

Stablecoins and Their Risks to Financial Stability

by Cameron MacDonald and Laura Zhao

Financial Stability Department
Bank of Canada
cmacdonald@bankofcanada.ca, yzhao@bankofcanada.ca

Bank of Canada staff discussion papers are completed staff research studies on a wide variety of subjects relevant to central bank policy, produced independently from the Bank's Governing Council. This research may support or challenge prevailing policy orthodoxy. Therefore, the views expressed in this paper are solely those of the authors and may differ from official Bank of Canada views. No responsibility for them should be attributed to the Bank.

DOI: <https://doi.org/10.34989/sdp-2022-20> | ISSN 1914-0568

©2022 Bank of Canada



Acknowledgements

We would like to thank Natasha Khan for valuable discussions and suggestions. We also thank Scott Henry, Jonathan Chiu and Alejandro Garcia for helpful comments. Hugh Ding provided excellent research assistance. The views expressed in this paper are solely those of the authors and should not be interpreted as reflecting the official views of the Bank of Canada.

Abstract

The market for fiat-referenced cryptoassets, commonly known as stablecoins, has expanded rapidly in recent years alongside the growth of the cryptoasset ecosystem. In fact, the market capitalization of stablecoins increased by more than 30 times since the beginning of 2020. What risks could stablecoins pose to the financial system? We examine price stabilization mechanisms of stablecoins as well as the current and potential use cases of stablecoins. We then analyze the risks stemming from both. We argue that the price stabilization mechanisms of current stablecoins could lead to the risk of confidence runs, which can propagate to broader cryptoasset markets and the traditional financial sector. We also argue that stablecoins can contribute to risks to financial stability by facilitating the buildup of leverage and liquidity mismatches in decentralized finance. Such risks cannot be addressed by regulating the safety and soundness of stablecoins alone without adequately regulating broader activities in the crypto ecosystem. Finally, we explore the potential implications of the substitution of cash and bank deposits for stablecoins in payments and the financial system more broadly, particularly the current system of bank-intermediated credit and for monetary policy.

Topics: Digital currencies and fintech; Financial markets; Financial stability; Financial institutions, Financial system regulation and policies

JEL codes: E42, E44, E58, G23

Résumé

Le marché des cryptoactifs adossés à des monnaies fiduciaires, communément appelés cryptomonnaies stables, a connu une croissance rapide ces dernières années, tout comme le reste de l'écosystème des cryptoactifs. En effet, la capitalisation de marché des cryptomonnaies stables a été multipliée par plus de 30 depuis le début de 2020. Quels risques potentiels ces cryptomonnaies présentent-elles pour le système financier? Nous examinons les mécanismes de stabilisation de la valeur des cryptomonnaies stables ainsi que les cas d'utilisation actuels et potentiels de celles-ci. Puis, nous analysons les risques qui en découlent. Nous soutenons que les mécanismes de stabilisation de la valeur des cryptomonnaies stables utilisées présentement pourraient faire peser un risque sur la confiance susceptible d'entraîner des mouvements de ventes massives pouvant se propager à l'ensemble des marchés de cryptoactifs et au système financier traditionnel. Nous faisons valoir également que les cryptomonnaies stables sont de nature à contribuer aux risques pour la stabilité financière en favorisant la hausse du levier financier et l'asymétrie de liquidité dans la finance décentralisée. Il n'est pas possible de gérer de tels risques en régulant uniquement la sûreté et la solidité des cryptomonnaies stables; il faut aussi réglementer adéquatement les diverses activités au sein de l'écosystème des cryptomonnaies. Enfin, nous nous penchons sur les implications possibles d'un remplacement de l'argent comptant et des dépôts bancaires par les cryptomonnaies stables pour les paiements et plus généralement le système financier, y compris le système actuel d'intermédiation bancaire du crédit et la politique monétaire.

Sujets : Monnaies numériques et technologies financières; Marchés financiers; Stabilité financière; Institutions financières; Réglementation et politiques relatives au système financier

Codes JEL : E42, E44, E58, G23

Introduction

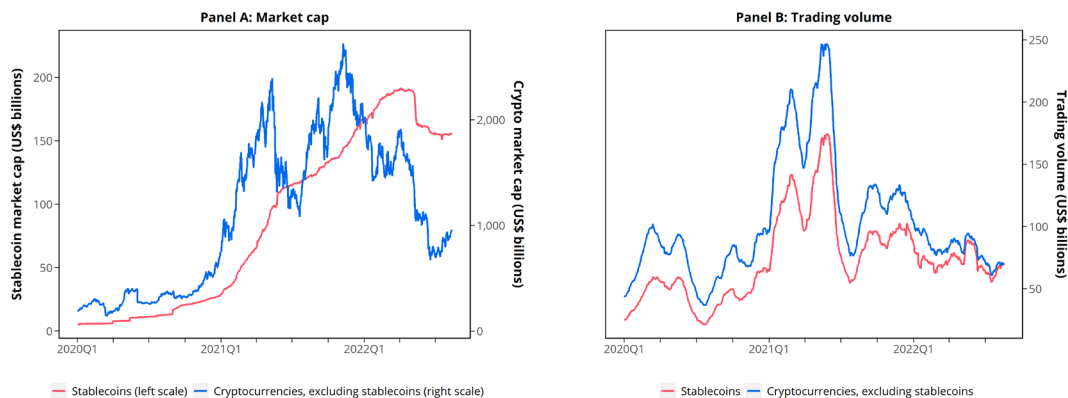
Fiat-referenced cryptoassets, commonly known as stablecoins, aim to maintain a steady value against a specified fiat currency.¹ Users therefore often treat stablecoins as a digital equivalent to that currency. Since the price of stablecoins is steadier than most other cryptoassets, it allows them to fulfill the role of settlement asset on cryptoasset trading platforms and in decentralized finance (DeFi). Stablecoins also have the potential for broader use in payments and the traditional financial system, so they could compete with other forms of money (e.g., bank deposits). In this paper, we primarily use the term stablecoin since the term is the most commonly used in official publications and in academic literature. But the term fiat-referenced cryptoassets may provide for a more accurate description of these cryptoassets given their sometimes poor track record in maintaining the targeted value.

The value of outstanding stablecoins has surged in recent years to accompany the growth in the broader cryptoasset markets—from US\$5 billion at the beginning of January 2020 to US\$155 billion by the end of July 2022. Stablecoins now account for about 15% of the total valuation of the cryptoasset market.² **Chart 1** shows that the market capitalization of stablecoins has been increasing at a relatively steady pace despite the significant volatility in broader cryptoasset markets. Meanwhile, even though stablecoins only constitute 15% of the cryptoasset market, the trading volume of stablecoins is similar to the total volume of non-stablecoin cryptoassets, suggesting their critical role as a source of liquidity in cryptoasset markets. The most common reference currency for stablecoins is the US dollar, which is the primary unit of account in cryptoasset markets and accounts for the vast majority—over 99%—of outstanding stablecoins. Stablecoins referencing other currencies (e.g., the euro, pound, Singapore dollar and Canadian dollar) have been issued but have not yet been widely adopted.

¹ To date, there is no consensus on the precise definition of “stablecoin.” While stablecoins can refer to asset-referenced cryptoassets more broadly, as is the case in the EU Markets in Crypto-Assets Regulation (MiCA), we use the term to describe only fiat-referenced cryptoassets.

² Based on data from CoinMarketCap on July 31, 2022.

Chart 1: Market capitalization and trading volume of stablecoins



Note: This chart shows data from January 2020 to July 2022. Volume is calculated as the rolling 30-day average volume.

Source: Authors' calculations based on data from CoinMarketCap

Last observation: July 31, 2022

Stablecoins featured prominently in the crypto market turmoil of May and June 2022, which included the collapse of the then third-largest stablecoin, TerraUSD, and a brief depegging of the largest stablecoin, Tether. The run on TerraUSD and its contagion across cryptoasset markets was similar to confidence runs that have occurred in the traditional financial sector involving banks and money market funds, highlighting the need to understand the risks stablecoins could pose to the financial system.

We examine the various price stabilization mechanisms used by existing stablecoins and classify them into three categories:

- fiat-backed
- crypto-backed
- algorithmic

We then examine how the triggers and transmission mechanisms of confidence runs can vary with each category. We also examine the potential knock-on effects for broader cryptoasset markets and the traditional financial system.

In addition, we consider the current and potential uses of stablecoins and how they could affect financial stability. Although they have possible future uses in payments, stablecoins are currently a key building block in DeFi and crypto banking. While DeFi may eventually represent a valuable alternative to traditional bank-based financial services, it could also become a source of systemic risk due to the:

- leverage enabled by the re-use of collateral using collateral chains, i.e., multiple claims on the same underlying collateral
- presence of maturity and liquidity transformation

We document how stablecoins play an outsized role in DeFi, accounting for over 50% of the total assets deposited in DeFi platforms. We also document how—for some stablecoins, such

as USD Coin—a significant share (over 50%) of the supply relates to DeFi activities.³ We emphasize that the risks stemming from DeFi cannot be addressed by only regulating the safety and soundness of stablecoins without adequately regulating broader activities in the crypto ecosystem.

Apart from the risks associated with stablecoins and the activities they enable, we further touch on the risks posed by the novel infrastructures and custodians that stablecoin-based activities rely on. Key among these are the operational risks associated with public blockchain networks that provide the ledger and smart contract platform used to mint, trade and redeem stablecoins as well as the wallet providers that maintain the cryptographic keys representing ownership of cryptoassets such as stablecoins.

Finally, we explore the potential implications of the substitution out of cash and bank deposits into stablecoins for payments and the financial system—including for the current system of bank-intermediated credit—and for monetary policy.

Related literature

Several national and international authorities responsible for financial stability have weighed in on the potential risks stablecoins pose.

Internationally, the Financial Stability Board (FSB) has published several reports that focus on the potential future risks to financial stability posed by global stablecoins—in other words, stablecoins that come to be widely used in multiple jurisdictions as a means of payment or a store of value (FSB 2020, 2021). The FSB focuses on four contagion channels: financial sector exposures to stablecoins; wealth effects, i.e., the degree to which changes in the value of stablecoins could affect users, with subsequent knock-on effects to the financial system; confidence effects, through which developments concerning stablecoins could affect investor confidence in cryptoasset markets and potentially the broader financial system; and the extent of stablecoins' use in payments and settlements.

The FSB also provides national regulators with high-level recommendations to promote consistent and effective regulation of global stablecoins across jurisdictions.

The Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) published final guidance on stablecoin arrangements—i.e., the range of functions and entities involved in the creation and distribution of a stablecoin—in July 2022 (CPMI-IOSCO 2021). This guidance aims to tackle the risks stablecoin arrangements may pose if they are widely adopted as payment, clearing and settlement systems. While systemically important stablecoin arrangements would be expected

³ Based on the metric of total value locked (Source: DefiLlama).

to observe all of the relevant Principles for Financial Market Infrastructures (PFMIs), the guidance focuses on a subset of four principles for which stablecoin arrangements are notably different from other financial market infrastructures: governance, comprehensive risk management, settlement finality and money settlements.

In the United States, the US President's Working Group report on stablecoins focuses on potential systemic risk posed by stablecoins that are used as a means of payment.⁴ This includes the risk of confidence runs, operational disruptions affecting a stablecoin's transfer mechanism, and the potential for an individual stablecoin to scale rapidly and concentrate financial risks and economic power. The report recommends that authorities impose appropriate, consistent and comprehensive prudential oversight on stablecoins that are used as a method of payment.

Several other jurisdictions have also conducted research on the financial stability implications of cryptoassets and DeFi. For example, in the United Kingdom, the Financial Policy Committee (FPC) highlighted the risk of greater involvement of financial institutions in cryptoassets. The FPC signalled concerns that bank holdings of cryptoassets could disrupt financial markets. They also shared concerns about the potential impact that the stablecoin market could have on payment and settlement services if it continues to grow.⁵ The European Central Bank has also published several reports on the risks of stablecoins.⁶

We build on earlier work by elaborating on the stabilization mechanisms and use cases of stablecoins, exploring the triggers and transmission channels of runs. We also highlight the risks stablecoins pose beyond the safety and soundness of the instrument itself—i.e., market participants' risk taking enabled by use of stablecoins in DeFi.

Price stabilization mechanisms and use cases

Price stabilization mechanisms

Stablecoins can maintain their peg using a variety of stabilization mechanisms. The most widely adopted mechanism, used by the three largest stablecoins, is to support the value of the stablecoin with a dedicated reserve of assets denominated in the reference currency. The value of this reserve typically equals the number of outstanding stablecoins, and the issuer of the stablecoin promises to issue and redeem the stablecoin for the reference currency on a one-to-one basis. The composition of reserve assets varies across stablecoins but often includes cash and equivalents, treasuries and commercial paper. We refer to stablecoins that use this mechanism as **fiat-backed** stablecoins. Fiat-backed stablecoins have a direct link to the existing

⁴ See President's Working Group on Financial Markets, the Federal Deposit Insurance Corporation and the Office of the Comptroller of the Currency (2021).

⁵ See Bank of England 2022.

⁶ For example, Adachi et al. (2020 and 2021).

financial system through their holdings of traditional financial instruments. This is not true of other mechanisms.

Another price stabilization mechanism that has emerged is stablecoins that are backed by a dedicated reserve of cryptoassets, which can include unbacked cryptoassets as well as other stablecoins. We refer to these as **crypto-backed** stablecoins.⁷ Because the value of unbacked cryptoassets is often volatile, crypto-backed stablecoins are overcollateralized to provide a buffer against a decline in collateral value. These stablecoins often feature a mechanism for liquidating the cryptoasset collateral if the collateralization ratio falls below a certain threshold, ensuring that the stablecoin remains solvent.

Stablecoins that are not backed by dedicated reserve assets or are only partially backed are often referred to as **algorithmic** stablecoins. Algorithmic stablecoins seek to achieve price stability through algorithms that regulate the supply and demand of the stablecoin in response to market conditions. They often rely on the incentives of actors in the secondary market to stabilize the price. These mechanisms vary and include allowing the stablecoin to be freely converted against a second unbacked cryptoasset (TerraUSD, Frax) or a periodic rebasing of the stablecoin through adjustments to the stablecoin supply (Ampleforth).

Table 1 summarizes the classification of stablecoins based on price stabilization mechanism.

Table 1: Classification of stablecoins by price stabilization mechanism

	Description	Market Share*	Examples
Fiat-backed	Stablecoins that maintain a reserve of fiat-denominated assets. Typical reserve assets include cash and equivalents, treasury bills and commercial paper.	92% Market cap: US\$141.2 billion	<ul style="list-style-type: none"> • Tether • USD Coin • Binance USD • Pax Dollar • True USD
Crypto-backed	Stablecoins that are backed by cryptoassets.	5% Market cap: US\$7.8 billion	<ul style="list-style-type: none"> • Dai
Algorithmic	Stablecoins that achieve price stability through pre-programmed algorithms that regulate the supply and demand of the stablecoin in response to market conditions.	2% Market cap: US\$3.7 billion	<ul style="list-style-type: none"> • TerraUSD • Frax • USDD • Ampleforth

* Based on the CoinMarketCap data on July 31, 2022.

⁷ In the case of Dai, the most popular crypto-backed stablecoin, individuals deposit cryptoasset collateral into a smart contract and can borrow newly issued stablecoins against this collateral (often called collateralized debt position). If the collateral declines in value below a certain threshold, the borrower can top up the collateral position, pay down the loan or have the existing collateral liquidated.

Uses of stablecoins

Cryptoasset trading

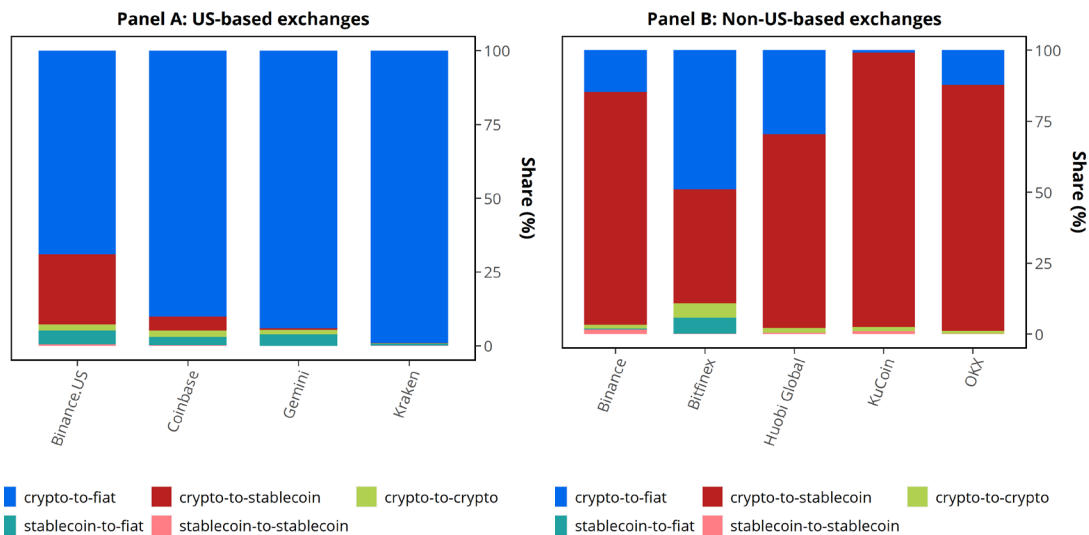
The original and currently the main use for stablecoins is to facilitate the trading of other cryptoassets. On crypto exchanges, stablecoins compete with fiat currency, in the form of bank deposits, as the medium of exchange for users buying and selling cryptoassets. While it is possible to trade one cryptoasset directly for another, this may be costly if the specific cryptoassets do not have large and liquid markets. For most trades, selling one cryptoasset for fiat currency or stablecoins and then buying another with the proceeds is more efficient than trading cryptoassets directly. Moreover, traders may wish to hold fiat currency or stablecoins on exchanges as a store of value while waiting for the next trading opportunity.

Although fiat currency and stablecoins can serve similar functions on cryptoasset exchanges, trading activity on many exchanges is concentrated in stablecoins. Several factors may explain the preference for stablecoins over fiat currency. First, stablecoins face less regulation than bank deposits. For example, a cryptoasset trading platform that offers US-dollar wallets to its users would require the services of a US bank, which may also entail the scrutiny of US regulators. Banks, for their part, may not be willing to provide banking services to a cryptoasset trading platform due to the regulatory uncertainty around crypto markets. Hence, cryptoasset exchanges may choose to support stablecoin-based markets rather than face the regulatory scrutiny associated with offering services in US dollars.

Second, cryptoasset markets are always open, but the traditional banking system has limited operating hours. Since stablecoins can be transferred outside of regular banking hours, movement of liquidity could become easier. If it costs more to manage the liquidity of fiat currency than it does to manage the liquidity of stablecoins, exchanges may charge their users higher fees for transactions in fiat currency.

Nonetheless, some cryptoasset trading platforms use fiat currencies rather than stablecoins as the primary medium of exchange. **Chart 2** compares the share of stablecoins, fiat currency and crypto-to-crypto trades in trading activity at the largest exchanges globally. Trading activity at the largest exchange, Binance, is dominated by Tether and Binance's own stablecoin, Binance USD. Likewise, major exchanges based in jurisdictions outside the United States are more likely to have a large share of trading activity in stablecoin pairs. In contrast, the major platforms that are based in the United States and serve mainly US residents tend to have a greater share of trading activity using fiat currency.

Chart 2: Composition of trading pairs on crypto exchanges



Note: We show the composition of average daily trading volume from January to July 2022 on selected crypto exchanges. Crypto-fiat trades are the main trading activities on US-based exchanges, while stablecoin-related trades are the main trading activities on non-US based exchanges.

Source: Authors' calculations based on data from CoinMarketCap

Margin and settlement assets for crypto derivatives

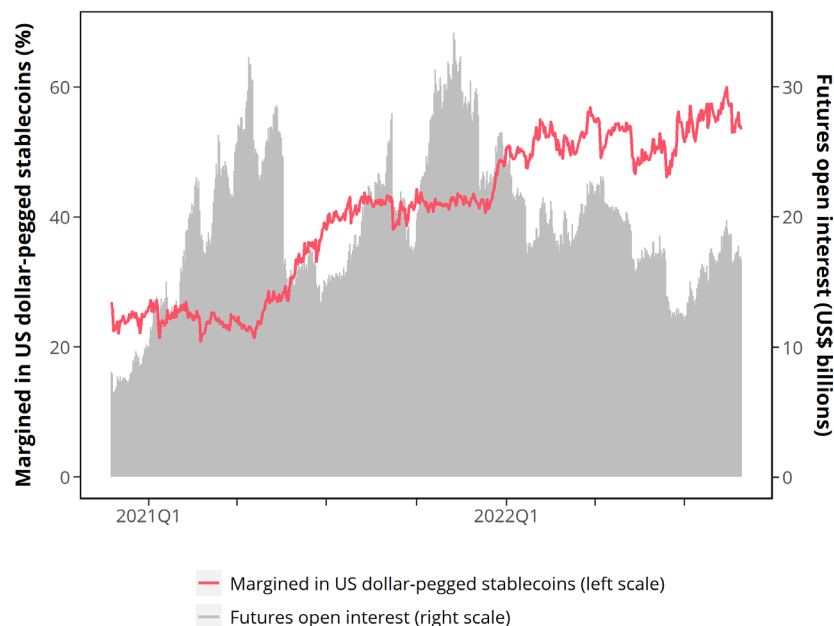
Stablecoins have been taking on an increasingly important role in the growing crypto derivatives markets. In the crypto futures markets, stablecoins are used widely as margin assets.

Chart 3 shows that over 50% of Bitcoin and Ether futures were margined in US dollars or stablecoins backed by US dollars by the end of July 2022, more than doubling the size at the beginning of 2021.⁸ In options markets, where the contracts are typically margined and settled using the contract asset, crypto exchanges have started to offer settlement using stablecoins.⁹

⁸ The statistic from Glassnode shows only a combined statistic for USD fiat and USD-pegged stablecoins. We expect that in non-US based exchanges, the stablecoins will dominate the margin assets, similar to the composition of trading pairs in **Chart 2**.

⁹ For example, see J. He, "Crypto Derivatives Exchange Bybit to Settle Options Contracts in USDC," Coindesk (June 29, 2022).

Chart 3: Use of stablecoins in crypto futures markets



Note: The red line plots the share of Bitcoin and Ether futures contracts that use stablecoins (and US dollars) as margin assets. The grey area shows the sum of the Bitcoin and Ether open interests.

Source: Authors' calculations based on data from Glassnode.

Last observation: July 31, 2022

Decentralized finance

Stablecoins also play a critical role in the emerging system of DeFi. DeFi aims to increase efficiency and accessibility of financial services by replacing centralized intermediaries with transparent and largely automated platforms built on blockchain infrastructure using smart contracts.¹⁰ Most DeFi applications require the use of stablecoins because they are the only form of fiat-referenced cryptoassets that can interact with other cryptoassets that reside on blockchains. The total value of cryptoassets locked in DeFi platforms has grown rapidly since the second half of 2020, but it has fallen from its peak level in November 2021. In July 2022, stablecoins accounted for over 50% of total value locked in DeFi, as shown **Chart 4, panel a**, even though the market capitalization of stablecoins represented only 15% of the total cryptoasset market. Among the top stablecoins, over 50% of Dai supply is locked in smart contracts, and around 40% of USD Coin supply is locked in smart contracts (**Chart 4, panel b**). Large, institutional investors are the main users of DeFi applications; according to Chainalysis (2021), over 65% of DeFi transactions involve amounts greater than US\$10 million.¹¹

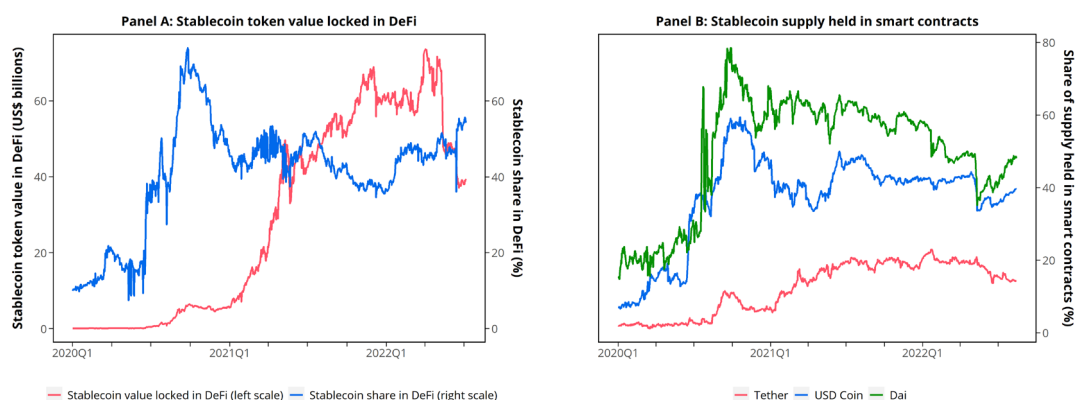
The two largest categories of DeFi applications are decentralized exchanges (DEXs) and lending platforms. Compared with their centralized counterparts, DEXs account for much less trading

¹⁰ Smart contracts are self-executing programs that can fulfill the terms and conditions of a transaction automatically when certain pre-determined criteria are met.

¹¹ Large institutional investors are defined as parties engaging in transactions greater than US\$10 million.

volume but rely more on stablecoins as a medium of exchange. About 70% of trading volume on DEXs involves stablecoins, while the remaining 30% involves crypto-to-crypto trades.¹² On DeFi lending platforms, users can earn interest by depositing cryptoassets with the protocol. The cryptoassets then become available to other users to borrow against their own cryptoasset deposits. Most commonly, unbacked cryptoassets are borrowed against stablecoin collateral, or stablecoins are borrowed against unbacked cryptoassets to enable users of the platform to make leveraged bets on the direction of cryptoasset prices. On the two largest DeFi lending platforms, Aave and Compound, stablecoins account for about one-half of the value of deposited cryptoassets and three-quarters of the value of loans.¹³

Chart 4: Uses of stablecoins in decentralized finance



Sources: Authors' calculations based on data from DefiLlama and Glassnode. Last observation: July 31, 2022

Crypto banking

Crypto banks pay interest on users' deposits of cryptoassets, including stablecoins, and seek to earn a return by either lending them back to users at a higher rate of interest or investing them in DeFi and over-the-counter crypto markets. In some cases, users are paid an interest rate of up to 18% annual percentage yield ("APY") on their deposits.¹⁴ However, unlike traditional banks, crypto banks are subject to minimal regulation of their activities. Using stablecoins instead of fiat currency on these platforms may help these entities avoid regulations that would likely apply if the deposits and loans were in denominated in fiat currency.

Payments

Although Bitcoin was first designed as a system for peer-to-peer payments, the large daily fluctuations in its price prevent it from serving as a desirable method of payment. Stablecoins

¹² The percentage of trading volume involving stablecoins was calculated from CoinMarketCap data for the five highest-volume non-derivative DEXes, which were Uniswap (V2), PancakeSwap (V2), Curve Finance, Serum DEX, and the aggregation of Sushiswap across blockchains, and then averaged between these five exchanges.

¹³ Based on data from [Compound Finance Markets](#) and [Aave Markets](#).

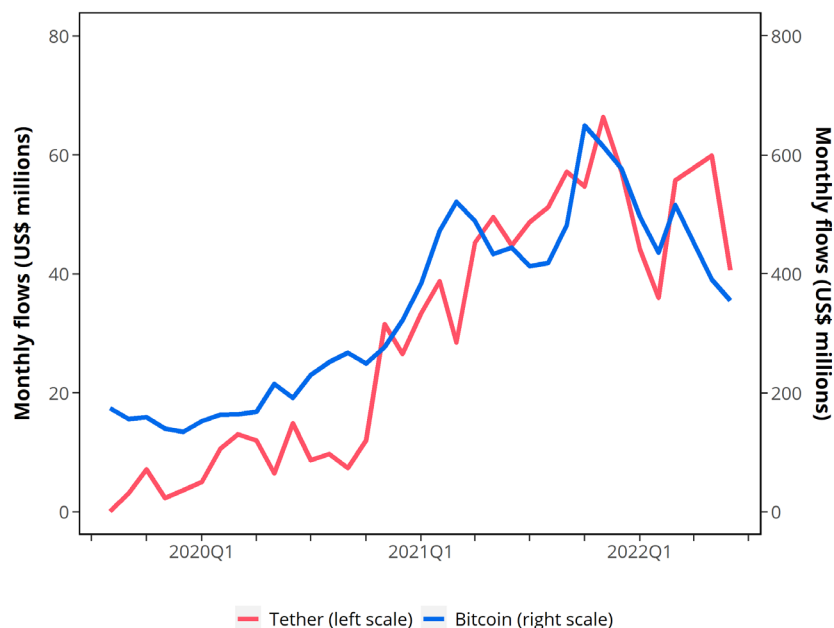
¹⁴ Z. Faux and J. Light, "Celsius's 18% Yields on Crypto Are Tempting—and Drawing Scrutiny," [Bloomberg](#) (January 27, 2022).

are intended to solve much of the volatility problem and could be in a better position to fulfill Bitcoin's initial promise.

Stablecoins have not yet been used for payments on a significant scale but have started to gain momentum. Measures of the monthly flows of stablecoins into payment wallets from Chainalysis, as shown in **Chart 5**, suggest that stablecoin use for payments has been increasing since 2020, but it remains small when compared with traditional methods of payment. One current impediment to the adoption of stablecoins for payments is the lack of scalability of the underlying blockchains, which can give rise to high transaction fees during periods of elevated activity.¹⁵

Nonetheless, it remains possible for a stablecoin to launch and scale rapidly as a method of payment, particularly if partnered with an established firm that has an existing customer base. Indeed, mainstream payment service providers, including Visa and Mastercard, have started developing features to enable payment services using stablecoins (see **Box 1**).

Chart 5: Payment transaction flows



Note: We measure payment flows as monthly inflows of Bitcoin and Tether to merchant service providers.

Source: Authors' calculations based on data from Chainalysis

Last observation: July 31, 2022

¹⁵ Public blockchain networks currently lack the scalability that would allow them to compete with traditional payment systems in both speed and cost. For instance, the Bitcoin blockchain processes four to seven transactions per second while Visa processes approximately 1,700 transactions per second.

Box 1: Examples of established companies implementing stablecoin payment services

Both major payment networks, Visa and Mastercard, are conducting pilot projects to settle payments using stablecoins. Visa has partnered with the cryptoasset exchanges Crypto.com and Anchorage Digital to experiment with settling transactions in USD Coin (USDC).¹⁶ Similarly, Mastercard plans to incorporate USDC into its network by enabling the integration of cryptoasset wallets with its payment infrastructure.¹⁷

Social media giant Facebook (now Meta) launched a pilot of its Novi digital wallet in October 2021.¹⁸ The pilot program allowed users to send and receive money using the Pax Dollar (USDP) stablecoin. Facebook targeted the remittance market by offering a low fee payment option to its users; however, the long-term ambition is beyond remittances, and future use cases include commercial transactions and other financial services.

PayPal began allowing its US users to buy, sell and hold cryptoassets through its app in November 2020. Stablecoins are not supported right now, but PayPal confirmed in January 2022 that it is exploring a branded stablecoin as crypto payments gain traction.¹⁹

Stablecoin use in Canada

In Canada, awareness and use of stablecoins is low but growing. Moreover, the vast majority of stablecoins owned by Canadians were denominated in US dollars. According to Bank of Canada's 2021 Bitcoin Omnibus Survey, around 2% of Canadians reported owning Tether, USD Coin or Binance USD, compared with less than 1% in 2019 (Engert and Huynh 2022).

Few stablecoins are denominated in Canadian dollars, and those have relatively little adoption. As of August 2022, just over Can\$10 million stablecoins were outstanding, with over 1,000 token holders having made about 43,000 transactions since 2020.²⁰ In 2021, a Canadian bank, VersaBank, announced plans to issue a stablecoin-like digital deposit receipt for use in capital markets position settlement, business-to-business transactions and institutional settlement.²¹

¹⁶ Visa, "Visa Becomes First Major Payments Network to Settle Transactions in USD Coin (USDC)," press release (March 29, 2021).

¹⁷ Mastercard, "Mastercard creates simplified payments card offering for cryptocurrency companies," press release (July 20, 2021).

¹⁸ N. De, "Meta's WhatsApp to Trial Novi Digital Wallet," CoinDesk (December 9, 2021).

¹⁹ M. Gurman and J. Surane, "PayPal Explores Launch of Own Stablecoin in Crypto Push," Bloomberg (January 7, 2022).

²⁰ Source: Etherscan data for CADX, QCAD/VCAD, jCAD and TCAD.

²¹ VersaBank, "Canadian Financial Institution Launches World's First Stablecoin Backed by Bank Deposits," press release (February 25, 2021).

Risk of runs and propagation channels

For a stablecoin to serve as a reliable method of payment and store of value, users must be confident that its value will be maintained even under adverse conditions. This requires that the stabilization mechanism always allows for the stablecoin to be redeemed or otherwise converted at par value into another liquid asset. Any circumstances that undermine this confidence could precipitate a disorderly run—a self-reinforcing dynamic wherein many token holders seek to sell or redeem the stablecoin at once, thereby undermining the stabilization mechanism and motivating further sales and redemptions.

Although stablecoins have emerged only in recent years, the history of runs on banks and other financial intermediaries has provided many theories about the causes of runs. The insight of the strategic run theory pioneered by Diamond and Dybvig (1983) is that runs happen in settings where each investor or depositor benefits from withdrawing earlier than others; under these circumstances, the mere risk of a run can generate a run. A strategic run can occur when token holders perceive an advantage in redeeming ahead of others (i.e., early redemptions are met at par value, but later redemptions may be delayed or subject to haircuts).

Another broad theory of runs emphasizes that a panic can happen when a market event causes highly risk-averse investors to realize that assets they previously regarded as safe may incur losses. This realization results in the investors treating the slightly risky assets in a much different way.²² This perspective on run dynamics is relevant for stablecoins that users regarded as money-like assets and a safe store of value in crypto space.

Triggers of runs

Fiat-backed stablecoins

For fiat-backed stablecoins, the credibility of the issuer's commitment to redeem the stablecoin largely depends on the quality of the reserve assets. Since the fiat reserve is backing the stablecoin on a one-to-one basis, even a modest decline in the value of reserve assets can result in the issuer being unable to meet redemptions in full. Hence, a strategic run could be triggered if adverse market conditions create an expectation that the reserve assets will fall in value or become illiquid, possibly preventing redemptions from being fulfilled. Without other mechanisms in place to ensure the redemptions can be fulfilled, such as those that exist in the banking sector (e.g., deposit insurance, access to central bank liquidity facilities), reserve assets must be highly liquid and free of credit risk so the stabilization mechanism can function even during adverse market conditions.

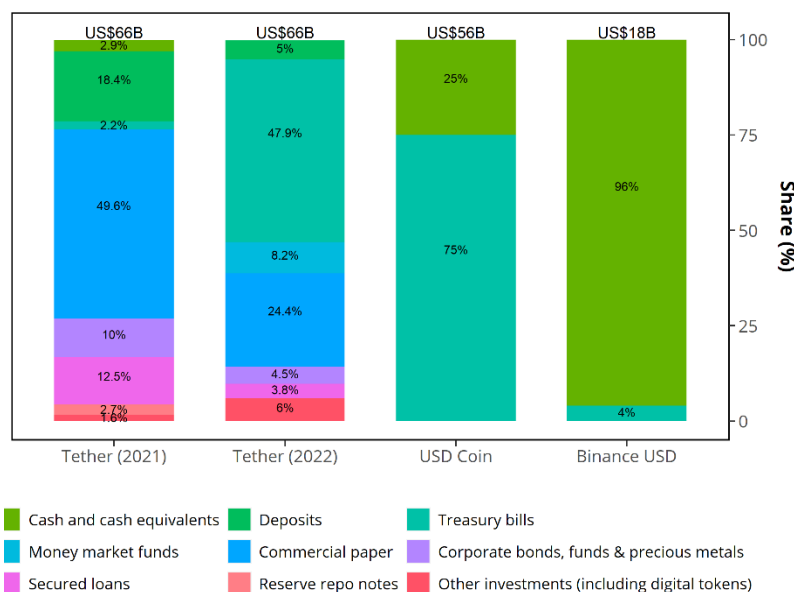
The major fiat-backed stablecoins have tended toward conservative reserve compositions. USD Coin and Binance USD have maintained a reserve composition consisting only of cash,

²² See, for example, Gennaioli, Shleifer and Vishny (2012).

cash equivalents and treasury bills since their launch. Tether's reserve, in comparison, includes relatively risky assets such as commercial paper, corporate bonds and even investments in cryptoassets. Concerns about the quality of Tether's reserve assets have previously led to episodes where Tether has traded at a discount to the US dollar, including during the recent collapse of TerraUSD. In response to these concerns, Tether has committed to reducing its commercial paper exposure to zero by November 2022. **Chart 6** shows the recent reserve composition of Tether, USD Coin and Binance USD.

The risk of a strategic run for existing fiat-backed stablecoins may also be exacerbated by a lack of robust redemption rights and adequate disclosure and reporting standards. Some of the largest stablecoin issuers set high minimum thresholds for redemptions, limit the availability of redemptions or reserve the ability to delay or deny redemptions for any reason.²³ Moreover, public disclosures of stablecoin issuers contain limited detail on the composition of reserve assets such as the geographical origin of commercial paper holdings.

Chart 6: Reserve composition of top stablecoins



Note: We use data on market caps extracted from CoinMarketCap on July 31, 2022. Data for the 2021 Tether 2021 breakdown on September 2021 are from Moore Cayman (2021). Data for the 2022 Tether breakdown on March 2022 are from MHA Cayman (2022). Data for the USD Coin breakdown on June 2022 are from Circle (2022). Data for the Binance USD breakdown on July 2021 are from Burstein (2021).

A panic run on a fiat-backed stablecoin can be triggered by any number of negative events. For example, when a sudden credit event (e.g., default) occurs within the reserve asset pool, investors may change their opinion about the riskiness of that stablecoin and seek to redeem

²³See, for example, the Terms of Service from [Tether](#) and [USDC](#).

their stablecoin tokens. Spillovers from the run on other stablecoins can also trigger a change of investor belief and hence lead to a run (see **Box 2**).

Further examples include:

- a failure of the underlying technologies on which stablecoins rely (e.g., smart contracts, blockchain infrastructures)
- a failure of a major exchange or wallet provider
- a sudden change in the regulatory environment

Each of these events can lead to changes in investor beliefs and trigger a panic run on a stablecoin.

Crypto-backed stablecoins

For crypto-backed stablecoins, overcollateralization provides a buffer against a decline in the value of reserve assets, which allows for riskier assets to be included in the reserve. Nonetheless, the credibility of this model requires that:

- the degree of overcollateralization be sufficient to cover even large declines in collateral values
- markets for collateral assets be sufficiently liquid for collateral to be sold under adverse market conditions

An equity buffer may also exist as an additional layer of protection for token holders. This is the case for the Dai stablecoin, which can absorb the losses incurred if liquidated collateral is worth less than the stablecoins it was backing.²⁴

Despite the multiple layers of protection, existing crypto-backed stablecoins are inherently more fragile than fiat-backed stablecoins because they rely on unbacked cryptoassets that may have no intrinsic value and are susceptible to large price swings. A strategic run is likely if the collateral backing the stablecoin suffers a large decline in value, resulting in users believing the overcollateralization and any other buffers are insufficient, or could become insufficient, to support the value of outstanding stablecoins.

Crypto-backed stablecoins are also subject to panic runs, with the triggers more likely from:

- the price crash of prominent cryptoassets such as Bitcoin and Ether
- market contagion from other stablecoin runs
- technological and operational events
- a sudden change in the regulation environment

Algorithmic stablecoins

With no reserve backing or only partial reserve backing, algorithmic stablecoins are highly susceptible to runs caused by speculative attacks or sudden changes in market sentiment. In the model used by the algorithmic stablecoins TerraUSD and Frax, whose stabilization relies on

²⁴ See [MakerDAO System Surplus Buffer](#).

convertibility with another unbacked cryptoasset, it may appear as though the value of the latter is supporting the value of the former as with crypto-backed stablecoins. However, unlike crypto-backed stablecoins, the values of the two become dependent on one another and, like a pyramid scheme, require continuous inflows from investors to sustain the virtuous cycle. When adverse market conditions arise and inflows become outflows, the virtuous cycle can operate in reverse and become a “death spiral,” culminating in a precipitous decline in the value of both assets (see **Box 2**).

Algorithmic stablecoins are particularly vulnerable to market contagion. In the recent TerraUSD run episode, other algorithmic stablecoins, such as Neutrino USD and USDD, experienced much deeper deviation from their pegs compared with other stablecoins. As with the other types of stablecoins discussed above, technological, operational and regulatory events can lead to panic runs on algorithmic stablecoins.

Propagation channels

A run on one stablecoin can have implications for other stablecoins, the broader cryptoasset market and even the traditional financial system. This section discusses the likely propagation channels.

Propagation to other stablecoins

A run on one stablecoin, whether it is caused by its own reserve inadequacy or other factors, can influence market confidence in stablecoins more broadly, resulting in redemptions and the propagation of runs to other stablecoins. The recent market reaction after the run on TerraUSD illustrates the potential for such spillover effects because all major stablecoins experienced dislocations in their price after that event. **Chart 2-A** in Box 2 shows how, four days after the onset of the TerraUSD run, Tether, the largest stablecoin, briefly deviated below its peg to the US dollar by as much as 500 basis points.

Propagation to broader crypto markets

A run on a major stablecoin would likely be highly disruptive to broader cryptoasset markets, which depend on stablecoins as a source of liquidity. As discussed earlier, stablecoins are the primary settlement asset on many cryptoasset trading platforms. If a major stablecoin experienced a run and the issuer was unable to meet the demand for redemptions, the price of that stablecoin on trading platforms will likely fall in relation to its peg. As a result, much of the liquidity on these platforms would disappear, and market functioning would be significantly impaired.

A run would cause similar disruptions throughout the DeFi ecosystem. It would be exacerbated by interconnectedness between stablecoins and various DeFi platforms as well as by automated liquidations triggered by a decline in the price of stablecoins on secondary markets. The forced sales from liquidations could lead to declines in the prices of other cryptoassets. If the proceeds

of liquidations are not enough to repay outstanding loans, the run could propagate to DeFi platforms and crypto banks as well.

Propagation through banks' short-term funding

A run on a fiat-backed stablecoin may result in the fire sale of the underlying reserve assets. Commercial paper and bank certificates of deposits account for a significant share of these reserve assets.²⁵ As the markets for these instruments are a crucial source of short-term funding for large financial firms, the significant selling pressure from a stablecoin run could lead to funding stress at these institutions and have broader effects on the financial system and real economy.

Although the total size of the commercial paper holdings of stablecoin issuers is relatively small compared with the overall size of the commercial paper market, it may be cause for greater concern in the future if stablecoins continue to grow.²⁶ In addition, from the existing disclosures of stablecoin issuers, the composition of their commercial paper holdings is not known. If the commercial paper investments are concentrated in certain financial institutions, or certain geographic areas, then those institutions could be vulnerable even if the total commercial paper exposure is limited.

While commercial paper exposures have attracted the most attention from markets, it is also worth noting that stablecoin issuers hold significant amounts of bank deposits. In the case of a run, the withdrawal of these deposits could put further liquidity pressures on the banking sector.

Propagation to traditional financial markets

Finally, the disruptions in crypto markets stemming from a stablecoin run could further propagate to the financial system through the balance sheets of institutional investors—for example, if they need to sell traditional financial assets to meet margin calls after a decline in the value of their cryptoasset investments.^{27, 28} DeFi may also represent a significant propagation channel given the participation of institutional investors in those markets.²⁹

It is also worth noting that, according to a recent Bank for International Settlements report, Canada is among the jurisdictions where banks have exposure to crypto activities (Auer et al. 2022). While these exposures are currently small relative to the size of the banking sector, the

²⁵ The experience of money market funds in 2020, and desire not to refinance maturing securities, showed the lack of a dealer's ability to intermediate secondary markets when orders were at significant discount and all in one direction.

²⁶ Kim (2022) finds a positive correlation between stablecoin yield and commercial paper issuance.

²⁷ Institutional investors accounted for over 40% of total crypto trading volume by end of the second quarter of 2021, according to Chainalysis (2021).

²⁸ More than half of the largest banks have invested in crypto and blockchain-related companies according to Blockdata (Wouters 2021).

²⁹ The concentration of institutional investor holdings can spark large, disruptive redemptions regardless of the quality of the underlying assets in a "dash for cash" to meet margin calls or other liquidity pressures.

crypto activities of banks and other institutional investors should be monitored for potential vulnerabilities and risks. To ensure that banks adopt sound risk management practices concerning their cryptoasset holdings, the Basel Committee on Banking Supervision is currently developing international standards for bank exposures to cryptoassets.³⁰ Consistent with this international standard, in Canada, the Office of the Superintendent of Financial Institutions has published an interim approach to capital and liquidity requirements for cryptoassets held by federally regulated financial institutions.³¹

³⁰ See Basel Committee on Banking Supervision 2022.

³¹ See OSFI, "[OFSFI announces interim approach to cryptoassets](#)," press release (August 18, 2022).

Box 2: TerraUSD case study

Context

In May 2022, the algorithmic stablecoin TerraUSD faced a confidence run against the backdrop of a broad decline in cryptoasset market valuations. At the time, TerraUSD was the third-largest stablecoin, with a market capitalization of about US\$18 billion, and had only recently risen to prominence having grown rapidly over the previous six months. The rapid growth of TerraUSD was partly attributed to the high yields (up to 20%) offered on deposits of the stablecoin in the decentralized finance protocol, Anchor.

As an algorithmic stablecoin, TerraUSD was not backed by a dedicated reserve. To maintain its peg to the US dollar, the stablecoin used a smart contract algorithm that allowed for a dollar-for-dollar conversion between TerraUSD and Luna, the unbacked native cryptocurrency of the Terra blockchain. This mechanism was designed to stabilize the value of TerraUSD by creating arbitrage opportunities if the value of the stablecoin deviated from its peg.

Nonetheless, during the tumultuous market conditions in May 2022, TerraUSD's stabilization mechanism was unable to maintain the stablecoin's peg as many token holders sought to liquidate their holdings simultaneously. As a result, the value of TerraUSD and Luna plummeted to a fraction of their original value over a few days, resulting in total losses of nearly US\$40 billion to the holders of the two cryptoassets.

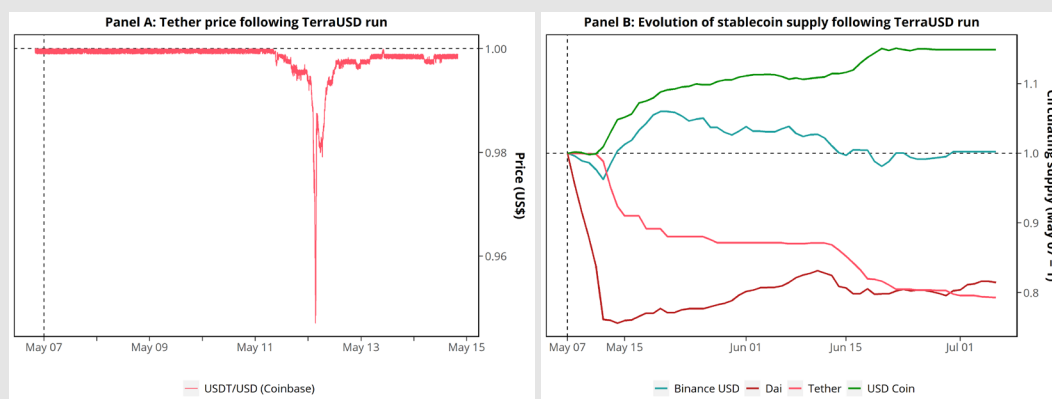
Consequences

The example of the TerraUSD collapse highlights the fragility of algorithmic stabilization mechanisms to adverse market conditions. It also highlights the potential for stablecoin runs to propagate to other stablecoins and broader markets.

The run on TerraUSD briefly spread to other stablecoins in the days following the onset of the run. Tether, the largest stablecoin by market capitalization, briefly deviated by roughly 500 basis points from its peg to US\$0.95, its largest deviation since 2017 (**Chart 2-A**). Because the TerraUSD stablecoin was not directly linked to Tether, the contagion appears to have been an example of a confidence-based panic run. Moreover, the market reaction for other stablecoins was diverse; while Tether experienced significant redemptions and a deviation in its price below the peg, the stablecoins USD Coin and Binance USD experienced net inflows and brief deviations above the peg (**Chart 2-A**). The differences in the market's response may suggest a preference for those fiat-backed stablecoins with relatively safer and more transparent reserve assets, particularly during stressed market conditions. Tether, which had the greatest negative impact, has previously faced controversy around the composition and transparency of its reserve assets.

The collapse of TerraUSD and Luna also had knock-on effects on broader crypto markets and may have contributed to the insolvency of crypto banks Celsius and Voyager and the crypto hedge fund Three Arrows Capital, all of which were reported to have had exposures to the stablecoin.

Chart 2-A: Market reactions to the TerraUSD run



Note: The Tether price series ranges from May 7 to 14, 2022. Circulation supply ranges from May 7 to July 10, 2022.

Sources: Authors' calculations based on data from Kaiko and Glassnode

Risks from DeFi and crypto banking

Stablecoins facilitate the creation of collateral chains and maturity/liquidity transformation in DeFi

Stablecoins are widely used in DeFi platforms where they make it easier for leverage to build up by creating collateral chains. Collateral chains result from the repeated rehypothecation of collateral, which means the proceeds of loans borrowed against initial collateral are pledged as collateral for new loans. Although each individual loan in the chain is overcollateralized, the result is a multiplier effect that enables users to leverage an initial position into a much larger exposure.

For example, consider a trader holding the stablecoin USD Coin as a store of value while waiting for their next trading opportunity. The trader can deposit the USD Coin on a lending platform to earn interest on their stablecoins in the interim. Another trader looking to speculate on the price of Ether then borrows the stablecoins using their own cryptoasset portfolio as collateral and exchanges them for Ether on a decentralized exchange. The counterparties of that trade then take those stablecoins and deposit them back on the lending platform where they can be borrowed again by a third trader. This cycle can repeat indefinitely, limited only by the collateral requirements of the lending protocol. Suppose for Ether, loans can be extended up to 82.5% of the value of the collateral, then each \$1,000 of initial capital can generate over \$4,700 of lending. This process is not unlike fractional reserve banking, with collateral requirements replacing reserve requirements.

Stablecoins are essential in the creation of such collateral chains because they account for a large share of the deposited collateral and most of the loans taken on the largest DeFi lending platforms. Stablecoins are the preferred cryptoasset for lending and borrowing due to their liquidity, perceived safety and price stability.

While common in traditional finance, such rehypothecation can be catastrophic in the context of the boom-and-bust cycles associated with speculative asset bubbles; the collapse of Lehman Brothers is one such example. Moreover, the cycles in cryptoasset markets can be even more exaggerated than those in traditional finance. During the boom periods, cryptoasset prices appreciate rapidly and collateral requirements fall. This allows more credit to be extended and causes prices to appreciate further. During the bust, however, a modest decline in asset prices can trigger the liquidation of loans and a disorderly unwinding of collateral chains (Aramonte et al. 2022). As a result of this fragility, relatively small shocks can be amplified and quickly spread across cryptoasset markets.³²

DeFi platforms can also involve liquidity and maturity transformation that, if not adequately managed, can result in confidence runs on the platforms themselves. For instance, deposits of stablecoins and other cryptoassets in DeFi lending platforms can typically be withdrawn at any time, while the loans based on these assets have indefinite terms. If the use rate of any asset (i.e., the amount borrowed over the amount deposited) reaches 100%, depositors may not be able to withdraw their assets from the platform. Most lending platforms, including Aave and Compound, seek to mitigate liquidity risk by charging a higher interest rate to borrowers as use rises to encourage the repayment of loans. However, it is unclear whether mechanisms that rely on economic incentives are adequate to protect depositors during adverse market conditions.

Unregulated crypto banks can generate significant risk

While DeFi activity tends to be dominated by large, institutional investors, the emergence of crypto banks such as Celsius Network (Celsius) and BlockFi have provided a centralized platform for crypto-based financial services serving both retail and institutional clients.³³ Crypto banks sometimes offer significant returns (as high as 18% in the case of Celsius) on customers' cryptoasset deposits and source such returns by investing these assets in DeFi markets. As described in its Chapter 11 filing, "Celsius engages in other asset deployment activities to generate a sufficient yield for Celsius. One of the ways Celsius did this was by deploying digital assets into automated market maker or lending protocols, for a fee. In addition, Celsius borrowed U.S. dollars as stablecoins from DeFi protocols collateralized by digital assets."

³² Darlin, Palaiokrassas and Tassioulas (2022) also discuss that widespread use of stablecoins as debt-financed collateral increases financial stability risks in the DeFi ecosystem.

³³ By July 2022, Celsius had approximately 1.7 million registered users and approximately 300,000 active users with account balances of more than US\$100.

As a centralized interface, crypto banks may encourage excessive risk taking from retail and institutional clients who would otherwise have no or only limited access to DeFi products.³⁴ While DeFi products offer significant returns, the associated risks are sometimes barely disclosed to the investors. In fact, in the case of Celsius, the platform claims ownership rights over clients' cryptoassets and has full discretion of how to use or invest those assets.³⁵ The perceived highly attractive risk-return profile combined with the ease of investing have not only fuelled the growth of crypto banks in recent years but have also led to the buildup of vulnerabilities in broader financial system. The failure of the crypto banks amid the general crypto market downturn in May and June 2022 illustrates how these institutions can be brought down quickly when the market faces a negative turn.

Moreover, crypto banks also introduce additional layers of leverage and liquidity risk by employing a fractional reserve lending model. Customers of crypto banks are often promised immediate redemption while their deposits are invested in less-liquid assets. Customer assets may also be used as collateral to borrow further using DeFi markets. This model was highly successful while cryptoasset prices were increasing and inflows from customers exceeded outflows. However, when market sentiment worsened and demand for redemptions increased, such platforms often struggled to meet redemptions.

Finally, crypto banks have generally operated outside of or in non-compliance with existing regulatory frameworks. With few regulatory constraints and little transparency, vulnerabilities can build within crypto banks unrestricted and unseen from their clients, counterparties and regulators. Recent enforcement actions by the US Federal Deposit Insurance Corporation also suggest that depositors on these platforms may have been led to believe they have the same protections extended to depositors of regulated banks.³⁶

Regulation of stablecoins could propel growth of DeFi activity

While DeFi and crypto banking may not yet have the scale or linkages with the traditional financial sector to present a material risk to financial stability, these markets have the potential to grow rapidly as traditional financial institutions and the public grow more comfortable with their use. Moreover, this growth may be faster if regulation of stablecoins enhances their safety and soundness such that users have similar confidence in these instruments as they do in other forms of private money. In the absence of effective regulations for a broader range of cryptoasset activities, growth in DeFi could exacerbate vulnerabilities in the overall sector and could eventually present financial stability risks beyond cryptoasset markets.

³⁴ The technology and design features of DeFi products present a higher entry barrier to the average investor.

³⁵ Celsius Terms of Use as of April 2022.

³⁶ See the [joint press release](#) of FDIC and Federal Reserve Board on July 28, 2022.

Infrastructure and custody risks

The transfer and custody of stablecoins relies on a new set of digital infrastructures and custodians from those used in the traditional financial system. The most important of these are the public blockchain networks that serve as the digital ledger and smart contract platform for stablecoins and the digital wallet providers that offer custody and other services for users transacting in stablecoins. If stablecoins are to be used as money on a scale that competes with commercial bank deposits and cash, these infrastructures and custodians should be subject to the same standards of operational resilience as other financial market infrastructures and systemic payment service providers. If not appropriately safeguarded, the failure of these entities could affect the availability of stablecoin-based financial services, result in the loss or theft of users' assets, and have spillover effects across the cryptoasset markets and the traditional financial system.

Public blockchains

Most stablecoins are issued on public blockchain networks (e.g., Ethereum), which serve as the ledger and transfer system for the stablecoin. On the one hand, these networks may be highly resilient to certain types of cyber attacks because they are distributed across independent nodes with no single point of vulnerability. In comparison, the cyber security of traditional banks and financial market infrastructures depends on the risk management practices of a small number of individual entities, often supported by regulatory oversight. On the other hand, the use of public blockchains as a ledger and transfer system can introduce unique risks to stablecoin-based financial services, including smart contract bugs, double-spending attacks and issues with network congestion.^{37, 38}

Digital wallets

Since transactions on a public blockchain are often irreversible, the use of cryptoassets presents a greater risk of loss through theft or mismanagement compared with other forms of money. The ownership of digital assets on public blockchains relies on knowledge of a unique and secret private key used to digitally sign transactions. Hence, if a private key is lost or compromised, the cryptoassets associated with that key may be unrecoverable. Owners of cryptoassets may assume responsibility for the security of these keys themselves (i.e., self-custody) or they can entrust them to a third-party wallet provider. Providers of custodial wallets include cryptoasset exchanges (e.g., Binance, Coinbase) and closed-loop transfer systems (e.g., Freewallet, Novi). While wallet providers may be better positioned than users to securely

³⁷ As with any computer program, smart contracts can contain coding errors that could cause the contract to perform unexpectedly or allow a malicious actor to exploit its functions.

³⁸ Double-spending attacks are rare and perhaps prohibitively expensive in the case of the largest blockchain networks, but they involve subverting the mechanism by which transactions are validated to reverse a previously validated transaction.

manage private keys, they can represent a single point of failure that, if hacked, could result in the loss or theft of users' cryptoassets. Indeed, wallets and cryptoasset trading platforms have been the subject of numerous hacks resulting in losses of billions of dollars in cryptoassets.³⁹

Impacts to the financial system

The use of stablecoins outside the cryptoasset ecosystem remains limited, and stablecoins do not yet represent a credible alternative to bank deposits or cash. However, under a scenario where stablecoins can fulfill their promise as an efficient and low-cost payment instrument, they may gradually displace other forms of payment. The implications of this displacement on the financial and monetary system could be wide-ranging and will vary considerably depending on how stablecoins are regulated and how incumbent financial institutions respond. This section describes a few potential scenarios where the implications for the financial and monetary system could be significant.

Credit supply and intermediation

The widespread adoption of fiat-backed stablecoins could have important implications for aggregate credit supply and credit intermediation. The direction and magnitude of this impact will depend critically on how stablecoins will be regulated, particularly the composition of the stablecoin's reserve assets.

As the economy becomes more digital, consumer demand for digital means of payments and stores of value is likely to increase, and stablecoins could compete with bank deposits to meet this additional consumer demand. This process will likely lead to a substitution from bank notes in circulation to stablecoins and bank deposits.⁴⁰ Since bank notes, as a direct liability of the central bank, do not support the creation of credit, this substitution will likely increase the supply of credit to the real economy. With current stablecoin reserve models, however, some of this new credit will be channelled only through the short-term debt instruments that make up stablecoin reserves. This dynamic could distort credit markets by reducing the relative cost of short-term debt instruments, thereby encouraging a greater reliance on short-term funding for entities such as banks. This impact could be mitigated if stablecoin issuers are regulated similarly to banks (or banks become stablecoin issuers), so they are not restricted to investing reserves in short-term debt instruments. Because such a case would involve issuers engaging

³⁹ See, for example, K. Collier, "[Crypto exchanges keep getting hacked, and there's little anyone can do](#)," NBS News (December 17, 2021) and J. Ossinger and S. Shukla, "[Crypto Takes a New Hit as Thousands of Solana Wallets Hacked](#)," Bloomberg (August 3, 2022).

⁴⁰ We discuss the mechanism in the current economic context where a central bank digital currency (CBDC) has not been issued. The potential introduction of a CBDC may change the substitution depending on the actual design features.

in significant maturity transformation, all key features of existing frameworks that support confidence in commercial banks and provide protection against run risk would be warranted.⁴¹

In contrast, if stablecoin reserves are required to be fully backed by a direct liability of the central bank (e.g., a central bank digital currency), the impact on aggregate credit is more ambiguous. In particular, a substitution into stablecoins from bank deposits could reduce the supply of credit to the real economy. Such a substitution could occur if the functionality of stablecoins is more preferred by consumers (e.g., easier to use in payments) than that of bank deposits and the risk characteristics are similar (i.e., both are secured by government credit).

In sum, the overall impact of aggregate credit supply and intermediation will depend on the interaction between the sources of capital inflow to stablecoins and the regulation of the issuers. Liao and Caramichael (2022) provide a detailed analysis of the outcomes from such interactions.

Banking stability

In addition to a potential impact on bank-led credit intermediation, the adoption of stablecoins could have broader implications for the stability of the banking sector by affecting banks' access to stable funding. The bank deposits that are most at risk for competition from stablecoins are transactional accounts, which are among the most stable and inexpensive sources of funding for banks and a key source of customer relationships and transaction data. In some cases, the substitution into stablecoins could lead to stable retail deposits being transformed into less stable wholesale funding, which would have negative implications for the stability of banks' funding profiles. Banks could also lose the revenues associated with existing payment services. Under a scenario like this, banks may need to rely to a greater extent on savings accounts and long-term deposit instruments that provide a higher return to their customers. Ultimately, significant uncertainty surrounds how banks will be affected by stablecoin adoption because they may find ways to adapt to changing consumer preferences and mitigate the effect on their business, including by becoming stablecoin issuers themselves.

"Cryptoization" and monetary policy

The rapid adoption of stablecoins pegged against the US dollar in some emerging-market economies can pose significant challenges to monetary authorities by reinforcing dollarization pressure—a phenomenon the International Monetary Fund (IMF) refers to as "cryptoization" (IMF 2021). If domestic demand for the sovereign currency as a method of payment and store of value declines in these countries, there will likely be implications for the ability of the central bank to deliver on objectives such as anchored inflation and financial stability. Weak central

⁴¹ The key features of bank regulation that have evolved over time to capture the risk of runs from deposit-taking activity more adequately include prudential requirements (including financial risks and non-financial risks), deposit insurance, access to central bank liquidity facilities, consumer protection provisions, and the intervention and resolution regime to promote orderly resolution of troubled entities to promote public confidence in the broader financial system.

bank credibility and inefficient payment systems are noted as likely driving forces behind cryptoization.

Crypto-backed and algorithmic stablecoins may have additional implications for the supply of money and credit, even in economies with credible central banks. When a stablecoin does not need to be backed by fiat currency, issuers are able to mint tokens that are fully independent of the current system of money creation. If such stablecoins gain wider adoption, these issuers will benefit from seigniorage—the revenue that typically accrues to central banks from printing bank notes instead of issuing interest-bearing debt—and could challenge the effectiveness of that country's monetary policy.

Concluding remarks

Stablecoins have emerged as a form of “risk-free” asset in the crypto ecosystem and have witnessed tremendous growth in recent years. Currently, stablecoins are mainly used to facilitate trading, borrowing and lending of other cryptoassets, but they also hold the potential to compete as a broader medium of exchange for goods and services. Even though the size of the market remains small, stablecoins will likely become more widely adopted across geographic areas and demographic groups, along with the digitalization trend of the global economy. The design and use of stablecoins could give rise to various risks in the financial system, particularly if the regulation of stablecoin issuers alone propels the growth of DeFi, which could exacerbate vulnerabilities in the overall sector if not appropriately regulated. Regulatory responses should therefore take a holistic view of the ecosystem to mitigate these risks.

Just like bank deposits, stablecoins are vulnerable to confidence runs if token holders no longer believe a stablecoin can be redeemed or converted to another form of money on a one-to-one basis. A run on a major stablecoin could result in losses for token holders and disruptions for stablecoin-based services and could affect the broader financial system. The risk of runs on stablecoins can be mitigated by regulations to ensure that reserve assets are invested only in highly liquid and risk-free instruments or that it otherwise employs features of the safety net that currently exists for commercial bank deposits (e.g., prudential regulation, deposit insurance, access to central bank liquidity facilities).

In addition to the risks associated with the stablecoin instrument itself, regulators should also consider how the use of stablecoins may facilitate the buildup of vulnerabilities through leverage and liquidity-maturity transformation in DeFi and crypto banking. When these activities resemble deposit-taking and fractional reserve banking, or significant rehypothecation of collateral is taking place, they should be regulated in accordance with the principal of “same risks, same regulation” as advocated by the Financial Stability Board.

The use of stablecoins may also present new risks associated with the digital infrastructures (i.e., public blockchain networks) and custodians (i.e., digital wallet providers) they rely on. Failures of these infrastructures and custodians could affect the availability of payments or

financial services based on stablecoins and should thus be subject to the same standards of operational resilience as other financial market infrastructures and payment services.

Finally, under a possible scenario where stablecoins prove to be a more efficient and low-cost payment instrument than existing alternatives, there could be wide-ranging implications for the supply of credit, the banking sector and monetary policy. These effects will largely depend on the regulatory framework developed for stablecoins and on the response of incumbent financial institutions. Given the potential for disruptions, authorities should consider the implications for the entire financial system when designing regulations for stablecoins. In Canada, the federal government is undertaking a financial sector legislative review with the first phase focused on the digitalization of money, including cryptocurrencies and stablecoins.⁴²

⁴² See Budget 2022, "A Plan to Grow Our Economy and Make Life Affordable."

References

- Adachi, M., M. Cominetta, C. Kaufmann and A. van der Kraaij. 2020. "[A Regulatory and Financial Stability Perspective on Global Stablecoins](#)." European Central Bank *Macprudential Bulletin*.
- Adachi, M., M. Cominetta, C. Kaufmann and A. van der Kraaij. 2021. "[The Expanding Functions and Uses of Stablecoins](#)." European Central Bank Financial Stability Review (November).
- Aramonte, S., S. Doerr, W. Huang and A. Schrimpf. 2022. *Defi Lending: Intermediation Without Information?* BIS Bulletin No. 57 (June 14).
- Auer, R., M. Farag, U. Lewrick, L. Orazem and M. Zoss. 2022. "*Banking in the Shadow of Bitcoin? The Institutional Adoption of Cryptocurrencies*." Bank for International Settlements Working Paper No. 1013.
- Bank of England. 2022. [Financial Stability in Focus: Cryptoassets and Decentralised Finance](#).
- Basel Committee on Banking Supervision. 2022. *Second consultation on the Prudential Treatment of Cryptoasset Exposures*.
- Burstein, D. 2021. [A Regulated Stablecoin Means Having a Regulator](#). Paxos.
- Chainalysis. 2021. *The 2021 Geography of Cryptocurrency Report*.
- Circle. 2022. [USDC Reserve Assets](#).
- CPMI-IOSCO. 2021. *Application of the Principles for Financial Market Infrastructures to stablecoin arrangements*. Bank for International Settlements.
- Darlin, M., G. Palaiokrassas and L. Tassiulas. 2022. *Debt-Financed Collateral and Stability Risks in the DeFi Ecosystem*.
- Diamond, D. W. and P. H. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity." *Journal of Political Economy* 91 (3): 401–419.
- Engert, W. and K. P. Huynh. 2022. "[Cash, COVID-19 and the Prospects for a Canadian Digital Dollar](#)." Bank of Canada Staff Discussion Paper No. 2022-17.
- Financial Stability Board. 2020. *Regulation, Supervision and Oversight of "Global Stablecoin" Arrangements: Final Report and High-Level Recommendations*.
- Financial Stability Board. 2021. *Regulation, Supervision, and Oversight of "Global Stablecoin" Arrangements: Progress Report on the Implementation of the FSB High-Level Recommendations*.
- Gennaioli, N., A. Shleifer and R. W. Vishny. 2012. "Neglected Risks, Financial Innovation and Financial Fragility." *Journal of Financial Economics* 104 (3): 452–468.

- IMF. 2021. "COVID-19, Crypto, and Climate: Navigating Challenging Transitions." *Global Financial Stability Report* (October).
- Kim, S. R. 2022. "How the Cryptocurrency Market Is Connected to the Financial Market." SSRN.
- Liao, G. Y. and J. Caramichael. 2022. "[Stablecoins: Growth Potential and Impact on Banking.](#)" Board of Governors of the Federal Reserve System International Finance Discussion Paper.
- MHA Cayman. 2022. [Independent Accountant's Report.](#)
- Moore Cayman. 2021. [Independent Accountant's Report.](#)
- President's Working Group on Financial Markets, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency. 2021. *Report on Stablecoins.*
- Wouters, S. 2021. "[Top Banks Investing in Crypto & Blockchain Companies.](#)" Blockdata.