DISRUPTIVE MONEY

Exploring the Future of Corporate Cryptocurrency

JIM MIGNANO ¤ JADE YEUNG ¤ FIONA QUIMBRE
MANDLENKOSI DUBE ¤ STEVEN W. POPPER
NOREEN CLANCY

RAND CORPORATION

For more information on this publication, visit **www.rand.org/t/RRA2251-1.**

About RAND

The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. To learn more about RAND, visit www.rand.org.

Research Integrity

Our mission to help improve policy and decisionmaking through research and analysis is enabled through our core values of quality and objectivity and our unwavering commitment to the highest level of integrity and ethical behavior. To help ensure our research and analysis are rigorous, objective, and nonpartisan, we subject our research publications to a robust and exacting quality-assurance process; avoid both the appearance and reality of financial and other conflicts of interest through staff training, project screening, and a policy of mandatory disclosure; and pursue transparency in our research engagements through our commitment to the open publication of our research findings and recommendations, disclosure of the source of funding of published research, and policies to ensure intellectual independence. For more information, visit www.rand.org/about/research-integrity.

RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

Published by the RAND Corporation, Santa Monica, Calif.
© 2023 RAND Corporation
RAND® is a registered trademark.

Cover: Adobe Stock/Adin, MoonBandit.

Limited Print and Electronic Distribution Rights

This publication and trademark(s) contained herein are protected by law. This representation of RAND intellectual property is provided for noncommercial use only. Unauthorized posting of this publication online is prohibited; linking directly to its webpage on rand.org is encouraged. Permission is required from RAND to reproduce, or reuse in another form, any of its research products for commercial purposes. For information on reprint and reuse permissions, please visit www.rand.org/pubs/permissions.

About This Report

This report considers a future in which *corporate crypto*, a type of fungible digital token sponsored by multinational corporations, is in widespread use in a manner that is widely seen to serve the public interest. Using a method known as *participatory foresight*, we convened internal experts and external stakeholders to envision such a future and identify strategic approaches to evolving technological and economic trends underpinning this future. Our analysis devotes special attention to the balance of global benefits and risks that corporate crypto presents. The report should be of interest to policymakers, businesspersons, technologists, and advocates working on the future of money and payments at the global level.

RAND Center for Global Risk and Security

This work was undertaken by the RAND Center for Global Risk and Security, part of International Programs at the RAND Corporation. The center explores systemic risks to global security, drawing on researchers' expertise in multiple disciplines to complement and expand RAND research in such fields as security, economics, health, and technology. A board of distinguished business leaders, philanthropists, and former policymakers advises and supports center activities, which are increasingly focused on global security trends and the effects of disruptive technologies on risk and security. For more information, visit www.rand.org/international/cgrs.html or contact the director (contact information is provided on the webpage).

Funding

Funding for this project was provided by the generous contributions of the RAND Center for Global Risk and Security Advisory Board.

Acknowledgments

The authors are grateful for the support of the RAND Center for Global Risk and Security Advisory Board, whose generous donations made this work possible. We thank Robin Meili and King Mallory for providing guidance and support throughout. Jonathan Welburn deserves special recognition for inspiring our efforts from the outset.

Eighteen external stakeholders participated in our participatory foresight workshop, each of whom made our findings more complete. We thank and admire each of them for contributing several hours of their time to engage through the workshop.

We also thank Anita Szafran for her indispensable research support and Fadia Afashe, Elizabeth White, and Peter Soriano for their support in creating this report. Finally, we thank Simon Callaghan and Sale Lilly for their engaging reviews of our work.

Summary

This report explores the prospects for, and implications of, a future in which multinational corporations increasingly sponsor new types of digital currencies. Our key findings included the following:

- Peer-to-peer digital currencies are designed to make payments easier, faster, and less expensive. Some multinational corporations are experimenting with peer-to-peer digital currencies to increase payment efficiencies and support innovation. Examples of this *corporate crypto*, a type of fungible digital token sponsored by multinational corporations, exist today but are few in number; limited in use; and remain in developmental, experimental, or pilot stages. The most ambitious corporate crypto, Facebook's Libra, faced significant regulatory headwinds and was canceled before launch.
- Corporate crypto is functionally similar to other digital currencies that enable peer-to-peer transactions (e.g., Bitcoin, retail Central Bank Digital Currencies). Unlike these other digital currencies, however, a corporate crypto can benefit from characteristics of its corporate sponsor, such as market share, existing customer base and business relationships, and brand equity.
- Corporate crypto would be disruptive—developing new markets or altering existing ones—to the degree it disintermediates existing financial service providers. The most disruptive corporate crypto would be sponsored by a nonbank private enterprise with a global footprint.
- As disruptive as it might ultimately become, a desirable future state involving corporate crypto relies on overcoming policy challenges that are not unique to corporate crypto (e.g., multilateral cooperation, conceptual and normative consensus, adequate information).
- Considering the recent failures of unregulated cryptocurrency projects, it is important to be alert to how corporate crypto can succeed where other crypto projects have failed. As multinational corporations contemplate sponsoring corporate crypto, stakeholders will need to engage in dialogue with one another to decrease uncertainty and ensure innovation serves the public interest.

Contents

About This Report iii
Summary v
Figures and Tables ix

CHAPTER 1
Introduction 1

CHAPTER 2
What Are Corporate Cryptocurrencies? 3
Corporate Crypto Is a Type of Fungible Digital Token That Can Be Transferred Peer-to-Peer and Is Sponsored by MNCs 3
Corporate Crypto Is Not Bitcoin 4
Corporate Crypto Is Not Immune to Tensions That Have Persisted Over Time 6

CHAPTER 3
What Makes Corporate Crypto Disruptive? 11
Sponsorship and Footprint Characterize Disruptive Potential 11
Potential Specific Risks Are Also Associated with Corporate Crypto 12
Despite Many Risks, Corporate Crypto Could Also Offer Valuable Opportunities 17

CHAPTER 4
What Could a Successful Corporate Crypto Future Look Like? 19
Corporate Crypto Might Be Neither Feasible Nor Desirable, But Envisioning Its Potential Matters 20
Corporate Crypto Could Become Desirable Because of Enhanced Features and Values Embedded By Design 21
Big Ideas Are at the Root of Achieving This Desirable Vision 22
Each Big Idea Rests on Key Assumptions That Must Be Examined for Vulnerabilities 24
The Failure of Key Assumptions Could Lead to a Less Desirable Corporate Crypto Future 27

CHAPTER 5
What Do Policymakers Need to Think About Today? 29

CHAPTER 6
Conclusion 31

APPENDIXES
A. Workshop Participants 33
B. Workshop Agenda 35

Abbreviations 37
References 39

Figures and Tables

Figures

3.1. Corporate Crypto's Disruptive Potential Varies by Sponsorship and Footprint ... 12
4.1. Three Horizon Foresight Technique ... 23
6.1. Developing Pathways Through Transition ... 31

Tables

2.1. Central Bank Money, Cryptocurrency, and Corporate Cryptocurrency Compared ... 4
3.1. Risks and Opportunities Associated with Private Digital Currencies ... 14
4.1. Key Assumptions Underpinning Each Big Idea ... 26
B.1. Session 1, October 19, 2022 ... 35
B.2. Session 2, November 2, 2022 ... 36

CHAPTER 1

Introduction

Multinational corporations (MNCs) are exploring ways to issue digital tokens for customers and suppliers to use as a means of payment and exchange. This new type of currency, what we call *corporate cryptocurrency*, garnered attention in 2019 when Facebook introduced Libra. Libra was to be a "simple global currency and financial infrastructure" (Libra Association, 2019, p. 3) based on blockchain technology; tied to a group of different currencies, such as the dollar and euro; and governed by an independent association of private entities. With Libra, Facebook intended to provide its users a cheap, fast, and secure means of payment worldwide. Facing significant worldwide regulatory headwinds, Libra was rebranded to Diem before being ultimately abandoned in 2022 (Murphy and Stacey, 2022). But its spirit lives on.

Other MNCs have been experimenting with similar initiatives.[1] In 2019, a subsidiary of South Korean tech giant Kakao launched Klaytn, which enables payment with its KLAY token and is designed primarily for metaverse projects (Klaytn Foundation, undated). In 2020, J.P. Morgan developed a limited-use digital token called JPM Coin. Eligible clients can use JPM Coin to "transfer U.S. Dollars held on deposit with J.P. Morgan . . . to help solve common hurdles of traditional cross border payments" (J.P. Morgan, undated). Russia's state-owned technology conglomerate, Rostec, touts its CELLS digital payments platform as an "alternative to [Society for Worldwide Interbank Financial Telecommunication] SWIFT in international settlements" (Elder, 2022). To the best of our knowledge, mainland Chinese MNCs have not issued, piloted, or developed a corporate cryptocurrency. Moreover, it is difficult to envision such development in the immediate future because of the Chinese government's ongoing ban on crypto trading and mining, its concern with the market power of large payment service providers such as WeChat Pay and Alipay, and, ultimately, its support for the electronic Chinese Yuan (e-CNY) central bank digital currency.[2]

Corporate cryptocurrencies (hereafter referred to as *corporate crypto*) exist only in developmental, experimental, or pilot forms, according to our assessment as of summer 2023. Yet, if corporate crypto becomes generally available, it might bring about benefits such as facilitating cross-border payments and creating new lines of business, as well as potential risks and unintended consequences. Most strikingly, corporate crypto could disintermediate financial

[1] These examples are for illustrative purposes only and are not the entire universe of corporate crypto projects.

[2] See Benzmiller (2022) for a discussion of the e-CNY and China's digital payments system.

services, displacing banks and shifting payment activity from highly regulated to (as yet) less regulated environments.

We explored the prospects for, and implications of, a future in which MNCs increasingly sponsor these new digital currencies, asking the following questions:

1. What are corporate cryptocurrencies?
2. What makes corporate crypto disruptive?
3. What could a desirable future with widespread corporate crypto look like?
4. If corporate crypto went mainstream, what might the global security implications be?
5. What do policymakers need to think about today to achieve an outcome consistent with the desirable future vision?

By answering these questions, we ultimately seek to stimulate debate on what a future with mainstream corporate crypto could look like and how various communities of practitioners in the digital currency space could help shape this future toward desirable outcomes. Our goal is to set the table for the next stage of decisions confronting policymakers, businesses and tech leaders, and consumer advocates in the digital currency space. Our intent is not to reach finished conclusions, but to contribute to the policy debate and to bring greater clarity to subsequent deliberations over digital currency's possible futures.

To this end, we implemented a mixed-methods approach, comprising a literature scan and a participatory foresight exercise. In the first step, we reviewed the literature on private monies and risks associated with new digital currencies, resulting in a working definition of corporate crypto, a greater understanding of what makes corporate crypto disruptive for good or ill, and a taxonomy of potential benefits and risks. The second step was two online participatory foresight exercises that included experts and stakeholders from 21 relevant organizations (see Appendix A). Participants were walked through a structured process to envision a future where corporate crypto has gone mainstream by 2032 with minimal global security risks and then, through backcasting,[3] asked to identify changes necessary to achieve this preferred future vision. We then synthesized, analyzed, and reported the findings in the following chapters, drawing together the results of our literature scan and participatory foresight workshop and taking special note of themes and variations that surfaced throughout.

[3] *Backcasting* is a foresight method that places participants in the future and invites them to imagine, describe, and agree on a shared tangible and credible vision of the future before walking them back to the present to identify pathways that can connect the envisioned future with the present state. Our exercise generally encouraged participants to think about the goals they wish to achieve in the development of corporate crypto and in the wider digital currency space. In doing so, "this approach obviates a too early focus on strategies (means) without sufficient explicit exploration of objective values (ends) to be used in evaluating outcomes" (Lempert et al., 2020, p. 9).

CHAPTER 2

What Are Corporate Cryptocurrencies?

Corporate crypto is a new type of private digital currency that can be transferred peer-to-peer and is sponsored by an MNC. Although its key attributes (e.g., private sponsorship, reliance on distributed ledgers)[1] and functions (e.g., unit of account, medium of exchange)[2] distinguish corporate crypto from central bank money and earlier cryptocurrencies, such as Bitcoin, corporate crypto should not be considered an entirely new phenomenon. In many respects, corporate crypto reflects common themes in economic history that might illuminate how to consider its emergence and actions to design or influence its future.

Corporate Crypto Is a Type of Fungible Digital Token That Can Be Transferred Peer-to-Peer and Is Sponsored by MNCs

Corporate crypto is a type of digital currency, meaning a type of currency that is exclusively available in electronic form. More specifically, it is a type of private digital currency, sponsored by MNCs. Although the term *corporate crypto* encompasses "global stablecoins" (G7 Working Group on Stablecoins, 2019)—a type of crypto that attempts to mitigate price volatility by linking its value to other assets—its implementation might not take the form of a stablecoin, and not all private digital currencies (e.g., account-based mobile payment systems) are corporate crypto. Thus, we characterize corporate crypto by the following two main attributes:

1. **Private sponsorship**: Corporate crypto is sponsored by MNCs that can exploit existing business relationships, network effects, and resources (hence *corporate*).

[1] *Distributed ledgers* are a technology that enables multiple parties to share and manage transaction data without relying on a single authority or coordinating party (see Rauchs et al., 2018). Cryptocurrency is often built using one implementation of distributed ledger technology known as blockchain (see Zhang and Lee, 2020).

[2] Economists generally identify three fundamental functions of money: medium of exchange, unit of account, and store of value. Well-functioning money facilitates buying and selling goods and services (*medium of exchange*), recordkeeping and comparing prices (*unit of account*), and savings and future consumption (*store of value*). For further elaboration in the context of cryptocurrency, see Gerba and Rubio, 2019.

2. **Reliance on distributed ledger technology (DLT)**: Corporate crypto relies on DLT to manage digital tokens and enable peer-to-peer transfer (hence *cryptocurrency*).[3]

Corporate Crypto Is Not Bitcoin

Although the term cryptocurrency often evokes Bitcoin—the world's first cryptocurrency, which inspired thousands of derivate cryptos and led to further technological developments, such as smart contracts and central bank digital currencies (CBDCs)[4]—corporate crypto differs fundamentally from Bitcoin and other cryptocurrencies. Unlike them, a corporate crypto is sponsored by an MNC or a consortium of MNCs with other primary lines of business. Corporate crypto could also satisfy the three functions of money (store of value, unit of account, and medium of exchange), whereas cryptocurrencies have yet to perform all three functions well.

Corporate cryptos, traditional cryptocurrencies, and central bank money are compared in greater detail below, and Table 2.1 summarizes these comparisons.

Liability

Central bank money is a liability of the central bank and is guaranteed by the state. Cryptocurrencies, such as Bitcoin, do not represent claims in the conventional sense: They are not liabilities on an issuer's balance sheet and offer no such backstop (Brunnermeier, James, and Landau, 2019, p. 4). Users typically assume full risk of loss. However, numerous crypto

TABLE 2.1
Central Bank Money, Cryptocurrency, and Corporate Cryptocurrency Compared

Variable	Central Bank Money	Cryptocurrency (e.g., Bitcoin)	Corporate Crypto
Liability	Central Bank	Uncertain/contested	Likely MNC
Store of value	Yes, with exception	Mixed	Possibly
Unit of account	Yes	No	Possibly
Medium of exchange	Yes	Rarely	Yes

[3] For discussion on DLT, see Rauchs et al., 2018. An MNC might be able to sponsor a digital token functionally equivalent to corporate cryptocurrency as described without employing DLT. However, we did not encounter any such examples during the course of this project and workshop.

[4] As the name indicates, CBDCs are issued by national monetary authorities and are digital sovereign money. A CBDC might employ DLT, but it also might not. Although not the focus of this study, CBDCs might interact with other digital currencies, including corporate crypto, in novel ways.

service providers (e.g., exchanges that facilitate buying, selling, and trading crypto) may face liability during a crisis.

It is unclear precisely how corporate crypto would be treated in terms of liability. As a crypto's sponsor, an MNC or a consortium might be exposed to at least some degree of liability in the event of a crisis, and it might not be an exclusively money form of liability (e.g., a claim on future goods or services provided by the sponsoring MNC[s]).

Store of Value

Most central bank money holds its value relatively well over time. Cryptocurrencies such as Bitcoin, on the other hand, exhibit highly volatile prices, making them poor stores of value. Stablecoin cryptocurrencies might ultimately prove to be more effective as stores of value than other cryptocurrencies but have so far raised concerns about reserve asset transparency, fraud, and misconduct (Adachi et al., 2022; Carlisle, 2022; President's Working Group on Financial Markets, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency, 2021). Indeed, "consumer protection measures such as transparency requirements, refunds, protection from excessive fees, and fraud compensation are currently not applicable for stablecoins" (Adachi et al., 2022). Moreover, stablecoin issuers continue to constrain users' redemption possibilities (for example, by limiting users' periods or thresholds for redemptions) (Adachi et al., 2022; Carlisle, 2022; President's Working Group on Financial Markets, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency, 2021).

Whether corporate crypto adequately functions as a store of value remains to be seen. To solve this price volatility problem, Facebook designed Libra to operate like a stablecoin backed by reserves of "cash or cash equivalents and very short-term government securities" (Libra Association, 2020). Besides such direct efforts, an MNC's reputation and management might also lend greater price stability to its digital token(s).

Unit of Account

Central bank money serves as a unit of account, a common measure of economic value. It is rare to find goods or services priced in Bitcoin or some other crypto. When they are, it is usually alongside their price in central bank money (Gerba and Rubio, 2019).

In contrast, a corporate crypto may serve as a unit of account, particularly for goods and services offered by its sponsor (International Monetary Fund, 2020, pp. 16–17).

Medium of Exchange

Central bank money is customarily accepted for payment. Some businesses have started accepting crypto for payment, but this is far from customary (Deloitte, 2021). Furthermore, many vendors that accept crypto use systems that convert the payment to central bank

money on demand, effectively making crypto a contingent medium of exchange in such transactions.[5]

A corporate crypto would instantly benefit from its sponsor's existing sphere of economic activity. That is, an MNC could declare its crypto acceptable as payment for its own goods and services. The MNC might also be able to increase its crypto's role by arranging for its suppliers and employees to accept payment in its crypto.

Corporate Crypto Is Not Immune to Tensions That Have Persisted Over Time

Despite its technological novelty and 21st century context, corporate crypto reflects tensions that have persisted throughout history. Four key interrelated tensions are the balance of public and private interests, competition between banks and nonbank enterprises, local interests and globalization, and economic inequities.

Balance of Public and Private Interests

Public and private interests in managing monetary systems are not always identical. Monetary authorities stress financial stability, but enterprising private parties might find opportunity in innovations that ultimately strain existing systems. In *The Future of Money*, Eswar Prasad observes that technological innovation by private parties is often what leads to monetary disruption and rebalancing. For example, in the seventh century, Chinese merchants issued the first paper currency in the form of their own notes to facilitate commerce, displacing long-standing reliance on metal coins; public innovation came centuries later when Kublai Khan issued the first paper currency by fiat, dislodging merchants' paper notes as well as precious metals (Prasad, 2021, p. 14).

In various forms, the same basic story plays itself out throughout time: Private entities disruptively innovate, and, eventually, public institutions step in to impose order. The Scottish free banking era of 1716 to 1845, characterized by multiple competing banks that issued their own currencies (White, 1995), and U.S. "wildcat" banking from about 1837 to 1863, which featured remotely located banks and even railroad companies issuing their own currencies, are two examples of this story (Rockoff, 1974). In both episodes, policymakers ultimately imposed order by restricting banks' power to issue their own currencies through the Bank Notes (Scotland) Act 1845 and the (U.S.) National Bank Act of 1863.

Corporate crypto is not unlike previous financial innovations. The growth of e-commerce, decline of cash, and dawn of the metaverse have spurred business interest in crypto. Concur-

[5] For example, Bakkt, a crypto service provider, enables customers to pay retailers such as Starbucks and Best Buy in crypto, which is converted to U.S. dollars at the point of sale ("Bakkt Launches Its Digital Wallet, Bakkt App, to Manage All Forms of Digital Assets, Debuting with Starbucks, GolfNow, and Best Buy Among Other Marquee Brands," 2021).

rently, policymakers have grappled with whether corporate crypto upsets the delicate public/private balance by reinforcing private entities' grasp over the financial system at the expense of public authorities (Read and Schäfer, 2020).

While tensions are evident, public benefit does not necessarily come at the expense of private gain, or vice versa. In fact, money is often comanaged by public and private bodies. Today's typical national monetary system involves a collection of entities, both public (e.g., central banks, treasuries) and private (e.g., commercial banks, payment companies), that provide and circulate money in an economy.[6]

Competition Between Bank and Nonbank Enterprises

Banks play several roles essential to monetary systems; they take deposits from savers, lend those deposits to borrowers, process payments, create money, and transmit monetary policy (Gobat, undated). Because bank failures can have devastating economic consequences, banks are often subject to stringent regulatory limits and compliance requirements.[7] Tensions surface when enterprises that are not regulated as banks perform banking functions.

It is not uncommon for businesses outside the regulated banking and financial sectors to take on bank-like functions. The truck wage system, practiced worldwide for centuries, involved nonbank businesses that paid wages in kind, credit, or scrip. These businesses could circumvent the monetary system, even occasionally forming the core of what would be known as *company towns*, with nearly an entire local economy operated on company scrip. Goods available for purchase with company scrip were often "of high price or poor quality," eroding company employees' real earnings (Hilton, 1960, p. 112).

During the 20th century, trading stamp companies in the United States and Europe issued paper stamps and sold them to retailers, who in turn distributed the stamps as rewards to incentivize customer loyalty. Holders could redeem the stamps for goods listed in catalogs by the stamp issuers. By the 1960s, the first and largest trading stamp company, Sperry & Hutchinson, was selling more S&H Green Stamps in number than the United States Postal Service was selling postage stamps (Lonto, 2013).

Today's airline loyalty programs reach even greater heights. In 2020, each of the three largest frequent flyer programs were valued at between $18 billion and $30 billion and comprised an estimated 30–50 percent of U.S. airlines profits the prior year (Bushey, 2020). Frequent flyer programs are often linked with bank-issued credit cards. In this model, airlines sell frequent flyer miles to credit card issuers who, in turn, offer mileage perks to incentivize use of their cards.

---

[6] The logic of this arrangement is that public authorities provide public goods, such as monetary stability, while commercial banks provide private goods, such as retail and payment services.

[7] Banking regulations, including the definition of *bank* for regulatory purposes, vary by jurisdiction but are commonplace worldwide. Regulation of nonbank financial activities (e.g., insurance, venture capital, currency exchange) also varies by jurisdiction. For a brief discussion of nonbank financial institutions and common regulatory models worldwide, see World Bank, undated.

Corporate crypto similarly affords enterprises outside the banking sector the ability to trade in their own branded forms of currency and possibly sidestep regulations that apply to banks. However, to compete with banks and other traditional financial services providers, nonbank MNCs wishing to create their own cryptocurrencies will have to overcome scalability challenges associated with digital assets. Corporate cryptos could surmount scalability challenges if the MNCs that issue them build their cryptocurrencies on relatively centralized blockchains.[8]

Local Interests and Globalization

Although the international monetary system features many shared standards and coordination mechanisms,[9] states reserve ultimate regulatory discretion over domestic banking and financial services activities. National policy differences, such as varying liquidity requirements or sanctions determinations, invite the potential for regulatory arbitrage (a firm's deliberate choice to locate activities in more-favorable regulatory environments).

Currencies are often points of tension between localities. Exchange rates influence business and investment decisions in international trade and financial markets. In a practice known as *currency substitution*, some countries have adopted foreign currencies as de facto domestic monies. Individuals faced with unstable domestic currencies often seek to obtain more-stable ones; others face barriers sending money across borders to family and friends.

Tensions also surface at the hyper-local level within national jurisdictions. The Brixton Pound is an example of currency in the UK designed to stimulate local commerce in its namesake locality. The Brixton Pound project is in the process of developing a peer-to-peer digital version of its originally paper-based currency (Brixton Pound, undated).

Corporate crypto sponsors will need to be deliberate about where they host and conduct their activities because they are not immune to local and global tensions. Even Walmart Units, patented for launch in the United States and pegged to the U.S. dollar, could quickly and unintentionally become used outside the United States. For example, Walmart's large presence in Mexico could make it easier for people in the United States to send remittances to people in Mexico in the form of Walmart Units (Bilotta and Botti, 2019).

Economic Inequities

Currency dynamics and financial innovation can also aggravate disparities in wealth and income. In its report on the causes of the 1987 stock market crash, the Presidential Task Force

[8] Developers working in the digital asset space must reckon with trade-offs between scalability, decentralization, and security. That is, to increase scalability, decentralization, or security, a developer must sacrifice at least one of the other two to some degree. For a richer discussion of this trade-off, see the "scalability trilemma" in "The Ethereum Vision: A Digital Future on a Global Scale" (Ethereum, undated).

[9] For example, the intergovernmental Financial Action Task Force leads in developing international anti–money laundering and combating the financing of terrorism (AML/CFT) standards.

on Market Mechanisms identified new computerized trading programs like portfolio insurance as key drivers of the crash (U.S. Department of the Treasury, 1988). Some scholars trace several recent financial crises to speculative currency trading (Corsetti, Pesenti, and Roubini, 1999; Flood and Marion, 1999). Kubler and Schmedders (2012) connected financial innovations to asset price volatility in an economic model in which financial innovations create new opportunities for market participants to engage in speculation that dramatically alters the wealth distribution and drives increased asset price volatility. Many agree that relatively novel financial instruments (e.g., collateralized debt obligations) were at the root of—or at least amplified—the 2007–2008 financial crisis (Acharya and Richardson, 2009; Acharya, Schnabl, and Suarez, 2013; Financial Crisis Inquiry Commission, 2011; Tett, 2009). It is often the case that those with fewer resources disproportionately feel both the pain of loss and burden of recovery (Bodea, Houle, and Kim, 2021; Reinhart and Rogoff, 2009; Rewilak, 2018).

Still, financial innovation has generally facilitated economic relations among greater numbers of people. The increasing diversity and penetration of financial instruments—from coins and paper money to deposit accounts and credit cards—offer more avenues of access. Recent innovations, such as peer-to-peer lending and mobile payments, are touted as providing greater access to financial products (e.g., by supporting new sources of credit, relatively low-value transactions, and payments that do not require bank accounts). Other innovations, such as cryptocurrencies and currencies used within online games, have had unintended distributional aspects. Market research indicates that the appeal of cryptocurrencies such as Bitcoin is their potential appreciation, particularly drawing people who have not been able to afford traditional investments (Morning Consult, 2022). Others are turning to gaming to earn in-game currency and exchanging it for central bank money as a form of income (Wiener, 2022).

Through effects on employment, growth, and price stability, monetary policy choices might also have distributional outcomes. The success of a corporate crypto might hinge on its ability to balance distributional tensions while incorporating lessons learned from key monetary policy debates.[10]

[10] The more a corporate crypto functions like money, the more its management will have to contend with choices about monetary policy, such as how quickly the supply of tokens should increase. Monetarism and Keynesianism are two major competing schools of thought that can provide valuable insight into choices available to policymakers.

CHAPTER 3

What Makes Corporate Crypto Disruptive?

Disruptive technologies develop new markets or alter existing ones by changing consumer behavior. They "introduce a very different package of attributes from the one mainstream customers historically value" (Bower and Christensen, 1995, p. 45). Observers often suggest that the most disruptive feature of digital currencies, such as Bitcoin, global stablecoins, and CBDCs, is their potential to disintermediate financial service providers (Arner, Auer, and Frost, 2020; Bank for International Settlements, 2021; Dodd, 2018). That is, they provide services that customers would usually expect from a bank or other third-party financial institution. Financial disintermediation is disruptive because it presents a head-on challenge to traditional financial institutions' roles and effectively means shifting financial activities out of the regulated banking sector. This carries a range of known political, regulatory, and environmental implications. But many potentially disruptive effects of digital currencies also remain unknown.[1]

Sponsorship and Footprint Characterize Disruptive Potential

Two attributes of a corporate crypto are likely to characterize its potential disruptiveness: the nature of its MNC sponsor (sponsorship) and how wide and far that MNC reaches (footprint). Figure 3.1 portrays types of corporate crypto along these two dimensions, color-coded to indicate their relative disruptive potential.

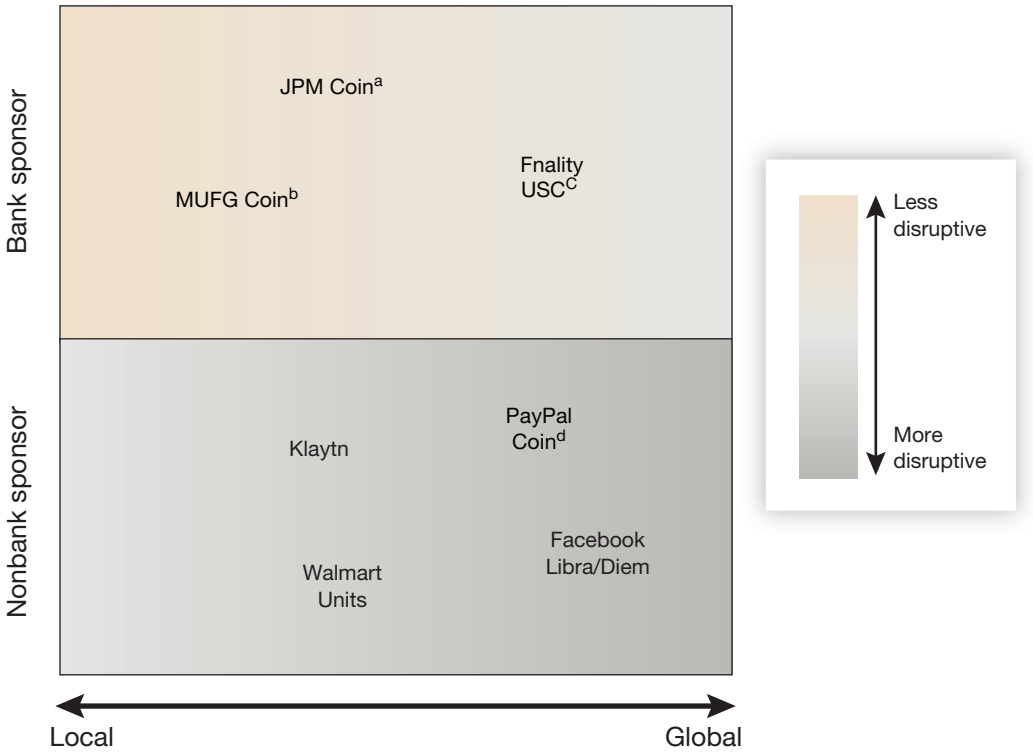
Sponsorship

A corporate crypto may be issued by a bank or a nonbank MNC. This distinction is important because relevant regulations are typically more demanding of banks, making nonbank sponsorship more disruptive. With no need to meet regulations, such as reserve requirements and no access to deposit insurance, nonbank sponsored crypto will need to devise new

[1] Although the terms *disruptive* and *disintermediation* might carry a negative connotation, we stress that these are features of technological change and, when used in this report, are not meant to convey evaluative judgment. It is also worth noting that the concept of disintermediation loses its relevance for corporate crypto adopted by the unbanked, because this does not represent a shift out of regulated banking. According to the World Bank Group (2022), there were 1.4 billion unbanked people worldwide in 2021.

FIGURE 3.1

Corporate Crypto's Disruptive Potential Varies by Sponsorship and Footprint



NOTE: The identification of projects and their approximate locations in this figure are for illustrative purposes only. JPM Coin = J.P. Morgan Coin; MUFG Coin = Mitsubishi UFJ Financial Group Coin; Fnality USC = Fnality Utility Settlement Coin.

[a] Although J.P. Morgan conducts operations globally, its JPM Coin is limited to select clients for intrabank transfer only (Oliver Wyman and J.P. Morgan, 2022).

[b] MUFG Coin was a digital currency project of MUFG announced in 2016 (MUFG, 2016). Its current operational status is unclear.

[c] Fnality USC is a peer-to-peer digital currency project with 17 participating financial institutions in Asia, Europe, and North America (Fnality, undated).

[d] PayPal Coin is a stablecoin project of the global digital payments and commerce company. The project was paused shortly before this report went to publication (Yang and Surane, 2023).

ways to protect users against loss (Adrian and Mancini-Griffoli, 2019, pp. 3–6). Additionally, banks and other financial intermediaries have developed a web of relationships integral to global commerce; nonbank crypto sponsors would be poised to disrupt this web as they refashion it in their own image (Brunnermeier, James, and Landau, 2019).

In Figure 3.1, JPM Coin, MUFG Coin, and Fnality USC are examples of bank-sponsored crypto. Nonbank-sponsored crypto includes Klaytn, a PayPal stablecoin (the development of which was paused in February 2023), a patented Walmart Unit, and Facebook's defunct Libra.

Footprint

A corporate crypto capability able to harness the power of networks would be a significant breakthrough. First, *network effects*—the phenomenon by which the value of something increases with the number of people who use it—are a critical enabler of digital currency (Adrian and Mancini-Griffoli, 2019). Second, any new currency must contend with the network effects that make existing currencies resilient to newcomers (Raskin, Saleh, and Yermack, 2019). The larger and more global the corporate crypto sponsor, the greater its potential to exploit network effects and erode the staying power of existing currencies (G7 Working Group on Stablecoins, 2019).

Figure 3.1 depicts JPM Coin, MUFG Coin, Klaytn, and Walmart Units as relatively local cryptos. Footprint is laid out along a spectrum from local to global. By contrast, Fnality USC is designed for worldwide use, PayPal's stablecoin could facilitate cross-border payments among its 435 million users (including 35 million merchants),[2] and Facebook Libra would have had a global base of about 2 billion users.[3]

Potential Specific Risks Are Also Associated with Corporate Crypto

Short of disintermediation, several risks may emerge if corporate crypto gains widespread use. Notable risks of corporate crypto increase in severity as products move from payment services to banking, credit, and investment services.[4] Table 3.1 lists risks and opportunities that the literature associates with private digital currencies. Each could potentially apply to corporate crypto as discussed below.

Legal and Regulatory Risks

At present, many risks arise from ambiguities in the legal frameworks, regulations, and standards at the intersection of digital assets and corporate activities. Particularly relevant to corporate crypto are questions of necessary licenses (Bilotta and Botti, 2018), legal obligations and responsibilities, taxation, privacy, consumer protection, law enforcement, and operational safety and security. Having a sound, clear, and transparent legal basis underpinning

[2] PayPal Holdings, Inc. (undated) reported 435 million accounts active during 2022, including 35 million active merchant accounts.

[3] Facebook (2019) reported 1.59 billion daily active users and 2.41 billion monthly active users as of June 2019, the month Facebook announced Libra.

[4] At the payment level, corporate crypto concerns involve money laundering and illicit finance, consumer protection and privacy, and cybersecurity. If corporate crypto were to move into banking, it would bear these and more concerns, such as disrupting monetary policy transmission and increasing financial instability risks.

TABLE 3.1
Risks and Opportunities Associated with Private Digital Currencies

Risks	Opportunities
• Financial instability • Ineffective regulation and supervision; lack of consumer protection • Erosion of monetary policy transmission • Large, unforeseen wealth transfer and/or currency imbalances • Money laundering, terrorism financing, and other forms of financial crimes • Abuse of data, erosion of privacy • Negative environmental impacts • Cyberattacks, operational failures, code vulnerabilities • Disappointing technical performance	• Easy, quick, less expensive payments and cross-border transfers • Lower costs of doing business • New revenue streams • Diversified financial services • Greater financial inclusion • New ways to comanage money with public bodies • Reduced counterparty risk • Accelerated financial innovation

SOURCE: Features information from various sources cited in this chapter.

regulation and monitoring can also have implications for how business models are designed and how customers are served (Kriwoluzky and Kim, 2019).

However, considering the likely global nature of corporate crypto, developing integrated frameworks and regulation is challenging because there is substantial variation in how crypto is regulated across different jurisdictions. Currently, there is a lack of consensus on cross-jurisdiction regulatory coordination of cryptocurrencies. A mixed and fragmented regulatory framework could result in ineffective regulation while also limiting some of the advantages and efficiencies that corporate crypto potentially offers (Zetzsche, Buckley, and Arner, 2021). Resolving these differences in regulation across jurisdictions and establishing robust cross-border multilateral supervisory cooperation and regulation will be challenging, as will enforcement (Gerba and Rubio, 2019).

Although it may be possible to apply certain aspects of existing regulation to them, different corporate cryptos are likely to differ significantly in their contractual and technological structures; thus, "the applicable legal regime depends crucially on the particular design and characterization" of a given corporate crypto (G7 Working Group on Stablecoins, 2019, pp. 5–6). That said any corporate cryptocurrency with global ambitions will likely be subject to U.S. regulation; for example, the U.S. Securities and Exchange Commission (SEC) may apply the Howey Test to such corporate cryptos to determine whether it should regulate them.[5] The development of corporate crypto might also give rise to new and untested technologies, which could facilitate the emergence of new risks.

[5] Whether SEC regulates a corporate crypto will largely depend on whether that cryptocurrency has the characteristics of an investment contract. The U.S. Supreme Court, in SEC v. W. J. Howey Co., 328 U.S. 293 (1946), "found that an 'investment contract' exists when there is the investment of money in a common enterprise with a reasonable expectation of profit to be derived from the efforts of others" (cited in SEC, 2019). In the digital asset space, cryptocurrencies that meet the criteria of an investment contract are known as *security tokens* while those that do not are known as *utility tokens*.

Market and Social Influence

With the current uncertainties in legal frameworks and regulation, a scenario with widespread global use of corporate crypto could portend the transfer and control of potentially vast amounts of money and the collection of data on a wide-reaching scale. This could further expand the influence of sponsoring corporations, which might result in social and financial risks.

Facebook co-founder Chris Hughes (2019) asserted that Libra would "insert a powerful new corporate layer of monetary control between central banks and individuals" and that "inevitably, these companies will put their private interests—profits and influence—ahead of public ones." Indeed, the credibility and viability of any corporate crypto will be linked to the credibility and trustworthiness of the company that sponsors it (G7 Working Group on Stablecoins, 2019). For example, Murphy and Stacey's (2022) postmortem of Libra revealed that the project ultimately failed because government regulators did not trust Facebook. One U.S. government official quoted went so far as to say that though Facebook "spent many years trying to engineer their project to fix all its faults . . . they could never fix being linked to Facebook. It was their original sin."

Data Uses and Abuses

Data are valuable in themselves as a major competitive factor in today's economy. There is significant latent power in the scale and extent of data that companies could collect on both financial transactions and user accounts (Abraham and Guégan, 2019). This is especially sensitive when financial data are incorporated and integrated into other networked services, and, indeed, "large tech corporations are likely to encourage users to allow the free flow of information within their ecosystem's activities with the promise of rewards" (Bilotta and Botti, 2018, p. 18). With the advancement of artificial intelligence and machine learning techniques and applications, privacy concerns could be exacerbated through a lack of transparency in how data might be used. Absent clear regulation, there is a risk that the standards and norms of practice and their enforcement will be defined by crypto-sponsoring corporations in areas such as privacy, identity verification, liability, and consumer protection.

Despite cryptocurrencies operating on persistent, publicly accessible ledgers, part of their appeal has been privacy in the form of anonymity. This has contributed to concerns about their use in criminal activities, terrorist financing, and sanctions evasion.[6] Although distributed ledgers might actually facilitate monitoring, "the *conditio sine qua non* to unlock this potential is that the real-world identities of users behind their pseudonyms are certain and known" (Bilotta and Botti, 2018, p. 17). Various digital forensics tools have emerged with criminal activity in mind (Harold et al., 2022). However, it is not clear whether, or to what extent, ledgers operated by corporations will be publicly available. Questions linger regarding

[6] For discussion on cryptocurrencies and their use by terrorist organizations, see Dion-Schwarz, Manheim, and Johnston, 2019. On cryptocurrencies in sanctions evasion and illicit activity, see Harold et al., 2022.

"how and to what extent enforcement agencies will be allowed to access, collect and analyze data of users" (Bilotta and Botti, 2018, p. 18). Additionally, the obligations of corporations to conduct Know Your Customer, AML/CFT checks, and sanctions compliance are also unclear. These AML/CFT and sanctions checks, while essential, add significant costs in the current financial system (G7 Working Group on Stablecoins, 2019); costs that unregulated or unscrupulous corporate crypto sponsors might be tempted to forgo. Finally, it is unknowable at this time how corporate crypto might facilitate tax evasion; this has flow-on consequences for the provision of public services through reduced government income.

Monetary Influence

If corporate cryptocurrency adoption increases and usage becomes customary across society worldwide, this might pose global financial systemic risk, particularly in the transmission of monetary policy and maintenance of financial stability.

The movement of money into systems sponsored by MNCs represents a shift of control from central banks and state financial institutions to corporations. This could diminish monetary sovereignty, especially in developing countries where lack of stable national currencies and financial systems might spur faster adoption (Kriwoluzky and Kim, 2019). Transfer of money into cryptocurrencies, particularly stablecoins, has been popular in parts of the world where there is high inflation or volatility in the domestic currency; for example, in Turkey or Venezuela (Ellsworth, 2021; Erkoyun and Wilson, 2021).

Similar to currency substitution or dollarization, rapid transfer of money to corporate crypto can weaken monetary policy with potentially destabilizing impacts, especially in developing nations (Kriwoluzky and Kim, 2019; Zetzsche, Buckley, and Arner, 2021). "Having control on capital is an important tool of central bank policy-making" (Bilotta and Botti, 2018, p. 17). Central banks have less power if citizens hold less of their national currency, particularly in periods of economic stress.

Corporate crypto could increase interdependencies between global money authorities. Libra aimed to derive stability and reduce volatility by pegging its value to a basket of stable world currencies. It is possible that corporate crypto would "increase cross-border capital mobility and thus the substitutability of domestic and foreign assets, thereby amplifying the responsiveness of domestic interest rates to foreign rates and decreasing domestic monetary control" (Kriwoluzky and Kim, 2019). Monetary policy implemented by states independently of one another could be made more difficult, and interdependencies between money authorities could facilitate the "cross border transmission of shocks" (G7 Working Group on Stablecoins, 2019, p. 12).[7]

[7] For further discussion on financial risks associated with cryptocurrencies, see Financial Stability Board, 2022.

Operational Risks

According to the G7 Working Group on Stablecoins (2019, p. 8), "inadequately designed and operated payment systems can be a source of systemic risk." For instance, a technological failure in a highly connected payment system could cause or worsen credit losses, or some other financial shock, that would broadly affect the stability of the financial system. Other operational risks could include cyberattacks, hacks, and fraud (Abraham and Guégan, 2019).

Environmental Risks

Bitcoin and many other cryptocurrencies are known for being highly energy and resource intensive. Bitcoin's energy consumption, particularly for its mining processes, results from its proof-of-work protocol (Harold et al., 2022). Newer, less energy-intensive protocols have since been developed.[8] Although corporations might employ a centralized, less energy-intensive model, it is not clear whether the environmental impact will be lower compared with other cryptocurrencies or current financial infrastructures, especially if operating globally.

Unknown Risks

While potential risks from the widespread adoption of corporate crypto can be anticipated, currently unknown risks could also arise. Features offered by corporate crypto platforms could evolve to be used in innovative ways not intended in their original design and result in unforeseen indirect effects. Risks could also disproportionately affect certain population groups.

Despite Many Risks, Corporate Crypto Could Also Offer Valuable Opportunities

Although there are potential risks, reputable MNCs are still experimenting with corporate cryptos; there are possible opportunities not only for MNCs but also for users, policymakers, and the global financial system.

Opportunities for Users

A central motivation for digital currencies is to move money anywhere as easily, quickly, and cheaply as sending an email. Corporate crypto could offer users—including customers and suppliers—these benefits by integrating rewards and financial products, such as payments, into applications that customers regularly use while displacing slower settlement processes and lowering transaction fees. In a world of multiple, competing corporate cryptos, users could have more choice over instruments that meet their individual needs. Corporate crypto

[8] For discussion on the main types of blockchain consensus protocols, see Zhang and Lee, 2020.

could provide users new avenues to access financial services and new software built to work with digital currency.[9]

Opportunities for MNCs

Businesses that sponsor cryptocurrencies could also benefit from lower costs associated with fees for financial services and settlement delays (minus the costs of the crypto's development, promotion, and maintenance). In addition to *seigniorage* (profits from selling newly created crypto), these companies could also generate revenue through new lines of business enabled by their own currencies (e.g., payments, credit products). Finally, the value of access to consumer behavior data that a proprietary digital currency would provide cannot be overstated.

Opportunities for Policymakers

Corporate cryptocurrencies could assist in the comanagement of money by diversifying the provision of banking and payment services and expanding access to such services. Built-in monitoring and analysis tools could help enforcement agencies secure payment systems. If regulators had direct access to transactional data—for example, by operating nodes within a corporate crypto's DLT ecosystem—compliance reporting requirements on participating firms could decrease. New policy tools could be identified as a byproduct of research and experience with corporate crypto.[10]

Global Opportunities

If corporate crypto supports cheaper, faster cross-border payments, it could facilitate remittances and international trade (e.g., by reducing counterparty risk) (Delivorias, 2021, p. 3). Corporate crypto could also foster additional financial innovation, including more-inclusive and less energy-intensive financial services.

---

[9] DLT payment systems can support smart contracts. *Smart contracts* are software programs that automatically execute based on predefined criteria and cannot be modified. For example, a smart contract can be used to automatically transfer a specific number of tokens given that certain conditions are met, similar to an automated bank payment but with a wider array of potential applications. See Oliva, Hassan, and Jiang, 2020.

[10] For policymakers and regulators to take full advantage of access to transactional data and new tools associated with digital assets, however, they would face additional workforce development/recruiting needs and likely bear additional costs associated with compliance that were once assumed by regulated firms.

CHAPTER 4

What Could a Successful Corporate Crypto Future Look Like?

Assuming MNCs continue to experiment with corporate crypto,[1] it remains to be seen how the technology will play out. Attempting to predict any technology's course of development is often folly; and with little empirical basis for examining existing corporate crypto, forecasts are highly speculative. But given the potential disruptive effects of corporate crypto, the associated risks and opportunities, and the persistent tensions involved in payments and money, it is worth contemplating policy implications.

To consider corporate crypto's future in as rigorous and informed manner as possible, we held a workshop with 18 experts using a method known as participatory foresight (see Appendix A for the list of participants and Appendix B for the workshop agenda). The workshops employed three techniques—backcasting, assumption-based planning, and Three Horizon Foresight—described in further detail throughout the following sections (Ecola et al., 2018; Lempert et al., 2020). In a participatory foresight exercise, a facilitator guides a small group of stakeholders from different perspectives through a series of questions and provocations curated to identify key elements of a desirable future and to collectively probe various alternative paths from the present to that future. This approach has proven particularly useful in enabling groups and communities to collectively explore and envision difficult-to-predict futures such as this one; to explicitly discuss what would constitute success; to examine possible actions to achieve desirable outcomes; and to identify adverse trends, events, and forces.[2]

The participatory foresight exercise was based on an imagined 2032 future in which corporate crypto is widespread. Distant enough to allow for ample change yet near enough to readily envision, this hypothetical future gave participants the liberty to imagine what role

[1] While crafting this report, there was a major downturn in the cryptocurrency market, and several large crypto firms failed. Some observers labeled the period *Crypto Winter*, and others suggested the market moves portended the ultimate demise of cryptocurrency. We note that, although developments in the cryptocurrency space have implications for corporate crypto, they are not one and the same. In fact, if corporate crypto is seen as an alternative to cryptocurrency, these events might even improve corporate crypto's prospects.

[2] Participatory foresight is also useful to build relationships among stakeholders who might not typically cross paths with one another. These relationships can provide benefits that last well after the exercise has concluded.

corporate crypto should play, while drawing on their expertise to describe how it could come about.

Participants were asked to envision this future as one in which corporate crypto has resolved—or at least reached a satisfactory equilibrium concerning—several tensions at play in money and payments: the balance of public and private interests, competition between banks and nonbank enterprises, local interests and globalization, and economic inequities. To reinforce that this part of the workshop was a normative exercise, envisioning what widespread use of corporate crypto should look like to be consistent with societal objectives, our facilitators used the word *desirable* to characterize this future state.[3] Participants then proceeded through a series of questions, including:

- What differentiates this future from the present?
- What are some strategic concepts that could enable realization of this future?
- Which constraints and uncertainties need to be addressed?
- What courses of action may be considered?
- What complications may arise along the way?

The following subsections detail results from the workshop proceedings and their subsequent review. The intent was neither to predict the future nor resolve whether corporate crypto will go mainstream. Rather, the aim was to contemplate one of many desirable futures in which corporate crypto did become widespread and to fashion a pathway to reach this outcome. Our findings are also by no means exhaustive. They reflect the views of the participants invited and the discussions held during the online workshops. Different stakeholder participation (and facilitation) in another setting might well result in different findings. The purpose in sharing these findings is to start a discussion on the future of corporate crypto with the community represented in those workshops and policymakers, businesspersons, technologists, and advocates working on the future of money and payments at the global level.

Corporate Crypto Might Be Neither Feasible Nor Desirable, but Envisioning Its Potential Matters

During the first workshop session, we asked experts and stakeholders from the organizations listed in Appendix A to describe what a future where corporate crypto goes mainstream could look like. Participants' initial reactions to the premise were telling. Not everyone agreed that corporate crypto is even desirable in the first place. One participant questioned

[3] A complete application of participatory foresight would consider the emergence of several possible futures. Because the workshop duration was compressed, this foresight exercise elaborated a single, most desirable future.

whether widespread use of corporate crypto is a plausible phenomenon; another expressed that a desirable state of corporate crypto is rather fanciful. Several disagreed about the pace by which—and degree to which—corporate crypto would introduce wider change. Others implored the group to consider how digital currency, whether implemented by MNCs or not, could completely reshape business and even reorganize society through decentralization and disintermediation. Beyond impressions about feasibility or desirability, participants differed with respect to whose interests would be primarily served by corporate crypto: many identified MNC sponsors and corporate crypto service providers as the likeliest beneficiaries because of ensuing business advantages. A few suggested that corporate crypto could meaningfully benefit unbanked individuals or those otherwise excluded from traditional financial services.

Still, participants from every professional affiliation present in the workshop (e.g., investor, policymaker, academic) were willing to take the premise of mainstream corporate crypto seriously. As subsequent results show, participants increasingly engaged with the topic and offered various perspectives over the course of the workshop. If such a small group can generate so many different responses to the exercise, ample opportunity exists for deliberation among the wider universe of stakeholders.

Corporate Crypto Could Become Desirable Because of Enhanced Features and Values Embedded By Design

On agreement that the intent of the workshop was to contemplate one of many possible futures in which corporate crypto did become widespread and to fashion a pathway to reach this outcome, facilitators prompted participants to define what this future could look like, using a backcasting technique.[4] Participants were divided into three breakout groups and tasked with imagining themselves in the year 2032, when corporate crypto has become widespread. Participants were asked what this world would look like, which elements would be emphasized, and what happened between 2022 and 2032 to make the success of corporate crypto possible. Facilitators emphasized how tensions currently at play in the context of crypto had been resolved or, at least, how some satisfactory equilibrium had been reached.

Participants ultimately agreed on the following key elements to characterize this future state:

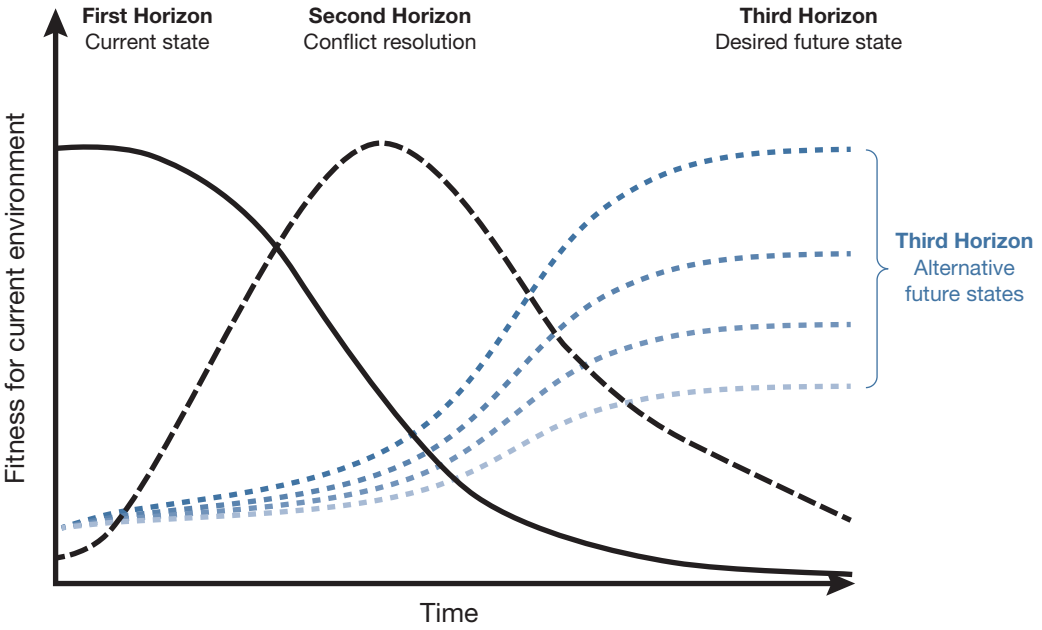
[4] *Backcasting* is a foresight method that places participants in the future and invites them to imagine, describe, and agree on a shared tangible and credible vision of the future before walking them back to the present to identify pathways that can connect the envisioned future with the present state. Our exercise generally encouraged participants to think about the goals they wish to achieve in the development of corporate crypto and in the wider digital currency space. In doing so, "this approach obviates a too early focus on strategies (means) without sufficient explicit exploration of objective values (ends) to be used in evaluating outcomes" (Lempert et al., 2020, p. 9).

- **Trustworthiness**: Corporate cryptos have become trustworthy and desirable means of payment and exchange because of their features (e.g., financial stability, cost-effectiveness) and embedded values (e.g., transparency, inclusiveness). Some level of trust in corporate crypto sponsors and related brands also prevails.
- **Transparency**: Transparency permeates all the features of corporate crypto and extends to the activities and operations of their sponsors, ultimately fostering trust in the product, service, the sponsor, and its brand.
- **Monetary stability**: Corporate cryptos are perceived as being broadly stable. Their value and exchange rate are clearly and transparently defined and adequately protected against runs, ensuring trust and consumer protection.
- **Public-private partnership**: Greater public-private cooperation in issuance and management of cash and money has supported monetary stability and reduced ambiguity around crypto regulation and helped central banks to retain their authority over monetary policy. In some instances, this has led to the integration of corporate crypto and CBDCs.
- **Exchangeability**: Exchanging corporate crypto with other digital currencies has become easy and costless. People can use corporate crypto to move money easily, quickly, and cheaply across borders without significant obstacles to exchangeability or intermediaries, and without compromising on interoperability. Some tokens can even be transferred directly through social media.
- **Privacy**: Data privacy and wider user rights have been embedded in the design of corporate crypto. Corporate crypto issuers have agreed to collect and process data for limited purposes only and in a transparent manner. Although this is not without competitive pressure, trust in corporate crypto issuers and their brands has ultimately increased, and the principles of data capitalism—accruing greatest benefit from the data gained on users rather than from charges for the service being offered to them—are eroding.
- **Inclusiveness**: Corporate crypto has become widely accessible to and usable for nontraditional users without compromising on user privacy. As a result, the gap between the haves and have-nots has been bridged or, at least, sufficiently reduced to solve frictions in the credit markets.
- **Cybersecurity**: The number of possible entry points for unauthorized access on these digital currencies (i.e., attack surface) and the potential severity of cyberattacks on these digital currencies have been minimized.

Big Ideas Are at the Root of Achieving This Desirable Vision

To help navigate from 2022 to the envisioned state, facilitators led participants using a technique known as Three Horizon Foresight, pictured in Figure 4.1.[5] Facilitators invited participants to consider what strategic concepts, or *big ideas*, could guide alternative courses of action to realize the desired future state. These big ideas underpin recommendations for deliberate and sustained changes to policy and technology, confronting constraints and uncertainties that arise as the world changes over time.

FIGURE 4.1
Three Horizon Foresight Technique



SOURCE: Features information from Ecola et al., 2018.

[5] The first horizon describes the present-day conditions shaping the digital currency space as presented in the previous sections of this report. The third horizon describes the long-term future state of the corporate crypto landscape. It could achieve the desired future vision elicited by workshop participants but could also take a completely different form, including a less desirable one, depending on the pathway choice, external drivers, and other potential surprises. The second horizon is the period of transition between the first and third horizon that participants need to navigate to shift from the current state to the desired future state (Lempert et al., 2020).

The following four big ideas to reach the proposed vision emerged from the workshop:

1. **Regulate globally**: Problems that are global in nature, or that have global ramifications, require a global response. Work toward the creation of an international regime, or, at least, extend existing global regulatory mechanisms to address corporate crypto.
2. **Harmonize standards**: Setting up international regimes is difficult and invites its own set of problems. Work toward adopting and coordinating internationally recognized standards at the national level.
3. **Prioritize privacy**: Focus on promoting and enforcing users' informed agency for release of information.
4. **Leverage tech for good**: Attempt to shape and guide technological development toward ends that serve the vision (e.g., verifiable credentials for privacy, interoperability for exchangeability, built-in transparency).[6]

A fifth strategic concept, not discussed in the workshop, is to do nothing. This alternative can be overlooked during creative discussion for it might not strike observers as much of a big idea at all. However, it could be employed for various reasons, two of which were derived from the literature.

5. **Do nothing**: Wait-and-see, or less charitably, let it burn. The wait-and-see reason to do nothing is grounded in the perspective that the novelty of cryptocurrency merits continued monitoring, and its present pace of adoption grants time to thoughtfully consider its consequences. The reasoning behind let it burn differs, but it also leads to doing nothing. Those who advocate this course argue that crypto is a destructive but passing fad, and any attempt to regulate crypto would implicitly legitimize it (Cecchetti and Schoenholtz, 2022).

It is worth noting that big ideas are not necessarily mutually exclusive, and many plausible courses of action can be derived from a combination of big ideas.

Each Big Idea Rests on Key Assumptions That Must Be Examined for Vulnerabilities

A shared vision and big ideas are important navigational aids but are rarely sufficient to cross the uncertain period of transition between the current state of the world and the future state. This transition period is rife with sources of unpredictable technological and social change,

[6] Many participants found the big idea *leverage tech for good* to be fraught with vulnerable assumptions about what constitutes good, for whom, and how it can be measured.

as well as environmental constraints. It also forces stakeholders to contend with conflict as expectations are tempered by real-world events and differing interests clash.

To continue to help participants navigate the transition period from the present state to the future state and implement their big ideas, the second workshop session explored potential obstacles and focused, in part, on identifying what could go wrong. To do so, participants were asked to identify the assumptions on which each big idea rests. These are *key assumptions*, meaning they are critical to the success of a particular course of action taken to implement a big idea. Participants were also invited to discuss where key assumptions might be vulnerable to breaking down. When real-world events run counter to expectations, key assumptions might fail and can negatively affect the result of a particular course of action, or, worse, completely derail it; in either case, they can lead to less desirable outcomes.

Table 4.1 maps seven key assumptions identified to each big idea, based on our synthesis and analysis of the workshop results. In the following sections, we discuss each key assumption.

Gains from Multilateral Cooperation

The big ideas *regulate globally* and *harmonize standards* assume that the benefits of multilateral cooperation (e.g., increased inclusiveness, enhanced global financial stability) outweigh its costs.[7] However, this assumption is primarily vulnerable to the underprovision of resources necessary to act collectively (e.g., to coordinate, monitor, and enforce) because of the free rider problem.[8] The *harmonize standards* big idea also relies on private entities' willingness to voluntarily agree to some baseline set of common standards. But, again, the benefit of doing so must outweigh the cost for private actors in the digital currency sphere. If, for example, a corporate crypto sponsor's business model relied in part on out-of-sync standards, then this assumption could begin to fail.

Appropriate Policy Venue

Another key assumption underpinning global regulatory and standards pathways is that the appropriate policy venue is available and chosen to deliberate and implement coordination between governments, as well as between public and private actors. As just discussed, multilateral cooperation is difficult, but it can become nearly impossible if attempted under the wrong circumstances (e.g., through a very public-facing venue during times of geopolitical tension or heightened public scrutiny, through a legal process when a political process is merited). The challenge is to identify a venue that accommodates both public and private interests without bringing regulation or standardization to a standstill.

---

[7] Benefits of international cooperation often come in two varieties: (1) reducing the negative effects (or increasing the positive effects) of spillover between countries and (2) providing for some global public good.

[8] The free rider problem is a common barrier to cooperation, occurring when a beneficiary of a good provided in common can contribute less than their share of the cost of providing that good.

TABLE 4.1

Key Assumptions Underpinning Each Big Idea

	Assumptions						
Big Ideas	Gains from Multilateral Cooperation	Appropriate Policy Venue	Consensus on the What and the Why	Solutions Keep Pace	Adequate Information Is Available	Existing Policy Regimes are Sufficient	Crypto Is a Fad
Regulate Globally	X	X	X	X	X		
Harmonize Standards	X	X	X	X	X		
Prioritize Privacy			X	X	X		
Leverage Tech for Good			X	X	X	X	
Do Nothing					X	X	X

Consensus on the What and the Why

Pursuing any of the big ideas except *do nothing* necessitates reaching a consensus on fundamental concepts related to corporate crypto, such as privacy and decentralization. Such pursuits also require developing a shared understanding and buy-in with respect to the key elements of a desirable future, because these factors may differ widely among different stakeholders.

Solutions Keep Pace

Unless pursuing the *do nothing* big idea, suitable policy instruments and technical solutions will need to keep pace with technological and social change. These tools would be necessary to build in elements of the vision while mitigating various risks (e.g., cyberattacks, including quantum-based attacks; money laundering; ownership changes leading to the deanonymization of ledger entries). The failure to keep pace with evolving threats—through policy, technology, or some combination thereof—will shift the course of progress away from the desirable state.

Adequate Information Is Available

Data will also need to be available in sufficient quantity, quality, and timeliness for regulatory instruments to operate effectively. The data needed differ depending on intended purpose of use. For example, data to prove wrongdoing differ, in most cases, from data needed to understand market dynamics. When, where, and how to obtain these data will require consideration while being mindful of privacy issues. Policymakers unable to gather necessary data will be at a disadvantage.

Existing Policy Regimes Are Sufficient

The generous version of the big idea *do nothing* assumes that existing policy regimes can adequately address the emergence of corporate crypto. However, this approach might not be sufficient to address the most disruptive manifestation of corporate cryptocurrency; those sponsored by a nonbank enterprise with a global footprint. Existing policy regimes were simply not set up to anticipate both characteristics at once.

Crypto Is a Fad

The less generous version of *do nothing* assumes that cryptocurrency, in general, is a fad—or, worse, a fraud. This *let it burn* perspective advises against any form of regulation for fear that action taken by policymakers would legitimize cryptocurrency by giving the public a false sense of security. It might be the case that cryptocurrency, indeed, fails, but the assumption is vulnerable to the event that corporate cryptocurrency succeeds in solving the problems that have plagued cryptocurrency.

The Failure of Key Assumptions Could Lead to a Less Desirable Corporate Crypto Future

An important benefit of probing key assumptions is the ability to deduce how their failure could affect courses of action between the present and the future. In the case of corporate crypto, the failure of key assumptions might be traced directly to undesirable consequences such as systemic risk and negative spillovers, fragmentation and workarounds, and loss of privacy and security.[9]

If any one of the five key assumptions were to fail, direct implications for financial stability and policy effectiveness are plausible. Failed multilateral cooperation, the inability to coordinate in the appropriate policy venue, or insufficient policy regimes could leave the global financial system vulnerable to contagion. A lack of consensus among stakeholders or inadequate information would leave policymakers in the dark about the potential magnitude of a problem and its solution. Each failure could play out, for example, during a run on a corporate crypto with a large footprint, as collapse could propagate from one jurisdiction or sector to another.

Fragmentation and the emergence of workarounds are another potential consequence of failed assumptions, particularly those involving multilateral cooperation. *Fragmentation* refers to the breakdown of long-standing relationships between actors at the global level while relationships strengthen among smaller sets of actors. Workarounds involve circumventing regulation or standards to satisfy some market or nonmarket demand. A common concern about workarounds is their role in avoiding sanctions or other conditions placed on participation in the agreed multilateral system.

The failures of two key assumptions—consensus on the what and the why and solutions keep pace—are especially relevant for privacy and security. In fact, on closer examination, these assumptions go hand in hand. First, stakeholders will need to reach a consensus on what privacy and security mean with respect to privately issued electronic cash. This could mean completely reimagining privacy and delinking it from identity, as discussed below, although granting enforcement authorities more visibility into the payments system to ensure its use does not run afoul of the law. Second, to achieve newly agreed conceptions of privacy and security, new technological and policy solutions will probably need to be developed (e.g., digital credential standards, real-time analytical capabilities). Failure of either assumption could make corporate crypto neither private nor secure, for example, by enabling belligerent actors (state or non-state) to access and abuse sensitive data.

[9] We limit our focus to undesirable consequences for global risk and security. Informed by the literature on systemic risk and international relations, we conceptualize global risk to security as the threat that a global system fails, increasing tensions at the global level.

CHAPTER 5

What Do Policymakers Need to Think About Today?

Unless adequate steps are taken to prepare for—or respond to—key assumptions breaking down, it becomes more difficult to divert from the path to a less desirable future state. With some forethought, it is possible to hedge against these vulnerabilities by considering actions designed to mitigate the negative consequences of an assumption's failure. In the process, it is also worth thinking about early warning signs (or signals) that an assumption is about to fail. If one of these signals were to flash, stakeholders can employ *shaping actions*, strategies designed to help navigate changing circumstances toward the desired future.

During the second workshop session, we asked participants to consider signals that could provide early warning that an assumption could fail, and hedging or shaping actions that could be used to help prevent failures and shape circumstances toward a more desirable future state.

A common refrain throughout the workshop was the need for regulatory action in the wider crypto space (including corporate crypto). Specifically, most participants expressed a desire for regulatory clarity and coordination to support competition among private enterprise in providing safer, easier, faster, and less expensive payments. Several pointed to unregulated cryptocurrency projects' recent failures—including Basis Cash, TerraUSD, and Luna[1]—and implored policymakers to take thoughtful, deliberate, and coordinated but not hasty action.

Participants offered many steps that stakeholders could begin with to act toward such thoughtful, deliberate, and coordinated regulation. Facilitating regular dialogue between stakeholders with different perspectives (e.g., regulators and policymakers, developers, users, investors) could help decrease uncertainty and ensure that innovation serves the public interest. Furthermore, institutionalizing and locating these discussions in forums at the lowest working level possible and shielded from scrutiny could create an environment where issues can be discussed without excessive politicization and hype. Developing a comprehensive, shared taxonomy might help stakeholders understand what is being negotiated and agreed on, especially around contested concepts such as privacy and decentralization.[2] Leverag-

[1] See Gladwin (2022) for a brief history of major stablecoin failures.

[2] We recognize the taxonomical work of organizations such as Bank for International Settlements, Financial Stability Board, and Financial Action Task Force. What became clear in the workshop is that existing

ing all possible tools available for enforcement (especially *soft tools*, such as international norms, naming and shaming), although allocating and developing resources toward effective enforcement mechanisms might reduce opportunities for regulatory arbitrage.

Another common refrain was that corporate crypto is interlinked with many other social and physical systems, such as markets, cyber infrastructure, identification systems, and the emerging metaverse. How these systems develop and evolve, and how they interact with corporate crypto, will influence how corporate crypto develops and will present different opportunities for policy action. For example, participants debated how the desirable corporate crypto element of privacy would evolve conceptually as different practices and technologies take hold. Would privacy expectations vary person to person as MNCs offer different levels of privacy in exchange for other benefits, such as discounted prices? In a similar spirit, depending on users' expectations and cost-benefit calculus, would privacy become a major differentiator between competing digital currencies? Participants discussed how complementary standards and technologies such as verifiable credentials and decentralized identifiers—essentially practices and tools that allow for authentication while protecting personal identities—might be employed to build in protections from the start and even reshape how users think about privacy.

As technology and society evolve, continued deliberation and analysis should offer lessons transferable both to and from corporate crypto policy. This would be strengthened by bolstering science and technology monitoring and analysis capabilities within governments, alongside interdisciplinary information- and knowledge-sharing among industry, academia, and policy bodies. Furthermore, participants discussed the value of believing in the possible: That is, even when solutions fail to keep pace with expectations, leaders can continue cultivating momentum toward successful solutions with the vision and big ideas.

Participants also suggested several ways to think about uncertainties related to corporate crypto. First, the corporate crypto that goes mainstream in the future could, in fact, differ substantially from what we can imagine today (including by design or in use). Defining corporate crypto rather broadly, as we have, should make the concept quite robust to different manifestations of the technology. Second, workshop participants stressed that public discourse (e.g., trending searches, viral stories, new lingo) might exaggerate the benefits and risks of corporate crypto. Developing feedback mechanisms and rigorously evaluating emerging projects will be important to inform stakeholders and decisionmakers and might help reinforce pathways toward desirable corporate crypto. Third, peer-to-peer electronic cash is novel to many and, perhaps because of its novelty, can be difficult to understand. This, in part, leaves individuals vulnerable to fraud and other abuses. Workshop participants discussed how greater consumer awareness efforts can help protect against these vulnerabilities.

taxonomies are still evolving, incomplete, and under-socialized (the lack of an inclusive but precise term for what we call *corporate cryptocurrency* is a case in point).

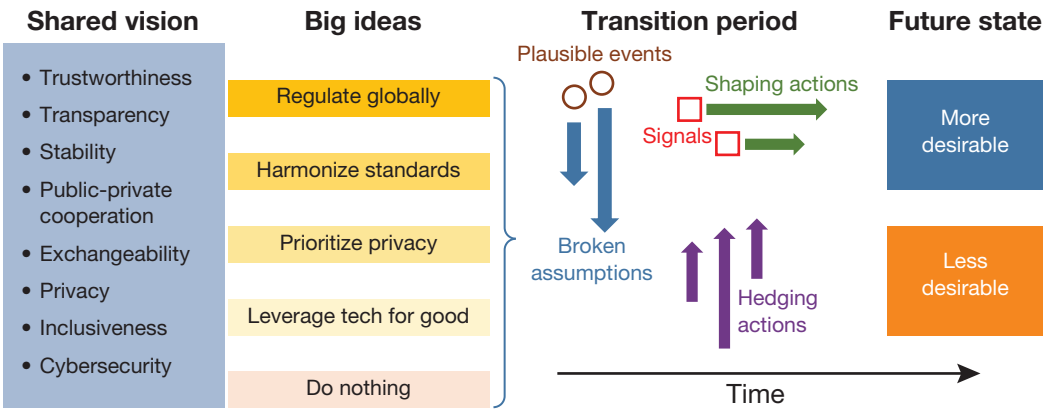
CHAPTER 6

Conclusion

Some may recall the story of Facebook Libra or point to perennial crises in crypto markets and question whether corporate crypto is even plausible. A bit of skepticism is justified, because regulators appear to have drawn a line in the sand in the case of Libra, and asset volatility, some high-profile cases of fraud, and regulatory uncertainty have stunted the growth of the wider crypto market, at least for now. However, interest in expanding the capabilities of private money runs deep, and corporate crypto could satisfy that interest—for good or otherwise. Applying participatory foresight methods can shed light on important questions about the path forward while developing fruitful relationships among stakeholders in the corporate crypto space.

Figure 6.1 weaves together the major elements of the corporate crypto workshop. The (hopeful) shared vision and (actual) future state bookend elements of possible pathways from the present to the future. The big ideas inform actions taken during the transition period, which is another way of looking at the Second Horizon portrayed previously in Figure 4.1. That is, as time progresses along the right half of Figure 6.1, paths moving upward approach a more desirable future while downward movement approaches a less desirable future.

FIGURE 6.1
Developing Pathways Through Transition



The participatory workshop resulted in the following key findings about the potential for widespread corporate crypto and its consequences:

- Participant perspectives differed on the feasibility and desirability of corporate crypto, but they all agreed it is important to take it seriously.
- Corporate crypto could be part of a desirable future of money and payments, but care must be taken to ensure it embodies values shared by stakeholders.
- While differing on exactly what should be done, participants universally agreed that more could be done from a policy perspective to address the potential of corporate crypto.
- As disruptive as it might ultimately become, corporate crypto's implications for policy-making do not differ substantially from many other challenges that require multilateral cooperation.

As crypto policy work continues to mature, incorporating participatory foresight is a valuable way to strengthen and enrich such policy recommendations. Participatory foresight provides a safe, structured venue for a variety of stakeholders to explore and experiment with contentious and uncertain topics. It can also be a way to bridge gaps in understanding between various interests, which can often lead to the development of new ideas and solutions. Judging by the enthusiasm and supportive feedback that participants shared about the corporate crypto workshop, they would be delighted to engage with policymakers in this way.

APPENDIX A

Workshop Participants

People affiliated with the following organizations participated in one or both of the two workshop sessions. Institutional affiliations are given for purposes of identification only. Any findings are personal ones of participants and should not be taken to represent positions of the organizations identified.[1]

- Amazon Web Services
- Aspen Institute
- Bank for International Settlements Innovation Hub (Swiss Centre)
- Bank of Italy
- Blockchain Foundation
- Coinbase Institute
- CryptoConexión
- Enterprise Ethereum Alliance
- European Commission Directorate-General for Financial Stability, Financial Services and Capital Markets Union (DG FISMA)
- International Monetary Fund
- INTERPOL Financial Crime and Anti-Corruption Center
- Israeli Ministry of Finance
- London School of Economics
- Lightspark
- Massachusetts Institute of Technology
- Modest
- Organisation for Economic Co-operation and Development
- Terranet Ventures
- University College London
- University of California, Santa Barbara

[1] One additional person participated, but their respective organization declined to be identified. Three participants were affiliated with more than one organization. This table lists all institutional affiliations provided by participants, so the total number of organizations listed (20) exceeds the total number of individual workshop participants (18).

APPENDIX B

Workshop Agenda

All times Pacific; both workshop sessions held online.

TABLE B.1
Session 1, October 19, 2022

Time	Description
6:00–6:20 a.m.	Introduction (plenary)
6:20–7:05 a.m.	• Part A (small groups): What could a future with a successful widespread corporate crypto look like? • Describe an element of a desired future for corporate crypto. • What tensions remain? • What is the driving force behind it? • Are there examples from other financial innovations? • Difference from the present (change) • Conflicts that must be resolved • Relevant stakeholders
7:05–7:35 a.m.	• Part B (small groups): What "big ideas" could help bridge the gap between the present and the desirable future? • Identify and describe big ideas • Constraints • Uncertainties
7:35–7:45 a.m.	Break
7:45–8:15 a.m.	Report back and discuss (plenary)
8:15–8:30 a.m.	Conclusion (plenary)

TABLE B.2

Session 2, November 2, 2022

Time	Description
7:00–7:30 a.m.	Introduction (plenary)
7:30–7:50 a.m.	• Part A (small groups): What assumptions underpin the success of each "big idea?" • What occurred to make the desired future happen? What did not happen? • What allowed this change from the present to be sustainable? • Are there elements of this change visible in the contemporary world?
7:50–8:30 a.m.	• Part B (small groups): What vulnerabilities, hedging actions, signals, and shaping actions should be considered as the world changes? • How might the assumptions of each "Big Idea" be vulnerable? • What ways might be possible to hedge against these vulnerabilities? • What early warning signs (signals) could indicate divergent trajectories? • What active measures of shaping the future could be carried out to enhance the chances of success?
8:30–8:40 a.m.	Break
8:40–9:20 a.m.	Report back and discuss (plenary)
9:20–9:30 a.m.	Conclusion (plenary)

Abbreviations

AML/CFT	Anti-Money Laundering and Countering the Financing of Terrorism
CBDC	Central Bank Digital Currency
DLT	distributed ledger technology
e-CNY	electronic Chinese Yuan
MNC	multinational corporation
MUFG	Mitsubishi UFJ Financial Group
SEC	U.S. Securities and Exchange Commission
USC	Utility Settlement Coin

References

Abraham, Louis, and Dominique Guégan, "The Other Side of the Coin: Risks of the Libra Blockchain," *ArXiv*, 2019.

Acharya, Viral V., and Matthew Richardson, "Causes of the Financial Crisis," *Critical Review*, Vol. 21, Nos. 2–3, 2009.

Acharya, Viral V., Philipp Schnabl, and Gustavo Suarez, "Securitization Without Risk Transfer," *Journal of Financial Economics,* Vol. 107, No. 3, 2013.

Adachi, Mitsu, Pedro Bento Pereira Da Silva, Alexandra Born, Massimo Cappuccio, Stephanie Czák-Ludwig, Isabella Gschossmann, Antonella Pellicani, Mirjam Plooij, Georg Paula, and Sarah-Maria Philipps, "Stablecoins' Role in Crypto and Beyond: Functions, Risks and Policy," *Macroprudential Bulletin,* Vol. 18, 2022.

Adrian, Tobias, and Tommaso Mancini-Griffoli, "The Rise of Digital Money," *International Monetary Fund FinTech Notes*, No. 2019/001, July 15, 2019.

Arner, Douglas, Raphael Auer, and Jon Frost, "Stablecoins: Risks, Potential and Regulation," Bank for International Settlements Working Papers, No. 905, November, 2020.

"Bakkt Launches Its Digital Wallet, Bakkt App, to Manage All Forms of Digital Assets, Debuting with Starbucks, GolfNow, and Best Buy Among Other Marquee Brands," Business Wire, March 30, 2021.

Bank for International Settlements, *Central Bank Digital Currencies: Financial Stability Implications*, September 2021.

Benzmiller, Theodore, "China's Progress Towards a Central Bank Digital Currency," Center for Strategic & International Studies, April 19, 2022.

Bilotta, Nicola, and Fabrizio Botti, "Libra and the Others: The Future of Digital Money," *Istituto Affari Internazionali*, Nos. 19–22, November 2019.

Bodea, Cristina, Christian Houle, and Hyunwoo Kim, "Do Financial Crises Increase Income Inequality?" *World Development*, Vol. 147, November 2021.

Bower, Joseph L., and Clayton M. Christensen, "Disruptive Technologies: Catching the Wave," *Harvard Business Review,* Vol. 73, No. 1, January–February 1995.

Brixton Pound, homepage, undated. As of July 30, 2022:
https://brixtonpound.org/

Brunnermeier, Markus K., Harold James, and Jean-Pierre Landau, "The Digitalization of Money," National Bureau of Economic Research, Working Paper No. 26300, September 2019.

Bushey, Claire, "US Airlines Reveal Profitability of Frequent Flyer Programmes," *Financial Times*, September 15, 2020.

Carlisle, David, "Tokens and Stablecoins in Financial Crime," *Elliptic Blog*, May 20, 2022.

Cecchetti, Stephen, and Kim Schoenholtz, "Let Crypto Burn," *Financial Times*, November 17, 2022.

Corsetti, Giancarlo, Paolo Pesenti, and Nouriel Roubini, "What Caused the Asian Currency and Financial Crisis?" *Japan and the World Economy,* Vol. 11, No. 3, October,1999.

Delivorias, Angelos, *Stablecoins: Private-Sector Quest for Cryptostability*, European Parliamentary Research Service, November, 2021.

Deloitte, "The Use of Cyptocurrency in Business: Why Companies Should Consider Using Cryptocurrency," webpage, undated. As of August 2, 2022:
https://www2.deloitte.com/us/en/pages/audit/articles/corporates-using-crypto.html

Dion-Schwarz, Cynthia, David Manheim, and Patrick B. Johnston, *Terrorist Use of Cryptocurrencies: Technical and Organizational Barriers and Future Threats*, RAND Corporation, RR-3026, 2019. As of June 20, 2022:
https://www.rand.org/pubs/research_reports/RR3026.html

Dodd, Nigel, "The Social Life of Bitcoin," *Theory, Culture & Society,* Vol. 35, No. 3, May 2018.

Ecola, Liisa, Steven W. Popper, Richard Silberglitt, and Laura Fraade-Blanar, *The Road to Zero: A Vision for Achieving Zero Roadway Deaths by 2050*, RAND Corporation, RR-2333-NSC, 2018. As of November 12, 2022:
https://www.rand.org/pubs/research_reports/RR2333.html

Elder, Bryce, "No, Russia Won't Replace SWIFT with the Blockchain," *Financial Times*, June 20, 2022.

Ellsworth, Brian, "As Venezuela's Economy Regresses, Crypto Fills the Gaps," Reuters, June 22, 2021.

Erkoyun, Ezgi, and Tom Wilson, "Turkey's Slumping Lira Adds Fuels to Crypto Trading Boom," Reuters, March 31, 2021.

Ethereum, "The Ethereum Vision: A Digital Future on a Global Scale," webpage, undated. As of February 16, 2023:
https://ethereum.org/en/upgrades/vision/

Facebook, "Facebook Reports Second Quarter 2019 Results," July 24, 2019.

Financial Crisis Inquiry Commission, *The Financial Crisis Inquiry Report: The Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States Including Dissenting Views*, Government Printing Office, 2011.

Financial Stability Board, *Assessment of Risks to Financial Stability from Crypto-Assets*, February 16, 2022.

Flood, Robert, and Nancy Marion, "Perspectives on the Recent Currency Crisis Literature," *International Journal of Finance & Economics*, Vol. 4, No. 1, February 1999.

Fnality, homepage, undated. As of February 16, 2023:
https://www.fnality.org/home

G7 Working Group on Stablecoins, *Investigating the Impact of Global Stablecoins*, Bank for International Settlements, October 2019.

Gerba, Eddie, and Margarita Rubio, *Virtual Money: How Much Do Cryptocurrencies Alter the Fundamental Functions of Money?* Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, November 2019.

Gladwin, Ryan S., "Panics and Death Spirals: A History of Failed Stablecoins," *Fast Company*, May 14, 2022.

Gobat, Jeanne, "Banks: At the Heart of the Matter," *International Monetary Fund Finance & Development*, undated.

Hilton, Georege W., *The Truck System, Including a History of the British Truck Acts, 1465–1960*, W. Heffner and Sons, Ltd., 1960.

Harold, Scott W., Kathryn E. Bouskill, Hiroo Ichikawa, Sale Lilly, and Ryushi Watanabe, *Proceedings of the U.S.-Japan Socioeconomic Policy Research Exchange: The Rise of Telework Under COVID-19 and the Growth of Cryptocurrency*, RAND Corporation, CF-A1556-1, 2022. As of June 20, 2022:
https://www.rand.org/pubs/conf_proceedings/CFA1556-1.html

Hughes, Chris, "Facebook Co-Founder: Libra Coin Would Shift Power into the Wrong Hands," *Financial Times*, June 21, 2019.

International Monetary Fund, "Digital Money Across Borders: Macro-Financial Implications," *International Monetary Fund Policy Papers*, No. 2020/050, October 2020.

J.P. Morgan, "Onyx Coin Systems," webpage, undated. As of July 10, 2022:
https://www.jpmorgan.com/onyx/coin-system.htm

Klaytn Foundation, "About Klaytn," webpage, undated. As of July 10, 2022:
https://klaytn.foundation/about-klaytn/

Kriwoluzky, Alexander, and Chi Hyun Kim, "Public or Private? The Future of Money," Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Monetary Dialogue Papers, December 2019.

Kubler, Felix, and Karl Schmedders, "Financial Innovation and Asset Price Volatility," *American Economic Review,* Vol. 102, No. 3, 2012.

Lempert, Robert J., Tim McDonald, Steven W. Popper, Diogo Prosdocimi, and Thomas A. Small, *Implementing a New Mobility Vision for Rancho Higuera in a Deeply Uncertain, Fast-Changing World: Results from RAND Corporation Participatory Local Planning Workshops*, RAND Corporation, CF-407-RPC, 2020. As of November 10, 2022:
https://www.rand.org/pubs/conf_proceedings/CF407.html

Libra Association, "An Introduction to Libra," June 18, 2019. As of August 7, 2023:
https://www.diem.com/en-us/updates/introducing-libra/

Libra Association, "Economics and the Reserve," April, 2020. As of August 2, 2022:
https://www.diem.com/en-us/economics-and-the-reserve/

Lonto, Jeff R., *The Trading Stamp Story (or: When Trading Stamps Stuck)*, Studio Z-7 Publishing, 2013.

Morning Consult, *The Crypto Report: Our Analysts on the State of Cryptocurrency*, July 2022.

Mitsubishi UFJ Financial Group, "Fintech, Blockchain and Digital Currencies," webpage, 2016. As of February 16, 2023:
https://www.mufg.jp/english/ourbrand/featuredarticle/2016_03.html

MUFG—*See* Mitsubishi UFJ Financial Group.

Murphy, Hannah, and Kiran Stacey, "Facebook Libra: The Inside Story of How the Company's Cryptocurrency Dream Died," *Financial Times*, March 10, 2022.

Oliva, Gustavo A., Ahmed E. Hassan, and Zhen Ming Jiang, "An Exploratory Study of Smart Contracts in the Ethereum Blockchain Platform," *Empirical Software Engineering*, Vol. 25, No. 3, 2020.

Oliver Wyman, and J.P. Morgan, *Deposit Tokens: A Foundation for Stable Digital Money*, 2022.

PayPal Holdings, Inc., homepage, undated. As of February 16, 2023: https://investor.pypl.com/home/default.aspx

Prasad, Eswar, *The Future of Money: How the Digital Revolution is Transforming Currencies and Finance*, Harvard University Press, 2021.

President's Working Group on Financial Markets, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency, *Report on Stablecoins*, November 2021.

Raskin, Max, Fahad Saleh, and David Yermack, "How Do Private Digital Currencies Affect Government Policy?" National Bureau of Economic Research Working Paper Series, No. 26219, September 2019.

Rauchs, Michel, Andrew Glidden, Brian Gordon, Gina Pieters, Martino Recanatini, François Rostand, Kathryn Vagneur, and Bryan Zhang, *Distributed Ledger Technology Systems: A Conceptual Framework*, Cambridge Centre for Alternative Finance, August, 2018.

Read, Oliver, and Stefan Schäfer, "Libra Project: Regulators Act on Global Stablecoins," *Intereconomics,* Vol. 55, No. 6, November 2020.

Reinhart, Carmen M., and Kenneth S. Rogoff, "The Aftermath of Financial Crises," *American Economic Review,* Vol. 99, No. 2, May 2009.

Rewilak, Johan, "The Impact of Financial Crises on the Poor," *Journal of International Development,* Vol. 30, No. 1, January 2018.

Rockoff, Hugh, "The Free Banking Era: A Reexamination," *Journal of Money, Credit and Banking,* Vol. 6, No. 2, May 1974.

SEC—*See* U.S. Securities and Exchange Commission.

Tett, Gillian, *Fool's Gold: The Inside Story of J.P. Morgan and How Wall St. Greed Corrupted Its Bold Dream and Created a Financial Catastrophe*, Simon and Schuster, 2009.

U.S. Department of the Treasury, *Report of the Presidential Task Force on Market Mechanisms*, U.S. Government Printing Office, 1988.

U.S. Securities and Exchange Commission v. W. J. Howey Co., 328 U.S. 293, 1946.

U.S. Securities and Exchange Commission, "Framework for 'Investment Contract' Analysis of Digital Assets," webpage, April 3, 2019. As of February 16: https://www.sec.gov/corpfin/framework-investment-contract-analysis-digital-assets

White, Lawrence H., *Free Banking in Britain: Theory, Experience and Debate, 1800–1845*, 2nd ed., The Institute of Economic Affairs, 1995.

Wiener, Anna, "Money in the Metaverse," *The New Yorker*, January 4, 2022.

World Bank, "Nonbanking Financial Institution," webpage, undated. As of July 30, 2022: https://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/nonbank-financial-institution

World Bank Group, "COVID-19 Boosted the Adoption of Digital Financial Services," webpage, July 21, 2022. As of February 16: https://www.worldbank.org/en/news/feature/2022/07/21/covid-19-boosted-the-adoption-of-digital-financial-services

Yang, Yueqi, and Jennifer Surane, "PayPal Pauses Stablecoin Work Amid Regulatory Scrutiny of Crypto," Bloomberg, February 10, 2023.

Zetzsche, Dirk A., Ross P. Buckley, and Douglas W. Arner, "Regulating Libra," *Oxford Journal of Legal Studies,* Vol. 41, No. 1, 2021.

Zhang, Shijie, and Jong-Hyouk Lee, "Analysis of the Main Consensus Protocols of Blockchain," *ICT Express,* Vol. 6, No. 2, June 2020.