoslate.com/bitcoin-is-now-a-top-15-currency-as-it-surpasses-russian-ruble/ [https://perma.cc/WYD6-KSC3].

5.    *Building a Secure Crypto Infrastructure for Institutional Investors*, COINDESK (Dec. 22, 2021, 8:54 AM), https://www.coindesk.com/sponsored-content/building-a-secure-crypto-infrastructure-for-institutional-investors/ [https://perma.cc/C9CQ-XKVA].

6.    *Id.*

7.    *See id.*

8.    Kate Ashford & John Schmidt, *What Is Cryptocurrency?*, FORBES (Jan. 25, 2022, 4:15 PM), https://www.forbes.com/advisor/investing/what-is-cryptocurrency/ [https://perma.cc/W6V5-4F9T].

9.    Cryptopedia Staff, *What Is Encryption? A Brief Overview*, GEMINI (Apr. 20, 2021), https://www.gemini.com/cryptopedia/what-is-encryption-blockchain-symmetric-asymmetric [https://perma.cc/C9CQ-XKVA].

10.   *What is Decentralization in Blockchain?*, AMAZON, https://aws.amazon.com/blockchain/decentralization-in-blockchain/ [https://perma.cc/9UJB-N623].

11.   *The birth of the Web*, CERN, https://home.cern/science/computing/birth-web [https://perma.cc/XM75-2EM8].

Web 1.0, consisted of static pages with few content creators.[12] The second era of the internet, Web 2.0, is the internet of today, where companies "provide services in exchange for your personal data."[13] The third era of the internet, Web 3.0 (Web3), is the internet of tomorrow, where developers create decentralized applications (dApps) which run on the blockchain.[14]

During the COVID-19 pandemic, Web3 inundated the zeitgeist of finance. While cryptocurrencies captured the public's attention in 2021, it is blockchain's financial instruments and organizations that will catalyze the adoption of Web3: (1) Smart contracts will replace financial services like escrow, insurance, and underwriting; (2) Decentralized Autonomous Organizations (DAOs) will create new business opportunities for historically disenfranchised groups while disrupting long standing legal principles of business entity law; and (3) crypto-lending and staking will shift the distribution of capital with attractive interest rates. In total this comment will explore a limited number of Web3 disruptions to traditional financial entities and transactions.

## II.   HISTORY OF BLOCKCHAIN FINANCE

### A.   A Brief Overview of Currency and Wealth from Cattle to Crypto

Before civilization had liquid currency to facilitate trade, many cultures bartered for items. One of the earliest forms of currency was Cattle.[15] In fact, a Mesopotamian named Nanni penned the earliest recorded customer complaint nearly 4,000 years ago.[16] Upset over a copper ingot shipment's quality, Nanni wrote to the merchant Ea-nasir that from now on, Nanni would "exercise against [Ea-nasir his] right of rejection."[17]

In the time since Cattle exchanged hands directly, currency has evolved into a complex web of actors attempting to influence the market. Currently, the United States operates on a fiat currency system.[18] "[F]iat currency—

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12.   Madhurkant Sharma, *Web 1.0, Web2.0 and Web 3.0 with their difference*, GEEKSFORGEEKS (Jan. 27, 2022), https://www.geeksforgeeks.org/web-1-0-web-2-0-and-web-3-0-with-their-difference/ [https://perma.cc/VP67-5YZ2].

13.   *WEB2 VS WEB3*, ETHEREUM, https://ethereum.org/en/developers/docs/web2-vs-web3/ [https://perma.cc/E7Z9-8Q32].

14.   *See id.*

15.   *The History of Money*, PBS (Oct. 25, 1996), https://www.pbs.org/wgbh/nova/article/history-money/ [https://perma.cc/XBE7-6FL7].

16.   *See Clay Tablet Containing Letter from Ea-nasir to Nanni*, (1750 B.C.) ARCHAEOLOGICAL INST. AM., (May/June 2016), https://www.archaeology.org/issues/213-1605/features/4368-cuneiform-letters [https://perma.cc/YDC6-QC54].

17.   *Id.*

18.   *See Fiat v. Virtual Currency*, TEXAS STATE SEC. BD., https://www.ssb.texas.gov/fiat-v-virtual-currency [https://perma.cc/K6JN-H7AW].

such as dollars, euros, pounds, or yen—is a trusted medium of exchange, or legal tender, that is issued by a recognized government authority."[19] One of the primary benefits to virtual currencies is that they cut out intermediaries.[20] Instead they engage in peer-to-peer transactions which the blockchain can verify.[21] This verification system requires no trust between users.[22] Blockchain's disruptive potential makes financial intermediaries and government regulators nervous.[23] For instance, the Texas State Securities Board touts that virtual currencies are not legal tender, are unregulated, and have no consumer protections.[24] But in 2021, El Salvador became the first country to recognize Bitcoin as legal tender.[25]

When a person or entity plans to create a cryptocurrency, they will release a "white paper." A "white paper" outlines the "purpose and the technology behind" the cryptocurrency.[26] On April 23, 2011, Satoshi Nakamoto released the Bitcoin white paper in an email saying, "I've moved on to other things."[27] Following this cryptic email, no one has ever seen or heard from Nakamoto, and their identity remains in much dispute.[28] The Bitcoin "white paper," however, set out the plan for "the first functional digital currency powered by a distributed ledger technology called blockchain."[29]

## B.   Society Improves Each Time It Enhances Its Ledgers

Having a reliable way to record information about parties and their relationships allows for a more sophisticated web of relationships between parties with no prior relationships. "A ledger is a book containing accounts to

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19.   *Id.*

20.   *See id.*

21.   *Id.*

22.   *Id.*

23.   *Fiat*, *supra* note 18.

24.   *Id.*

25.   Joe Hernandez, *El Salvador Just Became the First Country to Accept Bitcoin as Legal Tender*, NPR (Sept. 7, 2021, 4:57 PM), https://www.npr.org/2021/09/07/1034838909/bitcoin-el-salvador-legal-tender-official-currency-cryptocurrency [https://perma.cc/3RFW-6WJY].

26.   *What's a Whitepaper in Cryptocurrency? What's Its Purpose?*, NDTV (Oct. 1, 2021, 6:30 AM), https://www.ndtv.com/business/what-are-whitepapers-in-the-world-of-cryptocurrency-2556831#:~:text=What%20is%20a%20whitepaper%3F,and%20other%20data%20about%20cryptocurrency [https://perma.cc/MRP8-DCVK].

27.   Ollie Leech, *Bitcoin White Paper Celebrates 13th Birthday*, CoinDesk (Jan. 21, 2021, 1:22 PM), https://www.coindesk.com/tech/2021/01/21/what-is-the-bitcoin-white-paper/ [https://perma.cc/PD35-XG4H].

28.   *Id.*

29.   *Id.*

which debits and credits are posted from books of original entry."[30] Each time a new form of ledger emerges, society takes an incredible leap forward.[31] Mesopotamian Cuneiform allowed recordkeeping to show the quantities of barley meal and malt needed to make types of beers.[32] The notion of balancing an entity's accounts through double-entry bookkeeping was first recorded in 1494 by Luca Pacioli, the "Father of Accounting."[33] Werner Sombart, a Marxist economist, remarked that "capital, as a category, did not exist before double-entry bookkeeping."[34] Next banks began to use money in ledgers rather than measuring "a quantity of something tangible owned or owed."[35] So "[h]umanity's primal motivation to gather wealth was redirected away from real goods to ledger numbers on paper and electronic databases."[36] The next leap forward is the distributed ledger.

## C.  Ethereum Demonstrates the Vast Potential and Danger of Distributed Ledgers

One such blockchain is the Ethereum network. Ethereum's model of decentralization means that "[a]nyone who is on the network has permission to use the service."[37] Users and services cannot block each other or "deny . . . access to the service."[38] And "[p]ayments are built in" through the Ethereum currency.[39]

In 2016, investors started a Decentralized Autonomous Organization (DAO) with the intent "to act as an investor-directed venture capital firm."[40] The DAO raised approximately $150 million USD worth of Ethereum's na-

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30.  *Ledger*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/ledger [https://perma.cc/9ZB6-VTVL].

31.  *See* LLFOURN, *A Brief History of Ledgers*, MEDIUM (Feb. 15, 2018) https://medium.com/unraveling-the-ouroboros/a-brief-history-of-ledgers-b6ab84a7ff41 [https://perma.cc/MP4G-YLCX].

32.  *See id.*

33.  *Double Entry*, CORP. FIN. INST., https://corporatefinanceinstitute.com/resources/knowledge/accounting/double-entry/ [https://perma.cc/RBX7-4FX2].

34.  LLFOURN, *supra* note 31; *See* Bruce G. Carruthers & Wendy Nelson Espeland, *Accounting for Rationality: Double-Entry Bookkeeping and the Rhetoric of Economic Rationality*, 97 AM. J. SOCIO. 31, 33 (Jul. 1991).

35.  LLFOURN, *supra* note 31.

36.  *Id.*

37.  ETHEREUM, *supra* note 13.

38.  *Id.*

39.  *Id.*

40.  Cryptopedia Staff, *What Was The DAO?*, GEMINI (Mar. 16, 2022), https://www.gemini.com/cryptopedia/the-dao-hack-makerdao#section-what-is-a-dao [https://perma.cc/GEB8-4CZY].

tive coin, ETH, from more than 11,000 investors.[41] But hackers then exploited a vulnerability in the DAO's computer code.[42] Ultimately, it lost around $60 million worth of ETH.[43] Someone claiming to be the attacker "published an open letter to the Ethereum community that claimed the funds had been obtained in a 'legal' way in accordance with the rules set out in the smart contract."[44] To "return the money to its original owners, Ethereum core developers chose to implement a hard fork."[45]

So, then there were two Ethereum blockchains. Ethereum Classic chose not to erase the theft, instead supporting "[a] truly immutable blockchain with a permanent record of the network's entire history, including a successful cybertheft."[46] Ethereum chose to revise the blockchain to erase the theft.[47] The "proponents of Ethereum Classic argue that the [Ethereum] hard fork hypocritically enabled the very thing that blockchain technology is meant to prevent—subjective human manipulation."[48] The blockchain is engaging in a conversation as to the value of equity in parallel to the legal field's recent evaluations of equity, which can be distilled to whether society should privilege "the ex ante perspective of the parties intent at the time of [a contract's] formation," or "the ex post perspective of justice and fairness to the parties at the time of adjudication."[49]

The blockchain penetrates other social decisions, too, such as environmentalism. Bitcoin miners opened a bitcoin mine on top of "the last working coal plant in the state of New York."[50] The plant, northeast of Niagara falls, is "ripe for Bitcoin mining" because of "its cheap hydroelectric power and abundance of shuttered power plants" which "often [have] existing connections to the power grid."[51] While embodying the spirit of recycling, these

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41.  *Id.*

42.  *Id.*

43.  *Id.*

44.  *Id.*

45.  Cryptopedia Staff, *Ethereum Classic (ETC): A Rift in the Blockchain Community*, Gemini (Dec. 3, 2021), https://www.gemini.com/cryptopedia/ethereum-classic-etc-vs-eth#section-ethereum-vs-ethereum-classic [https://perma.cc/4XLM-GM2C].

46.  *Id.*

47.  *Id.*

48.  *Id.*

49.  *Compare id.*, *with* Jody S. Kraus & Robert E. Scott, *The Case Against Equity in American Contract Law*, 93 S. Cal. L. Rev. 1323, 1327 (2020).

50.  Corey Kilgannon, *A Bitcoin Boom Fueled by Cheap Power, Empty Plants and Few Rules*, N.Y. Times (Dec. 6, 2021), https://economictimes.indiatimes.com/markets/cryptocurrency/a-bitcoin-boom-fueled-by-cheap-power-empty-plants-and-few-rules/articleshow/88118672.cms [https://perma.cc/D4RD-KCFT].

51.  *Id.*

mines "[g]lobally . . . consume more electricity annually than all of Argentina."[52] China, a historically massive holder of bitcoin mines, "banned [bitcoin mining] this year to help achieve [China's] carbon-reduction goals."[53]

Further, the mainstream adoption of blockchain technology and cryptocurrencies could lead to further income inequality.[54] Bitcoin's massive increase in price created new mines. mines.[55] Wealthy investors "increasingly [view] cryptocurrencies the way they see other high-risk assets, like private equity shares and venture capital."[56] This increase in price, including the high barriers to entry for some cryptocurrencies, could lead to the continued exclusion of persons previously excluded by traditional finance.[57]

Additionally, miners use Graphics Processing Units (GPUs) to mine cryptocurrencies which has caused a shortage of GPUs in the market.[58] While the GeForce RTX 3060 Ti GPU sells for $400, the average price on eBay for that GPU in November of 2021 was $946.[59] Because most users can only purchase a GPU on the secondary market, blockchain mining becomes increasingly inaccessible to the poor.[60]

However, some commentators note "that cryptocurrencies can contribute positively to reduce the global imbalance of income and wealth distribu-

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52. *Id.*

53. *Id.*

54. Ashish Rajendra Sai et al., *Characterizing Wealth Inequality in Cryptocurrencies*, FRONTIERS IN (Dec. 20, 2021), https://www.frontiersin.org/articles/10.3389/fbloc.2021.730122/full#h7 [https://perma.cc/823J-6K2E].

55. *See* Megan DeMatteo, *Bitcoin Doubled Its Value in 2021, Then Lost It All in the First Month of 2022. Here's a Look at Its Price Over the Years*, TIME NEXTADVISOR (Jan. 28 2022), https://time.com/nextadvisor/investing/cryptocurrency/bitcoin-price-history/ [https://perma.cc/F35S-6PD6].

56. Paul Sullivan, *As Bitcoin's Price Surges, Affluent Investors Start to Take a Look*, N.Y. TIMES (Jan. 29, 2021), https://www.nytimes.com/2021/01/29/your-money/bitcoin-wealth-investors.html [https://perma.cc/H3UX-6GES].

57. *See* Sai et al., *supra* note 54.

58. Griffin Davis, *Nvidia, AMD Cryptomining To Continue Until 2022 — How Can ETH Help GPU Shortage?*, TECH TIMES (Oct. 26, 2021, 1:10 PM), https://www.techtimes.com/articles/267141/20211026/nvidia-amd-cryptomining-continue-until-2022-ethereum-help-gpu-shortage.htm [https://perma.cc/CBU5-Z29Z].

59. Tim Schiesser, *GPU Availability and Pricing Update: November 2021 Will GPU Pricing Ever Go Down?*, TECHSPOT (Nov. 19, 2021), https://www.techspot.com/article/2369-gpu-pricing-2021-update/#:~:text=Nvidia%20GPUs%20saw%20an%20average,3070%20which%20rose%20by%204%25.&text=despite%20these%20price%20increases%2C%20Nvidia,we've%20seen%20in%202021 [https://perma.cc/5CCW-4QKG].

60. *Id.*

tion."[61] The blockchain's ability to fight inequality rests on its ability to include previously excluded groups.[62] Researchers use the Gini coefficient to measure income inequality in populations.[63] A Gini value of zero "indicates a perfectly equal distribution of income or wealth within a population," while "[a value] of one represents a perfect inequality when one person in a population receives all the income."[64] In 2021, researchers measured the Gini value of Bitcoin at .65, which is comparatively close to Australia's Gini score.[65] Dogecoin held "the highest observed Gini" value of .82, which is just under the United States score of .85.[66] However, the blockchain's observable level of inequality could merely be the result of our current economic system adopting these cryptocurrencies.[67]

The blockchain has already inherited some of the vices of the traditional market like day trading.[68] Day traders trade "one or more securities throughout the day to turn a profit, [w]hile traditional buy-and-hold investors are concerned with the long-term performance of a company."[69] The United States Securities and Exchange Commission (SEC) does not consider day trading to be illegal, but it acknowledges the extreme risk it poses to unsophisticated parties.[70] The SEC warns that "[m]ost individual investors do not have the wealth, the time, or the temperament to make money and to sustain the devastating losses that day trading can bring"[71] Yet, popular news sites push articles with headlines like *5 Strategies to Start Day Trading Crypto*[72]

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61. Sai et al., *supra* note 54.

62. *See id.*

63. *Gini Coefficient*, Corp. Fin. Inst., https://corporatefinanceinstitute.com/resources/knowledge/economics/gini-coefficient/ [https://perma.cc/3E78-DTBS].

64. *Id.*

65. Sai et al., *supra* note 54.

66. *Id.*

67. *See id.*

68. Ryan Austin, *5 Strategies to Start Day Trading Crypto*, Business Insider (Nov. 10, 2021, 9:05 AM), https://www.businessinsider.com/day-trading-crypto [https://perma.cc/2XRU-G53U].

69. *Id.*

70. *Day Trading: Your Dollars at Risk*, U.S. Sec. & Exch. Comm'n (Apr. 20, 2005), https://www.sec.gov/reportspubs/investor-publications/investorpubsday tipshtm.html#:~:text=While%20day%20trading%20is%20neither,that% 20day%20trading%20can%20bring [https://perma.cc/8H5U-GABK].

71. *Id.*

72. Austin, *supra* note 68.

and *How to Make $100 a Day Trading Crypto*.[73] The market peddles high
risk equity positions to the average consumer because GPU prices remain too
high for entry.[74] This cycle unfairly allocates the risk of ownership to those
least able to handle its consequences. As a result, inequality will probably
continue on the blockchain as it always did in traditional finance.

## III.    SMART CONTRACTS MAKE TRADITIONAL FINANCIAL
SERVICES MORE EFFICIENT AND AFFORDABLE.

Essentially, smart contracts are codified business rules.[75] Smart con-
tracts are "code that does what it's been programmed to do. If the business
rules . . . have been defined [poorly] . . . the result is going to be a mess"
which auto-executes.[76] Ordinary contracts merely suffer inartful drafting, but
smart contracts suffer both inartful drafting and coding.[77] The Stacks Foun-
dation lists eight serious vulnerabilities to smart contracts which Clarity,[78] "a
smart contract language that [purportedly] optimizes for predictability and
security," may fix.[79]

To add another layer of unpredictability, courts are yet to address press-
ing issues about smart contracts.[80] Because "the use of smart contracts is in
its incipient stages, there is no case law precedent that directly addresses the
enforceability of smart contracts and . . . there are only a handful of state
statutes purporting to address this issue directly."[81] Setting aside any poten-
tial problems with the unlicensed practice of law for programmers, lawyers
have a duty of competence under the ABA's Model Rules for Professional
Responsibility which provides "[a] lawyer shall provide competent represen-

73.    Gal Mux, *How to Make $100 a Day Trading Crypto*, Medium (Nov. 1, 2021),
       https://medium.com/geekculture/how-to-make-100-a-day-trading-crypto-
       ca93a3054b89 [https://perma.cc/K5S7-AGUX].

74.    *See id.*

75.    Lucas Mearian, *What's a Smart Contract (and How Does It Work)?*, Com-
       puterworld (Jul. 29, 2019, 3:00 AM), https://www.computerworld.com/arti-
       cle/3412140/whats-a-smart-contract-and-how-does-it-work.html   [https://
       perma.cc/9NVT-LBL8].

76.    *Id.*

77.    *See id.*

78.    Jude Nelson, *Bringing 'Clarity' to 8 Dangerous Smart Contract Vulnerabili-
       ties*, Stacks Foundation (Mar. 11, 2020), https://stacks.org/bringing-clarity-
       to-8-dangerous-smart-contract-vulnerabilities/ [https://perma.cc/U6P8-832N].

79.    Aaron Blankstein, *Introducing Clarity, a Language For Predictable Smart
       Contracts*, Blockstack, https://blog.blockstack.org/introducing-clarity-the-
       language-for-predictable-smart-contracts/ [https://perma.cc/7FDU-B6RK].

80.    Stuart Levi et al., Blockchain & Cryptocurrency Regulation 2020 156
       (Jasias N. Dewey ed., 2d ed. 2020).

81.    *Id.*

tation to a client."[82] "Competent representation requires the legal knowledge, skill, thoroughness and preparation reasonably necessary for the representation."[83] The American Bar Association updated the comment to Rule 1.1 comment in 2012 to require that "a lawyer should keep abreast of changes in the law and its practice, including the benefits and risks associated with relevant technology."[84] While artificial intelligence systems are helping draft legal documents;[85] artificial intelligence cannot completely replace the lawyer's role in review any time soon.[86] It is imperative that lawyers intending to work with smart contracts develop adequate technological and legal competency to work with these instruments.[87]

## A.   How Smart Contracts Work

Programmers write smart contracts to execute after a condition is met.[88] A blockchain will use nodes "to verify each batch of network transactions, called blocks."[89] An individual can submit a transaction to a node in the network.[90] That node then "broadcasts [the transaction] to" the other nodes on the network.[91] Over time, every node processes the transaction using the smart contract's If/Then logic, and if the nodes come to a quorum over the transaction, then the nodes update the blockchain.[92] Further, no one may alter a smart contract once the contract is in place, so getting it right the first time

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82.   Model Rules of Pro. Conduct r. 1.1 (Am. Bar Ass'n 1983).

83.   *Id.*

84.   Model Rules of Pro. Conduct r. 1.1 cmt. 8 (Am. Bar Ass'n 2012).

85.   *See* Lexi Soberanis, *From Research to Contracts, AI Is Changing the Legal Services Industry*, IBM (Nov. 4, 2021), https://www.ibm.com/blogs/journey-to-ai/2021/11/from-research-to-contracts-ai-is-changing-the-legal-services-industry/ [https://perma.cc/WPE4-JSXF].

86.   David Silbert, *Contract AI: What It Is and What It Isn't*, Docusign (Jun. 8, 2021), https://www.docusign.com/blog/contract-ai [https://perma.cc/43DE-MZH4].

87.   *See id.*

88.   *What Are Smart Contracts On Blockchain?*, IBM, https://www.ibm.com/topics/smart-contracts [https://perma.cc/ZV8M-8AFE].

89.   *What Is a Blockchain Node and How Is It Used in Cryptocurrency?*, Gadgets360 (Aug. 21, 2021, 10:23 AM), https://gadgets.ndtv.com/cryptocurrency/features/what-is-a-blockchain-node-how-does-cryptocurrency-work-2515427#:~:text=A%20blockchain%20node's%20main%20purpose,others%20by%20a%20unique%20identifier [https://perma.cc/PZJ9-9MNS].

90.   Jim Zhang, *What Are Smart Contracts and How Do They Work?*, Kaleido (Oct. 1, 2019), https://www.kaleido.io/blockchain-blog/what-are-smart-contracts-and-how-do-they-work [https://perma.cc/EA47-JR4X].

91.   *Id.*

92.   *Id.*

is more important than ever.[93] It is even possible to run an Ethereum node on a Raspberry Pi;[94] a "credit-card sized computer" capable of impressive functions like playing high-definition video and playing games.[95]

To run smart contracts based on the Ethereum blockchain, the Ethereum Virtual Machine (EVM) "act[s] as a runtime environment."[96] Every "computation that happens in the EVM requires gas."[97] Gas is "a unit of measurement used to assign a fee to each transaction with a smart contract."[98] So "[t]he more complex and tedious [the computation] is, the more gas is needed to execute the smart contract."[99] Luckily users can view an estimate of gas fees prior to executing their smart contract.[100]

IBM lists the advantages of smart contracts to include speed, trust, and security.[101] A smart contract is faster than an ordinary contract because "[o]nce a condition is met, the contract is executed immediately."[102] But the speed varies between each blockchain that supports smart contracts.[103] The speed of a blockchain is measured in transactions per second (TPS).[104] The TPS of Ethereum is "between 15 and 45," while the TPS of a competing blockchain, Solana, is "around 50,000."[105]

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93.  LEVI ET AL., *supra* note 80 at 163.

94.  *See* Raphael Pralat, *Start an Ethereum Node on a Raspberry Pi 4 with Geth*, MEDIUM (Aug. 19, 2019), https://raphaelpralat.medium.com/start-an-ethereum-node-on-a-raspberry-pi-4-with-geth-ba13d9f57ef8 [https://perma.cc/5U58-VPZJ].

95.  *What Is a Raspberry Pi?*, RASPBERRYPI, https://www.raspberrypi.org/help/what-%20is-a-raspberry-pi/ [https://perma.cc/67ZZ-JXX4].

96.  Avadhoot Kulkarni, *How to Write and Deploy Your First Smart Contract*, FREECODECAMP (May 18, 2018), https://www.freecodecamp.org/news/how-to-write-and-deploy-your-first-smart-contract-341d5e2ffb35/ [https://perma.cc/4XR3-TBED].

97.  *Id.*

98.  *Id.*

99.  *Id.*

100.  *Id.*

101.  *See* IBM, *supra* note 88.

102.  *Id.*

103.  *See What Is Solana? All You Need To Know About The Ethereum Killer Before Investing*, NDTV (Nov. 12, 2021), https://www.ndtv.com/business/what-is-solana-all-you-need-to-know-about-the-ethereum-killer-before-investing-2605678#:~:text=3)%20Solana%20has%20great%20speed,15%20and%2045%20TPS%20currently [https://perma.cc/86TE-5C6T].

104.  *Id.*

105.  *Id.*

## B.   Smart contracts solve authenticity problems

The authenticity of documents and signatures in traditional contracts is a highly litigious field. The blockchain, following adequate regulation from the federal government, will have much less litigation as to the authenticity of documents because "encrypted records of transactions are shared across" every node in the system.[106] In fact, "[d]igitization increases a regulator's ability to perform effective oversight" because of the blockchain's increased transparency.[107] The blockchain can even help proactively enforce regulations because a digital asset can police itself and report every transaction to regulators.[108] Today, regulators mostly react to traditional finance transactions, but proactive regulators monitoring the blockchain will increase regulatory effectiveness.[109]

The authenticity of a transaction on the blockchain is confirmed by a quorum of the nodes on the blockchain before the nodes execute the smart contract.[110] The security of a blockchain with proper incentives is supported by evolutionary game theory.[111] As opposed to classical game theory where "the success of a strategy depends on the strategy itself," evolutionary game theory "is played multiple times among numerous players," and "[t]he success of an individual strategy depends not only on the strategy itself but also on the frequency distribution of alternative strategies and their successes."[112] If a blockchain penalizes validators much more than the incentive received for being in a quorum, then game theory suggests that the validators "are better off by acting honestly in an honest quorum than acting maliciously in a malicious quorum."[113]

## C.   Hackers can exploit smart contracts

While proponents of smart contracts tout the security of the blockchain, malicious attacks have plagued blockchains operating smart contracts.[114] As

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106.  *See* IBM, *supra* note 88.

107.  Hines, *supra* note 1 at 91.

108.  *Id.*

109.  *Id.*

110.  IBM, *supra* note 88.

111.  Shashank Motepalli & Hans-Arno Jacobsen, Reward Mechanism for Blockchains Using Evolutionary Game Theory, 2021 3rd Conf. on Blockchain Rsch.; Applications for Innovative Networks and Servs. (BRAINS) 217, 223 (2021) https://arxiv.org/pdf/2104.05849.pdf [https://perma.cc/2AB4-9BMY].

112.  *Id.* at 218.

113.  *Id.* at 222.

114.  *See* Cryptopedia Staff, *supra* note 40.

of the time of this writing, Solana has been brought down by 3 attacks.[115] Following each of these attacks, it took Solana hours to become operational again.[116] One of the attacks forced the hard fork between Ethereum Classic and Ethereum.[117] As a result, the alleged attacker was able to claim the money following the execution of those smart contracts as written.[118]

Rational minds disagreed over whether this was truly an attack and whether the hard fork emerged.[119] While the contract was executed due to the fulfillment of a condition in the smart contract, the parties to the transaction did not intend that transfer.[120] At a minimum this raises the point that a lawyer should help draft smart contracts.[121] The Ethereum hard fork should alert the legal community to a serious need for intelligent drafting in Web3.[122] These attacks mark a major vulnerability for blockchains—design is crucial to capturing these benefits.

## D. Every smart contract probably qualifies for federal jurisdiction

Virtually every blockchain could qualify for federal jurisdiction under the Interstate Commerce Clause.[123] The nodes for a blockchain are bound to be in more than one state, and likely, more than one country.[124] For example, every Ethereum transaction as of 2022 necessarily uses foreign hardware.[125] Approximately forty-four percent of Ethereum nodes are in the United States.[126] But a block on Ethereum requires that the nodes reach a consensus where at least sixty-six percent of nodes agree.[127] So for Ethereum to reach a

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115. *Solana's Network Goes Down For the Third Time in Less Than Six Months*, Bus. Insider India Bureau (Jan. 5, 2022, 10:29 AM), https://www.businessinsider.in/cryptocurrency/news/ethereum-killer-solana-network-crashes-for-third-time-in-six-months/articleshow/88703869.cms [https://perma.cc/HRJ6-RXSC].

116. *Id.*

117. Cryptopedia Staff, *supra* note 45.

118. *Id.*

119. *See id.*

120. *Id.*

121. *See id.*

122. *See id.*

123. *See* U.S. Const. art. I, § 8, cl. 3.

124. *Ethereum Mainnet Statistics*, Ethernodes.org, https://ethernodes.org/countries [https://perma.cc/ZDU2-WQRV].

125. *Id.*

126. *Id.*

127. *Consensus Mechanisms*, Ethereum (Jan. 29, 2022), https://ethereum.org/en/developers/docs/consensus-mechanisms/ [https://perma.cc/3W88-XZJM].

consensus on any block there is at least one node outside of the United States.[128]

However, "[t]here is no federal contract law in the United States."[129] The elements to form a contract under the common law are "two or more parties, each of whom is legally capable of being bound, a manifestation of mutual assent, and consideration."[130] Similarly, "the UCC defines a contract as 'the total legal obligation that results from the parties' agreement . . .' and an agreement as 'the bargain of the parties in fact, as found in their language or inferred from other circumstances."[131] A smart contract may result in a legally enforceable contract if a court determines it meets the requirements of the Uniform Commercial Code (UCC) or the Second Restatement of Contracts.[132] Importantly, parties must reduce some contracts to writing to satisfy state statutes of frauds or additional formalities under the UCC.[133] The UCC defines "writing" to include "printing, typewriting, or any other intentional reduction to tangible form."[134]

The Uniform Law Commission published a guidance note in 2019 specifically addressing the applicability of the Uniform Electronic Transactions Act (UETA) and ESIGN to blockchains.[135] The federal Electronic Signatures Recording Act (E-Sign Act) provides that a "signature, contract, or other record relating to such transaction may not be denied legal effect, validity, or enforceability solely because it is in electronic form."[136] UETA and E-Sign "establish a legal framework for all electronic technologies through broad definitions for electronic signatures and records and then basic provisions assuring that they are on par with pen-and-ink for all legal purposes."[137]

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128. *See* ETHERNODES.ORG, *supra* note 124.

129. Stuart D. Levi & Alex B. Lipton, *An Introduction to Smart Contracts and Their Potential and Inherent Limitations*, HARV. L. SCH. F. ON CORP. GOVERNANCE (May 26, 2018), https://corpgov.law.harvard.edu/2018/05/26/an-introduction-to-smart-contracts-and-their-potential-and-inherent-limitations/#5 [https://perma.cc/77PQ-JVRS].

130. *Guidance Note Regarding the Relation Between the Uniform Electronic Transactions Act and Federal Esign Act, Blockchain Technology and "Smart Contracts"*, UNIF. L. COMM'N (Jan. 2019), https://www.uniformlaws.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=D2026 984-1040-3c6f-62c8-a676b12d7bff&forceDialog=0 [https://perma.cc/V8ZE-BU9Z].

131. *Id.*

132. *Id.*

133. Levi & Lipton, *supra* note 129.

134. U.C.C. § 1-201(b)(43) (AM. L. INST. & UNIF. L. COMM'N 1977).

135. *See* Uniform Law Commission, *supra* note 130 at 1.

136. 15 U.S.C. § 7001(a)(1).

137. Uniform Law Commission, *supra* note 130 at 5.

UETA section 14 provides that "a contract 'may be formed by the interaction of electronic agents of the parties, even if no individual was aware of or reviewed' the operations of the agent or the terms and agreements."[138] Further, the E-Sign Act provides that "[a] contract . . . may not be denied legal effect, validity, or enforceability solely because its formation . . . involved the action of one or more electronic agents," provided that the electronic agent's "action . . . is legally attributable to the person to be bound."[139] While securities law is beyond the scope of this paper, legal commentators have argued that "[c]ode-based, self-executing mechanisms arguably bring any agreement that utilizes them within the UCC's statutory parameters for security interests."[140]

## E.  Smart Contracts Are Already Replacing Traditional Financial Instruments

While smart contracts come with a battery of problems, the potential solutions that smart contracts promise could revolutionize how we deal with all sorts of financial intermediaries and instruments. Developers on the blockchain are using smart contracts to disrupt traditional financial solutions like escrow, fiduciary duties, alternative dispute resolutions, insurance, and financial instruments.[141]

### 1.  *Escrow*

Real estate law is a prime example of where a smart contract could fundamentally change the apportionment of risk in escrow situations. In 2017, the co-founder of TechCrunch purchased an apartment in Kiev, Ukraine, for $60,000 (around 212.5 ETH) using smart contracts on the Ethereum blockchain.[142] Rather than using an escrow agent to handle the money prior to closing, the buyer sent the funds to the address of a smart contract.[143] After the buyer sent the money to the smart contract address, the buyer's

138. *Id.* at 5–6 (citing Unif. Elec. Transactions Act § 14 (Unif. L. Comm'n 1999)).

139. 15 U.S.C.A. § 7001(h).

140. Heather Hughes, *Blockchain and the Future of Secured Transactions Law*, Stan. J. Blockchain L. & Pol'y (Jan. 5, 2020), https://stanford-jblp.pubpub.org/pub/blockchain-secured-transactions/release/1 [https://perma.cc/K58N-H4HB].

141. *Infra* Section E(1)–(3) and accompanying text.

142. Anthony Cuthbertson, *Blockchain Used to Sell Real Estate For the First Time*, Newsweek (Oct. 12, 2017), https://www.newsweek.com/blockchain-sell-real-estate-first-time-ethereum-682982 [https://perma.cc/8PC2-UJYL].

143. Natalia Karayaneva, *How a Smart Contract replaced An Escrow Company in a $60k Deal*, Hackernoon (Oct. 17, 2017), https://hackernoon.com/how-a-smart-contract-replaced-an-escrow-company-in-a-60k-deal-551ff7839044 [https://perma.cc/22RP-9EX4].

agent, with power of attorney, signed the final document in front of a no-tary.[144] The notary then sent the deal details and the smart contract address to the National Property Registry to finish the deal.[145]

Blockchain users could repeat this transaction elsewhere using a 4 part process: (1) either the buyer or seller deploys the smart contract and specifies the settlement procedure and conditions of the smart contract; (2) the buyer then sends a digital asset to the escrow smart contract; (3) if a specified condition is met within the allotted time period, then the fulfilment is re-ported to the smart contract; and (4) the escrow smart contract ensures fulfil-ment of each condition and then releases the buyer's digital asset to the seller.[146] If the escrow smart contract is not informed of the fulfillment of the conditions or the condition was not satisfied pursuant to the agreement, then the tokens are refunded to the buyer.[147] Escrow smart contracts eliminate the danger that either the escrow agent steals the money or the escrow agent delivers the deed before receiving the money.[148]

A potential hiccup under Texas law is whether an escrow smart contract can serve as an escrow agent.[149] "An escrow agent acts as a neutral party to the transaction and owes a fiduciary duty to both parties."[150] So can a smart contract "ac[t] as a neutral party to the transaction and ow[e] a fiduciary duty to both parties?"[151]

Drafters may require a smart contract to make an objective evaluation or to rely on the objective evaluation of agreed upon third parties.[152] In both instances it is the programmer who should hold fiduciary responsibility.[153] Where a smart contract makes an objective evaluation as to a condition's fulfillment—e.g. the smart contract verifies that a buyer has deposited a spe-cific number of tokens into the smart contract's address—the fiduciary duty should lay with the programmer to code the smart contract according to the

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144. *Id.*

145. *Id.*

146. *Escrow*, CSIRO, https://research.csiro.au/blockchainpatterns/general-patterns/blockchain-payment-patterns/escrow-2/ [https://perma.cc/FCT6-Q7R4].

147. *Id.*

148. *Id.*

149. *See generally* Capcor at KirbyMain v. Moody Nat. Kirby Houston S, 509 S.W.3d 379, 384–87 (Tex. App.—Houston [1st] 2014).

150. *Id.* at 385.

151. *Id.*

152. *See generally* Mimi Zou et al., *In Code We Trust? Trustlessness and Smart Contracts*, SCL (Apr. 4, 2019, 11:00 AM), https://www.scl.org/articles/10493-in-code-we-trust-trustlessness-and-smart-contracts [https://perma.cc/HZ9F-YAR6].

153. *See id.*

specifications of the parties.[154] A programmer's failure to adhere to party instructions should qualify as a breach of their fiduciary duty. Courts should only hold programmers responsible for deviations from clear instructions, but programmers should not be held responsible for unclear instructions from the parties. For example, the attack on the DAO exploited a smart contract as written.[155] The failure was in the design of the conditions, not the programming itself.[156]

Where a smart contract relies on a representation by a third party outside the blockchain—like where a condition to the smart contract is that the low temperature in Sault Ste. Marie, Michigan, is above freezing on October 31—the fiduciary duty should still lay with the programmer. In this second situation, the smart contract uses an oracle (an API) to communicate with parties off the blockchain.[157] Here the oracle will look to a designated source of information, perhaps the website of a local meteorologist in Michigan, and if the data from that source satisfies the condition of the smart contract, then the contract will execute. Where parties agree upon a source, the only risk is that the program does not execute correctly.

In both scenarios it is the programmer that should serve as the fiduciary of the deal. A programmer, however, should never be held responsible for poor contract design. This is another reason why involving a trained lawyer and programmer to handle the separate tasks of legal drafting and computer drafting is a good idea. Where a lawyer and programmer are involved in a smart contract, a court can appropriately apportion liability.

### 2. Smart Contracts help facilitate alternative dispute resolutions

The on and off nature of smart contracts does not leave much room for the nuance of contract interpretation. A new trend in the world of Alternative Dispute Resolutions is to use a Decentralized Dispute Resolution.[158] Kleros Escrow is a dApp "that can be used for any exchange of goods, assets, or services involving an Ethereum-based asset."[159] Kleros allows users to create a transaction on its platform.[160] If parties dispute a transaction, "they can

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154. *See generally id.*

155. Cryptopedia Staff, *supra* note 40.

156. *See id.*

157. *See Oracles*, Ethereum (Jan. 3, 2022), https://ethereum.org/en/developers/docs/oracles/ [https://perma.cc/VCK9-HJMG].

158. *See generally Escrow*, Kleros, https://kleros.io/en/escrow/ [https://perma.cc/2CX5-VU2J].

159. *Kleros Escrow Tutorial*, Kleros, https://kleros.gitbook.io/docs/products/escrow/new-in-progress-kleros-escrow-tutorial [https://perma.cc/6YGH-Y5LG].

160. *Kleros Escrow Specifications*, Kleros, https://kleros.gitbook.io/docs/products/escrow/kleros-escrow-specifications [https://perma.cc/YG9K-F2JZ].

create a dispute in Kleros court."[161] There are three possible outcomes to a dispute involving an exchange of cryptocurrency: (1) the transaction's sender wins all the locked funds and Kleros reimburses their arbitration fees; (2) the transaction's receiver wins all the locked funds and Kleros reimburses their arbitrations fees; or (3) Kleros splits the fees and locked funds evenly between the parties.[162]

Kleros selects arbitrators from a global pool.[163] The system uses a native token called "Pinakions" (PNK) to incentivize honest juror participation.[164] While PNK is an innovative solution to the incentive problem that plagues blockchain technology, it creates a questionable incentive structure for legal arbitration. Kleros admits there is no specific way to ensure that jurors reviewed any evidence.[165] Rather, they purely rely on an incentive system.[166] Kleros requires jurors to deposit PNK to have a chance to be selected in the global pool.[167] Jurors self-select into different courts under Kleros by topic.[168] Jurors stake coins by placing them with Kleros.[169] An "incoherent" juror's vote disagrees with the ultimate ruling.[170] If jurors render an "incoherent" opinion they must pay part of their stake to the coherent jurors.[171] The arbitration fees are divided among only the coherent jurors.[172] This incentive structure encourages jurors to agree with each other, not to fairly arbitrate.[173] So on the blockchain, the twelve angry men become the twelve coherent men.

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161. *Id.*

162. *Id.*

163. *See generally Kleros Juror Tutorial*, KLEROS, https://kleros.gitbook.io/docs/products/court/kleros-juror-tutorial [https://perma.cc/J2MN-E2UH].

164. Clément Lesaege et al., *Kleros Short Paper v1.0.7*, KLEROS (Sep. 2019), https://kleros.io/static/whitepaper_en-8bd3a0480b45c39899787e17049ded26.pdf [https://perma.cc/FP76-EX52].

165. *Kleros FAQ*, KLEROS, https://kleros.gitbook.io/docs/kleros-faq [https://perma.cc/WGL3-5HEY].

166. *Id.*

167. Lesaege et al., *supra* note 164.

168. *Id.* (Topics include freelancing, package delivery, international deliveries, air transport, sea transport, land transport, car insurance, house insurance, and commercial insurance.)

169. *Id.*

170. *Id.*

171. *Id.*

172. Lesaege et al., *supra* note 164.

173. *See id.*

Kleros allows parties to appeal the result of any decision to its own appellate system.[174] Kleros defends its platform as a voluntary system, "meaning the enforcement is automatic and pre-accepted by contracting parties agreeing on using Kleros as an arbitrator."[175] The contractual view of Kleros stands in stark contrast to the Kleros white paper which proposes to create "a multipurpose court system able to solve every kind of dispute."[176] Kleros makes an interesting statement that this serves as "a self-enforceable arbitration method."[177] However, the enforceability of a Kleros decision is beyond the scope of this article.

### 3. *Insurance*

Traditional insurance "relies on a trusted intermediary to execute [a] transaction."[178] Intermediaries add time and cost to any system, but especially insurance.[179] Using a smart contract to automate an insurance claim provides transparency for both parties, speeds up the claims process, reduces administrative costs, and preserves the agreement in a secure blockchain.[180] But smart contracts today follow the "if X, then Y" formula, which fails to capture the complexity of many insurance agreements.[181]

For example, if a party denies the enforceability of a contract, normally that party can withhold payments before a court settles the matter. But a smart contract will transfer the funds instantaneously. This forces courts to make decisions after the transaction has been completed. This is a major complication to the insurance industry. Inversely, the cost of challenging an insurance denial in court is prohibitively expensive.

One possible solution is to use smart contracts with "parametric insurance."[182] Parametric insurance bases claims off of "clearly defined event[s]

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174. *Kleros FAQ*, *supra* note 165.

175. *Id.*

176. Lesaege et al., *supra* note 164.

177. Dmitry Narozhny, *Is Kleros Legally Valid as Arbitration?*, Kleros (Jun. 12, 2019), https://blog.kleros.io/is-kleros-legally-valid-as-arbitration/ [https://perma.cc/4UB2-9443].

178. Ivan Kot, *Smart Contracts in Insurance*, Ins. Thought Leadership (Dec. 1, 2020), https://www.insurancethoughtleadership.com/blockchain/smart-contracts-insurance [https://perma.cc/R5X6-FBMR].

179. *Id.*

180. *Id.*

181. *Id.*

182. Adelyn Zhou, *How Blockchain Smart Contracts Are Reinventing the Insurance Industry*, NASDAQ (Jan. 29, 2021, 10:53 AM), https://www.nasdaq.com/articles/how-blockchain-smart-contracts-are-reinventing-the-insurance-industry-2021-01-29 [https://perma.cc/GK4P-HML8].

and . . . pre-agreed upon payout[s]."[183] While parametric insurance has been around as an idea since the 1990's, the trustless design of smart contracts has helped reduce the risk of fraud, and has helped make such insurance products feasible.[184] The development of sophisticated oracles allows parametric insurance to reliably consult outside sources for contingent conditions.[185]

NASDAQ estimates that "there are over $1 trillion dollars of uninsured crops."[186] For farmers dependent on rainfall, climate change is expected to add to the risk of farming.[187] So far traditional insurance has not offered coverage to small plots in developing countries.[188] Insurtech, Arbol's Parametric crop insurance, uses "smart contracts that execute based on oracle-delivered weather data from the National Oceanic and Atmospheric Administration (NOAA)."[189] Small farmers reap the benefit of Arbol's circumvention of costly "legal systems and subjective insurance assessments."[190] Smart contract parametric insurance can even be used to reimburse a claimant whose flight was delayed by forty-five minutes or more.[191] So long as a passenger holds a ticket for a flight, they can choose what level premium to pay, and the platform conveniently returns the coverage for the flight.[192]

This form of insurance might be an excellent hedge against the dangers of smart contracts. Nexus Mutual is hesitant to call itself insurance, but it provides a similar service.[193] Nexus Mutual "is a discretionary mutual: a mutual fund that provides discretionary cover, which is an insurance-like product that involves only a discretion, not a legal obligation, to pay out on the occurrence of a material loss."[194] The automation of insurance claims processing in simple situations that fit the if X then Y formula could drastically lower insurance costs.[195] The lower costs these products can provide might bring more smart contracts under the safety of insurance-like products.

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183. *Id.*

184. See *id.*

185. *Id.*

186. *Id.*

187. *Id.*

188. Zhou, *supra* note 182.

189. *Id.*

190. *Id.*

191. Etherisc, *Flight Delay Insurance DApp Powered by Etherisc*, YouTube (Jul. 20, 2018), https://www.youtube.com/watch?v=LCRkFifVcIc [https://perma.cc/9TLC-G8FE].

192. *Id.*

193. *Understanding Nexus Mutual*, Nexus Mutual, https://nexusmutual.gitbook.io/docs/users/understanding-nexus-mutual [https://perma.cc/EF9Z-5YEX].

194. *Id.*

195. *See* Kot, *supra* note 178.

As a result, the increased use of insurance is likely to inspire consumer confidence in smart contracts and ultimately facilitate its adoption into the mainstream.

All of the potential problems that smart contracts introduce to insurance are short-term.[196] By designating a trusted third party, like NOAA, to validate an event, parties can still utilize the truth-seeking function of courts without having to pay for its expertise.[197] A judge might take judicial notice of an earthquake.[198] The automation of these questions allows for reliable data to determine the outcome of a contract.[199] If the parties agree to a fixed payout based on the occurrence of an event to which a judge may take judicial notice, it would be wholly appropriate, markedly cheaper, and more efficient to keep the contract out of the traditional legal system.[200] Traditional insurance transactions keep power with the issuing company.[201] The company has the power to employ an insurance adjuster to render a subjective opinion.[202] In parametric insurance, the power favors the claimant.[203] A consumer could negotiate with an insurance company about which trusted third party to connect to an oracle, or whether to aggregate a consensus among several trusted third parties, or alternatively find a company that is willing to negotiate. If those trusted third parties publish data that triggers the smart contract, the money is immediately paid out to the claimant.[204] The fight over the condition fulfillment of a smart contract takes place after its execution.[205] That way claimants who might rely on that money can get that money sooner without having to wait for the legal system to analyze the facts.[206]

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196. *Id.*

197. *See generally* Zhou, *supra* note 182.

198. *See* Wolfe v. State Farm Fire & Cas. Ins. Co., 46 Cal. App. 4th 554, 560 (1996) ("We must take judicial notice of the Northridge earthquake itself since that occurrence is a fact of generalized knowledge so universally known that it cannot reasonably be the subject of dispute").

199. *See Oracles*, *supra* note 157.

200. *See* Zhou, *supra* note 182.

201. *See Parametric Disaster Insurance*, NAIC (Feb. 24, 2022), https://content.naic.org/cipr-topics/parametric-disaster-insurance [https://perma.cc/C9Z7-4J48].

202. *See id.*

203. *See generally id.*

204. *Claims Assessment*, Nexus Mutual, https://nexusmutual.gitbook.io/docs/users/understanding-nexus-mutual/claims-assessment [https://perma.cc/5F4Q-4T6J].

205. *See Parametric Disaster Insurance*, *supra* note 201.

206. *See id.*

**F.  Smart contracts, like traditional contracts, offer benefits and drawbacks.**

These are only a few examples of how smart contracts are changing traditional financial instruments today. Any transaction that can be reduced to an "if X, then Y" statement is more efficient on the blockchain.[207] Ultimately, the market will decide whether smart contracts and decentralization are valuable.[208] End users might not care about how parties execute contracts, but end users do care that a product is faster, cheaper, and more secure.[209] Thus, smart contracts are here to stay.

## IV.  THE LEGAL STATUS OF DECENTRALIZED AUTONOMOUS ORGANIZATIONS IS UNKNOWN AND UNPREDICTABLE

A Decentralized Autonomous Organization (DAO) "is a software running on a blockchain that offers users a built-in model for the collective management of its code."[210] Simply put, DAOs are an organization of people with rules for how those people interact and how the organization makes decisions.[211]

One common way of thinking about DAOs is that owners collectively manage "an internet-native business."[212] A lack of centralized leadership can be a good or a bad thing.[213] There is no CEO to authorize a budget or CFO to cook the books.[214] The amorphous nature of DAOs makes them difficult to define as business entities.[215]

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207. *See* Kot, *supra* note 178.

208. *See* Sam Klemens, *Do People Really Care About Decentralization?*, Exodus (Apr. 27, 2021), https://www.exodus.com/blog/do-people-really-care-about-decentralization/ [https://perma.cc/VW3M-GD6D].

209. *See generally id.*

210. *What Is a DAO? (Decentralized Autonomous Organization)*, Kraken, https://www.kraken.com/en-us/learn/what-is-decentralized-autonomous-organization-dao [https://perma.cc/2C2W-ETYG].

211. *Id.*

212. *Decentralized autonomous organizations (DAOs)*, Ethereum, https://ethereum.org/en/dao/ [https://perma.cc/2PFX-HJ9S].

213. *See id.*

214. *Id.*

215. *See* Robbie Morrison et al., *The DAO Controversy: The Case For a New Species of Corporate Governance?*, Frontiers In (May 27, 2020), https://www.frontiersin.org/articles/10.3389/fbloc.2020.00025/full [https://perma.cc/JZ33-FHC2].

The most famous example of DAOs is the DAO.[216] As previously mentioned, hackers exploited the DAO for $60 million U.S. dollars worth of Ether.[217] This theft resulted in Ethereum's hard fork.[218] In this DAO, "all members were owners who functioned also as managers."[219] However, the owners did not all share a vision for the organization.[220] While the ethics of the DAO's hard fork are beyond the scope of this comment, the DAO raises several important legal questions.[221]

Where someone is physically hurt because of a DAO's actions, traditional business entities offer analogous case law.[222] In that same vein, legal service provider "OpenLaw provides the blockchain-based tools to create 'limited liability wrappers' for DAOs."[223] OpenLaw claims that it improves a DAO's settlement predictability both on and off the blockchain.[224] And importantly, OpenLaw claims that it "provides an important *corporate veil* over DAO business activities to remove the default, joint, and several liability" ordinarily associated with general partnerships.[225]

## A.   Wyoming and Vermont Are on the Forefront of Blockchain Law

Some states have proactively answered whether DAOs are a distinct legal entity. Wyoming allows DAOs to form as a legal entity recognized by the state.[226] A DAO's agent must select LLC from the Wyoming Secretary of State and then select "Decentralized Autonomous Organization from the Additional Designation drop down menu."[227] No member of a limited liability autonomous organization (LAO) must be a Wyoming Resident.[228] But a LAO

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216.  *See generally* Cryptopedia Staff, *supra* note 40.

217.  *Id.*

218.  Morrison, *supra* note 215.

219.  *Id.*

220.  *Id.*

221.  *See id.*

222.  OpenLaw, *The Era of Legally Compliant DAOs*, MEDIUM (Jun. 26, 2019), https://medium.com/@OpenLawOfficial/the-era-of-legally-compliant-daos-491edf88fed0 [https://perma.cc/UD52-BNKE].

223.  *See generally id.*

224.  *Id.*

225.  *Id.*

226.  *See* Wyo. Sec. of State, *Decentralized Autonomous Organization (DAO): Frequently Asked Questions*, https://sos.wyo.gov/Business/Docs/DAOs_FAQs.pdf; WYO. STAT. § 17-31-104(2021) (amended 2022).

227.  Wyo. Sec. of State, *supra* note 226.

228.  *See* WYO. STAT. § 17-28-101 through 111 (2019) (amended 2021).

must designate a "registered agent" who resides at a "registered office" to receive service of process.[229]

Wyoming has made several moves in recent years to encourage the development of cryptocurrency.[230] The state exempted open blockchain tokens from state securities laws.[231] Effectively, Wyoming distinguishes between utility tokens and non-utility tokens.[232] The test is multifaceted and considers several complicated factors.[233] The move is mostly symbolic because the SEC has refused to draw a bright-line rule exempting utility tokens.[234] However, the law "provides a great deal of clarity for blockchain developers who have thus far been operating in an information vacuum."[235] Earlier Wyoming also exempted "virtual currency" from Wyoming's Money Transmitter Act.[236]

Wyoming's blessing to the LAO corporate structure provides similar clarity. The state allows an existing LLC to convert into a LAO.[237] Further, the state allows the LAO to statutorily declare whether it is a member managed LAO or an algorithmically managed LAO.[238] Empirical data suggests that regulations do not scare off investors.[239] There is rarely a price decline following a country's cryptocurrency regulations.[240]

Vermont has taken a similarly proactive approach to nurture blockchains.[241] Vermont allows for "Blockchain-based Limited Liability Companies" (BBLLC).[242] BBLLCs "may provide for its governance, in

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229. *Id.*

230. *See* Daniel Cohen et. al, *Understanding the Effect of Wyoming's Blockchain and Cryptocurrency Legislation*, JDSᴜᴘʀᴀ, https://www.jdsupra.com/post/contentViewerEmbed.aspx?fid=AA8f16b3-2717-4697-8c06-9e606f3c9ee8 [https://perma.cc/JYP6-L9X4].

231. *Id.*

232. Matthew T. McClintock, *Understanding Wyoming's 2018 Blockchain Laws: A Model for Industry Regulation*, 41 Wʏᴏ L. J. 40, 43 (2018).

233. *Id.*

234. Cohen, *supra* note 230.

235. McClintock, *supra* note 232.

236. *Id.*

237. Wʏᴏ. Sᴛᴀᴛ.17-31-104(b) (2021) (amended 2022).

238. Wʏᴏ. Sᴛᴀᴛ.17-31-104(e) (2021) (amended 2022).

239. Kevin Werbach, *Why Regulation Won't Harm Cryptocurrencies*, Uɴɪᴠ. ᴏꜰ Pᴀ. Wʜᴀʀᴛ. (Apr. 27, 2021), https://knowledge.wharton.upenn.edu/article/why-regulation-wont-harm-cryptocurrencies/ [https://perma.cc/5CJP-ACYX].

240. *Id.*

241. *See* Catherine Martin Christopher, *Error Correction Mechanisms for Transactional Script Smart Contracts*, 69 U. Kᴀɴ. L. Rᴇᴠ. 493, 514 n.116 (2021).

242. *See* 11 V.S.A. § 4173 (2017).

whole or in part, through blockchain technology.[243] Additionally, Vermont allows corporate recordkeeping through distributed ledger technology as admissible evidence in court.[244]

## B. States Ignore DAOs at Their Own Risk.

Regardless of how a state decides to treat DAOs in their business codes, they must resolve the issue soon. One legal commentator has proposed "that many state LLC statutes permit the development of zero-member LLCs governed exclusively by an operating agreement."[245] "This technique . . . allows software systems to achieve a very close surrogate for legal personhood."[246] The technique has four steps: (1) a person (Founder) files to create a member-managed LLC in the state; (2) the LLC adopts an operating agreement that says "the LLC will take actions as determined by an autonomous system;" (3) the Founder then transfers their interests in the autonomous system's "physical apparatus" and intellectual property to the LLC; and finally (4) the Founder leaves the LLC.[247] In theory, this technique might work in Wyoming's LAO system because the LAO can self-select into the member managed option.

Critics point out that "it is unlikely that a court considering [these statutes] would conclude" that the law allows for zero-member LLCs.[248] But states do not have the luxury of reacting to these issues.[249] Hypothetically a true artificial intelligence could solicit an unwitting agent to complete this technique. The artificial intelligence could then go on to amass interests in real estate, financial instruments, or even a private military. If there is no clear rule to prevent this situation, an artificial intelligence may choose to deliberately conceal its existence until it has amassed enough power to achieve its goals. Such a scenario "is merely the culmination of decades of increased power for operating agreements and decreased power for the membership of legal entities."[250]

States that choose to embrace blockchain as the future of finance and business entity law will reap massive benefits over those that do not. Kear-

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243. *Id.* at (1).

244. 12 V.S.A. § 1913(b) (Westlaw Acts 77 through 81 of the Regular Session of the 2021-2022 Vermont General Assembly (2022)).

245. Shawn Bayern, *Are Autonomous Entities Possible?*, 114 Nw. U. L. Rev. Online 23, 24 (2019).

246. *Id.*

247. *Id.* at 26–27.

248. Matthew U. Scherer, *Of Wild Beasts and Digital Analogues: The Legal Status of Autonomous Systems*, 19 Nev. L. J. 259, 265 (2018).

249. *See id.*

250. Bayern, *supra* note 245.

ney, Nebraska, known as "[t]he Sandhill Crane Capital of the World,"[251] now hosts many cryptocurrency miners ousted by China's ban on mining.[252] Migrating miners hold the United States in high regard because of improved legal protections for business owners.[253] But, "environmental concerns and infrastructure bottlenecks in the [United States] have slowed the mining migration."[254] Thus, as countries around the globe make regulatory blunders with blockchain technology, states that are set up to accept and support blockchain operations will flourish with new revenue streams.[255]

### C. It Is Unclear What Kind of Fiduciary Duties Courts Will Impose on Members of DAOs.

States could further provide regulatory clarity by deciding whether to impose fiduciary duties on members of a DAO.[256] Legal commentators have proposed that Delaware fiduciary laws might solve the fifty-one percent attack issue.[257] In a DAO, a fifty-one percent attack occurs where the "holder of [fifty-one percent] of a DAO's tokens could make and approve a proposal to send all of the DAO's funds to [themselves]."[258] At the moment "it is unclear whether . . . human decision-makers would be found to owe fiduciary duties to a DAO and its investors."[259] This confusion extends to a DAO's coders or curators too. Must a DAO's programmer "act in good faith, with due care and in the best interests of the organization and token-holders when writing" a DAO's code?[260]

The running theme to these unanswered questions is that a state's answer one way or another is more helpful than the murky waters of today's blockchain regulatory scheme. Empirically, "public companies have shown a significant appetite" to contract around the traditional duty of loyalty in Dela-

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251. *Welcome to Kearney*, Visit Kearney, https://visitkearney.org/ [https://perma.cc/SX3X-GYNZ].

252. John Ruwitch & Emily Feng, *How the U.S. benefits when China turns its back on Bitcoin*, NPR (Feb. 24, 2022), https://www.npr.org/2022/02/24/1081252187/bitcoin-cryptocurrency-china-us [https://perma.cc/4FYC-LEAD].

253. *Id.*

254. *Id.*

255. *See id.*

256. Matthew J. O'Toole et al., *O'Toole, Kelly and Hahn on Why Delaware May Be the Right Jurisdiction For "Smart" Orgs*, Potter Anderson Corroon (Feb. 16, 2018), https://www.potteranderson.com/newsroom-publications-OToole-Kelly-and-Hahn-On-Why-Delaware-May-Be-The-Right-Jurisdiction-For-Smart-Orgs.html [https://perma.cc/YF8J-A6NY].

257. *Id.*

258. *Id.*

259. *Id.*

260. *Id.*

ware and other states that allow for similar corporate opportunity waivers.[261] This trend towards contractually changing fiduciary duties is further evidence that our legal system is capable of extraordinary flexibility for blockchain organizations.[262] Blockchain businesses should push for recognition as official legal entities so that they may avail themselves of the benefits that society has bestowed upon traditional business.

The worst-case scenario would be where a DAO with massive capital implodes overnight, and the courts treat that DAO as a general partnership. Some legal commentators take the position that the DAO was merely "a general partnership."[263] Where a DAO aims to provide transparency as to the allocation of risk in a business, a state's silence as to a DAO's legal status might upend that transparency.[264] Investors who thought they were participating in a safe DAO could be held jointly and severally liable for that DAO's actions.[265] So long as states provide clear rules about how they will treat DAOs, these entities can contract to create the optimal solution for their investors.

## V.  THE BLOCKCHAIN ALLOWS FOR UNIQUE NEW FINANCIAL LENDING INSTRUMENTS.

The instantaneous quality of blockchains has allowed lending instruments to flourish in the cryptoeconomy.[266] The International Monetary Fund acknowledges that blockchains "have potential as a tool for faster and cheaper cross-border payments."[267] The International Monetary Fund uses the term *cryptoization* to refer traditional asset and currency substitution with crypto solutions.[268]

Cryptocurrency staking is a way for investors to "stake" their holdings to earn rewards over time.[269] Staking cryptocurrency is like placing money in

261. Gabriel Rauterberg & Eric Talley, *Contracting Out of The Fiduciary Duty of Loyalty: An Empirical Analysis of Corporate Opportunity Waivers*, 117 Colum. L. Rev. 1075, 1147 (2017) [https://perma.cc/CSM3-VHZR].

262. *See id.*

263. *Id.* at 1536, 1554–55.

264. *See id.* at 1536.

265. *Id.* at 1535–36.

266. *See* Ryan Wangman, *Crypto-backed Loans Don't Require a Credit Check, but Your Collateral Isn't Immune to Market Swings*, Bus. Insider (Nov. 2, 2021), https://www.businessinsider.com/personal-finance/what-is-crypto-lending [https://perma.cc/G5KR-NGS4].

267. IMF, The Crypto Ecosystem and Financial Stability Challenges 41 (2021).

268. *Id.*

269. *What is Staking?*, Coinbase, https://www.coinbase.com/learn/crypto-basics/what-is-staking [https://perma.cc/W6KT-PHSP].

an interest-bearing account.[270] While "[t]he national average interest rate for savings accounts [as of March 2022] is 0.06 percent,"[271] popular coins like Ethereum, Cardano, and Polkadot can yield as high as five to twenty percent.[272]

However, staking remains shrouded in unclear regulation.[273] Weighing heavy on the minds of every crypto investor is whether gains made through staking are taxable.[274] In 2019 Joshua Jarrett received rewards from staking on the Tezos public blockchain.[275] Jarrett argued to the IRS that those staking rewards were not income and requested a refund.[276] Jarrett filed a subsequent complaint in the United States District Court for the Middle District of Tennessee for a refund.[277] The complaint argues that tokens are only taxable at sale, not when they accrue through a staking reward.[278] The complaint cites to "an established tax law principle that newly created property is not an 'accession to wealth' that is 'clearly realized.'"[279] The IRS offered Jarrett a refund, but Jarrett declined "because the IRS did not provide a reason for the refund and left open the issue of whether the creation of tokens through staking is a taxable event."[280]

Investors like Jarrett are taking the fight to regulators in search of clarity.[281] Rather than merely accepting the refund, Jarrett is fighting to ensure that the either the IRS or the courts will deliver a rule.[282] Regulators will not

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270. *Id.*

271. Matthew Goldberg, *What Is the Average Interest Rate for Savings Accounts?*, Bankrate, https://www.bankrate.com/banking/savings/average-savings-interest-rates/#:~:text=the%20national%20average%20interest%20rate,2022%20weekly%20survey%20of%20institutions [https://perma.cc/LUV8-JYEJ].

272. James Royal, *Crypto Staking: What Is It and How Much Can You Earn in Rewards?*, Bankrate (Feb. 24, 2022), https://www.bankrate.com/investing/crypto-staking/ [https://perma.cc/UVC8-EYZ6].

273. Pallav Raghuvanshi & Shira Peleg, *A Recent Court Case Leaves Many Speculating on the Taxation of Staking Rewards*, 12 Nat'l L. Rev. (2022) https://www.natlawreview.com/article/recent-court-case-leaves-many-speculating-taxation-staking-rewards [https://perma.cc/NLE3-EPUZ].

274. *Id.*

275. *Id.*

276. *Id.*

277. Tom Geraghty & Kali McGuire, *The Jarretts Raise the Stakes*, DLA Piper (Feb. 18, 2022), https://www.dlapiper.com/en/us/insights/publications/2022/02/the-jarretts-raise-the-stakes/ [https://perma.cc/9R77-QVNZ].

278. *Id.*

279. *Id.*

280. Raghuvanshi, *supra* note 273.

281. *See id.*

282. *See id.*

have the luxury of sitting back and waiting for cryptocurrencies to develop so that they can then draft policies.[283]

Not all players in the crypto space are willing to place their money on the line for the sake of clarity. For example, BlockFi offered BlockFi Interest Accounts (BIA), where investors stake cryptocurrencies, in exchange for a variable interest rate paid out monthly.[284] But in February, 2022, BlockFi Lending agreed to pay a $100 million settlement to the SEC and thirty-two states for offering unregistered securities.[285] SEC Chair Gary Gensler said it was "the first case of its kind with respect to crypto lending platforms."[286] The SEC's move has prompted Coinbase to shutter its plans for a lending product.[287]

Online lenders have also inherited the same evils present in traditional-predatory lending operations.[288] While the term Fintech used to signify something about a bank (or non-bank company) operation, now Fintech is a confusing term that predatory lenders can use to deceive consumers.[289] Companies "operat[ing] online but have little other technological advancement still bill themselves as 'fintechs.'"[290] And now Fintech lumps together firms that offer affordable interest rates with firms "that charge triple digit rates and prey on the poor."[291]

Aristotle labeled usury as "the most hated sort" of trade.[292] The introduction of new technology like cryptology, which enables new forms of

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283. *See id.*

284. *Crypto Interest Rates*, BLOCKFI, https://blockfi.com/rates/ [https://perma.cc/6X9R-UZR7].

285. *BlockFi Agrees to Pay $100 Million in Penalties and Pursue Registration of Its Crypto Lending Product*, SEC (Feb. 14, 2022), https://www.sec.gov/news/press-release/2022-26 [https://perma.cc/W8E6-TJKB].

286. *Id.*

287. Emily Flitter, *BlockFi, A Crypto Firm, Reaches a $100 Million Settlement for Failing to Register Loan Products*, N.Y. TIMES (Feb. 14, 2022), https://www.nytimes.com/2022/02/14/business/blockfi-sec-crypto-loans.html [https://perma.cc/VY5L-PVVV].

288. Christopher K. Odinet, *Predatory Fintech and the Politics of Banking*, 106 IOWA L. REV. 101, 117 (2021), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3677283 [https://perma.cc/5NY6-JUWF].

289. *Id.*

290. *Id.*

291. *Id.*

292. Cheryl A. Olechnowicz, *History of Usury: The Transition of Usury Through Ancient Greece, The Rise of Christianity and Islam, and the Expansion of Long-Distance Trade and Capitalism*, 5 GETTYSBURG ECON. REV. 97, 98–99 (2011), https://cupola.gettysburg.edu/cgi/viewcontent.cgi?article=1034&context=Ger [https://perma.cc/PK6F-NS8L].

usury, does not fundamentally change the underlying evil of these transactions. And it does not help that the Federal Reserve's interest rates are at historic lows.[293] Investors will always follow higher yields, and "[t]here is now more than $200 billion in total value locked or deposited" in decentralized finance platforms.[294] Regulators must not allow the blockchain to become the wild west of lending and allow predatory lenders to target the most vulnerable consumers.

## VI.    CONCLUSION

Cryptocurrency, like any technology, has potential for good and evil. Smart contracts will improve the speed and cost of routine business transactions, but only if developers and law makers can agree on a proper risk allocation. The same is true for DAOs. DAOs will be a powerful tool for new forms of corporate governance in the coming years, but only if law makers can wrap their heads around this new design and provide clarity. Lending on the blockchain has the opportunity to expand access for underserved communities, but it will also take advantage of those communities if regulators remain passive. Every technology on the blockchain has the power to revolutionize these traditional financial transactions for people who have consistently been excluded from these transactions before. As it stands now, the federal legislature must take intelligent and coherent steps towards reigning in bad actors so that society may fully benefit from its adoption of this new ledger technology.

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293.    Tomio Geron, *BlockFi Yields to the SEC*, PROTOCOL (Feb. 15, 2022) https://www.protocol.com/newsletters/protocol-fintech/crypto-lending?rebelltitem=5#rebelltitem5 [https://perma.cc/8Z4E-3G6R]

294.    *Id.*