

# The Macroeconomic Impact of Cryptocurrency and Stablecoins

WHITE PAPER

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# Foreword



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With the aim of mitigating risks to financial stability, safety and equity while broadening financial access and enabling innovation, cryptocurrencies and stablecoins should play a regulated role in economies.

During the final weeks of authoring this report, the cryptocurrency market entered into a free fall, experiencing a loss of 50% year-to-date and, at points, surpassing \$2 trillion in losses.

This kicked off a crypto “bear market”, known by some in the crypto industry as “crypto winter”, a downslope with no definite ending, though optimistically followed by a springtime resurgence. Many of the macroeconomic predictions described in this paper for cryptocurrencies and stablecoins played out in real time. Some of the immediate impacts during this downturn are:

- 1. Spillover effects and market contagion** to other parts of the crypto industry, the traditional financial system and companies exposed to the crypto market. Some of the spillover effects are caused, for example, by leveraged investing<sup>1</sup> such as margin trading, where investors use borrowed gains to reinvest in other assets in order to seek higher investment profits overall.<sup>2</sup>
- 2. Liquidity crises** – citing “extreme” market conditions in June 2022, one crypto lender froze withdrawals and transfers between accounts “to stabilize liquidity and operations” while taking steps to preserve and protect assets.<sup>3</sup>
- 3. A short-term slowdown in funding** for crypto ventures – venture capital firms recently raised financing for crypto investment that will still need to be spent on the asset classes promised to their limited partners (LPs).
  - Even though the venture capital deployed to cryptocurrency entrepreneurs was down in May 2022, the amount of capital invested in the space has increased by 89% since May 2021.<sup>4</sup>

**4. Sudden job loss** within crypto firms that grew too quickly, with some companies blaming a “dramatic shift in macroeconomic conditions worldwide” for the lay-offs.<sup>5</sup>

**5. Individual investors have lost funds** and, in some cases, their life savings. However, Goldman Sachs calculates US consumer losses at only about 0.3% of American household wealth.<sup>6</sup>

The downturn will reveal which crypto companies have strong business models. This paper analyses the more holistic macroeconomic effects that we may see playing out in the near future, against an illustrative continuum of posed regulatory scenarios. As we move into increasingly uncertain economic times, coordinated domestic and global regulation is needed to mitigate the risks to financial stability, safety and equity while broadening financial access and enabling innovation.

In this context, the World Economic Forum has been working with members of the public and private sectors, civil society and academia to highlight what history has taught us about financial risk. The Digital Currency Governance Consortium (DCGC) community – comprising a global, multi-sector set of more than 85 leading organizations – continues to discuss the potential solutions and regulatory paths for the future to enable continued encouragement of the responsible roll-out and adoption of digital currencies. We will be publishing the DCGC’s second phase of work in two releases:

1. The macroeconomic impact of cryptocurrency and stablecoins
2. Regulatory best practices for cryptocurrency and stablecoins (to be published later this year)

# Preface

The scale of usage and domestic and international impact of crypto-assets varies across jurisdictions, but there has indisputably been a rapid growth in adoption. The Financial Stability Board (FSB) has highlighted their use as an emerging risk to global financial stability, with potential macroeconomic impacts.<sup>7</sup> There is a need for a timely and precautionary evaluation of the possible macroeconomic impacts and corresponding policy responses.<sup>8</sup>

In the absence of high-certainty macroeconomic models that project the impact of cryptocurrency and stablecoins, this white paper seeks to forecast the potential effects based on qualitative assessments from global macroeconomists and credible literature in this space.

# Defining cryptocurrency and stablecoins

This white paper will focus on cryptocurrency and fiat-backed stablecoins, though it is important to note the definitions of and differences between commonly known digital currencies.

According to economics professor Eli Noam, digital currencies are “representations of value in digital form with monetary characteristics”.<sup>9</sup> From a crypto-asset standpoint, digital currencies can refer to cryptocurrencies, stablecoins and central bank digital currencies (CBDCs).

- **Crypto-assets:** a type of private digital asset that depends primarily on cryptography and distributed ledger or similar technology.<sup>10</sup>

## Non-financial assets

Floating rate payment instrument (e.g. Bitcoin, DOGE): can be a financial asset or a non-financial asset (depending on the issuer – if it’s a claim against the issuer, it’s a financial asset).

**Cryptocurrency:** digital assets and digital infrastructure such as Bitcoin and Ethereum that are open-sourced and public.<sup>11</sup>

- Cryptocurrencies (e.g. BTC, LTC)
- Crypto tokens (e.g. FIL)
- Crypto commodities (e.g. ETH)

## Financial assets

- **Stablecoin:** a broad term used to refer to digital currencies, most often DLT-based cryptocurrencies, that are designed to maintain a stable value relative to another asset (typically a unit of sovereign currency or commodity) or a basket of assets. [CoinDesk](#) has defined four common types of stablecoin. This white paper will focus only on fiat-backed stablecoins.

## Fixed rate payment instruments

- **Fiat-backed:** stablecoin issuers hold 1:1 reserves of fiat currency. The total value matches how much they have backed by fiat.
- **Commodity-backed:** similar to fiat-backed stablecoins, stablecoin issuers hold equivalent values of commodities such as precious metals, oil and real estate. The coins may or may not be redeemable for the physical asset.
- **Algorithmic:** these stablecoins are not backed. Instead, they aim to maintain a stable value through algorithms and smart contracts that manage the expansion and contraction of token supply.
- **Crypto-backed:** these stablecoins are backed by other cryptos via smart contracts rather than a service provider. They are “over-collateralized”, meaning that the value of the crypto backing exceeds the value of stablecoins issued, in order to account for price fluctuations.

## Cryptocurrency

For the purposes of this white paper, cryptocurrencies refer to digital assets such as bitcoin (BTC) and Ether (ETH) that are public and permissionless in nature and dependent on global networks of computers to validate transactions and ensure network integrity.

Bitcoin was created in 2008 by an unknown person or group using the name Satoshi Nakamoto, as an alternative global money source that was uncontrolled by government authorities. It was popular among libertarians who were eager for a new monetary system.

With cryptocurrency there are two key innovations:

1. The assets
  - A digital payment instrument with properties akin to a bearer instrument or a digital token
  - A payment instrument issued by a non-bank and non-financial entity whereby the entity is undefined
  - A decentralized network based on blockchain to validate transactions
2. The decentralized networks and payment rails
  - The distributed ledger environment offers:
    - Security and integrity
    - Atomicity of the payment exchange<sup>12</sup>
    - Traceability and transparency

There are various perspectives on the role that cryptocurrency takes within an economy:

- **A currency**
  - Most currencies attract speculation and are subject to significant valuation changes.
  - Like most currencies, however volatile, cryptocurrency can theoretically serve as a payment medium.
- **A store of value/an asset class**
  - Gold and bitcoin are perceived by some as a safe haven against distrust in the monetary system.

- Tangible or intangible instruments can be perceived to have utility, be used as a payment instrument and attract value (e.g. using collectibles such as baseball or Pokémon cards or cigarettes in wartime as currency). The novelty with cryptocurrency is that the assets are digital representations. The combination of rarity and utility determines value.

- **A means of payment**

- If cryptocurrency is to become a popular means of payment, as for any issuer of money, there needs to be some confidence among users that it actually works for making a payment.

- **A platform (such as Ethereum)**

- In 2013, Vitalik Buterin, co-founder of Ethereum, wrote a 36-page white paper describing his vision for Ethereum as an open-source blockchain on which programmers could build applications.

- **A pyramid**

- A buyer is dependent on more people buying in for the value to rise. The person who buys in the latest, at the highest price, loses.

Cryptocurrencies have been used across a wide range of industries and domains. While each project is unique in a cryptographic sense, many share similar or opposing characteristics derived from the original bitcoin design. The distinction between permissionless and permissioned coins is important. Permissionless blockchains allow anyone to participate in validating and mining transactions as well as in using the system to buy, sell and trade assets. A permissioned blockchain is a distributed ledger that is not publicly accessible – it can be accessed only by users with permissions. The users can perform only specific actions granted to them by the ledger administrators and are required to identify themselves through certificates or other digital means.<sup>13</sup> Bitcoin and some Ethereum blockchains are permissionless, while many CBDCs would tend to be used on a permissioned blockchain or other DLT platforms.

There is significant expressed scepticism among important global leaders regarding the inherent definition and utility of cryptocurrencies:



**All cryptocurrencies, alleged to be currencies, are not currencies at all. They are speculative assets, the valuation of which changes enormously over time. Moreover, they present themselves as currencies, which they are not. An asset is an asset but should not claim it is a currency; it is not.**

Christine Lagarde, President, European Central Bank, Germany, speaking on Radio Davos about crypto

## Stablecoins

This white paper will focus on private fiat-backed stablecoins, leaving collateralized stablecoins and algorithmically stabilized coins<sup>14</sup> out of scope. As it is also important to understand and regulate these, they will be addressed in future work. Fiat-backed stablecoins are defined by the FSB as stablecoins that purport to maintain a stable value by referencing physical or financial assets or other crypto-assets.<sup>15</sup> Stablecoin issuers hold various reserve assets to back up the fixed value of their coins and ensure a 1:1 redeemability. Stablecoins are issued with a promise to keep a value that is stable relative to an external anchor in the case of fiat-backed stablecoins. As such, stablecoins are monetary liabilities similar to bank deposits and money market funds; there are even some parallels to e-money.

Many reserve designs exist and, in contrast with other cryptocurrencies such as bitcoin, many stablecoins are centralized and issued by a corporate entity. These corporate entities are responsible for holding reserve assets, issuing coins and engaging with regulators. Issuers' design choices revolve around the kinds of reserve assets they hold, and the stabilization mechanisms used to maintain the pegged price.<sup>16</sup> However, some experts insist that the underlying assets behind these coins – high-quality or not – may be more safely held by existing financial institutions, prompting calls for more guidance and regulation around stablecoins and their issuers. Currently, there are no regulations defining what kinds of reserve assets stablecoin issuers should hold to protect their pegs, as well as what type of disclosure issuers should provide to protect investor confidence.



**When we look at stablecoins this is the area where the big mess happened. If a stablecoin is backed with assets, one to one, it is stable. When it is not backed with assets, but it is promised to deliver a 20% return, it's a pyramid. What happens to pyramids? ... They eventually fall to pieces.**

Kristalina Georgieva, Managing Director of the IMF, speaking during a panel moderated by CNBC at the World Economic Forum's Annual Meeting 2022 in Davos



# Executive summary

Too little is known about the economics guiding our understanding and analysis of cryptocurrency and stablecoins, which may deliver benefits and negative outcomes. There are many unanswered, and perhaps unanswerable, questions about the economic impact of alternative scenarios. A broad spectrum of views and predictions for the future exists, and the economic outcomes will vary depending on what shape any regulation takes. Additionally, there is insufficient data to create macroeconomic models for crypto and stablecoins, as neither is currently included in monetary financial statistics.

To project the macroeconomic outcomes of given regulatory scenarios/paths, interviews were conducted for this white paper with 16 global macroeconomists who have made qualitative assessments of how cryptocurrencies and stablecoins might affect individual economies and the global financial system.

The possible macroeconomic outcomes and scenarios described in this white paper are categorized according to the following criteria:

- Financial stability (domestic and global)
  - Promotes monetary stability
  - Promotes stability of the financial system
- Equity and safety
  - Promotes access to the financial system for people who have been historically excluded
  - Promotes protection against illegal activity
- Innovation
  - Promotes productive innovation and efficiency
- Sustainability
  - Promotes environmental sustainability

For cryptocurrency, governments can choose to let present trends continue, ban cryptocurrency, let it play a regulated role in the economy or make cryptocurrency legal tender. While the spectrum of possibilities within these options is broad and nuanced (e.g. there are many ways to implement a ban and within the regulatory category there could be anything from loose guidelines to strict rules, which may render these instruments obsolete),

this paper seeks to explore the economic effects of each high-level path. Based on projected macroeconomic outcomes, the majority of economists interviewed predict that allowing cryptocurrency to play a regulated role in the economy will bring the highest macroeconomic net benefit to society. This is contingent on the responsible design and enforcement of regulation. A separate workstream within the World Economic Forum's Digital Currency Governance Consortium (DCGC) will deliver more detail regarding regulatory best practices at a later date.

For fiat-backed stablecoins, governments can choose to let present trends continue, allow private fiat-backed stablecoins to play a regulated role in the payments system or tax (or ban) private stablecoins out of existence. Of these, allowing fiat-backed stablecoins to play a regulated role in the economy is predicted to bring the highest macroeconomic net benefit to society. This is contingent on the responsible design and enforcement of regulation.

Based on this analysis, policy-makers should:

- Create an international classification framework/taxonomy to provide a common ontology (i.e. set of concepts and categories) to differentiate between the different digital currency types, how they interact and how stablecoins are collateralized
- Include cryptocurrency and stablecoins in monetary financial statistics
- Take economic qualitative assessments, such as this one, into consideration, as they become available, when choosing regulation
- Coordinate with other governments to avoid:
  - Creating regulatory arbitrage
  - Causing negative economic impacts due to the effect on emerging economies of developed economies' choices

Based on this analysis, business leaders should work proactively with policy-makers to receive regulatory clarity as business models are shaped and to have a voice in the creation of policy.



# Introduction

This white paper's analysis focuses on the macroeconomic impact of the widespread adoption of cryptocurrencies and stablecoins. Because any economic outcomes will depend on future regulatory decisions, the paper is organized according to the potential regulatory paths for cryptocurrency and stablecoins, respectively, and the possible macroeconomic outcomes of each regulatory path. The macroeconomic considerations are explained neutrally. The paper then examines each regulatory path in relation to the initial criteria to assess which regulatory path would produce the optimal macroeconomic outcome and net benefit to society. It offers recommendations and a look forward to future work. Finally, those potential outcomes for each regulatory path are rated against the criteria for achieving macroeconomic net benefit to society.

This white paper will:

- **Define** cryptocurrency and stablecoins in terms of how they apply to macroeconomics
- **Summarize** the economic analysis undertaken to date
- **Explain** why there are so many unknowns with regard to how cryptocurrencies and stablecoins will affect global economies
- **Define** the criteria for a macroeconomic net benefit to society in the context of cryptocurrencies and stablecoins
- **Acknowledge** that the macroeconomic outcomes depend on which regulatory path is chosen (e.g. let present trends continue, ban, regulate, etc.). Here it is critical to note that these **paths fall along a continuum** as opposed to being stringent categories.
  - For example, some jurisdictions will ban crypto for payments but still allow citizens to hold it. Other jurisdictions may ban mining only. Further, policy-makers may limit or ban targeted activities for regulated financial entities such as banks (e.g. no crypto on balance sheet, but allow customers to transfer funds to crypto platforms, etc.).
  - The same is true for other financial activities – e.g. crypto custody, derivatives, collective investment vehicles. Some policy-makers may also decide that only “qualified investors” can hold crypto, etc.
- **Set out the high-level spectrum** of possible regulatory paths for **cryptocurrency**
  - Use the criteria to **project the macroeconomic outcomes** of high-level regulatory paths for cryptocurrency based on interviews with macroeconomists (conducted under the Chatham House Rule)<sup>17</sup> and other literature review
- **Set out the spectrum** of possible regulatory paths for **stablecoins**
  - Use the criteria to **project the macroeconomic outcomes** of each regulatory path for stablecoins based on interviews with macroeconomists (conducted under the Chatham House Rule) and other literature review
- **Conduct the analysis for cryptocurrency** by rating each regulatory path in relation to the criteria for the optimal macroeconomic net benefit to society
- **Conduct the analysis for stablecoins** by rating each regulatory path in relation to the criteria for the optimal macroeconomic net benefit to society
- **Decide** on the optimal regulatory path for **cryptocurrency**
- **Decide** on the optimal regulatory path for **stablecoins**
- **Offer recommendations** to policy-makers and business leaders
- **Conclude** with a look forward to work in the pipeline from the World Economic Forum's Digital Currency Governance Consortium (DCGC) working group on specific regulatory best practices for cryptocurrency and stablecoins

## Scope of work

The scope of this white paper includes regulatory scenario-based macroeconomic impact projections by global macroeconomists for cryptocurrencies, including bitcoin (BTC) and Ethereum (ETH) and fiat-backed stablecoins. Projections are based on the educated opinions of macroeconomists in the absence of economic models for this topic.

This report will not focus on:

- Value cases/use cases for cryptocurrency and stablecoins
- Central bank digital currencies (CBDCs)
- Regulatory analysis
- Regulatory recommendations
- Consumer protection
- Microeconomics



1

# Summary of work done to date

As crypto-assets have expanded in terms of both their use and market capitalization, macroeconomic research has followed suit. Work has been done to understand the risk of inflationary events in private currencies, the optimal reserve design for stablecoins to minimize macroeconomic risk, and regulatory lessons from financial assets that share similarities with cryptocurrencies. Academic literature has also put forward the idea of increased public-private partnerships to help central banks and financial regulators keep up with the fast-moving pace of cryptocurrency developments and applications. Previous work done by the World Economic Forum Global Future's Council for Cryptocurrency outlines financial integrity, operational considerations, consumer protection and privacy risks.

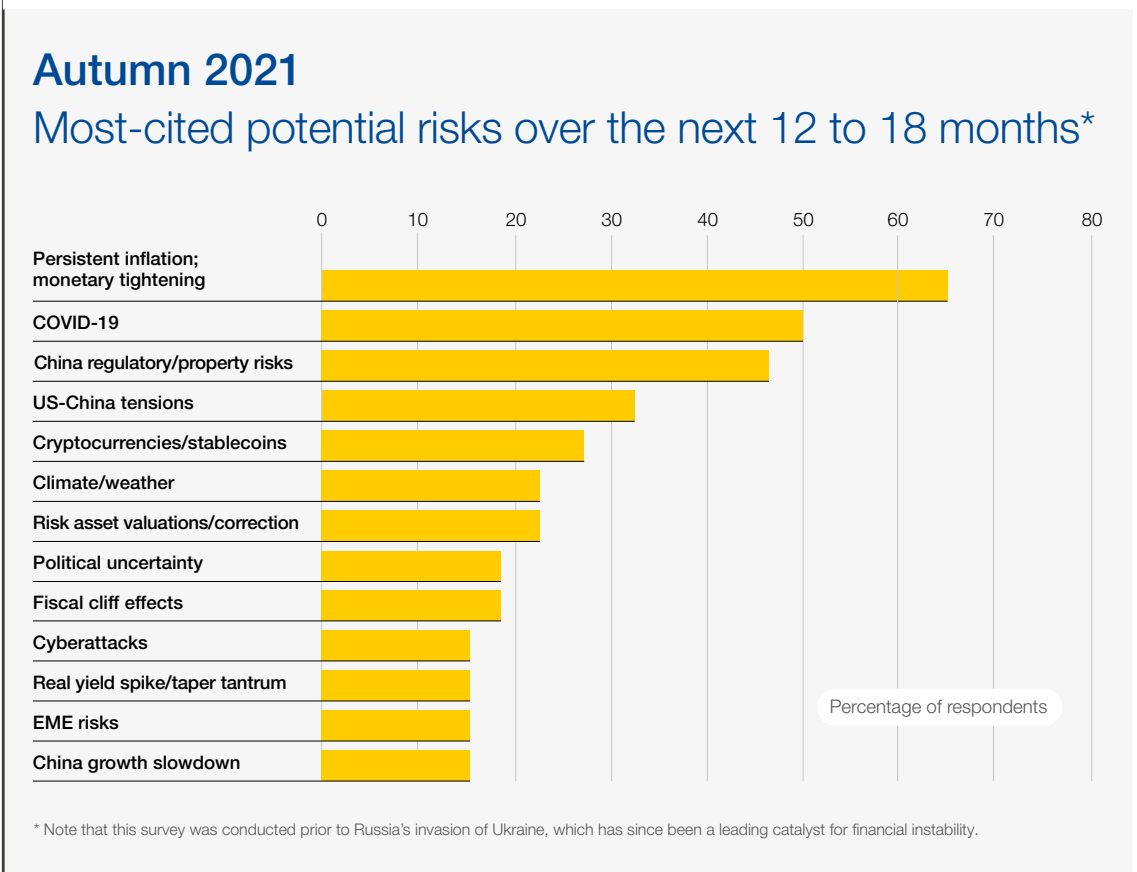
From a policy standpoint, the macroeconomic consequences of cryptocurrencies have been top of mind for domestic and international policy-makers as well as non-governmental organizations (NGOs), multilateral development banks and financial

services providers. Such concern was triggered especially by the introduction of Libra (later Diem) in 2019, a global stablecoin that would be operated by Facebook (now Meta), which sparked fear that Facebook could have a disproportionate influence on the global financial system.

Bankers in the Eurozone, North America and elsewhere have all published risk assessments of digital currencies and how risks may be addressed in forthcoming regulation. In these assessments, central banks have raised concerns about, for example, substitution effects by global stablecoins and contagion risks to other parts of the financial system. Additionally, groups such as the FSB have brought attention to the need to conduct prudential risk monitoring.

In the figure below, published by the US Federal Reserve in May 2022 on the basis of survey data from autumn 2021, cryptocurrency and stablecoins were the fifth most cited risk to financial stability.<sup>18</sup>

FIGURE 1 Survey of salient risks to financial stability



Source: United States Federal Reserve Bank of New York

At the same time, central banks began to expand the research into CBDCs. Today, central banks recognize that CBDCs could offer enhanced functionalities to conventional central bank monies, increase efficiencies and improve international payments. While some emerging markets – such as China’s large-scale pilot, the Eastern Caribbean Central Bank and Nigeria – have issued CBDCs, there is still no consensus that CBDCs represent a “silver bullet” to mend all challenges.

**Geopolitical context**

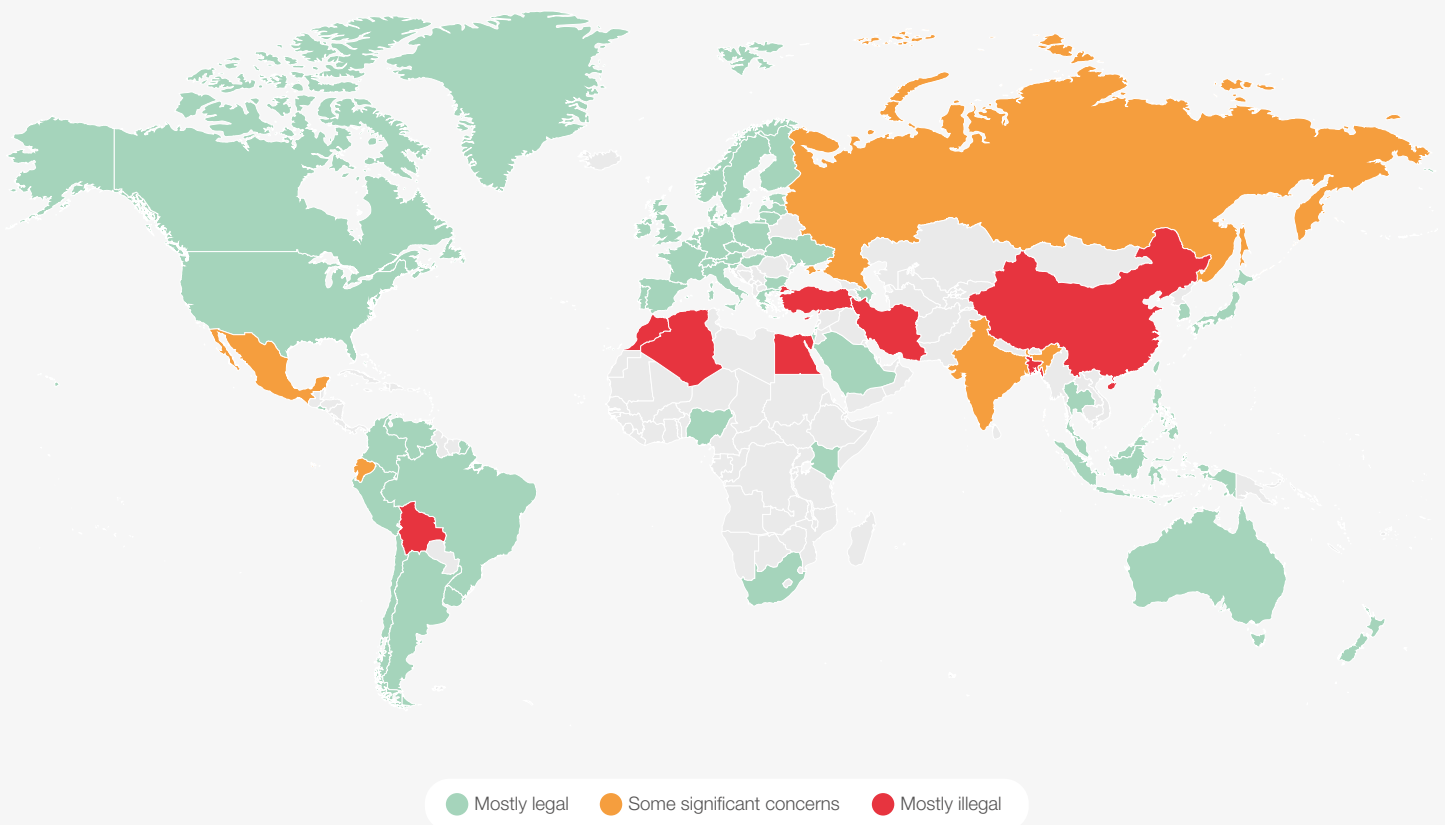
The Russian invasion of Ukraine has also accelerated the exploration of the economic impacts of cryptocurrency. For example, in the initial days of the war, cryptocurrency became a tool for rapidly collecting financial support in service of Ukraine’s resistance. More than \$100 million in crypto was raised in the first three weeks after the invasion for the Ukrainian government and NGOs. Cryptocurrency has also provided a means for Ukrainian refugees to carry their money across borders.<sup>19</sup> Similarly, in the past year, [Afghan citizens fleeing the Taliban](#) have used

cryptocurrency as a mechanism for payments.<sup>20</sup> Such adoption has been immense – while a 2020 report on cryptocurrency use from Chainalysis did not include Afghanistan, by 2021 the country was ranked 20th in the group’s Global Crypto Adoption Index.<sup>21</sup> There has also been speculation that crypto-assets could be used as a tool to evade sanctions; however, this is still unproven at scale.<sup>22</sup> While El Salvador is making efforts to move away from reliance on the dollar,<sup>23</sup> other countries see the power of the global financial system and how easily a country can become economically isolated.<sup>24</sup>

**Current state of global regulation**

Regulatory uncertainty and fragmentation at the domestic and international levels, such as a lack of implementation of Financial Action Task Force (FATF) rules and unclear institutional mandates (e.g. commodities vs. securities regulators), has created a window for regulatory arbitrage and build-up of risk beyond the regulatory perimeter. For example, the map below illustrates the variation in government acceptance of cryptocurrency across various parts of the world.

FIGURE 2 Cryptocurrency regulations by country



Source: Thomson Reuters 2022<sup>25</sup>

### Audience

The audience for this white paper is business leaders and policy-makers. It may inform regulation and business decisions (e.g. platform services, institutional investment decisions). Since the regulatory approach will be driven by the underlying macroeconomic impact, the predictions in this report will drive what kind of regulation needs to be applied in certain situations. This white paper will also serve to inform business chief executive officers, chief information officers and chief financial officers who are interested in how the environment might change.

### Approach

The research for this work used the following methodology:

- Desk research (see Appendix A for a summary)
- Semi-structured interviews with 15 global elite macroeconomists, conducted under the Chatham House Rule

- Topic advisory team biweekly consultations (private-sector, non-profit and government ministry macroeconomists)
- World Economic Forum Digital Currency Governance Consortium (DCGC) community review
- DCGC Steering Committee review

The World Economic Forum has embarked on this work because of the global knowledge capital within its DCGC. The DCGC community has expertise of the unique characteristics of cryptocurrency and stablecoins, which will inform governments making regulatory decisions based on desired macroeconomic outcomes. International efforts by various organizations and central banks are already making headway. The Forum brings together individuals from the private sector in addition to the public sector, civil society and academia. It is, therefore, uniquely positioned to collate a broad range of possible macroeconomic impacts of cryptocurrency and stablecoins.



2

# Problem statement

Too little is known about the economics guiding our understanding and analysis of cryptocurrency and private fiat-backed stablecoins.

It is, therefore, difficult to project the macroeconomic outcomes of cryptocurrencies and stablecoins, leaving policy-makers with uncertainty as to which high-level regulatory path will yield the greatest macroeconomic net benefit to society. These unknowns have accelerated fears especially related to monetary and financial stability as well as substitution and dollarization effects.<sup>26</sup>

This white paper aims to resolve this uncertainty by laying out potential high-level regulatory paths and measuring the macroeconomic outcome of each against a set of criteria: global and domestic financial stability; equity and safety; innovation; and sustainability. The aim is to present macrocritical considerations for policy-makers and business leaders.

The World Economic Forum's DCGC is leading a separate workstream to consider regulatory best practices. The outputs of this work on the macroeconomic impact of cryptocurrency and stablecoins may be a valuable input to the regulatory best practices workstream, which will publish its findings at a later date.

FIGURE 3 Current state and market size<sup>27</sup>





Crypto has inspired an unusually polarized discourse. Its biggest fans think it is saving the world. In contrast, its biggest skeptics believe it is an environment-killing speculative bubble orchestrated by grifters and sold to greedy dupes, which will probably crash the economy when it bursts. Despite the goofy veneer, crypto is not just another weird internet phenomenon. It is an organized, technological movement, armed with powerful tools and hordes of wealthy true believers, whose goal is nothing less than a total economic and political revolution.<sup>28</sup>

Kevin Roose, *The Latecomer's Guide to Crypto*, *The New York Times*

Although still a relatively small part of the global financial system, the crypto-asset market capitalization grew by 350% in 2021.<sup>29</sup> Crypto-assets have remained in the spotlight and attract new investors. A Goldman Sachs survey found that 40% of the company's high-net-worth clients already have some crypto holdings.<sup>30</sup> While 2022 has brought more severe volatility, the overall value of these assets has grown considerably since 2008.

Cryptocurrency price volatility stems from several factors (e.g. speculation, price manipulation, media coverage and regulatory uncertainty), leading to

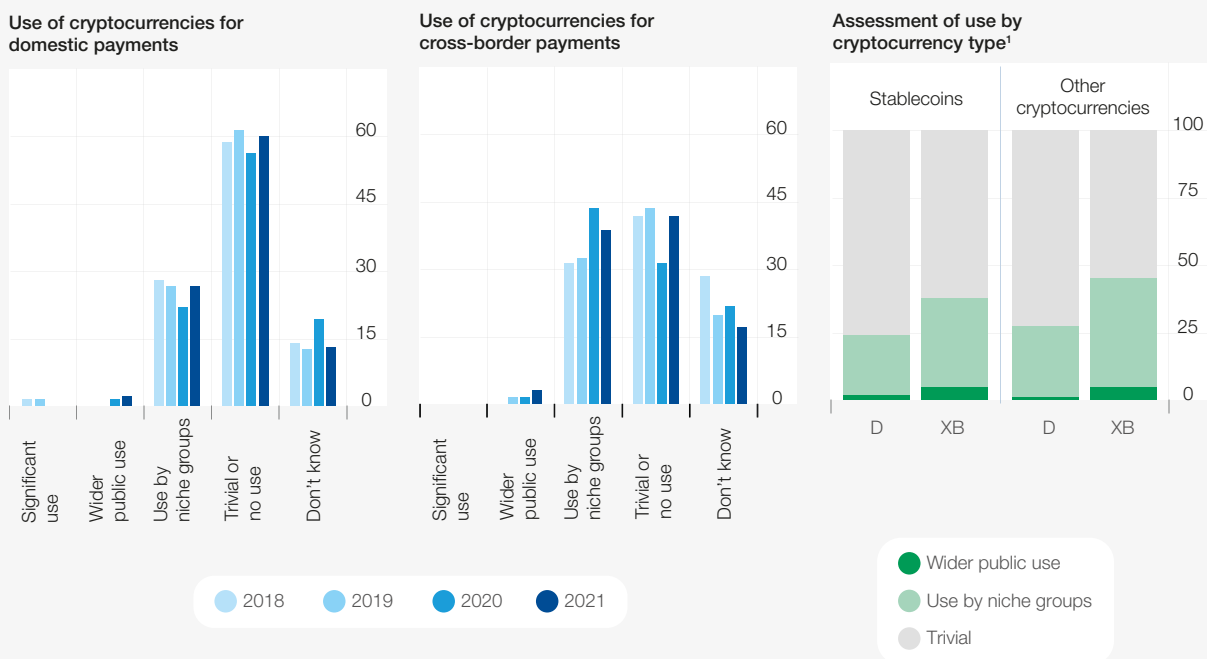
a lack of stability compared with leading national currencies.<sup>31</sup> Cryptocurrencies are not subject to the stabilization policies that central banks can provide as a public service, nor are cryptocurrency issuers necessarily motivated to offer stabilization policies in the first place.

Cryptocurrencies have not been widely adopted as a means of payment due to their extreme price volatility, lack of integration with service providers and limitations on transaction throughput compared to established players. The figure below illustrates important uses for cryptocurrencies and stablecoins.

FIGURE 4 Prevalence of use of cryptocurrencies and stablecoins for payments

## Current significance of use for payments

Share of respondents



D = domestic payments; XB = cross-border payments.

<sup>1</sup> This question was asked for the first time in 2021. The panels show the shares of respondents after removing those replying "Don't know".

Source: Bank for International Settlements (BIS)

**Methodology:** In 2021, a record 81 central banks replied to the survey (Annex 1). Some 56 of these respondents had taken part in the 2020 survey and 41 replied for the fourth time. This lets us assess how their views and the status of their CBDC involvement have changed over time. The jurisdictions of the responding central banks represent close to 76% of the world's population and 94% of global economic output. Twenty-five respondents are in advanced economies (AEs) and 56 are in emerging market and developing economies (EMDEs).<sup>32</sup>

Stablecoins are primarily applicable in facilitating the “trading, lending, or borrowing of other digital assets, predominantly on or through digital asset trading platforms”, according to the US Department of the Treasury.<sup>33,34</sup> Tether, the largest stablecoin by market share, was first introduced in 2014 and was

the only stablecoin available for use until 2018 when TrueUSD, USDC, Pax Dollar and Gemini dollar were introduced.<sup>35</sup> Today, stablecoins have a combined market cap of \$153 billion and play a critical role in crypto-asset exchanges and decentralized finance (DeFi) applications.

## Data limitations

The ability to identify and quantify risks to financial stability from crypto-assets is slowed by the lack of transparent, consistent and trusted data on crypto-asset markets and their linkages with the core financial system.<sup>36</sup> Data is either not available on mining activity in all countries or statisticians may not collect or include the information that is made available by some firms. It is also challenging to aggregate and analyse such data, as many transactions occur “off-chain” rather than on the DLT ledger, at entities that do not report off-chain data, or through complex protocols and smart contracts.<sup>37</sup>

Any data that has been collected on cryptocurrency and stablecoins is excluded from monetary financial statistics. Economic projections and connections to the financial system are hard to assess because of significant data gaps.<sup>38</sup> Monetary policy decisions are dependent on accurate data and therefore significant uncertainty remains when determining the direction of policy in this area.

The tables that follow, published by the FSB, highlight the data gaps for both cryptocurrencies and stablecoins, which prevent proper prediction modelling.





TABLE 1 Metrics for data gaps for crypto-assets

**Transmission channels**

**Available metrics**

**Data gaps**

<b>Wealth effects*</b>	Market capitalization of crypto-assets	Share of households invested in crypto-assets
	Trading volumes	Share of assets relative to household wealth
	Realized volatility and gamma	Demographic skew among household's holdings
	Geographical adoption	Owners of unbacked crypto-assets
<b>Confidence effects</b>	Share of retail ownership of crypto-assets	Volume of crypto-asset fraud
	Number of clients in infrastructures that provide access to crypto-assets (e.g. trading platforms, wallet providers)	
<b>Financial sector exposures**</b>	Share of institutional ownership of crypto-assets	AUM and share of holdings of funds that offer exposure to crypto-assets (by asset type e.g. spot, derivative, ecosystem and investor type)
	Share of assets invested in crypto-assets	Bank sector exposure (absolute vs. hedged; change in open interest)
	Number of large financial service providers offering crypto-asset services	Reporting by financial institutions on crypto-assets held and serviced
	Volume of crypto-asset derivatives market	
	Open interest of crypto-asset derivative contracts	
	Correlations of crypto-assets with other asset classes	
	Share of transaction volume by transaction size	
<b>Use in payments and settlements</b>	Prices and delta (over one week, one month, three months, six months, one year)	Number and value of transactions – Jurisdiction of the payers and payees – Type of transactions (e.g. remittances, ecommerce, trading)
	Trading volumes (absolute vs. average)	Types of crypto-assets employed
	Number of large payment service providers supporting crypto-assets	Acceptance as legal tender
	Market share of major crypto-asset exchanges	

Source: Financial Stability Board<sup>39</sup>

\* Survey-based metrics are updated infrequently/irregularly.

\*\* Survey-based metrics are not customizable and are updated infrequently/irregularly.

TABLE 2 Metrics for data gaps for stablecoins

**Transmission channels**

**Available metrics**

**Data gaps**

<b>Wealth effects</b>	Market capitalization of stablecoins	Owners of stablecoins
	Trading volumes	
	Realized volatility	
<b>Confidence effects</b>	Share of retail ownership of stablecoins	Volume of crypto-asset fraud
	Number of clients in infrastructures that provide access to stablecoins (e.g. trading platforms, wallet providers)	
<b>Financial sector exposures</b>	Share of institutional ownership of stablecoins	Amounts and share of holdings of ETFs that offer exposure to stablecoins (by investor type)
	Share of assets invested in stablecoins	Profit and loss exposures
	Number of large financial service providers offering stablecoin services	Reserve assets invested in regulated markets
	Size of stablecoin market relative to US prime money market funds	Liquidity of reserve assets
		Granular and robust data on composition of stablecoins reserve assets
<b>Use in payments and settlements</b>	Prices	Number and value of transactions
	Trading volumes	Jurisdiction of the payers and payees
	Number of large payment service providers supporting crypto-assets	Type of transactions (e.g. remittances, e-commerce, trading)
	Number of large payment service providers supporting stablecoins	Usage in crypto-asset trading platforms by stablecoin
		Breakdown of uses of stablecoins

Source: Financial Stability Board<sup>40</sup>

3

# Criteria

## Criteria for net positive macroeconomic outcomes for cryptocurrency and stablecoins

The table below illustrates the criteria for net positive macroeconomic outcomes from cryptocurrency and stablecoins. It is noted that the same criteria will be applied to both cryptocurrencies and stablecoins, though each will affect the economy very differently.

TABLE 3 Criteria for net positive macroeconomic outcomes

Criteria pillars	Measures	Example of economic effects
<b>Financial stability (global and domestic)</b>	Promotes monetary stability	– Exchange rate effects
	Promotes stability of the financial system	– Liquidity effects – Valuation effects – Duration risk
<b>Equity and safety</b>	Promotes access to the financial system for people who have been historically excluded	– Financial deepening effect <sup>41</sup>
	Promotes protection against illegal activity	
<b>Innovation</b>	Promotes productive innovation/efficiency	– Innovation effect – Efficiency gains – Multiplier effect
<b>Sustainability</b>	Promotes macrocritical environmental sustainability	



4

# Cryptocurrency: macroeconomic impacts

## General macroeconomic impacts of cryptocurrency

Cryptocurrencies represent novel payment instruments and infrastructures that aim to form a new rail to existing payment systems. They add to the continuum of monies and may complement or substitute existing monies. They form part of a broader trend of increasing diversification in asset holdings and potentially in payments.

## Macroeconomic impacts of crypto by regulation chosen

Some macroeconomic impacts of cryptocurrency will depend entirely on what type of regulation is chosen. The next section outlines the spectrum of regulation that countries may choose, and, beneath

this, a projection of the macroeconomic impact associated with those regulatory choices. It is noted that some countries may be recipients of the economic impacts of regulatory choices made by other countries.

The table below illustrates the high-level spectrum of regulatory options that countries may choose. It is critical to note that these paths fall along a continuum. There are many permutations of a “ban on cryptocurrency” and, similarly, “regulation” could be either simple guidelines or strict rules and requirements. Many countries have already taken steps to select one of these options, and countries have also changed course along the way.

TABLE 4 The spectrum of regulatory possibilities for cryptocurrency

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Regulatory options	Let present trends continue	Ban the use of cryptocurrency	Let cryptocurrency play a regulated role within the economy	Make cryptocurrency legal tender



# Economic outcomes of various cryptocurrency regulation alternatives

## Scenario 1

### Let present trends continue

Letting present trends continue means taking a “wait and see” approach – allowing trends to develop further before enacting regulation. This section will weigh the scenario for letting present

cryptocurrency trends continue in relation to the criteria for an optimal macroeconomic net benefit to society.

### Monetary stability

#### Aggregate demand effect

Bitcoin, for example, is created and floats alongside a national currency. If bitcoin is used to purchase an asset (e.g. a car or a house), there is an aggregate demand effect, as bitcoin is added into the supply of currency in circulation. The aggregate demand effect holds only if the original miners are using their proceeds to purchase goods and services in the economy and if those proceeds exceed the mining cost. If bitcoin is exchanged for national currencies, this is a substitution effect and there is no direct aggregate demand effect.

#### Wealth effect

Cryptocurrency is more frequently used as an investment than as a means of payment. Bitcoin, for example, has a limited supply and so, as demand increases, the price of bitcoin increases. In cases where wealth is gained and the additional value is spent within the economy, there is a wealth effect, which has an impact on the monetary system.

#### Valuation effects

Cryptocurrencies may be subject to significant valuation changes that may have positive and negative wealth effects for consumers.

### Stability of the financial system

- “Entrepreneurs do not mint additional coins like the US government, to account for price effects created for other participants in the market. They just seek to maximize profits. They do not consider monetary externality effects on other participants in the economy. Private entrepreneurs have an incentive to issue additional amounts of currencies when their value is positive.
- “Supply does not depend on demand conditions. As a result, the value of privately issued currencies will not be stable. Even when a particular currency like bitcoin has a supply limit, there is no boundary to the total units of other cryptocurrencies that can enter the money supply.
- “Therefore, there is no effective upper bound on the total money supply, which if there were a profusion of cryptocurrencies could lead to runaway inflation. This lack of control over the total supply of money in circulation has critical implications for the stability of prices across the economy.
- “In an environment with multiple digital currencies in circulation and no centralized way to limit the supply of units, the value of these virtual units will inevitably diminish to zero in the long run. In other words, it invites a state of hyperinflation.<sup>42</sup>

Eli Noam, Columbia School of International and Public Affairs

Some macroeconomists believe that the widespread adoption of crypto will be unexpected and sudden; without clear regulation it could create financial stability risks.

However, managing financial stability is not straightforward when it comes to cryptocurrencies. Cryptocurrency lacks the ability for a central authority to use adjustable monetary policy, like central banks use for fiat currencies to maintain price stability and serve as a lender of last resort. Crypto-asset markets are fast evolving and could represent a threat to global financial stability due to their scale, structural vulnerabilities and interconnectedness with traditional financial systems.<sup>43</sup>

If the current trajectory of growth in scale and interconnectedness of crypto-assets to these institutions were to continue, this could have implications for global financial stability.<sup>44</sup> The International Monetary Fund (IMF) highlights

that there is little consensus among economists on whether currency competition improves or deteriorates financial stability. Currency competition or denomination or dollarization risks are familiar concerns, especially in emerging markets. In principle, these risks always exist and sharp exchange-rate depreciations are a prominent sign. Still, aggressive business models (e.g. providers seeking a dominant market position by providing services at a loss) could drive additional risk to an ecosystem.<sup>45</sup> Institutional investor interest could create financial instability if investors need to sell other assets to meet margin calls on crypto-asset positions.<sup>46</sup>

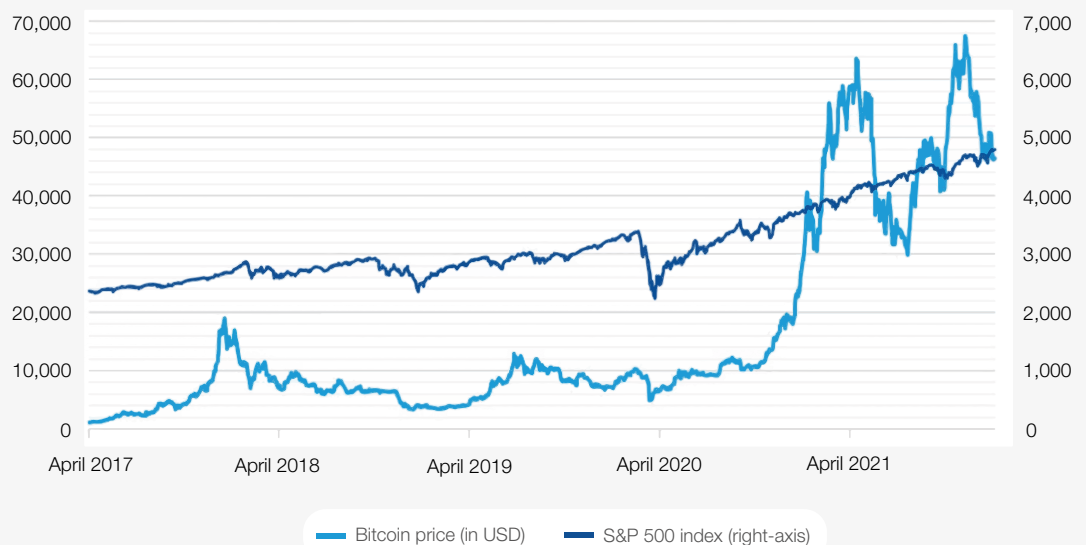
The evidence suggests that any abrupt decrease in crypto-asset value might result in a loss of investor confidence, which could amplify other broad market corrections.<sup>47</sup> Spillover effects were a new cause for concern when bitcoin began trading in correlation with the S&P 500 during the COVID-19 pandemic.

FIGURE 5 Bitcoin's price correlation with the S&P 500 index

## Stronger correlation

Bitcoin and US stocks have moved together more closely during the pandemic

Bitcoin price and S&P 500 index



The apparent relationship between bitcoin prices and the US stock market could be cause for focus on cryptocurrency regulation.

Source: IMF<sup>48</sup>

It is also worth noting that immature market infrastructure presents a risk and that its interdependent nature can cause system-wide issues. There have been recent examples of systems going down; some surmise that these may have been caused when calling in loans on one platform caused a rush in selling on another to

source cash. To date, there are not mature market level controls as there are in core capital markets; and even these can still fail, as exemplified in 2021 when traders on Reddit engaged in a buying frenzy of GameStop stock and Robinhood decided to freeze trades.<sup>49</sup>

In June 2022, bitcoin dipped below \$21,000 after hitting an all-time high of almost \$69,000 just the previous November. Coinbase, Gemini and Crypto.com announced large-scale lay-offs. The rapid decline in the crypto market has mirrored the sell-off in traditional asset markets triggered by rising

inflation and a sharp tightening of monetary policy by global central banks.<sup>50</sup> This has proven how strongly correlated bitcoin is with the markets and that it is not at all a hedge against inflation, as some had previously predicted or, perhaps, hoped.

## Access to the financial system

**Financial deepening effect:** Cryptocurrencies may extend financial reach by relying on more effective distribution models that could advance financial deepening and inclusion.

### Emerging markets and developing economies (EMDEs)

The significant volatility of cryptocurrencies such as bitcoin and Ether diminishes their ability to challenge reserve currencies from a payments perspective. However, crypto adoption in some emerging market and developing economies (EMDE) has outpaced that in advanced economies as a result of unsound local macroeconomic policies or inefficient payment systems.<sup>51</sup> Weak central bank credibility and vulnerable banking systems can trigger asset

substitution as domestic residents seek a safer store of value.<sup>52</sup> Inefficiencies in cross-border remittances driven by a lack of payment system interoperability push people to faster and cheaper crypto-asset payment services, with the caveat that this depends on access to the internet and other technologies.<sup>53</sup>

**Capital flow management measures**, commonly found in EMDEs to reduce volatile exchange rates and inflation, could be more easily circumvented in countries where cryptocurrency achieves widespread adoption. A lack of international standards on cryptocurrencies alongside new exchange platforms not bound to capital control measures could prevent monetary authorities and central banks from enforcing these arrangements.<sup>54</sup>

## Illegal activity

Risky transactions include gambling, dark markets, ransomware (98% of which is conducted with cryptocurrency),<sup>55</sup> malware, criminal actors, dark vendors and high-risk exchanges.<sup>56</sup> CipherTrace analysts found that risk for nefarious transactions is high with cryptocurrencies, but it affects only 0.1–0.2% of transactions. Just 1.2% of bitcoin transactions in December 2020 were between a virtual asset service provider (VASP) and a risky entity. According to Chainalysis, crypto-based crime doubled from 2020 to 2021. However, this represented just 0.15% of total crypto-asset transaction volume, which grew to \$15.8 trillion in 2021, up 567% from 2020's totals.<sup>57</sup> All that said, the United Nations Office on Drugs and Crime estimates global fiat money laundering to be between \$800 billion and \$2 trillion (2–5% of global GDP), meaning crypto-based crime is also relatively small at the global level.

Depending on the wallet structure, concerns about illicit activity could be amplified if self-hosted wallets – importantly different from omnibus accounts such as Coinbase or other crypto-asset

exchanges – emerge as the most widely adopted ways of maintaining custody of an individual's assets. Nevertheless, with a VASP issuing a custody-based wallet, the provider could censor or steal money from the consumer. In countries where cryptocurrencies are not regulated, the government's ability to investigate cases of crypto-related financial crimes is limited. However, there is one new Securities and Exchange Commission (SEC) requirement in the United States, SAB 121 – a newly required disclosure for public companies that hold crypto-assets for third parties.<sup>58</sup>

In the absence of mandatory crypto-asset disclosure, it is difficult for governments to determine the identity of users engaging in crypto-asset activity.<sup>59</sup> Currently, private companies have built databases of discovered identities and these companies work with governments when tracing is needed. Many people still assert that crypto is good for criminals, but there is [growing evidence](#) that crypto's traceable ledgers make it undesirable for illicit activity.<sup>60</sup>

## Innovation

Innovation would continue to accelerate at a rapid pace if countries were to let present trends continue. However, businesses would be taking on the risk that future regulation might stop them in their tracks. Companies prefer to incorporate

in countries that already have some degree of regulatory certainty to secure the longevity of their business. In addition, in the absence of regulation, there are no checks to ensure responsible roll-out of cryptocurrencies (and stablecoins).<sup>61</sup>

## Ban the use of cryptocurrency (on a country-by-country basis)

One possible direction that can and has been taken already by some countries is to restrict or “ban” the use of cryptocurrencies. Mechanisms for banning crypto are nuanced and could include any permutation of the following examples:

- Ban crypto for payments but still allow citizens to hold it (or decide that only “qualified investors” can hold it)
- Ban crypto mining

### Monetary and financial stability

Banning cryptocurrency is one regulatory path that could favour a central bank’s maintenance of monetary sovereignty. Cryptocurrencies differ from traditional fiat money controlled by a monetary sovereign, which is able to:<sup>62</sup>

- Manage and control financial stability in a country through financial regulation<sup>63</sup>
- Adjust money supply to provide adjustable monetary policy

### Protection against illegal activity

Another common reason cited by countries choosing to “ban” cryptocurrency is the effort to curtail the darknet economy. Crypto is used in illegal drug trade, hacks, thefts, illegal pornography and murder-for-hire. It has the potential to fund terrorism, launder money and avoid capital controls.

It is difficult to determine whether such activities would otherwise still have occurred on the street or if cryptocurrency has made illegal goods more accessible and less risky due to pseudonymity. Crypto has an advantage over cash in terms of moving large amounts of value across borders as it circumvents the need to shift large physical cases of cash through customs. However, criminal activity challenges relating to crypto remain in the on-and-off ramp process. As long as on-ramps and off-ramps are managed using know-your-customer (KYC)/anti-money-laundering (AML) measures, most transactions made using cryptocurrency would be traceable.

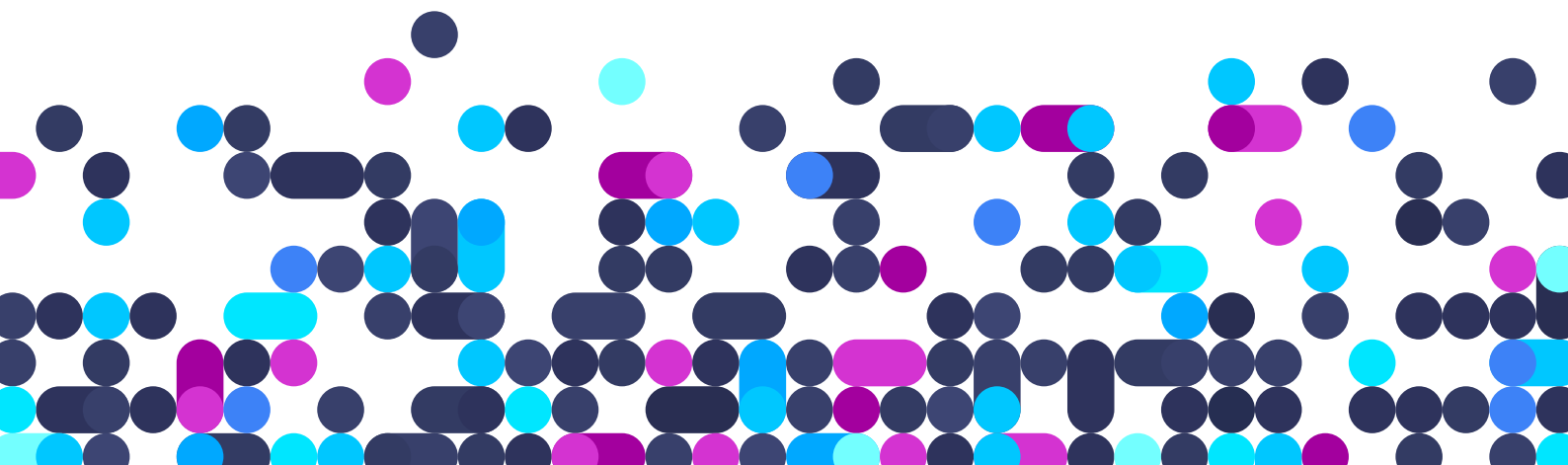
- Limit or ban targeted activities for regulated financial entities such as banks (e.g. no crypto on balance sheet, but allow customers to transfer funds to crypto platforms, etc.)
- Make initial coin offerings (ICOs) illegal
- Ban crypto exchanges from operating
- Ban commercial banks from providing crypto services

- Access a lender of last resort function<sup>64</sup>
- Maintain a common domestic unit of account<sup>65</sup>

The state cannot currently exercise the above controls for cryptocurrency and, therefore, may threaten a state’s sovereignty over its currency.

Of course, any ban has the possibility of driving activity “underground”. There are several ways to access crypto regardless of a government ban, including holding crypto through a cold-storage/ offline wallet (though you can only hold and not transfer money this way) and using a VPN system to log on to a foreign crypto exchange.

Some economists believe that countries which ban crypto are essentially putting up a “firewall” to it, similar to the way in which countries put a firewall on the internet. Governments can make the use of cryptocurrency illegal, but they can never block people from accessing the bitcoin network and transacting on it unless they shut down the entire internet. Even then, it is possible to use satellite internet, which is what miners started doing after internet outages in Kazakhstan, for example. What governments can do is make it difficult to access the on-ramps and off-ramps that allow crypto to be exchanged for fiat currency.



## Let cryptocurrency play a regulated role within the economy

The key focus areas for impact studies and regulation would be the points within payment and banking processes where fiat systems serve as a bridge to crypto.<sup>66</sup> For example, regulation could:<sup>67</sup>

- Require cryptocurrency exchanges to implement the [Travel Rule](#), meaning that providers of virtual assets must collect and share customer data for transactions over a certain threshold
- Require cryptocurrency exchanges to identify their corporate counterparts

- Conduct transaction monitoring over a certain threshold, on crypto exchanges
- Implement sanctions compliance controls for crypto exchanges in accordance with the US Treasury Office of Foreign Assets Control (OFAC)

Below are the possible macroeconomic outcomes of letting crypto play a regulated role within the economy.

### Access to the financial system

According to [PolicyLink's Equity Manifesto](#), equity is the “just and fair inclusion into a society in which all can participate, prosper, and reach their full potential”.<sup>68</sup> Equity is important in the assessment of the macroeconomic impacts of cryptocurrency because it has been shown to boost economic growth. It is therefore macrocritical to analyse whether cryptocurrencies enhance equity within the financial system.<sup>69</sup>

What is different about cryptocurrency compared to other risk assets is the fact that cryptocurrency assets are widely held among the general public and are particularly volatile. Therefore, any regulation will likely be geared towards protecting the retail consumer.

According to Janell Ross, writing in *Time* in October 2021, “At the Black Blockchain Summit, there is almost no conversation about making money that does not carry with it the possibility of liberation.”<sup>70</sup> Surveys indicate that people of color are investing in cryptocurrency in ways that outpace or equal other groups. About 44% of those who own crypto are people of color, according to a June survey by the University of Chicago's National Opinion Research Center. A Harris Poll reported that while 16% of US adults overall own cryptocurrency, 18% of Black Americans have gotten in on it. For Latino Americans, the figure is 20%.<sup>71</sup>

According to one interview conducted for this white paper, a civil society chief executive echoed that it is difficult for people of colour to access mainstream banks. It is attractive for people of colour to operate “off the grid” and outside of the current system, a system that has oppressed them. In other words, crypto may be attractive to the very people widely regarded to have been exploited by the establishment. Some people of colour have commented that their

digital selves encounter less discrimination when it comes to asset ownership. In the digital world, people of colour can operate on an even playing field.<sup>72</sup>

Ross continues, “The Internet was supposed to democratize all sorts of things. In many cases, it defaulted to old patterns. (As Black crypto policy expert Cleve Mesidor put it, ‘The Internet was supposed to be decentralized, and today it’s owned by four white men.’) But with the right people involved from the start of the next wave of change – crypto – the possibilities are endless. ... ‘Being in the Black community and seeing banks’ actions, with redlining and other things, it just appealed to me,’ [says Isaiiah Jackson, author of *Bitcoin & Black America* and co-presenter of internet show *The Gentlemen of Crypto*]. ‘You free the money; you free everything else.’”<sup>73</sup>

However, economists and policy-makers still express concern that the very people who are excluded from our current financial systems are also at the highest risk of losing all of their life savings in crypto investments. Holders of cryptocurrency have no protection from the possibility of losing their invested money, in the same way that this is possible with participation in the lottery and other betting-type activities. It is possible that small investment for potential substantial returns is the lure of cryptocurrency. Misleading advertisements, especially on social media and by influencers promising fast and/or high returns, have become a risk for consumers. Black Americans’ higher exposure to cryptocurrencies has left them more [vulnerable to the recent financial downturn](#), even as their households on average hold less wealth.

One civil society chief executive officer noted in an interview for this white paper:



**Consumer protection brings up mixed emotions for people of color. The intent is to protect people from exploitation. However, those instincts are paternalistic. Instead, we should be asking: how do people of color get the benefits of decentralization?**

Anonymous, civil society chief executive officer, US



The Central Bank of Nigeria issued a blunt warning to consumers in 2017 that it reiterated in early 2021:



**The [Central Bank of Nigeria] CBN has no comfort in cryptocurrencies at this time and will continue to do all within its regulatory powers to educate Nigerians to desist from its use and protect our financial system from activities of fraudsters and speculators.<sup>74</sup>**

Osita Nwanisobi, Assistant Director, Corporate Communications, Central Bank of Nigeria (CBN)

## Illegal activity

Letting cryptocurrency play a regulated role in the economy has the potential to combat illicit activity, depending on the design and effectiveness of the regulation. The FATF and the Financial Crimes Enforcement Network (FinCEN) have addressed some risks and vulnerabilities already,

but 50% of countries are behind on meeting AML and combating the financing of terrorism (CFT) requirements for virtual asset service providers. While any country can make regulations, their effectiveness depends on implementation and the success of enforcement.

## Innovation

**The innovation effect** of novel payment instruments may produce wider spillovers in terms of innovation in the economy.

**Efficiency gains:** Cryptocurrencies (and stablecoins) may, in certain use cases, offer more efficient means of conducting payments that reduce transaction costs and enable new business models.



**Good crazy is when there's tech work and research and development and public goods coming out of the other end ... And we have to be intentional, and make sure more of the right things happen.<sup>75</sup>**

Vitalik Buterin, Co-Founder of Ethereum, USA

## User optionality to use cryptocurrency creates competition and encourages innovation

Cryptocurrencies allow users to interact with distributed ledger-enabled ecosystems and offer the possibility of conducting financial operations outside of conventional payment systems. Banks such as JPMorgan have responded by offering tokenized deposits, providing an example of a response to innovation by incumbents.

Regulatory certainty will help drive more innovation and companies into the fold and will be especially good for countries looking to attract investment and talent. Regulatory certainty is likely to limit and alleviate the downsides associated with currency substitution as policy-makers can pre-empt currency substitution and large capital outflows with regulation.

### Innovation and future economies

Innovation in the crypto space is happening at a fast pace, creating a multiplier effect of new concepts such as NFTs (non-fungible tokens) and the metaverse. Cryptocurrency will be the means of transaction for the DeFi, decentralized autonomous organizations (DAOs) and NFT economy as well as the metaverse, in which cryptocurrencies are already being used to purchase metaverse real

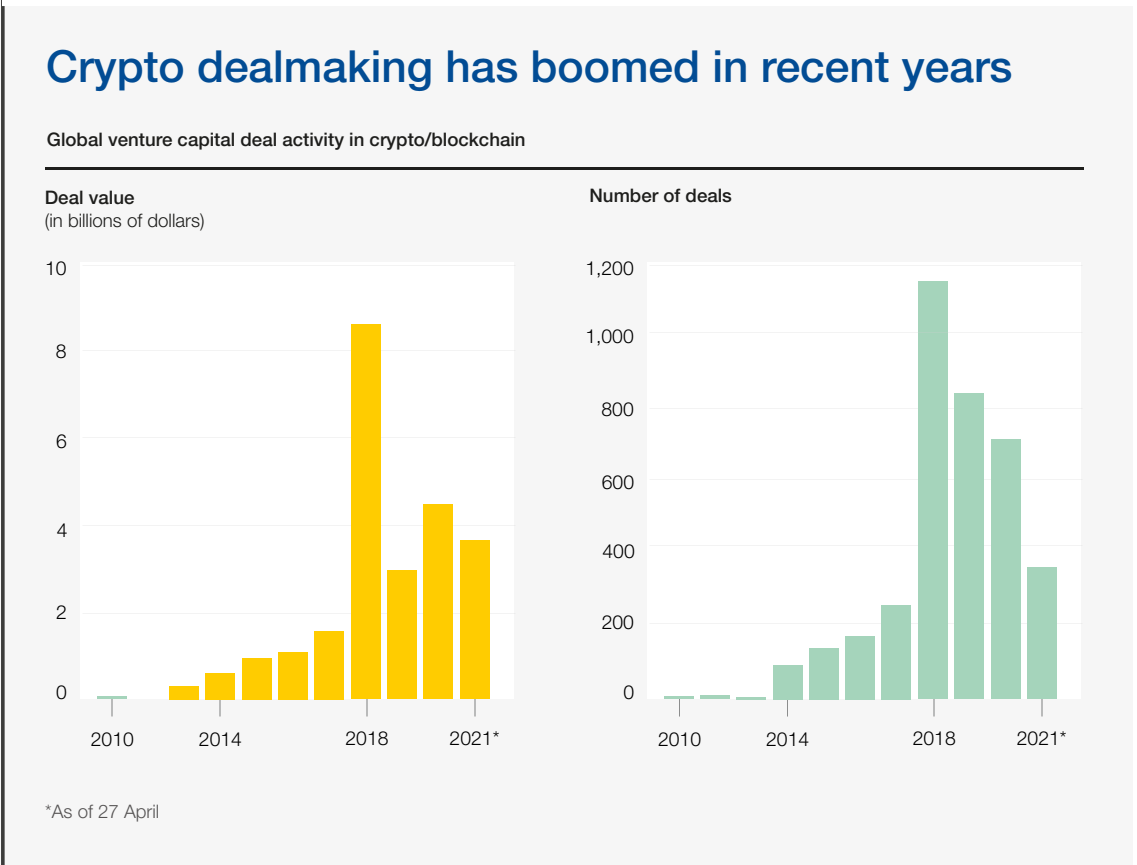
estate and experiences. This wave of innovation is kick-starting new projects that are attracting talent and significant investment, spurring job creation and the setting up of new companies centred around a digital economy.

NFTs have rapidly become one of the most popular tokens or assets within the Ethereum ecosystem.<sup>76</sup> In early 2022, the NFT trading platform OpenSea hit a record \$5 billion in monthly sales and, while sales have stagnated,<sup>77</sup> interest in these assets remains high.<sup>78</sup> Other use cases for tokenized assets include the ability to create currencies, apps and virtual economies that are resistant to censorship and top-down control.<sup>79</sup>

The projected global macroeconomic value of the metaverse varies from \$1 trillion within three years to \$20 trillion within a decade. The metaverse could become an important economic and financial environment. If citizens gain cryptocurrency in the metaverse, it could lead to net wealth creation; if the proceeds were to be carried outside the metaverse and were substantial, this could have an aggregate demand effect that results in economic growth.

The figure below illustrates the booming economic activity in the cryptocurrency space over the past decade:

FIGURE 6 The rising crypto economy



Source: Financial Times

## Macrocritical environmental sustainability

Concerns for the world’s climate now have a direct impact on macroeconomics and, in this sense, climate has become the new monetary policy. The environment is a critical lens through which to examine the macroeconomic impact of cryptocurrency. While there are many distributed ledger platforms that consume no more electricity than databases that are currently used broadly, the consensus mechanism used by Bitcoin and Ethereum, known as Proof of Work (PoW), is energy-intensive by design. PoW is used to validate transactions and mine new tokens. PoW mining is a competitive process that requires miners to spend computing power and electricity in order to win and receive the block reward of 6.25 BTC, for example. The more miners who participate, the harder it becomes to guess the right answer, thus the more electricity it would require to compromise the network. Therefore, though non-winners are not rewarded, their electricity consumption contributes to network security.

Conversely, while cryptocurrency alone cannot tackle climate change, it could be argued that the crypto industry has the potential to provide market incentives for renewable energy power generation and grid decarbonization. There are opportunities for regenerative finance (referred to within the crypto industry as ReFi) and carbon-negative blockchains, in which cryptocurrencies could assist climate objectives.<sup>80</sup>

The Ethereum Foundation research team is also working on technical updates to convert Ethereum from Proof of Work (PoW) to Proof of Stake (PoS), which it is said will reduce Ethereum’s energy use by more than 99%.<sup>81</sup> Several crypto-assets are exploring a shift away from PoW to PoS, given the promise of energy reduction. That said, there are trade-offs, such as a move away from decentralization and the technical difficulty of engineering a migration. There are other risks with PoS, which illustrates that a conversion to PoS may not be a perfect solution.



**There is an evolution that is taking place: we started with an energy-intensive solution, Bitcoin and its PoW, which is akin to a steam locomotive, and now we are moving toward a potentially more efficient system, which is PoS, akin to a levitating train.**

Luc Froehlich, Global Head of Digital Assets, Fidelity International, Hong Kong

The European Union's (EU) proposed Markets in Crypto-Assets (MiCA) regulation suggested banning PoW in the interests of promoting sustainability, but this regulation did not pass in early 2022.

The following questions are important for future regulatory design:

- Could consensus be based on renewable energy?
- Would the mix of the energy used matter, as not all energy sources result in the same carbon emitted?
- What circular economies could arise?
- Could the heat generated from mining be used to grow algae for pharmaceuticals, etc.?
- Would a ban on mining activity within one jurisdiction have any impact on sustainability if larger jurisdictions continue to allow mining activity to operate with no restrictions?
- Could the crypto mining industry help achieve energy independence and in effect incentivize the development of more renewable development projects in locations that were previously deemed uneconomical?



## Make cryptocurrency legal tender

The adoption of a foreign currency as legal tender is not uncommon. Adopting cryptocurrency as legal tender might be controversial: while the macroeconomic effects of adopting foreign currencies are well known, it is not clear whether the adoption of cryptocurrency would produce a different effect. It is also important to note that “legal tender” is neither a sufficient nor necessary condition for widespread adoption of a payment instrument.

El Salvador, and recently the Central African Republic,<sup>82</sup> has taken the step of declaring bitcoin

a fiat currency, enabled by the Chivo Wallet (slang for “cool”). In the case of El Salvador, the key stated objectives for this decision were:

- To move away from dollarization, which linked them to the welfare of the US economy, and its monetary policy
- To promote increased financial inclusion
- To decrease the costs of remittances



### Monetary stability

One economist believes that the sovereign bond created in bitcoin is precarious because of the dual possibility of bitcoin volatility risk and the risks of the yields of this bond. There is a mismatch when

lending is in a foreign currency and revenue is in the domestic currency. If there is a swing in the domestic currency, it could drive debt much higher. This is referred to as “original sin” in Latin America.

### Stability of the financial system

Because El Salvador is dollarized, and FX conversion is a major element of remittance costs, El Salvador has the lowest remittance cost in Latin America. The United Nations Sustainable Development Goal (SDG) objective for remittances is less than 3%. In the fourth quarter of 2021 the figures were as follows:

- US to El Salvador – 3.69% remittance cost for sending \$200

- Latin America and Caribbean – 5.60% for sending \$200
- Global average – 6.04% for sending \$200

El Salvador already has a low remittance cost and is close to the SDG objective. One economist interviewed for this white paper commented that it is a myth to say remittances could get very much lower by switching from the dollar to using cryptocurrency.

### Access to the financial system

Financial inclusion is defined as providing access to and use of quality affordable products and services that lead to financial well-being.

Local businesses look at the volatility of currencies when deciding which currency to use. The volatility of the dollar is low, while bitcoin has huge volatility. Therefore, it is likely that El Salvadorian citizens will continue to prefer to keep their resources in dollars. It might be possible to include more people with other instruments such as digital wallets with fiat money and innovate more in fintech. Financial literacy education programmes must also be in place.

Local adoption is difficult to achieve, with huge swings in income and expenditure with bitcoin. Lastly, citizens will adopt and pay taxes in whichever currency is cheaper for them.

According to a national face-to-face survey conducted by the El Salvador National Bureau of Economic Research, for a large fraction of people downloading Chivo Wallet, usage of bitcoin for everyday transactions was low and was concentrated among the banked, educated, young and male population.<sup>84</sup>

## Protection against illegal activity

The Chivo application has been vulnerable to identity theft, and bitcoin has been volatile. Vendors do pay fees to accept bitcoin, and there is a conversion fee to off-ramp to the US dollar. According to some macroeconomists interviewed for this white paper, bitcoin started on Bitcoin Beach, a bitcoin-based system operating on the coast of El Salvador, and then was suspected by some to have been adopted as national legal tender to enable the drug trade, as part of the country's underground economy.<sup>85</sup> Macroeconomists also

argue that El Salvador is trying to solve several worthy problems relating to remittance costs, financial inclusion and economic instability – with the wrong solution. Further, El Salvador's choices may be misguided other countries in Latin America; Ricardo Salinas Pliego, Mexican billionaire businessman and founder of Grupo Salinas, took to Twitter to recommend that the public buy BTC and “forget about selling”. He advised people to buy BTC in late 2021, calling fiat money such as dollars and euros “fake money made of paper lies”.<sup>86</sup>

## Innovation

El Salvador's Bitcoin technology operates on the second layer of the Lightning network, an innovative transaction mechanism operating on top of bitcoin's main blockchain, which makes the transaction speed much faster because all transactions do not have to be approved by all nodes within a blockchain.

In El Salvador, bitcoin is enabled through the Chivo Wallet. Citizens were given \$30 for opening a wallet without the need for banks, offering them an alternative to the dollar and additional freedom of

choice. There are no remittance fees to send bitcoin to El Salvador using the Chivo app. Consumers can also pay their taxes using bitcoin.

El Salvador's adoption of bitcoin as legal tender has boosted tourism and attracted celebrities and billionaires to the countries for holidays and business. The president has even built a state-of-the-art Chivo pet hospital with bitcoin gains. Since people in Latin America do not have access to the US stock market, this has been another way for a few El Salvadorians to make financial gains.



5

# Fiat-backed stablecoins: macroeconomic impacts

## General macroeconomic impacts of stablecoins

Stablecoins have different macroeconomic implications, depending on the type of backing. For instance, while backing with bank deposits would only transform one type of money into another, backing with securities could lead to “money creation” in the sense that a security has been transformed into a medium of exchange in addition to its nature as a store of value. This white paper focuses on fiat-backed stablecoins, though other types may be mentioned.

## Macroeconomic implications of fiat-backed stablecoins by regulation chosen

Some macroeconomic impacts will depend on which regulatory path is chosen. The following section lays out the spectrum of high-level

regulations that countries may choose. Following that is a projection of the macroeconomic impact of those regulatory choices. It is critical to note that these paths fall along a continuum rather than within stringent categories. There are many permutations of a “ban on stablecoins” and, similarly, “regulation” could take the form of simple guidelines or strict rules and requirements. It is noted that supportive regulation will promote higher adoption of stablecoins.

The table below illustrates the spectrum of regulatory options that nations may choose by high-level category. Many countries have already taken steps to select one of these options, and some governments have also changed course.

TABLE 5 The spectrum of regulatory possibilities for fiat-backed stablecoins<sup>87</sup>

	Scenario 1	Scenario 2	Scenario 3
Regulatory option	Let present trends continue	Allow stablecoins to play a regulated role in the economy	Tax or ban private stablecoins out of existence

## Economic outcomes of various stablecoin regulation alternatives

### Scenario 1

#### Let present trends continue

Allowing present trends to continue in relation to stablecoins means taking the time to perform due diligence to inform later decisions and get it right versus jumping quickly towards regulation. The risk with this approach is that negative events happen in the meantime.

According to some economists, letting present trends continue would be the most unfavourable option economically due to its lack of alignment with the following criteria:

## Monetary stability

**Exchange rate effects:** A significant substitution of national currencies for stablecoins would be akin to the risks of dollarization only if the stablecoin is denominated in a currency other than the national currency. If the stablecoins are denominated in the local national currency, this means the stablecoins are merely substituting the national currency for a new claim denominated in the national currency. This should have no economic effect; the stablecoins would represent a mere substitution of monetary liabilities, in a similar way to bank deposits and money market funds.

**Liquidity effects:** Large-scale conversions into stablecoins could have expansionary monetary effects if the proceeds of the stablecoins are kept in the domestic financial system.

### Monetary policy levers

The economic effects of local and global stablecoins would be quite different. Local stablecoins denominated in the national currency

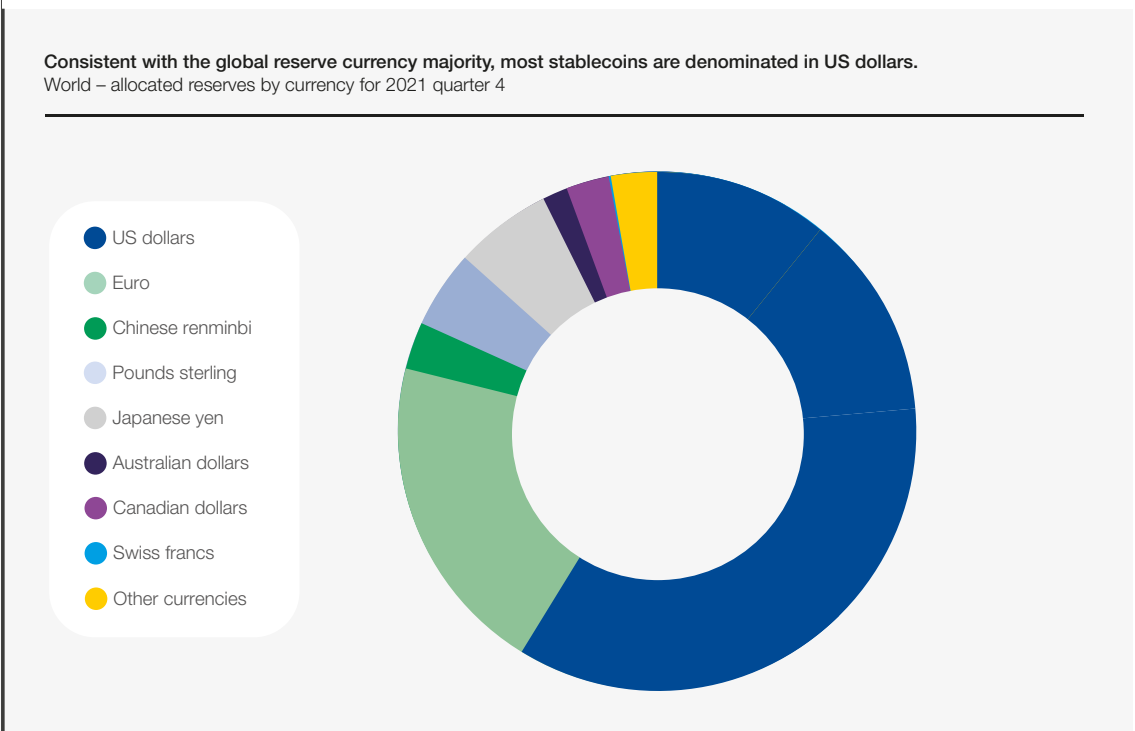
should be as sensitive to monetary policy impulses as other similar schemes. Global stablecoins, presumably denominated in a unit other than the national currency, could give rise to dollarization effects, as stated above.

Global fiat-backed stablecoins used as a store of value could weaken monetary policy on domestic interest rates, particularly in countries whose currencies are not part of their reserves.<sup>88</sup> The digitization of money may lead to monetary authorities adapting the use of fiscal and macroprudential policies to better respond to shocks when their monetary policy is impaired.<sup>89</sup>

### Capital control management

Digital currencies pose new challenges to regulators looking to enforce capital controls and other macroprudential policies (e.g. sending money overseas). While these incidents are not yet widespread, it is possible that a widely adopted stablecoin could enable disruptive flows in the future.<sup>90</sup>

FIGURE 7 Dollarization risks in emerging markets and developing economies (EMDEs)



Source: IMF<sup>91</sup>

### Reserve currency configurations

The dollar could become more dominant if it were available digitally to a wider user base, but the dollar could also lose its footing to other reserve currencies that offer advantages in terms of cost, trust, ease of use and existing user base. Digitization of money may accelerate changes to the configuration of reserve currencies, especially in areas where geopolitical forces are stronger and payment arrangements are more binding.<sup>92</sup>

### Macroeconomic impacts on EMDEs

Stablecoins denominated in dollars would allow people to save money in dollar-based currencies. In EMDEs, this creates a risk of dollarization, meaning that US monetary policy could dominate the economy of an EMDE. Dollarization via a stablecoin is linked to currency substitution; countries that engage in currency substitution are beholden to the governing entity of a nation that is not their own, thereby exposing them to misaligned monetary policy. EMDEs will likely not have a say

in the governance and reserve asset management of stablecoins, which could resemble existing challenges when supervisory groups act as crisis managers in EMDEs.<sup>93</sup> Stablecoins import the monetary policies of their underlying assets, which could be disadvantageous for EMDEs.<sup>94</sup>

Widespread currency substitution would undermine monetary policy independence and lending of last resort. Countries where currency substitution takes place will suffer from ineffective monetary policy control, more volatile inflation and a disproportionate impact on vulnerable households.

## Stability of the financial system

Macroeconomist Ganesh Viswanath-Natraj of Warwick Business School has distilled the four key risks of stablecoins:

- Custodial risk: centralized issuer absconding with funds. Issuer reputational risk is also inherent in custodial risk
- Run risk: redemptions exceed liquid cash reserves
- Systemic risk: stablecoins used in crypto derivatives increase risk exposures of financial intermediaries
- Payments risk: stablecoin devaluations can trigger insolvency of firms and consumers with savings/payments<sup>96</sup>

### Factors that could undermine stability of the stablecoin itself<sup>97</sup>

- Reserve assets falling in price or becoming illiquid
- Failure to safeguard reserve assets
- Lack of clarity regarding redemption rights
- Operational risk related to cybersecurity and data safeguards

### How stablecoins compare to currently used instruments

Stablecoins have similarities to concepts in the current financial system. Traditional investments are not transactable, whereas stablecoins are transactable (while the reserve remains unchanged). It can be argued that stablecoins are a commitment similar to a fixed exchange rate regime and are managed in a similar way to a money market fund. Fiat-backed stablecoins represent a claim to convert the stablecoin at par and on demand into the underlying national currency. Stablecoins should not see their value drop below par but, as in a money market fund, they may do so amid a severe impairment of the reserve assets. The main

However, dollarization is a problem that precedes stablecoins. Local currency-denominated stablecoins would not give rise to dollarization issues. And foreign currency-denominated stablecoins might make it easier to hold foreign currencies.

From a macroeconomic standpoint, according to Erik Feyen et al. in an article titled “What Does Digital Money Mean for Emerging Economies”, “weak growth, large fluctuations in the value of the domestic currency, or high inflation (volatility) may make private alternatives more attractive to users”.<sup>95</sup> Stablecoins are potentially easier to acquire and far easier to store, and thus introduce new risks.

difference is that a unit in a money market fund is normally a proportional share in the fund's assets. Stablecoins are mere promises to convertibility.

The only difference between a stablecoin and a money market fund is that if the proceeds of stablecoins were to be invested in the domestic financial system, this could have an expansionary monetary effect. The difference with a money market fund is that the money market fund unit or share is normally not used as a payment instrument, though it could be used as collateral.

The credit risk of money market funds should be the weighted average of its components/instruments. In contrast, the credit risk of a stablecoin is likely to be associated more with the entity issuing it (if consumers have limited visibility of the exact instruments making up the reserve). In this sense, the stablecoin also has a reputational value based on the public perception of the issuing company and potentially also the public perception of the company's CEO. Therefore, there is a risk that the value of the stablecoin could drop below par if, for example, the stablecoin company's CEO were to be involved in a public scandal of sorts.

### Runs

For fiat-backed stablecoins, reserves are typically made up of a portfolio of securities that have some duration (from a day to a few weeks or month), while the stablecoin they back can be settled immediately. For instance, in the unlikely case that all users of stablecoin were to redeem it for fiat, the central issuer of that stablecoin would be unable to sell all of the reserve portfolio holdings instantly. Additionally, it is most likely that the strongest credit-rated instrument would be liquidated first, which would deteriorate the credit quality of the reserves.

Without a guaranteed fixed value, runs could occur if the reserve asset price decreases and the redemption price of the stablecoin is expected to drop. With a fixed value, a run could occur if consumers perceive that an issuer is incapable of absorbing losses. A source of concentrated risk stems from a relatively small number of crypto-asset



trading platforms accounting for most crypto-assets traded. Sudden asset liquidation could generate contagion effects, especially in the case of global stablecoins.<sup>98</sup> Reserves for stablecoins are liquid assets, so the existence of stablecoins could create demand for these assets. If demand becomes very high, it could further drive up demand for these assets.

Klaas Knot, the Dutch central bank governor who became chair of the Basel-based FSB in December, said it was impossible to predict the “destabilizing effect across the financial sector” of a run on even a single crypto-asset such as a stablecoin — a type of crypto-asset whose value is pegged to a fixed currency or basket of currencies. But he said the likelihood of contagion to other parts of the financial markets had “of course increased” in line with the sharp rise in the size of the crypto market.<sup>99</sup>

#### **Spillover effects/market contagion**

Stablecoin failure could constrain liquidity in the broader crypto-asset ecosystem and spill over to short-term funding markets if stablecoin reserve holdings were liquidated in a disorderly fashion.<sup>100</sup> The trading volume of stablecoins has outpaced all other crypto-assets, and the failure of certain stablecoins could affect the crypto-asset ecosystem itself along with other aspects of the financial system.<sup>101</sup>

Were stablecoins to reach an operational scale that challenged existing payment methods, fragilities in stablecoin arrangements and their various links to the financial system could lead to stability risks. Stablecoins are vulnerable to runs if stablecoin sponsors are perceived as lacking sufficient loss-absorbing capacity, which could have adverse contagion effects on the financial system.<sup>102</sup> The growth of non-bank payment services could cause a shift from money in commercial banks to non-banks and introduce risk and instability into the financial system (i.e. non-bank providers lack equivalent protections that come with commercial bank money).<sup>103</sup>

Non-bank financial intermediaries’ (NBFIs) growth has outpaced banking growth in the euro area over the past decade and accounts for half of global financial assets. While regulatory reforms in the past decade have led to stability, they have been accompanied by an expansion of actors outside the regulatory perimeter.

#### **Speculation and shorting**

By establishing a fixed peg to an official currency, the stablecoin invites attacks by speculators shorting the currency, driving the price down, below par value, and then converting to the higher-valued fiat currency.<sup>104</sup>

Without regulation, stablecoin issuers have an incentive to drive profits via investments in risky assets or lend them out to achieve higher returns.<sup>105</sup> That said, stablecoin issuers are also highly incentivized to make sure the stablecoin they issue is in fact stable. Many stablecoin providers prefer to use on-chain assets in their reserves for reasons including transparency and efficiency. Once high-quality liquid assets (HQLA) such as US treasuries become available on chain, stablecoin issuers will be able to use those as reserves, which will be less risky than the reserves that are currently available on chain. Assets are considered to be HQLA if they can be easily and immediately converted into cash at little or no loss of value.<sup>106</sup>

#### **Death spirals**

Death spirals are likely to occur when the value of a stablecoin’s reserve is tied to the future success of the stablecoin (e.g. investment tokens are part of the reserve asset).<sup>107</sup> In May 2022, the Terra Network algorithmic stablecoin, terraUSD (UST), lost nearly \$18 billion in market value in less than five days as a result of UST being depegged from the US dollar on 8 May.<sup>108</sup> Amid market fears, investors raced to withdraw \$5 billion in the stablecoin’s reserves, which included assets such as UST, bitcoin and Luna, Terra’s native investment token. CoinDesk has broken down the timeline of events in an [article](#).<sup>109</sup>

The ensuing effect was a 80%+ market-value decline in DeFi protocols associated with the Terra Network in addition to a negative effect on Tether’s USDT stablecoin, which is backed by cash and cash equivalents.<sup>110</sup> USDT, the most popular DeFi stablecoin with \$67 billion in market value at the time of writing, briefly lost its 1:1 US dollar peg amid UST’s crisis, sinking to a low of \$0.951, likely influenced by investors redeeming their funds at a sharp rate.<sup>111</sup> If one assumes that the stablecoin will again reach 1:1, this kind of dip in price also creates an arbitrage opportunity, in which USDT could be purchased at \$0.95 and sold when the peg stabilizes at 1:1. The interconnectedness in the stablecoin ecosystem is noteworthy for regulators, as pointed out by the United States’ top banking regulator, Michael Hsu of the US Office of the Comptroller of the Currency.



**I think what’s really interesting, TerraUSD was an algorithmic stablecoin ... Tether is not. [Tether] is backed by assets. And yet, we still had some contagion from one to the other. Why? The way to deal with it is prudential regulation.<sup>112</sup>**

Michael J. Hsu, Acting Comptroller of the Currency, US Office of the Comptroller of the Currency (OCC)

There is now a question as to whether these kinds of algorithmically backed stablecoins should be called stablecoins at all. Though fiat-backed stablecoins should not, in theory, experience this same crisis, an initial shock to expectations can quickly result in a first wave of redemptions, and place stress on the reserve. If it is perceived that

there is a growing risk of a death spiral, the fear this causes in the market could inadvertently make it happen. Protocols that are highly exposed to a death spiral will therefore inevitably experience one, especially in a regulatory environment without safeguards against risk.

## Access to the financial system

**Financial deepening effect:** Cryptos and stablecoins may extend financial reach by relying on more effective distribution models that may advance financial deepening and inclusion.

Unlike cryptocurrencies such as bitcoin, fiat-backed stablecoins are currently and more frequently used as a means of transaction in addition to a store of value. Fiat-backed stablecoins present cheaper alternatives for cross-border transactions and would be desirable wherever remittances are high.<sup>113</sup>



## Allow private fiat-backed stablecoins to play a regulated role in the economy

### Monetary stability

#### Modelling regulation on existing frameworks

Examples of regulation could be like the Eurosystem tools.<sup>114</sup> The Eurosystem may expand the current oversight framework for payment instruments and schemes to include stablecoins. Banks could be required to put in place additional risk-management frameworks to account for any involvement with stablecoin arrangements. Stablecoins may improve current payment rails through competition and drive more innovation naturally.

#### Require fiat-backed stablecoins to be issued through FDIC-insured banks

##### Reserve requirements

Today, there is no regulatory protection, such as Federal Deposit Insurance Corporation (FDIC) insurance, for fiat-backed stablecoins, and banks are therefore hesitant to hold stablecoin reserves. By comparison, money market funds are also not FDIC-insured; however, money market accounts at banks are FDIC-insured.

The Basel Accords are international banking standards that have a focus on ensuring solvency and making sure financial institutions have sufficient capital to hedge credit, market and operational risk. One approach to addressing reserve requirement challenges with stablecoins is to expand the Basel Accords to new banks and stablecoin issuers. It may be feasible to adjust and apply the Basel III framework to stablecoin reserves to make the reserves compliant.

### Innovation

**The innovation effect** of novel payment instruments may exhibit wider spillovers on innovation in the economy.

**Efficiency gains:** cryptos and stablecoins may, for certain use cases, offer more efficient means of conducting payments, reducing transaction costs and enabling new business models.

#### Regulatory impact on economic behaviour

Regulatory certainty influences economic behaviour. Ambiguous policy could lead to a loss of confidence in a global stablecoin.<sup>120</sup> Many central banks still see CBDCs as a superior option. That said, stablecoins could coexist with a CBDC in the future and create

#### Keeping reserves at the central bank

Private stablecoins are only as strong as their reserve design, and a 1:1-backed reserve is a critical component of any robust design.<sup>115</sup> It should be a requirement for stablecoins to be backed one-for-one with treasuries or reserves at the central bank.

#### Reserve considerations for stablecoins

Liquid asset reserves create demand for these assets. If stablecoins use such assets to grow, they could drive up demand for these assets and lower interest rates. If stablecoins are forced to keep reserves at central banks, interest rates could become negative, and stablecoin issuers could be paying to keep their reserves there. These costs could be passed through to users.

Stablecoins that hold safe assets as collateral to achieve their stability increase demand for these assets and have a negative impact on price formation, collateral valuation, money markets, monetary policy and banks' intermediation capacity.<sup>116</sup> Stronger competition for bank deposits may push local banks towards less stable and more expensive funding sources to maintain loan growth and undermine credit risk assessment abilities.<sup>117</sup> Loss of confidence in stablecoins could also trigger sales of their reserve assets, potentially affecting the functioning of short-term funding markets.<sup>118</sup> Redemption should be guaranteed even during market stress. A reserve that risks becoming less than fully backed tomorrow will likely face a run today as stablecoin holders rush to redeem coins before the reserve is depleted.<sup>119</sup>

competition between the public and private sectors, keeping both sectors motivated to innovate.

#### Key considerations for stablecoin regulation

- In the United States, for example, it is not clear that the Fed is the designated regulator for stablecoins. If stablecoins were issued in the same way as money market funds, the regulator would be the Securities and Exchange Commission (SEC). If they were issued by banks, it would be the Office of the Comptroller of the Currency (OCC).
- Fringe (relatively less regulated) stablecoins provide more opportunities for financial access/inclusion.

- Stablecoins have arisen out of a demand for a stable monetary unit in distributed ledger applications.
  - They provide a representation for money.
  - A well-regulated stablecoin could allow programmability and other benefits in the same way as a CBDC.
- While there is potential for self-regulation (there are clear limits to this), a regulatory framework will need to address the incentive for stablecoin operators to take riskier investments.
  - There should be capital requirements and audits to ensure full collateralization.
  - There is a need for public or private insurance through a deposit guarantee scheme, akin to the FDIC insurance that banks have.
  - There is a need for liquidity support by the central bank to enable the bank to meet redemptions.
  - There is a need for macroprudential regulation to limit risk exposures of the banking sector, households and firms in crypto.<sup>121</sup>

### Scenario 3

## Tax or ban private fiat-backed stablecoins out of existence

### Monetary stability

Stablecoins could affect the availability of safe assets, which could influence the level and volatility of real interest rates.<sup>122</sup>

Mass stablecoin adoption could affect the central bank's ability to "offer sovereign money to all citizens and manage it in the public interest", according to Eva Szalay and Philip Stafford, writing in the *Financial Times* in September 2021. Private initiatives lack protections associated with national currencies and have "lower public benefit", they add.<sup>123</sup> One scenario explored by the IMF considers the case

where CBDCs and global stablecoins (GSCs) are adopted by blocs of countries. These blocs would instigate a system that mirrors the policy implications of single-currency adoption. Exchange rate fluctuations between different blocs could hinder efforts to deal with currency substitution. In terms of capital flow impacts, CBDC/GSC currency blocs could create opportunities for international risk sharing, but also lead to fragmented mechanisms to provide liquidity backstops and other means to dampen financial volatility.<sup>124</sup>



6

# Economic analysis of regulatory options

For cryptocurrencies, the table below rates the projected macroeconomic outcomes of each regulatory option against the criteria for a net macroeconomic benefit outcome. High scores indicate higher macroeconomic benefits. It is noted

that different regulatory approaches may have variable impacts in each country or jurisdiction; however, the tables below are illustrative of the general outcomes outlined in this white paper.

TABLE 6 Analysis of macroeconomic net benefit of each regulatory option for cryptocurrencies

High-level options for cryptocurrency regulation	Promotes monetary stability	Promotes stability of the financial system	Promotes access to the financial system	Promotes protection against illegal activity	Promotes innovation	Promotes environmental sustainability
Let present trends continue	●○○○	●○○○	●●○○	●○○○	●●○○	●○○○
Ban use of cryptocurrency	●●○○	●●○○	●○○○	●●○○	●○○○	●●○○
Let cryptocurrency play a regulated role within the economy*	●●○○	●●○○	●●○○	●●●●	●●●●	●●○○
Adopt cryptocurrency as legal tender	●○○○	●○○○	●○○○	●○○○	●●○○	●○○○

\* Depending on how regulation is designed and enforced.

- Low
- Medium or neutral
- High

For stablecoins, the table below rates the projected macroeconomic outcomes of each regulatory option for stablecoins against the criteria for a net

macroeconomic benefit outcome. High scores indicate higher macroeconomic benefits.

TABLE 7 Analysis of macroeconomic net benefit of each regulatory option for stablecoins

High-level options for stablecoin regulation	Promotes monetary stability	Promotes stability of the financial system	Promotes access to the financial system	Promotes protection against illegal activity	Promotes innovation	Promotes environmental sustainability
Let present trends continue	●○○○	●○○○	●●○○	●○○○	●●○○	●○○○
Let stablecoins play a regulated role in the financial system*	●●○○	●●○○	●●○○	●●●○	●●●○	●●○○
Tax or ban stablecoins out of existence	●●○○	●●○○	●○○○	●●○○	●○○○	●●○○

\* Depending on how regulation is designed and enforced.

- Low
- Medium or neutral
- High

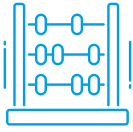
Letting present trends continue poses the greatest risk for both crypto and stablecoins. A total ban would hinder innovation, limit discovery of alternative transaction methods and encourage illicit use of these currencies. At the other end of the spectrum, making crypto legal tender cannot be modelled with the present data, but predictions do exist. Overall, the current unknowns pose risks, which indicates that encouraging understanding and regulation will be the optimal choice.

Letting crypto and stablecoins play a regulated role is the optimal way to promote the advantages of innovation, while attempting to curtail the potential downsides. The findings of our analysis on stablecoins, in particular, indicate that it is worth risking some financial instability for the gains in innovation and potential for increased financial access/inclusion.

There are risks associated with this regulation, which should be managed during the regulatory design process. These risks include:

- Ineffective regulation that will negatively affect the industry and in effect create negative externalities or macroeconomic outcomes
- Challenging and costly enforcement of regulation
- Regulatory arbitrage
- Over-regulation that could stifle the cost and speed efficiency advantages of these innovations

There is a risk of imposing regulation that would create similar regulatory regimes as are currently in place. However, it should be considered that it may not take much regulation to undermine and render the business model for stablecoins unviable.



## For policy-makers

### 1. Create an international classification framework/taxonomy to provide a common ontology/set of concepts and categories to differentiate between the different digital currency types and how they interact.

For example, such efforts are under way as part of the Digital Currency Global Initiative (DCGI).

- The DCGI is working on a taxonomy model for all digital currency types to make it simple to explain the different ways in which transactions occur in CBDC, stablecoins and crypto-assets.
- The objective of the taxonomy model for digital currencies is to provide a standard unified ontology that can be used to describe the characteristics and differentiate between various digital currency types. This is currently lacking.

### 2. Coordinate with other governments to mitigate regulatory arbitrage and reduce the negative economic impacts of choices made by developed economies on emerging economies.

### 3. Include crypto and stablecoins in monetary financial statistics.

Monetary policy is dependent on this data, so there is therefore a gap. The information on mining activity is not available for all countries, and statisticians may not collect the information known by some firms.

To integrate crypto and stablecoin data into monetary financial statistics:

- A proper data collection mechanism would need to be mandated for exchanges to report activity, similar to the way in which commercial banks report activity. The data should reflect how the crypto-assets are used and how this use affects specific sectors of the economy.
  - Currently, statisticians do not know how to classify cryptocurrency and stablecoins. At present, crypto-assets that are not backed are classified as a commodity. The classification matters and will affect monetary policy.
  - An example of a data-collection mechanism that could be of reference and already exists is the EU-specific Basel III crypto monitoring. A recurrent exercise, it collects information about the financial industry's exposure to crypto in the EU. It could be extended to virtual asset service providers as it becomes increasingly likely that they will be supervised by institutions with regulations such as MiCA in the EU.
- ### 4. As economic projections become possible and as qualitative assessments such as this one are completed, take these into consideration when designing regulation. Policy-makers should also account for the differences between types of cryptocurrency and stablecoins when designing regulation.



**Our regulatory frameworks should be designed to support responsible innovation while managing risks – especially those that could disrupt the financial system and economy. As banks and other traditional financial firms become more involved in digital asset markets, regulatory frameworks will need to appropriately reflect the risks of these new activities.<sup>125</sup>**

Janet Yellen, United States Secretary of the Treasury





I think that it's actually not that hard to differentiate these things [e.g. Terra, Celsius] from other things. It does not reflect the broader crypto ecosystem in any kind of meaningful way. Education is really important here. Crypto is not a monolith. Every crypto L1 [layer 1] platform has a very different approach to what it's thinking about doing. Every stablecoin is different – the reserves are held differently. And all of that nuance is critically important for us to understand as we move toward more of a regulation and policy environment.

Sheila Warren, Chief Executive Officer, Crypto Council for Innovation, in a Bloomberg Crypto Report<sup>126</sup>

Follow the [World Economic Forum's Digital Currency Governance Consortium](#) workstream for regulatory best practices for cryptocurrency and

stablecoins and for additional research and detail regarding regulatory design.



## For businesses

1. Work proactively and in partnership with regulators when designing business models.



I've loved my time here ... but in the end, what's important is that we're in the right place for the business ... What we've been doing also is reaching out to try and find governments that would be excited to have us and work with us. That's something we're still working on, and we have a lot of candidates in mind.<sup>127</sup>

Sam Bankman-Fried, Chief Executive Officer, FTX, Hong Kong, speaking to the *Financial Times*



What we've been really working toward [in the US] is where the UK is now, toward a world in which the political and regulatory environment is much more amenable and forward-leaning on innovation in the digital assets market.<sup>128</sup>

Dante Disparte, Chief Strategy Officer and Head of Global Policy, Circle



# Conclusion

Allowing cryptocurrencies and stablecoins to play a regulated role in economies will have the greatest macroeconomic net benefit to the high-level regulatory paths laid out in this white paper. In the future, the adoption of cryptocurrencies and stablecoins will most likely be correlated with the level of regulation in a given jurisdiction.

Policy-makers should act quickly to gather macroeconomic impact data and begin to design regulatory frameworks that are custom-made for cryptocurrencies and stablecoins. Countries should collaborate to avoid regulatory arbitrage. Policy-makers should also collaborate with the business and technology community to receive feedback about the effects that certain regulatory designs will create.

The future regulation itself should support the criteria outlined in this paper. It should promote monetary stability, stability of the financial system, access to the financial system, protection against illegal activity, innovation and environmental sustainability. The goals for the future should be to embrace the innovations that cryptocurrency and stablecoins bring, while using regulation to curtail the risks to the economy to the greatest extent possible.

The DCGC will continue a separate workstream throughout 2022, exploring the key risks and associated global implications as applicable to the regulation of cryptocurrencies/stablecoin. The workstream will also look at various policy approaches globally, based on perspectives from public-private partners, with the aim of understanding the nuances that need to be considered in a global coordinated approach to cryptocurrency and stablecoin regulation.

# Glossary

**Anti-money laundering (AML)/Combating the financing of terrorism (CFT):** AML includes any policies, laws, regulations and protocols designed to combat the introduction of funds obtained from illicit activities (such as racketeering, corruption, drug trafficking and fraud) into legitimate money systems and exchanges. CFT consists of similar measures designed to prevent and combat the financing of terrorist activities. Both money laundering and terrorist financing activities generate financial flows that divert resources away from economically and socially productive uses, often with negative impacts on the financial sector, national fiscal stability and society.

**Atomic swaps:** These are automatic exchange contracts that allow two parties to trade tokens from two different blockchains.<sup>129</sup>

**Bank run:** When depositors attempt a simultaneous withdrawal of funds due to a perceived lack of faith that their bank will repay their deposits fully and on time. To meet this sudden demand, banks may be forced to sell assets at a loss, driving them into insolvency.<sup>130</sup>

**Blockchain:** A form of distributed ledger technology (DLT) in which transactions are conducted in a peer-to-peer fashion and then broadcast to the entire set of system participants, all or some of whom work to validate them in batches known as blocks. Such validation is executed using the system's consensus protocol (such as Proof of Work or Proof of Stake). Validated blocks are then cryptographically linked to a primary sequence of blocks, referred to as a blockchain.<sup>131</sup>

**Capital controls:** Taxes or restrictions on international transactions intended to reduce volatility in exchange rates or inflation.<sup>132</sup>

**Central bank digital currency (CBDC):** A digital form of central bank money that may be accessible to the public (general-purpose or retail CBDC) or to a select set of licensed participants such as financial organizations (wholesale CBDC). CBDC is denominated in the national unit of account. It is issued by and is a direct liability of the central bank.

**Centralized exchange:** A business service that acts as an intermediary in an exchange transaction to enable the conversion to and from certain assets or currencies.

**Cross-border and cross-currency payment:** Cross-border payments are those where the payer and payee reside in different jurisdictions. Many, but not all, of these are also cross-currency payments – that is, payments where the payer and payee

are respectively debited and credited in different currencies. Payments within monetary unions or payments in a common invoice currency may be cross-border but not cross-currency.<sup>133</sup>

**Crypto-asset:** A type of private digital asset that depends primarily on cryptography and distributed ledger or similar technology.<sup>134</sup>

**Cryptocurrency:** Digital assets and digital infrastructure such as Bitcoin and Ether – that are open-sourced and public.<sup>135</sup>

**Currency leakage:** Money flowing out of the banking system to be held as currency rather than being deposited into some form of financial institution. More broadly, leakages are capital or income that diverge from an iterative system (i.e. savings, taxes and imports).

**Currency reserves:** Assets held by one country in the denomination of another country's currency, most commonly the US dollar.<sup>136</sup>

**Decentralized finance:** A set of alternative financial markets, products and systems that operate using crypto-assets and “smart contracts” (software) built using distributed ledger or similar technology.<sup>137</sup>

**Digital currency:** Typically used to refer to currency that exists in electronic form and that may or may not be available in physical form. Digital currencies often have some characteristics of a currency, namely serving as a store of value, unit of account or medium of exchange, although the term may also be used more liberally. They may also have characteristics of a commodity or other asset.

**Digital wallet:** A digital device, software-based system or online application for storing payment information such as passwords and private keys, which when used in conjunction with a payment system can enable online payments. When they involve cryptocurrency, digital wallets are also used as a mechanism to store private key information for users to access their cryptocurrencies.

**Disintermediation:** The removal of financial intermediaries in a transaction; associated with the emergence of decentralized finance that replaces exchanges, market makers, asset managers, banks and other lenders with software protocols.<sup>138</sup>

**Distributed ledger technology (DLT):** An overarching term that includes blockchain technologies and refers to the protocols and supporting infrastructure that allow computers in different locations to propose and validate transactions on a ledger and update ledger records

in a synchronized way across a network. Many DLTs are designed to function without a centralized trusted authority, relying instead on distributed consensus-based validation procedures combined with cryptographic signatures.

**E-money:** Short for “electronic money”, e-money is stored value held in digital accounts or physical devices (e.g. a chip card or a hard drive in a personal computer) that is used as a means of payment and a store of value. E-money systems vary across different jurisdictions, but they are often fully backed by fiat currency, denominated in the same currency as central bank or commercial bank money and exchangeable at par value for such money or redeemable in cash.

**Exchange rate:** The nominal exchange rate is the price of one currency in terms of another. The real exchange rate measures the relative under- or overvaluation of two currencies by comparing the price of goods in their respective markets.<sup>139</sup>

**Expansionary monetary effect:** Expanding the money supply faster than usual or lowering short-term interest rates. Expansionary monetary policies are intended to combat unemployment by enticing businesses to borrow money and expand, thereby creating labour demands.

**Fiat currency:** A form of currency established by government decree and generally issued by a monetary authority such as a central bank. Fiat currencies can be distinguished from other historic forms of government-issued money by typically not being backed by a commodity such as gold or silver. Fiat currency can take the form of physically issued banknotes and cash or it can be represented electronically, such as with bank credit, central bank reserves or central bank digital currency (CBDC).

**Financial inclusion:** The ability of individuals and businesses to access useful and affordable financial products and services that meet their needs, such as payment, savings, credit and insurance services, considering a variety of factors affecting that access, including affordability, access to appropriate technology, education and literacy, geographic accessibility and financial infrastructure.

**FinTech:** Technology-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on the provision of financial services.<sup>140</sup>

**Global stablecoin:** A stablecoin with a potential reach and use across multiple jurisdictions and which could become systemically important in and across one or many jurisdictions, including as a means of making payments.<sup>141</sup>

**High-quality liquid assets (HQLA):** Assets are considered to be HQLA if they can be easily and immediately converted into cash at little or no loss of value.<sup>142</sup>

**Interest rates:** In a general sense, interest rates set the cost of borrowing money or the financial reward for saving it. Interest rates set by central banks are important drivers of monetary policy. Lowering them allows for increased borrowing at banks during times of economic stress, while raising them incentivizes investment during periods of inflation.<sup>143</sup>

**Know your customer (KYC):** Processes and protocols, usually prescribed by law, that apply to certain accountable institutions, such as banks, obliging them to verify and keep records of the identities of their customers in line with strict global or national anti-money laundering, anti-terrorism and other laws and regulations.

**Mobile money:** A broad category defined as a service in which a mobile phone is used to perform financial services.

**Monetary policy transmission:** The way in which central bank policy decisions flow through a larger economic system. Simply put, policy changes affect interest rates, which in turn affect economic activity and inflation.<sup>144</sup>

**Monetary sovereignty:** The right of a state to issue currency as legal tender, determine and adjust the value of that currency and regulate the use of that and any other currency within its territory.<sup>145</sup>

**Payment service provider:** An entity that may issue payment instruments or provide retail payment services. This can include commercial banks and non-bank financial institutions.<sup>146</sup>

**Peer-to-peer (P2P):** Refers to interactions between peers in a system, such as transactions or information exchange, that occur without the need of an intermediary. In the blockchain industry, this has come to refer to systems that enable transfers of value without an intermediary bank, using, for example, distributed ledger technology.

**Proof of Stake:** A consensus mechanism for blockchain networks where validators stake some amount of an underlying cryptocurrency in order to be selected to verify transactions, create new blocks and ensure nodes agree on the network's state. Staked assets can be lost if a validator tries to validate a faulty block, thereby incentivizing trustworthy behaviour.<sup>147</sup>

**Proof of Work:** A consensus mechanism for adding new blocks to a blockchain network where miners use a computationally intensive algorithm to prove to each other that new blocks are valid and do not contain double-spent assets. Proof of Work mechanisms may reward validators with some fraction of an underlying cryptocurrency to incentivize participation.<sup>148</sup>

**Redenomination:** The process of changing the face value of circulating currency via the issuance of new legal banknotes while phasing out old ones. Redenomination typically occurs in response

to hyperinflation that makes small-denomination banknotes useless, or during the introduction of an entirely new currency.<sup>149</sup>

**Retail CBDC:** A form of central bank digital currency (CBDC) that is accessible to the general public. Retail CBDCs may take a two-tiered structure, where citizens would hold CBDC balances with commercial banks or other customer-facing financial entities, such as private payment service providers, rather than directly with the central bank. A retail CBDC could be used both domestically and cross-border (i.e. be both accessible and usable by foreign entities). Retail CBDCs are sometimes also referred to as general purpose or universally available CBDCs.

**Special drawing right (SDR):** A supplementary foreign exchange reserve asset created and maintained by the International Monetary Fund (IMF) to supplement its member countries' official reserves. An SDR is neither a currency nor a claim on the IMF, but rather a potential claim on the freely usable currencies of IMF members, and exchangeable for those currencies.

**Stablecoin:** A broad term used to refer to digital currencies, most often DLT-based cryptocurrencies, that are designed to maintain a stable value relative to another asset (typically a unit of sovereign currency or commodity) or a basket of assets. To achieve this, a stablecoin's value may, for example, be pegged to the value of a sovereign currency such as the US dollar, other crypto-assets or commodities, or supported by algorithms. Depending on the effectiveness of the stabilization mechanism and backing, the digital currency may or may not hold a stable value relative to its reference asset.

**Substitution effect (dollarization):** The use of foreign currency in parallel to or instead of a domestic currency. Most associated with dollarization given the US dollar's role as a reserve currency. Typically, a sign that the currency being replaced is tied to a weak or unstable government and economic conditions.

**Ultimate finality:** Final settlement in central bank money. Finality is achieved when settlement of an obligation is legally irrevocable and unconditional. The choice of settlement asset is important because, even when the original payment obligation is fully extinguished (i.e. paid with finality), there can be both credit and liquidity risks for the payee associated with holding the resulting settlement asset. The related term "ultimate settlement" combines the concept of settlement being final with the concept of the settlement asset being the least risky possible.<sup>150</sup>

**Unbanked:** Refers to adults or households who do not use the services of a bank or similar financial organization for transactions or in any other capacity. Often such persons or households make use of alternatives, such as cash or prepaid vouchers to pay for goods or services.

**Underbanked:** Refers to persons or households that use the services of a bank or similar financial institution but rely to a larger extent on alternative financial services. Examples of such alternative financial services used by underbanked households include non-bank money orders, non-bank cheque-cashing services, non-bank remittances, payday loans, rent-to-own services, pawn shop loans or refund anticipation loans.

**Virtual asset:** A virtual asset is a digital representation of value that can be digitally traded, or transferred, and can be used for payment or investment purposes. Virtual assets do not include digital representations of fiat currencies, securities and other financial assets that are already covered elsewhere in the Financial Action Task Force (FATF) rules.<sup>151</sup>

**Virtual private network (VPN):** A VPN is a system that delivers enterprise-focused communication services on a shared public network infrastructure and provides customized operating characteristics uniformly and universally across an enterprise.<sup>152</sup>

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