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The Emerging Autonomy-Stability Choice for Stablecoins

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The Emerging Autonomy–Stability Choice for Stablecoins*

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Abstract

Lawmakers have called for better stablecoin regulation, but authorities tend to have little control over the global operators of distributed ledgers that process stablecoin transactions. This chapter illustrates how peg deviations may occur when the issuer of a fiat-backed stablecoin loses its access to the traditional payment system of the jurisdiction that issues the relevant fiat currency. The need for reliable access to the traditional payment system in order to maintain a stable peg provides an important foothold for regulators to exercise control over fiat-backed stablecoins. Conditional upon regulators having little control over the operators of some distributed ledgers, an autonomy–stability choice may emerge where users of stablecoins ultimately face a choice between regulated stablecoins with a stable value but little autonomy and alternative stablecoin arrangements with more autonomy but a less stable value.

Keywords: Stablecoins, Cryptocurrency, Exchange rate, Distributed ledgers, Regulation

JEL Codes: E42, G23, G28.

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I. Introduction

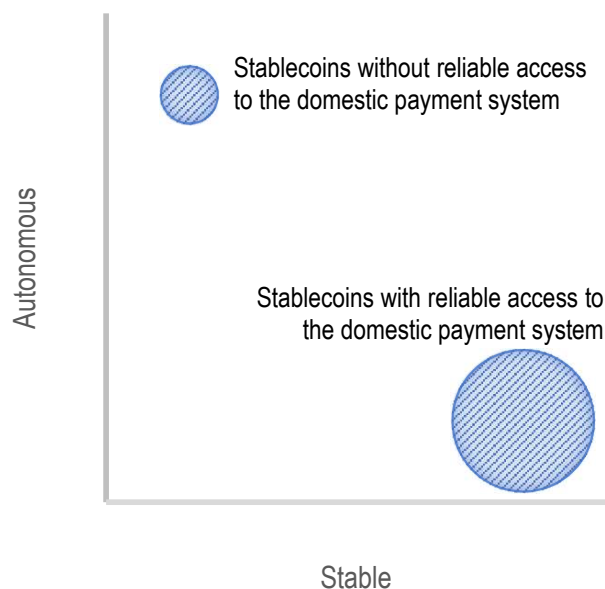
The emergence of cryptocurrencies has enabled the storage and transfer of digital assets in a decentralized manner using distributed ledgers (“blockchains”) but the exchange rates of cryptocurrencies such as Bitcoin have witnessed high levels of volatility (Yermack, 2015; Dwyer, 2015).¹ Many initiatives have explored different arrangements to create digital tokens or “coins” that maintain a stable value and that could be used as a form of money in transactions on distributed ledgers. Coins initiated with this goal in mind have been labelled *stablecoins* after their objective of a stable value.

Most stablecoins target a fixed exchange rate against a fiat currency such as the dollar or the euro.² Two types of stablecoin arrangements that target a fixed exchange rate against a fiat currency tend to be most popular. The first type can be characterized as stablecoins that are backed with assets denominated in a fiat currency that are held in the traditional financial system, or *fiat*-backed stablecoins. The supply of the two largest stablecoins of this type (Tether and USD Coin) represented a total value of 121 billion U.S. dollar at the end of 2021. The second type can be characterized as stablecoins that are backed with digital assets such as cryptocurrencies that are held in distributed ledgers, or *crypto*-backed stablecoins. The market capitalization of the largest stablecoin of this type (DAI) was 9 billion U.S. dollar at the end of 2021. The precise meaning of *backing* I leave intentionally vague, but one can think broadly about backing as assets that are meant to be available to the stablecoin arrangement to redeem tokens or to intervene whenever a stablecoin deviates from the targeted exchange rate.

¹Reasons mentioned for the high volatility of cryptocurrency exchange rates include the unresponsiveness of their supply to transactional demand, their limited use for real payments – which causes their exchange rate to be highly sensitive to the actions of speculators (Bolt and Van Oordt, 2020) – and the fundamental uncertainty regarding the popularity of a cryptocurrency while many other cryptocurrencies exist that could act as potential substitutes (Garratt and Wallace, 2018).

²A complete taxonomy is not my purpose at present, but would include among others stablecoins pegged to commodities and so-called algorithmic stablecoins (e.g., Bullmann et al., 2019).

Figure 1: The Autonomy–Stability Choice for Stablecoins



Stablecoin arrangements have not remained unnoticed by regulators worldwide ([Financial Stability Board, 2020, 2021](#)). Many policy makers have raised the importance of the solvency, liquidity and transparency of stablecoin arrangements as well as the importance of their compliance with regulations aimed at financial consumer protection, investor protection, operational resilience and the prevention of money-laundering, terrorist financing and other illicit activities ([European Central Bank, 2020](#); [US President’s Working Group et al., 2021](#); [Garcia et al., 2021](#); [Bolt et al., 2022](#)).³ Less attention has been paid to the fact that stablecoin transactions are processed by decentralized networks that may largely operate outside the sphere of control of the relevant authorities.

The topic of this chapter is the need for the issuer of a fiat-backed stablecoin to maintain reliable access to the domestic payment system of the jurisdiction that issues the fiat currency in order to maintain a stable peg. In particular, I show how substantial deviations of the one-to-one peg could occur for the largest fiat-backed stablecoin when its access to the domestic payment system was interrupted. This is an important observation for regulators,

³See also [Lyons and Viswanath-Natraj \(2020\)](#), [Gorton and Zhang \(2021\)](#) and [Lipton et al. \(forthcoming\)](#).

because the need for reliable access to the domestic payment system in order to maintain a stable value provides an important foothold for regulators to exercise control over fiat-backed stablecoins.

The chapter then discusses the potential implications of regulation for the universe of stablecoins. As regulators increasingly pay more and more attention to stablecoins, I expect stablecoins to increasingly face the choice between either *less autonomy* in the sense of subjecting themselves to regulatory control or *less stability* due to a lack of reliable payment system access. Conditional upon domestic regulators having little control over the operators of some distributed ledgers, this is likely to lead to a situation where the users of stablecoins ultimately face a choice between stablecoins with a stable value but little autonomy (the lower-right corner of Figure 1) and alternatives with more autonomy but a less stable value (the upper-left corner of Figure 1).

II. Payment System Access

The issuers of the most popular form of stablecoins, fiat-backed stablecoins, effectively manage their exchange rates by providing a possibility for their users to redeem or convert their stablecoin tokens into fiat currency and vice versa at a rate that is close to the target rate. The redemption or conversion of fiat-backed stablecoin tokens may either be directly with the issuer or indirectly, for example, with a third-party such as either a cryptocurrency exchange or a market maker acting as a middleman.

The redemption of stablecoin tokens requires two flows of transactions to take place that are each processed in different systems. First, it must be possible for the issuer to either directly or indirectly receive the stablecoin tokens that were sent by the stablecoin users. The flow of stablecoin tokens takes place in the realm of distributed ledgers and is processed by a decentralized network. Second, it must be possible for the stablecoin issuer to send either directly or indirectly fiat currency to the bank accounts of the stablecoin users. The flow of

fiat currency is processed by the domestic payment system of which the direct participants (e.g., banks) and indirect participants (e.g., respondents of correspondent banks) provide bank accounts to their customers.

Enabling the redemption or conversion of a fiat-backed stablecoin ultimately requires the issuer to have the ability to receive, store and send funds using the traditional financial system. After all, if the demand for a stablecoin drops substantially and users wish to convert their stablecoin into fiat money – that is, balances in their bank accounts – then the funds held by the issuer of the stablecoin will need a channel to flow to the users’ bank accounts. The issuer could obtain access to the domestic payment system to facilitate this flow of fiat currency, for example, through a banking relationship of either the stablecoin issuer or its payment processor with a direct or indirect participant.

When the flow of fiat currency between the stablecoin issuer and the users becomes disrupted, then the issuer can no longer remit fiat currency to users who redeem or convert their stablecoin tokens. Although users would still be able to buy and sell tokens from and to each other, there is no mechanism that guarantees that the price of the tokens traded among users would be close to the targeted exchange rate. Hence, the prevailing exchange rate may deviate from the target rate if the access of the issuer to the domestic payment system becomes disrupted.

The crucial role of reliable access to the domestic payment system for the issuer of a fiat-backed stablecoin in order to maintain a stable peg can be well-illustrated by some episodes in the early history of Tether which currently is the largest stablecoin in terms of market capitalization.⁴

⁴Some of the largest and most persistent deviations in Tether’s exchange rate were during periods where the issuer’s access to the traditional payment system was disrupted. That said, solvency concerns may impact the exchange rate too. Whether Tether always held enough high-quality liquid assets (e.g., cash and cash equivalents) to redeem each token has been the subject of considerable controversy ([Faux, 2021](#); [Griffin and Shams, 2020](#)). The issuer of Tether provided a loan of USD 625 million to the close-related cryptocurrency exchange Bitfinex that experienced financial headwinds at the time without informing the public ([New York AG, 2021](#)). These type of concerns are not without historical precedent ([Frost et al., 2020](#)).

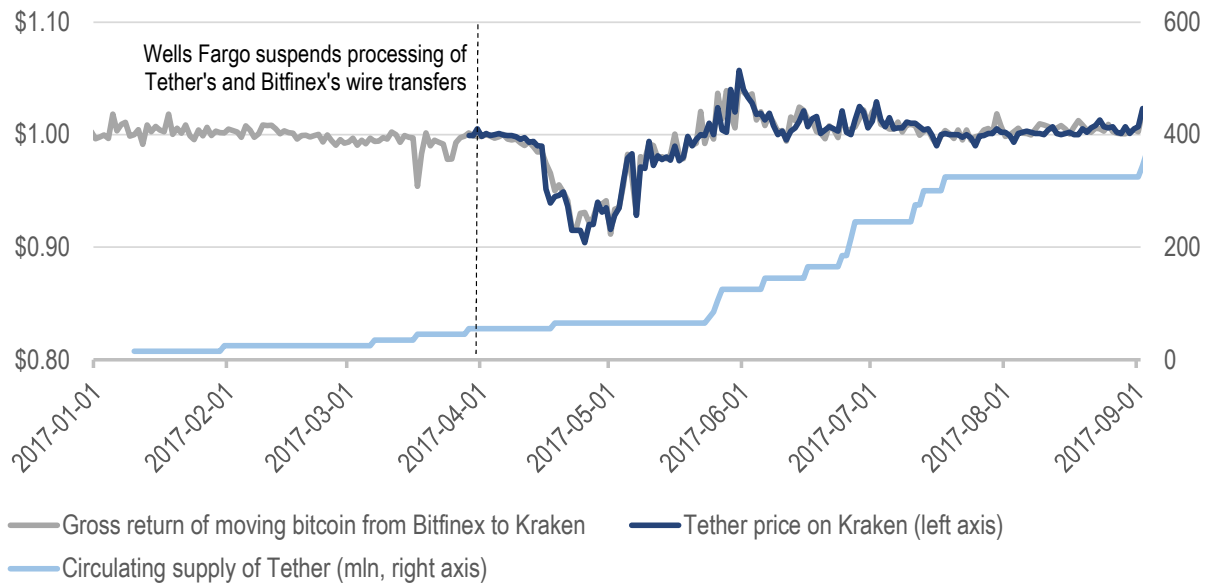
A. Losing Payment System Access

For a long time, the stability of Tether’s exchange rate was supported by the closely-related cryptocurrency exchange Bitfinex. Bitfinex customers could adjust their dollar balances held with the exchange either through wire transfers from their bank accounts, or through deposits and withdrawals of Tether where Bitfinex would apply a one-to-one exchange rate when adjusting the customers’ dollar balances at the exchange ([Bitfinex, 2018](#)). This provided users of Tether with the indirect ability to convert their Tether tokens into U.S. dollars held in their bank accounts at a one-to-one exchange rate. At least, this possibility existed as long as Bitfinex continued to be able to send and receive payments in U.S. dollars through the traditional financial system. Bitfinex and Tether relied on Taiwan-based banks to send and receive U.S. dollar wire transfers with Wells Fargo providing access to the domestic payment system as the corresponding bank. End of March 2017, Wells Fargo elected to no longer process the wire transfers for Bitfinex and Tether ([New York AG, 2021](#)). As a consequence, Bitfinex and Tether were essentially cut off from the domestic payment system, which disrupted the ability of users to convert their Tether tokens at a one-to-one exchange rate through U.S. dollar withdrawals at Bitfinex ([Bitfinex, 2017](#); [Tether, 2017](#)).

Without reliable access to the traditional payment system, the exchange rate peg of Tether to the U.S. dollar started to fickle. End of March 2017, another cryptocurrency exchange called Kraken – arguably a platform with better access to the traditional payment system at the time – had started to support the trading of Tether without guaranteeing its exchange rate ([Kraken, 2017](#)). When both Bitfinex and Tether were cut off from the traditional payment system, users could in principle continue to convert their Tether tokens into dollar balances in their bank accounts by selling Tether tokens to other users at Kraken. In return, they would receive U.S. dollar balances at Kraken which could be withdrawn by relying on Kraken’s access to the payment system.⁵ The price received for Tether tokens at Kraken would depend on the prevailing exchange rate rather than the fixed one-to-one

⁵It seems this remained a popular route in subsequent episodes ([Coindesk, 2018a](#)).

Figure 2: Tether's Exchange Rate when Losing Payment System Access in 2017



Sources: cryptocompare.com, coinmetrics.io, messari.io.

exchange rate applied to Tether deposits at Bitfinex. Tether's exchange rate at the Kraken exchange is shown by the dark line in Figure 2. Initially, the price dropped substantially below the peg to around 90 cents on the dollar, before recovering and even overshooting the peg.⁶

Although Bitfinex's continued its practice to credit balances for Tether deposits at a one-to-one exchange rate throughout this episode, this did not prevent the occurrence of deviations from the one-to-one peg that customers experienced in practice when converting Tether into U.S. dollar balances in their bank accounts. With Bitfinex being cut off from the domestic payment system, an alternative route for users was to purchase bitcoins or other cryptocurrencies at Bitfinex – which could be withdrawn using blockchain transactions – and to subsequently sell those bitcoins at Kraken. However, this was costly too. Differences in the exchange rates of cryptocurrencies at Bitfinex and Kraken started to emerge as customers

⁶When the exchange rate started to overshoot the peg in the second half of May 2017, Tether issued a substantial number of additional tokens to increase the supply. From the 2021 settlement agreement, it seems that these additional tokens were may have been accounted for through an account receivable from Bitfinex, see [New York AG \(2021\)](#).

started to discount the dollar balances held with Bitfinex which couldn't be withdrawn to their bank accounts. The grey line in Figure 2 reports how much customers could receive at Kraken per U.S. dollar of balances at Bitfinex that they would convert into bitcoin after accounting for the differential in the bitcoin exchange rates at both exchanges.⁷ The discount (and later, premium) closely follows the deviation in the peg of the exchange rate of Tether. In other words, the support of Bitfinex for the one-to-one peg could not prevent the peg users experienced in practice from becoming unstable when Bitfinex was cut off from the domestic payment system.

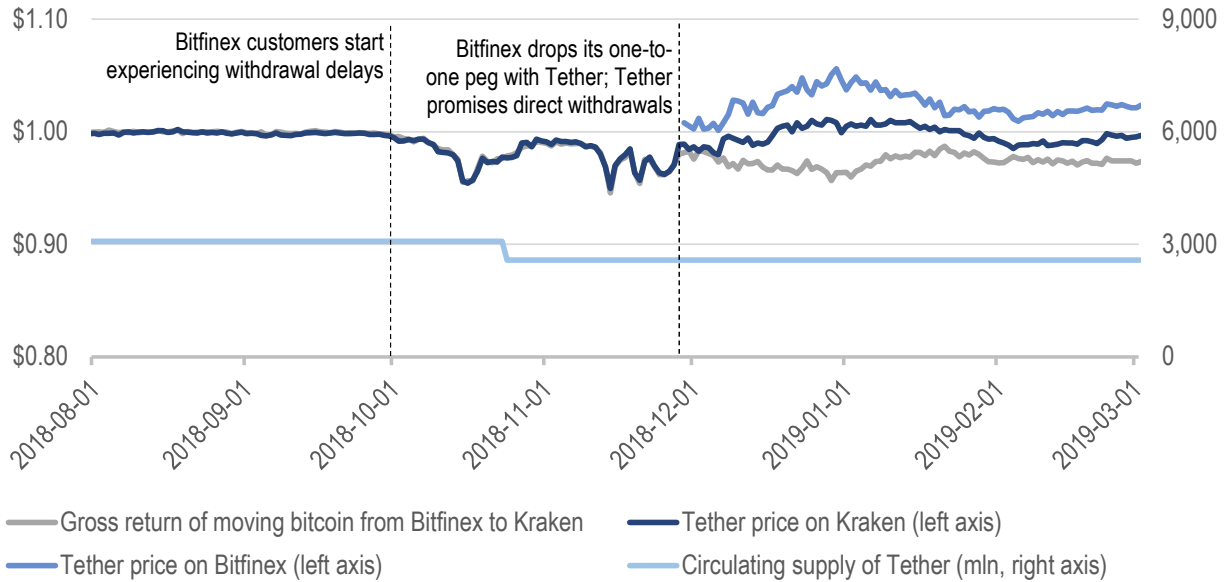
B. Bitfinex dropping the peg

A second episode illustrating the importance of domestic payment system access for maintaining the peg of a fiat-backed stablecoin happened during the fall of 2018. After the earlier banking troubles, Bitfinex had started to increasingly rely on third-parties to handle customer deposits and withdrawals, and the stability of the exchange rate of Tether improved during the first half of 2018. However, customers started to experience substantial delays in withdrawals of balances from the Bitfinex trading platform to their bank accounts in the fall of 2018 (Coindesk, 2018b) after Bitfinex started experiencing trouble with their major payment processor, Crypto Capital, and lost control over a significant amount of funds (New York AG, 2021). As in the earlier episode, this resulted in both a deviation in the peg of Tether as well as a discount on the amount of fiat currency customers would get when moving bitcoin from Bitfinex to Kraken (Figure 3).

What makes this episode particularly interesting is that, by the end of November, Bitfinex (2018) announced it would no longer apply a one-to-one exchange rate for Tether deposits and withdrawals. Instead, it would start offering customers the ability to buy and sell Tether through a Tether-U.S. dollar trading pair like the one on Kraken. When the pair started

⁷The figure abstracts from transaction costs. Interestingly, Pieters and Vivanco (2017) find that the bitcoin prices on cryptocurrency exchanges that do not require customer identification tend to exhibit larger deviations from the benchmark price. This is consistent with these exchanges facing more difficulties in establishing stable banking relationships.

Figure 3: Tether’s Exchange Rate Before and After Bitfinex Drops the Peg



Sources: cryptocompare.com, coinmetrics.io, messari.io.

trading the day after, Tether traded at a *premium* at Bitfinex – consistent with customers discounting dollar balances held in Bitfinex relative to holding Tether tokens – even though Tether itself continued trade for a while at a *discount* at Kraken.⁸ Hence, for a while, there were two unstable “pegs” rather than one. Tether tokens were discounted compared to U.S. dollar balances at Kraken which could be withdrawn, and dollar balances held with Bitfinex were discounted even more.

III. Regulatory Implications

The need for reliable access to the domestic payment system in order to maintain a stable peg has substantial implications for the regulation of stablecoins. Regulators may have relatively little effective control over the operators of distributed ledgers (e.g., miners),

⁸Tether’s exchange rate at Kraken recovered relatively quickly towards the target rate while the discount on dollar balances held in Bitfinex remained more persistent. The simultaneous announcement of [Tether \(2018\)](#) promising the reopening of the possibility for direct redemptions of Tether tokens for large customers through their new banking relationship may have contributed to this recovery. However, it is not entirely clear to what extent customers were truly able to redeem their Tether tokens.

but the participants in their domestic payment systems (e.g., banks) tend to be within their sphere of control.⁹ The control of regulators over the participants in the domestic payment system provides them with substantial leverage to directly or indirectly enforce regulatory compliance for any entity that requires reliable access to the domestic payment system, including fiat-backed stablecoin issuers that wish to maintain a stable peg.

The empirical evidence in this chapter suggests that – if regulators exercise this control – the issuers of fiat-backed stablecoins will face the choice between *less autonomy* in the sense of subjecting themselves to regulatory control or a *less stable peg* as operating their stablecoins without regulatory approval would leave them without reliable access to the domestic payment system. Regulators are likely to subject stablecoin issuers to a wide variety of standards and rules given the concerns they have raised. For example, the [US President’s Working Group et al. \(2021, p. 16\)](#) suggest that legislation should require stablecoin issuers to be insured depository institutions which would subject them to intensive regulatory oversight. Moreover, stablecoin issuers would likely need to comply with regular requests from law enforcement agencies and financial supervisors to freeze balances ([Cointelegraph, 2020a,b](#)).¹⁰ Conditional upon domestic regulators having little control over the operators of distributed ledgers, users of stablecoins are then likely to face a choice between stablecoins with a stable value but little autonomy (the lower-right corner of Figure 1) and stablecoins with more autonomy but a less stable value (the upper-left corner of Figure 1).

Three types of candidates for stablecoins in the upper-left corner of Figure 1 emerge.

First, an obvious candidate is the issuer of a fiat-backed stablecoin that is willing to accept the risk of being cut off from the payment system in a cat-and-mouse game with

⁹The sphere of control extends to payments from and to indirect participants (e.g., foreign respondent banks) as regulators have the ability to set standards that correspondent banks need to adhere to when providing services to respondent banks ([Coelho et al., 2020](#)). For example, the allegations of Australia’s regulator against Westpac that resulted in a AUD 1.3 billion settlement agreement included deficiencies in Westpac’s oversight of its correspondent banking relationships ([AUSTRAC, 2019](#)).

¹⁰Such requests could be used by regulators to not only freeze balances that are suspected to be linked to crime, but to also target balances held by unregulated centralized exchanges and balances held in smart contracts and decentralized exchanges that facilitate the trade in between regulated and unregulated digital assets.

regulators. Such an issuer would expose its users to an unstable peg, but could potentially experience a higher level of autonomy for as long as it lasts.

Second, there may be hurdles for domestic regulators to force the issuer of a fiat-backed stablecoin that is pegged to a foreign fiat currency to comply with regulations in their jurisdiction. Even though domestic users of a “foreign” fiat-backed stablecoin would face some foreign exchange rate risk, they could still benefit from such a stablecoin when the exchange rate risk of the foreign fiat currency is less than that of cryptocurrencies like Bitcoin and Ethereum. The operator of such a foreign stablecoin could maintain a peg with a fiat currency of a jurisdiction that allows them to operate with a higher degree of autonomy. Initiatives for international cooperation and harmonization in the area of stablecoin regulation (e.g., [Financial Stability Board, 2020](#)) could help to reduce some of the hurdles domestic regulators would face with respect to foreign stablecoins.

Third, crypto-backed stablecoins may experience a high degree of autonomy because these type of stablecoins require no access to the traditional payment systems. The management of the supply of crypto-backed stablecoins involves transactions with tokens and assets on a distributed ledger only, so these stablecoins may experience a high degree of autonomy as long as regulators continue to have little control over the operators of distributed ledgers.¹¹ However, crypto-backed stablecoins are unlikely to maintain a stable one-to-one peg with a stable supply in the event where a deep crash in the prices of the underlying crypto-assets occurs.¹²

¹¹A potential exception is the crypto-backed stablecoin that is backed with digital assets of which the issuers are within the sphere of control of the regulator (e.g., a fiat-backed stablecoin that is within the control of the regulator). For example, the multi-collateral version of the crypto-backed stablecoin DAI ([MakerDAO, 2020](#)) is partially backed by the fiat-backed stablecoin USD Coin; see <https://daistats.com/>. The regulator could request the issuer of USD Coin to freeze the relevant balances.

¹²Some early empirical evidence on the stability of crypto-backed stablecoins is provided by [Bellia and Schich \(2020\)](#), who report their exchange rates to be more volatile than those of fiat-backed stablecoins, and [Kozhan and Viswanath-Natraj \(2021\)](#), who find that their stability depends on the stability of the collateral. See, e.g., [Li and Mayer \(2021\)](#) for a theoretical analysis.

IV. Concluding Remark

The continued existence of “more autonomous – less stable” stablecoins as the regulatory pressure rises would rely on the continued existence of some decentralized networks that can operate outside the sphere of control of the relevant authorities. There are some reasons to believe that some decentralized cryptocurrency networks do not operate completely independently of the local regulatory stance. For example, China’s crackdown on mining activities in May 2021 ([Economist, 2021](#)) was followed by an approximately 40 percent drop in the computational power of the Bitcoin network. However, this does not imply that the operators of all decentralized networks will be within the sphere of control of the relevant authorities. First, decentralized networks may operate from jurisdictions that take a more lenient stance. Second, the operators of the Bitcoin network rely on specialized hardware to maintain the integrity of the ledger ([Garraat and Van Oordt, 2020](#); [Prat and Walter, 2021](#)) which requires ties to a physical location. Some other decentralized cryptocurrency networks rely on protocols that do not use specialized hardware (e.g., “proof-of-stake”), which allows their operators to move virtually anywhere. This suggests that some of the autonomous stablecoins are here to stay, although they may turn out to become limited in scale and importance compared to their stable regulated counterparts.

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