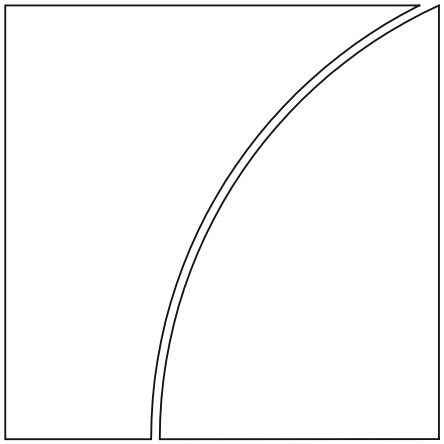
Committee on Payments and Market Infrastructures

Board of the International Organization of Securities Commissions

Consultative report



Application of the Principles for Financial Market Infrastructures to stablecoin arrangements

October 2021

BANK FOR INTERNATIONAL SETTLEMENTS

IOSCO

This publication is available on the BIS website (www.bis.org) and the IOSCO website (www.iosco.org).

ISBN 978-92-9259-494-7 (online)

Application of the Principles for Financial Market Infrastructures to stablecoin arrangements

Contents

Executive summary

With the emergence of stablecoins, and in light of their potential impact on the financial system, the G7, the G20 and the Financial Stability Board (FSB) called upon the standard-setting bodies to revise standards and principles or provide further guidance supplementing existing standards and principles, as needed. These standard-setting bodies include the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO).

Against this background, this report provides guidance on the application of the *Principles for financial market infrastructures* (PFMI) to systemically important stablecoin arrangements (SAs), including the entities integral to such arrangements. This report is not intended to create additional standards for SAs but rather to provide more clarity to systemically important SAs and relevant authorities as those SAs seek to observe the PFMI. Although this report provides guidance on only a subset of principles, a systemically important SA primarily used for making payments would be expected to observe all of the relevant principles including those principles for which no further guidance is provided in this report. This report also does not cover issues specific to stablecoins denominated in or pegged to a basket of fiat currencies (multicurrency SAs), as they will be covered in future work to consider whether the guidance in this report is sufficient to provide clarity to multicurrency SAs when seeking to observe the PFMI.

Stablecoins' usability as a means of payment relies on the core functions performed by SAs. In particular, the SA "transfer function" enables the transfer of coins between users and typically entails the operation of a system, a set of rules for the transfer of coins between or among participants, and a mechanism for validating transactions. The transfer function of an SA is comparable to the transfer function performed by other types of financial market infrastructure (FMI). As a result, an SA that performs this transfer function is considered an FMI for the purpose of applying the PFMI and, if determined by relevant authorities to be systemically important, the SA as a whole would be expected to observe all relevant principles in the PFMI. This report provides considerations to assist relevant authorities in determining whether an SA is systemically important.

Notwithstanding the fact that the transfer function of SAs is considered an FMI function for the purpose of applying the PFMI, SAs may present some notable and novel features as compared with existing FMIs. These notable features relate to: (i) the potential use of settlement assets that are neither central bank money nor commercial bank money and carry additional financial risk; (ii) the interdependencies between multiple SA functions; (iii) the degree of decentralisation of operations and/or governance; and (iv) a potentially large-scale deployment of emerging technologies such as distributed ledger technology (DLT).

The CPMI and IOSCO believe that guidance on the application of the PFMI with respect to these features of SAs is useful for SAs and relevant authorities in applying the PFMI to systemically important SAs. The guidance provided in this report is summarised in Table 1 below. This guidance focuses on a subset of the PFMI for which the CPMI and IOSCO consider that guidance is warranted in light of notable features of SAs as compared to existing FMIs. This guidance should be read in conjunction with the relevant principles, key considerations and explanatory notes of the PFMI as well as further considerations provided in Section 3.

Guidance on the application of the PFMI to stablecoin arrangements (SAs) Table 1

Principles and key considerations (KCs)	Guidance
Governance Principle 2 – KCs 2, 6, 7	A systemically important SA should have appropriate governance arrangements. When seeking to observe Principle 2, a systemically important SA should consider how: • the SA's ownership structure and operation 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; and • the SA's ownership structure and operation allow the SA to observe Principle 2 and the other relevant principles of the PFMI irrespective of the governance arrangements of other interdependent functions.
Comprehensive risk management Principle 3 – KC 3	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 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.
Settlement finality Principle 8 – KC 3	A systemically important SA should provide clear and final settlement, regardless of the operational settlement method used. When seeking to observe Principle 8, a systemically important SA should: • clearly define the point at which a transfer on the ledger becomes irrevocable and technical settlement happens and make it transparent whether and to what extent there could be a misalignment between technical settlement and legal finality; and • ensure proper transparency regarding mechanisms for reconciling the misalignment between technical settlement and legal finality and have measures in place to address the potential losses that could be created in case of reversal stemming from the misalignment between technical settlement and legal finality.
Money settlements Principle 9 – KCs 2, 4, 5	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[1] 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. When seeking to observe Principle 9, a systemically important SA should determine whether the credit and liquidity risks of the stablecoin that it uses for money settlements are minimised and strictly controlled and the stablecoin is an acceptable alternative to the use of central bank money. Relevant factors may include but are not limited to: • The clarity and enforceability of the legal claims, titles, interests and other rights and protections accorded to holders of the stablecoin and SA participants in relation to the issuer of a stablecoin and reserve assets backing it, including their treatment (eg seniority) in the event of insolvency of the issuer, its reserve manager or a custodian of the reserve assets and/or other protections such as third party guarantees. • The nature and sufficiency of the SA's reserve assets to support and stabilise the value of the outstanding stock of issued stablecoins, and the degree to which the SA's reserve assets could be liquidated at or close to prevailing market prices. • The clarity, robustness and timeliness of the process for converting the stablecoin into other liquid assets such as claims on a central bank in both normal and stressed circumstances. The stablecoin should be convertible into other liquid assets, as soon as possible, at a minimum by the end of the day and ideally intraday. • The creditworthiness, capitalisation, access to liquidity and operational reliability of the issuer of the stablecoin, provider of the settlement accounts and custodian(s) of the reserve assets. Reserve assets held or placed in custody should be protected against claims of a

	custodian's creditors. Any chosen custodians should have robust accounting practices, safekeeping procedures and internal controls to protect the assets, as well as a sound legal basis supporting its activities, including the segregation of assets. • The sufficiency of the regulatory and supervisory framework that applies to the issuer, reserve manager(s) and/or custodian(s) of the reserve assets. • The existence of risk controls that could, where needed, reduce credit and/or liquidity risks. Possible examples include collateral pools supporting committed lines of credit, third party guarantees and procedures for allocating losses arising from a default by the issuer or a decrease in value of the stablecoin.

[1] As soon as possible, at a minimum by the end of the day and ideally intraday, as set out in KC5 and the third bullet point in this section.

Box 1

Questions for consultation

The CPMI and IOSCO are inviting comments on this consultative document and the questions set out below. Comments should be sent to both the CPMI secretariat (cpmi@bis.org) and the IOSCO secretariat (consultation-03-2021@iosco.org) by 1 December 2021. Comments will be published on the CPMI and IOSCO websites unless respondents expressly request otherwise.

Applicability of the PFMI to SAs

1. Is it clear when SAs are considered FMIs for the purposes of applying the PFMI?

Considerations for determining the systemic importance of an SA

2. Are the suggested considerations for determining the systemic importance of SAs clear, comprehensive and useful? Are there any risks or considerations missing?

Governance

3. Is the guidance provided on governance clear and actionable to inform how SAs will need to ensure clear and direct lines of accountability and set up governance arrangements to observe the PFMI?
4. What are the challenges that SAs may face due to the use of distributed and/or automated technology protocols and decentralisation, when seeking to observe Principle 2 on governance, in particular when ensuring the clear allocation of responsibility and accountability?

Interdependencies

5. Is the guidance on Principle 3 clear and actionable to inform how SAs will need to comprehensively manage risks from other SA functions and entities and their interdependencies?

Settlement finality

6. Is the guidance on Principle 8 on settlement finality clear and actionable to inform how SAs will need to manage risks arising from a misalignment between technical and legal finality?

Money settlements

7. Is the guidance on Principle 9 on money settlements clear and actionable to inform how SAs will need to manage risks associated with the use of a stablecoin as a settlement asset? In particular, is the guidance clear on the considerations which an SA should take into account when choosing a stablecoin as a settlement asset with little or no credit or liquidity risk as an appropriate alternative to central bank money?

General

8. Are there other issues or principles of the PFMI where additional guidance for SAs would be useful? If so, what is the issue identified and how is it notable for SAs?
9. Are there any terms used in this report for which further clarification would be useful for SAs when seeking to observe the PFMI?

1. Introduction

1.1 Background

1.1.1 The payments landscape is rapidly evolving. Broad-based growth in financial innovation has lowered barriers for new actors to offer payment services.[1] Among the new players are the operators of stablecoin arrangements (SAs). An SA is an arrangement that combines a range of functions to provide an instrument that purports to be used as a means of payment and/or store of value.[2] However, a particular SA may be used for different purposes and could evolve over time.

1.1.2 With the emergence of stablecoins, the international regulatory community has sought to further understand these new entrants and the potential risks they may pose to the financial system. The G7 Working Group on Stablecoins and the Financial Stability Board (FSB) conducted work on the impact of global SAs and each published recommendations for their regulation, supervision and oversight.[3] As part of that work, the G7, the G20 and the FSB recognise the potential role of SAs in improving global cross-border payments and called upon the standard-setting bodies "as needed, to make any revisions to standards and principles or provide further guidance supplementing existing standards and principles in light of the FSB Report and following their review of their existing frameworks, including on cooperation, coordination and information sharing amongst authorities".[4] These standard-setting bodies include the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO).

1.1.3 Where appropriate, the CPMI and IOSCO will further examine regulatory, supervisory and oversight issues associated with SAs and, as needed and appropriate, coordinate with other standard-setting bodies to address outstanding standards gaps. This report does not cover issues specific to stablecoins denominated in or pegged to a basket of fiat currencies (multicurrency SAs), as they will be covered in future work which will consider whether the guidance in this report is sufficient to provide clarity to multicurrency SAs when seeking to observe the PFMI.

1.2 Purpose of the report

1.2.1 The purpose of this report is to provide guidance on the application of the Principles for Financial Market Infrastructures (PFMI)[5] to SAs. This report is intended for use by systemically important SAs as they design, develop and operate their services and arrangements, including SAs that have the potential to become systemically important after launch; and by regulatory, supervisory and oversight authorities as they carry out their respective responsibilities for systemically important SAs. The guidance in this report does not create additional standards for SAs beyond those set out in the PFMI, but rather aims to provide increased clarity and granularity on how systemically important SAs should approach observing certain

1 See Carstens (2020).

2 See FSB (2020a). The FSB report defines stablecoins as "a crypto-asset that aims to maintain a stable value relative to a specified asset, or a pool or basket of assets".

3 See G7 Working Group on Stablecoins (2019) and FSB (2020a).

4 See FSB (2020b). The "roadmap" in the report sets out actions for 19 building blocks (BBs), including BB18: "Fostering the soundness of global stablecoin arrangements for cross-border payments." This CPMI-IOSCO report is the CPMI-IOSCO's deliverable under Action 1 of BB18.

5 CPSS-IOSCO (2012).

aspects of the PFMI. Topics in this report are interrelated and are intended to be considered holistically, similar to the standards set out in the PFMI.

1.3 General applicability of the PFMI to SAs

1.3.1 SAs can be designed and organised in a variety of ways. In particular, as noted in the reports by the G7 Working Group on Stablecoins and the FSB, an SA "[t]o be useable as a means of payment and/or store of value, […] typically provides three core functions: (i) issuance, redemption and stabilisation of the value of the coins; (ii) transfer of coins [hereinafter the "transfer function"]; and (iii) interaction with coin users for storing and exchanging coins".[6] In some cases, all three functions are conducted by a single entity, while in others, the functions are unbundled, that is, each function is managed by a different entity or person.

1.3.2 The PFMI define an FMI as "a multilateral system among participating institutions, including the operator of the system, used for the purposes of clearing, settling, or recording payments, securities, derivatives, or other financial transactions. FMIs typically establish a set of common rules and procedures for all participants, a technical infrastructure, and a specialised risk-management framework appropriate to the risks they incur. FMIs provide participants with centralised clearing, settlement, and recording of financial transactions among themselves or between each of them and a central party to allow for greater efficiency and reduced costs and risks." The PFMI go on to note that "[t]here can be significant variation in design among FMIs with the same function."[7]

1.3.3 In considering the functions of FMIs against those performed by SAs, the CPMI and IOSCO have determined that the transfer function is an FMI function. Accordingly, an SA that performs a transfer function should be considered an FMI for the purpose of applying the PFMI.[8] Since SAs are primarily used for making payments, the principles that apply to payment systems, including those for which no further guidance is provided in this report, will apply in their entirety to SAs performing a transfer function based on a functional approach ("same business, same risks or risk profile, same rules"). To the extent to which an SA provides functions that more closely resemble those provided by other types of FMIs, the SA should consider the relevant principles and observe them accordingly. However, these scenarios are beyond the scope of this report. The PFMI are designed to apply to systemically important FMIs. Where an SA performs a transfer function and is determined by authorities to be systemically important (see Section 2), the SA as a whole would be expected to observe all relevant principles of the PFMI.

1.4 Notable SA features

1.4.1 Although SAs are considered FMIs based on the functional approach, they may present some novel features as compared with other FMIs. The CPMI and IOSCO believe that guidance with respect to these features is useful for SAs and relevant authorities in applying the PFMI to systemically important SAs.

1.4.2 The CPMI and IOSCO consider that the unique feature of SAs as compared to existing FMIs is the **use of stablecoins – settlement assets that may be neither central bank money nor commercial bank**

6 See the FSB (2020a), p 10. See also Annex A below.

7 CPSS-IOSCO (2012), paragraph 1.9.

8 Depending on the organisational structure or governance of the SA, the FMI board (or equivalent) could be the governance body for the transfer function or the SA as a whole.

money.[9] The safety of an SA's money settlements[10] will depend on the credit and liquidity risk stemming from the entity performing the issuance and redemption of the stablecoin, on the assets used to support the value of the stablecoin and the relevant custody and investment arrangements. It also depends on the ability of the users to have access to these assets. Money settlements play a crucial role in an FMI's operation. The novelty and uniqueness of an SA's approach to money settlements call for the more granular guidance in this report (see Section 3.5, Money settlements).

1.4.3 SAs are further characterised by some features that appear more pronounced in SAs than in existing FMIs, such as **multiple interdependent functions**. As mentioned above, an SA typically performs other functions beyond a transfer function. To a varying degree, these functions may entail other activities that assist or affect the FMI function, or may be commingled with the FMI function, such that their performance affects the ability of the SA to observe the PFMI as a whole. In fact, the perimeter of the FMI function and thus the boundary between this function and other SA functions and activities may vary across SA models. For example, in some SA models, all the SA functions may be conducted and/or governed by a single entity, while in other models each SA function may be performed by separate entities, including non-FMI and/or unregulated entities. Existing FMIs also feature "institutional interdependencies" and the PFMI provide standards for FMIs to comprehensively manage risks that arise in or are borne by the FMI, including risks resulting from interdependencies. This report builds on this standard by providing guidance in the context of SAs' multiple interdependent functions (see Section 3.3, Framework for the comprehensive management of risks).[11]

1.4.4 Finally, SAs may have new features that may also be adopted by other FMIs. These features include **the use of distributed and/or automated technology protocols as well as decentralisation of operations and/or governance** facilitated by the use of these technology protocols. While the PFMI do not prescribe the use of a certain technology, new and innovative technologies may have an impact on how an FMI observes certain principles. For instance, the use of distributed ledger technology (DLT) in the SA's transfer function may create a misalignment between legal (settlement) finality and technical settlement (see Section 3.4, Settlement finality). It may also facilitate different degrees of decentralisation, of both FMI operations and organisational structure, in contrast to the typically centralised nature of FMI functions in existing FMIs. This report provides some guidance on these features to the extent that SAs may be the first to deploy these new technologies and models at scale (See Section 3.2, Governance).[12]

1.5 Organisation of the report

1.5.1 The remainder of the report sets out considerations for determining the systemic importance of SAs (Section 2) and provides guidance on how certain aspects of the PFMI could be observed by SAs (Section 3).

9 CPSS-IOSCO (2012), paragraph 3.9.1, states: "Commercial bank money is a liability of a commercial bank, in the form of deposits held at the commercial bank, which can be used for settlement purposes". Whether a stablecoin issued by a commercial bank is considered a form of commercial bank money for the purpose of applying the PFMI may depend on its design and relevant legal and regulatory frameworks.

10 The use of the term "money settlements" here should not be understood as a definitive statement that stablecoins are a form of monies.

11 The guidance in this report regarding multiple interdependent functions is not intended to apply to FMIs which employ similar notable features but are not SAs, as those FMIs are outside the scope of this report.

12 The guidance in this report regarding the use of distributed and/or automated technology protocols as well as decentralisation of operations and/or governance is not intended to apply to other FMIs which employ similar notable features but are not SAs.

2. Considerations for determining the systemic importance of an SA

2.1.1 The PFMI apply to systemically important FMIs. Certain types of FMIs – central counterparties, central securities depositories, securities settlement systems and trade repositories – are presumed to be systemically important at least in the jurisdiction in which they are located, whereas there is no such presumption for payment systems and they are evaluated individually. The PFMI observe that "where definitions exist, statutory definitions of systemic importance may vary somewhat across jurisdictions".[13]

2.1.2 The PFMI provide guidance that authorities can take into account when determining whether an FMI is systemically important in their jurisdiction. For example, in general, a payment system is systemically important if it has the potential to trigger or transmit systemic disruptions.[14] Among other things, this includes: (i) systems that are the sole payment system in a country or the principal system in terms of the aggregate value of payments; (ii) systems that mainly handle time-critical, high-value payments; and (iii) systems that settle payments used to effect settlement in other systemically important FMIs.[15] These systems may be domestic, cross-border or multicurrency.

2.1.3 The CPMI and IOSCO have identified four overarching considerations, along with more granular underlying factors to provide additional context that an authority may take into account when assessing the systemic importance of an SA within its jurisdiction for the purpose of applying the PFMI. These considerations may be in addition to any other aspects that an authority deems relevant to its analysis.[16] The organisation, design and function of SAs continue to evolve, and SAs may be designed and used differently across jurisdictions. Accordingly, these considerations provide flexibility to authorities in their assessment of the systemic importance of an SA. The set of considerations are intended to be assessed holistically, rather than taking each point as an independent reflection of systemic importance (each point alone would not necessarily be sufficient to determine systemic importance). The considerations include:

I. Size of the SA, ie whether the stablecoin is used as a principal payment or settlement mechanism for the jurisdiction or the market it serves. This could include consideration of the:

   a. number of stablecoin users; and

   b. number and value of transactions and value of stablecoins in circulation.

II. Nature and risk profile of the SA's activity, ie what is (are) the type(s) or nature of transactions and users. This could include consideration of the:

13 CPSS-IOSCO (2012), paragraph 1.20.

14 CPSS-IOSCO (2012), paragraph 1.20.

15 The PFMI state that these criteria for systemic importance mirror those outlined in CPSS (2001). See CPSS-IOSCO (2012), paragraph 1.20 and footnote 19. In addition to the three factors described in CPSS-IOSCO (2012), paragraph 2.1.2 above, CPSS (2001) provides factors to distinguish a systemically important payment system (SIPS) from those which are not. See CPSS (2001), paragraphs 6.6–6.11. The distinguishing feature is that a SIPS is capable of triggering or transmitting disruptions across the financial system domestically or internationally. The main factor in assessing the potential for such triggering or transmitting is the value of payments processed by the system in relation to resources of the system's participants and in the context of the financial system more generally. Another relevant factor is the nature of payments handled by the system.

16 These considerations are broadly consistent with the potential elements developed by the FSB in considering whether a stablecoin qualifies as a global stablecoin, which are, in turn, built upon the criteria set forth in the PFMI and by the Basel Committee on Banking Supervision with respect to considering whether an entity is a global systemically important bank. A global stablecoin is defined by the FSB as: "a widely adopted stablecoin with a potential reach and use across multiple jurisdictions". A stablecoin arrangement is defined by the FSB as "[a]n arrangement that combines a range of functions (and the related specific activities) to provide an instrument that purports to be used a means of payment and/or store of value." See FSB (2020a).

a. type of stablecoin users, eg retail customer, financial entities; and

b. type or nature of transactions, based on indicators such as: (i) time criticality of the transactions given possible disruption; (ii) wholesale or retail nature of transactions; (iii) use or purpose of transactions, such as whether the SA is used in connection with cross-border payments, financial transactions/investments, monetary operations, or foreign exchange transactions; and (iv) denomination of the stablecoin and/or its reserve assets.

III. Interconnectedness and interdependencies of the SA, ie whether the SA has significant interconnectedness and interdependencies with the real economy and financial system. This could include consideration of the:

a. interconnectedness with other systemically important FMIs and institutions and the real economy and governments (eg whether the SA is used to settle transactions for governments, important financial markets or other FMIs); and

b. business, structural and operational complexity: the more complex the SA is, the greater the potential for interdependencies and the greater the challenge of managing them given the likely higher number of involved entities and risk propagation channels.

IV. Substitutability of the SA, ie whether there are available alternatives to using the SA as a means of payment or settlement for time-critical services.

2.1.4 The considerations could be used by an authority overseeing the SA or by authorities assessing the SA's systemic importance to their respective jurisdictions. At their discretion, authorities may consider the potential growth and future state of an SA in determining the systemic importance of an SA that is under development.

3. Guidance on specific principles

3.1 Background

3.1.1 As mentioned above, a systemically important SA should observe all relevant principles of the PFMI and refer to the principles, key considerations and explanatory notes when considering its governance, design and operating model. Section 1.4 describes how SAs present notable features as compared with other FMIs. The following guidance may be useful for SAs and relevant authorities to understand how certain principles of the PFMI would apply in the light of these features.

3.1.2 The guidance provided in this report should be understood in the context of the principles-based approach reflected in the PFMI, which recognises FMIs' differing organisations, functions and designs, and the different ways to achieve a particular result. The guidance provided in this report should be read in conjunction with the relevant principles, key considerations and explanatory notes in the PFMI. Although this guidance is not intended to impose additional standards on systemically important SAs or authorities beyond those set out in the PFMI, an SA may need to make changes to its rules, procedures, governance arrangements and risk management framework taking the guidance into consideration in order for its practices to be consistent with the PFMI.

3.1.3 Against this background, this section describes the context and issues and proposes guidance on aspects related to governance (Principle 2), framework for the comprehensive management of risks (Principle 3), settlement finality (Principle 8) and money settlements (Principle 9).

3.2 Governance

Context

3.2.1 Principle 2 of the PFMI outlines the expectation that an FMI's governance arrangements promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations and the objectives of relevant stakeholders. To this end, the principle sets forth governance standards for an FMI.[17] Specifically, the principle states that an FMI should have documented and disclosed governance arrangements that provide clear and direct lines of responsibility and accountability and clearly specify the roles and responsibilities of the FMI's board of directors (or equivalent) and its management.[18] The principle also states that an FMI's board[19] should establish a clear, documented risk-management framework. Accordingly, an FMI's governance arrangements should ensure that the FMI's overall risk management framework assigns responsibilities and accountability for risk decisions and decision-making in crises and emergencies.[20] The explanatory text states that the governance arrangements should provide for effective decision-making in a crisis and support any procedures and rules designed to facilitate the recovery or orderly wind-down of the FMI.[21]

3.2.2 The explanatory text for Principle 2 further notes that an FMI that is part of a larger organisation may need to focus particular attention on aspects of its governance arrangements including the parent's or affiliated organisation's structure to ensure such an arrangement does not have adverse effects on the FMI's observance of the PFMI. The explanatory text also notes that FMIs should consider and adequately manage any risks that the FMI's other services pose to its FMI functions.[22]

3.2.3 Therefore, the organisation of an FMI composed of one or more legal entities, ultimately controlled by natural persons, is essential for an FMI's observance of Principle 2. In addition, the ability of an FMI to observe Principle 2 and all relevant principles of the PFMI relies on appropriate governance arrangements of relevant non-FMI counterparts such as affiliated organisations.

Issues

3.2.4 The CPMI and IOSCO have identified three broad challenges that certain SA models may face when seeking to observe Principle 2.

3.2.5 First, SA governance may be partially or fully decentralised and 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. These smart contracts could specify the validation mechanisms on which transfer functions rely to effect settlement. For these SA models, governance of the transfer function may be performed solely by software (while human interaction with the smart contract may be part of the SA's coding) and there may be no identifiable legal entities or persons that assume responsibility and accountability for the transfer function.

17 The key considerations detail the specific expectations that an FMI should meet. Among those are requirements 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).

18 See key considerations 2, 3 and 5 of Principle 2.

19 References to "board" in this report should be understood to mean the board of directors (or equivalent).

20 See key consideration 6.

21 CPSS-IOSCO (2012), paragraph 3.2.13.

22 CPSS-IOSCO (2012), paragraphs 3.2.5 and 3.2.6.

3.2.6 Second, and related, FMIs operate in dynamic and changing environments and need mechanisms in place for making changes, as and when needed, to their design or operations. However, this may not be feasible for certain SA models. Although governance arrangements controlled by software, such as a smart contract, foster transparency and predictability, governance implemented solely through software is likely to be inflexible in case of a changing environment, as it is not feasible to consider all eventualities and contingencies in a software-based code that is established ex ante. For example, this could be a particular issue during times of crisis, where expert judgment and discretionary decision-making may be required to deal with unforeseen situations, or in instances where there is an identified problem or error with the software implementation. In such circumstances, the execution of effective governance is not possible by a smart contract alone (ie without human intervention).[23]

3.2.7 Finally, the governance of other SA functions may impact the ability of the SA to observe Principle 2 and all relevant principles of the PFMI. As noted in Section 1, SAs are often designed in a way that intertwines the transfer function and other SA functions. If these other functions are subject to a separate governance arrangement that does not take into account the risks that those functions pose to the SA's transfer function, governance of the SA's transfer function may be less effective in certain situations.

Guidance

3.2.8 A systemically important SA should have appropriate governance arrangements. When seeking to observe Principle 2, a systemically important SA should consider how:

- the SA's ownership structure and operation 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 ownership structure and operation allow the SA to observe Principle 2 and the other relevant principles of the PFMI irrespective of the governance arrangements of other interdependent functions.

3.3 Framework for the comprehensive management of risks

Context

3.3.1 Principle 3 of the PFMI 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 and service providers.[24] Principle 3 sets the expectation that FMIs should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operational and other risks. It states that an FMI should have risk-management policies, procedures and systems that enable it to identify, measure, monitor and manage the range of risks that arise in or are borne by the FMI.[25] It also clarifies that an FMI should regularly review the material risks it bears from and poses to other entities (such as other FMIs, settlement banks, liquidity providers and service providers) as a result of interdependencies and develop tools to address them.[26]

[23] Similarly, while coded governance arrangements on a public ledger may be considered a form of disclosure of governance arrangements to authorities, relevant stakeholders and the general public, the interaction of implemented features in the code may be too complex to be meaningful as a form of disclosure and to achieve accountability.

[24] See key consideration 3.

[25] See key consideration 1.

[26] See key consideration 3.

Issues

3.3.2 The CPMI and IOSCO have identified one broad issue that certain SA models may face when seeking to observe Principle 3.

3.3.3 SAs fulfil multiple interdependent functions (see Section 1.4), of which some (ie issuance, redemption and stabilisation of the value of coins and interaction with users) may not fall under the scope of the PFMI as they do not constitute an FMI function. Like other FMIs, SAs may rely for their transfer function on other entities (such as other FMIs, settlement banks, liquidity providers or service providers) that could pose material risks to the function. Furthermore, depending on the SA's organisational structure, the entities that perform other SA functions may be independent from the entity performing the transfer function and/or may not qualify as either participants or service providers to the FMI. Yet, other SA functions and the entities that perform them can have risk implications (legal, credit, liquidity, business, operational, and other risks) on the transfer function, and vice versa. These factors may complicate the SA's task to comprehensively manage risks to observe Principle 3. In addition, multiple interdependent functions may hinder the identification of (responsible) entities that should be brought under the integrated and comprehensive view of FMI risks under Principle 3.

Guidance

3.3.4 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 or service providers)[27] 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.

3.4 Settlement finality

Context

3.4.1 Principle 8 of the PFMI 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".[28] Final settlement (or settlement finality) is a legally defined moment (see also Principle 1 of the PFMI). The clarity and certainty of settlement finality is critical for mitigating settlement risk[29] which, if not properly managed, could lead to systemic risk. Specifically, Principle 8 of the PFMI states that an FMI's rules and procedures should clearly define the point at which settlement is final.[30] It further states that an FMI should complete final settlement no later than the end of the value date,[31] and clearly define the point after which unsettled payments, transfer instructions or other obligations may not be revoked by a participant.[32]

27 See key consideration 3 and paragraph 3.3.7.

28 CPSS-IOSCO (2012), paragraph 3.8.1.

29 The PFMI define settlement risk as "the general term used to designate the risk that settlement in a funds or securities transfer system will not take place as expected. This risk may comprise both credit and liquidity risk". See Annex H of CPSS-IOSCO (2012).

30 See key consideration 1.

31 See key consideration 2.

32 See key consideration 3.

Issues

3.4.2 The CPMI and IOSCO have identified one broad issue that certain SA models may face when seeking to observe Principle 8.

3.4.3 SAs may feature "probabilistic settlement", where a misalignment between legal finality and technical settlement may occur.[33] A misalignment occurs, for example, when legal finality is thought to have been achieved, but a "fork" causes technical settlement to be reversed.[34] With probabilistic settlement, even if the relevant legal framework and the SA's rules and procedures have defined the point at which final settlement occurs, the possibility remains that forks emerge that could lead to a reversal of technical settlement of transactions. The probability for a given state of technical settlement to be conclusive increases as more transactions are added to the ledger. At the same time, the settlement risk implications of a fork increase with the number of transactions added to the ledger, as they are subject to a potential reversal.

3.4.4 This situation with a misalignment between technical settlement and legal finality may be exacerbated in the absence of a legal entity responsible for the SA's transfer function (see Section 3.1), including for setting and maintaining the rules and procedures to be followed in case of transaction reversals and forks. Without a responsible legal entity, there may be no way to enforce the legal settlement finality of a transaction or the resulting legal claim if it conflicts with the settlement status on the ledger. Also, even where it may be possible to align technical settlement and legal finality, transactions with technical settlement could nonetheless continue on the basis of the forked ledger. Where this happens, new transactions on the forked ledger may eventually have achieved both technical settlement and legal finality (as far as the forked ledger is concerned), but they may still be subject to a partial or full reversal – through legal action taken outside the system – due to the valid legal claims that are not represented on the forked ledger.

Guidance

3.4.5 A systemically important SA should provide clear and final settlement, regardless of the operational settlement method used. When seeking to observe Principle 8, a systemically important SA should:

- clearly define the point at which a transfer on the ledger becomes irrevocable and technical settlement happens, and make it transparent whether and to what extent there could be a misalignment between technical settlement and legal finality; and
- ensure proper transparency regarding mechanisms for reconciling the misalignment between technical settlement and legal finality and have measures in place to address the potential losses that could be created in case of reversal stemming from the misalignment between technical settlement and legal finality.

[33] Technical settlement (or operational settlement) describes the point in time at which an SA's electronic ledger reflects that a transaction has occurred and is irrevocable from a technical standpoint. In some DLT arrangements, it can take time to update and synchronise changes to each ledger. The first instance of an update may not represent technical settlement because it may take time for consensus to be achieved across the nodes in the synchronisation of ledgers. In arrangements that use a proof-of-work or other consensus mechanisms, settlement is probabilistic ("probabilistic settlement").

[34] The FSB describes a "hard fork" as a bifurcation in a distributed ledger whereby separate and irreconcilable ledgers are created usually due to an unresolved disagreement among developers or other actors such as miners associated with a distributed ledger (See FSB (2019), p 23, footnote 82). However, forks can also result more generally from changes of the code in the underlying protocol which are incompatible with the previous version (See IOSCO (2020)).

3.5 Money settlements

Context

3.5.1 Principle 9 of the PFMI sets the expectations for the settlement asset(s) of an FMI. Settlement assets are transferred among FMI participants to settle payment obligations.[35] Settlement of a transaction can occur on an FMI's own books, on the books of another FMI, or on the books of an external party (for example, a central bank or commercial bank). Principle 9 states that "[a]n 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".

3.5.2 Participants of an FMI may hold settlement assets intraday or overnight to settle their payment obligations. However, if participants hold settlement assets, they can face both credit and liquidity risks from the settlement asset. They face credit risk if the provider of the settlement asset could default on its obligation to them and liquidity risk if the asset ceases to be readily transferable, for example into claims on a central bank or other liquid assets. Where these risks exist, they can have systemic implications, because all participants holding the settlement asset are exposed to them simultaneously. This makes it highly desirable for there to be no risk that the provider of the settlement asset will default.

3.5.3 The goal of Principle 9 is for FMIs to use central bank money where practical and available or to otherwise use a settlement asset with little or no credit and liquidity risk that is readily convertible into central bank money or other liquid assets in both normal and stressed circumstances. One of the fundamental purposes of central banks is to provide a safe and liquid settlement asset.[36] In less usual circumstances, the settlement asset can be a claim on a private, supervised institution, for example on a commercial settlement bank. Balances on the books of a commercial bank can be transferred among payment system participants' accounts with that bank. However, in these cases, unlike the case of balances at the central bank of issue of the currency, participants are subject to the credit and liquidity risks of the commercial bank providing the settlement asset.

3.5.4 In order for the use of commercial bank money as a settlement asset to comply with Principle 9 as an acceptable alternative to central bank money, Principle 9 states that the asset must have little or no credit or liquidity risk.[37] Principle 9 sets out the relevant factors to determine whether, in cases where the settlement asset is privately issued by a commercial bank or the FMI itself (an FMI that settles on its own books), the additional credit and liquidity risks have been minimised and strictly controlled.[38] For example, if the commercial bank conducting settlement on its books becomes insolvent, the FMI and its participants may not have immediate access to their settlement funds or ultimately receive the full value of their funds.[39] To this end, an FMI should limit both the probability of being exposed to a commercial settlement bank's failure and limit the potential losses and liquidity pressure to which it would be exposed in the event of such a failure. An FMI should establish and monitor adherence to strict criteria for its commercial

35 In other words, settlement assets are the assets that the participant receiving the payment ends up holding when the original payment obligation is fully extinguished.

36 The term "ultimate settlement" is sometimes used to denote final settlement in central bank money. This combines the concept of settlement being final with the concept of the settlement asset being the least risky possible. Claims on the central bank are typically free of the credit and liquidity risks associated with settlement assets. Where this is the case, "ultimate settlement" would denote final settlement in central bank money (See CPSS (2003), p 14, Box 2).

37 See key consideration 2.

38 See key considerations 3–5.

39 CPSS-IOSCO (2012), paragraph 3.9.4.

settlement banks that take into account, among other things, their effective regulation and supervision, creditworthiness, capitalisation, access to liquidity and operational reliability.[40]

Issues

3.5.5 The CPMI and IOSCO have identified one broad issue that certain SAs may face when seeking to observe Principle 9.

3.5.6 A privately issued settlement asset should have little or no credit or liquidity risk to be considered as an acceptable alternative to the use of central bank money to observe Principle 9. In SAs, as a stablecoin is used as the settlement asset, participants will be subject to the credit and liquidity risks of the stablecoin itself, the issuer of the stablecoin and/or the settlement institution.[41] This may result in a greater amount of risk than "little to no" credit and liquidity risk and may not enable the FMI and its participants to readily transfer their assets into other liquid assets, such as claims on a central bank.

3.5.7 Stablecoins may be backed with underlying funds, securities or other assets (collectively, "reserve assets"). The funds received from SA participants can be, for example: (i) deposited at commercial banks; (ii) deposited at central banks; or (iii) invested in safe and liquid assets that will then be held at custodians. The manner and extent to which the reserve assets serve as backing depends on the design and associated contractual arrangements of the stablecoin in question as well as applicable law.[42] These will have significant implications for the level of protection of rights of holders of the stablecoin and other relevant SA participants and their confidence in the value of the stablecoin as a settlement asset, and therefore needs to be clarified by the SA and made transparent to SA holders and participants. Further, the level of protection and confidence will also rely on the sufficiency of the regulatory and supervisory framework that applies to the issuer, reserve managers and custodians of reserve assets.

3.5.8 Participants may be exposed to credit risk if a stablecoin loses value relative to the sovereign currency in which it is denominated or to which it is pegged, or if the issuer of the stablecoin defaults on its obligations to the participant. Participants may face liquidity risk if a stablecoin cannot promptly be converted into other liquid assets. Under some SA models, the settlement institution ("the provider of the settlement account") and the stablecoin issuer ("the provider of the settlement asset") can be two different institutions, with the SA providing participants with settlement accounts on its own books for a stablecoin

40 CPSS-IOSCO (2012), paragraph 3.9.5.

41 The institution across whose books transfers between participants take place in order to achieve settlement within a system. A settlement account is an account held at a central bank or any other institution acting as a settlement agent, which is used to settle transactions between participants in a system.

42 For example, a stablecoin holder may have an individual direct claim (determined pro rata by the units it holds) on the underlying funds at the issuer's (or its reserve manager's) account with its bank(s). Alternatively, a stablecoin holder may have a beneficial interest in (a trust created upon) the underlying funds. In another setting a stablecoin holder may not have any direct or indirect claim on, title to or interests in the underlying funds; but only a claim on the issuer, whose financial ability to redeem at par would be supported, but not necessarily guaranteed, by the existence of the underlying funds. In the case of underlying securities, the securities holding model in the law of the relevant jurisdiction would play an important role in determining the nature of the stablecoin holder's relationship with the custodians and underlying securities. Securities holding models vary across jurisdictions.

as a settlement asset issued by a third party.[43] Under these models, participants may be subject to credit[44] and liquidity risk from both the issuer and settlement account provider. For example, operational issues with record keeping relating to the ownership of a stablecoin at the SA could delay prompt redemptions from the issuer.[45] Measures to address these risks could include collateral pools supporting committed lines of credit, third-party guarantees and procedures for allocating losses arising from a default by the issuer or a decrease in value of the stablecoin.

3.5.9 In addition, stablecoins may be vulnerable to confidence effects or "run risk". If the reserve assets are insufficient or cannot be liquidated at or close to market values in a timely manner when needed, the stablecoin may lose value and create credit or liquidity risk for participants of the SA, leading to loss of confidence. If participants in the SA lose confidence in the value of the stablecoin or in their ability to convert it at par into other liquid assets – like claims on the central bank – this may result in large-scale redemptions. This in turn could lead to large-scale "fire sales" of reserve assets, further reductions in the value of the stablecoin and further redemptions. These confidence effects can have systemic implications if they spread to non-retail participants (eg financial institutions) that hold the stablecoins or to financial assets in which the stablecoin's reserve assets are invested. If not properly monitored, mitigated and managed, these risks may be greater for a stablecoin than for commercial bank money.

3.5.10 Lastly, there are a number of different SA issuance, stabilisation and redemption models. These models are intrinsically intertwined with the safety and efficiency of an SA's transfer function. Some non-bank SAs may issue stablecoins that represent assets held in safeguarded custody in the name of the SA rather than stabilising the stablecoin's value by actively managing a reserve asset. When an SA receives assets from its participants – and uses them to back the value of the stablecoin – the SA and its participants could face credit and possibly liquidity risk if the custodian of the assets defaults on their obligations to the SA or its participants. An SA should place, safeguard or invest those assets in a way that minimises the risk of loss on and delay in access to those assets, and enables the stablecoin as a settlement asset to have little or no credit or liquidity risk. (See also Principle 16 of the PFMI on custody and investment risks.)

Guidance

3.5.11 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[46] 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.

3.5.12 When seeking to observe Principle 9, a systemically important SA should determine whether the credit and liquidity risks of the stablecoin that it uses for money settlements are minimised and strictly

[43] Typically, an FMI's settlement institution(s) provide participants with the settlement asset as well as their settlement accounts, ie the books upon which settlement account balances and positions are recorded, updated and maintained. For example, central bank money is a liability of a central bank in the form of deposits held at the central bank which can be used for settlement purposes. Commercial bank money is the liability of a commercial bank in the form of deposits held at the commercial bank. When an FMI settles on its own books, it offers cash accounts to its participants, and a payment or settlement obligation is discharged by providing an FMI's participants with a direct claim on the FMI itself.

[44] For example, if the settlement institution becomes insolvent, and it has poor record keeping in place for its participants, the ability to facilitate redemption of settlement assets may not be possible or the settlement assets may not be accessible at all or may be lost.

[45] See also Principle 17 on operational risk in CPSS-IOSCO (2012).

[46] As soon as possible, at a minimum by the end of the day and ideally intraday, as set out in KC5 and the third bullet point below.

controlled and the stablecoin is an acceptable alternative to the use of central bank money. Relevant factors may include but are not limited to:

- The clarity and enforceability of the legal claims, titles, interests and other rights and protections accorded to holders of the stablecoin and SA participants in relation to the issuer of a stablecoin and reserve assets backing it, including their treatment (eg seniority) in the event of insolvency of the issuer, its reserve manager or a custodian of the reserve assets and/or other protections such as third party guarantees.
- The nature and sufficiency of the SA's reserve assets to support and stabilise the value of the outstanding stock of issued stablecoins, and the degree to which the SA's reserve assets could be liquidated at or close to prevailing market prices.
- The clarity, robustness and timeliness of the process for converting the stablecoin into other liquid assets such as claims on a central bank in both normal and stressed circumstances. The stablecoin should be convertible into other liquid assets, as soon as possible, at a minimum by the end of the day and ideally intraday.
- The creditworthiness, capitalisation, access to liquidity and operational reliability of the issuer of the stablecoin, provider of the settlement accounts and custodian(s) of the reserve assets. Reserve assets held or placed in custody should be protected against claims of a custodian's creditors. Any chosen custodian should have robust accounting practices, safekeeping procedures and internal controls to protect the assets, as well as a sound legal basis supporting its activities, including the segregation of assets.
- The sufficiency of the regulatory and supervisory framework that applies to the issuer, reserve manager(s) and/or custodian(s) of the reserve assets.
- The existence of risk controls that could, where needed, reduce credit and/or liquidity risks. Possible examples include collateral pools supporting committed lines of credit, third party guarantees and procedures for allocating losses arising from a default by the issuer or a decrease in value of the stablecoin.

References

Carstens, A (2020): "Shaping the future of payments", *BIS Quarterly Review*, March, pp 17–20.

Committee on Payment and Settlement Systems (2001): *Core principles for systemically important payment systems*, January.

——— (2003): *The role of central bank money in payment systems*, August.

Committee on Payment and Settlement Systems and Technical Committee of the International Organization of Securities Commissions (2012): *Principles for financial market infrastructures*, April.

Financial Stability Board (2019): *Decentralised financial technologies: Report on financial stability, regulatory and governance implications*, June.

——— (2020a): *Regulation, supervision and oversight of "Global Stablecoin" arrangements: Final report and high-level recommendations*, October.

——— (2020b): *Enhancing cross-border payments: stage 3 roadmap*, October.

G7 Working Group on Stablecoins (2019): *Investigating the impact of global stablecoins*, October.

International Organization of Securities Commissions (2020): *Issues, risks and regulatory considerations relating to crypto-asset trading platforms*, February.

Annex A: Functions and activities in a stablecoin arrangement

Table A1

Functions	Activities	Operational design elements
Governance of the arrangement	Establishing rules governing the stablecoin arrangement	The rules covering, among other issues, the types of entities that could be involved in the arrangement, the protocol for validating transactions, the mechanism for stabilising the value of the stablecoin, and the arrangements for the management and ownership of the reserve assets. Generally, a governance body is essential to a stablecoin arrangement and also may have a role in promoting adherence to common rules across the stablecoin arrangement.
Issuance, redemption and stabilisation of value of coins	Issuing, creating and destroying stablecoins	The mechanism through which stablecoins may be issued or created, and subsequently destroyed by one or more entities or software protocols designed by these entities.
	Managing reserve assets	The activity of managing the assets that are "backing" the value of a stablecoin, where a stablecoin fully or partially maintains its value or confidence in its value based on real or financial assets or other crypto-assets. This may involve buying and selling assets based on an investment policy. The activity may also be undertaken by using software protocols that adjust the composition of the reserve through smart contracts and algorithmic decision-making.
	Providing custody/trust services for reserve assets	The activity of holding the assets that are "backing" the value of a stablecoin. The entity or entities issuing the stablecoin or other entities may hold the reserve assets.
Transfer of coins	Operating the infrastructure	A DLT protocol determining roles in and access to the system. Access may be permissioned (access, including the ability to hold and transfer stablecoins, is controlled with defined access conditions) or permissionless (anyone can access and transfer the stablecoins peer-to-peer, directly to other wallets).
	Validating transactions	Mechanism by which a transaction is authorised and validated by validator nodes.
Interaction with users	Storing the private keys providing access to stablecoins (wallets)	Cryptographic wallets storing private and public keys which are used to digitally sign transaction instructions performed by the stablecoin arrangement. Wallets can be custodial (hosted), where a third party operates the wallet and holds the private keys on behalf of the users, or non-custodial (unhosted), where the users hold the private keys directly. Multiple different parties can develop wallets, based on a set of specifications provided by the stablecoin arrangement.
	Exchanging, trading, reselling and market making of stablecoins	The activity of purchasing/exchanging a stablecoin with fiat currencies, or a stablecoin with other stablecoins or cryptoassets.

Source: Excerpt from FSB (2020a), Table 1, pp 11–12.