ON INNOVATION AND THE COEXISTENCE OF STABLECOINS AND CENTRAL BANK DIGITAL CURRENCIES

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I

INTRODUCTION

Money is not a simple concept.[1] It is a complex construct consisting of public and private elements.[2] Money is not all printed by the U.S. government, and a

This Article is also available online at http://lcp.law.duke.edu//

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The authors would like to thank the participants of the University Blockchain Research Initiative 2023 Annual Meeting for their comments. Soorim Choi, Parker Ramsay, and Cagla Yetis provided invaluable research assistance. All errors are ours.

[†]The authors thank for their comments and suggestions the participants of the 2024 Payments Symposium at the Chicago Federal Reserve Bank, the AALS Midyear Meeting of the Financial Regulation Section, the 2024 Meeting of the European Association of Law and Economics, and the University Blockchain Research Initiative 2023 Annual Meeting. Aryana Dehghan, Parker Ramsay, and Cagla Yetis provided research assistance. All errors are ours. The research was supported by the University Blockchain Research Initiative, the Ripple Impact Fund, and the Silicon Valley Community Foundation.

1. *See*, *e.g.*, Louise Davidson, *The Nature of Money*, *in* PAUL DAVIDSON, UNCERTAINTY, INTERNATIONAL MONEY, EMPLOYMENT AND THEORY 169, 169 (Louise Davidson ed., 1999); J.R. Hicks, *A Suggestion for Simplifying the Theory of Money*, 2 ECONOMICA 1, 1 (1935); Geoffrey Ingham, *Money is a Social Relation*, 54 REV. SOC. ECON. 507, 507 (1996) (acknowledging the theoretical and conceptual perplexities surrounding traditional economic theories of money); Heiner Ganβmann, *Money—A Symbolically Generalized Medium of Communication? On the Concept of Money in Recent Sociology*, 17 ECON. & SOC'Y 285, 285 (1988) ("[E]ven love has not turned more men into fools than has meditation upon the nature of money." (citation omitted)).

2. Although we will not discuss the nuances of public and private forms of money, for a general definition, *see* U.S. DEPT. OF TREASURY, THE FUTURE OF MONEY AND PAYMENTS, 1 (2022) https://home.treasury.gov/system/files/136/Future-of-Money-and-Payments.pdf [https://perma.cc/3CK7-5WXE] (explaining that public money is a central bank liability whereas private money is the liability of banks); Tobias Adrian & Tommaso Mancini-Griffoli, *Public and Private Money Can Coexist in the Digital Age*, IMF BLOG (Feb. 18, 2021), https://www.imf.org/en/Blogs/Articles/2021/02/18/blog-public-and-private-money-can-coexist-in-the-digital-age [https://perma.cc/QZ3L-TY87] (explaining that private money maintains its stability through the assurance from central banks that it can be) exchanged for central bank money at a consistent, predetermined value).

significant portion of it originates from private-sector entities like banks, against which other private parties have contractual claims.[3] Transacting parties use money through various payment systems, including exchanging notes issued by central banks and making bank transfers. These longstanding coexistence of and partnership between public and private institutions in creating, supplying, and transferring money are deeply embedded in economic history and, arguably, even the U.S. Constitution.[4]

Over the centuries, federal law has specified which firms provide the safest private money and payments and, in doing so, placed banks in a somewhat privileged position. Namely, the Federal Reserve (the "Fed") sits atop our monetary system, managing the markets through monetary policy tools such as open market operations, bank reserve requirements, and discount window lending.[5] Within this system, banks bundle lending, payments, and deposit-taking in their business models, comply with extensive regulation, and are protected by high regulatory barriers to entry.[6] The deposit insurance system and a special regime involving the resolution of troubled banks make the banking system safer.[7] Other financial firms do not have access to either safety valve.[8]

Nor do non-bank financial firms have access to the Fed-provided rails of the

3. Markus K. Brunnermerier & Dirk Niepelt, *On the Equivalence of Private and Public* Money, 106 J. MONETARY ECON. 27 (2019); *How is Money Created?*, BANK OF ENG. (Oct. 1, 2019), https://www.bankofengland.co.uk/explainers/how-is-money-created [https://perma.cc/JT5J-MC9Q]. Ninety-seven percent of money exists in the form of bank deposits. Jess Cheng & Joseph Torregrossa, *What is Money? A Lawyer's Perspective on U.S. Payment System Evolution and Dollars in the Digital Age* 1 (Aug. 23, 2021) (unpublished manuscript) (on file with the Social Science Research Network), https://ssrn.com/abstract=3885031 [https://perma.cc/G8RB-N97E] (explaining that money in the United States consists of central bank balance sheet, like Federal Reserve notes; commercial bank balance sheets, like bank deposits; and non-bank payment companies' balance sheet, like PayPal). For a theoretical discussion, *see generally* James Tobin, *Commercial Banks as Creators of "Money," in* BANKING AND MONETARY STUDIES 408 (Deane Carson ed., 1963); Milton Friedman, *The Monetary Studies of the National Bureau*, *in* NAT'L BUREAU OF ECON. RSCH., THE NATIONAL BUREAU ENTERS ITS FORTY-FIFTH YEAR 7, 9 (1964) (differentiating money from credit creation by banks and non-banks). For a historical context of private money creation, *see generally* Helmut Siekmann, *Deposit Banking and the Use of Monetary Instruments*, *in* MONEY IN THE WESTERN LEGAL TRADITION: MIDDLE AGES TO BRETTON WOODS 489 (David Fox & Wolfgang Ernst eds., 2016) (explaining the historical development of money as a result of market forces, such as banks, and not of sovereign power); Michael Kumhof et al., *Central Bank Money: Liability, Asset, or Equity of the Nation?* 5 (Cornell L. Sch., Working Paper No. 46, 2020), https://ssrn.com/abstract=3730608 [https://perma.cc/3PZC-665K] ("In the United States, for example, the *Emergency Banking Act of 1933* created an implicit government guarantee of commercial bank deposits, accommodating private credit money into the public money system.").

4. Christina Parajon Skinner, *Central Bank Digital Currency as New Public Money*, 172 U. PA. L. REV. 151, 166 (2024).

5. FED. RSRV. SYS., *Conducting Monetary Policy*, *in* THE FED EXPLAINED: WHAT THE CENTRAL BANK DOES 16, 36–39 (11th ed., 2021), https://www.federalreserve.gov/aboutthefed/files/the-fed-explained.pdf [https://perma.cc/H5PA-UNA6].

6. Dan Awrey, *Bad Money*, 106 CORNELL L. REV. 1, 8 (2020) [hereinafter Awrey, *Bad Money*]; Dan Awrey, *Unbundling Banking, Money, and Payments*, 110 GEO. L.J. 715, 721–22, 733 (2022) [hereinafter Awrey, *Unbundling Banking*].

7. *See* 12 U.S.C. §§ 1815, 1821, 1821a (2024) (creating the deposit insurance system).

8. For the consequences, *see, e.g.*, Kara Bruce et al., *The Private Law of Stablecoins*, 54 ARIZ. ST. L.J. 1073, 1115–16 (2022).

U.S. clearing and settlement system for inter-bank payments and the master accounts at the Fed.[9] Payments made in private money are run on the rails which operate separately from the underlying private institutions.[10] Financial regulation favors banks by granting them access to the Federal Reserve's master accounts.[11] The rest of the private institutions within our complex money system often depend on banks to provide them with access to the clearing and settlement system.[12]

These regulatory fundamentals of the private-public economic partnership are long-standing but imperfect. For one thing, we periodically see how various regulated financial intermediaries fail: it happened during the financial crisis of 2008[13] and when several midsize banks failed in 2023.[14] These failures exhibit interdependencies between banks and non-bank financial institutions and underscore the intricate nature of our system of money and payments.

Banks also have flaws in their operational coverage and do not serve every part of our economy: there are millions of unbanked and underbanked residents in the United States.[15] Large segments of the population do not have proper access to the financial system, raising social justice and equity concerns and undermining the economic potential and productivity of the most vulnerable parts of the population.

Crucial problems arise in payment systems, which exhibit inefficiencies and high costs in payment transfers, clearing, and settlement.[16] Cross-border

9. Financial institutions can settle transactions either by having their own master account or by using another depository institution's master account. *Master Account and Service Database*, FED. RSRV. (Dec. 15, 2023), https://www.federalreserve.gov/paymentsystems/master-account-and-services-database-about.htm [https://perma.cc/2VE6-QKHY]; Yesha Yadav et al., *Payments and the Evolution of Stablecoins and CBDCs in the Global Economy* 11–12 (Vand. L. Sch., Research Paper No. 23-19, 2023), https://ssrn.com/abstract=4425922 [https://perma.cc/C4Z9-BYW4] (explaining that only a handful of banks and selected entities have the privilege to access the Fed's master accounts, as "individuals and non-banks generally do not hold master accounts").

10. Skinner, *supra* note 4, at 165 ("The question of which institution creates the money . . . can be treated as separate from the question of which institution or set of payment rails is used to move that money around through the economy.").

11. *See* 12 U.S.C § 321 (2024) (explaining that individual banks can obtain the Fed's membership).

12. *See generally* Awrey, *Unbundling Banking*, *supra* note 6.

13. *See infra* Part IV.A; *see generally* David G. Tarr, *The Political, Regulatory, and Market Failures that Caused the U.S Financial Crisis: What Are the Lessons?*, 2 J. FIN. ECON. POL'Y 163 (2010).

14. Vivian Giang, *Banking Turmoil: What We Know*, N.Y. TIMES (Mar. 13, 2023, 4:50 PM), https://www.nytimes.com/article/svb-silicon-valley-bank-explainer.html [https://perma.cc/8HQS-ADKQ]; Martin J. Gruenberg, Chairman, Fed. Deposit Ins. Corp., Remarks by Chairman Martin J. Gruenberg on Recent Bank Failures and the Federal Regulatory Response before the Committee on Banking, Housing, and Urban Affairs, United States Senate (Mar. 27, 2023); Scott Horsley, *Five Things We Learned From the Senate Hearing on the Silicon Valley Bank Collapse*, NPR (Mar. 28, 2023, 3:44 PM), https://www.npr.org/2023/03/28/1166507714/senate-hearing-silicon-valley-bank-signature-bank-failure-collapse [https://perma.cc/ZWX6-J4RY].

15. FED. RSV. SYS., ECONOMIC WELL-BEING OF U.S. HOUSEHOLDS IN 2020 39–40 (2021), https://www.federalreserve.gov/publications/files/2020-report-economic-well-being-us-households-202105.pdf [https://perma.cc/QG6K-S6FT].

16. *See, e.g.*, FIN. STABILITY BD., ENHANCING CROSS-BORDER PAYMENTS: STAGE ONE REPORT

transfers, for example, are accompanied by considerable costs due to slow speed, legal and operational discrepancies among countries, and the need to rely on correspondent banks and networks.[17] Payment clearing and settlement systems fail to enable real-time payments across the board within the United States.[18] These problems impede economic activity: money stuck during a long payment cycle could have been deployed productively.[19]

The foregoing issues, suggesting why the current public-private money and payment systems and their regulatory framing are not ideal, militate in favor of reform. The obvious first-order questions in designing this reform are how to ensure (1) that an optimal relationship exists between the public and the private financial institutions, and (2) that the discussed socioeconomic inefficiencies and concerns are appropriately addressed.

The traditional avenue for improving efficiencies and reducing transaction costs is innovation accompanied by relevant regulatory changes which ensure that innovations do not broadly generate negative externalities affecting consumers, financial markets, and the economy.[20] One relevant innovation is digital assets and blockchains,[21] which have given market participants new ways to transact.[22] Although these general tools already exist,[23] we still need to

TO THE G20 1 (2020), https://www.fsb.org/wp-content/uploads/P090420-1.pdf [https://perma.cc/CSG3-NMAC]; Yadav et al., *supra* note 9, at 3–4; Awrey, *Unbundling Banking*, *supra* note 6, at 722, 739; Douglas Arner et al., *Building Regional Payment Areas: The Single Rule Book Approach* 7 (Bank for Int'l Settlements, Working Paper No. 1016, 2022), https://www.bis.org/publ/work1016.pdf [https://perma.cc/28AH-PMAQ] ("The more correspondent banks involved in a transaction, the more intermediate booking of transactions is necessary, with longer transaction time, greater credit risk, and higher costs.").

17. *See, e.g.*, Tobias Adrian et al., *Trust Bridges and Money Flows: A Digital Marketplace to Improve Cross-Border Payments* 1–2 (Bank for Int'l Settlements, Working Paper No. 1112, 2023), https://www.bis.org/publ/work1112.pdf [https://perma.cc/33P2-9HB3]; Yadav et al., *supra* note 9, at 25, 38–39; Awrey, *Unbundling Banking*, *supra* note 6, at 756 n.226, 777 n.339.

18. *See* Yadav et al., *supra* note 9, at 25–27.

19. Average U.S. firms wait over a month to receive cross-border payments. *Average U.S. Firm Waits Thirty-three Days to Receive Cross-Border Payments, Data Show*, PYMNTS (Sept. 16, 2021), https://www.pymnts.com/news/b2b-payments/2021/average-us-firm-waits-33-days-to-receive-cross-border-payments/ [https://perma.cc/W8ZT-HM4B].

20. Ross P. Buckley et al., *Regional Solutions to Global Payment Challenges: Toward a Single Rulebook*, 38 BANKING & FIN. L. REV. 81, 86 (2022); Skinner, *supra* note 4, at 157, 190.

21. *See Digital Assets*, IRS (Jul. 19, 2024), https://www.irs.gov/businesses/small-businesses-self-employed/digital-assets [https://perma.cc/4U8C-F2SN] (defining a digital asset as "any digital representation of value recorded on a cryptographically secured, distributed ledger (blockchain) or similar technology" (citation omitted)); *What is Blockchain Technology?*, IBM, https://www.ibm.com/topics/blockchain [https://perma.cc/6ZMC-V65M] (last visited Jan. 15, 2024) ("Blockchain is a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network.").

22. Yuliya Guseva, *Decentralized Markets and Self-Regulation*, 92 GEO. WASH. L. REV. 1281, 1283–84 (2024).

23. We will not provide a general description of the technology's impact on the financial sector. For nuanced discussions, *see generally* MICHAEL CASEY ET AL., THE IMPACT OF BLOCKCHAIN TECHNOLOGY ON FINANCE: A CATALYST FOR CHANGE (2018), https://www.cimb.ch/uploads/1/1/5/4/115414161/geneva21.pdf [https://perma.cc/N64E-CNT5]; Tom C.W.

determine the best ways to apply and control private innovation's negative externalities through regulation. The other relevant questions are about which parties within the public-private financial system are best positioned to innovate and how they should interact under changing rules.

In examining these questions in this Article, we consider two technology-based initiatives: "central bank digital currencies" or "CBDCs," which are digital money designed as a representation of fiat money with universal accessibility and the status of a legal tender,[24] and "stablecoins," [25] which are privately issued cryptoassets relying on blockchain technology and aiming to maintain stable value, mainly through collateralization by other assets that have "intrinsic value."[26] These public and private innovations are often presented as contrasting and competing products. Central bankers, for example, directly acknowledge the impetus to work on CBDC projects against the rise of stablecoins and to compete with other digital currencies—both private and sovereign.[27] Policymakers have described CBDCs as "more stable than the volatile cryptocurrencies proliferating in the private sector, safer than a bank deposit, and (like crypto) more efficient than existing currency," providing firms and the population with better control.[28] Some scholars also believe that CBDCs could increase financial inclusion.[29]

By contrast, other research emphasizes that private stablecoins are risky alternatives for users[30] and that stablecoin issuers should be regulated as banks, *i.e.,* the traditional suppliers of payment services and private money.[31] To date,

Lin, *Compliance, Technology, and Modern Finance*, 11 BROOK. J. CORP. FIN. & COM. L. 159 (2016); ROSS P. BUCKLEY ET AL., FINTECH: FINANCE, TECHNOLOGY AND REGULATION (Cambridge Univ. Press 2023); John W. Schindler, *FinTech and Financial Innovation: Drivers and Depth*, FIN. & ECON. DISCUSSION SERIES (2017) (explaining that new market entrants are engaged in deep innovation that has the potential to radically change the market).

24. *See infra* Part III.

25. Gary B. Gorton & Jeffrey Y. Zhang, *Taming Wildcat Stablecoins*, 90 U. CHI. L. REV. 909, 915 (2023) ("Stablecoins are a digital form of circulating private money where each coin is supposed to be backed with safe assets." (citation omitted)).

26. Steven L. Schwarcz, *Regulating Digital Currencies: Towards an Analytical Framework*, 102 B.U. L. REV. 1037, 1042–43 (2022) [hereinafter Schwarcz, *Regulating Digital Currencies*].

27. *Digital Yuan: What Is It and How Does It Work?*, DEUTSCHE BANK (Jul. 14, 2021), https://www.db.com/news/detail/20210714-digital-yuan-what-is-it-and-how-does-it-work [https://perma.cc/D8T2-3NJP]; Heng Wang, *China's Approach to Central Bank Digital Currency: Selectively Reshaping International Financial Order?*, 18 U. PA. ASIAN L. REV. 77, 77 (2022). *See also* Jiaying Jiang, Digital Dollar: Privacy and Transparency Dilemma 11 (2024) (unpublished manuscript) (on file with author).

28. Skinner, *supra* note 4, at 152–53.

29. Raphael Auer et al., *Central Bank Digital Currencies: A New Tool in the Financial Inclusion Toolkit?*, BANK FOR INT'L SETTLEMENTS FSI INSIGHTS, Apr. 2022, at 1, 30–31, https://www.bis.org/fsi/publ/insights41.pdf [https://perma.cc/JX67-6H9D].

30. Bruce et al., *supra* note 8, at 1148–50 (examining private stablecoins agreements and terms of use).

31. Arthur E. Wilmarth, *We Must Protect Investors and Our Banking System from the Crypto Industry*, 101 WASH. U.L. REV. 235, 236 (2023); Bruce et al., *supra* note 8, at 1106, 1122; PRESIDENT'S WORKING GRP. ON FIN. MKTS., THE FED. DEPOSIT INS. CORP., AND THE OFF. OF THE COMPTROLLER OF THE CURRENCY, REPORT ON STABLECOINS 2 (2021),

however, stablecoins have been issued mainly outside traditional banks, meaning that stablecoin issuers do not fall within the remit of bank regulators or have master accounts at the Fed, nor are they insured through the Federal Deposit Insurance Corporation's (FDIC) regime.[32]

Stablecoins are admittedly neither the first nor will they be the last technology to create private money or provide new payment options.[33] Like other financial innovations before them, stablecoins have been described in the literature and policy reports with an oft-repeated refrain of being risky to users and the economy,[34] raising systemic risk concerns,[35] and threatening monetary policy and sovereignty,[36] among other problems.[37] The 2023 joint paper by the Financial Stability Board (FSB) and the International Monetary Fund (IMF)—the major international bodies focusing on financial stability and growth—painted a particularly grim picture of stablecoins as a source of risk.[38]

In sum, regulators have openly worried that stablecoins could create unwanted competition for fiat currencies, and commentators have suggested that

https://home.treasury.gov/system/files/136/StableCoinReport_Nov1_508.pdf [https://perma.cc/3SMM-7T57].

32. *Id.* Being outside the protective perimeter of banks, they have been called "bad money." Awrey, *Bad Money*, *supra* note 6, at 1.

33. Gorton & Zhang, *supra* note 25, at 956.

34. Wilmarth, *supra* note 31, at 235.

35. Douglas Arner et al., *Stablecoins: Risks, Potential and Regulation* 12, 14 (Bank for Int'l Settlements, Working Paper No. 905, 2020), https://www.bis.org/publ/work905.pdf [https://perma.cc/89CX-3MLZ]; Parma Bains et al., *Regulating the Crypto Ecosystem: The Case of Stablecoins and Arrangements*, IMF FINTECH NOTES NO. 8, 2022, at 1, 8, 16, 20, https://www.imf.org/en/Publications/fintech-notes/Issues/2022/09/26/Regulating-the-Crypto-Ecosystem-The-Case-of-Stablecoins-and-Arrangements-523724 [https://perma.cc/L9FC-5QMR]; FIN. STABILITY BD., REGULATION, SUPERVISION AND OVERSIGHT OF "GLOBAL STABLECOIN" ARRANGEMENTS: FINAL REPORT AND HIGH-LEVEL RECOMMENDATIONS 7 (2020), https://www.fsb.org/wp-content/uploads/P131020-3.pdf [https://perma.cc/F877-PNG6]; Mitsu Adachi et al., *Stablecoins' Role in Crypto and Beyond: Functions, Risks and Policy*, EUROPEAN CENTRAL BANK (Jul. 11, 2022), https://www.ecb.europa.eu/pub/financial-stability/macroprudential-bulletin/html/ecb.mpbu202207_2~836f682ed7.en.html [https://perma.cc/TGT5-24FA].

36. KATHERINE FOSTER ET AL., DIGITAL CURRENCIES AND CBDC IMPACTS ON LEAST DEVELOPED COUNTRIES (LDCS) 4 (2021), https://www.undp.org/sites/g/files/zskgke326/files/2021-06/UNDP-UNCDF-TP-1-2-Digital-Currencies-and-CBDC-Impacts-on-Least-Developed-Countries-LDCs-EN.pdf [https://perma.cc/7J4N-GWC8]; Lee Reiners, *What Congress Should Ask About Facebook's New Cryptocurrency*, FINREG BLOG (Jul. 2, 2019), https://sites.duke.edu/thefinregblog/2019/07/02/what-congress-should-ask-about-facebooks-new-cryptocurrency/ [https://perma.cc/7HAJ-7HZT] ("If Libra becomes the currency of choice in developing countries, the traditional tools available to central banks would become useless.").

37. *See generally* Steven L. Schwarcz, *Regulating Global Stablecoins: A Model-Law Strategy*, 75 VAND. L. REV. 1729, 1729 (2022) [hereinafter Schwarcz, *Regulating Global Stablecoins*] ("[S]tablecoins present complex and novel cross-border regulatory challenges, including managing the costs of complying with a multitude of national laws and ensuring international legal enforceability.").

38. FIN. STABILITY BD. & INT'L MONETARY FUND, IMF-FSB SYNTHESIS PAPER: POLICIES FOR CRYPTO-ASSETS 1–2 (2023), https://www.fsb.org/wp-content/uploads/R070923-1.pdf [https://perma.cc/9S7Y-9HGT].

experiments with stablecoins spurred the development of CBDC projects.[39] Some scholars have even referred to CBDCs as "a sovereign digital-money competitor"[40] to stablecoins. Not surprisingly, international bodies and central banks are very much engaged in CBDC projects.[41]

Note that public digital innovations do not need to rely on CBDCs based on distributed ledger technology (DLT) to solve the problems of bank inefficiencies, payment costs, and financial inclusion. Scholars have considered a variety of reforms, such as creating a people's ledger and providing direct access to the Fed through retail accounts.[42] However, regardless of digital technologies, various voices within the current discourse simultaneously acknowledge the existing socioeconomic problems, call for the use of digital innovation, raise concerns about stablecoins, and essentially reconsider the foundations of the public-private money partnership as it currently exists.

In this Article, we examine the coexistence of private and public money in the new digital world and identify the pros and cons of the relationship between stablecoins and CBDCs. The United States has historically understood the importance of public monetary sovereignty, private money, and private financial institutions.[43] The public does not need to oust the private. Instead, carefully regulated private initiatives should be preserved lest the United States loses the efficiencies of private innovation.

In exploring the economic potential and risks of private digital innovation outside the traditional banking system and central banks, this Article provides theoretical support to the ongoing legislative and regulatory initiatives that aim to establish a framework for payment stablecoins backed by the U.S. Dollar.[44] These policy efforts align with our proposition that private innovations such as stablecoins can provide additional value to existing systems of public money and

39. Anton N. Didenko et al., *After Libra, Digital Yuan and COVID-19: Central Bank Digital Currencies and the New World of Money and Payment Systems* 1, 21–22, 26 (Eur. Banking Inst., Working Paper No. 65/2020, 2020), https://ssrn.com/abstract=3622311 [https://perma.cc/6TGT-FW98].

40. Gorton & Zhang, *supra* note 25, at 913.

41. *See infra* Part III.

42. *E.g.*, Saule T. Omarova, *The People's Ledger: How to Democratize Money and Finance the Economy*, 74 VAND. L. REV. 1231, 1235–36 (2021); *see* Robert C. Hockett, *Finance Without Financiers*, 47 POL. & SOC'Y 491, 491 (2019) (characterizing the relationship between the people and the financial system as "a franchise arrangement . . . the public is franchiser and the institutions dispensing its full faith and credit are its franchisees"); Morgan Ricks et al., *Central Banking for All: A Public Option for Bank Accounts*, GREAT DEMOCRACY INITIATIVE, June 2018, at 1, 1, https://rooseveltinstitute.org/wp-content/uploads/2021/08/GDI_Central-Banking-For-All_201806.pdf [https://perma.cc/E292-N6BG]; John Crawford, Lev Menand & Morgan Ricks, *FedAccounts: Digital Dollars*, 89 GEO. WASH. L. REV. 113 (2021).

43. *See*, *e.g.*, Skinner, *supra* note 4 at 181–86 (discussing theory and history of U.S. policies).

44. As this Article was going to print, the United States Senate voted for the Guiding and Establishing National Innovation for U.S. Stablecoins Act of 2025 (GENIUS Act of 2025), S.394 — 119th Congress (2025-2026), https://www.congress.gov/bill/119th-congress/senate-bill/394/titles. While we do not delve into the details of the Act, we provide a theoretical background for it and for other similar initiatives. We also do not provide a detailed analysis of Executive Order 14178 "Strengthening American Leadership in Digital Financial Technology" (3 CFR Executive Order 14178 (2025)). Instead, we examine the pros and cons of CBDCs vis-à-vis innovations led by private parties.

conventional payments. As Professor Steven Schwarcz observed, for instance, the private nature of stablecoins indicates that they may "have even greater potential than CBDC[s] to revolutionize the monetary system."[45] On balance, the risks of stablecoins should undoubtedly be acknowledged and regulated, but the possible benefits of technology-enabled private innovation and the need to address the flaws of the current public-private system of money and payments should not be overlooked either.

We examine these concerns in the following order: Part II starts with a brief overview of the historical combination of public and private money and highlights the importance of government backing of the safest forms of money. Part III focuses on the challenges of rolling out appropriate CBDC projects. We demonstrate how regulatory ambiguities, economic risks, and legal uncertainties add complexity to CBDC development, requiring careful research and adaptation before CBDCs can be formally introduced. Part IV discusses stablecoins, their risks, and relevant regulations. It highlights policymakers' concerns about stablecoins, including their impact on monetary sovereignty and financial stability. Part V asks which private parties—banks or emerging tech firms—innovate in a more optimal way. It highlights concerns about the limited incentives for innovation among banks and suggests the need for more adaptable regulatory options. Part VI makes a case for a better and more diverse regulatory regime based on the evolving coexistence of various forms of money and institutions. It underscores the potential benefits of coexistence between well-regulated stablecoins and CBDCs in a changing technological environment.

II

IT IS ALL MONEY

Our system of money has historically combined a credit-based system involving some forms of trusted intermediaries—starting with ancient temples and then creating modern banks—and commodity-based monetary instruments, often backed by gold.[46] Some scholars have argued that it emerged in response to the needs of individual economic actors in a barter economy.[47] This evolution

45. Schwarcz, *Regulating Digital Currencies*, *supra* note 26, at 1044.

46. Awrey, *Unbundling Banking*, *supra* note 6, at 725–28*; see generally* Hyman P. Minsky et al., *Financial Crisis, Financial Systems, and the Performance of the Economy*, *in* IRWIN FRIEND ET AL., PRIVATE CAPITAL MARKETS; A SERIES OF RESEARCH STUDIES PREPARED FOR THE COMMISSION ON MONEY AND CREDIT 173 (1964) (discussing history and how economic growth may spur financial innovation); HYMAN P. MINSKY, STABILIZING AN UNSTABLE ECONOMY (Yale Univ. Press 1986) (arguing that money is endogenous, meaning that it is created within the private banking system through the extension of credit—banks create money by making loans, which in turn influences the level of economic activity and asset prices).

47. CARL MENGER, PRINCIPLES OF ECONOMICS 315–17 (James Dingwall & Bert F. Hoselitz trans., 2007); *cf.* GEOFFREY INGHAM, THE NATURE OF MONEY 7 (rejecting Menger's notion that money originates as a "spontaneous" response to barter economy); Geoffrey Ingham, *Revisiting the Credit Theory of Money and Trust*, in NEW PERSPECTIVES ON EMOTIONS IN FINANCE 121, 123 (Jocelyn Pixley ed., 2012) ("[T]here is little evidence to support the Mengerian notion that a single medium of exchange

gave us instruments that we can use as a unit of account, medium of exchange, and store of value[48] to transact and participate in the economy.

In the current monetary framework, a key prerogative of the government is to mint coins and print bills, both examples of fiat money,[49] but it is not the only source of money supply. In fact, these physical manifestations of money have been shrinking in our economy, replaced with credit-based money and financial instruments created, held, and transferred through financial institutions such as banks.[50]

As discussed in Part I, banks are essentially backed by the state through emergency loans from the Federal Reserve, the deposit insurance scheme of the FDIC, a special regulatory regime imposed on these institutions, and the resolution regime when they go bust.[51] Through these methods, the regulators bolster trust in the banking system, making it close to the safety of public money[52] and reassuring the transacting parties of the low riskiness of bank services and payments.

Yet, over time, alternatives to traditional banking services have emerged outside the banking system. These include money market funds (MMFs)[53] and e-money payment platforms.[54] More recently, DLT has enabled massive markets for stablecoins–"a digital form of circulating private money where each coin is supposed to be backed with safe assets."[55] There are also other forms of

might 'spontaneously' achieve the necessary level of exchange rate stability. . . ."); Alfred Mitchell-Innes, *The Credit Theory of Money*, 31 BANKING L.J. 151, 152 (1914) (positing that money represents the creditor's right to receive payment and the debtor's obligation to settle the debt); FRIEDRICH ENGELS, OUTLINES OF A CRITIQUE OF POLITICAL ECONOMY (Martin Milligan trans., 1843), https://www.marxists.org/archive/marx/works/1844/df-jahrbucher/outlines.htm [https://perma.cc/CUS6-SQKJ] (advocating for the Marxist theory of money and arguing that money is the product of the privatized mercantile system, originating from trade activities, and its value is determined by production costs); L. Randall Wray, *From the State Theory of Money to Modern Money Theory: An Alternative to Economic Orthodoxy* 2, 24 n.17, 25 (Levy Econ. Inst., Working Paper No. 792, 2014), https://ssrn.com/abstract=2407711[https://perma.cc/X285-ZVTR] (offering a concise summary of prominent economists' perspectives on the origin of money).

48. Yadav et al., *supra* note 9, at 9 (citation omitted).

49. Skinner, *supra* note 4, at 15–16.

50. *See generally* MILTON FRIEDMAN & ANNA JACOBSON SCHWARTZ, A MONETARY HISTORY OF THE UNITED STATES, 1867–1960 (Princeton Univ. Press 1971) (arguing, among others, that variations in the money supply, instead of its price, played a crucial role in influencing the economic performance of the United States during this time span and contributed to significant economic events such as the Great Depression).

51. Awrey, *Bad Money*, *supra* note 6, at 4–5.

52. In the end, the value of public and private money is based on the power of the issuing authority "accepted at the public offices," not underlying commodities. GEORG FRIEDRICH KNAPP, STATE THEORY OF MONEY vii–viii (August M. Kelley 1973) (1924).

53. *See generally* Gorton & Zhang, *supra* note 25, at 920–22 (describing how money market funds differ from the business of deposit taking, which is part of the business of banking). For the definition of money market funds, see 17 C.F.R. § 270.2a–7 (2015).

54. For a detailed overview of these platforms, *see* Dan Awrey & Kristin van Zwieten, *Mapping the Shadow Payment System* 12–22 (SWIFT Inst., Working Paper No. 001, 2019), https://ssrn.com/abstract=3462351 [https://perma.cc/AJ6C-MCFE].

55. Gorton & Zhang, *supra* note 25, at 915.

stablecoins, including coins stabilized by algorithms and cryptocurrencies, but the most widely used ones are reserve-backed assets.[56] Officially, stablecoin firms are outside the discussed safety net that links private banks to the state. Structurally, many stablecoin issuers are similar to banks, MMFs, or payment platforms such as PayPal, which also has a stablecoin.[57] They accept money from the public, give the public stablecoins in return, and often maintain reserves invested in cash, cash equivalents, and other assets.[58]

This approach reminds us of Friedrich Hayek's proposals for international commodity currencies. In 1943, Hayek, building off the work of other scholars, published a controversial proposal to create a commodity reserve currency based on a basket of raw commodities, with the "monetary authority [standing] ready to sell and buy the commodity unit at a fixed price."[59] Central bankers have not taken the scholars up on this proposal, but private stablecoins seem to have used the idea in their own way. Today's stablecoins are designed as global methods of payments and transfers that may be backed by currencies or commodities—or both.[60]

In summation, money may evolve outside of governments,[61] but the safest forms of money are, in some form, backed by governments. Additionally, private money exists, and new forms of private money can even be pegged to fiat currencies and collateralized by commodities and other assets such as fiat currencies and Treasury bills.[62] With this framework in mind, we turn our attention to digital public money in the form of CBDCs.

III
CBDCs

A. Structural Uncertainty and Its Implications

Recall that CBDCs are a digital form of fiat currencies. It is also a liability of a central bank.[63] CBDCs are public money, and central banks across the world

56. Bruce et al., *supra* note 8, at 1094–95, 1098–99.

57. Ebrima Santos Sanneh, *PayPal's Stablecoin Launch Has Washington's Attention*, AM. BANKER (Aug. 8, 2023), https://www.americanbanker.com/news/paypals-stablecoin-launch-has-washingtons-attention [https://perma.cc/9UZZ-BWQL].

58. Gorton & Zhang, *supra* note 25, at 950–51; Awrey, *Unbundling Banking*, *supra* note 6, at 47–48.

59. Friedrich A. Hayek, *A Commodity Reserve Currency*, 43 ECON. J. 176, 180 (1943).

60. *See infra* Part IV.

61. *See generally* LUDWIG VON MISES, THE THEORY OF MONEY AND CREDIT (1912) (explaining that money cannot be created by state decree or a universal social agreement; it must always emerge from free market dynamics).

62. *See*, *e.g.,* Regulation 2023/1114, of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets, and Amending Regulations No 1093/2010 and No 1095/2010 and Directives 2013/36/EU and 2019/1937, 2023 O.J. (L 150/40) [hereinafter MiCA] (discussing reserve mechanisms and different types of stablecoins).

63. *See generally* John Barrdear & Michael Kumhof, *The Macroeconomics of Central Bank Issued Digital Currencies* 3 (Bank of Eng., Working Paper No. 605, 2016), https://www.bankofengland.co.uk/-

have been exploring this sovereign-backed option.[64] The process, however, has

/media/boe/files/working-paper/2016/the-macroeconomics-of-central-bank-issued-digital-currencies.pdf [https://perma.cc/H4M7-742U] (describing the macroeconomic nuances of a "universal, electronic, 24x7, national-currency-denominated and interest-bearing" CBDC with access to a central bank's balance sheet); Christine Lagarde, Managing Dir., Int'l Monetary Fund, Winds of Change: The Case for New Digital Currency at the Singapore Fintech Festival (Nov. 14, 2018), https://www.imf.org/en/News/Articles/2018/11/13/sp111418-winds-of-change-the-case-for-new-digital-currency [https://perma.cc/E3MY-M8GS]; Itai Agur, *Central Bank Digital Currencies: An Overview of Pros and Cons*, *in* ITAI AGUR ET AL., DO WE NEED CENTRAL BANK DIGITAL CURRENCY? ECONOMICS, TECHNOLOGY AND INSTITUTIONS 113, 116–17 (Ernest Gnan & Donato Masciandaro eds., 2018), https://iris.unibocconi.it/bitstream/11565/4014058/1/Masciandaro%20SUERF%20book%20%2B%20SUERF%20book%20chapter.pdf [https://perma.cc/YVE3-N75P]; Itai Agur et al., *Designing Central Bank Digital Currencies* (Int'l Monetary Fund, Working Paper No. 2019/252, 2019), https://www.imf.org/en/Publications/WP/Issues/2019/11/18/Designing-Central-Bank-Digital-Currencies-48739 [https://perma.cc/H6JA-PLV7]; Gabriel Soderberg et al., IMF FINTECH NOTES NO.4, 2022, *Behind the Scenes of Central Bank Digital Currency: Emerging Trends, Insights, and Policy Lessons,* at 1, 1, https://www.imf.org/en/Publications/fintech-notes/Issues/2022/02/07/Behind-the-Scenes-of-Central-Bank-Digital-Currency-512174 [https://perma.cc/B5KY-XBM8] (studying six advanced CBDC projects from the Bahamas, Canada, China, Caribbean countries, Sweden, and Uruguay). For the U.S. context, *see, e.g.*, Digital Dollar Project, *Secure Adoption of a Digital Dollar: Operational and Compliance Risks for the U.S. Banking Sector* (Working Paper No. 1, 2023), https://digitaldollarproject.org/wp-content/uploads/2023/06/Risk-Working-Paper_Secure-adoption-of-a-digital-dollar.pdf [https://perma.cc/FBP5-KQDZ].

64. *See Central Bank Digital Currency (CBDC)*, FED. RSRV. (Apr. 20, 2023), https://www.federalreserve.gov/central-bank-digital-currency.htm [https://perma.cc/6SKM-GUUC]. The Fed has not made a concrete commitment to actively pursue a CBDC initiative as of now, but it has been "exploring the potential benefits and risks of CBDCs" with a particular focus on "whether and how" CBDCs can improve the U.S. domestic payment systems. *Id.* The Federal Reserve Bank of Boston and Massachusetts Institute of Technology (MIT) initiated Project Hamilton, "a multiyear research project to explore the CBDC design space and gain a hands-on understanding of a [retail] CBDC's technical challenges and opportunities." FED. RSRV. BANK OF BOS. & MASS. INST. OF TECH. DIGIT. CURRENCY INITIATIVE, PROJECT HAMILTON PHASE 1 EXECUTIVE SUMMARY (2022), https://www.bostonfed.org/publications/one-time-pubs/project-hamilton-phase-1-executive-summary.aspx [https://perma.cc/NB7P-KQLJ]; *see also* N.Y. INNOVATION CTR., FED. RSRV. BANK OF N.Y., PROJECT CEDAR: PHASE ONE REPORT 2 (2022), https://www.newyorkfed.org/medialibrary/media/nyic/project-cedar-phase-one-report.pdf [https://perma.cc/FQA7-DJBZ] (a multi-phase research project exploring theoretical designs for a wholesale CBDC); Press Release, The White House, Fact Sheet: White House Releases First-Ever Comprehensive Framework for Responsible Development of Digital Assets (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/ (setting out the White House policy objective for a U.S. CBDC system and encouraging more research on technology choices for a U.S. CBDC). In contrast, other economies are advancing in their efforts to adopt a CBDC. *See* Wang, *supra* note 27, at 77 ("China is likely to be the first major economy to issue central bank digital currency (CBDC), the digital version of sovereign currency."); EUR. CENT. BANK, A STOCKTAKE ON THE DIGITAL EURO 5 (2023), https://www.ecb.europa.eu/paym/digital_euro/investigation/profuse/shared/files/dedocs/ecb.dedocs231018.en.pdf [https://perma.cc/A28W-YCAQ] (describing that the European Central Bank is moving to the preparation phase of a digital euro, particularly for retail purposes); Bastian Benrath, *Swiss Digital Wholesale Franc Kicks Off Next Month, SNB Says*, BLOOMBERG (Nov. 2, 2023), https://www.bloomberg.com/news/articles/2023-11-02/swiss-digital-wholesale-franc-to-kick-off-next-month-snb-says [https://perma.cc/8K4C-5F4J]. These initiatives have been accelerated by the pandemic, contactless payment, and Facebook's Libra initiative. *See* Didenko et al., *supra* note 39, at 1 (arguing that both Libra and Covid-19 were systemic catalysts, paving the way to the development of the current state

been slow as regulators grapple with how to solve their "main challenges" of "increasing accessibility and reducing costs" through optimal design.[65] The Fed, in particular, is taking a measured, exploratory approach.[66]

Several reasons explain this pace. For one, governments often are not the main source of innovation, that realm of "innovative entrepreneurs."[67] Central bankers may simply lack the right toolkits.[68] After all, as Joseph Schumpeter suggests, technological innovation is a natural consequence of capitalism.[69] From capitalism, we move to innovation, which leads to economic growth.[70]

Next, there are unresolved, open-ended questions concerning the meaning, scope, and design of CBDCs. There has yet to be a precise definition of CBDC. Scholars use it to discuss a digital form of central bank money,[71] cash,[72] central bank claim or liability,[73] and new legal tender.[74] The nuances of these definitions are beyond the scope of this Article. However, the simplest definition is that a CBDC is a central-bank-issued "digital currency" that functions as a medium of exchange, unit of account, and store of value.

Designs of CBDCs vary along the lines of access, anonymity, availability, and interest-bearing features, which are being actively debated and explored.[75]

of CBDCs); Anton N. Didenko & Ross P. Buckley, *The Evolution of Currency: Cash to Cryptos to Sovereign Digital Currencies*, 42 FORDHAM INT'L L.J. 1041, 1093 (2019).

65. Schwarcz, *Regulating Digital Currencies*, *supra* note 26, at 1046. For a discussion of relevant design options, *see id.* at 1047–53.

66. Wilmarth, *supra* note 31, at 309–10 (citing Fed's Policy Statement).

67. Robert D. Cooter et al., *The Importance of Law in Promoting Innovation and Growth*, *in* KAUFFMAN TASK FORCE ON L., INNOVATION, & GROWTH, RULES FOR GROWTH: PROMOTING INNOVATION AND GROWTH THROUGH LEGAL REFORM 1, 4–5 (2011) (citation omitted).

68. *See*, *e.g.*, Rachel Greener, *Enabling Innovation Through A Digital Pound*, BANK OF ENG. Q. BULL., Aug. 24, 2023, https://www.bankofengland.co.uk/quarterly-bulletin/2023/2023/enabling-innovation-through-a-digital-pound [https://perma.cc/9F9U-SAP2].

69. For a review, *see* ARNOLD HEERTJE, SCHUMPETER ON THE ECONOMICS OF INNOVATION AND THE DEVELOPMENT OF CAPITALISM 16 (2006).

70. Robert M. Solow, *Technical Change and the Aggregate Production Function*, 39 REV. ECON. & STAT. 312, 316–17 (1957).

71. BANK OF ENG., CENTRAL BANK DIGITAL CURRENCY: OPPORTUNITIES, CHALLENGES AND DESIGN 7 (2020), https://www.bankofengland.co.uk/-/media/boe/files/paper/2020/central-bank-digital-currency-opportunities-challenges-and-design.pdf [https://perma.cc/M947-UW2F].

72. Skinner, *supra* note 4, at 152.

73. BD. OF GOVERNORS, FED. RSRV. SYS., MONEY AND PAYMENTS: THE U.S. DOLLAR IN THE AGE OF DIGITAL TRANSFORMATION 13 (2022) [hereinafter FED. RSRV. SYS., MONEY AND PAYMENTS], https://www.federalreserve.gov/publications/files/money-and-payments-20220120.pdf [https://perma.cc/Q8RS-5PWW]. For an analysis of central bank liability, *see generally* Kumhof et al., *supra* note 3, at 1, 20 (stating that central bank liability is a legal construct).

74. Tommaso Mancini-Griffoli et al., *Casting Light on Central Bank Digital Currency*, IMF STAFF DISCUSSION NOTES 1, 7 (Nov. 12, 2018), https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2018/11/13/Casting-Light-on-Central-Bank-Digital-Currencies-46233 [https://perma.cc/5CER-UCAR].

75. Agur et al., *supra* note 63, at 1; Raphael Auer & Rainer Böhme, *The Technology of Retail Central Bank Digital Currency*, BANK FOR INT'L SETTLEMENTS Q. REV., Mar. 2020, at 85, 85; Raphael Auer et al., *Rise of the Central Bank Digital Currencies: Drivers, Approaches and Technologies* (Bank for Int'l Settlements, Working Paper No. 880, 2020), https://www.bis.org/publ/work880.htm [https://perma.cc/HH8Y-HDDZ].

Structurally, CBDCs could be issued on decentralized public ledgers, permissioned ledgers, or centralized ledgers similar to the record-keeping model of banks. These models could be either based on accounts involving traditional banks or on transferable tokens, potentially disintermediating some functions of banks.[76] Strategically, a CBDC could cater to retail consumers' interests[77] or wholesale transactions for interbank transfers.[78] Moreover, there are ongoing and unresolved concerns regarding CBDCs' privacy,[79] the trade-off between anonymity and AML/CFT laws,[80] security and resiliency,[81] and financial stability issues.[82]

To sum up, there are no established CBDC models yet,[83] and existing CBDCs have variable designs. For example, the Eastern Caribbean Central Bank (ECCB) employs an account-based model, wherein consumers directly maintain deposit accounts with the central bank. In contrast, China's CBDC pilot deploys private-sector banks to provide and manage DC/EP (e-CNY) accounts for their

76. Auer et al., *supra* note 75, at 1, 28. *See* Schwarcz, *Regulating Digital Currencies*, *supra* note 26, at 1046–50; FOSTER ET AL., *supra* note 36, at 14 fig.1 (highlighting CBDC's various design choices). Disintermediation does not have to be an inevitable result. For example, international Project Rosalind operates as a public-private partnership where central banks would build and run the CDBC infrastructure and private firms would interact directly with retail users. BANK FOR INT'L SETTLEMENTS & BANK OF ENG., PROJECT ROSALIND: BUILDING API PROTOTYPES FOR RETAIL CBDC ECOSYSTEM INNOVATION 5 (2023), https://www.bis.org/publ/othp69.pdf [https://perma.cc/7GKB-ALFW] ("Two options for retail CBDC models have emerged: a single-tier system operated by the central bank, and a two-tier model where the central bank provides a core infrastructure, with user-facing services provided by private-sector service providers." (citations omitted)).

77. Auer & Bohme, *supra* note 75, at 85.

78. *See* Fabio Panetta, Member, Eur. Cent. Bank Exec. Bd., Demystifying Wholesale Central Bank Digital Currency (Sept. 26, 2022), *in* https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220926~5f9b85685a.en.html [https://perma.cc/Y5NZ-X3VZ]; *see also* Jon Durfee et al., *Examining CBDC and Wholesale Payments*, FEDS NOTES (Sept. 8, 2023), https://www.federalreserve.gov/econres/notes/feds-notes/examining-cbdc-and-wholesale-payments-20230908.html [https://perma.cc/S8J4-D7LR] (explaining that wholesale central bank digital currency can allow for arrangements in interbank payments).

79. *See* Sriram Darbha & Rakesh Arora, *Privacy in CBDC Technology*, BANK OF CAN. STAFF ANALYTICAL NOTE (June 2020), https://www.bankofcanada.ca/2020/06/staff-analytical-note-2020-9/ [https://perma.cc/9KE5-BWHC]; Nerenda N. Atako, *Privacy Beyond Possession: Solving the Access Conundrum in Digital Dollars*, 23 VAND. J. ENT. & TECH. L. 821, 821 (2021).

80. Robert Z. Mahari et al., *AML by Design: Designing a Central Bank Digital Currency to Stifle Money Laundering*, 3 MASS. INST. TECH. SCI. POL'Y REV. 57, 61 (2022).

81. Charles M. Kahn & Francisco Rivadeneyra, *Security and Convenience of a Central Bank Digital Currency*, BANK OF CAN. STAFF ANALYTICAL NOTES, Oct. 2020, at 1, https://www.bankofcanada.ca/wp-content/uploads/2020/10/san2020-21.pdf [https://perma.cc/JFU5-5227]; Gabriel Soderberg et al., *How Should Central Banks Explore Central Bank Digital Currency? A Dynamic Decision-Making Framework*, IMF FINTECH NOTES NO.8, 2023, at 1, 10, 14–15, https://www.imf.org/en/Publications/fintech-notes/Issues/2023/09/08/How-Should-Central-Banks-Explore-Central-Bank-Digital-Currency-538504 [https://perma.cc/5NVX-TZU6].

82. Adina Popescu, *Cross-Border Central Bank Digital Currencies, Bank Runs and Capital Flows Volatility* (IMF, Working Paper No. 83, 2022), at 4, 25.

83. However, G-7 Central Banks came up with some agreed principles. BANK OF CANADA ET AL., CENTRAL BANK DIGITAL CURRENCIES: FOUNDATIONAL PRINCIPLES AND CORE FEATURES NO. 1 (2020), at 11, https://www.bis.org/publ/othp33.pdf [https://perma.cc/37PW-L92A].

clients.[84] The European Union, under its current Digital Euro framework, explores a system with licensed financial institutions operating permissioned nodes on the blockchain network and facilitating the distribution of the digital euro in compliance with E.U. directives.[85]

B. Expected Benefits

Whenever central banks consider CBDCs, their choices may vary depending on national policy objectives, economic factors,[86] technological capability,[87] and regulatory specifics.[88] The overarching reasons for the introduction of CBDCs often touch upon the inefficiencies of existing systems. In the United States, for example, a CBDC could replace the cumbersome transfer, clearing, and settlement processes[89] or operate in parallel with services such as FedNow[90] and Fedwire.[91] CBDCs could also eliminate the existing costly procedures for domestic and cross-border payments and settlements.[92] A party making a

84. A similar model is used by Cambodia's Bakong. *See* BAKONG, https://bakong.nbc.gov.kh/en/ [https://perma.cc/BGR3-3LCH] (last visited Jan. 15, 2024).

85. EUR. CENT. BANK, OPINION OF THE EUROPEAN CENTRAL BANK OF 31 OCTOBER 2023 ON THE DIGITAL EURO, 2023 O.J. 1 (2023), https://www.ecb.europa.eu/pub/pdf/legal/ecb.leg_con_2023_34.en.pdf [https://perma.cc/2UBB-KB3P]. For example, Cambodia launched its digital currency "Bakong" to de-dollarize its economy. *Cambodia's Central Bank: Bakong Blockchain Payments May Help De-dollarization*, LEDGER INSIGHTS (Aug. 9, 2021), https://www.ledgerinsights.com/cambodias-central-bank-bakong-blockchain-payments-may-help-de-dollarization/ [https://perma.cc/5J66-KRHY].

86. *See*, *e.g.*, Jada Nagumo, *Cambodia Aims to Wean off U.S. Dollar Dependence with Digital Currency*, NIKKEI ASIA (Aug. 4, 2021), https://asia.nikkei.com/Business/Markets/Currencies/Cambodia-aims-to-wean-off-US-dollar-dependence-with-digital-currency [https://perma.cc/9VFH-ZYBX] (explaining the economic factors behind the Bakong's development).

87. The Bahamas' Sand Dollar project planned to leverage the country's "high penetration of mobile phone usage, and a likelihood that a higher share of the population would be willing to use digital financial services including electronic payments." CENT. BANK OF THE BAH., PROJECT SAND DOLLAR: A BAHAMAS PAYMENTS SYSTEM MODERNISATION INITIATIVE 3 (2019), https://www.centralbankbahamas.com/viewPDF/documents/2019-12-25-02-18-11-Project-Sanddollar.pdf [https://perma.cc/632T-NFZG].

88. *See*, *e.g.*, Marcelo Prates, *Legal Troubles May Delay CBDCs*, OMFIF (Feb. 24, 2021), https://www.omfif.org/2021/02/legal-troubles-may-delay-cbdcs/ [https://perma.cc/EJ3U-5T3V] (highlighting the legal and regulatory complexities, which are likely to slow CBDC projects in the European Union and United States).

89. *See* Yadav et al., *supra* note 9, at 4; Awrey, *Unbundling Banking*, *supra* note 6, at 732–35 (discussing types of payment tools that could be replaced by CBDCs in the United States).

90. FedNow® is an instant payments system launched by the Federal Reserve in July 2023. *See FedNow® Service*, FED. RSRV. (Jul. 20, 2023), https://www.federalreserve.gov/paymentsystems/fednow_about.htm [https://perma.cc/J5RW-YFE6] ("The FedNow Service is designed to maintain uninterrupted 24x7x365 processing with security features to support payment integrity and data security.").

91. Fedwire® is a real-time gross settlement system operated by the Federal Reserve Banks that enables financial institutions in the United States to electronically transfer funds and settle transactions on behalf of themselves and their customers. *Fedwire® Funds Service*, FED. RSRV. BANKS, https://www.frbservices.org/financial-services/wires [https://perma.cc/FH6L-MPCC] (last visited Jan. 15, 2024).

92. BANK FOR INT'L SETTLEMENTS ET AL., CENTRAL BANK DIGITAL CURRENCIES FOR CROSS-

transnational transaction through a bank would not depend on the bank holding an account at either a recipient's bank or a third-party correspondent bank. Payments could be more efficient and no longer delayed over several working days to clear and settle.[93] Next, CBDCs could offer better financial inclusion.[94] In short, the advocates of CBDCs highlight their potential to modernize payment systems,[95] better implement monetary policies and capital flow controls,[96] and improve cross-border transactions[97] while solving social problems.

C. Possible Downsides

On the other side of the debate, critics of CBDCs offer several counterarguments. Some suggest that in the absence of large-scale adoption of CBDCs, the aforementioned benefits may be speculative.[98] Others hypothesize that CBDCs could provide central banks with new, unlimited power to control the money supply and monetary policies,[99] diminish the independence of the central bank from the executive branch,[100] and trigger macroeconomic shocks,

BORDER PAYMENTS: REPORT TO THE G20 2 (2021), https://www.bis.org/publ/othp38.pdf [https://perma.cc/ZZ35-Q74T].

93. Buckley et al., *supra* note 20, at 11.

94. Omarova, *supra* note 42, at 1233–34; Mancini-Griffoli et al., *supra* note 74, at 4; *see* Jesse Leigh Maniff & W. Blake Marsh, *Banking on Distributed Ledger Technology: Can It Help Banks Address Financial Inclusion?*, 102 FED. RSRV. BANK OF KAN. CITY ECON. REV. 53, 53–54 (2017) (stating that financial inclusion in the context of CBDCs can be analyzed from three different dimensions: payment sector improvements, cross-border payments, and negative interest rate—each of these can be achieved through different CBDC designs); *see generally* Sangita Gazi, *Unlocking the Potential of Central Bank Digital Currencies for Developing Countries*, *in* DIGITAL ASSETS AND THE LAW: FIAT MONEY IN THE ERA OF DIGITAL CURRENCY (Filippo Zatti & Rosa Giovanna Barresi eds., 2024) (investigating the possibility of capitalizing on the existing digital infrastructure—such as mobile money—to amplify the positive effects of CBDCs on financial inclusion).

95. Schwarcz, *Regulating Digital Currencies, supra* note 26, at 1048–49; *E-krona Pilot Phase Three*, SVERIGES RIKSBANK (Apr. 4, 2023), https://www.riksbank.se/en-gb/payments—cash/e-krona/e-krona-reports/e-krona-pilot-phase-3/ [https://perma.cc/92GY-HKXY].

96. Barrdear & Kumhoff, *supra* note 63, at 3–4; Michael D. Bordo & Andrew T. Levin, *Central Bank Digital Currency and the Future of Monetary Policy* 2 (Nat'l Bureau of Econ. Rsch, Working Paper No. 23711, 2017), https://www.nber.org/system/files/working_papers/w23711/w23711.pdf [https://perma.cc/UF9H-VTXL]. For general literature review on the macroeconomic study of CBDCs, *see* Francesca Carapella & Jean Flemming, *Central Bank Digital Currency: A Literature Review*, FEDS NOTES, Nov. 9, 2020, at 1, https://www.federalreserve.gov/econres/notes/feds-notes/central-bank-digital-currency-a-literature-review-20201109.html [https://perma.cc/57TA-SLDQ]; David Andolfatto, *Assessing the Impact of Central Bank Digital Currency on Private Banks* 1 (Fed. Rsrv. Bank of St. Louis, Working Paper No. 2018–026B, 2018), https://s3.amazonaws.com/real.stlouisfed.org/wp/2018/2018-026.pdf [https://perma.cc/SR2B-QUHG].

97. BANK FOR INT'L SETTLEMENTS ET AL., *supra* note 92, at 2**.**

98. Ashley Lannquist & Brandon Tan, *Central Bank Digital Currency's Role in Promoting Financial Inclusion*, IMF FINTECH NOTES, No. 11, 2023, at 1, 3, https://www.imf.org/en/Publications/fintech-notes/Issues/2023/09/22/Central-Bank-Digital-Currency-s-Role-in-Promoting-Financial-Inclusion-538728 [https://perma.cc/M3DU-6BJW].

99. Paul Wong & Jesse Leigh Maniff, *Comparing Means of Payment: What Role for a Central Bank Digital Currency?*, FEDS NOTES, Aug. 13, 2020, at 1, https://www.federalreserve.gov/econres/notes/feds-notes/comparing-means-of-payment-what-role-for-a-central-bank-digital-currency-20200813.html [https://perma.cc/6CZ5-JMGK].

100. Skinner, *supra* note 4, at 161.

affecting both retail portfolio allocations and bank runs.[101] In the United States, issuance of CBDCs has become a divisive issue, leading to the introduction of bills sniping at CBDCs for, among other potential risks, surveilling Americans and their financial transactions.[102]

Not all jurisdictions are rushing to introduce CBDCs.[103] As a starting point, countries would need to achieve proper interoperability[104] among CBDCs to realize and maximize their potential benefits. Although projects are already underway to explore interactions among CBDCs and to effect frictionless settlements,[105] their completion and implementation will take time. The IMF Handbook on CBDCs specifically recommends that countries test their projects carefully and roll them out slowly.[106]

Developing the underlying design and technology behind CBDCs must be both impeccable and flexible to accommodate future technological change and improve cybersecurity and operational resilience. For example, one year into India's CBDC pilot, India's finance minister indicated that India's CBDC—Digital Rupee—combined DLT and application programming interface (API) and that the government could also consider alternative technologies.[107]

101. Andolfatto, *supra* note 96, at 20.

102. *See, e.g.*, CBDC Anti-Surveillance State Act, H.R.1122, 118th Cong. (2023) (limiting the power of the Fed to issue CBDCs); Congressman Tom Emmer (MN-06), while presenting the bill before the Financial Services Committee expressed concerns: "Unlike decentralized cryptocurrencies, a central bank digital currency is a digital form of sovereign currency that is designed and issued by a government and transacts on a digital ledger that is controlled by that government. In short, a central bank digital currency is government-controlled programmable money that, if not designed to emulate cash, could give the federal government the ability to surveil and restrict Americans' transactions." Press Release, Rep. Tom Emmer, Emmer's CBDC Anti-Surveillance State Act Passes Financial Services Committee (Sept. 20, 2023), https://emmer.house.gov/2023/9/emmer-s-cbdc-anti-surveillance-state-act-passes-financial-services-committee [https://perma.cc/7VFQ-4LKL].

103. Ananya Kumar et al., *Central Bank Digital Currency Tracker*, ATL. COUNCIL, https://www.atlanticcouncil.org/cbdctracker/ [https://perma.cc/H8XV-QA54] (last visited Jan. 16, 2024).

104. Darrell Duffie defines interoperability of a payment system: "To get at the meaning of interoperability, we can think of a payment system as a collection of multi-account ledgers. Each ledger is capable of instant transfers of funds between any two accounts on that ledger." Darrell Duffie, *Interoperable Payment Systems and the Role of Central Bank Digital Currencies*, in INSTITUT LOUIS BACHELIER, FAIR ADVANCES REPORT 40, 41 (2021), https://www.institutlouisbachelier.org/wp-content/uploads/2021/02/ra-fair.pdf [https://perma.cc/3NLQ-6BBT]. *See also* RAPHAEL AUER ET AL., BANK FOR INT'L SETTLEMENTS, MULTI-CBDC ARRANGEMENTS AND THE FUTURE OF CROSS-BORDER PAYMENTS, 1, 3–5 (2021), https://www.bis.org/publ/bppdf/bispap115.pdf [https://perma.cc/4LBA-PFSK] (providing a conceptual approach to CBDCs' interoperability).

105. *See generally* BANQUE DE FRANCE ET AL., CROSS-BORDER SETTLEMENT USING WHOLESALE CBDC (2021), https://www.bis.org/publ/othp44.pdf [https://perma.cc/ZWL6-79HL] (discussing an example of such interoperable interaction among foreign wholesale CBDCs –Project Jura—a collaboration among multiple central banks, BIS, and commercial banks).

106. Herve Tourpe et al., *A Guide to Central Bank Digital Currency Product Development*, IMF FINTECH NOTES NO.7, 2023, at 1, 24, https://www.imf.org/en/Publications/fintech-notes/Issues/2023/09/08/A-Guide-to-Central-Bank-Digital-Currency-Product-Development-538496 [https://perma.cc/A235-H6RL].

107. Amitoj Singh, *Unpacking India's CBDC Pilots as Country Prepares for Digital Rupee*, COINDESK (Feb. 8, 2023), https://www.coindesk.com/policy/2023/02/08/unpacking-indias-cbdc-pilots-as-country-prepares-for-digital-rupee/ [https://perma.cc/8EM5-R3VK].

Reports also suggest that some CBDC experiments are "facing similar setbacks" with relatively low adoption by businesses and consumers.[108] Slower rates of adoption indicate that the success of CBDCs depends on their "functionality as a better and more stable medium of exchange" and their better performance.[109] Factors ranging from user inertia, switching costs, and, potentially, easier and more familiar private payment options may make user payment preferences sticky and preserve non-CBDC solutions. The traditional dimensions of money and relevant competition—where consumers move to currencies with more stable value against less stable and depreciating currencies[110]—now incorporate the resilience and design of technologies as relevant factors. CBDCs must be as close to perfection as possible to maintain the safety of public money and provide superior utility to consumers.

D. Regulatory Ambiguity

To top it off, it is also unclear if central banks have the power to issue CBDCs. As Federal Reserve Chairman Jerome Powell cautioned, for example, there likely needs to be a clear legal mandate that authorizes the Fed to issue a CBDC. [111] Section 16 of the Federal Reserve Act of 1913 allows the Federal Reserve to issue "Federal Reserve notes" without defining the nature of these "notes."[112] Historical interpretations[113] and other relevant statutes[114] largely favor the view that these Federal Reserve notes are limited to paper currency.[115] Further legal

108. Vagisha Srivastava, *The Curious Case of the Missing CBDC Users*, GA. INST. OF TECH. INTERNET GOVERNANCE PROJECT (Jan. 30, 2023), https://www.internetgovernance.org/2023/01/30/the-curious-case-of-the-missing-cbdc-users/ [https://perma.cc/7Y43-9TKG].

109. FOSTER ET AL., *supra* note 36, at 13; *e.g.*, Nicholas Anthony, *Nigerians' Rejection of Their CBDC Is a Cautionary Tale for Other Countries*, COINDESK (Mar. 6, 2023), https://www.coindesk.com/opinion/2023/03/06/nigerians-rejection-of-their-cbdc-is-a-cautionary-tale-for-other-countries/ [https://perma.cc/7N7J-SCXB]: *see also* Jookyung Ree, *Nigeria's eNaira, One Year After* 1 (Int'l Monetary Fund, Working Paper No. 104, 2023) ("Despite the laudable undisrupted operation for the first full year, the CBDC project has not yet moved beyond the initial wave of limited adoption.").

110. *See generally* FRIEDRICH A. HAYEK, THE DENATIONALISATION OF MONEY (1976) (contending that a competitive market for currencies would result in the emergence of stable, non-inflationary monetary systems, as consumers and businesses would gravitate towards currencies with a proven track record of maintaining purchasing power over time).

111. Michael S. Derby, *Powell Says Congressional Support Likely Needed to Adopt Fully Digital Dollar*, WALL ST. J. (Mar. 22, 2021), https://www.wsj.com/articles/powell-says-congressional-support-likely-needed-to-adopt-fully-digital-dollar-11616424452 [https://perma.cc/8GCS-C8QE]; FED. RSRV. SYS., MONEY AND PAYMENTS, *supra* note 73, at 3, 13.

112. 12 U.S.C. § 411 (2024).

113. By 1913, a range of paper notes and certificates were already in use, including United States Notes, National Bank Notes, Gold Certificates, Silver Certificates, and Treasury Coin Notes. Paige Pidano Paridon, *Legal Authority to Issue a U.S. Central Bank Digital Currency*, BANK POL'Y INST. (Jun. 9, 2021), https://bpi.com/legal-authority-to-issue-a-u-s-central-bank-digital-currency [https://perma.cc/YM3U-T42B].

114. Agricultural Adjustment Act of 1933, Pub. L. No. 73-10, § 43, 48 Stat. 31, 52 (1933); 31 C.F.R. § 1010.100(m) (2014) (the U.S. Treasury defines "currency" as "[t]he coin and paper money of the United States or of any other country that is designated as legal tender . . . [and] includes U.S. silver certificates, U.S. notes, and Federal Reserve notes.").

115. Paridon, *supra* note 113.

ambiguities arise concerning the compatibility of existing laws with CBDCs' legal tender status.[116] Some authors argue that designating CBDCs as legal tender would require governmental and private entities to recognize and accept the CBDCs for discharging obligations.[117]

These processes are slow and call for considerable preliminary research. The rapid technological change of the twenty-first century thus creates an innovation-induced paradox. On the one hand, traditional finance literature tells us that central banks issue trustworthy *public* money. On the other hand, there is no guarantee of a successful launch, better functionality, technological resilience, and legality of central banks' innovations. Finally, the possibility of inadequate implementation or design of CBDCs risks creating a number of distortions, some of which may be unforeseeable by slow-moving CBDC designers.

IV

THE PROS AND CONS OF STABLECOINS

A. A Brief History

As opposed to public money initiatives, private money, and relevant payment solutions and institutions develop more gradually through the process of experimentation, booms, and busts. Stablecoins—as digital assets issued and secured on blockchains and preferably backed by safe assets[118]—represent one of these gradual evolutionary developments.

Among cryptoassets, the first, of course, was Bitcoin. Bitcoin was issued in the wake of the global financial crisis of 2008 when the world witnessed the weaknesses in legacy financial institutions and regulatory systems. Technology

116. "United States coins and currency (including Federal reserve notes and circulating notes of Federal reserve banks and national banks) are legal tender for all debts, public charges, taxes, and dues." 31 U.S.C. § 5103 (2024); *cf.* Prates, *supra* note 88 ("The word 'including' hints that the list that follows is illustrative, allowing other currency formats to be legal tender.").

117. Raphael Auer et al., *Central Bank Digital Currencies: A New Tool in the Financial Inclusion Toolkit?*, BANK FOR INT'L SETTLEMENTS FSI INSIGHTS 1, 30–31 (Apr. 2022), https://www.bis.org/fsi/publ/insights41.pdf [https://perma.cc/6KZS-8EQA].

118. For a general discussion of stablecoins, *see*, *e.g.*, Dirk Bullmann et al., *In Search for Stability in Crypto-Assets: Are Stablecoins the Solution?*, EUR. CENT. BANK OCCASIONAL PAPER SERIES 1, 9–11 (Aug. 2019), https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op230~d57946be3b.en.pdf [https://perma.cc/SD3X-VLW3]; Louis Abraham & Dominique Guégan, *The Other Side of the Coin: Risks of the Libra Blockchain* 1, 6 (Dep't of Econ. Rsch., Working Paper No. 30, 2019), https://ssrn.com/abstract=3474237 [https://perma.cc/798K-MNEP] (unpublished manuscript) (on file with the Social Science Research Network) (arguing that "[t]he principal idea for creating a stable currency is to use [Milton Friedman's] Quantity Theory of Money to determine when and how to print and destroy money"). For a taxonomy of stablecoins, *see* Alexander Lipton et al., *Stablecoins*, *in* BUILDING THE NEW ECONOMY: DATA AS CAPITAL 285, 299–302 (Alex Pentland et al. eds., 2021); Eur. Cent. Bank Crypto-Assets Task Force, *Stablecoins: Implications for Monetary Policy, Financial Stability, Market Infrastructure and Payments, and Banking Supervision in the Euro Area* 7–8 (Eur. Cent. Bank Occasional Paper Series, Paper No. 247, 2020), https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op247~fe3df92991.en.pdf [https://perma.cc/VQV3-JKKR] (providing an overview of stablecoins' characterizations).

was soon used to create alternatives to intermediated finance and payment and investment ecosystems outside legacy banking institutions.[119]

Bitcoin's creator, Satoshi Nakamoto, initially aimed to emulate the functions of traditional money—that is, a unit of account, store of value, and medium of exchange— through a decentralized platform without the need for a third-party intermediary.[120] Although blockchain technology existed prior to the adoption of Bitcoin,[121] Bitcoin became the first successful application integrating blockchain—a form of DLT[122]—to develop a peer-to-peer transaction network using cryptographically encrypted assets.[123] Multiple cryptoassets were designed thereafter.[124]

Although Bitcoin sought to pave the way for a more decentralized financial system built on blockchains and executed via smart contracts,[125] these institutional and technological innovations and peer-to-peer payments soon exhibited volatility[126] and use complexity, among other problems.[127] Numerous

119. On the evolution of blockchain-enabled markets in securities and other assets, *see generally* Yuliya Guseva & Irena Hutton, *Regulatory Fragmentation: Investor Reaction to SEC and CFTC Enforcement in Crypto Markets*, 64 B.C. L. REV. 1555 (2023); Guseva, *supra* note 22.

120. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System 1 (Oct. 31, 2008), https://bitcoin.org/bitcoin.pdf [https://perma.cc/SQH2-P9M6] (unpublished manuscript) (on file with Bitcoin.org).

121. *See*, *e.g.,* Ron Karjian & Robert Sheldon, *A Timeline and History of Blockchain Technology*, TECHTARGET (Sept. 27, 2023), https://www.techtarget.com/whatis/feature/A-timeline-and-history-of-blockchain-technology [https://perma.cc/S384-CZQ2] (describing early experiments, such as David Chaum's digital cash in 1989, Stuart Haber and W. Scott Stornetta's work on timestamping digital documents in 1991, and their incorporation of Merkle Trees into the design as some early efforts concerning blockchain technology).

122. Angela Walch, *Deconstructing "Decentralization": Exploring the Core Claim of Crypto Systems*, *in* CRYPTOASSETS: LEGAL, REGULATORY, AND MONETARY PERSPECTIVES 39, 49 (Chris Brummer ed., 2019).

123. DLT is a distributed ledger technology, a combination of "protocols and supporting infrastructure that allows computers in different locations to propose and validate transactions and update records in a synchronised way across a network." Morten Linnemann Bech & Rodney Garatt, *Central Bank Cryptocurrencies*, 2017 BANK FOR INT'L SETTLEMENTS Q. REV. 55, 58; *see also* Dirk A. Zetzsche et al., *The Distributed Liability of Distributed Ledgers: Legal Risks of Blockchain*, 2018 U. ILL. L. REV. 1361, 1363 (describing blockchain as a type of DLT); Walch, *supra* note 122, at 41 (describing decentralization as the core feature of the blockchain technology).

124. *See* Yuliya Guseva*, A Conceptual Framework for Digital Asset Securities: Token and Coins as Debt and Equity*, 80 MD. L. REV. 166, 175 (2021) (describing the landscape of cryptoassets).

125. *See* Kevin Werbach & Nicolas Cornell, *Contracts Ex Machina*, 67 DUKE L.J. 313, 313 (2017) ("Smart contracts are self-executing digital transactions using decentralized cryptographic mechanisms for enforcement.").

126. Brahim Gaies et al., *Interactions Between Investors' Fear and Greed Sentiment and Bitcoin Prices*, 67 N. AM. J. ECON. & FIN, at 2 (describing Bitcoin's price volatility during and after the COVID-19 pandemic); Arturas Sabalionis et al., *What Affects the Price Movements in Bitcoin and Ethereum?*, 89 MANCHESTER SCH. 102, 102 (2021) (conducting an empirical study on the price movements in Bitcoin and Ethereum).

127. David Yermack, *Is Bitcoin a Real Currency? An Economic Appraisal*, *in* HANDBOOK OF DIGITAL CURRENCY: BITCOIN, INNOVATION, FINANCIAL INSTRUMENTS, AND BIG DATA 31, 31 (David Lee Kuo Chen ed., 2015) ("Bitcoin's daily exchange rates exhibit virtually zero correlation with widely used currencies and with gold, making bitcoin useless for risk management and exceedingly difficult for

intermediaries emerged to issue and enable the trading and exchange of cryptoassets.[128] This new market infrastructure is not as decentralized as the original founders had hoped. Some intermediaries engaged in fraud and misrepresented their business models[129] and financial stability,[130] and unsophisticated traders and consumers involved in markets that they did not understand got the short end of the stick.[131]

Some of these problems required regulatory intervention,[132] but private entrepreneurs, that driver of innovation, soon attempted to address the volatility concerns with the launch of stablecoins.[133] In a 2012 Whitepaper, J.R. Willett circulated the idea of stabilizing the value of cryptoassets.[134] Recall that a

its owners to hedge."); FOSTER ET AL., *supra* note 36, at 10 ("[B]ecause of [cryptoassets'] volatility, high transaction cost and low throughput, [they] lack[] the necessary characteristics to be an efficient medium of exchange.").

128. *See* Yadav et al., *supra* note 9, at 56 ("Innovations are emerging to assist in mimicking direct deposit type-payments for businesses, connecting users to accounts on crypto-exchanges that can receive stablecoin payments and then allow users to convert the token to cash."); Guseva, *supra* note 22, at 1292–93, 1304–17 ("[B]lockchain-enabled intermediaries—cryptoexchanges—have emerged to trade, broker, and settle transactions with digital assets, including native cryptoassets and other tokenized assets.").

129. Tom Schoenberg & Matt Robinson, *Tether Bank-Fraud Probe Gets Fresh Look by Justice Department*, BLOOMBERG (Oct. 31, 2022), https://www.bloomberg.com/news/articles/2022-10-31/tether-bank-fraud-probe-gets-fresh-look-by-justice-department [https://perma.cc/Z88W-R6KT]; PRESS RELEASE, COMMODITY FUTURES TRADING COMM'N, 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/8H4T-9TXP].

130. *See* TOMMASO MANCINI-GRIFFOLI ET AL., G20 NOTE ON THE MACROFINANCIAL IMPLICATIONS OF CRYPTO ASSETS, INT'L MONETARY FUND 3 (2023) (A widespread adoption of unbacked cryptoassets pose risks on macrofinancial stability and "comes with substantial risks to the effectiveness of monetary policy, exchange rate management, and capital flow management measures, as well as to fiscal sustainability."); FIN. STABILITY BD., ASSESSMENT OF RISKS TO FINANCIAL STABILITY FROM CRYPTO-ASSETS 6 (2022), https://www.fsb.org/wp-content/uploads/P160222.pdf [https://perma.cc/N4HH-BLST] ("Persistently high price volatility underlines the market risks associated crypto-asset investments.").

131. *See* Sangita Gazi, *Reimagining a Centralized Cryptocurrency Regulation in the U.S.: Looking Through the Lens of Cryptoderivatives*, 6 CAMBRIDGE L. REV. 97, 112–17 (2021) (discussing retail investors' risk to cryptocurrency spot market volatility); ORG. FOR ECON. COOP. & DEV., INSTITUTIONALISATION OF CRYPTO-ASSETS AND DEFI–TRADFI INTERCONNECTEDNESS, 34–36 (2022), https://www.oecd-ilibrary.org/deliver/5d9dddbe-en.pdf?itemId=%2Fcontent%2Fpaper%2F5d9dddbe-en&mimeType=pdf [https://perma.cc/SFW2-TNQ5] (describing the increased investor risks at the micro-level emerging from the interconnectedness between traditional markets and cryptoassets).

132. Guseva & Hutton, *supra* note 119, at 1556–57 (discussing enforcement actions and regulatory approaches).

133. Aleksander Berentsen & Fabian Sch. . .r, *Stablecoins: The Quest For a Low Volatility Cryptocurrency*, *in* THE ECONOMICS OF FINTECH AND DIGITAL CURRENCIES 65, 65 (Antonio Fatás ed., 2019), https://www.researchgate.net/publication/332464789_Stablecoins_The_quest_for_a_low-_volatility_cryptocurrency [https://perma.cc/GPG4-FDCB]; BANK FOR INT'L SETTLEMENTS, INVESTIGATING THE IMPACT OF GLOBAL STABLECOINS ii, 9 (2019), https://www.bis.org/cpmi/publ/d187.pdf [https://perma.cc/24R6-YBTG].

134. J. R. Willet, *MasterCoin—A Second-Generation Protocol on the Bitcoin Blockchain for Creating and Trading New Currencies*, GITHUB (2012), https://github.com/bitsblocks/mastercoin-whitepaper/blob/master/index.md [https://perma.cc/486R-C5TZ].

stablecoin is a digital asset designed to maintain stable value.[135] It aims to provide a reliable medium of exchange by maintaining a consistent parity—known as a "peg"—against the reference asset through a wide range of mechanisms.[136] The peg is maintained mainly through reserves of assets, which can be fiat currencies, Treasury securities, commodities, and other assets, including cryptoassets.[137]

The first experiments, however, exposed problems with securing stablecoins with cryptoassets or relying purely on algorithms. In 2014, Charles Hoskinson and Dan Larimer introduced the first ever stablecoin, BitUSD, backed by BitShare blockchain's token.[138] The same year, Jordan Lee launched an algorithm-backed stablecoin known as NuBits.[139] Both soon lost their pegs, triggering heavy criticism.[140]

In 2015, Tether (USDT) became the first-ever successful stablecoin backed mainly by real-world assets.[141] Tether's allegedly full reserves comprised a mix of cash, U.S. Treasury bills, commercial paper, corporate bonds, and other assets. Unfortunately, Tether soon became an enforcement target for the New York Attorney General and the Commodity Futures Trading Commission (CFTC) for misrepresenting its reserves and commingling assets within its affiliated

135. Anastasia Melachrinos & Christian Pfister, *Stablecoins: A Brave New World?*, 4 STAN. J. BLOCKCHAIN L. & POL'Y 264, 265 (2021); Bullmann et al., *supra* note 118, at 3, 11.

136. *See*, *e.g.,* Bruce et al., *supra* note 8, at 1115–20 (describing a variety of stabilization mechanisms and connections between different stablecoins and assets).

137. *See* Robert Stevens, *What Are "Fully Backed" Reserves?*, COINDESK (Nov. 23, 2022), https://www.coindesk.com/learn/what-are-fully-backed-reserves/ [https://perma.cc/4TQV-XZNR] (reviewing what constitutes stablecoins' reserve assets and explaining examples of a "fully-backed" stablecoin). However, "[t]he composition and allocation of reserves are often opaque, elevating risks of conflict of interest between issuers and custodians and of misappropriation of reserve assets." Bains et al., *supra* note 35, at 20.

138. BitUSD is collateralized by BitShare's native token, BTS. Joakim Kristiansen, *The Rise and Fall of the First Stablecoins—BitUSD and NuBits*, MEDIUM (Nov. 4, 2022), https://medium.com/@yakhat86/the-rise-and-fall-of-the-first-stablecoins-bitusd-and-nubits-1efc020a7ae8 [https://perma.cc/NG5Y-67DT]. For the BitUSD white paper, see generally Daniel Larimer et al*., BitShares: A Peer-to-Peer Polymorphic Digital Asset Exchange (P2P-PDAE)*, BITMEX (2013), https://blog.bitmex.com/wp-content/uploads/2018/06/173481633-BitShares-White-Paper.pdf [https://perma.cc/M9EW-GVL8] (explaining the Bitshares protocol and Polymorphic Digital Asset (PDA) product).

139. The stabilization mechanism of NuBits was governed by a Seigniorage system—"an uncollateralized, algorithmically backed approach" to manage NuBits' price stability. Kristiansen, *supra* note 138. For the NuBits white paper, *see generally* Jordan Lee, Nu*,* NUBITS 1 (2014), https://blog.bitmex.com/wp-content/uploads/2018/06/NuWhitepaper.pdf [https://perma.cc/986K-9SNK] (explaining the operational and stabilization mechanisms of NuBits).

140. For a detailed account of how BitUSD and NuBits failed, *see* BITMEX, *A Brief History of Stablecoins (Part 1)* (Jul. 2, 2018), https://blog.bitmex.com/a-brief-history-of-stablecoins-part-1/ [https://perma.cc/5X4F-2H95] (describing that although they briefly peaked, both BitUSD and NuBits failed due to design flaws that failed to protect the cryptoassets from the price volatility).

141. *See* Coryanne Hicks & Farran Powell, *What Is Tether? How Does It Work?*, FORBES (May 4, 2023), https://www.forbes.com/advisor/in/investing/cryptocurrency/what-is-tether-usdt/ [https://perma.cc/RL5N-C43K] (describing Tether's operational mechanisms and stabilization methods, along with the composition of its reserve assets).

entities.[142] Following the enforcement actions, Tether became more transparent in its disclosure policies and began to report reserves.[143] Sometime after Tether's launch, Circle issued USDC, another stablecoin.[144] As of this writing, Tether and USDC are the largest stablecoins by market capitalization in the total market of $213 billion.[145]

Other financial firms built off these experiments and even collaborated with blockchain-focused and stablecoin firms.[146] In 2021, Visa pioneered a payment network settling transactions in stablecoins through its partnership with Anchorage—"the first federally chartered digital-asset bank."[147] Soon thereafter, Mastercard joined Visa by extending its Crypto Card Program[148] to offer "conversion of crypto to fiat through fiat-backed stablecoins."[149] More recently, PayPal, that behemoth of e-money payment platforms, launched PayPal USD. Issued by Paxos Trust Company, PayPal USD is "100% backed by US dollar deposits, short-term US treasuries, and similar cash equivalents" and "redeemed 1:1 for US dollar."[150]

In sum, the issuers of stablecoins have designed them with the explicit purpose of ensuring stable value. Scholars, moreover, were quick to observe that the combination of stable value and reliance on digital-asset technology may generate other crucial benefits in response to the problems discussed in Part I—

142. COMMODITY FUTURES TRADING COMM'N, *supra* note 129; Ryan Browne, *Cryptocurrency Firms Tether and Bitfinex Agree to Pay $18.5 Million Fine to End New York Probe*, CNBC (Feb. 23, 2021), https://www.cnbc.com/2021/02/23/tether-bitfinex-reach-settlement-with-new-york-attorney-general.html [https://perma.cc/94LS-6AP7].

143. Krisztian Sandor, *Tether Reports $3.2B Excess Reserves, But Lags in Reducing Secured Loans*, COINDESK (Oct. 31, 2023), https://www.coindesk.com/business/2023/10/31/tether-reports-32b-excess-reserves-but-lags-in-reducing-secured-loans/ [https://perma.cc/D3R7-SWYG].

144. For an explanation of how USDC operate, *see* Nathan Crooks, *What Is USDC and How Does It Work? A Guide to Circle's Stablecoin*, THE BLOCK (Oct. 21, 2023), https://www.theblock.co/learn/251863/what-is-usdc-and-how-does-it-work-a-guide-to-circles-stablecoin [https://perma.cc/PPQ4-S8SN].

145. *Top Stablecoin Tokens by Market Capitalization*, COINMARKETCAP, https://coinmarketcap.com/view/stablecoin/ [https://perma.cc/GQR4-F646] (last visited Dec. 25, 2024).

146. *See generally* David L. Portilla et al., *Blockchain in the Banking Sector: A Review of the Landscape and Opportunities*, HARV. L. SCH. FOR. CORP. GOV. (Jan. 28, 2022), https://corpgov.law.harvard.edu/2022/01/28/blockchain-in-the-banking-sector-a-review-of-the-landscape-and-opportunities/ [https://perma.cc/R2KQ-332F] (highlighting the opportunities for banks in utilizing blockchain technology, including J.P. Morgan's Link).

147. Emily Mason, *Despite Regulatory Scrutiny of Stablecoins, Mastercard Joins Visa in Offering Crypto-Friendly Payment Services*, FORBES (Jul. 20, 2021), https://www.forbes.com/sites/emilymason/2021/07/20/despite-regulator-skepticism-mastercard-steps-up-to-compete-with-visa-on-stablecoin-payments/?sh=4aec457c6f64 [https://perma.cc/94KG-3RZW].

148. *Crypto Card Program: Enabling Consumers to Use Crypto Cards for Purchases*, MASTERCARD, https://www.mastercard.com/global/en/business/issuers/crypto/card-program.html [https://perma.cc/PQ7J-AWZ6] (last visited Jan. 16, 2024).

149. *Mastercard Creates Simplified Payments Card Offering from Cryptocurrency Companies*, MASTERCARD (Jul. 20, 2021), https://www.mastercard.com/news/press/2021/july/mastercard-creates-simplified-payments-card-offering-for-cryptocurrency-companies/ [https://perma.cc/ER5D-KTGR].

150. *PayPal Launches U.S. Dollar Stablecoin*, PAYPAL (Aug. 7, 2023), https://newsroom.paypal-corp.com/2023-08-07-PayPal-Launches-U-S-Dollar-Stablecoin [https://perma.cc/45JA-8Q8Z].

financial inclusion and faster processing and settlement time of payments, particularly across borders.[151]

B. The Risks of Stablecoins

Despite the purported benefits, international and national policymakers have long eyed stablecoin arrangements with suspicion.[152] In particular, Facebook's proposal to launch stablecoin Diem—previously known as "Libra"—captured the attention of regulators worldwide.[153] Regulators believed Diem posed a critical risk of creating a parallel economy and an alternative monetary instrument with a large user base across a range of payment services.[154] With Facebook's global reach, its stablecoin could even threaten the sovereignty of money and the monetary policies of individual states.[155] In general, global stablecoins were thought to threaten the nation-states' monetary sovereignty and financial stability and challenge countries' efforts to counter money laundering

151. *See*, *e.g.*, David Murakami & Ganesh Viswanath-Nataraj, Cryptocurrencies in Emerging Markets: A Stablecoin Solution 2–3 (Sept. 21, 2024), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3949012 [https://perma.cc/AR5L-KGV8] (unpublished manuscript) (on file with the Social Science Research Network) (discussing the benefits for the unbanked population); ESWAR PRASAD, THE FUTURE OF MONEY: HOW THE DIGITAL REVOLUTION IS TRANSFORMING CURRENCIES AND FINANCE 197–200 (2021) (showing that the advent of technology and innovation in money could be significant in increasing financial inclusion); Tobias Adrian & Tommaso Mancini-Griffoli, *Digital Currencies: The Rise of Stablecoins*, IMF BLOG (Sept. 19, 2019), https://www.imf.org/en/Blogs/Articles/2019/09/19/blog-digital-currencies-the-rise-of-stablecoins [https://perma.cc/86BA-VWZN] ("The adoption of new, digital payment methods could bring significant benefits to customers and society: improved efficiency, greater competition, broader financial inclusion, and more innovation."); Brandon Zemp, *The Power of Stablecoins – Enabling Fast and Efficient Cross-Border Transactions*, FORBES (Apr. 5, 2023), https://www.forbes.com/sites/forbesbooksauthors/2023/04/05/the-power-of-stablecoinsenabling-fast-and-efficient-cross-border-transactions/?sh=6a8ff87847c3 [https://perma.cc/E8DZ-LKMF] (discussing transparency and speed of stablecoin transactions).

152. *See*, *e.g.*, YULIYA GUSEVA & CAROL GOFORTH, REGULATION OF CRYPTOASSETS 572–74 (W. Acad. Publ'g 2022).

153. Diem is an asset-backed stablecoin to be developed on a permissioned blockchain managed by an independent association and pegged to a basket of assets comprising various international currencies and bonds. DIEM, https://www.diem.com/en-us/ [https://perma.cc/SWC7-T5E7] (last visited Jan. 16, 2024).

154. Didenko et al., *supra* note 39, at 17–18; Arner et al., *supra* note 35, at 2.

155. J.P. Koning, *Does Libra Threaten Monetary Sovereignty?*, AM. INST. FOR ECON. RSCH. (Sept. 19, 2019), https://www.aier.org/article/does-libra-threaten-monetary-sovereignty/ [https://perma.cc/RN6P-H9ZK]; Bruno Le Marie, *Facebook's Libra Is A Threat to National Sovereignty*, FIN. TIMES (Oct. 17, 2019), https://www.ft.com/content/bf2f588e-ef63-11e9-a55a-30afa498db1b [https://perma.cc/3JD4-ECGP]; *See also* Antonio Diez de los Rios & Yu Zhu, *CBDC and Monetary Sovereignty*, BANK OF CAN. STAFF ANALYTICAL NOTES, https://www.bankofcanada.ca/2020/02/staff-analytical-note-2020-5/ [https://perma.cc/N279-Y8RM] (2020) (explaining that if "financial institutions substitute the central bank currency with a private digital currency like Libra," the central bank's capacity as "lender of last resort" could be reduced). Eventually, Facebook repackaged Libra, and then halted the initiative complete in September of 2023. Elizabeth Napolitano, *Meta to Shutter Novi Crypto Payments Wallet in September, Ending Libra Saga*, COINDESK (May 11, 2023), https://www.coindesk.com/business/2022/07/01/meta-to-shutter-novi-crypto-payments-wallet-in-september-ending-libra-saga/ [https://perma.cc/E4XD-E8GS].

and terrorist financing.[156] The major standard-setting bodies also became concerned with "cryptoization"[157] and "dollarization"[158] of markets as additional levers undermining states' sovereignty and monetary policies.[159]

In 2023, the IMF and FSB presented a particularly critical report warning against the risks of cryptoassets, including stablecoins.[160] Among other issues, the report observed that monetary policy could be undermined "if firms and households prefer to save and invest in crypto-assets that are not pegged to the domestic fiat currency or to use them as payment instruments."[161] Currency substitution may thus occur when local currencies are unstable. Public taxes "could be at risk," too.[162] In addition, "[t]raditional financial risks—market, liquidity and credit risks—may be more acute and complex in a stablecoin arrangement depending on . . . the choice and management of the stablecoin reserve assets."[163] These disruptors could "quickly scale and . . . pose specific risks to financial stability if they were to enter the mainstream of the financial system in multiple jurisdictions or if they are broadly adopted as payment instruments."[164] Finally, the IMF and FSB reiterated that stablecoins could threaten "monetary sovereignty and stability."[165]

In addition to these risks to state policies, stablecoins may be susceptible to the risks that banks face.[166] When trust in a bank deteriorates, a run on the bank may start as depositors rush to withdraw their money.[167] FDIC insurance provides an assurance that bank depositors would be made whole, but a stablecoin firm does not have similar coverage. Instead, it must rely on the sufficiency and quality of its reserves or its balance sheet.

In Facebook's case, its deep pockets could have given comfort to holders of Diem and prevented or slowed down a possible run on Diem. In other words, the implicit guarantee of Facebook's balance sheet could have made its stablecoin a more stable and more legitimate form of currency with a higher convenience yield. The trust in and reputation of a stablecoin issuer would have played an

156. G7 Working Group on Stablecoins, *supra* note 133, at iii, 2, 14.

157. FIN. STABILITY BD. & INT'L MONETARY FUND, *supra* note 38, at 5.

158. FOSTER ET AL., *supra* note 36, at 11.

159. *Id.* (stating that small economies are particularly at risk).

160. FIN. STABILITY BD. & INT'L MONETARY FUND, *supra* note 38, at 1–2.

161. *Id*. at 5.

162. *Id*. at 6.

163. *Id*. at 11.

164. *Id*.

165. *Id*. at 17.

166. *See* Kenechukwu Anadu et al., *Runs and Flights to Safety: Are Stablecoins the New Money Market Funds?* 1–2 (Fed. Rsrv. Bank of N.Y., Working Paper No. 1073, 2023), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr1073.pdf?sc_lang=en [https://perma.cc/9VP8-EPPX] (discussing runs on various stablecoins, including the one following the failure of Silicon Valley Bank in March 2023).

167. Gorton & Zhang, *supra* note 25, at 912.

important role in popularizing its stablecoins as a form of safe private money.[168]

In this sense, Facebook's project would not be unique. As Gary Gorton and Jeffery Zhang suggested, "Big Tech firms like Google, Apple, Facebook, and Microsoft . . . have significant resources and could be viewed as implicitly guaranteeing their stablecoins. This implicit guarantee could support a tremendous amount of stablecoins in circulation—a money supply that could not be controlled by the central bank."[169]

These non-bank-issued forms of private money and unregulated payments systems could receive both a wide user base and an appearance of legitimacy. In an extreme hypothetical scenario, the Fed might even need to bail out Apple if there were a run on Apple's systemically important stablecoin. Indeed, given the interconnectedness of financial institutions and possible systemic risk implications of stablecoins, it is plausible that the government might need to step in. This is precisely what the federal government did in 2008 and 2020 when MMFs (which some stablecoin arrangements imitate) faced runs.[170] Ex ante regulatory guardrails are needed to make sure these odd scenarios—i.e., the Fed bailing out commercial firms—remain hypothetical and to promote efficient innovation within our multifaceted public-private monetary and payment systems.

Various segments of our financial system are closely connected, and troubles in one area may spill over into others, exhibiting "the three Cs: connectedness, contagion, and correlation."[171] These vectors of risks are multidirectional and must be understood as stablecoin issuers begin to interact with the banking system. Recent developments demonstrate, however, that the directionality of risk is unclear. Consider the following example.

In a potent critique of crypto, Professor Arthur Wilmarth connected the fall of Silvergate Bank, Signature, and Silicon Valley Bank (SVB) to the risks of dealing with crypto businesses, among others.[172] But, an argument can be made that the banks' failures were the banks' own fault,[173] and not that of crypto firms.

168. *See generally* Jamie Morgan, *Systemic Stablecoin and the Brave New World of Digital Money*, 47 CAMBRIDGE J. ECON. 215, 231 (2023) ("Issuing a stablecoin represents a business opportunity to large corporations . . . If potential customers can be persuaded to adopt a stablecoin then they are also being encouraged to have available a wallet of corporate money.").

169. Gorton & Zhang, *supra* note 25, at 961.

170. *Id*. at 938–39.

171. Hal S. Scott, *How to Improve Five Important Areas of Financial Regulation*, *in* KAUFFMAN TASK FORCE ON L., INNOVATION, & GROWTH, RULES FOR GROWTH: PROMOTING INNOVATION AND GROWTH THROUGH LEGAL REFORM 113, 114 (2011).

172. Wilmarth, *supra* note 31, at 272. For specific accounts of the banks' exposure to cryptoassets, *see Crypto Crash: Why Financial System Safeguards are Needed for Digital Assets: Hearing Before the S. Comm. on Banking, Hous. & Urb. Affs.*, 118th Cong. 17 (2023) (statement of Lee Reiners, Policy Director, Duke Financial Economics Center, Duke University) (describing that ninety percent of Silvergate, Moonstone, and Silvergate's overall deposit base came from crypto-related corporate clients, "leaving the bank highly exposed to a volatile sector. This risk became manifest post-FTX's collapse when the bank experienced $8.1 billion in deposit outflows during the fourth quarter of 2022, more than 60% of its total deposits." (citations omitted)).

173. Willmarth, *supra* note 31 at notes 245, 263.

Depositors, including some crypto firms, wisely withdrew their deposits when the banks disclosed their precarious financial positions. Consider also that stablecoin issuers did not undermine SVB, but Circle lost its peg for USDC because it could not access its $3.3 billion of reserves deposited with SVB[174] due to SVB's negligent banking behavior. In the end, the FDIC expanded its safety net to cover unsecured depositors of the failed banks. Combined with the Fed's loans, these actions allegedly saved USDC when SVB failed.[175]

These examples demonstrate that, on the one hand, without better regulatory frameworks, responsible and transparent stablecoin issuers, which place their reserves for safekeeping within the regulated financial sector, may expose themselves to risks. On the other hand, without proper guardrails, under-regulated stablecoins may produce a ripple effect throughout the regulated financial industry. The end result remains the same in either case: there is a need for regulation.

C. A Regulatory Perspective

Existing regulatory initiatives, such as the new framework in the European Union, address some of these risks and are structured around shared characteristics of stablecoins. The first is their reliance on technology—such as smart contracts that eliminate the need for a "trusted party in their operation"[176]—and the involvement of intermediaries providing asset custody, reserve management, and other services.[177] The second feature is that every arrangement has a stabilization mechanism to maintain the coin's stable value.[178] The third common characteristic is their simultaneous reliance on free trading to maintain their value.[179] The value of a stablecoin hinges upon users' trust that "the stablecoin units will return to par value."[180]

Note that some stablecoins do not guarantee a user's redemption rights at par value, and obligations and rights depend on the contractual language and terms of service.[181] Commentators have emphasized that "stablecoin holders [might] or [might] not have a redemption right against the issuer or direct claim on the reserve assets."[182]

The European Union is addressing these discrepancies, bringing uniformity into stablecoin arrangements. Its Markets in Crypto-Assets Regulation (MiCA) has classified stablecoins into asset-referenced tokens—"purport[ing] to maintain a stable value by referring to the value of several fiat currencies that are

174. *Id.* at 252.

175. *Id.* at 288–92.

176. Bullmann et al., *supra* note 118, at 11.

177. These are the typical features of stablecoins designed, issued, and operated by centralized firms.

178. FIN. STABILITY BD., *supra* note 35, at 9–10.

179. Bruce et al. emphasize that issuers themselves can operate as arbitrageurs and market-makers, introducing a measure of risk into this market. Bruce et al., *supra* note 8, at 20–21.

180. Bullmann et al., *supra* note 118, at 11.

181. For instance, when stablecoin loses its parity with the reference asset.

182. FIN. STABILITY BD., *supra* note 35, at 10.

legal tender, one or several commodities or one or several crypto-assets, or a combination of such assets"[183]—and "e-money tokens"—"a type of crypto-asset the main purpose of which is to be used as a means of exchange and that purports to maintain a stable value by referring to the value of a fiat currency that is legal tender."[184] The European Union has also developed rules for public offerings of asset-referenced and e-money tokens,[185] disclosure requirements,[186] reserves,[187] custody procedures,[188] and redemption rights.[189] Legacy financial institutions and newly licensed entities will be able to operate in the newly regulated stablecoin space.[190]

In contrast to the European Union, there is no definitive legal status of stablecoins and stablecoin arrangements in the United States as yet.[191] Several courts have suggested that cryptocurrencies are commodities within the definition of the Commodity Exchange Act (CEA),[192] and the Commodity Futures Trading Commission has long proceeded on this assumption. For example, it brought an enforcement action against the issuers of Tether, the largest international stablecoin, for violating the antifraud provisions of the CEA.[193] The Chair of the Securities and Exchange Commission (SEC) has suggested that some stablecoins may be securities,[194] and the SEC tested its theory through enforcement actions. For example, in the complaint filed against

183. *Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-Assets and Amending Directive (EU) 2019/1937*, COM (2020) 593 FINAL tit. 1, art. 3.1(3) (Sept. 24, 2020).

184. *Id.* tit. 1, art. 3.1(4).

185. *Id.* tit. 3, arts. 16–17. E-money tokens need to be authorized under the E-Money Directive. *Id.* at art. 12.

186. *Id.* tit. 3, arts. 23–26; *id.* tit. 4, art. 47 (e-money tokens), tit. 5, art. 54.

187. *Id.* tit. 3, arts. 31–32.

188. *Id.* tit 3, art. 33.

189. *Id.* tit 3, art. 35.

190. Bill Lumley, *MiCA: What Does it Mean for Banks?*, THE BANKER (May 10, 2023), https://www.thebanker.com/MiCA-what-does-it-mean-for-banks-1683718292 [https://perma.cc/DT9P-2MXG].

191. *See supra* note 44 (referencing the new GENIUS Act of 2025). For a series of prior regulatory initiatives, *see* Eytan J. Fisch et al., *Federal Regulators Move To Regulate Stablecoins Through Banking Laws Plus New Legislation*, SKADDEN (Nov. 16, 2021), https://www.skadden.com/-/media/files/publications/2021/11/recent-developments-in-the-regulation-of-virtual-assets/federal_regulators_move_to_regulate_stablecoins_through_banking_laws_plus_new_legislation.pdf?rev=baeb77ff616643a59b4811139ba476a5 [https://perma.cc/48HQ-6XT2].

192. CFTC v. McDonnell, 287 F. Supp. 3d 213, 228–29 (E.D.N.Y. 2018). *See also* 7 U.S.C. § 1a(9) (2024); Press Release, Commodity Futures Trading Comm'n, Federal Court Finds that Virtual Currencies Are Commodities (Oct. 3, 2018), https://www.cftc.gov/PressRoom/PressReleases/7820-18 [https://perma.cc/7V73-C93B].

193. Press Release, COMMODITY FUTURES TRADING COMM'N, *supra* note 129; Guseva & Hutton, *supra* note 119, at 1579.

194. Gary Gensler, Chairman, Sec. & Exch. Comm'n, Prepared Remarks of Gary Gensler On Crypto Markets Penn Law Capital Markets Association Annual Conference (Apr. 4, 2022), https://www.sec.gov/news/speech/gensler-remarks-crypto-markets-040422 [https://perma.cc/BYF7-WXTS]; Nikhilesh De, *SEC Chair Hints Some Stablecoins Are Securities*, COINDESK (Sept. 14, 2021), https://www.coindesk.com/markets/2021/07/21/sec-chair-hints-some-stablecoins-are-securities/ [https://perma.cc/H5YQ-YYVH].

a major trading platform for cryptoassets, Binance, the SEC claimed in part that the stablecoins at issue were securities but was unable to present the court with sufficient allegations supporting this claim.[195]

The President's Working Group on Financial Markets took an even broader view and suggested that "depending on their structure, stablecoins, or certain parts of stablecoin arrangements, may be securities, commodities, and/or derivatives."[196] Finally, stablecoin arrangements may function like liquidity providers and resemble payment platforms, banks providing deposits, and MMFs.[197] The United States has yet to pass a clarifying reform applying to these assets. Numerous bills have been introduced over the years, but none of them have gained sufficient support to become law as of this writing.[198]

To conclude, stablecoins represent a promising technology for addressing several major financial policy and payment problems, but also pose risks. Although private firms issuing these cryptoassets grow fast, innovate promptly, and operate across borders, regulatory efforts are lagging behind private innovation, particularly in the United States.

195. SEC v. Binance Holdings Ltd., 2024 WL 3225974, at *25 (D.D.C. 2024). *See also* Press Release, Sec. & Exch. Comm'n, SEC Files Thirteen Charges Against Binance Entities and Founder Changpeng Zhao (June 5, 2023), https://www.sec.gov/news/press-release/2023-101 [https://perma.cc/SUD5-DPPK] (informing the public about the SEC enforcement action against Binance).

196. PRESIDENT'S WORKING GRP. ON FIN. MKTS., THE FED. DEPOSIT INS. CORP., AND THE OFF. OF THE COMPTROLLER OF THE CURRENCY, *supra* note 31, at 11.

197. For a sample of the rich scholarship on regulatory challenges and deposit-taking, *see*, *e.g.*, Jonathan R. Macey & Geoffrey P. Miller, *Nondeposit Deposits and the Future of Bank Regulation*, 91 MICH. L. REV. 237, 245 (1992); Awrey, *Unbundling Banking*, *supra* note 6, at 777–78 ("Simultaneously, by expanding the definition of a 'deposit' for the purpose of federal banking law, this blueprint would help ensure that functionally equivalent products and services did not emerge just outside this expanded regulatory perimeter."); Wilmarth, *supra* note 31, at 243 ("Allowing nonbanks or uninsured depository institutions to issue or distribute [stablecoins or tokenized deposits] would jeopardize the safety and stability of our banking and payment systems and pose great risks to persons who entrust their funds to those institutions."); Anadu et al., *supra* note 166, at 1; Gorton & Zhang, *supra* note 25, at 922.

198. *See*, *e.g.*, The GENIUS Act of 2025, *supra* note 44; Managed Stablecoins are Securities Act of 2019, H.R. 5197, 116th Cong. (2019) (seeking to "establish the treatment of managed stablecoins under the securities laws"); Crypto-Currency Act of 2020, H.R. 6154, 116th Cong. (2020) (seeking to "clarify which federal agencies regulate digital assets to require those agencies to notify the public of any Federal licenses, certifications, or registrations required to create or trade in such assets"); Stablecoin Classification and Regulation Act of 2020, H.R. 8827, 116th Cong. (2020) (seeking to "amend the Federal Deposit Insurance Act to provide for the classification and regulation of stablecoins"); Digital Asset Market Structure and Investor Protection Act, H.R. 4741, 117th Cong. (2021) (seeking to "provide for the regulation of digital assets"); Ensuring Responsible Development of Digital Assets, Exec. Order No. 14067, 87 Fed. Reg. 14143 (Mar. 14, 2022) (establishing policy objectives for developing guidelines for digital assets and cross-border transfers and defining "stablecoin"); Stablecoin Transparency Act, S. 3970, 117th Cong. (2022) (seeking to "establish reporting requirements for issuers of fiat currency-backed stablecoins, and for other purposes"); Lummis-Gillibrand Responsible Financial Innovation Act, S. 4356, 117th Cong. (2022) (seeking to "provide for responsible financial innovation and to bring digital assets within the regulatory perimeter"); Stablecoin TRUST Act of 2022, S. 5340, 117th Cong. (2022) (seeking to provide a regulatory framework and consumer protections for issuing payment stablecoins).

V

THE SOURCES OF INNOVATION

A. Banks as a Source of Innovation

This Article's previous Parts have demonstrated that there are two forms of money—private and public—which are provided and transferred through a combination of private and public institutions. They also suggested that the changing technology and the need to improve efficiencies and financial inclusion challenge the status quo in novel ways, which can be addressed through financial innovation. To date, however, private digital-asset innovation, such as stablecoins attempting to address these challenges, is not adequately regulated, while public digital innovation is somewhat slow and uncertain.

These three threads lead us to explore which players in the public-private money space are best positioned to innovate in the first place. Is it banks—the safe, private money and payment institutions? Is it stablecoin issuers—the under-regulated private money and payment systems? Or is it the Fed—the public money? We have already addressed the problems associated with launching CBDCs.[199] In this Part, we focus on private banks and stablecoin issuers.

We start our analysis with banks. Can banks innovate in an optimal manner to resolve the inefficiencies and financial inclusion concerns? Under normal circumstances, a firm should innovate in order to survive and remain profitable. Following Schumpeter's intuition, large firms, such as banks, should have the capacity to innovate at scale[200] because they have better resources, expertise, and knowledge to begin with. But do banks have the right incentives and ability to adopt technologies that may disrupt their preexisting businesses?

The reality of banking and bank regulation is that these financial firms are nestled in a protected circumference of the law and have unique access to the Fed,[201] suggesting that their incentives to innovate quickly to ward off competitors may be weak. The very structure of the U.S. banking system erects protective barriers around banks. A small fraction of the largest U.S. banks

199. *See supra* Part III.

200. *See generally* JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY (3d ed., Harper Perennial Modern Thought 2008) (1950) (introducing the theory of "creative destruction"—the innovations and advancements that replace the old systems lead to improved productivity, increased efficiency, and often, entirely new industries and opportunities).

201. New entrants with innovative business models have a difficult time accessing the Fed's services (for instance, master account services). *See* Cheyenne Ligon & Jesse Hamilton, *Federal Reserve Says Custodia's Plans Would Endanger Itself and the Crypto Industry*, COINDESK (Mar. 24, 2023), https://www.coindesk.com/policy/2023/03/24/federal-reserve-says-custodias-crypto-focused-business-model-is-inconsistent-with-approval/ [https://perma.cc/5TDE-M2RE] (explaining that despite Custodia's sufficient capital and resources, the Fed denied its application for the Fed's membership). Custodia challenged the Fed's decision in court. Kevin Reynolds, *Custodia's Suit Against Fed Over Denial of Master Account Can Proceed, Court Rules*, COINDESK (June 12, 2023), https://www.coindesk.com/business/2023/06/10/custodias-suit-against-fed-over-denial-of-master-account-can-proceed-court-rules [https://perma.cc/3CL8-7476]. For the ruling on Custodia's challenge, *see* Custodia Bank, Inc. v. Fed. Reserve Bd. of Governors, 640 F. Supp. 3d 1169, 1176–77 (D. Wyo. 2022).

controls the majority of payments and deposits in the country,[202] which makes these banks doubly protected from external competition by both law and their too-big-to-fail status. Moreover, banks are heavily regulated, which may limit opportunities for radical innovation.[203]

Next, if we apply Clayton Christensen's framework to established and conservative firms such as banks, it becomes clear that they should be slower to innovate and abandon old approaches and products in the face of disruptive technologies, thus losing to nimbler, younger, and smaller entrants.[204] This combination of regulatory constraints, skewed incentives, and the poor ability to adapt suggests that some banks may engage in technological innovation to improve their services,[205] while many others may not.[206]

B. Bank Regulation and Innovation

In theory, law is an essential precondition for an innovative, entrepreneurial economy and may encourage banks to innovate.[207] Unfortunately, U.S. bank regulators confronted new technologies in a way best summarized by Gillian Hadfield as follows:

> [T]he [21st century] environment in which our regulatory efforts must operate is characterized by high levels of complexity and rapid change. This puts great pressure on the capacity of deliberative central planning to generate the structural and regulatory rules necessary to coax the results we want out of decentralized agents.[208]

Faced with the inexorable economic complexity, regulators seem to have focused on preserving the current system centered on banks. Thus, the Office of the Comptroller of the Currency (OCC) permitted national banks to use DLT and issue and transact in stablecoins_provided that a bank demonstrated compliance with regulatory safeguards and operated in a safe and sound manner—as early as 2021.[209] In its interpretative letter, the OCC seemed to

202. Awrey, *Unbundling Banking*, *supra* note 6, at 737 ("[L]ess than 1% of all licensed deposit-taking institutions—accounted for roughly 75% of the total volume of payments between banks.").

203. *See infra* Part V(B).

204. *See generally* CLAYTON M. CHRISTENSEN, THE INNOVATOR'S DILEMMA: WHEN NEW TECHNOLOGIES CAUSE GREAT FIRMS TO FAIL (Harvard Bus. Sch. Press 1997).

205. For example, J.P. Morgan introduced JPM Coin allowing its corporate clients to make "programmable, real-time, multi-currency payments" on a shared DLT ledger. *Onyx by J.P. Morgan: About Coin Systems*, J.P. MORGAN, https://www.jpmorgan.com/onyx/coin-system [https://perma.cc/8HUN-CZH5] (last visited Jan. 16, 2024).

206. Most banks prefer "riskless" innovation. Ron Shevlin, *Banks Don't Have to Innovate*, FORBES (Dec. 16, 2020), https://www.forbes.com/sites/ronshevlin/2020/09/14/banks-dont-have-to-innovate/ [https://perma.cc/65DE-SU9K].

207. WILLIAM J. BAUMOL ET AL., GOOD CAPITALISM, BAD CAPITALISM, AND THE ECONOMICS OF GROWTH AND PROSPERITY 7–8 (Yale Univ. Press 2007).

208. Gillian K. Hadfield, *Producing Law for Innovation*, *in* KAUFFMAN TASK FORCE ON L., INNOVATION, & GROWTH, RULES FOR GROWTH: PROMOTING INNOVATION AND GROWTH THROUGH LEGAL REFORM 23, 25 (2011); *see also* Gillian K. Hadfield, *Legal Barriers to Innovation: The Growing Economic Cost of Professional Control Over Corporate Legal Markets*, 60 STAN. L. REV. 1689, 1717 (2008).

209. OFFICE OF THE COMPTROLLER OF THE CURRENCY, OCC INTERPRETIVE LETTER NO. 1174, at

acknowledge a close relationship between sovereign currencies and stablecoins and even suggested that "[t]he use of stablecoins to facilitate payments allows banks to capture the advantages that [independent node verification networks] may present in a manner that retains the stability of fiat currency."[210]

The Fed followed suit in August 2023 by allowing state member banks—which are not regulated by the OCC—to engage in permitted stablecoin activities. To do so, "a state member bank should receive a written notification of supervisory nonobjection from the Federal Reserve."[211] In their review, the supervisory authorities are required to focus on relevant operational, cybersecurity, liquidity, illicit finance, consumer compliance, and other risks of proposed arrangements.[212]

Theoretically, these policy positions aim to promote bank innovation, but they also entrench the position of banks as the backbone of the U.S. payment system. Banks are already the foundational pillars of our financial system, producing the safe private money, providing various financial services, and having "direct access to the U.S. payment system"[213] and the federal safety net.[214] The foregoing steps by the OCC and the Fed, permitting banks to engage with cryptoassets, may further tip the scales in favor of banks. Their stablecoins could become a form of *good* bank-generated private money but without any cardinal reform.[215]

The desire of bank regulators to preserve their regulatory remit without principal change may be understandable. Yet channeling financial innovation through banks raises the discussed incentives concerns. Feeling safe and protected in their bailiwick, banks may innovate sub-optimally. Even when the regulators offer an opportunity to innovate, banks may face Christensen's

6 (Jan 4, 2021), https://www.occ.gov/news-issuances/news-releases/2021/nr-occ-2021-2a.pdf [https://perma.cc/VJD8-Q7VQ] (". . . [A] bank may use stablecoins to facilitate payment transactions for customers on an INVN [independent node verification network], including by issuing a stablecoin, and by exchanging that stablecoin for fiat currency. In this context, stablecoins function as a mechanism of payment, in the same way that debit cards, checks, and electronically stored value (ESV) systems convey payment instructions." (citations omitted)).

210. *Id*. at 8.

211. Bd. of Governors of the Fed. Rsrv. Sys., Supervision and Regulation Letter SR 23-8/CA 23-5: Supervisory Nonobjection Process for State Member Banks Seeking to Engage in Certain Activities Involving Dollar Tokens (Aug. 8, 2023), https://www.federalreserve.gov/supervisionreg/srletters/SR2308.htm [https://perma.cc/58MU-VGHE].

212. *Id.*

213. Awrey, *Unbundling Banking*, *supra* note 6, at 747 ("[T]he Federal Reserve Act dictates that only banks and other similar depository institutions have access to the Federal Reserve master accounts that represent the fastest, most convenient, and most reliable means of final settlement in our current payment system . . . Importantly, this leaves financial institutions that aspire to compete with banks in the increasingly lucrative realm of money and payments with a stark and unpalatable choice. First, they can themselves become conventional deposit-taking banks, incurring the time, expense, and ongoing regulatory compliance burdens that this entails [or] they can enter into agreements with banks—their primary competitors—that give them indirect access to the basic clearing and settlement architecture.").

214. *See supra* Part II.

215. Gorton & Zhang, *supra* note 25, at 950–51.

dilemma and act too slowly while dealing with disruptive technologies. In fact, legacy banks already prefer a more controllable and less innovative environment of permissioned blockchains.[216]

And even when the regulators themselves grapple with innovations and encourage banks to consider new technologies, they do so in a limited way. While not prohibiting DLT, several federal regulators jointly stated in 2023 that they "believe that issuing or holding as principal crypto-assets that are issued, stored, or transferred on an open, public, and/or decentralized network, or similar system is highly likely to be inconsistent with safe and sound banking practices."[217] Regulatory attitudes thus create prescriptive channels for the types of innovation selected by the regulators, not a broader market.

VI

A CASE FOR BETTER, SMARTER REGULATION AND COEXISTENCE

A lack of innovation against the existing inefficiencies of our financial system—such as payment costs and low financial inclusion—creates a window of opportunity for new institutions,[218] including stablecoins and relevant arrangements. These private firms already have the technological expertise and established digital infrastructure to exchange value and transfer payments and continue to build off their existing systems.

They are also subject to lighter regulation, arguably enabling them to innovate more. These technology-focused newcomers have been regulated in the United States primarily at the state level as money transmitters, a form of "money services businesses" (MSBs).[219] For example, Circle, the largest U.S.-based stablecoin issuer, has many of these state money-transmitter licenses[220] and is registered with the Financial Crimes Enforcement Network (FinCEN) as a

216. For example, J.P. Morgan Chase already has a permissioned ledger for transferring and clearing multi-bank transactions. *See* J.P. MORGAN, *supra* note 205.

217. Press Release, BD. OF GOVERNORS OF THE FED. RSRV. SYS., FED. DEPOSIT INS. CORP. & OFF. OF THE COMPTROLLER OF THE CURRENCY, JOINT STATEMENT ON CRYPTO-ASSET RISKS TO BANKING ORGANIZATIONS (Jan. 3, 2023), at 2, https://www.fdic.gov/news/press-releases/2023/pr23002a.pdf [https://perma.cc/NHN6-89AL]. This Statement, in theory, does not prevent banks from working with stablecoins but limits their use of DLT given the "[h]eightened risks associated with open, public, and/or decentralized networks." *Id.* at 1.

218. MCKINSEY & CO., FINTECHS: A NEW PARADIGM OF GROWTH (2023), https://www.mckinsey.com/industries/financial-services/our-insights/fintechs-a-new-paradigm-of-growth#/ [https://perma.cc/NB9V-BEXX] ("As of July 2023, publicly traded fintechs represented a market capitalization of $550 billion, a two-times increase versus 2019." (citation omitted)).

219. Awrey, *Bad Money*, *supra* note 6, at 7. FinCEN defines the term "money services business" as "any person doing business, whether or not on a regular basis or as an organized business concern, in one or more of the following capacities: (1) currency dealer or exchanger; (2) check casher; (3) issuer of traveler's checks, money orders or stored value; (4) seller or redeemer of traveler's checks, money orders or stored value; (5) money transmitter; or (6) U.S. Postal Service." Money Services Business Definition, FinCEN, https://www.fincen.gov/money-services-business-definition [https://perma.cc/9TVJ-ML6N] (last visited Jan. 17, 2024). For an exhaustive regulatory definition, *see* 31 C.F.R. 1010.100(ff) (2014).

220. *Legal Licenses*, CIRCLE (Oct. 4, 2023), https://www.circle.com/en/legal/licenses [https://perma.cc/T9QH-GZ3V].

money services business.[221] As opposed to federal regulators, state regulators generally have not dictated to stablecoin issuers which technology to use, and private stablecoin arrangements have been launched on public blockchains.[222]

A state-centered regulatory patchwork, however, is often insufficient. Designed for services like Western Union,[223] it can hardly address the needs of evolving and global digital payment systems. Varying in terms of the requirements for safety and operational stability of MSBs,[224] the state-focused system creates a potential node for generating massive negative externalities from improper operations of under-regulated stablecoin issuers operating on a global scale.

The risks of stablecoins discussed earlier in this Article call for a more coherent approach to regulation. Many scholars and regulators have emphasized that the risks of stablecoins must be properly controlled;[225] foreign jurisdictions such as the European Union are already rolling out special disclosure and approval regimes for stablecoins. However, the specifics of regulation in the United States remain unclear.

Against a bleak picture of risks versus insufficient regulation, it might be tempting to limit private innovation or even ban stablecoins, permanently or temporarily. For example, Congress could prescribe restrictive rules for stablecoin issuers or shut down all stablecoin firms and authorize a CBDC. Legally, this would not be problematic given that the Supreme Court confirmed these powers of Congress as early as 1869.[226] But a normative argument can be made that "[o]nly where social ills prove to outweigh the social benefits should regulators constrain, punish, or in extreme cases ban, innovative products and services."[227] It is not proven that stablecoins are at that level of risk.

Instead, they clearly change and even challenge the existing private-public

221. *What Licenses Does Circle Have and Are You Regulated By Someone?*, CIRCLE INV. HELP CTR., https://www.fincen.gov/msb-state-selector [https://perma.cc/5RYJ-53JR] (last visited Jan. 19, 2024).

222. *Ethereum USDC*, CIRCLE, https://www.circle.com/en/usdc-multichain/ethereum [https://perma.cc/EBA5-AP3V] (last visited Jan. 17, 2024).

223. Awrey, *Bad Money*, *supra* note 6, at 46–47, 55.

224. *Id*. at 48–51. The MSBs, of course, do not have direct access to the Federal Reserve or the deposit insurance scheme.

225. For a sample of this literature, *see* FIN. STABILITY OVERSIGHT COUNCIL, REPORT ON DIGITAL ASSET FINANCIAL STABILITY RISKS AND REGULATION 5–6 (2022), https://home.treasury.gov/system/files/261/FSOC-Digital-Assets-Report-2022.pdf [https://perma.cc/B87H-4J4T] (identifying three areas for crypto-asset regulatory framework: the unregulated crypto-asset spot market; lack of visibility by regulators into the risks of crypto-related businesses; and a lack of retail investor protection); PRESIDENT'S WORKING GRP. ON FIN. MKTS., THE FED. DEPOSIT INS. CORP., AND THE OFF. OF THE COMPTROLLER OF THE CURRENCY, *supra* note 31, at 1–3 (2021) (stating that Congress should enact legislation that will address stablecoins risks on market integrity, investor protection, illicit finances, and systemic risks on the payment system). Scholarship on these issues is extensive). *See generally* Awrey, *Bad Money*, *supra* note 6; Gorton & Zhang, *supra* note 25; Wilmarth, *supra* note 31; Schwarcz, *Regulating Digital Currencies*, *supra* note 26; Dirk A. Zetzsche et al., *Regulating Libra*, 41 OXFORD J. LEGAL STUD. 80, 103–06 (2021) (observing that regulation must address the operational, financial, and systemic risks of global stablecoin, such as Libra).

226. *See generally* Veazie Bank v. Fenno, 75 U.S. 533 (1869).

227. Cooter et al., *supra* note 67, at 15.

monetary landscape. As Professor Schwarcz has pointed out, "stablecoins epitomize the financial system's evolution towards more public-private interdependence and complexity."[228] In this sense, stablecoins have become one more manifestation of the theory of "popular monetary sovereignty" and "society theory of money," to which the United States has implicitly committed.[229] The state always enjoys "a monopoly privilege,"[230] enabling it to issue specific types of currency designated for both private and public use.[231] Nevertheless, under the concept of popular monetary sovereignty, people can create and accept private money which exists alongside public money.

The wrong regulatory approach to digital private money may also have international and geopolitical consequences. To start with, the United States cannot limit financial innovation at a time when it is already falling behind foreign countries "on the technological curve."[232] Practically, shutting down cross-border technology-based systems, for which foreign jurisdictions have already created regulatory rails, may be exceptionally complicated.[233]

In fact, instead of generating risks, properly regulated stablecoins may produce international benefits: given that the major stablecoins are pegged to the U.S. dollar, this feature potentially may help preserve the role of the dollar as a reserve currency and a major asset used for payment in cross-border transactions. Today, these roles could be challenged by other countries, particularly China,[234] rolling out their CDBCs at a faster clip and by transacting parties switching to

228. Schwarcz, *Regulating Global Stablecoins*, *supra* note 37, at 1732. Professor Schwarcz observed that "stablecoins epitomize the financial system's evolution towards more public-private interdependence and complexity." *Id.*

229. Skinner, *supra* note 4, at 191.

230. Max Raskin & David Yermack, *Digital Currencies, Decentralized Ledgers, and the Future of Central Banking* 7 (Nat'l Bureau of Econ. Rsch, Working Paper No. 22238, 2016), https://www.nber.org/system/files/working_papers/w22238/w22238.pdf [https://perma.cc/K4S2-6LUE] ("Without such laws, central banks would simply be banks.").

231. This privilege is regulated by a country's central banking and monetary laws. Wouter Bossu et al., *Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations* 18 (Int'l Monetary Fund, Working Paper No. 2020/254, 2020), https://www.imf.org/en/Publications/WP/Issues/2020/11/20/Legal-Aspects-of-Central-Bank-Digital-Currency-Central-Bank-and-Monetary-Law-Considerations-49827 [https://perma.cc/A4AZ-DXAV]; Jess Cheng et al., Preconditions for a General-Purpose Central Bank Digital Currency, FEDS NOTES (Feb. 24, 2021), https://www.federalreserve.gov/econres/notes/feds-notes/preconditions-for-a-general-purpose-central-bank-digital-currency-20210224.html [https://perma.cc/8HT9-GMQL].

232. Awrey, *Bad Money*, *supra* note 6, at 68.

233. FIN. STABILITY BD. & INT'L MONETARY FUND, *supra* note 38, at 10, 12–13.

234. Ross P. Buckley & Mia Trzecinski, *Central Bank Digital Currencies and The Global Financial System: The Dollar Dethroned?*, 18 CAP. MKTS. L.J. 137, 139–40 (2023); Barry Eichengreen, *Will Central Bank Digital Currencies Doom Dollar Dominance?*, PROJECT SYNDICATE (Aug. 9, 2021), https://www.project-syndicate.org/commentary/central-bank-digital-currencies-will-not-end-dollar-dominance-by-barry-eichengreen-2021-08 [https://perma.cc/93PC-U3HL]; *cf.* Sophia Kuehnlenz et al., *Central Bank Digital Currencies and the International Payment System: The Demise of the U.S. Dollar?*, 64 RSCH. IN INT'L BUS. & FIN., Jan. 2023, at 1, 2 (arguing the multi-CBDC arrangements alone will not threaten a dollar-based settlement system, although such arrangements may decentralize the international payment system); Maria Demertzis & Josh Lipsky, *The Geopolitics of Central Bank Digital Currencies*, 58 INTERECONOMICS 173, 175 (2023).

other currencies to settle transactions in international trade.[235]

It is the job of the regulators to create proper guardrails for a plural system of money to preserve the safety and soundness of the financial system and ensure consumer protection. The fact that regulators operate under increasingly complex conditions of newly emerging technology-based firms with new forms of private money makes their tasks more difficult but does not fundamentally alter them.

The major question here is how to proceed, given the ever-changing and inherently decentralized information inputs from markets.[236] One way to do that is to consider multiple options. The current public discourse suggests that stablecoins could—or should—be regulated as payment systems under a brand-new regime, possibly with access to the Fed;[237] bank products within existing depository institutions;[238] or MMFs.[239] In addition, stablecoins themselves could also be considered securities or commodities.[240]

Depending on the design of stablecoins and related arrangements, they might be closer to MMFs, bank deposits, or payment systems. This plurality of business models suggests that a diverse reform could be more effective than a prescriptive one-size-fits-all approach. A plurality of stablecoin designs also calls for smarter regulatory approaches, focusing on "identifying and managing specific risks" and applying rules matching businesses and their risks.[241] In cases where the plurality

235. Anna Hirtenstein, *The Dominant Dollar Faces a Backlash in the Oil Market*, WALL ST. J. (Dec 28, 2023), https://www.wsj.com/finance/currencies/the-dominant-dollar-faces-a-backlash-in-the-oil-market-0f151e28 [https://perma.cc/2P5Y-KUSQ].

236. On the distribution of knowledge in markets, see generally Friedrich A. Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519 (1945).

237. *See*, *e.g.*, Awrey, *Bad Money*, *supra* note 6, at 63–66 (discussing new monetary institutions under the supervision of the OCC); Awrey, *Unbundling Banking*, *supra* note 6, at 769–70; *see also* Howell E. Jackson et al., *How We Can Regulate Stablecoins Now—Without Congressional Action* (Hutchins Ctr. On Fiscal & Monetary Pol'y, Working Paper No. 76, 2022), https://brookings.edu/wp-content/uploads/2022/08/WP76-Massad-et-al_v4.pdf [https://perma.cc/24SE-NCGQ] (advocating for a Federal Stablecoin Platform).

238. Gorton & Zhang, *supra* note 25, at 950–51; Wilmarth, *supra* note 31, at 297, 312–13.

239. Eric S. Rosengren, President, Fed. Rsrv. Bank of Bos., Official Monetary and Financial Institutions Forum Fed Week Financial Stability Session (June 25, 2021), https://www.bostonfed.org/news-and-events/speeches/2021/official-monetary-and-financial-institutions-forum-fed-week-financial-stability-session.aspx [https://perma.cc/XNE7-NGHL]. The business models of stablecoin issuers are becoming increasingly complex and interconnected with MMFs and banks. Since 2022, for instance, Circle, the issuer of USDC, started moving its reserves to Circle Reserve Fund, which is a registered government MMF managed by BlackRock—the largest asset manager. The assets are custodied at a major regulated bank—The Bank of New York Mellon. Jesse Hamilton, *Circle Begins Putting Reserves Into New BlackRock Fund*, COINDESK (May 9, 2023), https://www.coindesk.com/business/2022/11/03/circle-begins-putting-reserves-into-new-blackrock-fund/ [https://perma.cc/ET3Z-NTVM].

240. *See supra* Part IV.

241. Steven L. Schwarcz, *Regulating Financial Innovation: FinTech, Crypto-assets, DeFi, and Beyond*, DUKE LAW SCH. PUB. L. & LEGAL THEORY SERIES NO. 2024-05 at 643 (Aug. 21, 2024) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4679360 [https://perma.cc/U7KW-ZYQY]. *See also* Dirk A. Zetzsche et al., Regulating A Revolution: From Regulatory Sandboxes to Smart Regulation, 23 FORDHAM J. CORP. & FIN. L. 31, 92–93 (2017) (discussing RegTech).

of business models and respective regulatory regimes may lead to instances of regulatory arbitrage, the legislature may impose sunset provisions to give industry regulators, stablecoin issuers, and users more time to hammer out a better public-private coordination mechanism and determine technological winners and losers.

Regardless of the form of these arrangements, however, the interests of the state must be safeguarded, and the payment system's inefficiencies addressed. One suggestion is that regulators could grant stablecoin arrangements access to the Fed's master accounts along the lines of Professor Dan Awrey's proposals for different licensing regimes.[242] In addition, the United States could follow in the European Union's footsteps with a separate licensing regime. Another option, suggested by Professor Schwarcz, could be to strengthen "a strategic public-private partnership to protect against risk,"[243] possibly with a government guarantee of redemption and a stipulated right of the government to "control . . . the stablecoin to the extent needed to manage monetary policy."[244] These options could streamline payment processes and reduce the risks of stablecoins as a new form of private money.

Note that the slow entrance of CBDCs into this scene would not undermine these private-public money reforms. CBDCs do not necessarily need to compete with well-regulated stablecoins, which could be given access to the federal government's safety net. Indeed, as IMF staff members suggested, "central banks may . . . allow other forms of digital money to co-exist—much like parallel operating systems—while leveraging the settlement functionality and stability of central bank digital currencies. This would open the door to faster innovation and product choice."[245] Better regulated stablecoins and CBDCs in the future could produce a new form of private-public money coexistence. Some regulators, such as the European Central Bank, already understand this need to explore "synergies" between the public and the private and thus create a more "innovative, competitive and resilient" payment system.[246]

Provided better interoperability[247] between new forms of digital money is

242. Awrey, *Bad Money*, *supra* note 6, at 63–66; Awrey, *Unbundling Banking*, *supra* note 6, at 769–70.

243. Schwarcz, *Regulating Digital Currencies*, *supra* note 26, at 1068.

244. *Id.* at 1070.

245. Adrian & Mancini-Griffoli, *supra* note 2.

246. EUR. CENT. BANK, REPORT ON A DIGITAL EURO 2 (2020), www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf; *see* FOSTER ET AL., *supra* note 36, at 13.

247. One policy concern is ensuring multidimensional interoperability "to account for different forms of interoperability—interoperability and coexistence with the payment methods we have today, such as cash and commercial bank money, as well as interoperability with potential future types of public or private money, such as properly regulated and well-designed stablecoins." BANK FOR INT'L SETTLEMENTS ET AL., OPTIONS FOR ACCESS TO AND INTEROPERABILITY OF CBDCS FOR CROSS-BORDER PAYMENTS: REPORT TO THE G20 29 (2022), https://www.bis.org/publ/othp52.pdf [https://perma.cc/G5HB-X473]. Given that stablecoins and CDBCs are both evolving, their coexistence

achieved—through, for example, APIs, smart contracts, and standardized protocols—users could be able to convert seamlessly from stablecoins to CBDCs and vice versa. In an ideal scenario, a sovereign-backed CBDC should ensure stability and confidence in a high convenience yield of money, whereas private stablecoins could provide user-friendly interfaces and reasonable safety through better regulation and possible access to the federal payment rails.

This coexistence of public and private digital money may offer individuals and businesses *options* for conducting transactions and managing financial affairs. Private money could cater to specific market niches that public money might not adequately address. An obvious example is providing private services to individuals who are underserved by traditional financial institutions, which would lead to greater financial inclusion, especially in regions with limited access to traditional banks.

The coexistence of the public and the private could accommodate different economic actors and adapt to the changing technological landscape, something innovative private firms do well. Private parties could continue experimentation and technological development that central banks can neither afford to engage in safely nor have the right incentives and expertise for.[248] Put another way, while public money can offer stability and trust, private money can ensure more innovation and diversity of solutions, and the relationship between the two will continue to evolve as we grapple with new technologies.[249]

VII
CONCLUSION

In conclusion, this exploration into the coexistence of stablecoins and CBDCs reveals a complex and evolving landscape of technological innovation in the payment and financial sectors. We underscore the need for a nuanced understanding of both private and public digital money, highlighting their distinct roles, potential benefits, and inherent risks within the global financial ecosystem. While stablecoins offer innovative solutions and contribute to efficiencies and diversification within the financial and payment sectors, their regulatory

and interoperability remain equally evolving and complex concepts. Chris Berg, Interoperability as a Critical Design Choice for Central Bank Digital Currencies 12 (Sept. 22, 2022) (unpublished manuscript) (on file with the Social Science Research Network), https://ssrn.com/abstract=4205405 [https://perma.cc/W9W8-BFF7] (explaining that operational cybersecurity risks are particularly concerning for technology-based interoperable payment systems, like those based on smart contracts).

248. Greener, *supra* note 68.

249. *See supra* Part III; *see also* Adrian & Mancini-Griffoli, *supra* note 2; Christian Catalini & Jai Massari, *Stablecoins and the Future of Money*, HARVARD BUS. REV. (Aug. 10, 2021), https://hbr.org/2021/08/stablecoins-and-the-future-of-money [https://perma.cc/AZ4X-3KGL]; Andrew Ackerman, *Digital Dollar Could Coexist With Stablecoins, Fed Vice Chairwoman Says*, WALL ST. J. (May 26, 2022), https://www.wsj.com/articles/feds-brainard-to-tell-panel-digital-dollar-could-coexist-with-stablecoins-11653570037 [https://perma.cc/FTW7-BSA8]. For a more inclusive approach including other cryptoassets, *see* Yiannis Giokas, *Can CBDCs, Tokenized Deposits, Stablecoins and DeFi Coexist?*, COINDESK (May 3, 2023), https://www.coindesk.com/opinion/2023/05/03/can-cbdcs-tokenized-deposits-stablecoins-and-defi-coexist [https://perma.cc/DGF3-47HU].

challenges and risk factors necessitate careful oversight. Conversely, the emergence of CBDCs represents a significant step by central banks in modernizing monetary systems and potentially enhancing financial inclusion, but these developments raise their own sets of challenges and risks.

A key overarching observation is that public money, including CBDCs, and digital private money and payment systems will continue to coexist. Regulators need to adapt to this evolving coexistence and plurality of monetary instruments and create reliable regulatory safeguards for this public-private economic partnership. Better, smarter guardrails for the evolving coexistence of private and public money must simultaneously capitalize on the benefits of private innovation, control its negative externalities, safeguard financial stability, and protect consumers. This way, we will have a chance to use the synergetic coexistence of public and private money to solve the longstanding problems of payment inefficiencies, slowly innovating traditional institutions, and inadequate financial inclusion. By contrast, entrenching the status quo and preserving the current regulatory and payment models could be a missed opportunity to address the inefficiencies of the existing system.