

DIGITAL ASSET REGULATION: PEERING INTO THE PAST, PEERING INTO THE FUTURE

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ABSTRACT

Blockchain is often compared to the internet as a disruptive technology that will realign economic structures across the world. This analogy extends to law and regulation. Similar to internet-based services, digital assets raise a host of challenges for policymakers. They also pose general questions regarding the desirability and practicality of regulating decentralized systems. Such debates play out against a backdrop of concerns that regulatory action will chill innovation or push market activity to more tolerant jurisdictions. The story of internet policy in the late 1990s and early 2000s therefore provides important lessons for policymakers today when confronting digital assets. Two incidents are of particular significance: the Clinton administration's 1997 Framework for Global Electronic Commerce and the judicial effort to address peer-to-peer (P2P) file sharing.

The early internet regulatory debates demonstrated that action by all three branches of government was important to resolve uncertainties and distinguish legitimate from illegitimate market activity. The history illustrates that policymakers have many tools at their disposal beyond direct prohibitions or exclusions from requirements. Claims that regulation is inherently impossible or damaging to

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market development are generally overblown. Focusing on policy objectives, rather than starting from traditional categories that were historically developed based on those objectives, will help policymakers develop appropriate rules for novel digital asset markets such as decentralized finance (DeFi).

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INTRODUCTION

In the year 2000, President Bill Clinton argued that admission to the World Trade Organization would promote openness and freedom in China, thanks in large part to the liberating force of the internet.¹ To those who claimed that China would muzzle the internet locally, Clinton had a witty rejoinder: “That’s sort of like trying to nail Jello to the wall.”² The belief that the internet was inherently too decentralized and global for national regulators to control was widespread at the time. It turned out to be grossly inaccurate. China built a “Great Firewall” to filter data passing within its borders and implemented other measures to impose its policy mandates on internet services operating locally.³ In democratic nations as well, the idea that the internet was, or even should be, an “unregulable” space became a quaint legacy of a time before the full potential of interconnected digital networks was well appreciated.⁴

Today, the notion of unregulability is back in connection with a new wave of decentralized technology. Blockchain networks facilitate services and applications based on cryptographically secured digital assets.⁵ Advocates argue that these systems cannot be regulated because they are resolutely decentralized and “censorship resistant.”⁶ The claim is as false today as it was for the internet twenty years ago. Blockchains can be subject to regulatory

1. See President Bill Clinton, Address at the Paul H. Nitze School of Advanced International Studies of the Johns Hopkins University (Mar. 8, 2000), in N.Y. TIMES, Mar. 9, 2000, <https://archive.nytimes.com/www.nytimes.com/library/world/asia/030900clinton-china-text.html> [<https://perma.cc/77XK-FFGE>].

2. Bethany Allen-Ebrahimian, *The Man Who Nailed Jello to the Wall*, FOREIGN POL’Y (June 29, 2016, 6:08 PM), <https://foreignpolicy.com/2016/06/29/the-man-who-nailed-jello-to-the-wall-lu-wei-china-internet-czar-learns-how-to-tame-the-web/> [<https://perma.cc/QMJ4-65MD>].

3. *Id.*

4. See Kevin Werbach, *The Song Remains the Same: What Cyberlaw Might Teach the Next Internet Economy*, 69 FLA. L. REV. 887, 902-09 (2017). See generally JACK GOLDSMITH & TIM WU, WHO CONTROLS THE INTERNET? ILLUSIONS OF A BORDERLESS WORLD (2006) (showing how the internet was effectively controlled by companies and governments).

5. See Karen Yeung, *Regulation by Blockchain: The Emerging Battle for Supremacy Between the Code of Law and Code as Law*, 82 MOD. L. REV. 207, 207 (2019).

6. See *id.* at 211 n.16, 212-14; Kevin Werbach, *Trust, but Verify: Why the Blockchain Needs the Law*, 33 BERKELEY TECH. L.J. 487, 521-22 (2018).

oversight, and they should. While government intervention may slow innovation, well-designed regulation can actually promote sustainable innovation and market development. In the context of digital assets, in which rapid growth of activities in regulatory grey areas has produced a great deal of fraud and other illicit activity,⁷ the adoption of effective regulatory frameworks is essential. Nowhere is this more true than for the burgeoning sector of decentralized finance (DeFi).⁸

Blockchain-based activity poses four major challenges for would-be regulators. First, digital assets are protean. They can be adapted to any use,⁹ which makes it difficult to apply rules, such as in the U.S. financial regulation model, which rely on sharp distinction between activities.¹⁰ Second, decentralized arrangements can make assigning legal responsibility to particular actors challenging.¹¹

7. See Hillary Allen, *DeFi: Shadow Banking 2.0?*, 64 WM. & MARY L. REV. 919 (2023); Gary Gensler, Chairman, SEC, Remarks Before the Aspen Security Forum (Aug. 3, 2021), <https://www.sec.gov/news/public-statement/gensler-aspen-security-forum-2021-08-03> [<https://perma.cc/9EPB-3QL8>]; Allyson Versprille, *Crypto, NFTs Are Rife with 'Mountains' of Fraud, IRS Says*, BLOOMBERG (Jan. 26, 2022, 12:15 PM), <https://www.bloomberg.com/news/articles/2022-01-26/irs-seeing-mountains-and-mountains-of-fraud-with-crypto-nfts#xj4y7vzkg> [<https://perma.cc/36M2-Q3XW>]; Chris Matthews, *Elizabeth Warren Warns Crypto 'Scams Continue to Surge' on Exchanges, Calls for SEC Regulation*, MARKETWATCH (July 8, 2021, 1:03 PM), <https://www.marketwatch.com/story/elizabeth-warren-warns-crypto-scams-continue-to-surge-on-exchanges-calls-for-sec-regulation-11625763807> [<https://perma.cc/CQC9-YHJV>]; TIMOTHY G. MASSAD, ECON. STUD. AT BROOKINGS, *IT'S TIME TO STRENGTHEN THE REGULATION OF CRYPTO-ASSETS 2-3* (2019), <https://www.brookings.edu/wp-content/uploads/2019/03/Timothy-Massad-Its-Time-to-Strengthen-the-Regulation-of-Crypto-Assets-2.pdf> [<https://perma.cc/SM6L-TWFL>]; *Demystifying Crypto: Digital Assets and the Role of Government: Hearing Before the Joint Econ. Comm.*, 117th Cong. 1, 3-4 (2021) (statement of Alexis Goldstein, Director of Financial Policy, Open Markets Institute), <https://static1.squarespace.com/static/5e449c8c3ef68d752f3e70dc/t/61955d9aa255b1473dcb4739/1637178779721/Alexis+Goldstein+-+Joint+Economic+Cmte+Crypto+Hearing+Testimony+-+Nov+2021%5B63%5D.pdf> [<https://perma.cc/U2L8-5TYA>]; Arianna Trozze, Josh Kamps, Eray Arda Akartuna, Florian J. Hetzel, Bennett Kleinberg, Toby Davies & Shane D. Johnson, *Cryptocurrencies and Future Financial Crime*, 11 CRIME SCI., 2022, at 1, 1, 5-9.

8. See, e.g., Ryan Browne, *Criminals Have Made Off With over \$10 Billion in 'DeFi' Scams and Thefts This Year*, CNBC (Nov. 19, 2021, 2:38 AM), <https://www.cnbc.com/2021/11/19/over-10-billion-lost-to-defi-scams-and-thefts-in-2021.html> [<https://perma.cc/CE7U-3H6G>].

9. See, e.g., Philipp Sandner, *Digital Assets: The Future of Capital Markets*, FORBES (Aug. 24, 2021, 10:18 AM), <https://www.forbes.com/sites/philippsandner/2021/08/24/digital-assets-the-future-of-capital-markets/?sh=7baf424c6a57> [<https://perma.cc/CD6H-B3HS>].

10. MARC LABONTE, CONG. RSCH. SERV., R44918, WHO REGULATES WHOM? AN OVERVIEW OF THE U.S. FINANCIAL REGULATORY FRAMEWORK 1-2, 7-9 (2020).

11. See Yeung, *supra* note 5, at 212-14.

Third, blockchains are global, which makes the application of national or subnational legal rules challenging.¹² Finally, even when the rules are clear, enforcement can be difficult when market participants are pseudonymous and geographically dispersed.¹³

Fortunately, the problem turns out not to be as difficult as it appears at first glance. One reason is that despite the talk of decentralization and censorship resistance, most blockchain and DeFi systems retain significant points of intermediation and central control.¹⁴ A second is that defining regulatory regimes that balance the desire for decentralized innovation with the need to address harmful conduct is possible.¹⁵ The history of internet regulatory development in the 1990s and early 2000s provides valuable lessons.¹⁶ Policymakers and regulators can adapt the concepts developed then to the new world of digital assets and blockchains.

I. RISKS OF DIGITAL ASSET MARKETS

The digital asset sector has seen extraordinary growth over the last decade, coupled with tremendous volatility. Daily trading volume far exceeded \$100 billion in late 2021.¹⁷ There is now a thriving industry of decentralized applications (DApps), enabled through blockchains in a plethora of industries, from financial

12. *See id.* at 212, 214.

13. *See FACT SHEET: White House Releases First-Ever Comprehensive Framework for Responsible Development of Digital Assets*, WHITE HOUSE (Sept. 16, 2022), <https://www.whitehouse.gov/briefing-room/statements-releases/2022/09/16/fact-sheet-white-house-releases-first-ever-comprehensive-framework-for-responsible-development-of-digital-assets/> [<https://perma.cc/4P6B-KK32>] (noting that some digital assets are “pseudonymous and can be transferred without a financial intermediary” as a reason for concerns about illicit finance activity); PARMA BAINS, ARIF ISMAIL, FABIANA MELO & NOBUYASU SUGIMOTO, INT’L MONETARY FUND, REGULATING THE CRYPTO ECOSYSTEM: THE CASE OF UNBACKED CRYPTO ASSETS 20 (2022), <https://www.imf.org/-/media/Files/Publications/FTN063/2022/English/FTNEA2022007.ashx> [<https://perma.cc/MTM6-SUEB>] (“[M]arket manipulation enforcement [for digital asset exchanges] is challenging because of the often pseudonymous, cross-border, and decentralized nature of the transactions.”).

14. *See infra* notes 199-204 and accompanying text.

15. *See infra* Part III.A.

16. *See infra* Part III.

17. Patricia Kowsmann & Caitlin Ostroff, *\$76 Billion a Day: How Binance Became the World’s Biggest Crypto Exchange*, WALL ST. J. (Nov. 11, 2021, 9:13 AM), <https://www.wsj.com/articles/binance-became-the-biggest-cryptocurrency-exchange-without-licenses-or-head-quarters-thats-coming-to-an-end-11636640029> [<https://perma.cc/4A7E-8BGA>].

services to supply chains to fine art.¹⁸ DApps are created using smart contracts, which are a form of software code that executes immutably according to its specified parameters on a blockchain network.¹⁹

The benefits and potential of digital assets are real. Unfortunately, so are the abuses in the digital asset market. The scope of fraud, attacks, and other harmful activity is worrisome.²⁰ The fact that so many parts of this market are opaque, despite the transparency of the underlying blockchain ledgers, increases that worry. And the fact that market participants so quickly brush off hacks and losses in the tens or hundreds of millions of dollars is perhaps the most worrisome fact of all.²¹

18. *See Dapp Industry Report: Q1 2022 Overview*, DAPPRADAR (Apr. 6, 2022), <https://dapp radar.com/blog/dapp-industry-report-q1-2022-overview> [<https://perma.cc/PV3W-KWEZ>]. While a number of these DApps have attracted significant capital or valuations for their underlying tokens, it remains an open question whether they will achieve sustained large-scale user adoption beyond speculative investment motivations. *Compare* Kevin Roose, *Maybe There's a Use for Crypto After All*, N.Y. TIMES: THE SHIFT (Aug. 3, 2022), <https://www.nytimes.com/2022/02/06/technology/helium-cryptocurrency-uses.html> [<https://perma.cc/8HS3-FM42>] (arguing that the Helium wireless network is one of the few examples of successful DApp adoption for real-world benefits), *with* Leo Schwartz, *Embattled Helium Is Attempting a Second Act as a Crypto-Powered Mobile Network*, FORTUNE CRYPTO (Sept. 27, 2022, 12:11 PM), <https://fortune.com/crypto/2022/09/27/embattled-helium-attempting-crypto-powered-mobile-network/> [<https://perma.cc/ZW8A-CCGA>] (stating that Helium's prospects fell with the crash in crypto markets, and it provided misleading information about its corporate users).

19. *See* Kevin Werbach & Nicolas Cornell, *Contracts Ex Machina*, 67 DUKE L.J. 313, 314 n.2 (2017).

20. *See supra* note 7.

21. *See, e.g.*, Lucy Brewster, *These Gen Z Crypto Investors Lost as Much as 6 Figures in the Crypto Crash, but They're Doubling Down on Their Investment*, FORTUNE (Aug. 14, 2022, 7:00 AM), <https://fortune.com/2022/08/14/crypto-investors-see-gains-ahead/> [<https://perma.cc/99GQ-9LBK>] (quoting investors who disregarded significant losses); Jordan Finneseth, *Survey Shows 55% of Crypto Investors Chose to HODL as Bitcoin and Altcoin Prices Collapsed*, COINTELEGRAPH (July 7, 2022), <https://cointelegraph.com/news/survey-shows-55-of-crypto-investors-chose-to-hodl-as-bitcoin-and-altcoin-prices-collapsed> [<https://perma.cc/XPX4-Q3DB>] (finding that 55 percent of retail crypto investors held their position despite a 60 percent decline in the market in 2022); Muyao Shen, *Crypto Investors Have Ignored Three Straight 51% Attacks on ETC*, COINDESK (Dec. 11, 2022, 2:31 PM), <https://www.coindesk.com/markets/2020/09/08/crypto-investors-have-ignored-three-straight-51-attacks-on-etc/> [<https://perma.cc/CVS4-3PX9>] (noting that Ethereum Classic investors disregarded three successful attacks on the core security of the network). To some extent, this reflects irrational investor herding behavior typical of booms and busts. *See* ROBERT J. SHILLER, *IRRATIONAL EXUBERANCE* 165 (3d ed. 2015) ("Investors are said to be euphoric or frenzied during booms or panic-stricken during market crashes. In both booms and crashes, investors are described as blindly following the herd like so many sheep, with no minds of their own."). However, many crypto investors have

Major financial bubbles have occurred repeatedly over the past four centuries, ever since finance and trade were sufficiently well-developed to allow for modern markets.²² These bubbles are often associated with scams and other abuses, especially in times of enthusiasm about new technology or market opportunities.²³ This is only to be expected. Times of transformation can create major profit opportunities. They also open the door for bad actors capitalizing on the general exuberance when the normal informational and legal counterweights are not in place.²⁴

The famed economist John Kenneth Galbraith coined the term “bezzle” for the gap between the perceived and real value of assets due to undiscovered theft or irrational exuberance.²⁵ This gap is particularly large during periods of market enthusiasm and innovation.²⁶ It creates what Galbraith called “a net increase in psychic wealth.”²⁷ People are, for a time, effectively wealthier, but this wealth is an illusion that collapses in a crash.²⁸ When the illusion is revealed, it can undermine trust and have negative long-term effects on markets.²⁹

According to *Chainalysis*, cryptocurrency crime reached an all-time high in value in 2021, with \$14 billion sent to illicit addresses.³⁰ Because of huge growth in digital asset trading activity, this represented only 0.15 percent of transaction volume.³¹ Those who

a particular belief that prices are bound to increase. See Megan McCluskey, *How Crypto Investors Are Handling Plunging Prices*, TIME (Feb. 1, 2022, 12:03 PM), <https://time.com/6141028/crypto-crash-investors/> [<https://perma.cc/X4RG-X5CB>].

22. See ROBERT Z. ALIBER & CHARLES P. KINDLEBERGER, *MANIAS, PANICS, AND CRASHES: A HISTORY OF FINANCIAL CRISES 18-19* (7th ed. 2015).

23. See Kenneth R. Gray, Larry A. Frieder & George W. Clark, Jr., *Financial Bubbles and Business Scandals in History*, 30 INT'L J. PUB. ADMIN. 859, 883 (2007).

24. See, e.g., *id.* at 861, 864-68, 871-72, 880-83.

25. See Michael Pettis, *Why the Bezzle Matters to the Economy*, CARNEGIE ENDOWMENT FOR INT'L PEACE (Aug. 23, 2021), <https://carnegieendowment.org/chinafinancialmarkets/85179> [<https://perma.cc/MJL7-TYWU>].

26. See *id.*

27. JOHN KENNETH GALBRAITH, *THE GREAT CRASH 1929*, at 133 (1997).

28. See *id.* at 133-34.

29. See *id.*

30. *Crypto Crime Trends for 2022: Illicit Transaction Activity Reaches All-Time High in Value, All-Time Low in Share of All Cryptocurrency Activity*, CHAINALYSIS (Jan. 6, 2022), <https://blog.chainalysis.com/reports/2022-crypto-crime-report-introduction/> [<https://perma.cc/5U9F-GJAU>].

31. See *id.*

allege that fraud and illicit activity are the only, or the predominant, function of cryptocurrencies are wrong. However, \$14 billion is not a small number, and it represents only transactions involving addresses known to be engaged in criminal activity, not the full range of scams, attacks, and manipulative activity likely occurring in the market.³² One recent survey identified twenty-nine different kinds of cryptocurrency fraud in the academic literature.³³ Researchers have identified over 47,000 scam Bitcoin and Ethereum addresses and over 8,000 cryptocurrency scam URLs.³⁴ And nearly 7,000 people filed complaints with the Federal Trade Commission reporting cryptocurrency scams between October 2020 and May 2021, losing a median of \$1,900 each.³⁵ The \$80 million in reported losses was a 1,000 percent increase from the year before.³⁶

In January 2022, a hack of Wormhole, a cross-blockchain bridge for DeFi, led to the theft of over \$300 million of ether.³⁷ The funds were replenished by Jump Trading, a high-frequency trading firm that is a significant investor in related projects, which raises as many questions as it answers.³⁸ Around the same time, the anonymous cofounder of the significant DeFi protocol Wonderland was discovered to be Michael Patryn, who has a history of financial fraud and was cofounder of QuadrigaCX, a Canadian cryptocurrency exchange that absconded with hundreds of millions of dollars of user funds.³⁹

32. *See id.*

33. Trozze et al., *supra* note 7, at 5.

34. *See* Massimo Bartoletti, Stefano Lande, Andrea Loddo, Livio Pompianu & Sergio Serusi, *Cryptocurrency Scams: Analysis and Perspectives*, 9 IEEE ACCESS 148353, 148364-65 (2021), <https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=9591634&tag=1> [<https://perma.cc/R7VV-AFTP>].

35. *See* Emma Fletcher, *Cryptocurrency Buzz Drives Record Investment Scam Losses*, FED. TRADE COMM'N (May 17, 2021), <https://www.ftc.gov/news-events/data-visualizations/data-spotlight/2021/05/cryptocurrency-buzz-drives-record-investment-scam-losses> [<https://perma.cc/PH35-U82J>].

36. *Id.*

37. *See* Tom Wilson & Pushkala Aripaka, *Jump Trading Replaces Stolen Wormhole Funds After \$320 Mln Crypto Hack*, REUTERS, Feb. 3, 2022, 5:20 PM, <https://www.reuters.com/technology/crypto-network-wormhole-hit-with-possible-320-mln-hack-2022-02-03/> [<https://perma.cc/S8HZ-CTW3>].

38. *Id.*

39. *See* Jordan Pearson & Lorenzo Franceschi-Bicchierai, *Crypto Co-Founder Revealed to Be Infamous Fraudster, Investors Shaken*, VICE: MOTHERBOARD (Jan. 28, 2022, 11:30 AM), <https://www.vice.com/en/article/epxakz/crypto-co-founder-revealed-to-be-infamous-fraudster->

When sizeable attacks and fraud are so common, and yet investors appear to shrug them off entirely, there is something wrong. Researchers on trust generally identify ability, benevolence, and integrity as the three pillars for establishing trustworthiness.⁴⁰ When digital asset and DeFi firms demonstrate their inability to safeguard assets and engage in behavior that suggests ill intent or inconsistency, it should result in a drop in trust. The fact that many such firms, and the market as a whole, do not experience such a reaction indicates that investors may not rationally be assessing risks. This could be a recipe for disaster.

In addition to hacks, scams, and thefts, there are many reasons to be concerned that the digital asset market is subject to manipulation. Practices that are routinely banned for other asset classes are widespread. A study in 2019 found that for lightly regulated digital asset exchanges outside the United States, approximately 95 percent of volume was faked due to artificial wash trading.⁴¹ Wash trading is also rampant in the ballooning NFT market,⁴² along with infringement, fakes, and spam.⁴³ Researchers found evidence that the Tether stablecoin was used systematically to pump up the price of Bitcoin in 2017.⁴⁴ Others found that bots on the Mt. Gox exchange

investors-shaken [<https://perma.cc/KDX9-R24D>].

40. See Roger C. Mayer, James H. Davis & F. David Schoorman, *An Integrative Model of Organizational Trust*, 20 ACAD. MGMT. REV. 709, 717 (1995).

41. BITWISE, BITWISE ASSET MANAGEMENT: ANALYSIS OF REAL BITCOIN TRADING VOLUME 12-13 (2019), <https://static.bitwiseinvestments.com/Research/Bitwise-Asset-Management-Analysis-of-Real-Bitcoin-Trade-Volume.pdf> [<https://perma.cc/R96K-YTXC>]; Rachel McIntosh, *Six Months After Bitwise, Wash Trading Lives on in Crypto*, FIN. MAGNATES (Sept. 25, 2019, 11:31 AM), <https://www.financemagnates.com/cryptocurrency/news/things-are-better-but-wash-trading-persists-in-crypto-heres-why/> [<https://perma.cc/ZQG5-GMJH>].

42. See *Crime and NFTs: Chainalysis Detects Significant Wash Trading and Some NFT Money Laundering in This Emerging Asset Class*, CHAINALYSIS (Feb. 2, 2022), <https://blog.chainalysis.com/reports/2022-crypto-crime-report-preview-nft-wash-trading-money-laundering/> [<https://perma.cc/RBW5-67GY>]; Andrew Hayward, *Hot Ethereum NFT Platform Looks Rare Is Rife with Wash Trading and OK with It*, DECRYPT (Jan. 12, 2022), <https://decrypt.co/90317/ethereum-nft-market-looks-rare-wash-trading> [<https://perma.cc/B75Y-3DGA>].

43. See Jordan Pearson, *More than 80% of NFTs Created for Free on OpenSea Are Fraud or Spam, Company Says*, VICE: MOTHERBOARD (Jan. 28, 2022, 9:54 AM), <https://www.vice.com/en/article/wxdzb5/more-than-80-of-nfts-created-for-free-on-opensea-are-fraud-or-spam-company-says> [<https://perma.cc/2YEA-PLSK>].

44. See John M. Griffin & Amin Shams, *Is Bitcoin Really Untethered?*, 75 J. FIN. 1913, 1936-47 (2020).

engaged in suspicious trading activity that drove the run-up in Bitcoin in 2013.⁴⁵

There are many openly operating pump-and-dump schemes for digital assets, a canonical form of illicit market manipulation. One study identified 355 such schemes involving 197 different coins, \$350 million of trading volume, and touching up to twenty-three million individuals.⁴⁶ And that was in 2018,⁴⁷ when the market was orders of magnitude smaller than it is today. Researchers have found evidence that public blockchain consensus mechanisms are subject to potential collusion among miners to influence prices.⁴⁸ And a January 2022 report revealed that Coinbase, the largest U.S.-based digital asset exchange, frequently decided to list tokens that it previously invested in without disclosure—a conflict of interest that would be prohibited for traditional exchanges.⁴⁹

Among the most worrisome elements in the digital asset market are those whose very name signals the opposite: stablecoins. Stablecoins are digital assets designed to avoid the endemic volatility of cryptocurrencies, typically by pegging somehow to the value of the U.S. dollar.⁵⁰ There are many legitimate reasons why stablecoins are important to the digital asset sector. They facilitate payment, lending, and other activities where the risks of sharp changes in

45. See Neil Gandal, JT Hamrick, Tyler Moore & Tali Oberman, *Price Manipulation in the Bitcoin Ecosystem*, CEPR: VOXEU (June 22, 2017), <https://cepr.org/voxeu/columns/price-manipulation-bitcoin-ecosystem> [<https://perma.cc/W3DH-G9A5>].

46. Anirudh Dhawan & Tālis J. Putniņš, *A New Wolf in Town? Pump-and-Dump Manipulation in Cryptocurrency Markets*, REV. FIN. 1, 2 (2022).

47. See *id.* at 9.

48. See Xiaotong Sun, *Bribes to Miners: Evidence from Ethereum 2*, 4, 8, 24 (June 6, 2022) (unpublished manuscript), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3940678 [<https://perma.cc/7HYE-9AA6>].

49. See Miles Kruppa, *The Coinbase Model: Profit from the Crypto Assets It Lists*, FIN. TIMES (Jan. 28, 2022), <https://www.ft.com/content/4e15d5b6-033b-4294-8aba-d95e02f51b3b> [<https://perma.cc/53HE-J4Y4>]. Conflicts of interest were even more extreme at the offshore exchange FTX, contributing to its spectacular downfall. See *infra* notes 80-85 and accompanying text.

50. PRESIDENT'S WORKING GRP. ON FIN. MKTS., FDIC & OFF. OF THE COMPTROLLER OF THE CURRENCY, REPORT ON STABLECOINS 4, 7-9 (2021), https://home.treasury.gov/system/files/136/StableCoinReport_Nov1_508.pdf [<https://perma.cc/T3P5-CCES>]; Douglas Arner, Raphael Auer & Jon Frost, *Stablecoins: Risks, Potential and Regulation* 3, 6 (Bank for Int'l Settlements, Working Paper No. 905, 2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3979495 [<https://perma.cc/WZT9-YSZJ>].

market prices is problematic.⁵¹ They create a bridge between digital assets and the traditional world of so-called fiat currencies, as well as the massive regulated financial system.⁵² And they facilitate liquidity in moving assets between exchanges and blockchains.⁵³ As a result, stablecoins represent three of the top six most valuable digital assets.⁵⁴ The value of major stablecoins reached nearly \$200 billion in spring 2022.⁵⁵

The problem with stablecoins is a familiar one to any student of banking and finance. If not designed and supervised properly, these large agglomerations of capital are at risk of catastrophic runs.⁵⁶ Banks and money market funds are subject to significant regulation to ensure safety and soundness.⁵⁷ While major U.S.-based stablecoins comply with some regulatory mandates, none today follow the full panoply of requirements governing banks or money market funds.⁵⁸ And many major stablecoins fail to do even that.⁵⁹

Some stablecoins are algorithmic, meaning that they maintain the peg through the operation of smart contracts that incentivize activity rather than by maintaining a store of fiat currency equal in value to the stablecoins in circulation.⁶⁰ Although MakerDAO—a hybrid system in which the stablecoin is overcollateralized with other digital assets—has a relatively good track record dating back to 2017,⁶¹ under collateralized and uncollateralized algorithmic

51. See PRESIDENT'S WORKING GRP. ON FIN. MKTS. ET AL., *supra* note 50, at 1, 8-9.

52. See *id.* at 4, 8.

53. See *id.* at 1, 4, 7-9.

54. *Today's Cryptocurrency Prices by Market Cap*, COINMARKETCAP, <https://coinmarketcap.com> [<https://perma.cc/P2WM-T2KM>].

55. Jamie Redman, *Stablecoin Economy Is \$10 Billion Away from Reaching a \$200 Billion Market Cap*, BITCOIN.COM (Apr. 11, 2022), <https://news.bitcoin.com/stablecoin-economy-is-10-billion-away-from-reaching-a-200-billion-market-cap/> [<https://perma.cc/2UQ8-7V9S>].

56. See Gary B. Gorton & Jeffery Y. Zhang, *Taming Wildcat Stablecoins*, 90 U. CHI. L. REV. (forthcoming 2023) (manuscript at 22, 24), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3888752 [<https://perma.cc/7QQQ-T6CE>].

57. See Dan Awrey, *Bad Money*, 106 CORNELL L. REV. 1, 25, 27-28 (2020).

58. See *infra* notes 257-63 and accompanying text.

59. See, e.g., *infra* Part IV.D.1.

60. See Muyao Shen, *How \$60 Billion in Terra Coins Went Up in Algorithmic Smoke*, BLOOMBERG (May 21, 2022), <https://www.bloomberg.com/graphics/2022-crypto-luna-terra-stablecoin-explainer/> [<https://perma.cc/Z3HH-7S4J>].

61. See Anupam Varshney, *How MakerDAO Is Forging the Future of Blockchain*, COINMARKETCAP (Aug. 2022), <https://coinmarketcap.com/alexandria/article/how-makerdao-is-forging-the-future-of-blockchain> [<https://perma.cc/Y5MY-5URV>]; Dirk Bullmann, Jonas

stablecoins are a disaster waiting to happen because sooner or later, they will fall victim to the death spiral pattern of a bank run. Indeed, this has already played out several times.⁶² The IRON stablecoin failed in 2021 despite high-profile backers such as billionaire investor Mark Cuban.⁶³ And in May 2022, the UST stablecoin, at its peak worth of \$60 billion, collapsed dramatically despite frantic efforts to prop it up using \$3 billion worth of Bitcoin held in reserve.⁶⁴

Klemm & Andrea Pinna, *In Search for Stability in Crypto-Assets: Are Stablecoins the Solution?* 23-26 (Eur. Cent. Bank: Eurosystem, Occasional Paper No. 230, 2019), https://papers.ssrn.com/so13/papers.cfm?abstract_id=3444847 [<https://perma.cc/YLL2-E45A>]. Recently MakerDAO has incorporated traditional assets such as U.S. Treasury bills into its collateral base for added stability. See Amitoj Singh, *Stablecoin Issuer MakerDAO to Invest \$500M in US Treasuries, Corporate Bonds*, COINDESK (Oct. 6, 2022, 10:58 AM), <https://www.coindesk.com/business/2022/10/06/stablecoin-issuer-makerdao-allocates-500m-for-treasuries-corporate-bond-investment/> [<https://perma.cc/Y8PN-CT6H>].

62. See Ryan S. Gladwin, *Panics and Death Spirals: A History of Failed Stablecoins*, FAST CO. (May 14, 2022), <https://www.fastcompany.com/90751716/panics-and-death-spirals-a-history-of-failed-stablecoins> [<https://perma.cc/PP3K-YJBE>].

63. See Austin Adams & Markus Ibert, *Runs on Algorithmic Stablecoins: Evidence from Iron, Titan, and Steel*, BD. OF GOVERNORS OF THE FED. RSRV. SYS.: FEDS NOTES (June 2, 2022), <https://www.federalreserve.gov/econres/notes/feds-notes/runs-on-algorithmic-stablecoins-evidence-from-iron-titan-and-steel-20220602.html> [<https://perma.cc/C9MB-9HGS>].

64. See Shen, *supra* note 60 (“TerraUSD, also known as UST, and its sister token Luna have melted down in spectacular fashion, sending their prices to near zero and their market values plunging to a shadow of the combined \$60 billion they once commanded.”); Ryan Browne, *\$3 Billion in Bitcoin Was Sold in a Last-Ditch Attempt to Save UST Stablecoin from Collapse*, CNBC: CRYPTO WORLD (May 16, 2022, 12:59 PM), <https://www.cnbc.com/2022/05/16/what-happened-to-the-bitcoin-reserve-behind-terras-ust-stablecoin.html> [<https://perma.cc/S A67-TADB>] (stating that Luna Foundation Guard spent nearly all of the Bitcoin in its reserve in an attempt to save UST); Matt Robinson, *SEC Investigating UST Stablecoin Blowup in Fresh Threat to Terra*, BLOOMBERG (June 9, 2022, 12:18 PM), <https://www.bloomberg.com/news/articles/2022-06-09/sec-investigating-ust-stablecoin-blowup-in-fresh-threat-to-terra> [<https://perma.cc/5V2X-5JN6>] (describing an SEC investigation into whether the marketing of TerraUSD violated federal investor-protection regulations).

Even more concerning is the stablecoin Tether (USDT).⁶⁵ Tether has continued to play an outsized role in the digital asset world despite having been found by the New York Attorney General and Commodity Futures Trading Commission to have lied about its backing and being banned from operating in New York.⁶⁶ Its claimed assets of approximately \$70 billion have never been formally audited.⁶⁷ How exactly major exchanges and digital asset lending platforms use Tether is opaque.⁶⁸ And how an asset that avoids U.S. regulation because it claims to have no U.S. customers is widely available on every U.S.-based digital asset exchange remains an open question.⁶⁹ The SEC has repeatedly cited evidence of fraud and

65. See Jeanna Smialek, *Why Washington Worries About Stablecoins*, N.Y. TIMES (Sept. 23, 2021), <https://www.nytimes.com/2021/09/17/business/economy/federal-reserve-virtual-currency-stablecoin.html> [<https://perma.cc/LUM3-K7EE>]; Zeke Faux, *Anyone Seen Tether's Billions?*, BLOOMBERG: BUSINESSWEEK (Oct. 7, 2021, 2:25 PM), <https://www.bloomberg.com/news/features/2021-10-07/crypto-mystery-where-s-the-69-billion-backing-the-stablecoin-tether> [<https://perma.cc/536U-2ZPR>]; Jeff Wise, *Tether Is a Trail of Shady Deals and Shattered Promises. Too Bad Cryptocurrency Now Depends on It*, MEN'S J., <https://www.mensjournal.com/entertainment/for-better-or-worse-cryptocurrency-depends-on-tether-mens-journal/> [<https://perma.cc/DC35-VFR8>]; David Yaffe-Bellany, *The Coin that Could Wreck Crypto*, N.Y. TIMES (June 17, 2022, 12:10 PM), <https://www.nytimes.com/2022/06/17/technology/tether-stablecoin-cryptocurrency.html> [<https://perma.cc/5CGQ-ZV62>]; Jonathan Weil, *Rising Tether Loans Add Risk to Stablecoin*, *Crypto World*, WALL ST. J. (Dec. 1, 2022, 5:30 AM), <https://www.wsj.com/articles/rising-tether-loans-add-risk-to-stablecoin-crypto-world-11669875590> [<https://perma.cc/72X2-VUK7>].

66. Press Release, Letitia James, N.Y. Att'y Gen., Attorney General James Ends Virtual Currency Trading Platform Bitfinex's Illegal Activities in New York (Feb. 23, 2021), <https://ag.ny.gov/press-release/2021/attorney-general-james-ends-virtual-currency-trading-platform-bitfinexs-illegal> [<https://perma.cc/4EQE-2RUW>]; Press Release, CFTC, CFTC Orders Tether and Bitfinex to Pay Fines Totaling \$42.5 Million (Oct. 15, 2021), <https://www.cftc.gov/PressRoom/PressReleases/8450-21> [<https://perma.cc/UL3B-VLKY>].

67. See Faux, *supra* note 65; Jonathan Weil, *What We Know—and Don't Know—About Tether's Books*, WALL ST. J. (Nov. 10, 2022, 5:38 PM), <https://www.wsj.com/articles/what-we-know-and-dont-know-about-tethers-books-11668119916> [<https://perma.cc/KL69-RCU4>].

68. See Coryanne Hicks, *What Is Tether? How Does It Work?*, FORBES: ADVISOR (May 16, 2022, 7:33 AM), <https://www.forbes.com/advisor/investing/cryptocurrency/what-is-tether-usdt/> [<https://perma.cc/C7KX-4WY9>]; Ryan Browne, *Investors Withdraw over \$7 Billion from Tether, Raising Fresh Fears About Stablecoin's Backing*, CNBC (May 17, 2022, 9:21 PM), <https://www.cnbc.com/2022/05/17/tether-usdt-redemptions-fuel-fears-about-stablecoins-backing.html> [<https://perma.cc/YDR3-8PNE>].

69. See Tory Newmyer & Jeremy B. Merrill, *Top Crypto Company Defies U.S. Sanctions on Service that Hid Stolen Assets*, WASH. POST (Aug. 24, 2022, 6:00 AM), <https://www.washingtonpost.com/business/2022/08/24/crypto-sanctions-tether/> [<https://perma.cc/ZP26-77HG>].

manipulation involving Tether and similar instruments as rationales for rejecting proposed Bitcoin exchange-traded funds.⁷⁰

There is good reason to believe that the digital asset market is riskier than most participants realize, especially for retail investors. In January 2022, the U.K. Financial Conduct Authority proposed new rules governing advertisements for investments in digital assets.⁷¹ The regulator's research found that many investors were taking on risks they did not fully appreciate, fueled by marketing that failed to disclose important information.⁷² Less than one-tenth of investors were aware of warnings the Financial Conduct Authority (FCA) had issued about the volatility and potential dangers of cryptocurrency investment, suggesting that more formal rules were needed.⁷³ The FCA's research also found that one of the biggest reasons for investment in digital assets was as a "gamble" that could make or lose money.⁷⁴ Gambling is not illegal. But it is carefully regulated,⁷⁵ given the potential for abuses and significant harms.

The growing practice of cryptocurrency "yield farming" and other mechanisms of leveraging (and then re-leveraging) digital assets is also making these markets more like the fragile interconnected financial markets they seek to replace.⁷⁶ One of the major

70. See, e.g., Steve Johnson & Philip Stafford, *Wall Street Regulator Rejects VanEck's Bitcoin-Backed ETF*, FIN. TIMES (Nov. 12, 2021), <https://www.ft.com/content/77bc7296-9bd4-4ea4-bab9-91cee789e47f> [<https://perma.cc/ZXQ9-EFFL>]; Order Disapproving Proposed Rule Change to List and Trade Shares of the One River Carbon Neutral BitCoin Trust, 87 Fed. Reg. 33,548, 33,553-54 (June 2, 2022).

71. See Joshua Oliver, *UK Financial Watchdog Proposes Tougher Rules for Crypto Adverts*, FIN. TIMES (Jan. 19, 2022), <https://www.ft.com/content/1a8b0285-9003-4c2f-8974-73137f323acd> [<https://perma.cc/S2DF-8DCF>].

72. See *id.*

73. See Joshua Oliver, *Most Would-Be Crypto Investors Unaware of UK Regulator's Warnings*, FIN. TIMES (June 17, 2021), <https://www.ft.com/content/39718cda-5cd1-4f0d-b7e3-0151e45bf25b> [<https://perma.cc/2ZXZ-DTGS>].

74. *Id.*; see also Rupert Jones, *FCA to Warn Younger Investors Off Cryptos and Other High-Risk Products*, THE GUARDIAN (Oct. 19, 2021, 7:01 PM), <https://www.theguardian.com/technology/2021/oct/20/fca-to-warn-younger-investors-off-cryptos-and-other-high-risk-products> [<https://perma.cc/V7P9-HC2E>] (describing how "[s]ocial media hype and the gambling-like thrill of competing to get rich quick" drive retail digital asset trading among the young).

75. See, e.g., 31 C.F.R. § 1021.200-.670 (2022).

76. See Caitlin Long, *Two Wall Street Terms Every Bitcoin Trader Needs to Learn Now*, FORBES (Aug. 13, 2018, 12:51 PM), <https://www.forbes.com/sites/caitlinlong/2018/08/13/the-r-and-c-words-enter-the-vocabulary-of-bitcoin-enthusiasts/?sh=2e98757168f3> [<https://perma.cc/6FUB-36KR>]; see also Alexander Osipovich, *Crypto 'Yield Farmers' Chase High Returns, but Risk Losing It All*, WALL ST. J. (July 17, 2021, 5:30 AM), <https://www.wsj.com/articles/>

vulnerabilities of the financial system is that intermediaries effectively create money as shadow banks by stacking multiple claims on assets such that holders do not necessarily own what they believe they own.⁷⁷ When liquidity dries up, these arrangements can produce the kind of crisis the world witnessed in 2008.⁷⁸ Already, major crypto lending firms including Celsius, Voyager Digital, and BlockFi have declared bankruptcy due to poor risk management, wiping out billions of dollars in customer assets.⁷⁹

The November 2022 collapse of FTX, one of the world's largest digital asset exchanges, illustrated the dangers of the current regulatory environment. FTX commingled customer funds with Alameda Research, a nominally separate trading firm also controlled by FTX CEO Sam Bankman-Fried.⁸⁰ It operated without standard internal controls and secretly took on massive risks with insufficient collateral.⁸¹ FTX, valued at \$32 billion in its latest funding round, owed over \$3 billion to creditors at the time of its bankruptcy.⁸² Many investors were blindsided.⁸³ Losses associated

crypto-yield-farmers-chase-high-returns-but-risk-losing-it-all-11626514200 [https://perma.cc/J964-ECLW] (explaining the appeal and risks of yield farming); Coryanne Hicks, *Yield Farming: An Investing Strategy Involving Staking or Lending Crypto Assets to Generate Returns*, BUS. INSIDER (July 7, 2022, 12:30 PM), https://www.businessinsider.com/personal-finance/yield-farming [https://perma.cc/6N4U-EFZS] (describing yield farming).

77. See ZOLTAN POZSAR, TOBIAS ADRIAN, ADAM ASHCRAFT & HAYLEY BOESKY, FED. RSRV. BANK OF N.Y., STAFF REP. NO. 458, SHADOW BANKING 1-2, 6, 10-12 (2012), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr458.pdf [https://perma.cc/XA7V-VND3].

78. See *id.* at 1-2, 6, 10-12, 26.

79. See Lauren Hirsch, David Yaffe-Bellany & Ephrat Livni, *Crypto Lender BlockFi Files for Bankruptcy as FTX Fallout Spreads*, N.Y. TIMES (Nov. 28, 2022), https://www.nytimes.com/2022/11/28/business/blockfi-bankruptcy-cryptocurrency-ftx.html [https://perma.cc/VAV9-RJ89]; Nikhilesh De, Opinion, *BlockFi Joins the Bankruptcy Parade*, COINDESK (Nov. 30, 2022, 2:08 PM), https://www.coindesk.com/policy/2022/11/29/blockfi-joins-the-bankruptcy-parade/ [https://perma.cc/6UA7-DF3N].

80. See Vicky Ge Huang, Alexander Osipovich & Patricia Kowsmann, *FTX Tapped Into Customer Accounts to Fund Risky Bets, Setting Up Its Downfall*, WALL ST. J. (Nov. 11, 2022, 12:16 PM), https://www.wsj.com/articles/ftx-tapped-into-customer-accounts-to-fund-risky-bets-setting-up-its-downfall-11668093732 [https://perma.cc/25XE-KW25].

81. See Kalley Huang, *Why Did FTX Collapse? Here's What to Know*, N.Y. TIMES (Nov. 18, 2022), https://www.nytimes.com/2022/11/10/technology/ftx-binance-crypto-explained.html [https://perma.cc/D563-47AU]; Joshua Oliver, *Sam Bankman-Fried's Trading Shop Was Given Special Treatment on FTX for Years*, FIN. TIMES (Dec. 3, 2022), https://www.ft.com/content/1e435a4e-e8f9-4330-be84-99c516630d4a [https://perma.cc/JHT8-BHW7].

82. See Ryan Browne, *Collapsed Crypto Exchange FTX Owes Top 50 Creditors over \$3 Billion, New Filing Says*, CNBC (Nov. 21, 2022, 2:25 PM), https://www.cnbc.com/2022/11/21/

with FTX undermined other major digital asset firms such as Genesis and BlockFi.⁸⁴ FTX purported to be fully regulated and had a major public presence in the United States, including prominent sports endorsement deals. However, it was domiciled in the Bahamas, where it was subject to significantly lighter regulatory requirements, many of which proved to be illusory.⁸⁵

Risk is a part of investing. And abuses in traditional financial markets exist as well. The ubiquitous presence of intermediaries and the opacity of most marketplaces create inefficiencies and opportunities to take advantage of unsophisticated players. Decentralized blockchains and DeFi protocols can offer transparency and direct relationships that actually benefit ordinary investors while increasing the sophistication of the market. However, the reality of blockchain-based markets is far from the fully decentralized, fully informed ideal. The most successful participants in the digital asset ecosystem are centralized firms such as exchanges and NFT marketplaces, which occupy a similar role in the financial ecosystem to conventional intermediaries.⁸⁶

As in all financial markets, investors should have accurate and sufficient information that they are capable of digesting. And they should not be subject to markets that are at risk of catastrophic failure or are rigged against them thanks to the disproportionate power of certain players.

collapsed-crypto-exchange-ftx-owes-top-50-creditors-3-billion-filing.html [https://perma.cc/T H2A-QLFA].

83. See Matthew Goldstein, Alexandra Stevenson, Maureen Farrell & David Yaffe-Bellany, *How FTX's Sister Firm Brought the Crypto Exchange Down*, N.Y. TIMES (Nov. 18, 2022), <https://www.nytimes.com/2022/11/18/business/ftx-alameda-ties.html> [https://perma.cc/EXY8-2XT8].

84. See David Gura, *Fears of Crypto Contagion Are Growing as Another Company's Finances Wobble*, NPR (Nov. 22, 2022, 3:56 PM), <https://www.npr.org/2022/11/22/1138639733/crypto-contagion-ftx-genesis-blockfi> [https://perma.cc/R7NL-YA2N].

85. See Chris Prentice, Angus Berwick & Hannah Lang, *How FTX Bought Its Way to Become the 'Most Regulated' Crypto Exchange*, REUTERS, Nov. 18, 2022, 12:21 PM, <https://www.reuters.com/technology/exclusive-how-ftx-bought-its-way-become-most-regulated-crypto-exchange-2022-11-18/> [https://perma.cc/24LY-6L8Z].

86. See Kristin N. Johnson, *Decentralized Finance: Regulating Cryptocurrency Exchanges*, 62 WM. & MARY L. REV. 1911, 1952-54 (2021).

II. DIGITAL ASSET REGULATION

A. *The Regulatory Landscape*

Technological innovation in financial services is not a new phenomenon. For decades, start-ups and established firms have devised new ways to engage in fundraising, payments, trading, lending, and other financial activities.⁸⁷ Even as the technologies change, the relevant activities continue to fit within regulatory categories. Just because something is a new kind of derivative or security does not mean that those frameworks no longer apply. If decentralized applications and digital assets meet the definitions of securities or derivatives, then those rules come into play.⁸⁸ Unfair and deceptive trade practices can be prosecuted by the Federal Trade Commission, regardless of the tools involved.⁸⁹ Similarly, the fact that systems and their developers are not entirely located in the United States does not make U.S. law inapplicable when, for example, services are targeted at or provided to U.S. customers.⁹⁰

When new technologies develop, there may well need to be clarifications, new interpretations by expert agencies, or legislative updates to better fit the legal regime to activity in the marketplace. However, the rationales for regulation do not change. If investors are being scammed out of their money, markets are being seriously manipulated, financial crime is being facilitated, or hidden risks of crises are excessive, then the need for protections does not depend on the technical specifics. However, the best ways to implement those protections may depend on various factors. Technologies may

87. See, e.g., Elizabeth Judd, *Timeline: 180 Years of Banking Technology*, INDEP. BANKER (Oct. 31, 2017), <https://independentbanker.org/2017/10/timeline-180-years-of-banking-technology/> [https://perma.cc/N4VE-UNUB].

88. See ANDREW P. SCOTT, CONG. RSCH. SERV., R46333, FINTECH: OVERVIEW OF FINANCIAL REGULATORS AND RECENT POLICY APPROACHES 17, 23 (2020).

89. See *Financial Technology: Protecting Consumers on the Cutting Edge of Financial Transactions*, FED. TRADE COMM'N, <https://www.ftc.gov/news-events/topics/consumer-finance/financial-technology> [https://perma.cc/DEQ6-VDM9].

90. See Jared Paul Marx, Opinion, *How Does US Law Apply to Foreign Cryptocurrency Companies?*, COINDESK (Sept. 11, 2021, 7:49 AM), <https://www.coindesk.com/markets/2015/08/14/how-does-us-law-apply-to-foreign-cryptocurrency-companies/> [https://perma.cc/PGZ7-9DCC].

increase dangers in one way and solve them in others. The question, therefore, is not whether to have regulatory oversight but what those regimes should look like. When market forces can effectively deter harmful behavior, intervention is not needed. However, this is an empirical question. We should not assume that competition and self-regulatory mechanisms will fail to rein in abuses, but neither should we assume they will succeed.

The fact of the matter is that financial markets are regulated in every jurisdiction with significant activity, and they have been for a very long time.⁹¹ When there is money to be made, someone will eventually figure out ways to cheat others or to amass so much power that they distort markets to their advantage. Similarly, we, and every major economy in the world, have central banks actively engaged in monetary policy because the alternative is repeated and devastating financial panics. If anything, advancing technology typically creates the need for more regulation, not less. For example, the collateralized debt instruments and other complex products that underpinned the 2008 Global Financial Crisis could not have taken off without the digitization of finance.⁹² These products highlighted the need to adopt new protections against systemic risk that were unnecessary in earlier eras of finance.⁹³

Broadly speaking, cryptocurrencies raise three major categories of financial regulatory consideration: (1) consumer/investor protection, (2) financial crime, and (3) macroprudential and monetary policy.⁹⁴ The first category relates to concerns about fraud, market

91. See INT'L ORG. OF SEC. COMM'NS, FACT SHEET 2-3 (2022), <https://www.iosco.org/about/pdf/IOSCO-Fact-Sheet.pdf> [<https://perma.cc/QK7M-M73X>].

92. See FIN. CRISIS INQUIRY COMM'N, THE FINANCIAL CRISIS INQUIRY REPORT: FINAL REPORT OF THE NATIONAL COMMISSION ON THE CAUSES OF THE FINANCIAL AND ECONOMIC CRISIS IN THE UNITED STATES 44, 58, 72 (2011), <https://www.govinfo.gov/content/pkg/GPO-FCIC/pdf/GPO-FCIC.pdf> [<https://perma.cc/5PRX-SRKV>].

93. See *id.* at 308.

94. This list does not represent all the regulatory or policy questions that digital assets raise. There are important issues about taxation, corporate law matters with decentralized autonomous organizations (DAOs), private law matters involving negotiability, and secured transactions involving digital assets. There are also grave concerns about the energy usage of proof-of-work blockchains, most notably Bitcoin. See, e.g., Jon Huang, Claire O'Neill & Hiroko Tabuchi, *Bitcoin Uses More Electricity than Many Countries. How Is That Possible?*, N.Y. TIMES (Sept. 3, 2021), <https://www.nytimes.com/interactive/2021/09/03/climate/bitcoin-carbon-footprint-electricity.html> [<https://perma.cc/ERC7-5Y9F>]; Sandali Handagama, *EU Parliamentarians Push to Limit Bitcoin Use over Energy Concerns*, COINDESK (Oct. 21, 2022,

manipulation, deception, information asymmetries, hacks, and excessive or hidden risk. The basic financial regulatory response to these concerns is the registration, disclosure, and market surveillance regime of the 1933 and 1934 Securities Acts and similar laws.⁹⁵ Outside of financial services, agencies such as the Federal Trade Commission take actions against unfair or deceptive trade practices,⁹⁶ and the Department of Justice pursues those who defraud consumers or investors.⁹⁷

The attributes that make cryptocurrencies valuable for legitimate uses also make them attractive for criminals, money launderers, sanctioned nations, terrorists, and others who are appropriately excluded from the global financial system.⁹⁸ Over the past decades, a sophisticated national and global regime of anti-money laundering and countering the financing of terrorism (AML/CFT) rules, as well as industry compliance practices, have been put into place.⁹⁹ While highly imperfect, these mechanisms serve important objectives.

Finally, as the size of digital asset markets increases and instruments such as stablecoins and central bank digital currencies become a greater component of the monetary system, financial policymakers will need to consider them in assessments of systemic risk. Financial policymakers may also need to take into account the

10:48 AM), <https://www.coindesk.com/policy/2022/02/24/eu-parliamentarians-push-to-limit-bitcoin-use-over-energy-concerns/> [<https://perma.cc/4XQX-XVMG>]. While a similar analysis could be done in these areas, this Article focuses on topics within the traditional sphere of financial regulation.

95. See Securities Act of 1933, ch. 38, 48 Stat. 74 (codified as amended at 15 U.S.C. §§ 77a-77aa); *Registration Under the Securities Act of 1933*, SEC, INVESTOR.GOV, <https://www.investor.gov/introduction-investing/investing-basics/glossary/registration-under-securities-act-1933> [<https://perma.cc/LQG7-D7D6>]; Securities Exchange Act of 1934, ch. 404, 48 Stat. 881 (codified as amended at 15 U.S.C. §§ 78a-78qq).

96. *Mission*, FED. TRADE COMM'N, <https://www.ftc.gov/about-ftc/mission> [<https://perma.cc/SKR6-QQP8>].

97. See, e.g., U.S. DEP'T OF JUST., THE REPORT OF THE ATTORNEY GENERAL PURSUANT TO SECTION 5(B)(III) OF EXECUTIVE ORDER 14067: THE ROLE OF LAW ENFORCEMENT IN DETECTING, INVESTIGATING, AND PROSECUTING CRIMINAL ACTIVITY RELATED TO DIGITAL ASSETS, at i, 27 (2022), <https://www.justice.gov/ag/page/file/1535236/download> [<https://perma.cc/FD89-K2KM>].

98. See KEVIN WERBACH, THE BLOCKCHAIN AND THE NEW ARCHITECTURE OF TRUST 3, 190 (2018); Sara Dudley, Travis Pond, Ryan Roseberry & Shawn Carden, *Evasive Maneuvers: How Malign Actors Leverage Cryptocurrency*, 92 JOINT FORCE Q. 58, 58-60 (2019).

99. See BUREAU OF INT'L NARCOTICS & L. ENFT AFFS., *Anti-Money Laundering and Countering the Financing of Terrorism*, U.S. DEP'T OF STATE, <https://www.state.gov/anti-money-laundering-and-countering-the-financing-of-terrorism/> [<https://perma.cc/3U6D-GT87>].

impacts that privately issued digital assets have on nations' abilities to exercise monetary policy, a topic that has already been raised in connection with Facebook's Libra/Diem proposal.¹⁰⁰

B. U.S. Regulatory Activity

Federal digital asset regulation in the United States to date has involved a number of agencies and offices: the Financial Crimes Enforcement Network (FinCEN), the Office of the Comptroller of the Currency (OCC), the Internal Revenue Service (IRS) in the Treasury Department, the Securities and Exchange Commission (SEC), the Commodity Futures Trading Commission (CFTC), and the Federal Deposit Insurance Corporation (FDIC).¹⁰¹ There has also been activity in a number of states,¹⁰² and several bills have been introduced in recent sessions of Congress,¹⁰³ which I will not cover here.

FinCEN classifies virtual currencies as "legal tender" for transmission purposes and, in 2020, proposed a rule that would impose record keeping, reporting, and customer identity verification requirements on large virtual currency transactions.¹⁰⁴ Recent FinCEN actions have built on the precedent of the \$110 million fine against the exchange BTC-e in 2017.¹⁰⁵ In addition, FinCEN's

100. See Ryan Browne, *Here's Why Regulators Are So Worried About Facebook's Digital Currency*, CNBC (Sept. 19, 2019, 10:25 AM), <https://www.cnbc.com/2019/09/19/heres-why-regulators-are-so-worried-about-facebooks-digital-currency.html> [<https://perma.cc/LWB9-F6PR>].

101. *Cryptocurrency Regulators and Regulations*, BITIRA (Nov. 10, 2020), <https://www.bitira.com/cryptocurrency-regulators-and-regulations/> [<https://perma.cc/SL6Q-CTBV>]; see also *FACT SHEET: White House Releases First-Ever Comprehensive Framework for Responsible Development of Digital Assets*, *supra* note 13 (identifying many federal agencies responsible for addressing regulatory and other public policy issues related to digital assets).

102. *Cryptocurrency Laws and Regulations by State*, BLOOMBERG L. (May 26, 2022), <https://pro.bloomberglaw.com/brief/cryptocurrency-laws-and-regulations-by-state/> [<https://perma.cc/KDC7-U33R>].

103. See, e.g., Fatima Hussein & Ken Sweet, ASSOCIATED PRESS, *New Cryptocurrency Oversight Legislation Arrives as Industry Shakes*, PBS: NEWSHOUR (Aug. 3, 2022, 5:25 PM), <https://www.pbs.org/newshour/economy/new-cryptocurrency-oversight-legislation-arrives-as-industry-shakes> [<https://perma.cc/ZB4U-VV4Y>].

104. Requirements for Certain Transactions Involving Convertible Virtual Currency or Digital Assets, 85 Fed. Reg. 83,840, 83,840-41 (proposed Dec. 23, 2020) (codified at 31 C.F.R. §§ 1010.1020, 1022 (2023)).

105. BTC-E, Case No. 2017-03 (July 26, 2017), https://www.fincen.gov/sites/default/files/enforcement_action/2020-05-21/Assessment%20for%20BTCeVinnik%20FINAL2.pdf [<https://perma.cc/8Q8V-8Q8V>].

enforcement focus has noticeably extended to penalties against individual persons. A pair of prominent enforcement actions targeted over-the-counter exchange activities by individuals who failed to register with FinCEN, implement an anti-money laundering program, or institute a reporting regime.¹⁰⁶ One of the actions included related criminal proceedings for money laundering of illicitly obtained Bitcoin funds.¹⁰⁷

Similar to FinCEN, the CFTC maintains a broad conception of its regulatory authority—if an active futures market exists for a digital asset, then it is within the CFTC’s purview.¹⁰⁸ The CFTC has plainly stated that it has standing to regulate Bitcoin and other virtual currencies in futures or options contracts, as well as any transactions involving margin financing or fraud.¹⁰⁹ Self-certifications of both the Chicago Mercantile Exchange (CME) and the Chicago Board of Options Exchange (CBOE), as well as a 2018 suit, legitimized this authority.¹¹⁰ In fiscal year 2022, over one-fifth of the CFTC’s enforcement actions involved digital asset trading.¹¹¹

The SEC’s framework for analyzing digital assets is based on the longstanding *Howey* test for classifying securities.¹¹² A 2018

perma.cc/A2GV-955G].

106. See Press Release, U.S. Dep’t of Just., “Bitcoin Maven” Sentenced to One Year in Federal Prison in Bitcoin Money Laundering Case (July 9, 2018), <https://www.justice.gov/usao-cdca/pr/bitcoin-maven-sentenced-one-year-federal-prison-bitcoin-money-laundering-case> [<https://perma.cc/BU5Z-ZQKF>]; see also Powers, Case No. 2019-01 (Apr. 18, 2019), https://www.fincen.gov/sites/default/files/enforcement_action/2020-05-21/Assessment%20Eric%20Powers%20Final%20for%20Posting%2004.18.19.pdf [<https://perma.cc/TP62-UUYV>].

107. See Judgment and Probation/Commitment Order at 1, *United States v. Tetley*, No. 17-cr-00738-R (C.D. Cal. July 9, 2018), ECF No. 45.

108. See DAWN D. STUMP, CFTC, DIGITAL ASSETS: CLARIFYING CFTC REGULATORY AUTHORITY & THE FALLACY OF THE QUESTION, “IS IT A COMMODITY OR A SECURITY?,” https://www.cftc.gov/media/6306/DigitalAssetsAuthorityInfographic_CommStump082321/download [<https://perma.cc/2BYH-LQ8E>].

109. Order, *In re Coinflip, Inc.*, CFTC No. 15-29, 2015 WL 5535736, at *2-3 (Sept. 17, 2015).

110. See Press Release, CFTC, CFTC Statement on Self-Certification of Bitcoin Products by CME, CFE and Cantor Exchange (Dec. 1, 2017), <https://www.cftc.gov/PressRoom/PressReleases/7654-17> [<https://perma.cc/3K5C-8DSY>]; *CFTC v. McDonnell*, 287 F. Supp. 3d 213, 217 (E.D.N.Y. 2018).

111. See Cheyenne Ligon, *Over a Fifth of Cases in CFTC’s 2022 Crackdown Were Crypto-Related*, COINDESK (Oct. 21, 2022, 3:17 PM), <https://www.coindesk.com/policy/2022/10/20/over-a-fifth-of-cases-in-cftcs-2022-crackdown-were-crypto-related/> [<https://perma.cc/YH8X-SYV8>].

112. See *Framework for “Investment Contract” Analysis of Digital Assets*, <https://www.sec.gov/corpfin/framework-investment-contract-analysis-digital-assets> [<https://perma.cc/38QZ-Y63L>].

statement by then Corporation Finance Director Bill Hinman stated that Bitcoin and Ether were sufficiently decentralized such that they did not appear to meet the requirements of securities classification at the time.¹¹³ Hinman argued that when a coin derives its value from an operational blockchain platform rather than the work of an identifiable group of issuers or promoters, the *Howey* requirements are no longer met.¹¹⁴ Few digital assets are likely to meet this test, however. SEC Chairman Gary Gensler has stated that “the vast majority” of cryptocurrency token are securities.¹¹⁵

To date, the SEC has issued nearly eighty enforcement actions against token issuers.¹¹⁶ Courts have upheld the SEC’s authority and legal analysis.¹¹⁷ SEC Chairman Gary Gensler has urged Congress to clarify the SEC’s regulatory authority over digital

113. See William Hinman, Dir., Div. of Corp. Fin., Digital Asset Transactions: When *Howey* Met Gary (Plastic) (June 14, 2018), <https://www.sec.gov/news/speech/speech-hinman-061418> [<https://perma.cc/4KRT-MW9N>].

114. See *id.*

115. Scott Nover, *The Head of the SEC Says Most Cryptocurrencies Are Operating Illegally*, QUARTZ (Sept. 8, 2022), <https://qz.com/the-head-of-the-sec-says-most-cryptocurrencies-are-oper-1849513471> [<https://perma.cc/HM53-PY4R>]. Gensler also indicated that with its transition to a proof-of-stake consensus mechanism, Ether might also now constitute a security. See Paul Kiernan & Vicky Ge Huang, *Ether’s New ‘Staking’ Model Could Draw SEC Attention*, WALLST.J. (Sept. 15, 2022, 6:07 PM), <https://www.wsj.com/articles/ethers-new-staking-model-could-draw-sec-attention-11663266224> [<https://perma.cc/H96A-V9P9>].

116. Press Release, SEC, SEC Nearly Doubles Size of Enforcement’s Crypto Assets and Cyber Unit (May 3, 2022), <https://www.sec.gov/news/press-release/2022-78> [<https://perma.cc/Z9U5-DXKK>]; see also David Yaffe-Bellany, *Inside a Crypto Nemesis’ Campaign to Rein In the Industry*, N.Y. TIMES (Nov. 21, 2022), <https://www.nytimes.com/2022/11/21/technology/gary-gensler-crypto-sec.html> [<https://perma.cc/3UWB-XZTR>] (describing the SEC’s aggressive enforcement posture).

117. See, e.g., SEC v. Kik Interactive Inc., 492 F. Supp. 3d 169, 173, 177-78 (S.D.N.Y. 2020) (upholding the SEC’s action against Kik over its Kin token offering); SEC v. Telegram Grp. Inc., 448 F. Supp. 3d 352, 358-59 (S.D.N.Y. 2020) (upholding an SEC action against the Telegram messaging platform over its TON token offering); SEC v. LBRY, Inc., No. 21-cv-260-PB, 2022 WL 16744741, at *7-8 (D.N.H. Nov. 7, 2022) (upholding an SEC action against video sharing service LBRY, despite evidence that the token had functional utility). The SEC’s 2020 case against digital payments firm Ripple, arguing that Ripple’s sales of the XRP token constituted an unregistered securities offering totaling approximately \$1.38 billion, is currently pending in court. See Complaint at 1-2, SEC v. Ripple Labs, Inc., No. 20-cv-10832 (S.D.N.Y. Dec. 22, 2020); Press Release, SEC, SEC Charges Ripple and Two Executives with Conducting \$1.3 Billion Unregistered Securities Offering (Dec. 22, 2020), <https://www.sec.gov/news/press-release/2020-338> [<https://perma.cc/FAQ8-4HVU>].

assets, in particular over exchanges, claiming the breadth of the industry is outpacing the SEC's purview.¹¹⁸

Although several earlier bills were introduced in Congress,¹¹⁹ the debate over digital asset regulation ramped up significantly in 2022. The Biden administration issued a major executive order on responsible development of digital assets.¹²⁰ Among other things, the order established an interagency working group and tasked a variety of agencies and departments with reports on issues ranging from the creation of a U.S. central bank digital currency to the energy usage of proof-of-work mining.¹²¹ In Congress, a bipartisan proposal cosponsored by Senators Lummis and Gillibrand sought to address major outstanding issues, including the allocation of responsibility between the SEC and CFTC.¹²² Another bipartisan bill from Senators Stabenow and Boozman, which would expand the CFTC's authority, ran into controversy because of support by the now-disgraced FTX.¹²³

C. Global Regulatory Environment

Significant differences in regulatory approaches to cryptocurrencies exist worldwide as governments grapple with the fast-paced development of the digital asset sector. While El Salvador has made Bitcoin legal tender,¹²⁴ China banned trading of cryptocurrencies

118. See Oversight of the U.S. Securities and Exchange Commission: *Wall Street's Cop Is Finally Back on the Beat: Hearing Before the H. Comm. on Fin. Servs.*, 117th Cong. 24 (2021) (statement of Gary Gensler, Chairman, SEC).

119. See Jason Brett, *Congress Has Introduced 50 Digital Asset Bills Impacting Regulation, Blockchain, and CBDC Policy*, FORBES (May 19, 2022, 11:59 PM), <https://www.forbes.com/sites/jasonbrett/2022/05/19/congress-has-introduced-50-digital-asset-bills-impacting-regulation-blockchain-and-cbdc-policy/?sh=79c123cb4e3f> [https://perma.cc/62QQ-8B6N].

120. Exec. Order No. 14,067, 87 Fed. Reg. 14,143 (Mar. 9, 2022).

121. See *id.* at 14,145-46, 14,148.

122. See Olafimihan Oshin, *Sens. Gillibrand, Lummis Introduce Major Cryptocurrency Bill*, THE HILL (June 7, 2022, 10:28 AM), <https://thehill.com/homenews/senate/3514299-sens-gilli-brand-lummis-introduce-major-cryptocurrency-bill/> [https://perma.cc/2MUN-UD37].

123. See Allyson Versprille, Lydia Beyoud & Annie Massa, *Bankman-Fried Courted Legislators and Regulators. Now, They're Shunning Him*, BLOOMBERG (Nov. 15, 2022, 7:00 AM), <https://www.bloomberg.com/news/articles/2022-11-15/ftx-collapse-forces-reckoning-among-washington-s-policy-makers#xj4y7vzkg> [https://perma.cc/9WUH-2WW8].

124. See Nelson Renteria, Tom Wilson & Karin Strohecker, *In a World First, El Salvador Makes Bitcoin Legal Tender*, REUTERS, June 9, 2021, 11:24 PM, <https://www.reuters.com/world/americas/el-salvador-approves-first-law-bitcoin-legal-tender-2021-06-09/> [https://perma.cc/9WUH-2WW8].

and declared cryptocurrency mining illegal.¹²⁵ Other countries have attempted to craft bespoke legal regimes that attract blockchain-based service developers.¹²⁶

Among the most aggressive jurisdictions are Switzerland and Liechtenstein. While Switzerland has amended its existing legislation,¹²⁷ Liechtenstein has introduced an entirely new law. In fact, Liechtenstein became the first country to comprehensively pass regulation for the token economy, which entered into force in January 2020.¹²⁸ The Liechtenstein Blockchain Act allows any right or asset to be tokenized.¹²⁹ In September 2020, the Swiss Parliament passed new regulations for blockchain technology, which entered into force in two phases in 2021.¹³⁰ The new Swiss distributed ledger technology (DLT) law amends several civil laws, financial market laws, and securities laws to provide a legal basis for trading rights through “electronic registers,” as it introduces ledger-based

cc/SYN5-PM7V].

125. See Alun John, Samuel Shen & Tom Wilson, *China's Top Regulators Ban Crypto Trading and Mining, Sending Bitcoin Tumbling*, REUTERS, Sept. 24, 2021, 1:49 PM, <https://www.reuters.com/world/china/china-central-bank-vows-crackdown-cryptocurrency-trading-2021-09-24/> [https://perma.cc/DA8V-APLU]. There are some indications that the ban on mining was not fruitful given the surge in underground mining. See, e.g., Jamie Crawley, *Bitcoin Mining Appears to Have Survived Ban in China*, COINDESK (May 20, 2022, 1:09 PM), <https://www.coindesk.com/business/2022/05/17/bitcoin-mining-appears-to-have-survived-ban-in-china/> [https://perma.cc/BNH8-DGQM]; Ryan Browne, *Bitcoin Production Roars Back in China Despite Beijing's Ban on Crypto Mining*, CNBC (May 18, 2022, 9:02 AM), <https://www.cnbc.com/2022/05/18/china-is-second-biggest-bitcoin-mining-hub-as-miners-go-underground.html> [https://perma.cc/83ZD-8JMP].

126. See, e.g., Tunbosun Oyinloye, *Top 12 Most Friendly Countries for Crypto Investment*, DAILYCOIN (July 31, 2022, 10:00 PM), <https://dailycoin.com/top-12-most-friendly-countries-for-crypto-investment/> [https://perma.cc/UXF8-4F4B].

127. AMTLICHE SAMMLUNG DES BUNDESRECHTS [AS] Sept. 25, 2020, AS 33 (2021) (Switz.), <https://www.fedlex.admin.ch/eli/oc/2021/33/de> [https://perma.cc/UJ58-WW6U].

128. See Press Release, Gov't Principality of Liech., Liechtenstein Parliament Approves Blockchain Act Unanimously (Oct. 3, 2019), <https://www.regierung.li/en/press-releases/222958/?typ=content&nid=11164> [https://perma.cc/7PNN-Q5WV]; LIECHTENSTEINISCHES LANDESGESETZBLATT [LL], Token- und VT-Dienstleister-Gesetz; TVTG (TVTG) [Token and Trusted Technology Service Provider Act] Dec. 2, 2019, Nr. 301 (Liech.), <https://www.gesetze.li/konso/2019301000> [https://perma.cc/9PVG-ZYYC]. The English version of the Blockchain Act, including the government consultation report, can be accessed at https://www.naegele.law/files/Downloads/2019-07-12_BuA_TVTG_en_full_report.pdf [https://perma.cc/27UW-SVDM].

129. TVTG, art. 2, § 1(c).

130. See Press Release, Swiss Confederation: Fed. Council, Federal Council Brings DLT Act Fully into Force and Issues Ordinance (June 18, 2021), https://www.efd.admin.ch/efd/en/home/the-fdf/nsb-news_list.msg-id-84035.html [https://perma.cc/KJC2-9BRU].

securities that are represented on blockchains.¹³¹ The law further introduces special provisions for the treatment of crypto-based assets in case of bankruptcy and establishes a new authorization category for DLT trading, a DLT license.¹³²

In the European Union (EU), Member States have implemented regulatory requirements relying on guidelines such as the Financial Action Task Force's (FATF) guidance for virtual asset service providers (VASPs) in 2019¹³³ and the EU's fifth Anti-Money Laundering Directive (AMLD5),¹³⁴ which has been enforced since 2020.¹³⁵ AMLD5 requires exchange services between "virtual currencies and fiat currencies," as well as custodial wallets, to be registered with an EU member state.¹³⁶ Countries such as Gibraltar¹³⁷ and Malta have adopted crypto-friendly regimes for VASPs licensing.¹³⁸ For example, in 2017, Gibraltar introduced a tailored license for fintech firms using blockchain technology.¹³⁹

To bring more clarity and provide a harmonious EU-wide approach, the European Commission proposed a new regulatory framework for digital assets as part of the European Union's Digital

131. See *Blockchain*, SWISS CONFEDERATION: FED. DEP'T OF FIN., <https://www.efd.admin.ch/efd/en/home/digitalisierung/blockchain.html> [<https://perma.cc/6CX9-CLSG>].

132. See *id.*

133. See generally FIN. ACTION TASK FORCE, GUIDANCE FOR A RISK-BASED APPROACH: VIRTUAL ASSETS AND VIRTUAL ASSET SERVICE PROVIDERS (2019), <http://www.fatfgafi.org/media/fatf/documents/recommendations/RBA-VA-VASPs.pdf> [<https://perma.cc/3X5N-EAEV>].

134. See generally Directive (EU) 2018/843 of the European Parliament and of the Council of 30 May 2018 Amending Directive (EU) 2015/849 on the Prevention of the Use of the Financial System for the Purposes of Money Laundering or Terrorist Financing, and Amending Directive 2009/138/EC and 2013/36/EU, 2018 O.J. (L 156) 43 [hereinafter EU Directive 2018/843].

135. As a directive, it leaves EU countries the freedom to create their own laws to achieve the directive's goals. See generally *Types of Legislation*, EU, https://european-union.europa.eu/institutions-law-budget/law/types-legislation_en [<https://perma.cc/ZR9Z-NPV7>].

136. See EU Directive 2018/843, *supra* note 134, at 67.

137. Note that upon the U.K.'s withdrawal from the EU, Gibraltar, as a British overseas territory, also ceased to be part of it, but it retains a special status regarding negotiations between the EU and the U.K., requiring the involvement of Spain. See *Gibraltar*, LA MONCLOA, <https://www.lamoncloa.gob.es/lang/en/brexit/gibraltar/Paginas/index.aspx> [<https://perma.cc/Z9EC-HK7J>].

138. See Sandali Handagama, *Europe's MiCA Crypto Rules Are Coming Soon. Here's Why They Matter*, COINDESK (Nov. 2, 2021, 7:00 AM), <https://www.coindesk.com/policy/2021/11/02/unpacking-europes-looming-mica-crypto-regulation/> [<https://perma.cc/B378-XAAJ>].

139. See Huw Jones, *Gibraltar Launches Financial Services License for Blockchain*, REUTERS, Dec. 14, 2017, 7:18 AM, <https://www.reuters.com/article/us-gibraltar-regulator-blockchain-idUSKBN1E81JO> [<https://perma.cc/U7VB-TKRE>].

Finance Strategy.¹⁴⁰ The regime for Markets in Crypto Assets (MiCA) aims to establish a common approach to digital assets beyond the existing rules for securities.¹⁴¹ Under MiCA, businesses issuing digital assets or serving as VASPs need to acquire a license in one EU member state, which then becomes valid in all of the EU.¹⁴² The proposal includes safeguards to address potential systemic risks, especially in relation to categories of digital assets such as stablecoins.¹⁴³

In Asia, regulatory approaches vary widely. Japan, which once was home to Mt. Gox, the biggest crypto exchange, which handled 80 percent of global Bitcoin trading before it went bankrupt due to a major hack,¹⁴⁴ was the first country in the world to define a crypto exchange business in 2017 and legally define “virtual currency.”¹⁴⁵ Singapore, considered one of the crypto-friendliest nations and home to many startups, continues to attract crypto-related business and already regulates cryptocurrency exchanges under the Payment Services Act¹⁴⁶ whereas in other parts of Asia, such as South Korea and Hong Kong, the cryptocurrency industry is facing new restrictions.¹⁴⁷

This is not a comprehensive global survey. And there are many details necessary to effectively compare policies across jurisdictions. I describe these global activities in part to illustrate that many other nations, including significant American competitors, are taking the digital asset phenomenon seriously. They are adopting

140. See *Commission Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-Assets, and Amending Directive (EU) 2019/1937*, at 1, COM (2020) 593 final (Sept. 24, 2020).

141. See *id.* at 1-2.

142. See *id.* at 21.

143. See *id.* at 3.

144. See Wataru Suzuki & Tsubasa Suruga, *Collapsed Crypto Exchange CEO Warns ‘Structural Risks’ Remain*, NIKKEI ASIA (Apr. 7, 2022, 3:04 PM), <https://asia.nikkei.com/Spotlight/Cryptocurrencies/Collapsed-crypto-exchange-CEO-warns-structural-risks-remain#:~:text=Launched%20in%202010%2C%20Mt.,%24480%20million%20at%20the%20time> [https://perma.cc/WG4W-VEQQ].

145. See *Guide: Japan Crypto Asset Regulation*, SYGNA, <https://www.sygna.io/blog/japan-crypto-asset-regulation-guide/> [https://perma.cc/C6WR-M4ZF].

146. See *Payment Services Act 2019*, MONETARY AUTH. OF SING. (Apr. 15, 2019), <https://www.mas.gov.sg/regulation/acts/payment-services-act> [https://perma.cc/HZS2-VGCJ].

147. See Mercedes Ruhl & Leo Lewis, *Stakes Rise for Singapore’s Big Crypto Bet*, FIN. TIMES (Sept. 30, 2021), <https://www.ft.com/content/1f948b38-2061-416d-951d-69415b879c17> [https://perma.cc/4V83-ACJV].

distinctive approaches based on their own policy objectives and existing legal or regulatory structures. The United States should do the same.

D. The DeFi Challenge

One of the most significant and rapidly growing parts of the blockchain sector is decentralized finance (DeFi). DeFi refers to financial services and associated activity, such as price feeds, with three distinctive characteristics: (1) trust-minimized execution and settlement on a permissionless blockchain; (2) noncustodial treatment of assets; and (3) software-based implementation that is open, programmable, and composable.¹⁴⁸ DeFi poses particularly acute challenges for regulators and policymakers.¹⁴⁹ Some of these relate to questions about securities rules or tax treatment for digital assets that have been under discussion and subject to regulatory pronouncements for years. Others are entirely new.

Total value locked (TVL) in DeFi, representing the value of digital assets that are committed as liquidity or collateral for DeFi services, went from roughly \$1 billion in late 2019 to more than \$10 billion in mid-2020, to \$110 billion in November 2021.¹⁵⁰ Centralized cryptocurrency exchanges, such as Bitfinex, have started offering bridges between their custodial trading platforms and DeFi offerings.¹⁵¹ DeFi developers and others are also looking at ways to connect DeFi with traditional finance (TradFi) institutions and markets. For example, payment processors are partnering with DeFi applications to enable direct purchases of stablecoins,¹⁵² and

148. WORLD ECON. F. & WHARTON BLOCKCHAIN & DIGIT. ASSET PROJECT, DECENTRALIZED FINANCE (DEFI) POLICY-MAKER TOOLKIT 6-7 (2021), https://www3.weforum.org/docs/WEF_DeFi_Policy_Maker_Toolkit_2021.pdf [<https://perma.cc/K44Q-T9QC>].

149. *See, e.g., id.* at 22, 25.

150. *See* DEFIPULSE, <https://www.defipulse.com/> [<https://perma.cc/Y7HQ-VZFW>].

151. *See, e.g.,* Tom Farren, *Bitfinex Launches the First L2 Bridge from CeFi to DeFi*, COINTELEGRAPH (Sept. 23, 2021), <https://cointelegraph.com/news/bitfinex-launches-the-first-l2-bridge-from-cefi-to-defi> [<https://perma.cc/LAU2-GTDD>].

152. *See, e.g.,* Adrian Zmudzinski, *DeFi Leader MakerDAO Partners with Simplex to Create a Dai Fiat On-Ramp*, COINTELEGRAPH (Mar. 3, 2020), <https://cointelegraph.com/news/defi-leader-markerdao-partners-with-simplex-to-create-a-dai-fiat-on-ramp> [<https://perma.cc/MTT7-M77F>].

brokerages are starting to offer clients crypto wallets to access the DeFi ecosystem.¹⁵³

DeFi taps into the desire for an open, inclusive financial system that operates globally—a fully transparent system with no central authority, in which users have ultimate control over their assets and can borrow, lend, trade, save, and invest freely. The fact that the DeFi ecosystem is fully digital and typically operates on the shared trust infrastructure and standards of a particular blockchain ledger means that services can be modified and combined far more easily than in traditional finance.¹⁵⁴ Increasing the velocity of assets and unlocking potential opportunities to earn yields or obtain capital efficiently has the potential to increase the risk-adjusted returns available to market participants.

As with other digital asset-based markets, DeFi also poses significant risks. The *DeFi Policy-Maker Toolkit*, a collaboration of the Wharton Blockchain and Digital Asset Project and the World Economic Forum, identified five major categories of DeFi risks:

Financial: Depletion of funds due to the transactional activity of fellow users[, including rapid price declines, failure of liquidity, or strategic behavior.]

Technical: Failures of the software systems supporting transaction execution, pricing and integrity[. These include issues such as smart contract vulnerabilities, poorly written smart contracts, failures of price oracles, or failures of the underlying blockchain settlement process.]

Operational: Failures of the human systems for key management, protocol development or governance[. These include problems with updates or forks, key management for users and governance participants, and how to resolve disputes.]

153. See, e.g., Robert Stevens, *Robinhood Crypto COO, CTO Hint that DeFi Features Are Coming*, DECRYPT (Sept. 26, 2021), <https://decrypt.co/81946/robinhood-crypto-coo-cto-defi-tools> [<https://perma.cc/HTN2-UG44>].

154. See WORLD ECON. F. & WHARTON BLOCKCHAIN & DIGIT. ASSET PROJECT, *supra* note 148, at 7; Vincent Tabora, *Money Legos and Composability as DeFi Building Blocks*, MEDIUM (Feb. 17, 2021), <https://medium.com/the-capital/money-legos-and-composability-as-defi-build-ing-blocks-efb1ad5e848e> [<https://perma.cc/62GJ-S3ML>].

Legal Compliance: Use of DeFi to engage in illicit activity or to evade regulatory obligations[.]

Emergent: Macro-scale crashes ... due to the interaction, scaling and integration of DeFi components[. These risks become particularly worrisome as DeFi services plug into each other, and into traditional financial services markets, with limited visibility into the full set of interconnections.]¹⁵⁵

In some cases, DeFi mitigates risks that are a serious problem in traditional finance and typically call for regulatory involvement. For example, with fully collateralized or over collateralized DeFi transactions, there is no counterparty risk that parties will not actually have the capital they claim to have.¹⁵⁶ Positions are visible on the blockchain and cryptographically secured.¹⁵⁷ In other cases, DeFi generates risks that have no analogue in the established environment. If identified, a software error in a traditional derivatives trade can be the basis for legal redress or rolling back a transaction.¹⁵⁸ DeFi is based on immutable execution of smart contracts, which can make even obvious mistakes nearly impossible to fix unless some anticipatory mechanism is put into place.¹⁵⁹

DeFi market participants, services such as smart contract auditors and DeFi insurance providers, and regulators are actively working to evaluate and address many of these risk categories. A full discussion of the state of play is beyond the scope of this Article. More to the point, many of these risks involve the kinds of technical issues best addressed by expert agencies or departments within the scope of their mandate. The question for Congress is whether and, if so, how to alter the statutory framework.

155. WORLD ECON. F. & WHARTON BLOCKCHAIN & DIGIT. ASSET PROJECT, *supra* note 148, at 13-19.

156. Fabian Schär, *DeFi's Promise and Pitfalls*, 59 FIN. & DEV. 33, 33-34 (2022); WORLD ECON. F. & WHARTON BLOCKCHAIN & DIGIT. ASSET PROJECT, *supra* note 148, at 14.

157. *See* Schär, *supra* note 156, at 33.

158. *See, e.g., Obvious Error Transactions Policy*, NASDAQ TRADER, <https://www.nasdaqtrader.com/Micro.aspx?id=ObviousErrorPolicy> [<https://perma.cc/F7BP-G7ZW>].

159. *See* WORLD ECON. F. & WHARTON BLOCKCHAIN & DIGIT. ASSET PROJECT, *supra* note 148, at 15.

III. LEARNING FROM THE PAST

In thinking about how to address digital assets, we should heed the lessons of internet policy, which similarly developed around a disruptive and transformative—yet deeply problematic—technological innovation. Two historical examples—the Clinton-Gore *Framework for Global Electronic Commerce* in 1997 and the judicial response to peer-to-peer (P2P) file sharing in the early 2000s—provide a roadmap for addressing seemingly intractable questions about digital asset regulation.

A. *The Clinton-Gore E-Commerce Framework*

The commercial development of the internet in the 1990s, after the creation of the World Wide Web, generated a slew of legal or regulatory questions. Suddenly, millions of people were accessing and creating content online through search engines such as Yahoo!, buying and selling in cyberspace through eBay and Amazon, communicating in real-time with people around the world they knew only through pseudonyms, and even trading stocks through their computers. Questions about intellectual property protection, fraud, privacy violations, jurisdiction for legal disputes, harmful speech, and other legal issues seemed impossible to address for exactly the same reasons blockchains pose regulatory difficulties today. Cyberspace was global and nowhere, services spanned legal categories, and networks were decentralized. Moreover, just as today blockchain-based approaches such as DeFi threaten to compete with—and even disrupt—traditional sectors of business activity, the internet posed a significant threat to established industries.

Internet entrepreneurs in the mid-1990s feared that regulators would trample on innovation, either inadvertently or out of deliberate desire to crush unfamiliar new services.¹⁶⁰ Incumbents pushed for rules that disadvantaged or even banned internet-based

160. See Sandra Sobieraj, *Clinton Issues 'Hands Off' Policy on Internet Commerce*, N.Y. TIMES (July 2, 1997), https://archive.nytimes.com/www.nytimes.com/library/cyber/week/070297commerce.html?source=post_page [<https://perma.cc/M8D9-UXDW>].

competitors.¹⁶¹ Yet there were real policy concerns to address. Keeping internet services in an uncertain legal status caused its own problems, as the lack of clarity created uncertainty in the market.¹⁶²

The Clinton administration, notably Vice President Al Gore, had come into office in 1992 promoting the value of what was initially called the “Information Superhighway” and later the “National Information Infrastructure.”¹⁶³ As it became clear that the decentralized public internet, not some proprietary or government-owned platform, would be the foundation for this digital revolution, serious regulatory questions began to spring up.¹⁶⁴ A task force was assembled from all relevant agencies, led in the White House by presidential advisor Ira Magaziner, to develop an overall approach.¹⁶⁵

The result was the *Framework for Global Electronic Commerce*, which the White House issued in 1997.¹⁶⁶ Though the *Framework* did not impose any rules itself, it set the stage for the development of internet policy in the United States going forward. The *Framework* announced five principles to govern regulatory activity in the area.¹⁶⁷ It started with the proposition that the private sector should lead in exploring the innovative potential of the internet.¹⁶⁸ Going further, it declared that, “[g]overnments should avoid undue restrictions on electronic commerce.”¹⁶⁹ This “do no harm” approach made it clear that contrary to fears in the private sector, regulators saw the success of the internet as a valuable objective. Critically,

161. *See id.*

162. *See id.*

163. *See* Thomas Kalil, *Public Policy and the National Information Infrastructure*, 30 BUS. ECON. 15, 15 (1995); Jonathan D. Blake & Lee J. Tiedrich, *The National Information Infrastructure Initiative and the Emergence of the Electronic Superhighway*, 46 FED. COMM'NS L.J. 397, 416-18 (1994).

164. *See* Blake & Tiedrich, *supra* note 163, at 421-22.

165. The author participated in the development of the *Framework for Global Electronic Commerce* as Counsel for New Technology Policy at the Federal Communications Commission.

166. *The Framework for Global Electronic Commerce*, WHITE HOUSE (July 1, 1997), <https://clintonwhitehouse4.archives.gov/WH/New/Commerce/> [<https://perma.cc/Z3ST-TKPPQ>].

167. *See Read the Framework*, WHITE HOUSE (July 1, 1997), <https://clintonwhitehouse4.archives.gov/WH/New/Commerce/read.html> [<https://perma.cc/P8DJ-NYDR>].

168. *Id.*

169. *Id.*

however, the document did not stop there. It also rejected the notion that all government had to do was get out of the way, and the internet market would evolve to address any problems. Rather, it stated, “Where governmental involvement is needed, its aim should be to support and enforce a predictable, minimalist, consistent and simple legal environment for commerce.”¹⁷⁰

The White House initiative, and the follow-up work in various agencies, created confidence that the government was not engaged in a knee-jerk effort to shut down unfamiliar activity that threatened established firms. At the same time, it pushed forward efforts to address the regulatory gaps and uncertainties that did exist around e-commerce.¹⁷¹ The convening role of the White House was particularly important. The *Framework* brought together a variety of agencies and departments that otherwise might operate at cross-purposes.

The Biden administration’s initiatives on digital asset regulation are following a similar path. Given the breadth of digital asset regulatory issues, bringing together different government entities for a harmonized response is essential. Several such initiatives were initiated in 2021 and 2022, including the President’s Working Group on Financial Markets,¹⁷² activities under the Financial Stability Oversight Council,¹⁷³ and the digital asset policy “sprint” between the OCC, FDIC, and Fed.¹⁷⁴ The March 2022 executive order is designed to increase coordination significantly by establishing interagency processes and the publication of reports on key issues.¹⁷⁵ The “whole of government” approach that the executive order promotes should help energize activity as well as coordination.

170. *Id.*

171. *See generally id.*

172. Press Release, U.S. Dep’t of the Treasury, President’s Working Group on Financial Markets Releases Report and Recommendations on Stablecoins (Nov. 1, 2021), <https://home.treasury.gov/news/press-releases/jy0454> [<https://perma.cc/Y4QC-YW92>].

173. Press Release, U.S. Dep’t of the Treasury, Financial Stability Oversight Council Releases Report on Digital Asset Financial Stability Risks and Regulation (Oct. 3, 2022), <https://home.treasury.gov/news/press-releases/jy0986> [<https://perma.cc/8TT2-PZLD>].

174. *See generally* Courtney Degen, *SEC’s Gensler: Legislation Should Regulate Stablecoins and Give CFTC More Authority*, PENSIONS & INVS. (Oct. 14, 2022, 1:07 PM), <https://www.pionline.com/cryptocurrency/secs-gensler-legislation-should-regulate-stablecoins-and-give-cftc-more-authority> [<https://perma.cc/4AFS-LQ7M>].

175. *See* Exec. Order No. 14,067, 87 Fed. Reg. 14,143, 14,145-46, 14,148 (Mar. 9, 2022).

One important difference between the internet then and digital assets now is that most internet activity did not involve regulated activities. Financial services are regulated because without those guardrails, there will inevitably be abuses of investors, market manipulation, theft, facilitation of financial crime, excessive market concentration, and unreasonable levels of hidden risk. Amazon selling books online or Yahoo! making it possible to search for websites did not raise such concerns. However, some internet activity did overlap with regulated industries. The communications services overseen by the Federal Communications Commission (FCC) were one class of examples.

The FCC wisely rejected a petition to ban internet telephony services because they allegedly represented unfair competition against long-distance carriers.¹⁷⁶ If enacted, the ban would have made Zoom, Facetime, and all the other real-time internet communications tools that are so important today illegal. However, the FCC did require Voice over Internet Protocol (VoIP) service providers interconnected with the public-switched telephone network to provide enhanced 911 compatibility.¹⁷⁷ If you pick up your phone in an emergency and dial 911, whether your call goes through and provides emergency personnel with the location information they need should not depend on the technology used to route communications. Similarly, when AT&T attempted to evade the access charges that fund universal service subsidies by offering a service that artificially switched in and out of internet protocols in the middle of the connection, the FCC rejected it.¹⁷⁸ When there are good public policy reasons for a requirement, the question should be how to achieve those goals in the most effective manner, with the least burden.

In the digital asset context, the major relevant classes of regulatory activity are investments classified as securities or commodities and banking subject to safety and soundness requirements. The SEC has so far hesitated to define the dividing line between digital

176. See Grant Gross, IDG NEWS SERV., *FCC Rejects AT&T VoIP Petition*, COMPUTERWORLD (Apr. 22, 2004, 12:00 AM), <https://www.computerworld.com/article/2564959/fcc-rejects-at-t-voip-petition.html> [<https://perma.cc/8DSB-VE8Q>].

177. See IP-Enabled Servs., 20 FCC Rcd. 10245 at 12, 38 (2005), *aff'd*, *Nuvio Corp. v. FCC*, 473 F.3d 302 (D.C. Cir. 2006); 47 C.F.R. §§ 9.3, 54.5 (2007).

178. See Gross, *supra* note 176.

assets treated as securities and those that will not be, preferring to engage in “regulation by enforcement.”¹⁷⁹ For stablecoins, by contrast, there is growing recognition that some clear federal rules should be established.¹⁸⁰ As with VoIP, the process of establishing such rules will enable discussion about the tradeoffs in different regulatory structures, highlighting the major areas of concern.

B. Peer-to-Peer File Sharing

The *Framework for Global Electronic Commerce* set out a road map for regulation, but it did not address the practicalities of implementing necessary rules. In particular, decentralized internet-based services posed significant enforcement difficulties. It seemed impossible in some cases to draw appropriate lines and to take action against those firms on the wrong side of those lines. These challenges resemble those arising today with respect to DeFi. Even if, for example, a decentralized exchange facilitates trading of unregistered securities and enables financial crime by avoiding the identification of counterparties, what can a regulator do to enforce obligations on a software protocol, running on a decentralized global blockchain?

In the case of DeFi, an important precursor is the rapid rise—and equally rapid fall—of peer-to-peer (P2P) file-sharing applications. Although the story is a familiar one in technology circles, the legal resolution of the P2P file-sharing challenges is not as well remembered.

P2P file sharing threatened to undermine the economic foundations of the music industry and other media industries as well—or perhaps merely to transform them. It all started with Napster, written by college student Shawn Fanning, and launched in 1999.¹⁸¹ Within a few months, Napster had more than twenty million users

179. See Richard Satran, *U.S. SEC Embraces “Regulation by Enforcement” as Securities Industry Morphs Beyond Rulebooks*, REUTERS, Nov. 12, 2021, 9:44 AM, <https://www.reuters.com/article/bc-finreg-sec-regulation-by-enforcement/u-s-sec-embraces-regulation-by-enforcement-as-securities-industry-morphs-beyond-rulebooks-idUSKBN2HX1OR> [<https://perma.cc/3EHU-U9VR>].

180. See PRESIDENT’S WORKING GRP. ON FIN. MKTS. ET AL., *supra* note 50, at 1-2.

181. Tom Lamont, *Napster: The Day the Music Was Set Free*, THE GUARDIAN (Feb. 23, 2013, 7:05 PM), <https://www.theguardian.com/music/2013/feb/24/napster-music-free-file-sharing> [<https://perma.cc/93AR-VXTC>].

and four million individual users active each day.¹⁸² These are astronomical numbers considering how much smaller the internet was at that point. Application store ecosystems, or even smart-phones, did not exist, and most internet users were still on dial-up connections over the telephone network. Napster and other P2P file-sharing applications took off primarily because they allowed people to access commercially released music for free.¹⁸³ At the time, the only way to purchase recorded music was on physical media such as CDs. Streaming was negligible and record labels refused to license online distribution of songs. With Napster, a user could freely download any songs shared by other users of the P2P network.¹⁸⁴ The music industry saw it as an existential threat.

Napster posed an issue similar to the one we now face with DeFi: how to regulate decentralized activity. The legal issue in the earlier case was copyright infringement rather than financial regulation, but the structure of the problem was the same. Napster itself did not distribute any music.¹⁸⁵ It did not store any music on its servers.¹⁸⁶ It did not create or control the network through which users traded music.¹⁸⁷ It merely distributed software, which connected itself to a dynamic decentralized network by finding other users of the software online at the same time.¹⁸⁸ Napster and its defenders argued that Napster was not, in fact, contributing to infringement; it only provided a neutral tool that could be used to exchange any files of the user's choosing.¹⁸⁹

The record industry sued Napster, and the case went to the United States Court of Appeals for the Ninth Circuit.¹⁹⁰ Napster lost.¹⁹¹ The court found that even though Napster did not itself store or transfer music files, Napster maintained a central database of all

182. See *Napster: 20 Million Users*, CNNMONEY (July 19, 2000, 5:27 PM), <https://money.cnn.com/2000/07/19/technology/napster/index.htm> [<https://perma.cc/2QXC-A2SG>].

183. See Lamont, *supra* note 181.

184. See *id.*

185. *How Napster Works—and How It Doesn't*, CBSNEWS (May 17, 2000, 6:50 PM), <https://www.cbsnews.com/news/how-napster-works-and-how-it-doesnt/> [<https://perma.cc/6LTU-3HPT>].

186. See *id.*

187. See *id.*

188. See *id.*

189. See *id.*

190. See *A&M Recs., Inc. v. Napster, Inc.*, 239 F.3d 1004, 1010-11 (9th Cir. 2001).

191. *Id.* at 1029.

content accessible on the network at any time.¹⁹² Napster users contributed their own list of files automatically to this database, which other users referenced to identify what was available where.¹⁹³ As a result, Napster knew exactly what was being traded on its network.¹⁹⁴ It could clearly see that the vast majority of the activity involved illicit sharing of licensed content.¹⁹⁵ Furthermore, Napster was essential to this activity. Without the dynamic database that Napster maintained, the file-sharing network could not operate.¹⁹⁶ In other words, Napster was essentially a DINO: decentralized in name only. It effectively maintained control of essential elements of the network and therefore could be held legally responsible for the network's activity.¹⁹⁷ Napster was quickly shut down.¹⁹⁸

There are today similar DeFi services that are decentralized in name only. Some of these simply associate with the name DeFi for marketing reasons without having any real decentralization compared to more established services. For example, DeFi Money Market (DMM) was styled as a centralized lending pool that would aggregate participants' capital and pay them interest.¹⁹⁹ It was in fact a fraud. Even as described, however, DMM was centralized: the operator of the pool controlled all the assets. The SEC had little difficulty taking action against DMM.²⁰⁰

192. *Id.* at 1011-12, 1015.

193. *Id.* at 1011-12.

194. *See id.* at 1021.

195. *See id.* at 1020.

196. *See id.* at 1011-13.

197. *See id.* at 1019-20, 1022-24.

198. The service had a second life as a tool for licensed music distribution but never regained its prior success. *See* Matt Rosoff, *Napster Is Finally Dead—Here's a Look Back at What It Once Meant*, BUS. INSIDER (Oct. 4, 2011, 6:56 PM), <https://www.businessinsider.com/napster-is-finally-dead-heres-a-look-back-at-what-happened-2011-10> [<https://perma.cc/F6NB-Y6EQ>].

199. *See generally* Order Instituting Cease-and-Desist Proceedings, Pursuant to Section 8A of the Securities Act of 1933 and Section 21C of the Securities Exchange Act of 1934, Making Findings, and Imposing a Cease-and-Desist Order, Securities Act Release No. 10,961, Exchange Act Release No. 92,588, 2021 WL 3470599 (Aug. 6, 2021) (describing DeFi Money Market's practices).

200. *See* Press Release, SEC, SEC Charges Decentralized Finance Lender and Top Executives for Raising \$30 Million Through Fraudulent Offerings (Aug. 6, 2021), <https://www.sec.gov/news/press-release/2021-145> [<https://perma.cc/K7TJ-38LN>].

There are likely to be many more DeFi services that are similarly centralized in practice or that maintain a significant amount of central control. In 2018, the SEC took action against EtherDelta, an early decentralized exchange (DEX).²⁰¹ EtherDelta, similar to today's DeFi automated market makers (AMMs), did not take custody over users' assets.²⁰² However, it was controlled by a single developer who controlled the order book, listings, and access to the system.²⁰³ The SEC had little difficulty going after EtherDelta for impermissibly trading unregistered securities.²⁰⁴

The more interesting parts of the P2P file-sharing story are what happened after Napster. Newer file-sharing applications architected themselves to remove the central control point that doomed Napster.²⁰⁵ These applications, most famously KaZaA but also including Grokster, LimeWire, and others, built up the database of available songs in a decentralized way through direct communications between users' software.²⁰⁶ There was no central database, and therefore the application developer could not directly see what users were transferring.²⁰⁷ Nor could the application distributor blacklist certain files.²⁰⁸ It had no direct control.

Nonetheless, the distributed P2P file-sharing services also lost in court. In *MGM Studios, Inc. v. Grokster, Ltd.*, the Supreme Court concluded that they were, like Napster, legally responsible for the activity on their network.²⁰⁹ The legal theory in this case was that even though these services did not see or allow each individual infringing transfer, they knew and encouraged the creation of a marketplace that was dominated by infringement.²¹⁰ In other words,

201. See Press Release, SEC, SEC Charges EtherDelta Founder with Operating an Unregistered Exchange (Nov. 8, 2018), <https://www.sec.gov/news/press-release/2018-258> [<https://perma.cc/BD4D-S8TN>].

202. See *id.*

203. *Id.*

204. See *id.*

205. See, e.g., Joseph A. Sifferd, Note, *The Peer-to-Peer Revolution: A Post-Napster Analysis of the Rapidly Developing File Sharing Technology*, 4 VAND. J. ENT. & TECH. L. 92, 104 (2002).

206. See, e.g., *id.*

207. See, e.g., *id.* at 105-06.

208. See, e.g., *id.*

209. See 545 U.S. 913, 941 (2005).

210. See *id.* at 922-26.

Grokster and KaZaA “induced” the illegal activity.²¹¹ Their marketing materials, business models, internal communications, and the obvious evidence of the market dynamics made clear that the file-sharing application developers were not just innocent bystanders.²¹²

Further reinforcing this test, there was no legal action taken against BitTorrent, a P2P file-sharing protocol optimized for distribution of video. Even though at one point upwards of one-third of all internet traffic globally involved BitTorrent transfers,²¹³ and most of them were not licensed by the content owners,²¹⁴ BitTorrent the company did nothing to induce such activity.²¹⁵ It merely disseminated open-source software.²¹⁶ Its revenues came from offering content owners tools to distribute licensed video streams.²¹⁷

The important point here is that the “why” of activity matters. Even when not explicitly spelled out in the laws or regulation, intent is a significant factor that regulators and enforcement agents consider in deciding whether to take action and that courts consider

211. *See id.* at 935, 937-38, 940-41.

212. *See id.* at 923-27.

213. *See CacheLogic Says 35% of All Internet Traffic Is Now BitTorrent*, ZDNET (Nov. 4, 2004), <https://www.zdnet.com/article/cachelogic-says-35-of-all-internet-traffic-is-now-bittorrent/> [<https://perma.cc/L8YT-ZQ5R>].

214. *See* Jacqui Cheng, *BitTorrent Census: About 99% of Files Copyright Infringing*, ARS TECHNICA (Jan. 29, 2010, 7:08 PM), <https://arstechnica.com/information-technology/2010/01/bittorrent-census-about-99-of-files-copyright-infringing/> [<https://perma.cc/S2ED-GXQQ>].

215. *See* Rob Pegoraro, *BitTorrent May Prove Too Good to Quash*, WASH. POST (Mar. 13, 2005), <https://www.washingtonpost.com/archive/business/2005/03/13/bittorrent-may-prove-too-good-to-quash/d38cf17b-c652-473a-9172-f8bb50d094b1/> [<https://perma.cc/CN98-9JDB>]; Jay Lyman, *Legitimate Use, Open Source, Keep BitTorrent out of Court*, LINUX.COM (Mar. 8, 2005), <https://www.linux.com/news/legitimate-use-open-source-keep-bittorrent-out-court/> [<https://perma.cc/EF44-FDF5>]; *see also* Ernesto Van der Sar, *Interview with Bram Cohen, the Inventor of BitTorrent*, TORRENTFREAK (Jan. 17, 2007), <https://torrentfreak.com/interview-with-bram-cohen-the-inventor-of-bittorrent/> [<https://perma.cc/H5JM-QB2Q>] (quoting BitTorrent Inc. founder Bram Cohen stating that “[w]e support keeping copyright infringing material off of our site” and that BitTorrent negotiated licensing agreements with most members of the Motion Picture Association of America).

216. *See* Pegoraro, *supra* note 215.

217. *See* Jim Finkle, *BitTorrent Moves from Piracy to Video Streaming*, REUTERS, Oct. 9, 2007, 7:01 AM, <https://www.reuters.com/article/industry-bittorrent-video-dc/bittorrent-moves-from-piracy-to-video-streaming-idUKN0833530820071009> [<https://perma.cc/T7NL-9NL2>]. Ironically, BitTorrent Inc. was eventually purchased by Tron, a blockchain network. *See* Ingrid Lunden, *BitTorrent Is Selling for \$140M to Justin Sun and His Blockchain Startup Tron*, TECHCRUNCH (June 18, 2018, 4:53 PM), <https://techcrunch.com/2018/06/18/bittorrent-tron/> [<https://perma.cc/QCP4-XLEJ>].

in resolving cases. This is relevant in the blockchain context as well. For example, an alarmist study found that the code for child pornographic images, in text form, had been embedded in the Bitcoin blockchain, suggesting that miners might be subject to criminal prosecution for possessing such material.²¹⁸ No such prosecutions have occurred. Law enforcement officials understand the distinction between actors who contribute to the scourge of child sexual abuse and those, who through no fault of their own and with no ability to remove it, happen to store data that could theoretically be reconstructed into an illicit image.²¹⁹

One of the important questions for DeFi services will be why they decentralize. There are many legitimate reasons to do so. Decentralization removed power from intermediaries that extract rents, making services cheaper and more broadly accessible. It can make services more efficient while also making them more inclusive and equal. It can make systems more robust and secure while drawing powerfully on the contributions of more participants. In these cases, the regulatory challenges DeFi poses are unintended side effects. In other cases, however, such as the KaZaA/Grokster architecture, decentralization is a deliberate means of avoiding legal obligations. If breaking the law is the primary benefit of decentralization, which otherwise creates difficulties for the service, asking whether regulators should defer action in the name of “innovation” is fair. Certainly, there will be many cases in which intent is not obvious. That should not prevent us from identifying those cases in which it is.

IV. RECOMMENDATIONS

The rise of digital assets is not a fad, nor are the overlapping trends increasingly described as Web3. These are volatile markets that have crashed before and will crash again.²²⁰ There is a good

218. See Hamza Shaban, *People Are Using Bitcoin's System to Share Child Pornography, Researchers Say*, WASH. POST (Mar. 22, 2018, 10:30 AM), <https://www.washingtonpost.com/news/the-switch/wp/2018/03/22/people-are-using-bitcoins-system-to-share-child-pornography/> [<https://perma.cc/E4HJ-SXQ7>].

219. See Kevin Werbach, Arvind Narayanan & James Grimmelmann, *Why Porn on the Blockchain Won't Doom Bitcoin*, WIRED (Mar. 29, 2018, 9:00 AM), <https://www.wired.com/story/why-porn-on-the-blockchain-wont-doom-bitcoin/> [<https://perma.cc/STG7-QT4V>].

220. See, e.g., *supra* notes 56-85 and accompanying text.

deal of irrational exuberance in the current crypto market or rational exuberance about short-term speculative profits that are nonetheless not sustainable or generalizable. And as detailed earlier, there are serious risks and abuses associated with cryptocurrencies that policymakers must address.²²¹ However, none of this calls into question the basic value proposition for blockchain as a foundational technology and digital assets as a means of powering financial and other services.

The four components of an effective approach to digital asset regulation are: capacity building, addressing “low-hanging fruit” aggressively, re-examining the existing financial regulatory legal regime, and developing new regulatory approaches for DeFi and other decentralized systems.

A. Capacity Building

The first step is to recognize that cryptocurrencies and blockchain pose thorny new challenges that regulators may be ill prepared to address. Steps should be taken to improve the state of knowledge and, when possible, to provide breathing space and help policymakers gain a greater understanding of market dynamics.

One part of this step is to ramp up public research and development efforts, as well as government agencies’ experimentation with blockchain-based solutions. Many important research questions related to blockchain and cryptocurrencies have not been subject to sufficient academic attention, especially regarding the business and financial dynamics rather than purely the computer science foundations. Public funding of research and the government operating as a convenor of public sector, private sector, and academic experts should both receive higher priority, given the potential importance of digital assets and blockchain.

Other countries provide significant support for research and development in this area. For example, the European Union has funded blockchain research for several years through its Horizon 2020 initiative, as well as other mechanisms.²²² The EU Blockchain

221. See *supra* Part I.

222. See *Blockchain Funding and Investment*, EUR. COMM’N, <https://digital-strategy.ec.europa.eu/en/policies/blockchain-funding> [<https://perma.cc/PGW3-63VQ>].

Observatory and Forum²²³ and European Blockchain Service Infrastructure²²⁴ are convening experts, developing standards, and coordinating responses to important issues. Chinese officials often describe blockchain as part of the country's "New Infrastructure" strategy, along with other strategic technologies such as 5G wireless and artificial intelligence.²²⁵

At the same time as government supports external research, agencies need to build the internal capacity to address tricky cryptocurrency-related questions effectively. Some mechanisms that have proven effective in similar contexts include:

Specialized regulatory units: A targeted group with qualified staffing[, such as the SEC's FinHub,] can serve as an initial gateway to gain experience in new technology, interact with the industry, and provide guidance. This knowledge can be shared with policy-makers and actions may include issuing non-action letters under existing regulatory regimes....

Incentivizing information flow: Disclosure is one of the most common tools of financial regulation. Even when the applicability of existing disclosure requirements on DeFi platforms is uncertain, efforts to encourage broad and consistent information disclosure may prove fruitful for regulatory analysis....

Regulatory sandboxes: Policy-makers may decide to establish regulatory forbearance programs such as sandboxes, where companies may test and operate their technology in a limited scope and therefore with limited regulatory risks.... The sandbox gives start-ups a chance to address regulatory compliance concerns and gives regulators a better understanding of the risks and benefits of a new space.²²⁶

223. *EU Blockchain Observatory & Forum*, EUBLOCKCHAIN, <https://www.eublockchaininfo.eu/> [<https://perma.cc/E2F9-K88M>].

224. *European Blockchain Services Infrastructure*, EUR. COMM'N, <https://digital-strategy.ec.europa.eu/en/policies/european-blockchain-services-infrastructure> [<https://perma.cc/4Z2J-7LUE>].

225. See Jane Wu, *Blockchain as an Infrastructure: A Deep Dive into China's DLT Strategy*, COINTELEGRAPH (June 23, 2020), <https://cointelegraph.com/news/blockchain-as-an-infrastructure-a-deep-dive-into-chinas-dlt-strategy> [<https://perma.cc/D6H6-QLSV>].

226. WORLD ECON. F. & WHARTON BLOCKCHAIN & DIGIT. ASSET PROJECT, *supra* note 148, at 22.

B. Short Term: Low-Hanging Fruit

The blockchain sector is developing and growing fast. Some needed policy actions do not require significant gestation and debate; they should be adopted as quickly as possible.

First, there are a number of situations in which laws and regulations were written with language that fails to effectively accommodate digital assets and the distinctive features of blockchain-based systems. These are generally situations of unintended consequences. Unclear or ill-fitting statutory language creates impediments for market participants that do not serve any public policy objective.

For example, the 2021 Infrastructure Investment and Jobs Act includes language classifying digital asset service providers as “brokers” subject to IRS reporting requirements.²²⁷ This law may cover actors, such as cryptocurrency miners, who have no means of complying and do not function as intermediaries the language targets.²²⁸ A bipartisan amendment was offered to address this oversight.²²⁹ Despite no direct opposition, it was not included in the final bill.²³⁰ The law also includes language²³¹ incorporating digital assets into section 6050I of the Internal Revenue Code, which requires those making transactions over \$10,000 in their “trade or business” to report the counterparties’ social security numbers and other personal information.²³² Without clarification or narrowing, this could sweep in a great deal of transactional activity that does not require reporting in the analogous situation involving traditional assets.

There are other areas that, though somewhat more complicated, call for rapid action to resolve significant market uncertainty or address underregulated activity:

227. Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, § 80603, 135 Stat. 429, 1339-41 (to be codified at 26 U.S.C. § 6045(c)(1)(D) (effective Dec. 31, 2023)).

228. *See id.*

229. *See* Nikhilesh De, *House Sends Infrastructure Bill with Crypto Tax Provision to US President*, COINDESK (Nov. 8, 2021, 2:45 PM), <https://www.coindesk.com/business/2021/11/06/house-sends-infrastructure-bill-with-crypto-tax-provision-to-us-president/> [<https://perma.cc/PGP7-FDWW>].

230. *See id.*

231. *See* Infrastructure Investment and Jobs Act § 80603.

232. I.R.C. § 6050I(a), (d).

- Allocation of authority over digital assets between the SEC and CFTC, given the ambiguity of when these assets function as securities, commodities, or something else, and the confluence of spot and derivatives markets.
- Clarity on the definition of a qualified custodian for digital assets. Custody of digital assets is very different at a technical and operational level from custody of traditional financial assets. However, the market has become far more sophisticated in custody solutions than a few years ago.
- A pathway for a digital asset firm to gain broad access to the banking system, FDIC insurance, and payments networks, including a Federal Reserve master account. There are many appropriate reasons for banks and bank regulators to be concerned about risks of digital assets. That does not mean that mechanisms for addressing those risks can never be identified.

At the same time that such efforts are underway to facilitate legitimate digital asset activity, regulators must take significantly stronger action against bad actors. There is no reason for firms to make efforts to comply with the rules if they see that others demonstrably do not suffer ill consequences. Put simply, there is a great deal of obvious fraud and regulatory avoidance in the blockchain world.²³³ There has been for some time.

Although a few fraudulent actors have been subject to enforcement actions, many have not.²³⁴ Limits on enforcement resources and the difficulty of successfully bringing cases are certainly part of the explanation. Pursuing every case that appears to involve illicit activity is infeasible. However, regulators and law enforcement should prioritize large and visible cases of fraud and theft and seek to set examples. If funding is the limiting factor, then Congress should consider additional appropriations.

At the same time as action is taken against the obvious bad actors, investigative resources should be devoted to the large players in the blockchain ecosystem who have been credibly accused of market manipulation and other illicit activities, such as Tether

233. *E.g.*, *supra* notes 69-70 and accompanying text.

234. *See, e.g.*, Stefania Palma & Patrick Jenkins, *SEC Chair Urges 'One Rule Book' for Crypto to Avoid Gaps in Oversight*, FIN. TIMES (June 24, 2022), <https://www.ft.com/content/b9466a10-a2a6-412d-acf4-086609283df2> [<https://perma.cc/XU29-LRUR>].

and Binance.²³⁵ Most of these actors purport not to operate in the United States;²³⁶ some claim to have no headquarters at all;²³⁷ others shift between jurisdictions whenever questions are raised about their activities.²³⁸ Any enforcement action will therefore require significant cooperation with foreign law enforcement authorities. The effort is worth it. In the current environment, regulated U.S.-based actors transact with, and apparently derive significant benefits from, these offshore entities.²³⁹ In other situations, individuals and firms take steps to nominally remove themselves from the United States while still enjoying the benefits of citizenship and easy access to U.S. capital markets.²⁴⁰

Such conduct blurs the distinction between compliant and noncompliant service providers and calls into question the integrity of the entire market. It may turn out that, after investigations, there is smoke but not fire. If that is the case, termination of investigations should help bring confidence to the market. On the other hand, if even a portion of the allegations of systemic manipulation are true, then many investors and other market participants are being taken advantage of, at massive scale. And it is only a

235. It is for regulators and law enforcement to decide whether these allegations are accurate. I raise them to note that they are long-standing and not unsupported by available evidence. See Griffin & Shams, *supra* note 44, at 1915, 1961; Angus Berwick, Dan Levine & Tom Wilson, *Exclusive: U.S. Justice Dept Is Split over Charging Binance as Crypto World Falter*, REUTERS, Dec. 12, 2022, 12:05 PM, <https://www.reuters.com/markets/us/us-justice-dept-is-split-over-charging-binance-crypto-world-falters-sources-2022-12-12/> [<https://perma.cc/TXS6-CGRD>]. Furthermore, even if cryptocurrency markets do not constitute trading in securities, that does not mean that market integrity concerns should be ignored.

236. See *Where Are the Major Crypto Exchanges Located?*, ESCAPE ARTIST (Mar. 3, 2021), <https://www.escapeartist.com/blog/where-are-the-major-crypto-exchanges-located/> [<https://perma.cc/P4CH-7EXY>]; Marx, *supra* note 90.

237. Katie Canales, *Some Crypto Firms Are Taking Remote Work a Step Further: No Corporate Headquarters*, BUS. INSIDER (June 1, 2022, 11:59 AM), <https://www.businessinsider.com/crypto-startups-nix-headquarters-remote-work-coinbase-binance-2022-5> [<https://perma.cc/2J6T-KGTY>].

238. See WORLD ECON. F. & WHARTON BLOCKCHAIN & DIGIT. ASSET PROJECT, *supra* note 148, at 18.

239. See Liam Proud, *Crypto Watchdogs Have a Giant Offshore Problem*, REUTERS, Nov. 17, 2022, 5:55 AM, <https://www.reuters.com/breakingviews/crypto-watchdogs-have-giant-off-shore-problem-2022-11-17/> [<https://perma.cc/L7CR-DRWN>].

240. See Alexander Osipovich, *U.S. Crypto Traders Evade Offshore Exchange Bans*, WALL ST. J. (July 30, 2021, 10:55 AM), <https://www.wsj.com/articles/u-s-crypto-traders-evade-off-shore-exchange-bans-11627637401> [<https://perma.cc/U6Y9-GFB5>].

matter of time before the shell game ends, with potentially disastrous consequences.

C. Rethinking Financial Regulation

Long term, we cannot escape from the conclusion that blockchain and digital assets, along with other fintech developments, will contribute to a fundamental reshaping of our financial markets and have major impacts in many other domains.

The fact that the relevant laws and, in many cases, judicial decisions establishing common law doctrines are decades old is not itself a problem. We venerate the Constitution because its broad language can be interpreted to address issues the Framers themselves never experienced. It makes no sense to adopt new laws, and narrowly tailored laws at that, for every significant technological change. Technology-specific laws and rules tend to advantage or disadvantage one technological approach, which should not be the role of government, and they quickly become outdated as newer technologies emerge.

However, there are situations in which laws or regulatory structures do need to be re-evaluated. For example, there is broad consensus that the accredited investor regime is an increasingly poor fit for the current investing environment, a problem that digital assets magnify.²⁴¹ More generally, information disclosure, the centerpiece of the securities regulatory structure, means something different in a blockchain context in which all transactions are transparent and cryptographically guaranteed, although interpreting the transaction data and associating it with market participants may be more challenging than in traditional finance. And the highly fragmented financial regulatory structure that is almost entirely unique to the United States deserves a closer look in an era of digital convergence. A structure of multiple specialized agencies has benefits, but it also creates opportunities for regulatory arbitrage and confusion.

241. See, e.g., French Hill & Byron Donalds, Opinion, *We Can Do More for the 90 Percent—Time to Fix the ‘Accredited Investor’ Regulation*, THE HILL: CONG. BLOG (July 28, 2022, 3:45 PM), <https://thehill.com/opinion/congress-blog/3578398-we-can-do-more-for-the-90-percent-time-to-fix-the-accredited-investor-regulation/> [<https://perma.cc/R3MW-SVHP>].

In 1996, after several years of effort, Congress passed the Telecommunications Act, which rewrote the outmoded Communications Act of 1934.²⁴² There are many problems with the 1996 Act, not the least that it failed to anticipate how important the internet would become in the communications, media, and technology sectors. However, we would be worse off trying to regulate today under the old law, which could barely be stretched to cover cable television.²⁴³ At some point, frameworks that poorly fit new technologies are, in effect, no longer technology neutral.

The rethink I am describing will take time. It will address many issues beyond blockchain. Some of the necessary changes are along the lines of this Article's previous Subsection, going more to clarifying language for a new context than changing the basic regulatory structure. However, others are deeper. The exercise of identifying high-level public policy goals, studying best practices for addressing them, balancing competing interests, and setting forth a modern framework will produce benefits in itself. And if successful, these changes could position the United States to maintain its leadership in the global financial system as it moves through its next technological transition.

D. DeFi and Regulating Decentralized Systems

DeFi squarely poses the challenge of how it may be possible to regulate decentralized systems. A centralized cryptocurrency exchange resembles traditional asset exchanges, such as stock exchanges, in having an identifiable firm that takes custody of users' assets, maintains an order book, and matches trades.²⁴⁴ A decentralized exchange functioning as an automated market maker (AMM), or other on-chain DeFi protocol, need only be software code in the form of smart contracts running on a distributed blockchain

242. See Telecommunications Act of 1996, Pub. L. No. 104-104, § 509, 110 Stat. 56, 137 (codified as amended at 47 U.S.C. § 230).

243. See David McCabe, *Bill Clinton's Telecom Law: Twenty Years Later*, THE HILL (Feb. 7, 2016, 9:00 AM), <https://thehill.com/policy/technology/268459-bill-clintons-telecom-law-twenty-years-later/> [<https://perma.cc/8XYQ-LGEG>].

244. See Johnson, *supra* note 86, at 1953-54; Benedict George, *What Is a CEX? Centralized Exchanges Explained*, COINDESK (Feb. 11, 2022, 11:01 AM), <https://www.coindesk.com/learn/what-is-a-cex-centralized-exchanges-explained/> [<https://perma.cc/4GEL-6488>].

network.²⁴⁵ If the code allows transactions that violate U.S. law, such as sending funds to sanctioned entities or transacting in unregistered securities, the question arises as to how those regulations could be enforced. No natural person or firm needs to be involved for the code to execute and process a trade. Furthermore, if a regulator wished to take enforcement action, there would appear to be no person or firm to take action against.

Although this may sound like an insoluble problem, it is likely to be manageable in practice if regulators adapt their approaches and focus on the objectives of legal requirements. Three points of contact deserve consideration as means of addressing potential regulatory concerns about DeFi: stablecoins, application platforms, and token issuance.

1. *Stablecoins*

DeFi services are heavily dependent on stablecoins.²⁴⁶ This is partly because DeFi, being constructed of smart contracts running on blockchains, cannot directly interface with off-chain payment mechanisms.²⁴⁷ There is no way to take out a DeFi loan involving traditional U.S. dollars or to interface directly with traditional payment rails.²⁴⁸ Instead, DeFi uses digital assets that are functionally equivalent to those dollars.²⁴⁹

The vast majority of stablecoin activity today is associated with centralized stablecoins, most notably USDT, USD Coin (USDC), and Binance Dollar.²⁵⁰ Facebook's proposed Diem platform, formerly Libra, would also operate in a centralized fashion.²⁵¹ Such operators

245. See Johnson, *supra* note 86, at 1955-59; Andrey Sergeenkov, *What Is an Automated Market Maker?*, COINDESK (Jan. 13, 2023, 10:14 AM), <https://www.coindesk.com/learn/what-is-an-automated-market-maker/> [<https://perma.cc/KSA6-SDEY>].

246. DAVID GOGEL, WHARTON BLOCKCHAIN & DIGIT. ASSET PROJECT & WORLD ECON F., *DEFI BEYOND THE HYPE: THE EMERGING WORLD OF DECENTRALIZED FINANCE 9* (2021), <https://wifpr.wharton.upenn.edu/wp-content/uploads/2021/05/DeFi-Beyond-the-Hype.pdf> [<https://perma.cc/K539-ZL55>].

247. See *id.* at 7.

248. See *id.* at 12-13.

249. See *id.*

250. See *Top Stablecoin Tokens by Market Capitalization*, COINMARKETCAP, <https://coinmarketcap.com/view/stablecoin/> [<https://perma.cc/L6ZV-WT45>].

251. See *Vision: How the Diem Payment System Works*, DIEM, <https://www.diem.com/en-us/vision/> [<https://perma.cc/EDR2-S944>].

maintain reserves of high-quality liquid assets as backing for the stablecoin.²⁵² The stablecoin may be manifested as a token on multiple blockchains.²⁵³ However, those tokens are always associated with an identifiable entity that is subject to licensure and regulatory oversight.²⁵⁴ The exception is Tether, which has an obscure management structure.²⁵⁵ Tether claims to do no business in the United States even though it is widely available through U.S.-based exchanges.²⁵⁶

Today, centralized stablecoins are not subject to a consistent regulatory framework in the United States. Some have obtained state money transmission licenses.²⁵⁷ Others have state trust licenses.²⁵⁸ Circle has announced plans to become a regulated full-reserve bank.²⁵⁹ Avanti Bank & Trust plans to launch a stablecoin connected to a Wyoming-chartered Special Purpose Depository Institution.²⁶⁰ And as noted above, Tether, the largest stablecoin by assets, is not currently regulated in the United States at all.²⁶¹ The

252. See, e.g., *Stablecoins 101: What Are Crypto Stablecoins, and How Do They Work?*, COINTELEGRAPH, <https://cointelegraph.com/altcoins-for-beginners/stablecoins-101-what-are-crypto-stablecoins-and-how-do-they-work> [<https://perma.cc/9WT6-ACA2>].

253. See *id.*

254. See *id.*

255. See *supra* notes 65-70 and accompanying text.

256. See *supra* note 69 and accompanying text.

257. For example, the USDC stablecoin's issuer Circle is regulated by FinCEN as a money services business and holds money transmitter licenses in several states. See *Legal & Privacy: US Licenses*, CIRCLE, <https://www.circle.com/en/legal/us-licenses> [<https://perma.cc/C9PV-UC2Y>].

258. For example, Paxos Standard (PAX) and the Gemini Dollar (GUSD) are trust companies regulated by the New York State Department of Financial Services. See Press Release, N.Y. Dep't of Fin. Servs., DFS Continues to Foster Responsible Growth in New York's FinTech Industry with New Virtual Currency Product Approvals (Sept. 10, 2018), https://www.dfs.ny.gov/reports_and_publications/press_releases/pr1809101 [<https://perma.cc/9LV3-AZ9N>].

259. See Jeremy Allaire, *Our Journey to Become a National Digital Currency Bank*, CIRCLE: BLOG (Aug. 9, 2021), <https://www.circle.com/blog/our-journey-to-become-a-national-digital-currency-bank> [<https://perma.cc/E2A4-6WEL>].

260. See Nate DiCamillo, *Unpacking the Avit, Avanti Bank's New Digital Asset Being Built with Blockstream*, COINDESK (Sept. 14, 2021, 5:42 AM), <https://www.coindesk.com/business/2020/08/12/unpacking-the-avit-avanti-banks-new-digital-asset-being-built-with-blockstream/> [<https://perma.cc/UPU8-M84S>].

261. See *supra* notes 65-70 and accompanying text. Tether and Bitfinex were sued by the New York Attorney General and agreed to pay an \$18.5 million fee for fraudulent activity. See Press Release, Letitia James, N.Y. Att'y Gen., *supra* note 66. The settlement included a commitment that the entities would cease operations in New York. See *id.*

proposed Stablecoin Classification and Regulation (STABLE) Act would have required all stablecoins to be regulated as banks²⁶² while Cornell law professor Dan Awrey proposes that they be treated as money market funds.²⁶³

As highlighted earlier,²⁶⁴ clarifying the regulatory context around stablecoins, and ensuring that they are subject to appropriate obligations, is a critically important step for policymakers and regulators.²⁶⁵ A run on a major stablecoin could be devastating for digital asset holders and could have spillover effects into the larger financial system.²⁶⁶ Similarly, if the allegations of insufficient backing, fraudulent statements, and market manipulation against Tether turn out to be accurate, it could undermine trust in the entire digital asset trading market, given how deeply embedded Tether is in that market.²⁶⁷

Any stablecoin regulatory framework must consider not only investor protection, market integrity, and financial stability but also the potential role of stablecoins as DeFi onramps and offramps. If stablecoin operators are all treated as virtual asset service providers subject to anti-money laundering obligations—such as Know Your Customer (KYC) rules—then that would provide a check that funds entering or leaving the DeFi ecosystem will associate with known, nonsanctioned individuals or entities. It would also provide an aggregation point for law enforcement agencies to monitor activity, with the assistance of sophisticated blockchain analytics tools. Although this framework alone would not eliminate concerns about actors using DeFi for criminal activity, it might ameliorate them to a material extent.²⁶⁸

262. See H.R. 8827, 116th Cong. § 3 (2020).

263. See Awrey, *supra* note 57, at 9.

264. See *supra* Part IV.B.

265. Kevin Werbach, Professor of Legal Stud. & Bus. Ethics, The Wharton Sch., Univ. of Pa., Comment Letter on Proposed Guidelines to Evaluate Requests for Accounts and Services at Federal Reserve Banks (July 9, 2021), https://www.federalreserve.gov/SECRS/2021/July/20210721/OP-1747/OP-1747_070921_138743_356123729916_1.pdf [<https://perma.cc/2MRX-S9S4>].

266. See *supra* notes 56-62 and accompanying text.

267. See *supra* notes 65-70 and accompanying text.

268. There are also stablecoins that operate entirely as smart contracts, rather than through fiat backing. The most prominent of these is MakerDAO, which has \$10 billion in assets. See Robert Stevens, *How Does MakerDAO Work? Understanding the 'Central Bank of Crypto'*, COINDESK (Aug. 10, 2022, 3:17 PM), <https://www.coindesk.com/learn/how-does->

An open question is whether stablecoin regulations would go beyond sanctions enforcement and standard anti-money laundering checks to, for example, incorporate blacklists of transactions with noncompliant DeFi protocols. Such a move could significantly increase regulators' leverage against decentralized DeFi protocols. However, it would also raise concerns about pushing activity to unregulated or offshore alternatives, as well as privacy concerns. The technical and policy aspects of such a step should be carefully considered.

2. Application Interfaces

The second point of potential regulatory oversight for DeFi is the centralized component of major services. Although the smart contracts themselves run on decentralized blockchains such as Ethereum, users often access their functionality through traditional websites. For example, Uniswap allows users to trade tokens on its Uniswap.org website by connecting a wallet such as Metamask.²⁶⁹ This website is operated by the company Uniswap Labs, which employs developers and can make changes to the code.²⁷⁰ For example, Uniswap delisted approximately 100 tokens in July 2021, including synthetic stock tokens, which would represent unauthorized unregistered securities transactions.²⁷¹ Now, users cannot

makerdao-work-understanding-the-central-bank-of-crypto/ [https://perma.cc/5BT9-CDBB]. There are many others, which either use collateral in the form of digital assets to back the stablecoin or dynamically increase and decrease supply to keep the price stable. See *supra* notes 60-62 and accompanying text. Several algorithmic stablecoins have failed to maintain their peg during periods of market volatility or due to deliberate attack, although others have so far managed to avoid that outcome. See *supra* notes 60-62 and accompanying text. These on-chain stablecoins raise similar regulatory challenges as DeFi services such as AMMs and lending engines. Although, perhaps ironically, MakerDAO's collateral has become increasingly dominated by USDC—a fiat-backed stablecoin—which may make it less difficult to address from a regulatory perspective. See *Overview*, DAI STATS, <https://daistats.com/#/overview> [https://perma.cc/PJ4A-W7QB].

269. See Gianmarco Guazzo, *The Best Wallet for Uniswap*, COINMONKS (Oct. 2, 2020), <https://medium.com/coinmonks/best-wallets-to-use-uniswap-e91a6385d9e8> [https://perma.cc/F2PA-M29D].

270. See *Uniswap Labs Trademark Guidelines*, UNISWAP, <https://uniswap.org/trademark> [https://perma.cc/CER9-9M9L].

271. See Martin Young, *Uniswap Delists 100 Tokens from Interface, Including Options and Indexes*, COINTELEGRAPH (July 26, 2021), <https://cointelegraph.com/news/uniswap-delists-100-tokens-from-interface-including-options-and-indexes> [https://perma.cc/4ZLA-ZG86].

trade those tokens through the Uniswap application.²⁷² They can, however, still send them programmatically to the Uniswap smart contract.

Because Uniswap Labs clearly controls the website and develops the end-user application, it has significant legal exposure to illicit or noncompliant activity it facilitates. Explicit declarations by regulators of their intent to take action against DeFi application providers if they fail to meet certain obligations could therefore have a significant impact, even when the protocols themselves are nominally decentralized. Due consideration should be given to the burdens such obligations would impose and the possibility that DeFi application providers will either move to another jurisdiction or shift away from a corporate form to a decentralized autonomous organization (DAO) structure. However, such steps are not costless, nor do they necessarily eliminate regulators' ability to act.

The significance of platform-targeted enforcement depends on how much activity flows through the website or consumer-facing application and how much is directly sent through the smart contract.²⁷³ The front-end interfaces are more user-friendly and therefore tend to be used by less sophisticated and smaller-scale DeFi market participants. Most retail investors, even those who express a commitment to the ideals of decentralization, tend to care more about user experience.²⁷⁴ After all, centralized platforms dominate social media and investment services. A more decentralized system, all things being equal, is usually harder to use, or

272. *See id.*

273. For example, in 2021, the decentralized exchange Uniswap removed over 100 tokens from its front-end interface that could be considered illegal unregistered synthetic stocks but emphasized that the blockchain-based protocol still allowed such transactions. *See* Kollen Post & Frank Chaparro, *Uniswap Labs Restricts Access to Certain Tokens Through Its Interface, Citing "Evolving Regulatory Landscape,"* THE BLOCK (July 23, 2021, 7:10 PM), <https://www.theblock.co/linked/112399/uniswap-labs-culls-synthetic-stock-and-derivatives-citing-evolving-regulatory-landscape> [<https://perma.cc/W8RG-5PLV>]. A year later, the Uniswap front-end website blocked over 250 addresses associated with stolen funds and the sanctioned mixer Tornado Cash. *See* Shaurya Malwa, *Popular Uniswap Frontend Blocks over 250 Crypto Addresses Related to DeFi Crimes,* COINDESK (Aug. 22, 2022, 1:41 PM), <https://www.coindesk.com/tech/2022/08/22/popular-uniswap-frontend-blocks-over-250-crypto-addresses-related-to-defi-crimes/> [<https://perma.cc/AZ6M-8MU3>].

274. *See Better User Experience, Better Investor Engagement,* DOW JONES, <https://www.dowjones.com/professional/resources/blog/better-user-experience-better-investor-engagement> [<https://perma.cc/VQU2-TZQ8>].

worse on some other dimension. The slow processing speed and limited capacity of Bitcoin compared to traditional payment networks is an example.²⁷⁵ There are technical tradeoffs involved in building effective decentralized systems and mechanisms to hide the resulting complexity from end users often wind up recreating new points of gateway control. All this suggests that regulation of application platforms—in other words, the more centralized component of DeFi services—could have significant effects, especially for the more vulnerable investors who are a source of particular concern.

The other side of the coin is how sophisticated institutional actors will respond. There is some evidence that although there is a significant and active retail DeFi community, including aggressive risk-taking “degens,”²⁷⁶ it is actually dwarfed by institutional-scale activity. The gas costs of every transaction on Ethereum, which is still the dominant platform for DeFi activity, can easily exceed \$100, which limits the scope of small-scale trades.²⁷⁷ Independent of that fact, the kinds of complex capital allocation and yield generation activities that DeFi offers, as well as the opportunity to trade large amounts of assets with limited “slippage” (corresponding price movement), appeal particularly to sophisticated traders. A recent Chainalysis report found that over 60 percent of DeFi volume was in transactions exceeding \$10 million.²⁷⁸

On the one hand, sophisticated traders may be better able to, or more interested in, finding ways to transact without going through central gatekeepers or subjecting themselves to regulatory controls.

275. Jesse Zhou, *Bitcoin Transactions Are Slow and Costly. Let's Explain Why.*, MEDIUM: GEEK CULTURE (Apr. 16, 2021), <https://medium.com/geekculture/bitcoin-transactions-are-slow-and-costly-lets-explain-why-a3f6f2e326db> [<https://perma.cc/2Q8E-H42P>]; WERBACH, *supra* note 98, at 79.

276. See *DeFi Degens*, COINMARKETCAP: ALEXANDRIA, <https://coinmarketcap.com/alexandria/glossary/defi-degens> [<https://perma.cc/F95A-HJC5>].

277. See Arijit Sarkar, *Ethereum Average Gas Fee Falls Down to \$1.57, the Lowest Since 2020*, COINTELEGRAPH (July 3, 2022), <https://cointelegraph.com/news/ethereum-average-gas-fee-falls-down-to-1-57-the-lowest-since-2020> [<https://perma.cc/8ZJP-RKF9>]. There are ways to keep some transactions off-chain. Scaling solutions for Ethereum, such as sidechains and layer-2 “rollups,” as well as alternative blockchains, such as Solana and Avalanche with lower transaction costs, may remove this impediment to small-scale DeFi activity. Exactly how and how quickly, though, remains to be seen.

278. See Osato Avan-Nomayo, *Institutional Investors Dominated the DeFi Scene in Q2: Chainalysis Report*, COINTELEGRAPH (Sept. 8, 2021), <https://cointelegraph.com/news/institutional-investors-dominated-the-defi-scene-in-q2-chainalysis-report> [<https://perma.cc/7CHV-68UN>].

On the other hand, many of these are regulated actors, or affiliated with regulated institutions. Regulators know who *they* are, and these actors will not engage in DeFi activities that expose them to major compliance risk. Recognizing how much capital that might flow into DeFi is controlled by institutional actors (subject to regulatory obligations), DeFi services have begun to provide tailored offerings that meet their compliance obligations. For example, Aave, one of the largest DeFi lending platforms, has created a separate set of collateral pools (called Aave Arc) which are only accessible to verified liquidity providers that are identified through KYC.²⁷⁹ Again, the fact that DeFi services are moving in this direction on their own suggests that as regulators more clearly identify concerns and paths to compliance, major segments of the DeFi market may adapt in ways that make enforcement more feasible.

There will always be some actors in DeFi, and in the blockchain world more generally, who are committed to evading legal obligations. They may do so for strong ideological reasons, because they see significant profit opportunities, or because they provide services to criminals and other illicit actors (or themselves fit into that category). However, enforcement need not be perfect to be effective. There are noncompliant actors in the traditional financial system as well. Most market participants, especially those seeking to become large and successful, do not aspire to target the market of criminals, terrorists, and sanctioned nations. They want to attract large numbers of users. Those users, in turn, want platforms they can trust. They are used to relying on the protections of legal enforcement and consumer protection measures, rather than hoping for honor among thieves. If the burdens of regulatory compliance are not excessive, therefore, then the larger DeFi market participants in particular are likely to accommodate them.

This is true even though blockchains are global. There is increasing coordination among major nations around regulatory approaches to blockchain-based systems, starting with financial crime guidelines under the Financial Action Task Force (FATF).²⁸⁰ Large

279. See Tim Copeland, *Permissioned DeFi Platform Aave Arc Gears up for Launch*, THE BLOCK (Sept. 27, 2021, 1:38 PM), <https://www.theblockcrypto.com/linked/118822/permissioned-defi-platform-aave-arc-gears-up-for-launch> [<https://perma.cc/ND5X-UJJF>].

280. See *About: Who We Are*, FIN. ACTION TASK FORCE, <https://www.fatf-gafi.org/about/> [<https://perma.cc/GA7X-RQP4>].

financial markets are moving to harmonize their rules, with the exception of China, which is imposing considerably more stringent restrictions on its local digital asset economy.²⁸¹ Small countries that seek to attract capital with loose regimes run the risk of being sanctioned or cut off from the global financial system. Again, this process is messy, but it fundamentally resembles broader efforts to harmonize requirements for increasingly global financial services activity that have been ongoing for decades.

3. *Token Issuers*

A final opportunity for regulatory engagement with DeFi is in the tokens that power these services. Tokens do not appear from nowhere. Once they are issued and accessible through blockchain networks, it may be impossible to point to any entity managing them or controlling their distribution. However, there is always a point in time at which tokens are issued. Further, there is an entity that structured the token issuance, initiates it, and often promotes it or connects it to other deliberate activities.²⁸²

The moment of token issuance, therefore, is an important regulatory opportunity. Issuance is the point at which there is likely to be some identifiable actor who must engage with the blockchain and the outside world. The first major wave of enforcement actions against blockchain-based services followed the 2017 boom in initial coin offerings (ICOs), in which developers premined tokens and issued them to raise funds for new applications or networks.²⁸³ Even when a token is not a security subject to registration requirements, however, the point of issuance is still the moment at which it is easiest to assess and implement regulatory obligations. It is not surprising, therefore, that the MiCA framework under development

281. See *supra* note 125 and accompanying text.

282. See Jake Frankenfield, *What Are Crypto Tokens, and How Do They Work*, INVEST-OPEDIA (last updated Feb. 12, 2023), <https://www.investopedia.com/terms/c/crypto-token.asp> [<https://perma.cc/RK93-SAHX>].

283. See Rahul Mukhi & James Michael Blakemore, *Newly Created SEC Cyber Unit Takes First Action Against Allegedly Fraudulent ICO*, CLEARY GOTTLEB: CLEARY CYBERSEC. & PRIV. WATCH (Dec. 8, 2017), <https://www.clearcyberwatch.com/2017/12/newly-created-sec-cyber-unit-takes-first-action-allegedly-fraudulent-ico/> [<https://perma.cc/D2MR-LJCH>].

by the European Union focuses heavily on requirements for token issuers.²⁸⁴

CONCLUSION

The regulatory conundrums of digital assets will not be easy to address. The sector is evolving so quickly that even a regime that works effectively for today's DeFi market may soon become outdated. Today, digital assets are used primarily in investment activities, such as financial speculation and maintaining a resilient store of value; in the future, a greater percentage of activity may involve payments or driving activity of Web3 applications. However, every technological or market development does not require a new regulatory regime. General rules can be applied to new circumstances, if designed with sufficient flexibility.

Even now, the regulatory landscape for digital assets is complex. Although topics such as the classification of activities as involving securities have occupied the lion's share of attention in recent years,²⁸⁵ a broad range of important questions will have to be answered by a number of different agencies. There will not be one "approach" to digital asset regulation that can be summarized in a sentence or even a paragraph.

The experience of the early development of internet policy shows that the task, while formidable, is feasible. The coordination efforts initiated in the Biden administration, leading up to the executive order *Ensuring Responsible Development of Digital Assets*,²⁸⁶ provide high-level direction and coordination along the lines of the White House e-commerce effort in the late 1990s. Although there are choices to be made, consensus is growing that the risks in the digital asset market deserve attention and that the absence of regulatory clarity is itself a major impediment to healthy market development. An approach to DeFi regulation that draws on the

284. See *supra* notes 140-43 and accompanying text. The other major category in MiCA is virtual asset service providers, primarily for financial crime prevention.

285. See, e.g., Bill Hinman & Valerie Szczepanik, *Statement on "Framework for Investment Contract" Analysis of Digital Assets*, SEC (Apr. 3, 2019), <https://www.sec.gov/news/public-statement/statementframework-investment-contract-analysis-digital-assets> [<https://perma.cc/SQ7Z-HWJC>].

286. See *supra* notes 119-23 and accompanying text.

lessons of the P2P file-sharing battles could address the enforcement challenges in confronting decentralized systems.

It is a truism that policymakers should aim to be “technology neutral.”²⁸⁷ Technologies should succeed or fail based on their performance and their distinctive affordances or limitations. Regulators should not intentionally favor traditional solutions; neither should they promote new ones purely for their novelty. However, neutrality means more than removing language from laws and regulations that assumes a certain technological context. It means shifting the focus from technologies to policy objectives. Fraud, financial crime, and catastrophic hidden risks are threats to any financial market. Conversely, to the extent that blockchain technologies and digital assets can promote desirable policy objectives—such as greater market efficiency, financial inclusion, and dynamic competition—they should be welcomed. The ongoing process of harmonizing blockchain and regulation will at times be painful, but that should not get in the way of the work to be done.

287. *But see* Chris Reed, *Taking Sides on Technology Neutrality*, 4 SCRIPT-ED 263, 264 (2007); Brad A. Greenberg, *Rethinking Technology Neutrality*, 100 MINN. L. REV. 1495, 1495 (2016).