



▶ CPMI Report

# Considerations for the use of stablecoin arrangements in cross-border payments

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## Executive summary

This report, prepared by the Bank for International Settlements' Committee on Payments and Market Infrastructures (CPMI), assesses whether and how the use of stablecoin arrangements (SAs), if properly designed and regulated, and compliant with all relevant regulatory requirements, could enhance cross-border payments. A properly designed and regulated (PDR) SA is one that, at a minimum and for each of its functions, observes, adheres to and complies with all relevant regulatory risk management requirements, including those for systemically important SAs if applicable, set out in relevant jurisdictions in accordance with relevant international standards, guidance and recommendations established by the FSB and standard-setting bodies, such as the CPMI, the International Organization of Securities Commissions (IOSCO) and the Financial Action Task Force (FATF).<sup>1</sup> Only then could PDR SAs be a viable payment option for enhancing cross-border payments. The report acknowledges that such PDR SAs do not yet exist.

Extensive work on the standards and framework for the appropriate regulation, supervision and oversight of stablecoin arrangements is being carried out by the standard setting bodies and the financial stability board (FSB). Examples include the CPMI and IOSCO's July 2022 final stablecoin guidance, confirming the application of the Principles for Financial Market Infrastructures (PFMI) to systemically important SAs. The Basel Committee on Banking Supervision has also set out the prudential treatment for banks' exposures to cryptoassets, including for stablecoins. Alongside this work on standards, the FSB issued updated high-level recommendations on the regulation, supervision and oversight of global stablecoin arrangements in July (FSB 2023), building on initial recommendations issued in 2020.

Alongside this work to set appropriate regulatory standards, the G20 cross-border payments programme (BIS (2020)) has identified the importance of exploring the role of new types of payment infrastructures and arrangements to improve cross-border payments while continuing efforts to improve existing infrastructures and arrangements. This report seeks to clarify for central banks and regulatory authorities whether and how potential PDR SAs could help to facilitate faster, cheaper, more transparent and more inclusive cross-border payments. A better understanding of properly designed and regulated SAs would help central banks to anticipate end-user preferences and demand for various payments options, which has implications for central banks' key functions.

Compared with the programme's other components, using new types of payment infrastructures and arrangements for cross-border payments, such as central bank digital currencies (CBDCs), multilateral platforms<sup>2</sup> and privately issued stablecoins, requires more extensive changes. As most of these infrastructures or arrangements are still at a conceptual or nascent stage, each would require further consideration to implement, as well as considerable time and resources. Accordingly, this report should not be taken as an endorsement, implicit or explicit, for SAs currently in operation or for potential future SAs.

The report focuses on stablecoins denominated in a single fiat currency, or pegged to one, and not on issues specific to other types of stablecoin. This work is an exploratory exercise that does not recommend any particular features of stablecoin arrangements per se, but it instead emphasises the compliance with applicable standards and regulatory requirements when qualifying an SA as PDR. In the first place, consistent with the high-level recommendations of the Financial Stability Board (FSB) for the regulation, supervision and oversight of global stablecoin arrangements, no SAs with systemic importance should begin operation until the legal, regulatory and oversight challenges and risks are adequately

<sup>1</sup> Each jurisdiction retains the prerogative to determine within its own context whether to allow stablecoin activity. For example, jurisdictions could choose to prohibit some or all stablecoin activities.

<sup>2</sup> For opportunities and challenges related to the cross-border use of CBDCs, see CPMI-BIS IH-IMF-WB (2021, 2022). For multilateral platforms, see CPMI (2023).

addressed, through appropriate designs and by adhering to regulation that is clear and proportionate to the risks.

International standards and guidance are technology-neutral. They do not prescribe the use of any specific technology in international finance. Thus, while this report considers the technological aspects of SAs such as distributed ledger technology (DLT), certain topics discussed within this report may be relevant to other types of payment systems and arrangements. For example, certain design principles, opportunities and challenges are not specific to the technological aspects of SAs, such as the use of DLT, but could apply to non-DLT forms of global e-money. In addition, DLT could also be used in arrangements such as CBDCs and tokenised commercial bank money. But these use cases are beyond the scope of the report.

How and to what extent the use of DLT by SAs could improve cross-border payments remains uncertain. The principle of “same business, same risks or risk profile, same regulatory outcome” should apply regardless of the technology used by a PDR SA. Potential benefits from the cross-border use of SAs should not be achieved by compromising on this principle. Critically, work on international standards for SAs is ongoing and regulatory frameworks for SAs have been, are being, or will be defined or clarified at all the relevant jurisdictional levels. Therefore, it may take time to ensure that there is a robust regulatory and supervisory framework in place to underpin PDR SAs at all relevant jurisdictional levels.

SAs present many challenges, not least because stablecoins may have shortcomings in multiple aspects, such as a lack of competition and consumer protection as well as issues with data privacy and anti-money laundering/combating the financing of terrorism. Further, stablecoins could lead to a fragmented or fragile monetary system and impair financial stability, and are subject to potential fluctuations in exchange values away from par (see Garratt and Shin (2023)). As such, the regulation, supervision and oversight of SAs alone may not be sufficient to mitigate such risks. Other private or public sector efforts, such as improvements to existing payment infrastructures, for example via interlinking of fast payment systems, or the development of CBDCs, may be explored. Potential benefits of using a PDR SA for cross-border payments may be achieved by enhancing existing payment arrangements, although the latter may come with its own challenges, which are being addressed in the G20 cross-border payments programme and outside the scope of this report (see BIS (2020)).

With these caveats in mind, the report discusses the possible opportunities of PDR SAs to enhance cross-border payments, including the potential to lower costs, increase speed, expand the set of payment options and improve transparency. It also discusses challenges these SAs would need to overcome if their potential for cross-border payments is to be fully harnessed. In exploring the opportunities and challenges associated with PDR SAs and their implications for central banks, special attention is paid to two crucial features: (i) the denomination of the stablecoin used by the SA, or the peg currency; and (ii) the on- and off-ramps between the stablecoin and the existing financial system. The report also discusses how PDR SAs might interact and coexist with other cross-border payments options and evaluates the potential impact of their cross-border use on the monetary policy, financial stability and payment functions of central banks.

All payment systems, even those that are PDR, incur risks, such as operational, liquidity, settlement and other risks. PDR SAs would also have such risks, and possibly to a greater degree than traditional payment systems. Their potential risks and challenges in the cross-border payments context include (i) the risk of concentration (or fragmentation) due to market structure and network scale; (ii) inconsistent access to on- and off-ramps; (iii) a lack of coordination between entities within an SA located across jurisdictions; and (iv) a lack of consistent regulation, supervision and oversight across jurisdictions.

If PDR SAs are to play a beneficial role in enhancing cross-border payments, they will need to coexist and compete on a level playing field with other payment options on cost, speed, access and transparency. PDR SAs' entry into markets, whether potential or actual, could enhance competition and induce improvements in alternative cross-border payment options, contribute to a robust global payments infrastructure, and provide users with a broader set of safe and resilient choices. Also, interoperability

within PDR SAs and between PDR SAs and other payment options will be essential to overcome the current challenges in cross-border payments. Broader use of PDR SAs may help to make cross-border payments more resilient by providing alternative or backup options, but only to the extent that PDR SAs are themselves resilient.

Even if PDR, the cross-border use of SAs will have potentially significant implications for central banks, whose objectives include (i) fostering safe, reliable, transparent and efficient payment systems; (ii) promoting monetary stability; and (iii) promoting financial stability. These implications should be carefully addressed if PDR SAs are to have a net positive effect on cross-border payments and the macroeconomy. Where authorities determine that the use of PDR SAs may weaken the resilience of their domestic financial system or interfere with central bank objectives or other public policy objectives, these authorities would need to consider steps (including the possibility to limit or prohibit the use of SAs in their jurisdictions) to mitigate the risks to national payment and monetary systems as well as to financial stability.

Overall, the report concludes that the use of stablecoins in cross-border payments could present opportunities, but also a number of challenges. Further, even if an SA is considered PDR and could help to address specific cross-border payment frictions, it may not necessarily have a positive impact on cross-border payments as the drawbacks could outweigh any potential benefits. The potential benefits, costs and trade-offs presented by PDR SAs for cross-border payments strongly depend on their designs and on the regulatory frameworks and macroeconomic conditions in the relevant jurisdictions. Improved cross-border payments may offer greater benefits to emerging market and developing economies (EMDEs) than to advanced economies (AEs) insofar as EMDEs experience more acute cross-border payment frictions. The frictions that EMDEs may face more strongly than AEs include a greater reliance on cash, higher barriers to access payment services, lower levels of financial inclusion and the decline in correspondent banking relationships. PDR SAs may be able to reduce some of these frictions. However, addressing these frictions by using PDR SAs may lead to greater challenges and risks to EMDEs than to AEs, especially when denominated in a foreign currency and operating from a foreign jurisdiction, such as in terms of currency substitution, including potential loss of seigniorage, volatile capital flows and difficulties in subjecting the PDR SAs to an appropriate degree of oversight. Currency substitution could undermine the ability of authorities to control the money supply or interest rates, eroding the effectiveness of monetary policy and financial policy control. As with any other financial product or service, the relevant authorities will be responsible for regulation, supervision, and oversight of a PDR SA to ensure that the SA fulfils its responsibilities.

Strongly-coordinated efforts at the international level are needed to avoid regulatory arbitrage while allowing for sufficient flexibility such that jurisdictional-specific risks and concerns are addressed. If PDR SAs are to enhance cross-border payments, while mitigating the risks and addressing the challenges identified, further work may be useful in several areas. Future work could explore (i) the most effective international cooperation and coordination mechanisms between relevant authorities; (ii) the implications of PDR SAs that are used both for cross-border and domestic payments; (iii) the implications of SAs backed by multiple fiat currencies and other types of assets; and (iv) interdependencies between multilateral platforms, CBDCs and PDR SAs. Importantly, such work could take macro-financial risks, such as the risk of currency substitution, into consideration and how these risks may vary across jurisdictions, including how these risks may affect the national payment and monetary systems as well as the financial stability of EMDEs and how to mitigate such risks. This work could also help central banks and standard setters promote responsible innovation and to address the existing frictions in cross-border payments.

## Introduction

Domestic payment systems have evolved rapidly in recent decades, while cross-border payments have in many cases remained slow, expensive, opaque and difficult to access for many users. In the meantime, stablecoins have emerged as a key component of the cryptoasset ecosystem. In some cases, they are being accepted as a quasi-substitute for fiat currency (and as a settlement asset) in the cryptoasset ecosystem. This has led to speculation that they could become an alternative to the existing options for cross-border payments.<sup>3</sup> However, the debate regarding their utility is far from over, not least due to the recent turmoil in cryptoasset markets. Further, the use of SAs for remittances and other retail cross-border payments is still limited and jurisdictional stances vary.

Against this backdrop and with the purpose of exploring the potential for new types of payment infrastructures and arrangements, the G20 cross-border payments programme has included a forward-looking element aimed at fostering the soundness of global SAs for cross-border payments (building block 18). This report by the Bank for International Settlements' Committee on Payments and Market Infrastructures (CPMI) considers whether and how the use of stablecoin arrangements, if properly designed and regulated, and compliant with all relevant regulatory requirements, could enhance cross-border payments, if such SAs were to exist.

In the following, the report is an exploratory exercise that discusses examples of design choices while not recommending any particular features of SAs. Among many design choices that may affect the potential of SAs for cross-border payments, this report will focus on two key aspects: (i) the denomination of the stablecoin used in an SA, or the peg currency; and (ii) the on- and off-ramps between the stablecoin and the existing financial system.

First, the peg currency is a critical feature for the use of stablecoins as it may affect users' confidence in holding and accepting it for payments, whether domestic or international. As with any other means of payment, this confidence derives not only from its ease of use but also from its perceived safety. Uniquely to stablecoins, this safety is strongly impacted by the quality and denomination of the assets in the stablecoin's reserve, among other features.<sup>4</sup> Depending on the peg currency, cross-border usage of stablecoins could affect cross-border capital flows, foreign exchange (FX) markets and monetary policy implementation. It might also increase currency substitution in some jurisdictions.

Second, among other features, the degree to which an SA is adopted for cross-border payments will critically rely on the on- and off-ramps. These on- and off-ramps are defined as the entities or payment systems or a combination of them through which a stablecoin may be converted into or out of sovereign currency, and which may allow users to move balances between the stablecoin and the existing financial system in different jurisdictions.<sup>5</sup> When using a stablecoin with a peg currency different from the local one, FX conversions would be needed. This is one of the reasons why the adoption of stablecoins for cross-border payments would depend on the availability and functioning of the on- and off-ramps that provide these bridging services.

This report makes no new recommendations on SAs, but rather it uses existing recommendations, standards and guidance from the Financial Stability Board (FSB) and standard-setting bodies (SSBs) as a basis for defining what is meant by PDR SAs. SSBs are working to develop consistent regulatory,

<sup>3</sup> In 2019, the Libra Association announced its plans to issue a stablecoin, which was positioned to be a global currency, able to function in a global infrastructure to serve billions of people around the world.

<sup>4</sup> Other features include users' perception of an SA's ability to redeem at its reference value in a timely manner, which is set out in the CPMI-IOSCO guidance on the application of the Principles for Financial Market Infrastructures (FMIs) to SAs (CPMI-IOSCO 2022) and is one of the recommendations of the revised FSB recommendations on regulation, supervision, and oversight of global stablecoin arrangements (2022), as adopted by this report's definition of a PDR SA (see Section 1).

<sup>5</sup> Additional features of the on- and off-ramps that are not discussed in this report but may facilitate the use of stablecoins include digital ID infrastructure, merchant acceptance infrastructure and digital wallet infrastructure.

supervisory and oversight frameworks for SAs. As such, the report uses the CPMI-IOSCO guidance on the application of the Principles for Financial Market Infrastructures (FMIs) to SAs (CPMI-IOSCO (2022)), the report of the Financial Action Task Force (FATF) to the G20 on stablecoins (FATF (2020)) and other relevant work to define what is meant by a PDR SA for the purpose of this report. Also relevant are the FSB's recommendations on regulation, supervision and oversight of global SAs (FSB (2020)), the FSB progress report on the implementation of these recommendations (FSB (2021)), and its 2023 report on an updated set of these recommendations. As such, algorithmic stablecoins are excluded from the analysis, as they are not consistent with the existing regulatory guidance and recommendations and hence do not qualify as PDR due to the lack of assets backing their value.

Meeting the conditions for a PDR SA is challenging. As work on international recommendations, standards and guidance for SAs is still ongoing and regulatory frameworks are still being defined or clarified and further implemented at various jurisdictional levels, it is unclear how exactly a PDR SA should be designed. This report assumes that no current SA is considered PDR, and it remains to be seen whether any future SA will be. In the case of SAs for cross-border payments, observing existing international standards is a necessary condition but it may not be the only condition to be considered PDR, given the possibility of implementation issues and rapid market changes. Nor are these conditions sufficient to meet all applicable jurisdictional requirements, which would also be necessary for an SA to be considered PDR. It is important to note that any potential benefits from the cross-border use of an SA should not be achieved by weakening risk management.

Overall, the report concludes that the use of stablecoins in cross-border payments could present opportunities, but also that it poses a number of challenges. It also notes that, even if an SA were PDR and could help to address specific cross border payment frictions, it may not necessarily have a positive impact on cross-border payments as the drawbacks could outweigh any potential benefits. The potential benefits, costs and trade-offs presented by PDR SAs for cross-border payments strongly depend on the design options and assumptions, and will vary across jurisdictions depending on their regulatory framework and macroeconomic conditions.

Improved cross-border payments may offer greater benefits to emerging market and developing economies (EMDEs) than to advanced economies (AEs) insofar as EMDEs experience more acute cross-border payment frictions. The frictions that EMDEs may face more strongly than AEs include a greater reliance on cash, significant barriers to access to cross-border payments, lower levels of financial inclusion, and a more pronounced decline in correspondent banking relationships than in AEs.<sup>6</sup> However, addressing these frictions by using PDR SAs may lead to greater challenges and risks to EMDEs than to AEs in the broader context of a jurisdiction's monetary system: there may be greater challenges and risks for EMDEs in the form of concerns on currency substitution, including potential loss of seigniorage, monetary sovereignty and difficulties in applying oversight to SAs based in foreign jurisdictions.

The report is structured as follows. Section 1 presents the definition of a PDR SAs as used for the purpose of this work and describes their two key features from the perspective of cross-border payments. Section 2 explores the potential benefits of and challenges for PDR SAs for cross-border payments. Section 3 discusses the forces affecting competition and coexistence of PDR SAs with existing and future cross-border payment options. Section 4 considers how the greater use of PDR SAs for cross-border payments could affect the roles and functions of central banks. Section 5 concludes by discussing questions to consider in future work, including the optimal international cooperation and coordination mechanisms to mitigate the risks of SAs used for cross-border payments, a deeper analysis of the macro-financial risks posed by these SAs and exploring the interdependencies of SAs for cross-border payments with central bank digital currencies (CBDCs) and multilateral platforms.

<sup>6</sup> See CPMI commentary "New correspondent banking data – the decline continues at a slower pace", [www.bis.org/cpmi/paysysinfo/corr\\_bank\\_data/corr\\_bank\\_data\\_commentary\\_2008.htm](http://www.bis.org/cpmi/paysysinfo/corr_bank_data/corr_bank_data_commentary_2008.htm).

## 1. Definition of PDR SA and key features for cross-border payments

An SA combines a range of functions to provide a stablecoin, ie a cryptoasset that aims to maintain a stable value relative to a specified asset, or a specified pool or basket of assets, that purports to be used as a means of payment and/or store of value. To this end, SAs typically provide four core functions: (i) governance of the arrangement; (ii) issuance, redemption and stabilisation of the value of stablecoins; (iii) transfer of stablecoins; and (iv) interaction with users for storing and exchanging stablecoins. This report considers SAs that can be used for cross-border payments, ie payments for which the payer's payment service providers and those of the payee are located in different jurisdictions.

SAs may differ with respect to the stabilisation mechanism used (eg types of reserve asset), technology choices (eg regarding the design of the distributed ledger technology (DLT)), and entities involved (eg regulated financial institutions or unregulated parties). This report considers SAs in which the stablecoin is pegged to a single sovereign currency because, at the time of writing, the largest SAs by market capitalisation are denominated in, or pegged to, a single sovereign currency. It is also assumed that the reserve assets and the peg have the same denomination.<sup>7</sup>

SAs may be associated with challenges stemming from features that are either unique to these arrangements or more pronounced than in financial incumbents providing similar functions, such as banks, non-bank payment service providers (PSPs) and payment systems.

### 1.1 Definition of PDR SA

Given its conceptual nature, this report concerns PDR SAs; it does not discuss specific existing SAs. For this purpose, a PDR SA is considered to be an SA that, at a minimum and for each of its functions, observes, adheres to and complies with all relevant risk management requirements, including those for systemically important SAs if applicable, set out in the relevant jurisdictions in accordance with relevant international standards, guidance and recommendations established by the FSB and SSBs, such as the CPMI, IOSCO and FATF. The path to be considered PDR also includes identifying, monitoring and mitigating the risks that it bears from and poses to its direct participants and end users, as well as other entities, such as other FMIs, banks (including liquidity providers) and non-bank PSPs.

At the time of writing, the clarification of relevant international risk management standards for SAs has made significant progress. Additional guidance or recommendations have been or are being formulated in several cases, setting out expectations and providing clarifications regarding key risks and issues to be addressed by an SA in response to specific challenges (see Table 1 and Annex 1 for relevant international standards, recommendations and guidance). As the stablecoin and cryptoasset industry continues to evolve, work on international standards for SAs is ongoing. In addition, at the jurisdictional level, regulatory frameworks for SAs are still being defined, clarified, implemented and strengthened. For this reason, the report does not assume or claim that any specific existing SAs may or may not be considered as PDR. Many of the design features or attributes of existing SAs would be inconsistent with those of PDR SAs. It is also uncertain whether any future SA will be considered PDR.

For the remainder of this report, we focus exclusively on PDR SAs and for brevity will refer to these arrangements as SAs, although a number of the considerations mentioned below may apply to a wider set of SAs, or even broader forms of global e-money arrangements that do not use DLT.

<sup>7</sup> A range of additional risks could arise if the denomination of the reserve assets differ from that of the peg currency, such as credit, market, liquidity, legal and operational risks.

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## Examples of key risks and international standards, recommendations and guidance

Table 1

Key risks	Relevant standards, recommendations and guidance
<b>Governance and comprehensive risk management</b>	CPSS-IOSCO (2012), CPMI-IOSCO (2022), FSB (2020, 2023)
<b>Illicit finance</b>	FATF (2020, 2021), FSB (2023)
<b>Credit and liquidity risks</b>	CPSS-IOSCO (2012), CPMI-IOSCO (2022), FSB (2020, 2023)
<b>Redemption rights</b>	CPSS-IOSCO (2012), CPMI-IOSCO (2022), FSB (2020, 2023)
<b>Final settlement</b>	CPSS-IOSCO (2012), CPMI-IOSCO (2022)
<b>Operational risks</b>	FSB (2020, 2023), CPSS-IOSCO (2012)

### 1.2 Key features for cross-border payments: the peg currency

When making payments across borders, the currency a stablecoin is pegged to or denominated in (hereinafter “the peg currency”) will be different from the domestic currency of either the sender or receiver, and, in some cases, both. The implications of this mismatch may be different for the sender and for the receiver, for instance in terms of costs and foreign exchange risk. From the central bank’s perspective, the peg currency of the stablecoin may have important macroeconomic implications for monetary and financial stability.

The benefits to the sender and receiver will vary, depending on the peg currency and local economic conditions in their respective jurisdictions. For instance, in a jurisdiction with a stable currency, a stablecoin pegged to the domestic currency (eg a US dollar-pegged stablecoin used in the United States) should generally have a greater potential for user adoption than a stablecoin pegged to a foreign currency (ie a stablecoin pegged to a non-US dollar currency). Conversely, in a jurisdiction with a volatile domestic currency, a stablecoin not pegged to the domestic currency may be more attractive, although PDR SAs denominated in a foreign currency may also pose risks, especially to EMDEs, such as currency substitution, volatile capital flows, and the erosion of monetary policy effectiveness and financial policy control.

### 1.3 Key features for cross-border payments: on- and off-ramp infrastructure

For the purpose of this report, the on- and off ramp infrastructure refers to the entities or payment systems or a combination of them through which a stablecoin may be converted into or out of sovereign currency. The availability of such an infrastructure will have an important impact on the use of SAs for cross-border payments. The need for on- and off-ramps will depend on the stablecoin’s level of adoption. If the stablecoin is widely accepted, there may be little need for frequent on- and off-ramp transactions. Conversely, in the absence of accessible on- and off-ramps, it is unlikely that a stablecoin would be widely accepted globally or domestically.

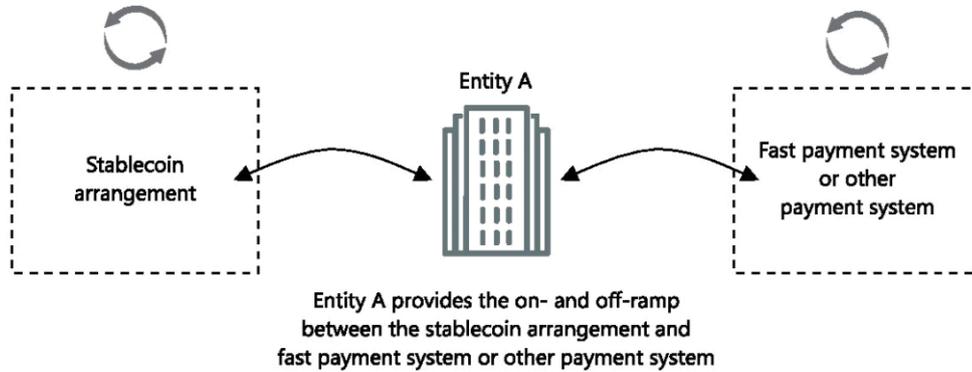
On- and off-ramps between existing payment systems and SAs enable a sovereign currency and the stablecoin to be exchanged (Graph 1). In the current stablecoin ecosystem, it is crypto-trading platforms, exchanges and custodial wallets that act as the primary on- and off-ramps, (often relying on a bank service provider or partnership to access the payment system). PSPs have also started to offer these functions.<sup>8</sup> In a future scenario, payment systems may themselves provide such on- and off-ramp services in which the payment system could allow for “end-to-end” processing of transactions, where sovereign currency and stablecoins represent the two ends of the transaction. Infrastructures for converting a stablecoin into or out of sovereign currency may be used to varying degrees and with different touchpoints

<sup>8</sup> For example, some PSPs allow customers to move cryptoassets into and out of, their digital wallets or cards and acquire merchants’ payments in cryptoassets (while crediting the merchant account in sovereign currency).

depending on the payments use case. The different types of infrastructure that could be used for such convertibility are discussed in Section 3.2.

Stylised model for on- and off-ramp infrastructure

Graph 1



Source: CPMI.

## 2. Opportunities and challenges

SAs could help to reduce the frictions in cross-border payments (in terms of costs, transparency, speed and access). At the outset, it should be noted that these benefits should not be achieved at the expense of regulatory arbitrage and weaker risk management, the anti-money laundering and countering the financing of terrorism (AML/CFT) measures and data protection expected of PDR SAs. Benefits and challenges and thus the balance between them will vary by jurisdiction, because of differing levels of access to and use of digital payments, as well as the varying degree of interoperability with existing payment systems. Jurisdictions that could gain the most from the entry of SAs for cross border payments are likely to be the jurisdictions where some of the preconditions for the introduction of SAs could be most challenging. Many of the topics discussed in this section may be relevant to other payment systems and arrangements. For example, certain design principles, opportunities and challenges are not specific to the technological aspects of SAs, such as DLT, but could also apply to non-DLT forms of global e-money. Technology innovations such as DLT could also be used by FMIs and arrangements such as CBDCs and tokenised commercial bank money. However, these use cases are beyond the scope of the report, and the discussion below is focused on the unique features of SAs that may make certain opportunities and challenges more prevalent for this type of cross border arrangement.

### 2.1 Opportunities

This section discusses the ways in which SAs might help to address current cross-border payment challenges. Opportunities that cross-border use of SAs could open up include (i) reducing costs by shortening transaction chains; (ii) speeding up settlements through technology and data improvements; (iii) broadening access by reducing the complexity faced by individuals and businesses; and (iv) increasing end-to-end transparency.

#### 2.1.1 Reducing costs

Cross-border payment transactions often involve long transaction chains, where each additional link adds costs. An SA could affect the intermediation chain, transaction and FX costs, and operational costs related to data availability but not all costs of cross-border payments can be addressed by an SA.

SAs that use a common platform across jurisdictions could help to reduce the overall number of intermediaries in the cross-border payment chain. Fewer links in the payment chain could lead to efficiency gains and cost reductions from lower settlement risk, improvements in the customer experience, and lower fees and rent-seeking across the payment chain. In addition, fewer links are likely to reduce funding needs associated with pre- or over-funding accounts along the chain and the need for intermediaries to extend intraday credit to facilitate payments.

In general, as with developments in existing payment systems and infrastructures, SAs could reduce costs in a number of ways. For instance, the more widely accepted they are, the greater potential SAs could have to reduce costs by benefiting from network effects and economies of scale. Conversely, the smaller a stablecoin ecosystem, or the fewer legs of a cross-border payment in which a stablecoin is used, the greater the users' reliance on conversion services to and from sovereign currency and the higher the costs incurred. Finally, data standardisation driven by SAs could facilitate greater interoperability and lead to efficiency gains through better interlinkages between SAs and other financial intermediaries, products and processes.

The use of SAs in cross-border payments might influence both transaction costs and FX conversion fees. First, digital remittances are consistently cheaper than cash-based remittances, although digital services still account for a small fraction of total services. SAs managed by firms with large user networks, in particular, may be able to reduce fees through cross-subsidisation, economies of scale and economies of scope. This may enable low-value cross-border transactions of goods and services (including in e-commerce) that would otherwise be uneconomical. Second, SAs could also increase trading liquidity between otherwise thinly traded currencies by limiting the need to use bridge currencies for their conversion, helping to reduce spreads.

The use of DLT by SAs, if properly designed and risk-managed, could help to lower costs in several ways. The use of stablecoins in cross-border payments could help to reduce costs if DLT increases the quality, frequency, transparency and availability of data, as this would help to promote better integration and connectivity with other technologies and infrastructures. DLT underpinning SAs could also help to improve data availability, particularly if the stablecoin were used end-to-end for cross-border payments. However, the potential for such efficiency gains may be limited by the regulation of data flows through "data localisation" requirements, which require that data are stored or processed within a given jurisdiction and which, in some jurisdictions, may extend to payments-related data.<sup>9</sup>

An SA may not address all the costs associated with existing cross-border payments. Such costs may stem from FX market risks, depending on whether and to what extent the exchange rate between the domestic currency and the peg of the SA is fixed. In addition, as is the case for other digital payment methods, the costs associated with know-your-customer (KYC) procedures and AML/CFT controls will be relevant for SAs, and, as clarified above, no cost-saving benefits of SAs should be pursued or achieved by weakening compliance with these requirements. In addition, the use of SAs for cross-border payments comes with costs associated with the on- and off-ramp infrastructures. Finally, the cost advantages of SAs using DLT will also depend on the fees paid to validators.<sup>10</sup>

<sup>9</sup> The interaction between data frameworks and cross-border payments is the topic of the G20 cross-border payments programme's building block 6.

<sup>10</sup> See eg "The future monetary system", *BIS Annual Economic Report 2022*, Chapter III for details on fees paid to validators that are associated with network congestion scenarios.

### 2.1.2 Increasing speed

The use of SAs may increase transaction speeds for cross-border payments, in particular if a common payment platform is used and available 24/7. Current cross-border settlement speeds via correspondent banking vary markedly across end-to-end routes, from less than five minutes to more than two days.<sup>11</sup>

Retail customers and some small and medium-sized businesses might use SAs to seamlessly send (near) real-time payments to recipients abroad. If a stablecoin were to be used for all steps of a cross-border payment from end to end, delays associated with transactions frictions arising from structural rigidities associated with the network of PSPs and payment systems could be further reduced.<sup>12</sup> However, such cases are rare at the moment. Thus any significant improvements in transaction speeds will rely heavily on the availability and efficiency of the associated on- and off-ramps used at each end of the transaction.

Principle 9 of CPMI-IOSCO's Principles for Financial Market Infrastructures (PFMI) states that "an FMI should conduct its money settlements in central bank money where practical and available". If central bank money is not used, an FMI should conduct its money settlements using a settlement asset with little or no credit or liquidity risk.<sup>13</sup> Operating hours for most central bank-operated payment systems do not currently provide for wholesale payments to be made 24/7. The same is true of most commercial banks. As a result, cross-border wholesale payments are currently subject to processing delays outside operating hours.<sup>14</sup> As clarified by CPMI-IOSCO (2022), any SA that is determined by relevant authorities to be a systemically important FMI should be expected to observe the PFMI. Thus, in case of a stablecoin used for wholesale cross-border payments, such a stablecoin should have little to no credit and liquidity risk.

No SAs provide settlement in central bank money; they do not use central bank liabilities for settlement (ie across accounts at the central bank). One of the key features of using a central bank-operated payment system is the use of central bank money as the settlement asset, which entails no credit or liquidity risk. Indeed, one of the fundamental purposes of central banks is to provide a safe and liquid settlement asset. This is all the more relevant for time-critical and high-value transactions. In this regard, CBDCs could reinforce the role of central bank money as an anchor for the payment system and as a safe settlement asset.

### 2.1.3 Expanding the set of payment options

SAs could potentially make cross-border payments more accessible for PSPs and end users. Elimination of the need for intermediaries along the payment chain would simplify cross-border payments and improve access for individuals and corporations. Although many payment options could improve access in similar ways, SAs could be unique in their ability to expand access to cross-border payments options through increased competition and the introduction of new products and services catering to specific use cases.

SAs could help to enhance the digital options available for individuals seeking to send or receive remittances, for instance by offering users access to an alternative payment platform for instant cross-border transfers.<sup>15</sup> However, in jurisdictions with a large digitally underserved or unbanked population, it

<sup>11</sup> Based on data from SWIFT gpi, see Nilsson, T, R Bouter, M Van Acoleyen and L Cohen (2022): *SWIFT gpi data indicate drivers of fast cross-border payments*, February.

<sup>12</sup> In international remittances (and other cross-border retail payments), (existing) PSPs in a franchised network can still offer a fixed/quick transaction time (eg less than one hour/same day) – provided that information (and liquidity) is available, even though there may be uncertainties regarding the timing of settlement. In an open service (where there is no relationship between PSPs) the service may be significantly slower.

<sup>13</sup> PFMI Key Consideration 9.2.

<sup>14</sup> Building block 12 of the G20 cross-border payments programme seeks to extend and align the operating hours of key payment systems for a broader overlapping of operating hours (see Box).

<sup>15</sup> In a similar way, payments with mobile phones have recently helped to broaden access in many jurisdictions to users who are underserved by the banking system, although mobile money makes up only a small percentage of overall payments.

is uncertain whether SAs could create the necessary partnerships to reach those who currently have no access to the relevant infrastructure or devices.

SAs could also improve access for firms, particularly for micro, small and medium-sized enterprises that depend on correspondent banking relationships to send cross-border payments. Such relationships have decreased in recent years because of banks' de-risking and business optimisation (Rice et al (2020)).

Direct access by banks, non-banks and payment systems to the SA's payment platform could simplify and streamline cross-border transactions, reducing the need to maintain a large number of relationships.<sup>16</sup> SAs used end-to-end for cross-border payments could also support settlement in currencies poorly served by current infrastructure, potentially offering firms in certain EMDEs enhanced access to international markets for their goods and services. It should be noted, however, that in some cases correspondent banks also offer additional products and services (eg cheque clearing, wire transfers and other services facilitating participation in foreign financial markets) and many users would need to weigh the cost of switching to another service provider for these other products and services if they move to an SA for sending and receiving cross-border payments.

Integrating stablecoin solutions with other digital services or platforms (such as online marketplaces, social media, ride hailing or food delivery) could also bring enhanced network effects and access to data across multiple jurisdictions. Digital services and platforms offer the potential to scale rapidly and can quickly expand access to additional cross-border payment options. Such services and platforms might help to meet the demand for digital payments and other financial services (eg lending) thereby expanding access. Integrating stablecoins into marketplaces, possibly enhanced with synchronising technologies that link payments and asset transfers, might increase the adoption of digital payments and the entry of specialised payment services and new players.

#### 2.1.4 Improving transparency

The current limitations to transparency in the cross-border payments landscape include not only transparency regarding transaction terms or conditions (eg prices, FX fees and expected time of settlement), but also traceability on the movement of a transaction through the various steps of the transaction process. An SA may improve the traceability of cross-border payments for payers and payees to the extent that the use of a stablecoin is based on DLT or similar technologies that could allow for better self-tracking by the users throughout the process of the payment transaction. These potential benefits would depend on the SA's design choices. Transaction ledgers accompanying stablecoin transactions could make for greater real-time transparency regarding the status of an individual transaction.

## 2.2 Challenges for cross-border use

SAs face a number of challenges before they could bring about benefits for cross-border payments. These include the SA's organisational structure; its market structure and network scale; any inconsistencies in its access to on- and off-ramps; and a lack of regulatory consistency across jurisdictions. Many of these challenges may undermine user trust in the SA as a form of private money and such lack of trust may in turn further exacerbate these challenges. By reducing the SA's potential to realise the opportunities discussed in the previous section, these challenges might deter the adoption of an SA for cross-border payments.<sup>17</sup>

<sup>16</sup> For more details on the feasibility of multilateral platforms for cross-border payments, see CPMI (2023) and other work on the G20 cross-border payments programme's building block 17.

<sup>17</sup> For an earlier discussion of related issues, see the G7 Working Group on Stablecoins (2019). Many of these considerations have already been addressed or being addressed by the work of the FSB and SSBs.

### 2.2.1 Organisational structure within an SA

A lack of coordination between an SA's entities that are located across multiple jurisdictions may amplify frictions in current cross-border payment systems. SAs face many of the same hurdles as other cross-border payment options, including the presence of entities in different locations, KYC considerations, and risk management challenges. For instance, the issuer of a stablecoin and the manager of its reserve assets may be two different entities located in different jurisdictions, which may again differ from the wallet provider's location or those of other financial intermediaries involved in the arrangement. Dispersion in the location of entities making up the SA is critical from the perspective of risks for cross-border payments because of both differing jurisdictional standards and regulations and time differences affecting the availability of local services and infrastructures, including on- and off-ramps. When entities in an SA are located in different jurisdictions, effective and efficient internal coordination is particularly important if the SA is to successfully carry out payments operations across borders. Internal coordination arrangements within an SA (eg between the issuer, wallet and other relevant entities) are likely to influence its on- and off-ramp infrastructure, with delays or operational errors affecting transaction speed and costs. In jurisdictions where intermediaries provide services (eg KYC checks) during on- and off-ramping, potential cost and speed advantages may diminish if these intermediaries do not have adequate coordination processes, such as service level agreements, in place within the SA ecosystem.

If entities within an SA are geographically dispersed, there may be challenges in ensuring that different entities all adhere to and comply with all applicable regulations, eg ensuring that intermediaries all apply appropriate AML/CFT controls and avoid regulatory arbitrage. This feature of SAs also raises coordination challenges among regulatory, supervision and oversight authorities (see below). Finally, SAs may be impacted by the vulnerabilities and failures of the platforms active on a global scale where the stablecoin is used.

### 2.2.2 Market structure and network scale

Payment systems typically benefit from network effects in which the value of a network increases as more users join the network and as more merchants adopt new payment products. This would also be the case with SAs, potentially leading to challenges arising from a high degree of concentration or, in an extreme case, a natural monopoly. This section discusses the unique ways in which SAs may achieve network scale for cross-border payments.

To support cross-border payments, an SA will need to attract end users in multiple jurisdictions. SAs may be promoted by big tech companies or other firms with global network scale. In such a case, they could gain traction and scale rapidly as these firms may exploit their existing user base and data to promote and market their stablecoin, which could result in a highly concentrated market. This may lead to a wider user adoption and a greater concentration of risk, given the already large user base of these firms compared with that of SAs promoted by entities with a smaller global footprint. The larger the network scale of a given SA operator, the more likely it is that payments would be settled on the operator's own books, resulting in sizeable global on-us payments, possibly even for corridors with low demand. Such cross-border on-us payments could significantly reduce transaction costs but might also increase concentration, operational, legal and other risks, as well as the potential that existing PSPs may be disintermediated and liquidity may be locked up in these arrangements. Whether an SA operator would pass on any cost savings to users is unclear.

It is possible that certain stablecoins or their user interfaces, such as wallets promoted by big tech firms, may dominate the marketplace, raising barriers to entry. This could also make SAs promoted by big tech firms more dominant in cross-border payments. Big tech activities tend to be more significant in EMDEs as a proportion of a jurisdiction's overall financial services, including payments, than in AEs (FSB (2020b)). If large portions of a country's population (eg recipients of international remittances) were to rely on big tech services, and if alternatives were not readily available or would incur high switching costs,

such a country could become more vulnerable to a big tech's commercial strategies.<sup>18</sup> In addition, given the resources of big tech firms and their existing international user base, they might leverage partnerships with other technology firms to promote the use of their stablecoins as a means of payment and thus be better placed than other firms to further grow their networks.

The possibility of a highly fragmented market may also pose certain challenges, as the development of multiple stablecoins in parallel may lead to siloed technologies and a lack of interoperability, both between stablecoins and with existing payment providers and financial intermediaries, as well as uneven access or coverage for end users.<sup>19</sup>

### 2.2.3 Inconsistent access to on- and off-ramps

An SA can facilitate cross-border payments only if there are convenient and inexpensive arrangements for buying and selling the stablecoin in the currencies of the jurisdictions involved in the transaction. Thus, the on- and off-ramp infrastructure is key in this context.

Some jurisdictions may prevent or restrict regulated financial institutions from providing services to individuals or entities dealing in cryptoassets. In such cases, the on- and off-ramps may be unavailable from these institutions, reducing the opportunities offered by SAs for cross-border payments.

SAs may face related challenges in jurisdictions where digital payments are not widely accepted, because they may not exclusively rely on digital means of payment and the underlying infrastructures for on- and off-ramping. In these jurisdictions, SAs would need to offer robust and secure "cash-in and cash-out" through networks of physical agents. Depending on the local context, leveraging existing networks of physical agents may prove challenging due to eg limited geographical coverage or exclusivity arrangements tying agents to a single PSP. While these issues have long been identified – and largely addressed – as a core element of financial inclusion policies, it is unclear at this stage whether and to what extent physical agent networks may be available to, or suitable for, stablecoin on- and off-ramping. Depending on the market situation, the access to on- and off-ramp infrastructures could become bottlenecks for the successful use of SAs.

### 2.2.4 Lack of consistent regulation, supervision and oversight across jurisdictions

To realise the SA's cross-border opportunities, and for the SA to remain PDR, the SA should be underpinned in all jurisdictions relevant to its operation by regulations concerning legal certainty, AML/CFT, market integrity, data protection, consumer and investor protection, prudential requirements and tax compliance, as well as for the safety, efficiency and integrity of payment systems. Regulatory frameworks should be designed based on the principle of "same business, same risk or risk profile, same regulatory outcome", to ensure that providers of stablecoins posing risks similar to other financial activities are subject to the same regulatory outcomes, while taking into account the characteristics of SAs. Regulatory frameworks should, to the extent possible, be consistent across jurisdictions to promote usability and limit risks and regulatory arbitrage, in line with the work of international SSBs and the FSB. Furthermore, as regulation may lag behind innovation, authorities may also adopt a case-by-case approach to address the inherent risks of individual SAs, including those that are PDR.

As the stablecoin ecosystem continues to evolve, international work is ongoing to address the risks associated with stablecoins, differences in regulatory requirements across jurisdictions (eg CPMI-IOSCO (2022), FSB (2020), FSB (2023)), and any remaining regulatory ambiguity and the risk of regulatory arbitrage. Under these circumstances SAs that are used for cross-border payments and thus may be

<sup>18</sup> See, for instance, Croxson et al (2022), Carstens et al (2021) and Petralia et al (2019).

<sup>19</sup> See Section 4.2 for further discussion of interoperability in the context of coexistence and competition among cross-border payment alternatives. Several options for enhancing cross-border payments, including stablecoins, are also discussed by Bindseil and Pantelopoulou (2022).

subject to regulations of multiple jurisdictions might encounter challenges in adapting to various regulatory regimes in the case of differing laws and conflicting classifications of entities.

Regulatory authorities may differ in their implementation of international standards in their jurisdictions, particularly in areas where no global standards exist. For example, privacy and data protection laws currently vary markedly in their degree of regulation and enforcement. In some jurisdictions, only limited rules are in place, while others impose extensive requirements on the handling of personal data. Among the jurisdictions where extensive regulatory requirements exist, legal frameworks diverge in design and scope. In addition, the legal classification of SAs may also vary across jurisdictions. For example, the entity performing issuance, redemption and stabilisation function of the SA could be classified as either a bank, an investment fund, or another type of non-bank issuer, depending on the regulatory regime, which could lead to different regulatory treatments and hence regulatory arbitrage.

If demand for stablecoins pegged to a foreign currency is sufficiently high, they could pose significant challenges for jurisdictions with capital flow controls. Similarly, if jurisdictions where SAs are located restrict unconstrained access by foreign institutions to SAs, this will result in the use of correspondent banking-like arrangements, which are likely to be accompanied by significant frictions in cross-border payments.

AML/CFT concerns are particularly pertinent to the cross-border use of stablecoins. FATF has issued standards relevant to stablecoins, which require jurisdictions, financial institutions and virtual asset service providers (VASPs) to identify, assess and understand the risks of money laundering (ML) and terrorist financing (TF) and to take mitigating action (FATF (2021)). SAs can pose ML/TF risks given their potential for anonymity, global reach and ability to enable the rapid layering of illicit funds and mass-adoption, particularly if they allow for anonymous payments without interacting with a regulated intermediary. For these reasons, SAs could also be used for criminal purposes in the context of cross-border payments and the circumvention of targeted financial sanctions. Further, an SA may consist of multiple entities (such as exchanges or custodial wallet providers), possibly located in multiple jurisdictions, each under differing AML/CFT obligations. To remain PDR, an SA should avoid expanding its service provision to jurisdictions that lack robust regulatory frameworks for addressing ML/TF risks.

### 3. Coexistence and competition

As discussed in Section 2, SAs can augment the set of cross-border payment options available to consumers, businesses and financial institutions, while also raising an array of potential risks and challenges that might stand in the way of ensuring that such payment options are a viable, safe and resilient. The coexistence and competition of SAs with other cross-border payment options on cost, speed, access and transparency could help to foster a robust global payments infrastructure, offering safe and resilient choices to users.

To support the role of PDR stablecoins as a safe means of payment in the cross-border context, the successful coexistence of SAs with other payment options would depend on at least three considerations. First, a competitive landscape would help to ensure that SAs operate on a level playing field with other payment options. Second, interoperability would be crucial for SAs' end users if they are to seamlessly transact with each other. Third, the resilience of SAs would also be essential for a successful, safe and reliable coexistence with other payment options.

Further, regulation will affect the way an SA competes and coexists with other cross-border payment options in a jurisdiction. The relevant authorities will be responsible for regulation, supervision, and oversight of a PDR SA to ensure that the SA fulfils its responsibilities. Where relevant authorities determine that the use of stablecoins might weaken the resilience of the domestic financial system or

interfere with key policy tools, they may consider taking steps to mitigate these risks to national payment and monetary systems as well as to financial stability.

### 3.1 Competitive landscape

To reap the potential benefits of SAs for cross-border payments, SAs should compete on a level playing field with both existing and future options for cross-border payments. While market-based competitive dynamics will influence demand for individual products or services, including cross-border payment options, regulatory frameworks and supervisory regimes should create a uniform set of expectations, incentives and consequences across both existing and new payment providers. It is essential that any increases in competition do not compromise the safety of cross-border payments. As such, regardless of the payment options used, final settlement should be in either commercial bank money or an alternative form of money with little or no credit or liquidity risk.

Building comprehensive and coordinated regulatory frameworks is an important tool for authorities to promote a competitive landscape. This should avoid discrepancies in regulatory requirements both across jurisdictions and between similar types of activity and should help to align the incentives of payment service providers across similar activities. Fostering a competitive landscape, however, is not limited to designing appropriate regulatory and supervisory frameworks. Existing payment systems face competition issues and do not always operate on a level playing field due to strong network externalities, which could lead to barriers to entry and result in reduced competition. Alternatively, the introduction of SAs could enhance competition and lead to improvements in alternative cross-border payment options. Certain characteristics of digital asset-based finance, including SAs, could quickly lead to structural changes across the global financial system that would have both costs and benefits for end users and the financial system more generally. The relevant authorities must stay vigilant, both through information-sharing across jurisdictions and analysing market developments from a competition perspective, including the potential for monopolistic trends and the concentration of risks to develop.

### 3.2 Interoperability

To overcome some of the current limitations in cross-border payments, interoperability within and between SAs and other payment methods is central to meeting user needs. Existing payment options are often not interoperable, contributing to the known frictions in cross-border payments and hindering end users in seamlessly transacting with each other regardless of geographic location or choice of PSP (Boar et al (2021)).

Interoperability between stablecoins is important to avoid further fragmentation and inefficiencies in cross-border payments. Different blockchains currently are not always compatible, and even tokens of the same stablecoin issued on multiple blockchains are not always fully interoperable. While cross-chain solutions for interoperability between stablecoins are available, they are vulnerable to hacks.<sup>20</sup> Therefore, standardisation and interoperability between stablecoins will be crucial at an early stage to avoid new and unintended barriers later.

SAs with stablecoins that can be used for a variety of economic activities and fast, efficient, universally accessible and easy to use on- and off-ramps could greatly improve interoperability. However, there is a risk that SAs become “walled gardens” that are separate and disconnected from existing payment systems. A failure to achieve interoperability between SAs and other payment methods and intermediaries could lead to liquidity fragmentation for users and ultimately to market fragmentation.

Interoperability between SAs and other payment infrastructures and arrangements is important for enabling users to seamlessly move value into and out of SAs via on- and off-ramps. Also, such

<sup>20</sup> See, for instance Chainalysis Team (2022).

interoperability may be necessary for SAs to serve a wide range of payment use cases, and, if designed properly, to allow for stablecoins to enhance efficiency in existing or future payment systems.

The design of SAs could complement existing payment methods by supporting consumer choice in when and how to pay. Currently, there are on- and off-ramps between SAs and other payment infrastructures and arrangements. In the future, these may include automated clearing house (ACH) and card and cash infrastructures, such as ATMs and agents,<sup>21</sup> fast payment systems, e-money, multilateral platforms, mobile wallets, CBDCs<sup>22</sup> and tokenised commercial bank money. Due to the application of new technologies, modern infrastructures may provide a quicker conversion between sovereign currency and stablecoins or other cryptoassets. In addition, improvements to existing payment systems and the development of fast payment systems are likely to support better functionality and interoperability of SAs if they are used as on- and off-ramps. Annex 2 further explores the mechanics of on- and off-ramps in selected use cases.

Incorporating standardised technical specifications would help to minimise the frictions associated with connecting to other platforms or institutions and could broaden the potential cross-border use cases for SAs.<sup>23</sup> Such common standards may also help to improve the user experience when transferring value into or out of SAs, but additional safe on- and off-ramps may be necessary to fully support interoperability and convertibility. New on- and off-chain FX conversion options may also need to be created to ensure that users can fully leverage all available payment methods.

### 3.3 Resilience

SAs could help to make the global payment system more resilient by promoting efficiencies, limiting systemic risk and fostering overall financial stability, but only insofar as they are themselves resilient. This would depend on an SA's ability to identify, protect against and recover from adverse shocks and other disruptions, including risks associated with cyber attacks and fraud.

Broader use of SAs could help to make cross-border payments more resilient by providing an additional option for transmitting payments. This could limit the potential for operational events or outages in any one payment system from becoming a single point of failure. In addition to promoting consumer choice and increasing efficiency through competitive forces, SAs could also play a part in contributing to international financial stability by augmenting the set of available payment rails (unless these new payment rails themselves become a single point of failure).

Box

#### Interdependencies

Other key initiatives being undertaken as part of the G20 cross-border payments programme are likely to have implications for how SAs might coexist or compete with other payment options or financial institutions.

A few building blocks under the programme deal with improving existing payment infrastructures and arrangements. There are at least two ways in which these developments and initiatives may be relevant to SAs: (i) SAs may directly benefit from these improvements, eg as users of such arrangements for cross-border payments; and (ii) improvements to existing infrastructures may increase the usage of alternative cross-border payment mechanisms and affect the value proposition of SAs.

<sup>21</sup> Crypto debit cards may also be included among the current (legacy) infrastructures to the extent that they automatically convert all cryptocurrency to US dollars prior to making a purchase or ATM withdrawal.

<sup>22</sup> For a discussion regarding CBDC place in future monetary system and its relation to other digital innovations, see BIS (2022).

<sup>23</sup> The G20 cross-border payments programme contains building blocks 14 (on harmonisation of ISO 20022) and 15 (on harmonisation of API protocols). These building blocks will cover crypto and stablecoin compatibility with ISO 20022, and adoption of API standards by SAs, particularly for on- and off-ramps.

- *Extending/aligning operating hours of key payment systems (building block 12).* An alignment of RTGS operating hours across jurisdictions may improve SA liquidity management and increase the availability of on- and off-ramps. Extending RTGS hours more broadly may increase the overall efficiency and availability of other institutions and intermediaries, promoting efficiency and functionality for SAs.
- *Payment system interlinking and multilateral platforms (building blocks 13, 15 and 17).* Interlinking between payment systems, particularly fast payment systems, and enhanced or new multilateral platforms, subject to reaching sufficient coverage, may weaken the value proposition of a stablecoin as a means of payment across borders. At the same time, multilateral platforms may feature and/or accommodate new settlement assets, including stablecoins.
- *Improving direct access to payment systems (building block 10).* SAs may benefit from efforts to expand access to domestic payment systems with a view to reducing frictions in cross-border payments. SAs' access to domestic payment systems may support safe and efficient on- and of-ramping and liquidity management. However, expanded access will depend on the domestic legal framework, the regulatory regime that will be applied to SAs at a jurisdictional level and the rules governing access to domestic payment systems. Expanded access may also entail risks that could adversely affect the smooth functioning of domestic payment systems if not appropriately addressed.
- *Increasing PvP adoption (building block 9).* SAs may benefit from existing and new PvP arrangements for providing cross-border payments, if these arrangements cover a wider range of transactions and currencies. SAs themselves may foster PvP adoption to the extent that they may settle FX transactions and enable faster, more efficient and safer settlement. PvP is also relevant to SA participants' funding and defunding mechanisms, for instance by the stablecoin issuer in buying and selling reserve assets.
- *Factoring an international dimension into CBDC design (building block 19).* Cross-border CBDC arrangements could be preferable to arrangements that involve stablecoins for improving cross-border payments, depending on the level of interoperability of CBDC systems, by allowing for payments using a direct liability of the central bank, which is the least risky and most liquid settlement asset. Also, users may benefit from having the choice between both CBDC and stablecoins.

The potential benefits of SAs will be dependent on the progress made in other focus areas, including:

- *Alignment of regulatory, supervisory and oversight frameworks across jurisdictions (BB4).*
- *Consistent and comprehensive application of AML/CFT standards (BB5).*
- *Cross-border data flows and data storage (BB6) to the extent that this paves the way for safe and efficient SAs.*

## 4. Implications for central bank functions

This section explores several potential implications of SAs used in cross-border payments from the perspective of central banks. Although this report focuses on cross-border payments, the opportunities and challenges of SAs used for payments may have implications for several of the functions of central banks. First, central banks play a key role as overseers and operators of payment systems. In their oversight role, they are interested in issues related to credit, liquidity and operational risks of systemically important SAs, in particular the risks associated with the use of private forms of money as a settlement asset. Central banks are also concerned with fostering responsible financial innovation, among other interests.

Second, central banks must consider how SAs might interact with their ability to promote monetary stability, including how SAs used for cross-border payments may affect the transmission mechanism to real economic activity, the demand for domestic high-quality liquid assets and volatility in the level of central bank reserves. Third, SAs could raise financial stability issues related to market distortions under stress, bank funding, pressure on capital flows and operational or cyber risks related to the technological characteristics or the decentralised nature of certain SAs.

## 4.1 Fostering safe, reliable, transparent and efficient payment systems

Central banks have a crucial role in maintaining the safety, reliability and efficiency of payment systems. Given that digital innovation is radically reshaping the payments landscape, this role is as critical as ever (BIS (2020)). Even if an SA is PDR, it may still pose payment system risks, particularly in the case of large and abrupt changes in demand. This situation may be comparable with that of existing payment systems, which, although PDR, also contain a certain level of risk, including operational, liquidity and settlement risks.

In their role as payment system overseers, central banks, together with other relevant authorities, should consider how to establish and maintain a clear regulatory, supervisory and oversight framework for systemically important SAs, both domestically and internationally. In addition to the considerations raised in Section 2.2.4, it is important to understand how the implementation of risk mitigation measures may be complicated by the decentralised structure of SAs. EMDE authorities in particular may face difficulties in the oversight of SAs, because the mechanisms needed to conduct such oversight may be lacking or unclear, especially in the case of SAs based in foreign jurisdictions (Feyen et al (2021)).

A key consideration regarding SAs stems from the potential use of stablecoins as a settlement asset that is neither central bank money nor commercial bank money and carries additional financial risk. Central bank money has an important settlement role in payment systems as it provides a safe and efficient means through which other forms of money can be converted at face value (CPSS (2003)). Used as a settlement asset, it is free of credit and liquidity risk. Typically, access to central bank money through central bank accounts is available only to a limited set of entities, which are mostly domestic banks. There are important trade-offs to consider with respect to access to central bank money by other entities, keeping in mind jurisdiction-specific conditions.<sup>24</sup>

CPMI-IOSCO (2022) clarifies that stablecoins used as a settlement asset by systemically important SAs should have little to no credit and liquidity risk, which is a crucial point since these risks could become systemic as the cross-border use of the stablecoins grows. A loss of confidence in a stablecoin widely used for cross-border payments may create spillovers into other payment systems and financial markets. The resulting large-scale redemptions would vary depending on both the peg and on- and off-ramp infrastructure. With respect to the peg, the liquidation of SAs' reserve assets might have a sizeable impact on jurisdictions in whose currencies the reserve assets are denominated. This applies even in the case of a PDR SA. For example, changes in demand from stablecoin users, both domestic and abroad, could have sizeable effects on local short-term funding or other markets. A large fall in foreign demand could lead to large effects on domestic markets. The extent of spillovers will depend on the size of redemptions and the concentration of the reserve portfolio in particular assets. If the portfolio is highly concentrated in a few asset classes in a single currency, this could have a large effect on a few geographically concentrated markets.

The impact of large-scale redemptions may also vary depending on the availability of on- and off-ramps and the speed with which these infrastructures can provide users with their desired means of payment. A sudden increase in the use of a certain off-ramp may imply negative externalities for other users. For example, if a significant number of stablecoin holders were to cash out their stablecoins using a particular payment system, that system might slow down, also for those using the system for non-stablecoin payments. Thus, payment systems used for on- and off-ramping should have sufficient liquidity and operational capacity to withstand periods of stress. The use of such payment systems may increase significantly as the stablecoin's adoption grows. As a result, these payment systems may become systemically important, implicating the relevant central bank's oversight responsibilities. Alternatively, in a steady state in which a stablecoin ecosystem operates separately from existing cross-border payment

<sup>24</sup> Access to key payment systems, which is a foundational element in providing cross-border payment services safely and efficiently, is the focus of the G20 cross-border payments programme's building block 10. In May 2022, the CPMI published a best practices framework for the self-assessment of access policies to key payment systems (see Box).

systems (eg with limited or no use of on- and off-ramps), there could be a shift in demand away from legacy systems. This could generate liquidity and other risks for existing cross-border payment providers.

## 4.2 Promoting monetary stability

Central banks have designed their existing policy implementation frameworks based on the current payment ecosystem and adjustments may be needed to adapt to innovations in cross-border payments. Depending on their design, and how widespread their use is, cross-border use of SAs could affect how central banks implement monetary policy.

Central banks may need to consider how the widespread cross-border use of a stablecoin for payments could affect FX markets if a stablecoin is denominated in a currency that has not been widely used for cross-border payments. The exchange rate, via demand for assets held in the reserve, could be affected by a stablecoin pegged to a currency previously not extensively used in global trade. Changes in local exchange rates may in turn affect jurisdictions' local financial conditions and potentially the value of their sovereign debt.

Central banks may also need to analyse how the increased adoption of a stablecoin that is not denominated in the domestic currency might affect the central bank's ability to implement monetary policy and maintain price stability. At the global level, the peg's denomination could lead to the dominance of a few currencies, which could pose risks to EMDEs through pressures on their currencies and capital accounts. For example, if this were to result in difficulties in maintaining international reserves in a particular reserve currency, the functioning of FX and interbank markets might be affected with a potential impact on monetary policy implementation. For some jurisdictions, the widespread cross-border use of foreign currency-denominated stablecoins could increase the risk of currency substitution and potential loss of seigniorage. Capital controls imposed by some jurisdictions, such as requirements on FX and capital flow management, might not be easily applicable to or enforceable on SAs.

Finally, the issuance of stablecoins for cross-border payment purposes by non-traditional financial intermediaries could affect the implementation of monetary policy. The implications may vary depending on the standing of the banking sector and incumbent financial institutions. Further, the balance sheet composition of central banks could change if a stablecoin were to become widely adopted. Also, depending on the scale of adoption, the composition of a stablecoin issuer's backing assets could have implications for the supply-demand conditions for safe assets and certain government securities markets. For example, if a US dollar-denominated stablecoin backed by US Treasuries were to be widely adopted, demand for US Treasuries would increase (all else equal).

## 4.3 Promoting financial stability

Central banks are responsible for maintaining public confidence in the currency and for ensuring that systemically important payment systems operate safely and efficiently, and this responsibility does not change as SAs seek to provide a new form of private money and new payment systems. The ability for individuals and businesses to transact smoothly and safely is critical to financial stability, which is a key public policy objective.

To increase the utility of SAs and to achieve regulatory coherence on the premise of avoiding conflicts between the laws and regulations of various jurisdictions, authorities should continue to coordinate internationally to implement international standards, promote interoperability across SAs and with other payment systems, and prevent regulatory arbitrage.<sup>25</sup>

<sup>25</sup> As part of the G20 cross-border payments programme, the FSB undertook a review of its recommendations for global stablecoins, in consultation with other relevant SSBs and international organisations. The FSB issued updated high-level recommendations in July 2023.

The viability of SAs for both domestic and cross-border payments depends on the confidence users place in them. The value of stablecoins not denominated in the domestic currency will fluctuate from the perspective of domestic residents, affecting users' perceptions of its use as a store of value and as a means of cross-border payment. While users are generally confident that central bank and commercial bank monies are convertible at par, this confidence may depend on the local context of monetary and fiscal policies as well as a jurisdiction's recent history of banking and currency crises. In addition, confidence in commercial bank money may be reinforced by legal and institutional safeguards, such as deposit insurance schemes. The availability of such safeguards varies across jurisdictions and would not necessarily cover SAs. However, safeguards of this kind could help maintain the confidence of stablecoin users and reduce their incentives to quickly convert stablecoin holdings into sovereign currencies. The CPMI-IOSCO PFMI and related guidance for systemically important SAs sets high expectations to ensure that stablecoins used as settlement asset(s) have no or little credit and liquidity risks and are readily transferable into central bank money or other liquid assets, as soon as possible, at a minimum by the end of the day and ideally intraday.

The widespread cross-border use of a stablecoin could contribute to bank runs as consumers could use on-ramps to start or expedite a "digital run" from commercial banks to stablecoins in times of stress (see Azar et al (2022)). Depending on specific jurisdictional conditions, crisis measures might be explored, such as limits or controlling fund outflows from bank deposits to avoid or slow possible bank runs. Safeguards might include a continuous review and assessment of prudential regulation to ensure that banks have enough liquidity to cover potential outflows, including in times of stress. This is important as depositors' behaviour in times of stress could vary according to a stablecoin's features and its ties to existing payment systems. At the same time, the use of a stablecoin for cross-border payments could also increase bank deposits if the on- or off-ramp is connected to domestic retail payment systems and some of the funds remain in the banking system rather than in cash. The impact of these challenges would probably depend on the extent of the take-up of stablecoins and whether any substitution occurs. And the risks will vary in the steady state and during a transition. The effects on bank intermediation may be manageable if the banking system has the time and flexibility to adjust.

## 5. Conclusions and future work

The use of stablecoins in cross-border payments could open up opportunities (in terms of increasing their speed and lowering their costs, as well as expanding the set of options and improving transparency). At the same time, the challenges could include coordination, competition, network scale and market structure, and the lack of internationally consistent and effective regulation, supervision and oversight. Even a PDR SA may not necessarily have a positive impact on cross-border payments as the drawbacks could outweigh any potential benefits. In order to address these challenges, the regulation, supervision and oversight of SAs alone may not be sufficient to mitigate such risks. Other private or public sector efforts, such as improvements in existing payment infrastructures or the development of CBDCs may be explored.

Strongly-coordinated efforts at the international level are needed to avoid regulatory arbitrage while allowing for sufficient flexibility such that jurisdictional-specific risks and concerns are addressed.<sup>26</sup> Given the significant risks posed to EMDEs in the form of currency substitution and potential loss of seigniorage, additional focus may be given to the steps (including the possibility to limit or prohibit the use of SAs) to mitigate risks to the national payment and monetary system as well as to financial stability, where authorities determine that the use of SAs may interfere with central bank mandate for monetary and financial stability.

<sup>26</sup> See footnote 1 above.

For a stablecoin to be used for safe cross-border payments, cross-border alignment of domestic regulatory frameworks and global standards is necessary. Otherwise, SAs could be limited to effective use within certain jurisdictions rather than across jurisdictions. As relevant regulations are coming into place in some jurisdictions (eg the Markets in Crypto-Assets (MiCA) Regulation in the European Union), future work to identify the most effective cooperation and coordination mechanisms between jurisdictional authorities may help to ensure that the opportunities of SAs can be realised while reducing their risks and challenges, as identified in this report. Future work is needed to (i) explore the implications of SAs used for both cross-border and domestic payments; (ii) compare the benefits and costs of SAs with those of alternatives such as expanded access to existing (cross-border) payment systems for intermediaries and end users; and (iii) analyse the benefits and challenges of stablecoins pegged to multiple rather than single sovereign currencies, including the resulting macro-financial risks and other challenges.<sup>27</sup> Another key area for future work is the exploration of interdependencies between multilateral platforms (building block 17), CBDCs (building block 19) and SAs for cross-border payments. Further analysis here would provide crucial insights for central banks and standard setters to promote responsible innovation and holistically address the existing frictions in cross-border payments. Finally, it would be useful to examine tools to address the new role of SAs in financial markets and how monetary policy might evolve as cross-border payments become more digital, including the effect of stablecoins on FX markets, on the demand for cash and safe reserve assets, and on financial intermediation.

<sup>27</sup> For a theoretical analysis of the macroeconomic implications of stablecoins pegged to multiple currencies, see Baughman and Flemming (2022).

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## Annex 1: Relevant FSB and SSBs guidance for properly designed and regulated SAs

### 1.1 Governance and comprehensive risk management

A properly designed and regulated SA ensures that the roles and responsibilities governing its functions are clearly identified and that its participants have the incentives and the ability to manage the risks they assume. In addition, it ensures that its rules are designed to protect end users. The SA considers all interdependent functions and the entities fulfilling these functions for comprehensively managing its risks.

- *CPSS-IOSCO (2012), Principle 2* states that an FMI should have documented and disclosed governance arrangements with clearly specified roles and responsibilities for the FMI's board of directors and management.<sup>28</sup> Certain SAs propose partially or fully decentralised governance arrangements, where there may be no legal entities and persons in control of the FMI function. In particular, the transfer function can be set up as a smart contract on a permissionless public ledger: in this case, the governance of the transfer function is solely performed by software and not by any identifiable legal entities. The CPMI-IOSCO (2022) guidance clarifies that a systemically important FMI should have appropriate governance arrangements. The SA's ownership structure and operation has to allow for clear and direct lines of responsibility and accountability, for instance, it is owned and operated by one or more identifiable and responsible legal entities that are ultimately controlled by natural persons. The SA's governance should allow for timely human intervention, as and when needed, in order to observe Principle 2 and the other relevant principles of the PFMI on a continuous basis. The SA's ownership structure and operation should allow the SA to observe Principle 2 and the other relevant principles of the PFMI irrespective of the governance arrangements of other interdependent functions.
- *CPSS-IOSCO (2012), Principle 3* aims to promote an integrated and comprehensive view of FMI risks. This includes the risks FMIs bear from and pose to their participants and their customers, as well as other entities, such as other FMIs, banks, liquidity providers, validating node operators and other node operators, and service providers. SAs may fulfil multiple interdependent functions, some of which do not fall under the scope the PFMI. The CPMI-IOSCO (2022) guidance states that a systemically important SA should regularly review the material risks that the FMI function bears from and poses to other SA functions and the entities (such as other FMIs, settlement banks, liquidity providers, validating node operators and other node operators, or service providers) which perform other SA functions or on which the SA relies for its transfer function. A systemically important SA should develop appropriate risk-management frameworks and tools to address these risks. In particular, it should identify and implement appropriate mitigations, taking an integrated and comprehensive view of its risks.

### 1.2 Illicit finance

A properly designed and regulated SA addresses money laundering and terrorist financing (ML/TF) risks and vulnerabilities for stablecoins, such as anonymity, global reach and their ability to enable the rapid layering of illicit funds. The SA fulfils AML/CFT obligations through its governance body and/or third parties with responsibility for specific functions (eg, exchange or wallet provision), either as financial institutions (FIs) or virtual asset service providers (VASPs). The SA addresses key residual ML/TF risks

<sup>28</sup> Principle 2's key considerations and explanatory notes provide details regarding the specific standards that an FMI should observe. Among those are considerations for: the objectives of an FMI (KC1); documentation of its governance arrangements (KC2); roles and responsibilities of its board (KC3); composition of its board (KC4); roles and responsibilities of its management (KC5); risk-management decision-making and accountability (KC6); and the balancing of interests and disclosure of major decisions (KC7).

relating to the risks posed by anonymous peer-to-peer transactions of the stablecoin, decentralised governance structures and weak or non-existent AML/CFT regulations (FATF (2020)). These risks should be analysed in an ongoing and forward-looking manner and mitigated before the SA is launched.

- *FATF Recommendations 1 and 15* states that countries, financial institutions and VASPs should identify, assess and take effective action to mitigate ML/TF risks, including those posed by new technologies. This includes ensuring all VASPs in an SA are regulated for AML/CFT purposes, and licensed or registered and subject to effective systems for monitoring and ensuring compliance. This includes compliance with key AML/CFT measures, such as the “travel rule”.<sup>29</sup>
- *FSB (2023) Recommendation 5*. Authorities should require that GSC arrangements have effective risk management frameworks in place that comprehensively address all material risks associated with their functions and activities, especially with regard to operational resilience, cyber security safeguards and AML/CFT measures, as well as “fit and proper” requirements, if applicable, and consistent with jurisdictions’ laws and regulations.

### 1.3 Credit and liquidity risks

A properly designed and regulated SA ensures that the credit and liquidity risks of the stablecoin are minimised, controlled and clearly disclosed to end users. The SA has a comprehensive resolution framework in place including continuity and recovery of identified critical functions and activities to prevent any shocks from leading up to disorderly failure.

- *CPSS-IOSCO (2012), Principle 9* states that “an FMI should conduct its money settlements in central bank money where practical and available. If central bank money is not used, an FMI should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money.” Participants of SAs may be exposed to credit risk if a stablecoin loses value relative to the sovereign currency in which it is denominated or if the issuer of the stablecoin defaults on its obligations to participants. Participants may face liquidity risk if a stablecoin cannot be promptly converted into other liquid assets, such as commercial or central bank deposits. The CPMI-IOSCO (2022) guidance states that a stablecoin used by a systemically important SA for money settlements should have little or no credit or liquidity risk. In assessing the risk presented by the stablecoin, the SA should consider whether the stablecoin provides its holders with a direct legal claim on the issuer and/or claim on, title to or interest in the underlying reserve assets for timely<sup>30</sup> convertibility at par into other liquid assets such as claims on a central bank, and a clear and robust process for fulfilling holders’ claims in both normal and stressed times.
- *FSB (2023) Recommendation 5*: [...] authorities should require GSC arrangements to have comprehensive liquidity risk management practices and contingency funding plans that clearly set out the strategies and tools for addressing large number of redemptions i.e. run scenarios, and are regularly tested and operationally robust. The GSC arrangement should also have robust capabilities to measure, monitor and control funding and liquidity risks, including liquidity stress testing.
- *FSB (2023) Recommendation 7*: Authorities should require that GSC arrangements have appropriate recovery and resolution plans.
- *FSB (2023) Recommendation 9*: For GSCs that use a reserve-based stabilisation method (“reserve-based stablecoin”), authorities should ensure that there are robust requirements for the

<sup>29</sup> FATF’s travel rule requires VASPs and other financial institutions to share relevant originator and beneficiary information alongside virtual asset transactions, therefore helping to prevent criminal and terrorist misuse.

<sup>30</sup> As soon as possible, at a minimum by the end of the day and ideally intraday, as set out in CPSS-IOSCO (2012), Principle 9, Key Consideration 5.

composition of reserve assets consisting only of conservative, high-quality and highly liquid assets. Authorities should consider limitations to the reserve that would exclude speculative and volatile assets as well as assets where there is insufficient historical evidence and data of quality and liquidity, such as most cryptoassets. Due to the potential risk of fire sales of reserve assets, there should be particular attention to the nature, sufficiency and degree of risk-taking in terms of duration, credit quality, liquidity and concentration of a GSC's reserve assets. Reserve assets should be unencumbered and easily and immediately convertible into fiat currency at little or no loss of value. The market value of reserve assets should meet or exceed the amount of outstanding claims or stablecoins in circulation at all times. In addition, risks of custodial arrangements for reserve assets should also be adequately managed and addressed. In particular, authorities should require reserve-based stablecoins to ensure safe custody and proper record-keeping of reserve assets and that ownership rights of reserve assets are protected at all times, including through segregation requirements from other assets of the GSC, members of its group and the custodian's assets. The reserve assets should be protected against claims of creditors of the GSC issuer, and members of the group of the GSC issuer, in particular in the event of insolvency of the issuer. GSC issuers should also consider the operational, credit and liquidity risks associated with the use of custody service providers to minimise the risk of loss, misuse of or delayed access to the reserve assets.

[..] In order to have effective stabilisation methods, GSC arrangements should also be subject to appropriate prudential requirements (including capital and liquidity requirements) to provide that losses can be absorbed and there is sufficient liquidity to deal with outflows. Prudential requirements should take into account the risks of the reserve assets and operational risks (amongst other risks). Adequate capital buffers also contribute to maintaining confidence in the GSC and a stable value at all times. Such capital buffers should be consistent with the size of the GSC in circulation and proportionate to the risks of GSC arrangement.

## 1.4 Redemption rights

A properly designed and regulated SA ensures that promise to maintain a stable value relative to one or several fiat currencies (so-called fiat-referenced stablecoins) is met by providing a robust legal claim to all users against the issuer and/or underlying reserve assets and guarantee timely redemption. The SA manages the reserve to maintain the value of the stablecoin and, in the case that it includes redemption rights, ensures that redemptions can be met under normal and extreme economic conditions.

- *CPSS-IOSCO (2012), Principle 9* on money settlement and the *CPMI-IOSCO (2022) guidance* cover the redemption rights alongside minimising and controlling the credit and liquidity risk.
- *FSB (2023) Recommendation 9: Authorities should require that GSC arrangements provide a robust legal claim to all users against the issuer and/or underlying reserve assets and guarantee timely redemption. For GSCs referenced to a single fiat currency, redemption should be at par into fiat. To maintain a stable value at all times and mitigate the risks of runs, authorities should require GSC arrangements to have an effective stabilisation mechanism, clear redemption rights and meet prudential requirements.*

## 1.5 Final settlement

A properly designed and regulated SA ensures that payments conducted through the SA are final and irrevocable, regardless of the operational settlement method used.

- *CPSS-IOSCO (2012), Principle 8* defines final settlement "as the irrevocable and unconditional transfer of an asset or financial instrument, or the discharge of an obligation by the FMI or its participants in accordance with the terms of the underlying contract". If an SA features

probabilistic settlement, a misalignment between the state of the ledger and legal finality may occur. The CPMI-IOSCO (2022) guidance states that a systemically important SA should provide clear and certain final settlement, at a minimum by the end of the value date, regardless of the operational settlement method used. Where necessary or preferable, such settlement should be provided on an intraday or real-time basis. The SA should clearly define the point at which a transfer of a stablecoin through the operational settlement method used becomes irrevocable and unconditional and ensure that there is a clear legal basis that acknowledges and supports finality of a transfer. The SA should have robust mechanism(s) for preventing any misalignment between the state of the ledger and legal finality and ensure that legal finality of a transfer, once it has occurred, is maintained regardless of competing state(s) of the ledger.

## 1.6 Operational risks (including cyber risk) and risk of loss of data

A properly designed and regulated SA ensures that risks to information and technology assets that could have an impact on the confidentiality, availability or integrity of the information and related systems are managed to acceptable levels, as may be decided between the SA and the relevant authorities. It ensures that critical third-party providers follow similar or higher standards to manage operational arrangements than the SA. It is designed to ensure that it can scale up the processing of transactions consistent with the demand without disruptions in the provision of services. It follows the data protection laws in all jurisdictions in which it operates, particularly with respect to the definition and treatment of sensitive data and the scope of entities covered by the law.

- *CPSS-IOSCO (2012), Principle 17* states that “an FMI should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures, and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfilment of the FMI’s obligations, including in the event of a wide-scale or major disruption.” *Guidance on cyber resilience for financial market infrastructures*, which was issued in 2016, states that FMIs should instil a culture of cyber risk awareness whereby its resilience posture, at every level, is regularly and frequently re-evaluated. It provides guidance on the preparations and measures that FMIs should undertake to enhance their cyber resilience capabilities in order to limit the escalating risks that cyber threats pose to financial stability.
- *FSB (2023) Recommendation 5*: Authorities should require that GSC arrangements have effective risk management frameworks in place that comprehensively address all material risks associated with their functions and activities, especially with regard to operational resilience, cyber security safeguards and AML/CFT measures, as well as “fit and proper” requirements, if applicable, and consistent with jurisdictions’ laws and regulations.
- *FSB (2023) Recommendation 6*: Authorities should ensure that global SAs have in place robust frameworks, including systems and processes for the collecting, storing, safeguarding and timely and accurate reporting of data. Authorities should have access to the data as necessary and appropriate to fulfil their regulatory, supervisory and oversight mandates.

## Annex 2: Mechanics of on- and off-ramps in selected use cases

### 2.1 E-commerce

E-commerce platforms allow consumers and businesses to trade goods and services. Such platforms are “borderless”, in the sense that a buyer from one country may purchase items from a seller in another country, hence requiring a cross-border payment. For most e-commerce platforms, on- and off-ramps are provided by the front-end of retail payment systems. Cryptoassets’ front-end service providers (eg crypto payment gateways) often use APIs as a way for firms to access their payment system. How on- and off-ramps for stablecoins work will depend on the type of e-commerce platform, and on how and where the stablecoin is adopted in the payment chain. There are two main e-commerce platform types: one-sided and two-sided marketplaces.

The one-sided marketplace has a single seller, offering an online store selling one or multiple products/services. Payments in these marketplaces are often managed by a third-party provider. An online store may directly or indirectly accept stablecoins as a means of payment, and the store (or its service provider) may off-ramp via the provider, bank, centralised exchange or other platforms. Alternatively, the store owner may accept stablecoins directly through a custodial or non-custodial wallet, or all payments may settle all payments in stablecoin deposited directly in the store owner’s wallet. In turn, wallets could be linked to a bank or other entity providing the conversion services, which may be connected to any of the infrastructures discussed above.

Two-sided marketplaces are platforms that bring buyers and sellers together. In these marketplaces, payments can be managed by the marketplace or outsourced. If the marketplace manages payments, it may choose to adopt a stablecoin and blockchain as its payment system. If the marketplace outsources payments, the interaction with the stablecoin will be similar to the case of one-sided markets discussed above. For the merchants on the marketplace, they may or may not have direct interaction with the stablecoin, and therefore may not need to off-ramp. If there is a need for off-ramp, then the process will be similar to the one-sided marketplace examples.

### 2.2 Remittances

Remittance transfers may represent a relevant use case for stablecoins in cross-border payments. Depending on the configuration of the service, the use of on- and off-ramps for stablecoins may occur at different steps of a remittance transfer and by different entities.

At the outset, the service may or may not require end users to hold stablecoins. Accordingly, to initiate a remittance, the sender or capturing agent may be required to pay the remittance service provider (RSP) by funding a stablecoin balance.<sup>31</sup> Similarly, on the receiving end, the recipient may be required to open a stablecoin wallet to receive remittance payments, or the disbursing agent may be required to disburse in cash or credit the recipient’s transaction account. On both ends of a remittance transaction, the means of payment will depend on the infrastructure of the capturing and disbursing agent or RSP and their access to domestic and cross-border payment systems.

Between the steps of initiating a remittance transfer and the disbursement process, other steps may entail the use of on- and off-ramps by RSPs and other service providers. For instance, to the extent that RSPs buy/sell stablecoins, or a third party provides liquidity in the domestic currency, these entities would need to use the relevant on- and off-ramps.

<sup>31</sup> The design of a stablecoin, including the rights and protections accorded to holders of the stablecoin, among other factors, may influence users’ propensity to maintain a “balance” in stablecoins, thereby potentially decreasing the frequency of, and costs associated with, on- and off-ramping.

## 2.3 Cross-border B2B payments

In the case of cross-border B2B payments, the on- and off-ramps vary depending on the service provider's business model. In some models, the service provider may act as a market-maker by buying or selling foreign currencies and cryptoassets including stablecoins. In this case, the service provider may serve businesses on either side of a cross-border transaction with the use of on- and off-ramps – to the extent that the service provider effectively buys sovereign currency from the sender and/or sells cryptoassets or stablecoins to its forex broker. In another model, businesses may be required to open a new stablecoin wallet or link an eligible wallet to the provider's platform. The on- and off-ramps are outside the scope of this model, in the sense that businesses arrange to convert sovereign currency into stablecoins and vice versa through a third party.

## Annex 3: Composition of the Future of Payments Working Group (FoP)

### Chair of the Working Group and Lead of the BB 18 drafting team

Board of Governors of the Federal Reserve System	David Mills
Sveriges Riksbank	Cecilia Skingsley [FoP Chair until September 2022]

### Members

Central Bank of Argentina	Luis D'Orio
Reserve Bank of Australia	Chris Thompson Cameron Dark (alternate)
National Bank of Belgium	Jan Vermeulen [since February 2023] Filip Caron [until February 2023]
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