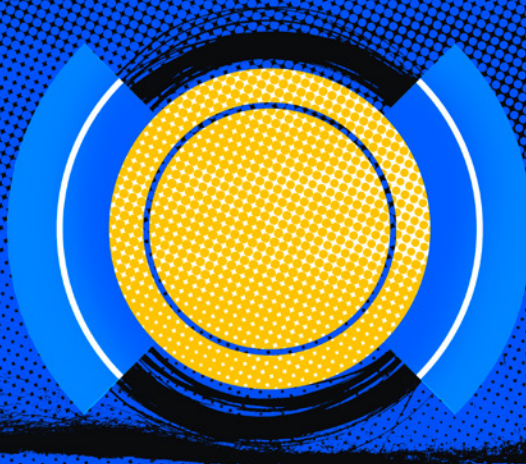


STABLECOINS:



COINBASE WHITE

PAPER

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PART 1

Introduction

Money takes many forms. It is conventionally defined as a store of value, a medium of exchange and a unit of account. All kinds of objects have been used as money in different times and places, from seashells,¹ tally sticks,² or even goats,³ to coins and paper notes. Whatever form it takes, money has a social dimension: it works because people believe in it and want to use it. Most people today think of money as either hard currency or bank deposits. In the future, we believe stablecoins will be used as money, just as easily as hard currency and bank deposits are today. Like any early stage technology, stablecoins are not yet widely understood, and their development has stretched policy makers' ability to keep up. We offer this whitepaper to help raise awareness of the underlying issues and to ground policy discussions in a solid, factual understanding of what stablecoins are and how stablecoin arrangements work.

¹Wikipedia, [Shell money](#)

²BBC, [What tally sticks tell us about how money works](#) (10 July 2017)

³Financial Times, [Cryptocurrencies untether the goat of sovereign tender](#) (21 Feb 2019)



Stablecoins are digitally native payment instruments that are designed to maintain a stable value compared to an external reference asset, usually a fiat currency such as the U.S. dollar.

They provide a bridge between the traditional financial system and the cryptoeconomy, allowing fiat currencies to exist in a form that can move more freely and more efficiently on blockchains. Unlike conventional payment methods, stablecoin payments require no centralized intermediary. As blockchain technology continues to improve, stablecoins could make it possible to send money to anyone, anywhere in the world as easily as sending a text message. Stablecoins could therefore be the foundation of a new era of innovation in financial services. But, like all financial instruments, they also present risks that need to be well understood and appropriately addressed by financial regulators.

Policy choices about stablecoins will fundamentally shape the future of the global financial system as it transitions to digitally native environments and distributed ledger technologies. Making good decisions requires understanding the different types of stablecoins and the arrangements underlying them. Our whitepaper explains how different stablecoin arrangements operate, the current and potential uses of stablecoins, and how to consider regulatory approaches that balance their potential benefits against their risks. The overarching goal is to provide insights and perspective to help shape the regulatory path forward.

1.1

Stablecoins and stablecoin arrangements

Two concepts frame the rest of this whitepaper: *stablecoins* and *stablecoin arrangements*.

Stablecoins are the actual tokens, i.e., digitally native payment instruments on a blockchain. A “stablecoin arrangement” is the ecosystem around a stablecoin, including the processes, people, and entities involved in using it. The processes include issuing and redeeming the stablecoin, transferring it between users and maintaining the stablecoin’s peg. The people and entities include not only the stablecoin’s holders and its issuer (which could be a legal entity or protocol), but also many others, such as custodians, developers, exchanges, market makers, and arbitrageurs.

Throughout the whitepaper, we use the term “stablecoin” to refer to a digital asset that is supposed to maintain a stable value. We want to use language that is familiar to most crypto market participants, and use technical terms only where their precision is important from a policy perspective. For the same reason, we use the following terms for three main types of stablecoins, based on the different mechanisms they use to maintain their value:

- **Fiat-backed:** Stablecoins backed by reserve assets in the traditional financial system, such as cash, cash equivalents, or securities
- **Crypto-backed:** Stablecoins backed by digital assets that exist and are used independently from the stablecoin arrangement
- **Algorithmic:** Stablecoins that are not backed by any reserve assets, that instead seek to maintain their value using algorithms to adjust their supply relative to another digital asset within the same stablecoin arrangement

These stablecoins fall into two types of arrangements:

- **Custodial arrangements:** Fiat-backed stablecoins have reserve assets held in custody by the stablecoin’s issuer, and the issuer bears primary responsibility for issuance, redemption, and maintaining the stablecoin’s peg
- **Non-custodial arrangements:** Crypto-backed and algorithmic stablecoins do not have reserve assets held in custody, and the core functions of the stablecoin arrangement are performed by automatic operation of smart contracts on a blockchain

These are general categories, and some stablecoins combine features from more than one of them, as the following sections of this whitepaper discuss in more detail.

1.2

Background and roadmap

Section 2 of the paper provides an overview of the stablecoin market and types of stablecoins. Approximately \$145 billion in stablecoins are in circulation today.⁴ Fiat-backed stablecoins represent 91.7% of this amount, and nearly all are pegged to the U.S. dollar.⁵ Fiat-backed stablecoins have generally been successful in maintaining their pegs, though as we discuss below they are not without risk. Some crypto-backed stablecoins have also established good track records, even through periods of market dislocation. DAI, for example, makes innovative use of smart contracts and over-collateralization to protect its value against the volatility of prices of other digital assets. In contrast, algorithmic stablecoins like TerraUSD (UST) have attempted to use smart contracts to maintain their pegs without collateral, and almost all of these have failed. We discuss the successes and the failures in Section 2.

⁴The Block, [Stablecoins](#), as of 30 June 2022

⁵Id.

Section 3 discusses the expanding range of stablecoins' potential uses. The earliest and heaviest use of stablecoins is for paired-trading with other digital assets on blockchains. Stablecoins provide market participants the simplicity and efficiency of pricing assets in a common currency, near-instantaneous settlement of digital asset transactions, and a way to retain assets on-chain with less exposure to volatility. But stablecoins also have the potential for mainstream commercial uses such as merchant payments and can even reshape parts of traditional finance by which disadvantaged communities have been underserved. For example, the global average cost of sending a \$200 remittance was \$12.08 in 2021, and in many remittance corridors the typical cost is much higher.⁶ Stablecoins, in addition to other cryptocurrencies, make it possible for these payments to be made instantaneously at a much lower cost.

⁶BIS, [The journey so far: making cross-border remittances work for financial inclusion](#) (15 June 2022); Coinbase Institute, [Crypto & Remittances](#) (30 June 2022)

Section 4 covers a wide range of policy considerations that will inform decisions in many jurisdictions on the regulatory frameworks for stablecoin issuance and use. These include:

- **Financial stability and run risk**
- **Operational resilience**
- **Prevention of financial crimes**
- **Consumer protection and market integrity**
- **Monetary policy**
- **Competitiveness**
- **Legal rights of stablecoin holders**

In Section 5 we conclude with our recommendations regarding the path forward for stablecoin policymaking. Most importantly, we believe regulatory frameworks should not impose a one-size-fits-all approach on stablecoins. Fiat-backed stablecoins should meet rigorous requirements to support consumers' confidence. Regulatory frameworks should also hold space for continued experimentation with crypto-backed and algorithmic stablecoins, within guardrails for consumer protection and financial stability.

1.3

About Coinbase

Coinbase provides a trusted and easy-to-use platform for accessing the broader crypto economy. Today, there are approximately 98 million verified users, 13,000 institutions and 230,000 ecosystem partners in over 100 countries who rely on Coinbase to easily and securely spend, save, earn, and use stablecoins and other cryptocurrencies.⁷ We offer custody services for 212 digital assets and trading services for 172 digital assets, including stablecoins, on our platform.⁸

Coinbase favors a comprehensive approach to the regulation of digital asset activities, tailored to the benefits and risks raised by these activities. We strongly believe that regulation of digital asset activities should not simply seek to pigeonhole new activities into existing categories, which are often ill-suited to the task. Designing an effective regulatory framework calls for careful balancing of risks, benefits, and tradeoffs. We actively contribute to the policy discussion through publications like our Digital Asset Policy Proposal (#dApp),⁹ responses to regulatory proposals and consultations,¹⁰ and research from the Coinbase Institute.¹¹ This whitepaper is a further contribution to that important discussion.

⁷ Coinbase, [About Coinbase](#), as of 30 June 2022

⁸ The Coinbase Blog, [Listing assets on Coinbase is free, and always has been](#) (31 May 2022)

⁹ Coinbase, [Digital Asset Policy Proposal \(#dApp\)](#) (14 Oct 2021)

¹⁰ Coinbase, [Public Policy](#)

¹¹ Coinbase, [Coinbase Institute](#)

PART 2

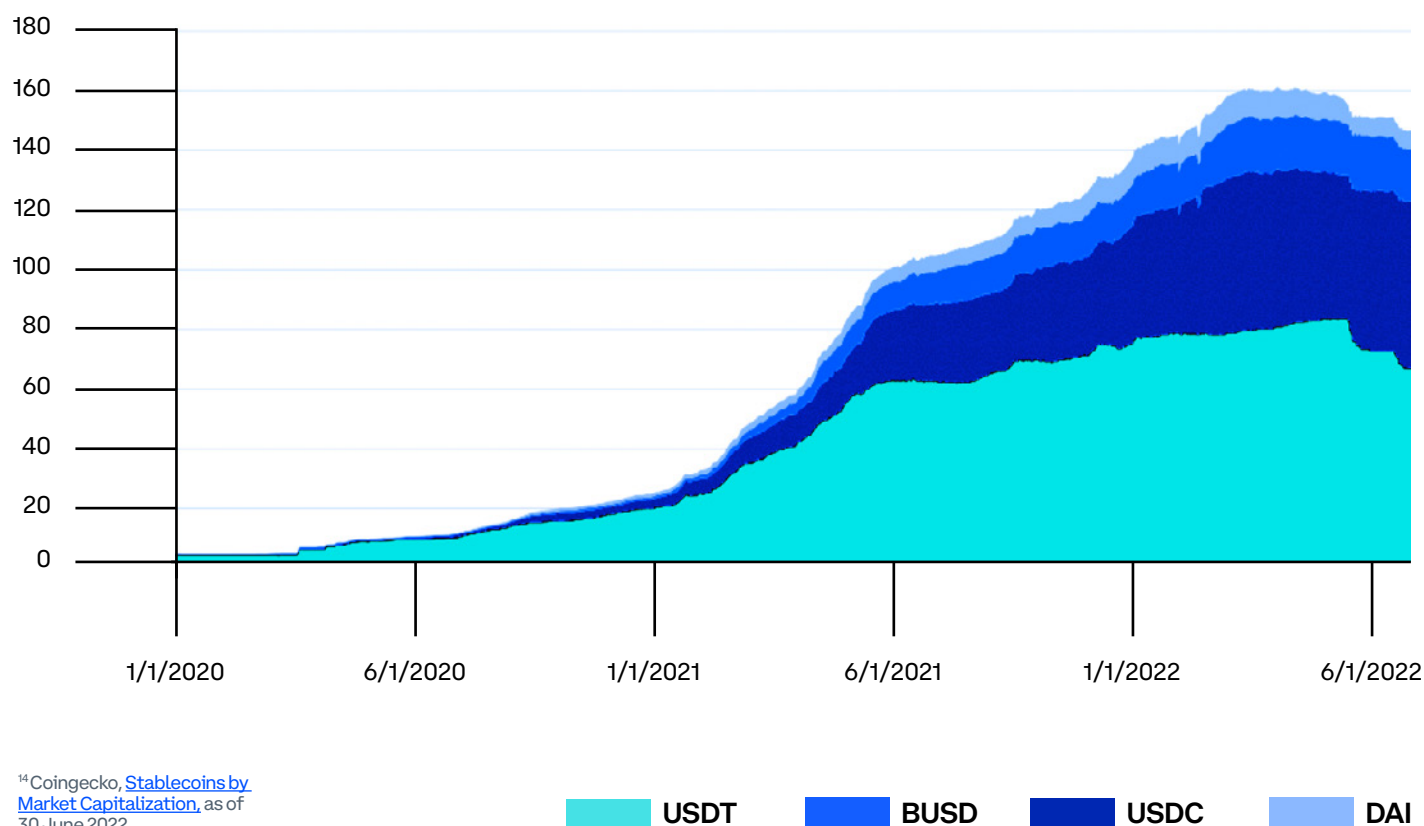
Stablecoins and stablecoin arrangements

¹² The Block, [Stablecoins](#), as of 30 June 2022

¹³ Id.

Stablecoins have rapidly gained popularity in the past few years in response to users' demand for stable and secure digital assets. As shown below, the total market capitalization of stablecoins globally is currently around \$145 billion, roughly 1.4 times the \$106 billion market capitalization as of the end of May 2021, and 13 times the \$11 billion market capitalization as of May 2020.¹² The four largest stablecoins today are USDT, USDC, BUSD, and DAI, which together comprise roughly 94.8% of the market.¹³

Figure 1: Market capitalization of USDT, USDC, BUSD, DAI¹⁴ (\$BN, 1/1/20 – 6/30/22)

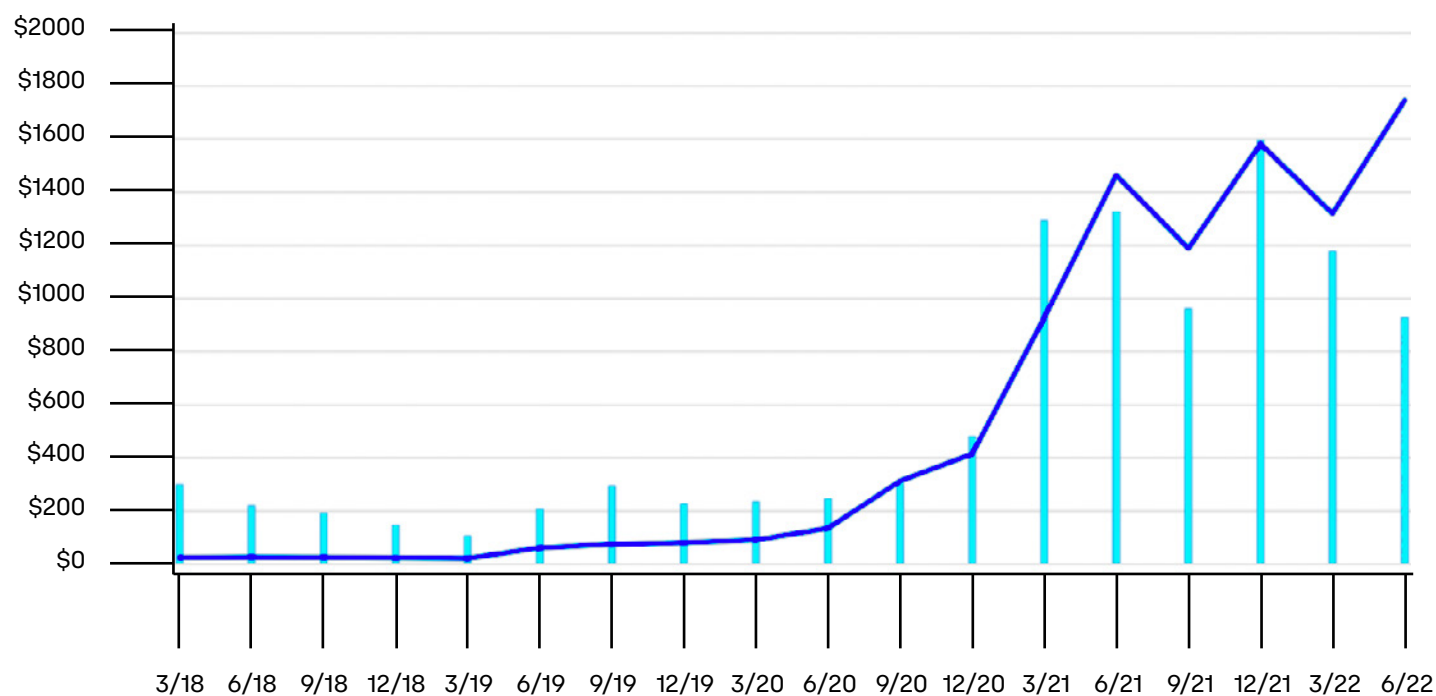


¹⁴ Coingecko, [Stablecoins by Market Capitalization](#), as of 30 June 2022.

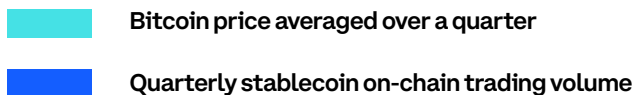
The trading volume of stablecoins has generally increased over time. In the past, stablecoin on-chain trading volume, as shown below, has generally been correlated with overall digital asset prices – stablecoins have traded in greater volume as digital asset prices increased. This changed in Q2 2022, when the volume of stablecoin on-chain trading increased following the collapse of UST and an overall decline in digital asset prices (Figure 2). This arguably shows digital asset market participants' willingness to remain digitally native in a market downturn, and demonstrates the use of stablecoins as a store of value outside of the traditional financial system.

Figure 2: Quarterly stablecoin trading volume and Bitcoin prices, Q1 2018 to Q2 2022¹⁵

Quarterly on-chain trading volume shown for USDT, USDC, DAI, USDP, HUSD, GUSD, BUSD in \$ billions. BTC quarterly average prices shown in \$ thousands.



¹⁵ The Block, [Adjusted On-chain Volume of Stablecoins](#), as of 30 June 2022; Coinmarketcap, [Bitcoin Price](#), as of 30 June 2022





Defining characteristics of stablecoins

Stablecoins differ from conventional payment instruments in several ways. Although the designs differ, all stablecoins today possess each of these characteristics to varying degrees.

#1	Digitally native and programmable Stablecoins run on blockchains operating like cash on digital rails. Security is enforced through private keys (complicated passwords) and they can be programmed in smart financial contracts that are self-executing based on predetermined conditions.
#2	Decentralized (peer-to-peer) transactions Stablecoins do not require a centralized third party, like a bank, to facilitate a transfer. They operate on 'permissionless' blockchains that allow any two counterparties to transact according to the rules established by the blockchain protocol.
#3	Operationally transparent Stablecoins transactions are fully observable on blockchains, making it possible for users and regulatory authorities to fully track their use, measure circulation, and assess their functionality and reliability.
#4	Pseudo-anonymous Transactions occur between digital wallets identified by a random arrangement of characters that preserve anonymity. However, once an address is connected to a person or entity, their full history of wallet transactions is revealed, resulting in a loss of anonymity.
#5	Stable value Stablecoins are less volatile than other cryptocurrencies, such as Bitcoin or Ether, because their value is pegged to fiat currencies. While different stablecoin arrangements can lead to different levels of price stability, their pegged values allow them to serve as a reliable medium of exchange.

2.1

Types of stablecoins

There are different ways that stablecoins maintain a stable value relative to the reference currency, falling into three general categories: fiat-backed stablecoins, crypto-backed stablecoins, and algorithmic stablecoins. These categories are not mutually exclusive, and a stablecoin may also use a combination of these mechanisms to maintain its value.

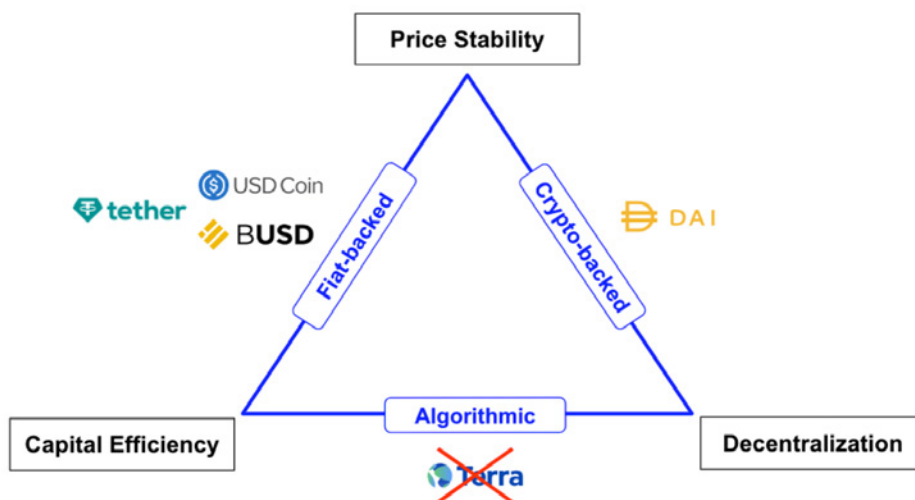
The core questions of stablecoin design are embodied in a problem known as the stablecoin trilemma: a theoretically perfect stablecoin would have three key features – price stability, capital efficiency, and decentralization – but, because of the tradeoffs between these features, no stablecoin can possess all three at once.¹⁶

¹⁶ Christian Catalini and Alonso de Gortari, [On the Economic Design of Stablecoins](#) (5 Aug 2021).

- **Price stability** is the strength of a stablecoin's ability to maintain its peg, even through periods of market stress.
- **Capital efficiency** refers to the total amount of assets (reserves plus a capital buffer) that a stablecoin needs to maintain its price stability; safe, liquid assets do not need as large a buffer and are therefore more capital efficient, as discussed below.
- **Decentralization** is the extent to which control of a stablecoin arrangement is distributed among its participants, and not concentrated in any single person or entity.

Each type of stablecoin represents a different tradeoff within the trilemma. Fiat-backed stablecoins have price stability and capital efficiency, but not decentralization. Crypto-backed stablecoins have price stability and decentralization, but not capital efficiency. Algorithmic stablecoins have decentralization and capital efficiency, but not price stability.

Figure 3: Stablecoin Trilemma



2.1.1

Fiat-backed stablecoins

A fiat-backed stablecoin is generally issued in exchange for a fiat currency that is then used to invest in reserve assets denominated in the same currency. By this process the original fiat currency becomes digitally native and can travel on the blockchain. The issuer of a fiat-backed stablecoin maintains the stablecoin's 1:1 peg with the fiat currency by holding reserve assets of at least equal value to the total amount of stablecoins outstanding. That is, the reserves back an issuer's obligation to redeem a stablecoin at its face value. Holding reserves in excess of the total amount outstanding provides a capital buffer for further stability. All fiat-backed stablecoins operate within custodial arrangements, as discussed in section 2.2 below.

As of June 2022, an estimated 91.7% of the total market capitalization of all stablecoins are fiat-backed stablecoins pegged to the U.S. dollar.¹⁷ Their defining characteristic is that reserve assets are held by custodians in the traditional financial system, apart from any blockchain.

¹⁷ The Block, [Stablecoins](#), as of 30 June 2022

The fundamental factors affecting a stablecoin's ability to maintain its peg to a fiat currency are: (1) the composition of its reserve assets, and (2) the size of its capital buffer. The capital buffer is necessary to protect against an unexpected decrease in the value of the reserve assets, which typically include cash, cash equivalents, and government bonds maturing within 90 days. But a fiat-backed stablecoin might also be backed by other types of assets, e.g. securities or commodities such as precious metals. The riskier and less liquid a stablecoin's reserve assets are, the larger the buffer needs to be to maintain a stable peg. In this respect, the economics of stablecoin reserves can draw on well-established principles from bank regulatory capital frameworks.

Reserve composition and buffer size are not the only determinants of a stablecoin's price stability. Clear, detailed disclosures verified by an independent accountant are necessary to alleviate concerns that might spark a run. Stablecoin arrangements also need to maintain strong risk management practices, encompassing financial as well as operational risks. Effective operational risk management is critical to maintaining a smoothly functioning redemption process, which in turn is necessary for stablecoin holders to have confidence in their ability to exchange the stablecoin for fiat currency on demand. Stablecoin issuers must also exercise care in establishing relationships with other institutions that perform critical functions within the stablecoin arrangement. For example, holding cash reserves at a bank may expose stablecoin holders to significant losses if the bank were to fail, especially where cash reserves are commingled in a single account and subject to a deposit insurance limit of only \$250,000.

¹⁸ Circle, [How to Be Stable – USDC Transparency and Trust](#) (13 May 2022); Binance, [The Importance of Fiat Reserve-Backed Stablecoins](#) (10 May 2022); see also Coingecko, [Tether Price Chart](#); Coingecko, [USDC Price Chart](#); Coingecko, [BUSD Price Chart](#).

The quality and liquidity of stablecoins' reserve assets are particularly relevant during periods of market stress. In May 2022, when the Terra USD (UST) algorithmic stablecoin collapsed, USDC and BUSD, which are backed by cash and short-term U.S. Treasuries, generally maintained their pegs.¹⁸ In contrast, USDT's reserves reportedly include some assets that are riskier and less

¹⁹ For more information on USDT reserve assets, see [Tether's Transparency Report](#). As of 31 March 2022, USDT's self-reported reserves included 4.52% in corporate bonds, funds, and precious metals; 3.82% in secured loans to unaffiliated entities; and 6.02% in other investments including digital tokens. The remaining 85.64% is invested in a general category of assets called "Cash & Cash Equivalents & Other Short-Term Deposits & Commercial Paper." 28.47% of the assets in this category are commercial paper and certificates of deposit. Some of these assets entail credit risk and may contribute to concerns regarding the reliability of USDT's reserves in maintaining a stable peg.

²⁰ Coingecko, [Tether Market Capitalization Chart](#).

²¹ Coingecko, [USDC Market Capitalization Chart](#).

²² Coingecko, [Tether Price Chart](#); Coingecko, [USDC Price Chart](#); Coingecko, [BUSD Price Chart](#).

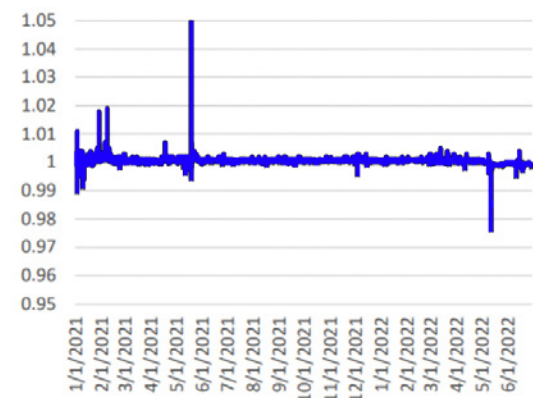
liquid. These features may have contributed to USDT's deviation from its one dollar peg during this stress period.¹⁹ Changes in the market capitalization of each of these stablecoins show how the quality and liquidity of a stablecoin's reserve assets can be important to their long-term resilience. USDT's market capitalization fell from \$72.58 billion to \$66.41 billion from May to June 2022,²⁰ whereas USDC's market capitalization increased from \$53.73 billion to \$55.6 billion over that same period.²¹

Over longer time horizons, the market prices of leading fiat-backed stablecoins have generally remained stable, with only a handful of instances where the price at which one of these stablecoins could be purchased or sold on an exchange deviated more than half a basis point (\$0.005) below the stablecoin's face value.²² These deviations generally occurred due to major, short-term increases in volatility in crypto asset markets and were quickly eliminated. In most cases, the stablecoin's price returned to within \$0.005 of its face value within a few hours. As shown in the figure below, there are minimal fluctuations in the price of USDT and USDC stablecoins from their pegs. From January 2021 to the end of May 2022, both USDT and USDC ranged between \$0.995 to \$1.005 a vast majority of the time.

Figure 4: Peg deviations for USDT and USDC January 2021 – June 2022 ²³

Peg stability for USDT January 2021 – June 2022

\$USD, prices observed at the end of every hour



	# of hours	% of hours
Price < \$0.995	18	0.14%
\$0.995 ≤ Price ≤ \$1.005	13,078	99.80%
Price ≥ \$1.005	8	0.06%
Total	13,104	100%

Peg stability for USDC January 2021 – June 2022

\$USD, prices observed at the end of every hour



	# of hours	% of hours
Price < \$0.995	9	0.07%
\$0.995 ≤ Price ≤ \$1.005	13,086	99.86%
Price ≥ \$1.005	9	0.07%
Total	13,104	100%

²³ Data sourced from [CryptoCompare](#), as of 30 June 2022

²⁴ JPMorgan, [Onyx Coin Systems](#), as of 30 June 2022

²⁵ USDF Consortium, [Introducing the USDF Consortium](#), as of 30 June 2022

The definition of fiat-backed stablecoins can also include deposit coins, which are digital representations of deposits at a bank. Deposit coins are not yet a widely adopted method of putting fiat currencies on blockchain rails but may emerge over time. Examples of deposit coins include JPM Coin²⁴ and USDF.²⁵

Deposit coins are a promising innovation, but their potential will be hard to realize without significant changes to existing bank regulations. Banks today must satisfy Know-Your-Customer (KYC) requirements with respect to each depositor, which means that deposit coins cannot trade freely outside of a bank's perimeter on public blockchains. Regulatory authorities would also need to determine how deposit coins should be covered by deposit insurance, and how users' deposit coin holdings should be aggregated in relation to deposit insurance limits (e.g., in the United States, \$250,000). The claims of deposit coin holders should also have the same priority (i.e. rank *pari passu*) as traditional bank deposits in the event that the bank fails. Each of these issues would likely require changes to the bank regulatory framework in most jurisdictions.

2.1.2

Crypto-backed stablecoins

A crypto-backed stablecoin is similar to a fiat-backed stablecoin in that both sustain their pegs based on a pool of reserve assets of at least equal value to the total amount of the stablecoins outstanding. However, a crypto-backed stablecoin relies on digital assets whose primary purpose is not to support the stablecoin. DAI, for example, is a crypto-backed stablecoin that is minted in U.S. dollar denominations by posting another digital asset as collateral. To prevent the value of DAI from dropping below its face value, the amount minted is only a fraction of the value of the collateral posted.²⁶ This overcollateralization serves as a buffer for any volatility in the price of the posted collateral relative to the dollar and pledged digital asset. This is conceptually similar to what happens when borrowers ask for a home equity loan at a bank. Borrowers post their houses as collateral, and the bank issues them newly minted currency in the form of a loan.

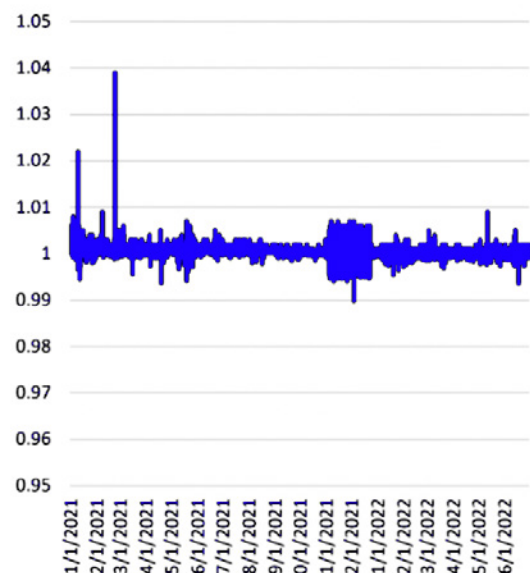
²⁶ MakerDAO, [A Guide to Dai Stats](#).

Crypto-backed stablecoins have another key difference from fiat-backed stablecoins in that there is no custodial arrangement. As with algorithmic stablecoins discussed in the next section, they rely on smart contracts to maintain their pegs. For example, the MakerDAO smart contract that governs DAI provides for the automatic liquidation of a user's collateral if its value drops below a pre-specified threshold.²⁷ While abrupt deviations in prices might yield unexpected liquidations, this mechanism protects the integrity of the peg.²⁸ DAI's track record demonstrates that this solution has been relatively effective to date in maintaining its peg to \$1.00, as does its resilience during the May 2022 volatility period.²⁹ The following figure shows that the price of DAI, like USDT and USDC, generally remained within a narrow range between \$0.995 and \$1.005 from January 2021 to the end of June 2022.

²⁷ *Id.*

²⁸ MakerDAO, [Liquidation](#), as of 30 June 2022.

²⁹ Data sourced from [CryptoCompare](#), as of 30 June 2022

Figure 5: Peg stability and market capitalization for DAI³⁰**Peg stability for DAI January 2021 – June 2022**
\$USD, prices observed at the end of every hour**Peg stability for DAI January 2021 – June 2022**

	# of hours	% of hours
Price < \$0.995	54	0.41%
$\$0.995 \leq \text{Price} \leq \1.005	12,910	98.52%
Price $\geq \$1.005$	140	1.07%
Total	13,104	100%

Peg stability for DAI May 2022 – June 2022

	# of hours	% of hours
Price < \$0.995	1	0.07%
$\$0.995 \leq \text{Price} \leq \1.005	1,461	99.80%
Price $\geq \$1.005$	2	0.14%
Total	1,464	100%

³⁰Id.

³¹See, e.g., [On the Economic Design of Stablecoins](#), by Christian Catalini and Alonso de Gortari, (August 5, 2021).

The primary weakness of crypto-backed stablecoins is their capital inefficiency. While over-collateralization can be an effective way to maintain a 1:1 peg, the amount of resources needed to protect against the volatility of collateral assets' prices is substantially larger than the resources required for traditional finance arrangements.³¹

2.1.3

Algorithmic stablecoins

Algorithmic stablecoins are similar to crypto-backed stablecoins in that they both operate in non-custodial arrangements using smart contracts, but there is a key difference. Crypto-backed stablecoins have reserve assets that exist apart from the stablecoin arrangement, whereas algorithmic stablecoins use another digital asset within the same arrangement to maintain their peg. That is, the value of the digital asset backing an algorithmic stablecoin depends on the stability of the stablecoin itself. This is commonly referred to as endogenous backing.

An endogenously backed algorithmic stablecoin involves two tokens: a stablecoin with an intended fixed face value, and an investment token with a floating value. The algorithm enables each token to be converted into the other at a ratio determined by the investment token's market price. For example, if the investment token has a market price of \$10, and the stablecoin has a face value of \$1.00, one stablecoin can be converted into one-tenth of an investment token. So long as the investment token has a non-zero market value, and the aggregate value of the investment tokens is greater than the combined face value of all minted stablecoins, the stablecoin should in theory be able to maintain its peg.

The primary weakness of algorithmic stablecoins is that their value could collapse if confidence wanes in the stablecoin arrangement as a whole – a so-called “death spiral.” As seen with the Terra USD stablecoin (UST), which was endogenously backed by LUNA tokens, it can be difficult for an algorithmic stablecoin to maintain its peg to a fiat currency. LUNA tokens had a floating value based on their utility in the Terra ecosystem and served as the shock absorber for UST. When UST began to lose its peg on May 9, dropping below \$1, speculators could buy and swap the discounted UST for \$1 of LUNA. In theory this arbitrage should have driven the price of UST back to \$1. In practice, the LUNA token was unable to maintain its value and support the arbitrage. Each UST coin burned required new LUNA tokens to be minted, and the supply of LUNA ballooned, diluting its value. Moreover, the demand for minting new LUNA was so strong that the network became congested, more costly, and unable to keep up. As a result, the price of LUNA dropped on trading platforms. The loss of confidence in UST fueled a loss in confidence in LUNA, which fueled a loss in confidence in UST – accelerating into the death spiral of a stablecoin that as of May 8 had a market cap of more than \$18.6 billion.³²

³² Coingecko, UST Price, last visited 30 June 2022

The UST death spiral was not entirely unexpected. As described by Christian Catalini and Alonso de Gortari in August 2021, “Death spirals are likely to occur whenever the value of a stablecoin’s reserve is tied to the future success of the stablecoin itself, for example through the inclusion of an investment token as part of the reserve assets.”³³ The point of no return in the UST-LUNA death spiral was when the total market value of LUNA dropped below the total market value of UST in circulation – meaning a full conversion could no longer be supported. As this breaking point approached on May 9, the Luna Foundation Guard, a reportedly nonprofit entity established to support UST’s peg in the event of a crisis, announced the release of Bitcoin reserves to purchase UST and drive its price back up. But it was too late. The run on UST could not be stopped, and by May 13 even Do Kwon, the CEO of Terraform Labs, acknowledged that UST would never restore its peg.³⁴ The collapse of UST and LUNA provides real-world evidence to support the theoretical prediction that a purely algorithmic stablecoin would struggle to maintain its peg during a market stress event.

³³ Catalini, *supra* at 16

³⁴ Do Kwon, [Terra Ecosystem Revival Plan](#) (“While a decentralized economy does need decentralized money, UST has lost too much trust with its users to play the role.”)

Figure 6: Terra USD (UST) price in May 2022 ³⁵

³⁵Data sourced from [CryptoCompare](#), as of 30 June 2022

2.2

Stablecoin arrangements: custodial and non-custodial

A stablecoin arrangement is the ecosystem around a stablecoin, including the processes, people and entities involved in using it. There are two types of stablecoin arrangements: custodial and non-custodial. Unlike the traditional payments system, in which banks can control the creation, redemption, transfer, and storage of money, both types of stablecoin arrangements can have these functions performed by different parties.

In a custodial arrangement, the reserve assets backing the stablecoin are held in custody by the stablecoin's issuer. The issuer bears primary responsibility for maintaining the functioning of the stablecoin arrangement. In many cases, the issuer may rely on third parties to fulfill this responsibility. For example, the issuer of a fiat-backed stablecoin would maintain an account at a bank to hold cash and other reserves, and may work with exchanges and market makers to facilitate issuance and redemption transactions.

Non-custodial arrangements seek to operate without the need for a stablecoin's holders to place their trust in an issuer or other intermediary. They do so by structuring the economic relationships among participants in the stablecoin arrangement through blockchain protocols.

All fiat-backed stablecoins must operate within a custodial arrangement; fiat-denominated assets exist in the traditional financial system, and therefore require an intermediary to interface with a blockchain. A crypto-backed stablecoin could potentially operate in a custodial arrangement, though most of them have non-custodial arrangements. All algorithmic stablecoins operate in non-custodial arrangements.

The following table, adapted from the Financial Stability Board's report on "Regulation, Supervision and Oversight of 'Global Stablecoin' Arrangements,"³⁶ describes the functions and activities in stablecoin arrangements, both custodial and non-custodial.

³⁶ Financial Stability Board, [Regulation, Supervision and Oversight of "Global Stablecoin" Arrangements](#) (13 Oct 2020)

Table 1: Stablecoin arrangements – functions and activities

Functions	Activities	Description
Governance	Establishing rules governing the stablecoin arrangement	Rules covering, among other matters, the types of entities that may be involved in the arrangement, the protocol for validating transactions, the mechanism for maintaining the stablecoin's peg, and arrangements for management and ownership of the reserve assets
Issuance, redemption, and stabilization of value	Issuing, creating and destroying stablecoins	The mechanism through which stablecoins may be issued or created (i.e. minted), or subsequently destroyed (i.e. burned) by one or more entities or software protocols
	Managing reserve assets	The activity of managing the assets that back the value of a stablecoin, where a stablecoin fully or partially maintains its value (or confidence in its value) based on real or financial assets or other crypto-assets
	Providing custody/trust services for reserve assets	The activity of holding the reserve assets backing the value of a stablecoin
Transfer of coins	Operating the infrastructure	A blockchain protocol that determines roles and levels of access to the arrangement. Access may be permissioned or permissionless
	Validating transactions	Mechanism by which a transaction is authorized and validated by validator nodes
Storage and interaction with users	Storage of private keys providing access to stablecoins in a digital wallet	Cryptographic wallets storing private and public keys which are used to digitally sign transaction instructions performed by the stablecoin arrangement. Wallets can be custodial (hosted) or non-custodial (self-hosted), and can be developed by multiple parties
	Exchanging, trading, reselling and market making	The activity of purchasing/exchanging a stablecoin with fiat currencies, or a stablecoin with other stablecoins or digital assets

All of the functions and activities performed by a stablecoin arrangement have analogues in traditional payments. One important difference between stablecoin arrangements and traditional payments is that core functions can be disaggregated and performed by different parties in a stablecoin arrangement.

Consider three of a stablecoin arrangement's core functions: (1) the creation and redemption of stablecoins, (2) transfers among users, and (3) storage of the stablecoins. Analogous functions could all be performed by a bank in the context of traditional payments. A bank creates and redeems a payment instrument by accepting a deposit or permitting its withdrawal by a depositor. The bank can make a transfer, either to another depositor at the same bank on its own books and records, or to a depositor at a different bank through a network of intermediaries, such as the Automated Clearing House (ACH). A bank can also store value for a depositor in a deposit account.

In a stablecoin arrangement, by contrast, each of the same three functions can be performed by different parties who may have no pre-existing relationship with one another. Creation and redemption of a stablecoin would be performed by the issuer in a custodial arrangement or by a protocol in a non-custodial arrangement. Transfers are effected on the blockchain in both arrangements. Storage could be provided by a custodial wallet provider or by a user herself with a self-hosted wallet.

Maintaining the smooth functioning of our payments infrastructure is of critical importance to the financial system and the real economy. As stablecoins grow in importance as a means of payment, policymakers must consider how standards to maintain the integrity of traditional payments infrastructure should be adapted for stablecoin arrangements. Global standard-setters have already made significant progress to provide a starting point for policymakers to implement globally coordinated standards in their respective jurisdictions.³⁷

³⁷ BIS, CPMI-IOSCO, [Application of the Principles for Financial Market Infrastructures to stablecoin arrangements](#) (13 July 2022)

PART 3

Stablecoin use cases

Stablecoins were born out of a need to put fiat currencies on digital rails for the purpose of accessing the crypto ecosystem. As the ecosystem grows, and infrastructure further develops, so will stablecoin use cases. Current use cases include domestic and international payments, digital asset trading, and lending and borrowing through decentralized finance (DeFi) protocols. More use cases, such as in additional DeFi solutions and financial inclusion, are likely to develop over time as innovations continue and stablecoins achieve further scale and breadth of acceptance.



It is important for policymakers to understand stablecoins' current and future uses when developing regulatory frameworks.

3.1

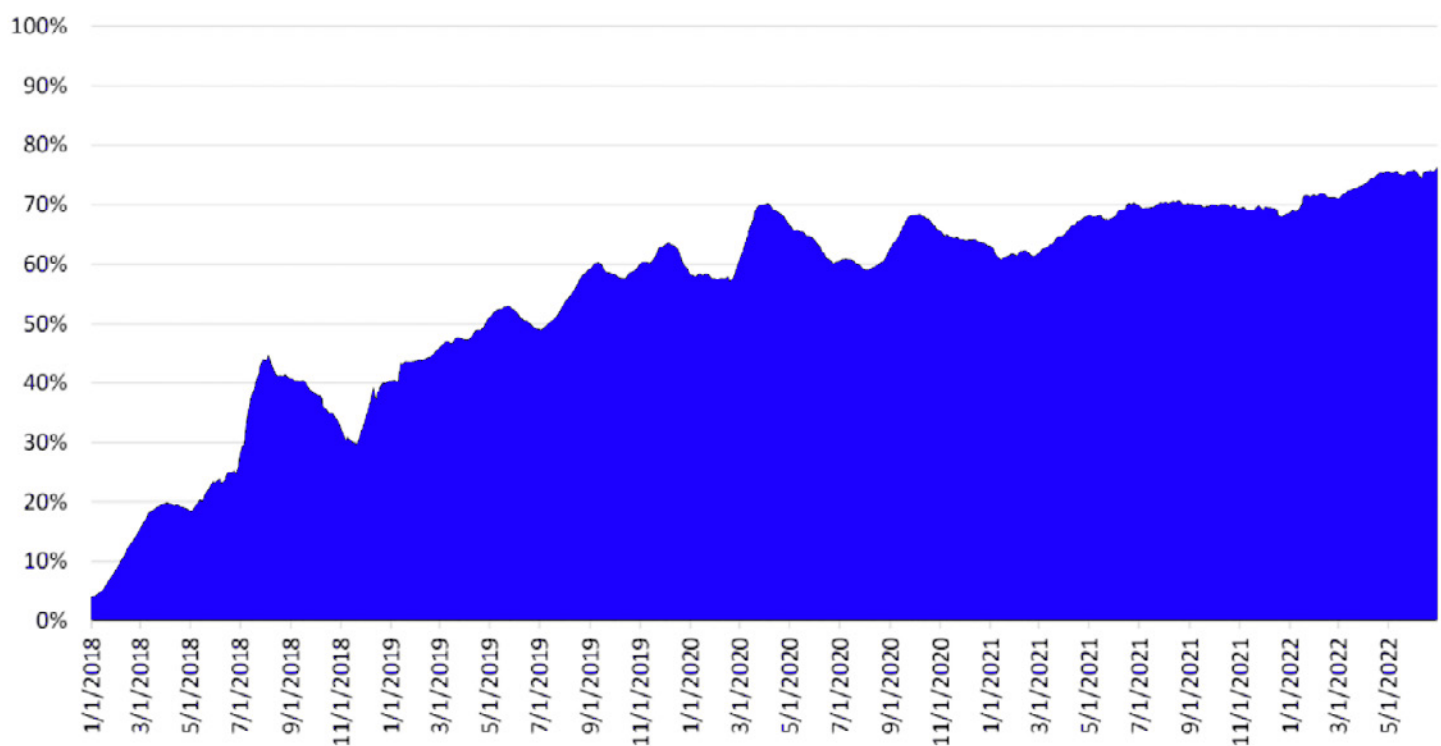
Digital asset trading – increasing digital asset market liquidity

One of the primary uses of stablecoins is to provide an efficient and safe on-ramp from a fiat currency into the digital ecosystem. Stablecoins allow digital asset investors to modify their portfolios in the same way investors trade in and out of securities listed on stock exchanges using conventional currencies like the dollar or euro. As such, digital assets are often listed on trading platforms as trading pairs with stablecoins.

Using stablecoins for digital asset trading is advantageous because it allows exchanges and market participants the simplicity and efficiency of a common medium of exchange, with assets priced in the same unit of account. It also allows investors to retain a portion of their portfolio in a low-volatility asset while they decide on the next investment or if they would like to temporarily reduce their exposure to the market. Stablecoins efficiently provide this option for digital asset investors by allowing near-instantaneous digital asset transactions and 24/7 availability via public blockchains. The result is an increase in market liquidity and depth for digital assets. This enables digital asset markets to provide more stability and reliability for participants to buy and sell easily, better protection for investors when trading, and higher barriers to any potential price manipulation. The expected increase in digital asset trading volumes over time will likely fuel continued demand for stablecoins in this use case.³⁸

³⁸IMARC Group, [Cryptocurrency Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2022-2027](#) February 2022.

Figure 7: Share of Centralized Exchange trading volume: USDC, USDT, BUSD, DAI³⁹
%, 30 day moving average, 1/1/2018 – 6/30/2022



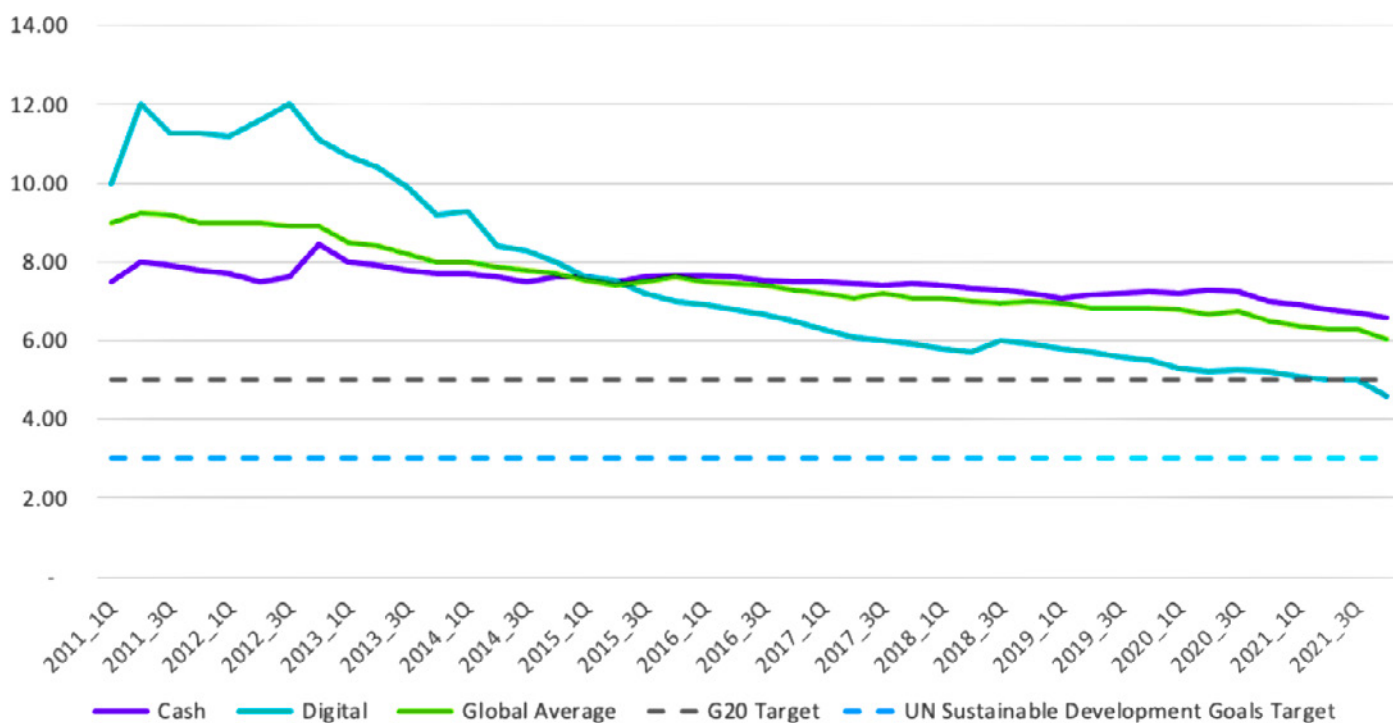
³⁹ Data sourced from [CryptoCompare](#), as of 30 June 2022

3.2

Payments – faster, cheaper money transfer

The stablecoin infrastructure developed for market trading can also serve as a medium of exchange between individuals and entities, including for cross-borders transfers, which today can be prohibitively expensive using conventional methods. The following figure shows trends in the global cost of sending \$200 in remittances since 2011:

Figure 8: Trends in the global cost of sending \$200 in remittances⁴⁰



⁴⁰BIS, [The journey so far: making cross-border remittances work for financial inclusion](#) (15 June 2022)

⁴¹Coinbase Blog, [There's now a cheaper, easier way for your friends and family in Mexico to cash out the crypto you send them](#) (15 Feb 2022)

As one example, Coinbase supports cross-border transfers of digital assets on our platform, including stablecoins such as USDC. Recipients of transfers from the U.S. to Mexico are able to save or cash out the money received in Mexican pesos at more than 37,000 physical retail outlets and convenience stores across Mexico.⁴¹

⁴²Circle Blog, [USDC Market Cap Grows to More than \\$50 Billion](#), (February 2022)

⁴³Coinbase, [Commerce](#), (March 2022)

⁴⁴Coinbase, [Coinbase pricing and fees disclosures](#), as of June 2022. Note that the above description doesn't refer to Coinbase Wallet, a separate, self-hosted wallet product.

⁴⁵PYMNTS.com, [Average US Firm Waits 33 Days to Receive Cross-Border Payments, Data Show](#), September 16, 2021.

⁴⁶Forbes, [Credit Card Processing Fees](#) (2022 Guide) (14 July 2022)

Stablecoins are also increasingly being used and accepted as means of payment by businesses. For example, since USDC operator Circle's launch of Circle Accounts for business clients to deposit, withdraw, receive, and store digital assets and settle all payments in USDC, the number of active Circle Account customers increased by 213% from 2020 to the end of 2021.⁴² Coinbase Commerce currently has 8,000+ merchants signed up to accept digital assets including USDC and DAI from their customers globally, in addition to accessing a set of business tools to manage such business transactions.⁴³

There is strong appeal to using stablecoins over conventional payments methods. Because stablecoin payments can be conducted on a public blockchain that enables peer-to-peer transfers, users can settle transactions near-instantaneously without an intermediary bank or financial institution to facilitate settlement. Stablecoin transfers can also be sent off-chain through a trusted intermediary. For example, Coinbase offers USD Wallet and Hosted Cryptocurrency Wallet services free of charge, and does not charge for transferring digital assets, including stablecoins, from one Coinbase user's wallet to another.⁴⁴

These options give stablecoin users alternatives to incumbent payment systems that can be slow and more costly, particularly for cross border transfers. For example, current payment and remittance platforms require multiple intermediaries to execute a transaction, often resulting in longer transaction/settlement times and additional fees, such as foreign transaction fees. Stablecoin transfers can be settled in under 30 minutes whereas international transfers can take multiple business days. According to PYMNTS' August 2021 Global B2B Payments Playbook, the average U.S. firm now waits 33 days to receive a cross-border payment, a lag that can significantly stress cash flow and cause downstream effects.⁴⁵ High costs and lengthy delays represent significant disadvantages for conducting payments transfers in traditional markets today.

The flexibility and low cost of stablecoin payment methods could also benefit consumers and businesses by increasing the competitive pressure on incumbent systems. Credit card processing fees, for example, typically range from 1.5% to 3.5% of the value of each transaction, with the vast majority of transactions processed on one of only four large networks.⁴⁶ The availability of stablecoins as an alternative could reduce the costs for merchants to receive payment for goods and services – not only could merchants choose to accept stablecoins directly, credit card companies may reduce their fees to incentivize merchants to remain on their networks. Increasing competition could similarly reduce costs to consumers for wire transfers and other traditional payments.

While stablecoins can reduce the cost and delay in transmitting payments, there remains a criticism that on-chain transactions can still be subject to high gas fees. Gas fees are payments required from users for their transactions to be validated and processed on a blockchain. The cost of gas fees to record transactions on some blockchains can be large on a percentage basis for a small dollar transaction. This can be particularly true for popular and

frequently congested networks like Ethereum. However, as with any emerging technology, the costs are likely to decrease over time as users migrate to using new blockchain solutions. In the long term, given that payments on blockchains allow for an automated transaction verification process, unlike the more costly manual verification process many banks use today, stablecoin payment methods are likely to be a competitive alternative.

3.3

Broadening access to financial services – financial inclusion

⁴⁷ a16z, [State of Crypto](#) (17 May 2022)

⁴⁸ Board of Governors of the Federal Reserve System, [Report on the Economic Well-Being of U.S. Households in 2020](#), (May 2021)

⁴⁹ FDIC, [How America Banks: Household Use of Banking and Financial Services](#), 2019 FDIC Survey (October 2020)

A remarkably large number of people around the world remain unbanked or underbanked. Globally, 1.7 billion people do not have access to a bank account.⁴⁷ In the United States, 5% of adults are unbanked and 13% are underbanked.⁴⁸ In a survey conducted by the FDIC, commonly cited reasons for not having a bank account included not having enough money to meet minimum balance requirements, distrust of banks, and fees being too high or unpredictable.⁴⁹ Many of these challenges were exacerbated during the COVID-19 pandemic, which highlighted the need for contactless and digital payments systems.

Stablecoins have the potential to overcome some of these barriers by making the global payments system faster and more efficient, and reducing the overall cost of financial services. All that is required is a smart phone or computer access to the internet, which includes many of the currently unbanked population. For example, among this population of 1.7 billion, 1 billion have access to a mobile phone and 480 million have access to the internet.⁵⁰

⁵⁰ a16z, [State of Crypto](#) (17 May 2022)

3.4

Next-generation applications – growing diversity of DeFi, tokenization, and web3



The next generation internet, dubbed “web3,” seeks to give users more control over their information, data, and digital footprint relative to the current walled-garden approach of web2.

In this decentralized approach to the internet, digital tokens will become the unit of the economic exchange for the services that fuel disintermediation. In web3, the value of a digital platform would be shared with its users, rather than captured entirely by its corporate creator, through tokens that provide both functionality on the platform and benefits from its success. We expect stablecoins to play an important role as the fiat onramp into this digital

ecosystem, even as central bank digital currencies are being contemplated by many jurisdictions.

Today's DeFi protocols provide a glimpse of this future, with new protocols constantly being developed that present innovative ways to address new market needs.⁵¹ These innovations include:

⁵¹Statista, [TVL across DeFi blockchains from November 2018 to June 26, 2022](#)

- **digital asset trading**
- **insurance solutions**
- **automatic payments**
e.g., rent, salaries, subscriptions, etc.
- **prediction markets**
- **saving, lending, and borrowing**

DeFi protocols that allow potential borrowers and lenders, or buyers and sellers, to find each other nearly instantly offer a tremendous opportunity to improve economic efficiency around the world. They have several key advantages over traditional finance. The lending protocols are autonomous and permissionless, enabling lending directly between participants without the need for any third-party involvement or any minimum funds. Eliminating the need for intermediaries can lead to lower barriers to entry, a more streamlined lending process, and better borrowing speeds compared to traditional lending.

PART 4

Policy considerations

Although no jurisdiction has yet adopted a comprehensive regulatory framework for stablecoins, many have issued reports and proposals, and further development is progressing quickly. There are a number of key considerations that we believe should inform policy development in the near term.

4.1

Financial stability and run risk

There is general concern among policymakers that a failure or distress of a stablecoin or stablecoin arrangement could adversely affect the stability of the financial system. For example, a sudden loss of confidence in a fiat-backed stablecoin could lead its holders to seek redemptions en masse, which in turn could force the stablecoin's issuer to liquidate reserve assets in a fire sale. The fear is that such an event could cause a sharp decrease in the market price of the reserve assets below their intrinsic value, with spillover effects on other market participants.

Different fiat-backed stablecoins present different run risks. The following figure provides a breakdown of the reserve assets backing the three largest fiat-backed stablecoins: USDT, USDC, and BUSD:

Figure 9: USDT, USDC, and BUSD reserve assets⁵²

USDT			USDC			BUSD		
Asset	\$ bn	%	Asset	\$ bn	%	Asset	\$ bn	%
Cash/Deposits	\$4,100,485,805	4.97%	Cash/Deposits	\$13,581,264,959	24.38%	Cash/Deposits	\$738,064,449	4.19%
U.S. Treasuries	\$39,199,221,428	47.56%	U.S. Treasuries	\$42,122,235,732	76.62%	U.S. Treasuries	\$10,597,042,200	60.12%
Commercial paper	\$20,096,579,998	24.38%	Total	\$55,703,500,691	100%	U.S. Treasury repos	\$6,292,771,150	35.70%
Reverse repo	\$105,331,269	0.13%				Total	\$17,627,877,799	100%
Money market funds	\$6,798,150,552	8.25%						
Other investments (incl. digital tokens)	\$4,959,634,446	6.02%						
Corporate bonds, funds, prec. metals	\$3,729,529,946	4.52%						
Secured loans	\$3,149,732,368	3.82%						
Non-U.S. Treasuries	\$286,155,289	0.35%						
Total	\$82,424,821,101	100%						

⁵² Tether, [Transparency](#), last viewed 30 June 2022, based on data from Tether's Independent Accountant's Report as of 31 March 2022; Circle, [USDC Reserve Assets as of 30 June 2022](#); Paxos, [BUSD Reserve Assets as of 30 June 2022](#).

⁵³Id.

⁵⁴ CFTC, [CFTC Orders Tether and Bitfinex to Pay Fines Totaling \\$42.5 Million](#) (15 Oct 2021); New York Attorney General, [Attorney General James Ends Virtual Currency Trading Platform](#), [Bitfinex's Illegal Activities in New York](#) (23 Feb. 2021)

⁵⁵ Tether, [Tether Continues to Reduce Commercial Paper Holdings As It Solidifies Its Position As The Most Transparent Stablecoin](#) (1 July 2022)

⁵⁶ Centre, [USDC Transparency](#), last viewed 30 June 2022

⁵⁷ Paxos Binance USD (BUSD), [Unaudited Holdings for June 30, 2022 at 5pm EST](#)

⁵⁸ DeFi Llama, [defillama.com](#), as of 30 June 2022

For example, Tether has not disclosed which companies' commercial paper it owns, making it impossible to assess asset-specific credit risk.⁵³ Consistent with these shortcomings, the CFTC and New York's attorney general both fined Tether for fraudulently misrepresenting its reserves.⁵⁴ Tether has announced its intention to shift a substantial portion of its reserves from commercial paper into U.S. Treasuries, which if done should substantially reduce incentives for a run.⁵⁵

In contrast, the run risk for USDC and BUSD is lower because, among other things, their reserves are more transparent. Independent certified public accountants attest monthly to the amount of USDC's reserves.⁵⁶ BUSD's issuer, Paxos Trust, is a regulated trust company in New York. Paxos recently published an unaudited list of the stablecoin's reserve assets.⁵⁷

As the market capitalization of stablecoin issuances grows, continued mitigation of financial stability concerns will depend not only on the quality of reserve assets, but also on the level of public transparency of reserves and the safeguards established to prevent a run. Regulatory frameworks should establish standards to engender confidence among stablecoin holders that the stablecoin can maintain its value, and thereby remove incentives to redeem, even during periods of financial market stress. Our policy recommendations for these regulatory frameworks are set out in section 5.

Lastly, the growing use of DeFi is sometimes cited as a potential risk to the traditional lending sector or to financial stability. DeFi collateralized lending protocols currently do not provide conventional credit intermediation. In place of assessing a borrower's creditworthiness, they rely on overcollateralization and automatic liquidation mechanisms to make loans, which are limited by the amount of collateral that a borrower posts. Potential risks to financial stability could materialize if a decrease in the value of collateral assets were to trigger mass liquidations, leading to further selling and even sharper decreases in their value.

The total value locked (TVL) in DeFi protocols was \$73 billion as of June 30, 2022, far below the high of over \$229 billion reached in March 2022.⁵⁸ This level of TVL is not in the realm of a financial stability concern. A cascade of selling triggered by automatic liquidations was in fact observed in May 2022, yet the DeFi collateralized lending protocols themselves generally continued operating throughout this period.

More generally, because DeFi protocols are over-collateralized, and not dependent on the creditworthiness of borrowers or the cash flow-generating capacity of the collateral pledged, they do not engender the same concerns as credit intermediation in the traditional system. However, to the extent these protocols are procyclical, they could increase the price volatility of the assets accepted as collateral. These risks should be monitored as DeFi grows, but they can be managed effectively using existing tools, as many DeFi protocols have demonstrated.

4.2

Operational resilience

Stablecoins are still in the process of gaining trust from mainstream users, and to do so they need to continue establishing a strong foundation of operational resilience and technological reliability. That means delivering good service consistently over time without disruptions.

Fiat-backed stablecoin arrangements, because they custody reserve assets at a centralized financial institution, face many of the same operational risks as with traditional payments systems. For example, to process issuance and redemption transactions, information from the blockchain must be sent off-chain to a custodian; these communications between the issuer and the custodian should be protected by high standards of information security. The issuer should follow best practices in vetting the custodian and any other entities performing important functions within the stablecoin arrangement. And, as for any process controlled by human beings on a day-to-day basis, certain types of operational risk – physical security risk, the risk of fraud or malfeasance, and basic fat-finger error risk – cannot be eliminated but can be managed effectively.

The blockchains themselves also present novel forms of operational risk. While blockchains have no single point of failure and can be more resilient than centralized payment systems in some respects, they introduce new risks related to programming errors and software bugs. Moreover, blockchains vary widely in terms of their security guarantees, resilience against malicious attacks, and extent of decentralization – on some blockchains, a centralized developer team maintains a high level of control, whereas others rely on agreement among a disparate set of validators.

Other potential risks could arise from the security arrangements associated with any super-users of a stablecoin smart contract – for example, if a small number of core developers are empowered to push through updates to the smart contract code in an emergency, strong safeguards must be in place to prevent malicious use of these special powers. Best practices for development should apply not only to the blockchain itself but at the level of stablecoin smart contracts too.

A stablecoin is only as good as the blockchain on which it runs, or if a stablecoin runs on many blockchains, as good as the weakest one. Operational problems could disrupt stablecoin holders' access or even cause them to lose their money. Before a stablecoin is deployed, a blockchain should reach a sufficient level of maturity in accordance with best practices for development, including testing, detecting bugs, and deploying fixes.⁵⁹

The importance of these technical issues will grow as the total amount of stablecoins increases over time. To reach sound, well-informed decisions on stablecoins, financial regulatory policymakers will need to develop greater fluency in these areas of technical expertise and integrate them into policymaking processes.

⁵⁹ See generally Neha Narula, [The Technology Underlying Stablecoins](#) (23 Sept 2021)

4.3

Preventing financial crimes

Stablecoins, like any financial asset, could potentially be used in financial crimes, such as money laundering, financing of terrorism, or sanctions evasion. Although crypto assets have certain features, such as speed and purported anonymity, that may appear to be beneficial to illicit actors, only a small percentage of crypto transactions are related to criminal activity.⁶⁰ Indeed, bad actors incur significant risk when using crypto assets because most transactions are recorded on a public searchable database – providing significant new methods of tackling financial crimes.⁶¹

⁶⁰Elliptic, [Financial Crime Typologies in Cryptoassets](#) at 5 (2020) (“illicit activity today still accounts for less than 1% of all transactions”); CipherTrace, [Cryptocurrency Crime and Anti-Money Laundering Report](#) at 9 (2021) (“illicit transactions mak[e] up less than 0.5% of Bitcoin’s yearly volume in 2020”); Chainalysis, [The 2021 Crypto Crime Report](#) at 5 (“In 2020, the illicit share of all cryptocurrency activity fell to just 0.34%[.]”).

⁶¹Neal B. Christiansen and Julia E. Jarrett, [Forfeiting Cryptocurrency: Decrypting the Challenges of a Modern Asset](#), 67(3) Department of Justice Journal of Federal Law and Practice 155, 166 (Sept. 2019) (“Cryptocurrency, despite the purported anonymity it grants criminals, provides law enforcement with an exceptional tracing tool: the blockchain.”).

⁶²Wired, [The DOJ’s \\$3.6B Bitcoin Seizure Shows How Hard It Is to Launder Crypto](#) (9 Feb 2022)

⁶³Bloomberg, [Crypto Experts Say No Evidence of Major Russia Sanctions Dodging](#) (17 March 2022)

⁶⁴Reuters, [U.S. Treasury official sees modest uptick in crypto illicit finance, but transactions small](#) (18 March 2022)

A key difference between traditional financial transactions and those involving digital assets is that blockchain technology makes it easier to trace how and where digital assets are being moved. Public blockchains offer law enforcement unprecedented visibility into the details of transactions, including the date, time, amount, and addresses involved in a transaction, without having to issue requests for information or subpoenas to market participants. The public, traceable, and permanent nature of blockchains have enabled law enforcement to achieve high-profile successes.⁶²

Questions about the role crypto assets could potentially play in illicit finance have come to the fore with Russia’s invasion of Ukraine. Even with intensified scrutiny of digital assets, including stablecoins, from the perspectives of national security and foreign policy, there is little to no evidence that crypto assets have played a role in helping Russians avoid U.S. and global sanctions.⁶³ For example, U.S. Treasury Under Secretary for Domestic Finance Nellie Liang referred to the potential illicit use of cryptocurrency in this context by stating that “People are very aware of it, and paying attention to it . . . While it’s growing because the use of crypto is growing, its share as a medium for illicit finance is not anywhere as large as just using cash.”⁶⁴

So, while some speculate that stablecoins could spur illicit activity, the evidence suggests this is not the case. As with most illicit finance risks, it appears the best defense against misuse of stablecoins is to ensure that regulated financial institutions handling these assets maintain effective anti-money laundering programs, including implementing Know Your Customer procedures, monitoring transactions, and filing suspicious activity reports. Regulation of stablecoins should avoid pushing their development and operations to jurisdictions where financial institutions are less likely to maintain robust anti-money laundering controls.

4.4

Consumer protection and market integrity

An appropriate regulatory framework of consumer protection for the issuance and use of stablecoins is still developing and merits careful attention to provide consumers with reliable protections as well as meaningful access to developing financial products. Key policy considerations include:

- Stablecoin holders should be protected from the risk of losses due to fraud, misconduct, negligence, or the operational failure of a stablecoin arrangement.
- Consumers should have the right to control the storage and use of any personally identifiable information (e.g., information stored off-chain at a service provider that could be used to connect their identities to on-chain wallet addresses).
- Consumers should have access to clear information about the risks and benefits of stablecoins, including their reserve assets, key technological features, and redemption rights.
- In the event that a fiat-backed stablecoin issuer enters into insolvency proceedings, stablecoin holders should have priority over other creditors of the issuer, either through a more senior claim on the issuer itself or a direct interest in the stablecoin's reserve assets.

In addition to robust protections for consumers' rights, stablecoins also need to operate in a fair and orderly market. Stablecoin issuers, market makers, and service providers should have measures in place to detect and prevent manipulative activity, such as trading activity designed to create false or misleading signals as to the supply, demand, or price of a digital asset.

4.5

Monetary policy

Central banks around the world are considering the potential impact that stablecoins could have on monetary policy and the provision of credit to the real economy. As with any financial market innovation that reaches a large scale through mass adoption, stablecoins could one day present certain risks to the formulation and operation of central banks' monetary policies. The prevalence of stablecoins might affect the speed of currency circulation, the effectiveness of different monetary policy transmission mechanisms, and foreign exchange price movements due to issuance and redemption of stablecoins. The same has also been true of the big-picture, historical shifts in the United States from bank lending to capital market borrowing, and the similar shift since the global financial crisis from bank to non-bank financial activity. Stablecoins are only one item in a long list of shifts in finance that affect monetary policy.

As explained in a Federal Reserve staff paper,⁶⁵ the potential impact of stablecoins on credit intermediation depends on two things: (1) the sources of inflows into stablecoins – e.g., cash, bank deposits, and cash-equivalent securities like money market funds – and (2) the composition of the stablecoin reserves in which the inflows are invested. For example, if funds are withdrawn from a bank savings account to purchase a fiat-backed stablecoin investing in government securities, the provision of credit is correspondingly shifted from commercial bank lending to government funding. If done on a wide scale, this could tilt the cost of capital in favor of public versus private financing.

⁶⁵ John Carmichael and Gordon Liao, [Stablecoins: Growth Potential and Impact on Banking](#) (January 2022)

⁶⁶ [New forms of digital money](#),
Bank of England discussion paper
(7 June 2021)

The reverse would be true if, for example, funds were redeemed from a money market account invested in government securities to purchase a bank-issued deposit coin.⁶⁶

The potential impact on credit intermediation therefore depends on the permitted types of stablecoins within a jurisdiction. The most significant potential impact on the provision of credit by banks relates to whether a narrow banking framework is permitted, in which a bank issues stablecoins backed directly by central bank reserves. The relative safety of such an arrangement could result in a migration away from commercial bank deposits that are classically used to underwrite (riskier) loan portfolios.

Because there is not yet widespread adoption of stablecoins these potential effects are uncertain. But the predictions are not dire. For example, the Bank of England predicted that the overall impact on lending rates and credit provision to the real economy would be modest, as any increase in non-bank lending largely compensates for a reduction in credit provision by banks.⁶⁷ Banks can always increase the interest rate they pay on deposits to incentivize more deposits to remain with them if volumes are decreasing more than they would like.

⁶⁷ *Id.*

Stablecoins even have the potential to enhance the transmission of monetary policy. According to the Bank of England, “New forms of digital money would be more likely to enhance the transmission of monetary policy to lending rates if they were interest-bearing and passed through interest rates with greater speed or extent than commercial banks, prompting banks to respond.”⁶⁸

⁶⁸ *Id.*

Stablecoins could also increase the velocity of money, i.e., the number of times that a unit of currency is used to purchase goods or services within a given period of time.⁶⁹ Inefficiencies in the existing payment system often leave money trapped – consider, for example, the amount of time between depositing a check and the funds becoming available in the depositor’s checking account.

⁶⁹ Caitlin Long, [Ten Stablecoin Predictions and Their Monetary Policy Implications](#) (Cato Journal, Spring/Summer 2021).



Stablecoins could unlock a significant amount of capital by making the payments system more efficient and reducing the amount of time to settlement finality for many consumer transactions.

Stablecoins present a more varied and complex set of monetary policy implications in jurisdictions with weaker or less stable fiat currencies. While consumers may find it advantageous to use foreign denominated stablecoins in lieu of a volatile local fiat currency, the local central bank may as a result find it more difficult to implement monetary policy. Global equity should remain an important consideration in the policy discussion of stablecoins going forward. For example, stablecoins today are commonly U.S. dollar backed, and their use in jurisdictions outside the United States could have the effect of dollarizing those economies. In contrast, for countries where a stablecoin is pegged to the local currency, use of those stablecoins by individuals in other jurisdictions could strengthen the currency. For example, increasing circulation of U.S. dollar backed stablecoins outside the United States could strengthen the U.S. dollar.

4.6

Concentration of economic power

Regulatory authorities have expressed concern about potential risks of scale associated with stablecoin arrangements. For example, the President's Working Group on Financial Markets cited concern that a stablecoin issuer or wallet provider being tied to a commercial firm could lead to an excessive concentration of economic power.⁷⁰ Additionally, if a particular stablecoin becomes widely adopted as a means of payment, there could be anti-competitive effects if users of that stablecoin face undue frictions or costs in the event they choose to switch to other payment products or services.⁷¹

⁷⁰ President's Working Group on Financial Markets, [Report on Stablecoins](#) (1 Nov 2021)

⁷¹ Id.

⁷² The Block, [Stablecoins](#), as of 30 June 2022.

⁷³ FFIEC, [Large Holding Companies](#), as of 31 March 2022.

⁷⁴ Id.

⁷⁵ St. Louis Fed, Gross Domestic Product, as of 30 June 2022.

In the near term, these risks are still highly attenuated, given the total amount of stablecoins currently in circulation is less than \$145 billion.⁷² By comparison, at the end of 2021, the largest bank in the United States had assets of \$3.7 trillion,⁷³ the largest six banks together had assets of \$13.8 trillion,⁷⁴ and the GDP of the United States was \$23 trillion.⁷⁵ Moreover, the interoperability of stablecoins across different blockchains, the ability to quickly and efficiently convert between stablecoins on centralized exchange platforms, and the broad decentralization of digital asset marketplaces are significant mitigants against potential anti-competitive effects.

Longer term, because the use and circulation of stablecoins can be measured with precision on public blockchains, regulators will be in a strong position to monitor for concentrations of economic power and anti-competitive behavior as stablecoins grow in volume and usage. Importantly, regulators will not need to rely on the accuracy and completeness of private entity reporting to collect this information, and neither will any other market participant. Any concerns that may arise regarding the concentration and use of stablecoins would be in full public view, enabling an unfettered analysis and discussion of the public interest.

4.7

Commercial law clarity and certainty

⁷⁶ Jess Cheng, [How to Build a Stablecoin: Certainty, Finality, and Stability Through Commercial Law Principles](#) (24 Sept. 2020)

Stablecoin users need to have legal clarity and certainty about the risks to which they are exposed for stablecoins to function well as a means of payment. Jess Cheng provides a thorough exposition of the commercial law issues that stablecoins raise in her 2020 paper, “How to Build a Stablecoin: Certainty, Finality, and Stability Through Commercial Law Principles.”⁷⁶

Stablecoins do not cleanly fit into existing categories under commercial law, which treats currencies and payment instruments differently from investment securities and commodities. Stablecoin arrangements can be complex, involving not only stablecoin issuers and holders but a range of other parties, including validators, custodians, market makers, exchanges, and others. Stablecoin issuers thus need to overcome significant hurdles to provide legal clarity and certainty to other participants in a stablecoin arrangement using the existing mechanisms of contract, property, and commercial law. Key questions include:

- *What is the nature of the commitment made by a stablecoin’s issuer to its holders?*
- *What relationship does the stablecoin have to its underlying assets?*
- *What are the stablecoin issuer’s obligations with respect to the safekeeping and possession of reserve assets?*
- *What are the stablecoin’s terms of redemption?*
- *What does it mean for a stablecoin transaction to achieve settlement finality?*
- *At what point is the underlying obligation discharged in a stablecoin transaction?*
- *What rules should govern adverse claims, e.g., in instances of fraud or theft?*

Providing clarity and certainty on these legal issues will require significant work on the part of stablecoin issuers, and potentially changes to existing commercial law. Policymakers should bear these considerations in mind as regulatory frameworks for stablecoins are developed.

PART 5

Policy recommendations

As jurisdictions deliberate over the appropriate regulatory frameworks for stablecoins, we believe there are certain objectives that policymakers have in common: protecting consumers, preventing financial crimes, safeguarding financial stability, and promoting responsible innovation. A well-designed approach to regulating stablecoin arrangements can achieve all of these objectives, providing consumers with fairer and more efficient financial services that are more responsive to their needs. Below we offer views on how to answer common questions faced by policymakers.

5.1

Which entities should be permitted to issue fiat-backed stablecoins?

Three models for the issuance of fiat-backed stablecoins are frequently considered in policy discussions:

Model 1: stablecoins limited to deposit coins issued by insured depository institutions. In this model, all fiat-backed stablecoins would be deposit coins, issued by the subset of banks that are insured depository institutions ("IDIs"). Each stablecoin would be a deposit liability on the balance sheet of the issuing IDI. In the United States, this model is consistent with the recommendations in the President's Working Group's report on stablecoins.⁷⁷ Under this approach, IDIs would manage stablecoins in essentially the same manner as deposits, i.e., as liabilities that are redeemable for fiat currency on a 1:1 basis at any time. IDIs would remain subject to existing capital and liquidity requirements, and stablecoin holders' balances would be eligible for deposit insurance coverage.

Model 2: limited to fully reserved stablecoins issued by any bank. Less restrictive than the first model, this model would permit any bank to issue fiat-backed stablecoins, including trust banks and other kinds of depository institutions whose deposits are uninsured. Rather than backing stablecoins with deposit liabilities, issuers could back their stablecoins with corresponding reserve assets in a segregated account or separate fund, apart from the rest of their business. The stablecoins would still be redeemable 1:1 for fiat currency at any time, and in a similar manner as conventional money market funds. Under this approach, assurance of the stablecoins' value would not come from government-backed deposit insurance, but from the quality of the segregated reserve assets.

Model 3: limited to fully reserved stablecoins issued by any supervised and regulated entity. Any entity would be permitted to issue fiat-backed stablecoins, provided that it satisfies rigorous regulatory requirements and remains subject to supervision. The regulatory requirements would address the composition and quality of reserves, disclosures and audits, financial and operational resilience, consumer protection, and other key areas.

⁷⁷ President's Working Group on Financial Markets, [Report on Stablecoins](#) (1 Nov 2021)

While proposed frameworks that follow bank models would leverage existing regulatory frameworks and bring comfort to prudential regulators that are familiar with the benefits and drawbacks of bank supervision, these models could severely restrict the adoption and use of stablecoins generally. Model 1 in particular would encumber the issuance of stablecoins with bank capital requirements that are designed for different purposes and to address different risks. Model 2 could enable banks to issue stablecoins without the complexity of these requirements, but it has other drawbacks. Banks may have little economic incentive to undertake this business model if it cannibalizes existing profit centers by competing with traditional bank deposits, particularly if they do not face competitive pressure from other types of stablecoins.

In our view, Model 3 strikes the appropriate balance between economic viability, consumer protection, responsible innovation, and financial stability. While the bank models should be permitted, they should not be the only models permitted. Neither has yet been implemented in significant volume or demonstrated economic viability, and restricting frameworks to only these models presents undue risk to safe and efficient innovation in digital marketplaces. Nonbanks can be subject to appropriate bank-like supervision and regulation to protect consumers and financial stability.



Fiat-backed stablecoins issued by non-banks have already gained traction and would benefit from high standards of regulation and supervision.

5.2

What requirements should apply to fiat-backed stablecoin arrangements?

The previous section stated our view that issuance of fiat-backed stablecoin should be permissible by any entity that meets high standards. This section states our views on what those standards should be. In many cases, these standards are more stringent than existing standards.

- **Reserve assets.** Permissible reserve assets for a fiat-backed stablecoin should be highly liquid and low risk: cash and cash equivalents, including short-duration U.S. Treasuries. Beyond these categories, further classes of reserve assets should be subject to appropriate capital buffers – above the aggregate amount of stablecoins outstanding – to account for potential credit risk losses and assure a stablecoin's redeemability at face value. These capital buffers would be particularly relevant during periods of market stress.

- **Transparency and audits.** Transparency is necessary for stablecoin holders to have the information necessary to make informed decisions, and independent verification is necessary for their disclosures to be worthy of stablecoin holders' trust. Effective transparency requirements for fiat-backed stablecoin issuers should include both monthly and annual disclosures. Monthly disclosures should include attestations by an independent accountant as to the composition and quality of reserve assets and whether they are at least equal in value to the aggregate face value of the stablecoins outstanding. Annual disclosures based on an independent audit should be more detailed, including information about the stablecoin's key technological characteristics, holders' ability to redeem, and the effectiveness of the issuer's internal controls, risk management and compliance.
- **Operational resilience and compliance.** Fiat-backed stablecoin issuers should be subject to high standards that cover a wide range of areas that could affect stablecoin holders. These would include cybersecurity and privacy safeguards to prevent hacks and protect stablecoins holders' personal information, operational risk and business continuity measures to sustain uptime, and a compliance program to prevent financial crimes. In most cases, these standards can be developed based on the existing standards that apply to banks today, tailored in an appropriate manner to reflect the differences in stablecoin issuers' business model and risk profile.
- **Government oversight.** A federal or a state regulator should periodically examine issuers' compliance with applicable regulatory requirements. Knowledge that the issuer of a stablecoin is subject to this kind of oversight will give the public additional confidence in issuers' financial and operational resilience.

5.3

What role should algorithmic stablecoins have in the marketplace?

The recent failure of TerraUSD has led many to call for bans on algorithmic stablecoins. Media reports told stories about investors whose life savings were lost, and many crypto pundits now claim that algorithmic stablecoins are not suitable for retail consumers and other users of crypto products. Indeed, some are even questioning whether TerraUSD was a fraud.⁷⁸

While time and investigation will make more clear why and how TerraUSD failed, it is important to note that its failure did not come as a surprise to many. As discussed earlier, academics explained how its endogenous support arrangements were inherently unstable and might not be able to absorb market shock or selling pressure. The May 2022 death spiral of UST has made this fragility more broadly understood, providing valuable empirical evidence that can inform future innovations.

⁷⁸Barron's, [U.S. Senator Sees Potential for Fraud in Terra Stablecoin Collapse](#) (23 May 2022); Al Jazeera, [South Korean prosecutors raid crypto exchanges amid Luna probe](#) (21 July 2022)

It is now broadly understood that algorithmic stablecoins are not really stable, and it is a misnomer to call them as such. Their value is not backed by exogenous reserves, but based on a tautology – that one token can be converted into another, and vice versa, at a ratio determined by code.

But this does not mean algorithmic stablecoins should be banned. Markets are better than governments at picking winners and losers. Innovation requires running experiments, and not all will succeed. Blockchain technology is moving the internet into its next phase, and we should not be surprised if we see shades of the dot.com era of the late 1990s. With hindsight it is always easy to understand and identify failures, and many of the dot.com-era investments look foolish today. But many of the successes were similarly accused of futility in their early stages.

In assessing the future regulatory framework, policymakers should avoid draconian and harmful measures like bans, and instead focus on the key principles that underpin today's successful markets. Crypto-backed stablecoins with exogenous collateral are likely to survive over the long-term. Allowing markets to experiment will help refine optimal designs. In doing so, protecting consumers through clear disclosures of the attendant risks is critical. Regulatory frameworks that focus on transparency as a central tenet, with robust provisions that protect against fraud and misconduct, will best allow stablecoins to continue to develop and prove themselves while letting market forces play out.

5.4

What rights should you have as a stablecoin holder?

Anyone who holds a fiat-backed stablecoin should know that their money is safe, without any need for due diligence or worry. That means being able to see quickly that their stablecoins are subject to a rigorous level of regulation and supervision and therefore can be trusted. As discussed above, regulatory requirements should cover the composition and quality of reserve assets, transparency and audits of the issuer's disclosures, and the issuer's ability to maintain strong operational resilience and compliance programs.

Consumers should also be confident in their ability to use fiat-backed stablecoins as money. From a legal perspective, there are two key issues: settlement finality and insolvency treatment. First, the law should treat stablecoins just like any other form of money and provide certainty that when a stablecoin transaction settles on a blockchain a corresponding legal obligation can also be discharged as nearly as possible at the same moment in time.

Second, should an issuer become insolvent, the law should make sure that holders suffer no losses and are able to keep using their money with minimal

interruption. In an insolvency proceeding, stablecoin holders should be first in line to receive any value from the stablecoin's reserve assets. This can be accomplished by making the stablecoin holders' claims senior to those of other creditors, or by treating stablecoin holders as having a pro rata interest in the reserve assets directly. Either way, stablecoin holders' claims should be satisfied as quickly as practicable, potentially in an administrative proceeding akin to the bank resolution process, if proceedings under the normal bankruptcy regime would not move quickly enough. To the extent that changes to commercial laws or banking laws are needed to facilitate these outcomes, the time for those changes has come.

For crypto-backed and algorithmic stablecoins, there is currently significant skepticism about their long term viability and appropriateness for consumers. The UST-LUNA failure in particular has led many policy makers to advocate for bans. However, a draconian measure like this can lead to suboptimal outcomes by limiting future innovation in an area that is still developing. Moreover, there are significant practical limitations of imposing a ban on activities that take place through DeFi protocols.

For these types of stablecoins, a better path would be to focus on facilitating disclosures that promote consumer protection. These products should be clearly differentiated from fiat-backed stablecoins that are subject to regulation and supervision as described above. The disclosures should be clear and conspicuous, free of misrepresentations, and otherwise subject to antifraud provisions. Under these conditions, there is value in permitting crypto-backed and algorithmic stablecoins to move forward with responsible innovation.

5.5

How should stablecoins interact with other forms of money?

Maintaining interoperability across stablecoin networks, and between stablecoins and other forms of money, will be crucial for stablecoins to realize their full potential benefits.

Observing the growing usage of private sector digital currencies, many countries are launching, or exploring the possibility of launching, a retail Central Bank Digital Currency ("CBDC"). Globally, over 100 countries, with over 90% of global GDP, are exploring a CBDC today.⁷⁹ While there are many different possible designs depending on the situational context of each country, a CBDC would represent a digital currency issued and backed by a country's central bank, which would enable the public to safely make digital payments.

⁷⁹ [Atlantic Council](#) March 2022

While some predict that CBDCs will render stablecoins obsolete, we strongly believe CBDCs will complement and encourage robust, inclusive, and safe innovation for stablecoins and the broader digital asset economy.



Stablecoins can meaningfully complement a CBDC in providing optimal support for consumers and businesses.

Well-regulated, privately issued stablecoins would complement CBDCs in several ways:

- Programmability and tailored services for different customer segments: CBDCs will necessarily be designed to serve the mass market, while stablecoins can be tailored to serve the specific needs of various user segments. Although CBDCs may be designed to allow some level of programmability, there may be constraints on how far and effectively CBDCs can go in this direction as a by-product of other policy constraints and objectives. The greater flexibility and innovative potential of stablecoins can compensate for any such constraints on a CBDC.
- Potential constraints on CBDCs that stablecoins may not face: Stablecoins may be able to offer economic options that a CBDC does not. For instance, the European Central Bank is exploring a 3,000 euro limitation on the amount of digital euro that can be held by one party, based on various policy considerations. Stablecoins would be able to cater to those needing larger holdings of a digital fiat currency equivalent. Similarly, a stablecoin may choose to pay interest, or to pay a rate higher than a CBDC may offer.
- Current state and expected near-term innovation: Stablecoins may also be in a better position to innovate, offering new features to their customers than would a CBDC. In addition to having a first-mover advantage, stablecoins are expected to continue to rapidly evolve and innovate over the coming years, experimenting in ways CBDCs may not be able to due to differences in size and scope. The private sector will be in a better position to experiment and will have more incentive to do so, as individual stablecoin providers vie for market share.

PART 6

Conclusion



Coinbase supports a broad, balanced, and fact-based dialogue on stablecoins to form the basis for a regulatory framework that will enable responsible innovation.

We look forward to continuing to share our experience and expertise and being a part of future consultations.