IMF Country Report No. 19/190

SWITZERLAND

FINANCIAL SECTOR ASSESSMENT PROGRAM

June 2019

TECHNICAL NOTE—SUPERVISION AND OVERSIGHT OF FINANCIAL MARKET INFRASTRUCTURES

This Technical Note on Supervision and Oversight of Financial Market Infrastructures for the Switzerland FSAP was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed in May 2019.

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International Monetary Fund
Washington, D.C.

INTERNATIONAL MONETARY FUND

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FINANCIAL SECTOR ASSESSMENT PROGRAM

June 12, 2019

TECHNICAL NOTE

SUPERVISION AND OVERSIGHT OF FINANCIAL MARKET INFRASTRUCTURES

Prepared by
Monetary and Capital Markets Department

This Technical Note was prepared in the context of an IMF Financial Sector Assessment Program (FSAP) mission to Switzerland. It contains technical analysis and detailed information underpinning the FSAP's findings and recommendations. Further information on the FSAP can be found at http://www.imf.org/external/np/fsap/fssa.aspx

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Glossary

CCP	Central counterparty
CHF	Swiss francs
CLS	Continuous Linked Settlement
CMG	Crisis Management Group
CPMI	Committee on Payments and Market Infrastructures
CPSS	Committee on Payment and Settlement Systems
CSD	Central Securities Depository
CSDR	Central Securities Depository Regulation
CSO	Chief Security Officer
EMIR	European Market Infrastructure Regulation
ESMA	European Securities and Markets Authority
ETF	Exchange traded fund
EU	European Union
EUR	Euros
FINMA	Federal Financial Markets Authority
FMI	Financial Market Infrastructure
FMIA / FMIO	Financial Market Infrastructure Act / Ordinance
FMIO-FINMA	FINMA Financial Market Infrastructure Ordinance
FSAP	Financial Sector Assessment Program
FTE	Full-time-equivalent
GCM	General clearing member
IMF	International Monetary Fund
IOSCO	International Organization of Securities Commissions
MELANI	Reporting and Analysis Centre for Information Assurance
MTF	Multilateral trading facility
NBA / NBO	National Bank Act / Ordinance
NIST	National Institution of Standards and Technology
PFMI	CPMI-IOSCO Principles for Financial Market Infrastructures
OTC	Over-the-Counter
PS	Payment System
RTGS	Real Time Gross Settlement
SIC	SIX Interbank Clearing
SIC AG	SIX Interbank Clearing AG
SIF	State Secretariat for International Finance
SIX Group	SIX Group AG
SNB	Swiss National Bank
SSS	Securities Settlement System
T2S	TARGET2-Securities
TR	Trade Repository

EXECUTIVE SUMMARY

While systemically important financial market infrastructures (FMIs) in Switzerland are generally well developed and subject to close supervision and oversight, their internal governance and crisis management arrangements require further work. In recent years the FMI regulatory regime and risk management at the systemically important FMIs underwent changes. At a high level, the Swiss FMIs appear to generally observe the Committee on Payment and Settlement Systems (CPSS)-International Organization of Securities Commissions (IOSCO) Principles for Financial Market Infrastructures (PFMI). SIX Group AG (SIX Group) operates in a competitive environment, and it is important that the systemically important FMIs it operates have strong internal governance arrangements that are sufficiently independent from the commercial incentives of the group to support sound risk management. While the Swiss arrangements for FMI supervision and oversight largely meet the Responsibilities set out in the PFMI, the Swiss Financial Market Supervisory Authority (FINMA) should dedicate more resources to FMIs. The Swiss authorities and SIX Group should also strengthen FMI crisis management arrangements.

The Swiss authorities consider three Swiss-domiciled FMIs to be systemically important: SIX x-clear, a central counterparty (CCP); SIX SIS, a securities settlement system (SSS) and central securities depository (CSD); and SIX Interbank Clearing (SIC), a real-time gross settlement (RTGS) payment system (PS). These FMIs are all operated by SIX Group, an unlisted user-owned company. SIX Interbank Clearing AG (SIC AG), a subsidiary of SIX Group and PostFinance, operates SIC on behalf of the Swiss National Bank (SNB), which acts as the system manager. SIX Group also operates a trade repository, securities exchange and multilateral trading facilities (MTFs), and provides services in payments and in financial information. Several foreign FMIs also operate in Switzerland, three of which are considered to be systemically important.

A revised regulatory framework for FMIs came into effect in Switzerland in January 2016. FINMA has responsibility for supervision of FMIs, and the SNB has responsibility for oversight of systemically important FMIs. There is close cooperation between FINMA and the SNB where their responsibilities overlap, and the authorities have been effective in inducing change in several areas. However, resources at FINMA dedicated to FMI supervision, and to FMI recovery and resolution, should be increased to ensure that FINMA can fulfil its mandate in these areas.

FMI crisis management work should continue to be a priority. The systemically important SIX Group FMIs have implemented recovery plans, broadly covering the issues considered in international guidance on FMI recovery. Further work is required to ensure that the recovery arrangements would be fully effective in supporting the continuity of the FMIs' critical services, even in extreme scenarios. The authorities are closely engaging with the FMIs on this topic. FMI resolution planning is at an early stage in Switzerland. While this work is likely to take several years, FINMA—in consultation with the SNB—should progress expeditiously with the development of FMI resolution plans. FINMA has recently established a crisis management group (CMG) for SIX x-clear, to support recovery and resolution planning for the CCP. The authorities are also strongly encouraged to complete their broader ongoing work to develop crisis management cooperation plans among Swiss authorities and with relevant foreign authorities.

SIX x-clear and SIX SIS should ensure that the independence of their governance arrangements place a high priority on sound risk management and financial stability considerations. Competitive pressures weigh on incentives to implement best practice risk management. FMI risk governance arrangements should be reviewed to ensure that they support sufficient attention being given to the risk management of the systemically important FMIs and that decisions about these matters are sufficiently independent from broader business decisions of SIX Group.

In other respects, the elements of the FMIs' risk management arrangements that were considered in this note generally appear to observe the PFMI. FMI risk management has been strengthened in several areas over recent years e.g., the management of liquidity risk and cyber resilience. The planned work of the authorities and SIX Group in these areas is likely to continue to result in enhancements. There are some areas where further improvements could be made e.g., managing dependencies on commercial banks for provision of services, and management of procyclicality.

There will be further, potentially significant, changes in the FMI space in Switzerland in coming years. As part of a planned replacement of its existing clearing systems, SIX x-clear will be introducing new risk models, including for margining and stress testing. This project presents risks, but also opportunities to implement improvements to the current approach. SIX Group has also announced that it will launch an integrated digital trading and settlement system in 2019. This new service will present novel regulatory and risk issues. For both projects, FINMA and the SNB will need to hold to a strong stance regarding the observance of regulatory requirements. More generally, current political risks, associated with the ongoing European Union (EU)-Swiss framework negotiations and with Brexit, create uncertainties for the Swiss FMIs. SIX Group and the Swiss authorities are continuing to monitor developments in this area.

Table 1. Switzerland: Recommendations

	Timing*	Priority**
FMI Regulation, Supervision and Oversight		
1. Increase resources dedicated to FMI supervision (FINMA; ¶34)	I	H
2. Address gaps identified in the CPMI-IOSCO assessment of implementation of the PFMI in the Swiss regulatory framework (FDF & SNB; ¶18)	ST	M
3. Finalize work to refine the supervisory approach for FMIs, in particular regarding consolidated group supervision (FINMA; ¶25)	I	M
4. Consider introducing regular discussion with FMI participants and/or market participants more broadly (FINMA & SNB; ¶27)	ST	L
FMI crisis management, recovery and resolution		
5. Increase resources dedicated to FMI recovery and resolution (FINMA; ¶63)	I	H
6. Finalize work to develop FMI crisis coordination plans (FINMA & SNB; ¶40)	I	H
7. Continue to improve recovery plans to ensure each FMI fully meets the requirements of the PFMI (SIX; ¶60)	I	H
8. Develop resolution plans for SIX x-clear and SIX SIS and assess the adequacy of the legislative framework for FMI resolution (FINMA; ¶64 & 65)	ST-MT	H
FMI governance and risk management		
9. Improve independence of SIX x-clear and SIX SIS governance arrangements to support sound FMI risk management (SIX; ¶42)	I	H
10. Monitor the effectiveness of the revised SIC governance arrangements (SNB; ¶46)	ST	H
11. Meet regularly with the independent members of the SIX x-clear and SIX SIS Boards of Directors (FINMA & SNB; ¶43)	C	M
12. Ensure full implementation of the relevant PFMI for the SIX x-clear clearing system replacement (SNB & FINMA; ¶49)	ST	M
13. Ensure a strong analytical justification for all assumptions in the liquidity stress testing model (SIX; ¶50)	ST	M
14. Undertake further analysis and/or testing of portability in the derivatives segment (SIX; ¶53)	ST	M
15. Include participants in default management tests (SIX; ¶54)	ST	M
16. Analyze dependencies on commercial banks as service providers and, where required, take steps to diversify or establish back up arrangements (SIX; ¶55)	I	M
17. Consider alternative approaches to mitigate potential cliff edge effects of the risk coefficient margin add on. Use the replacement of the clearing system to introduce a holistic approach to manage and assess procyclicality in margin models (SIX; ¶57)	ST	M
18. Undertake work on cross-sectoral cyber resilience (SIX, FINMA & SNB; ¶74)	ST	M

* C=Continuous; I=Immediate (within one year); ST (Short Term)=1–2 years; MT (Medium Term)= 3–5 years

** H=High; M=Medium; L=Low

INTRODUCTION

1. **FMIs play a central role in interbank and money and capital markets.**[1] By providing the central infrastructure to clear and settle payments, securities, and derivatives transactions, FMIs lie at the core of the sound functioning of the financial system. By their nature FMIs centralize risk and, if poorly managed, can be sources of financial shocks and risk transmission. Effective supervision and oversight is a key factor in ensuring that FMIs operate in a sound manner, and that there is market confidence that they will be able to continue to offer their critical services.

2. **The main objective of this note is to analyze the potential for systemic risks related to FMIs in Switzerland**.[2] The note contains an assessment of the supervision and oversight of FMIs by the relevant Swiss authorities, and analyzes elements of the risk management framework of the systemically important Swiss-domiciled FMIs. It also considers FMI financial crisis management arrangements and briefly discusses fintech developments relevant to FMIs.

3. **Recommendations in this note are based on the internationally agreed standards for FMIs, the CPSS-IOSCO PFMI.**[3] The analysis of the regulation, supervision and oversight of FMIs is based on the five Responsibilities for authorities in the PFMI (see Box 1). The analysis of the risk management arrangements of the Swiss FMIs is based on relevant Principles in the PFMI and related guidance, although the note does not include a comprehensive assessment against the Principles.

4. **The analysis builds on findings of earlier assessments.** These assessments include implementation monitoring work conducted by the CPMI-IOSCO (Appendix I), as well as the 2014 Switzerland FSAP (Appendix II).

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[1] In this note, consistent with the PFMI, the term 'FMI' includes PSs, SSSs, CSDs, CCPs, and trade repositories (TRs). Although Swiss legislation defines FMIs to also include exchanges and MTFs, this note does not cover trading venues unless explicitly stated.

[2] The note was prepared by Louise Carter (Reserve Bank of Australia), Consultant for the IMF. The analysis was based on publicly available information, self-assessments and other background documentation provided by the Swiss authorities and SIX Group, as well as discussions with the Swiss authorities, SIX Group, Norwegian authorities, and a participant of the SIX Group FMIs. The note reflects information as at November 2018; certain updates since that time are referenced in footnotes.

[3] Although the analysis in this note is based on the PFMI, the note does not include a comprehensive deep-dive assessment against the Principles.

Box 1. Switzerland: PFMI Responsibility A–E

Responsibility A: Regulation, supervision, and oversight of FMIs
FMIs should be subject to appropriate and effective regulation, supervision, and oversight by a central bank, market regulator, or other relevant authority.

Responsibility B: Regulatory, supervisory, and oversight powers and resources
Central banks, market regulators, and other relevant authorities should have the powers and resources to carry out effectively their responsibilities in regulating, supervising, and overseeing FMIs.

Responsibility C: Disclosure of policies with respect to FMIs
Central banks, market regulators, and other relevant authorities should clearly define and disclose their regulatory, supervisory, and oversight policies with respect to FMIs.

Responsibility D: Application of the principles for FMIs
Central banks, market regulators, and other relevant authorities should adopt the CPSS-IOSCO Principles for financial market infrastructures and apply them consistently.

Responsibility E: Cooperation with other authorities
Central banks, market regulators, and other relevant authorities should cooperate with each other, both domestically and internationally, as appropriate, in promoting the safety and efficiency of FMIs.

Source: CPSS-IOSCO Principles for Financial Market Infrastructures, April 2012.

DESCRIPTION OF FINANCIAL MARKET INFRASTRUCTURES IN SWITZERLAND

Overview of Financial Market Infrastructures in Switzerland

5. Three Swiss-domiciled FMIs have been designated as systemically important in Switzerland by the SNB, each operated by SIX Group AG:

- SIC, a RTGS PS. SIC is operated on behalf of the SNB by SIX Interbank Clearing AG, which is 75 percent owned by SIX Group and 25 percent owned by PostFinance AG.[4] The SNB is the system manager for SIC.[5] As well as facilitating interbank payments in Swiss francs (CHF), SIC settles a significant share of retail payments (by volume 96 percent of SIC transactions are retail payments) and plays an important role in the implementation of monetary policy in Switzerland.

[4] In March 2019, SIX increased its stake in SIC AG to 100 percent, acquiring the shares of PostFinance.

[5] As system manager, the SNB: sets settlement rules, rules of conduct and admission criteria; provides liquidity to facilitate settlement in SIC; sets the system operating hours; and maintains the accounts of participating financial institutions. It also monitors daily operations and is responsible for crisis management. SIX Interbank Clearing AG is responsible for: technical monitoring of the day-to-day operations of the system; operating IT infrastructure; developing and maintaining software; data management; and developing and supervising administrative rules.

- SIX SIS, a CSD and SSS operated by SIX SIS AG, a wholly owned subsidiary of SIX Group. SIX SIS provides for the custody and settlement of tradable financial instruments, including securities traded on the SIX Swiss Exchange, a Swiss-domiciled stock exchange owned by SIX Group. SIX SIS also provides collateral management services related to repo market transactions including SNB repo and interbank repo transactions concluded at the SIX repo MTF. SIX SIS maintains links with a number of other CSDs, including through TARGET2-Securities (T2S). It is currently applying to the European Securities and Markets Authority (ESMA) for equivalence with the Central Securities Depository Regulation (CSDR).

- SIX x-clear, a CCP operated by SIX x-clear AG, also a subsidiary of SIX Group. SIX x-clear provides CCP services for equities traded on SIX Swiss Exchange, London Stock Exchange, Oslo Bors and Nasdaq Nordic Exchanges, as well as several MTFs. It also clears derivatives traded on Oslo Bors, exchange traded funds (ETFs) and bonds traded on SIX Swiss Exchange, and Norwegian securities lending transactions. SIX x-clear is interoperable with two other CCPs, LCH Ltd and EuroCCP NV, for cash equities, ETFs and (with LCH Ltd only) derivatives. SIX x-clear is recognized as a third-country CCP by ESMA, allowing it to provide services to the EU market. The CCP operates a branch in Norway; SIX Group acquired Oslo Clearing, a Norwegian CCP, in 2014 and the business was legally integrated with SIX x-clear AG in 2015. Following the adoption of the European Market Infrastructure Regulation (EMIR) in Norway, SIX x-clear does not need to be formally licensed by the Norwegian authorities. The payments and securities transfer system of SIX x-clear has been designated under the Settlement Finality Regulations by the Bank of England.

6. **There is also one TR domiciled in Switzerland, SIX Trade Repository, which is also operated by SIX Group.** TRs may not be designated as systemically important under the Swiss regulatory framework for FMIs.

7. **In addition, the euroSIC system facilitates RTGS settlement in euro (EUR) for Swiss financial institutions (and some foreign banks).** This system is managed by Swiss Euro Clearing Bank (a subsidiary of SIX Group, UBS, Credit Suisse and PostFinance, that is licensed as a bank in Germany) and operated by SIC AG.[6] The SNB has assessed that system is not systemically important with respect to financial stability considerations in Switzerland at this stage.

8. **SIX Group AG is an unlisted public limited company, based in Zurich.** It is owned by about 130 domestic and international financial institutions, which are also the main users of its services. The shares are distributed in a way that mirrors shareholders' utilization of SIX and so that no category of owner holds an absolute majority.[7] The composition of the Board of Directors reflects the ownership structure. In addition to operating the Swiss-domiciled FMIs and SIX Swiss Exchange,

[6] In January 2019, SIX Group increased its stake in Swiss Euro Clearing Bank to 100 percent, acquiring the shares of UBS, Credit Suisse, and PostFinance.

[7] The shareholders are: the big Swiss banks (30 percent); foreign banks (17 percent); commercial and investment banks (17 percent); cantonal banks (14 percent); private banks (9 percent), regional and raiffeisen banks (8.5 percent), and other banks (1 percent). SIX Group and its companies hold 3 percent of shares.

SIX Group also provides retail payment services, financial data services and cards services. Per end of November 2018, SIX Group sold its card acquiring business to French company Worldline, in return for a 27 percent stake in Worldline and two seats on its board of directors. SIX retains its business of issuing domestic debit cards for Swiss banks.

9. Three foreign FMIs have been designated as systemically important to Switzerland:

- Continuous Linked Settlement (CLS), a U.S.-based international system for foreign exchange settlement.

- LCH Ltd, a U.K.-based CCP. LCH Ltd clears (among other products) equities and ETF transactions entered into on SIX Swiss Exchange; it interoperates with SIX x-clear for clearing of these products. It also clears over-the-counter (OTC) interest rate derivatives, including transactions denominated in Swiss francs.

- Eurex Clearing AG, a German-based CCP. Eurex Clearing AG provides CCP services for, among others, Eurex Stock Exchange which is used (among other things) for trading derivatives based on underlying Swiss assets. Eurex Clearing also clears OTC interest rate derivatives.

10. Other foreign FMIs also provide services in Switzerland. A number of foreign CCPs have been recognized by the Swiss authorities, permitting them to provide services to Swiss firms. With the exception of LCH Ltd and Eurex Clearing, these CCPs are not considered systemically important to the Swiss financial system. REGIS-TR, a TR domiciled in Luxembourg, has also been recognized by the Swiss authorities.[8] The landscape of systemically important FMIs in Switzerland is illustrated in Appendix III and basic statistics about the activities of the SIX Group FMIs are provided in Appendix IV.

Overview of the Supervisory and Oversight Framework

11. A revised legislative framework for regulation and supervision of FMIs came into effect in Switzerland in January 2016. This legislation, the FMIA,[9] also establishes an insolvency and resolution framework for FMIs, as well as a framework for regulation of OTC derivatives. The FMIA is principles-based, and is supported by the FMIO,[10] which sets out more detailed requirements. Prior to the introduction of the FMIA, SIX x-clear and SIX SIS were authorized by FINMA as banks; these FMIs have now been re-authorized under the FMIA. Key legislation relevant to regulation of FMIs in Switzerland is summarized in Appendix V.

[8] In addition, DTCC Derivatives Repository, a TR domiciled in the U.K., was recognized by the Swiss authorities in January 2019.

[9] *Federal Act on Financial Market Infrastructures and Market Conduct in Securities and Derivatives Trading.*

[10] *Ordinance of the Federal Council of 25 November 2015 on Financial Market Infrastructures and Market Conduct in Securities and Derivatives Trading.*

12. Supervision and oversight of FMIs is conducted, respectively, by FINMA and the SNB. The FMIA gives FINMA responsibility for authorizing and supervising FMIs (except those operated by or on behalf of the SNB).[11] PSs require authorisation from FINMA only if this is necessary for the proper functioning of the financial market or the protection of financial market participants, and if the PS is not operated by a bank, or by the SNB or on its behalf. The FMIA also gives FINMA powers for consolidated supervision for FMIs that are part of a financial group. In addition, the FMIA establishes FINMA as the resolution authority for FMIs. The SNB has oversight responsibilities for systemically important CCPs, CSDs and PSs. These responsibilities are set out in the NBA,[12] as well as in the FMIA. The SNB also has responsibility for (after consulting with FINMA) designating FMIs as systemically important, designating the systemically important business processes of those FMIs (see Paragraph 58) and imposing special requirements on systemically important FMIs. Swiss legislation does not provide for TRs to be designated as systemically important and consequently TRs are not subject to SNB oversight. FINMA and the SNB's current supervision and oversight responsibilities for systemically important FMIs are summarized in Table 2.

Table 2. Switzerland: Supervision and Oversight of Systemically Important FMIs

Category	FINMA	SNB
Domestic payment system	-	SIC AG
Foreign payment system	-	CLS
Domestic CCP	SIX x-clear AG	SIX x-clear AG
Foreign CCP*	LCH Ltd Eurex Clearing AG	LCH Ltd Eurex Clearing AG
Domestic SSS and CSD	SIX SIS AG	SIX SIS AG

* LCH Ltd and Eurex Clearing AG are recognized by FINMA but not subject to its supervision.

13. Foreign CCPs and TRs must be recognized by FINMA before they can provide services to Swiss participants or other Swiss FMIs. Recognized CCPs and TRs must comply with information and reporting requirements established by FINMA. The SNB's oversight of systemically important FMIs extends to FMIs domiciled overseas if those FMIs: have substantial parts of their operation or leading participants in Switzerland, or clear or settle significant transaction volumes in Swiss francs.

14. There is overlap in the responsibilities and objectives of FINMA and the SNB. The FMIA requires FINMA and the SNB to jointly carry out their activities regarding systemically important FMIs, to regularly exchange information and to avoid overlaps in execution of tasks. The authorities cooperate closely in practice.

[11] As noted above, Swiss legislation defines the term 'FMI' more broadly than the PFMI, to also include exchanges and MTFs.

[12] *Federal Act on the Swiss National Bank.*

15. The FMIA and FMIO provide the Swiss legislative framework for regulation of OTC derivatives. FINMA has primary regulatory responsibility in this area, and provides further details on the regulatory regime in the FMIO-FINMA.[13] The first phase of obligations to report OTC derivatives transactions to TRs came into effect in October 2017. Requirements regarding mandatory clearing of OTC derivatives came into effect in Switzerland in September 2018, covering standardized interest rate and credit derivatives; these requirements are subject to transition periods and so will begin to take effect from March 2019. Transactions must be cleared on a CCP that is authorized or recognized by FINMA; at present no Swiss CCP clears the products subject to the mandates and so Swiss market participants must use a recognized foreign CCP.

16. There is some uncertainty in the FMI regulatory landscape associated with ongoing EU-Swiss framework discussions and the exit of the United Kingdom (U.K.) from the EU. SIX Swiss Exchange and BX Swiss Exchange (a Zurich-based stock exchange) have been granted a one-year equivalence by the European Commission, ending in December 2018, with extension tied to the progress of the EU-Swiss framework negotiations.[14] Decisions by the European Commission regarding the extension of this equivalence could have potentially significant implications for SIX Swiss Exchange, with possible flow-on effects to CCP and CSD.[15] SIX Group has undertaken impact analysis for different scenarios. Brexit also has implications for the SIX Group FMIs, in particular for the CCP which interoperates with the U.K.-domiciled LCH Ltd (and also EuroCCP), and provides clearing services for several U.K.-based trading venues. More broadly, the outcomes of Brexit could have implications for the location of OTC derivatives clearing by Swiss financial institutions.

ANALYSIS OF SUPERVISION AND OVERSIGHT

Regulation, Supervision and Transparency (Responsibilities A, C, and D)

Regulatory Framework

17. The Swiss authorities apply the PFMI in their regulation of systemically important FMIs. This is achieved through a combination of requirements detailed in legislation and statements in explanatory material supporting the legislation. Certain elements of the PFMI are implemented through special requirements, detailed in FMIA, FMIO and NBO, that apply only to FMIs that have been designated as systemically important. The authorities refer to the PFMI and relevant guidance (including the CPMI-IOSCO reports *Resilience of central counterparties: Further guidance on the PFMI*, *Recovery of Financial Market Infrastructures* and *Guidance on cyber resilience for FMIs*) in their supervision and oversight of systemically important FMIs.

[13] *Ordinance of the Swiss Financial Market Supervisory Authority of Financial Market Infrastructures and Market Conduct in Securities and Derivatives Trading—FINMA Financial Market Infrastructure Ordinance.*

[14] On 20 December 2018, the European Commission extended the equivalence by six months, until June 2019.

[15] In November 2018, the Federal Council adopted a contingency measure to mitigate such potential implications.

18. A deep dive assessment of the implementation of the PFMI in the Swiss legal, regulatory and oversight framework is currently being conducted by the CPMI-IOSCO.[16] Due to this ongoing work, this technical note does not include a similar deep dive. In the areas considered in this technical note, certain gaps in the Swiss legislative framework—for example in the area of liquidity risk—do not appear to have limited the implementation of the PFMI in practice. However, there are some gaps with respect to TRs that cannot be addressed by the supervisory approach (e.g., there are no requirements in Swiss legislation for TRs to develop recovery or wind down plans, or to establish plans to raise additional equity should equity fall close to or below the amount needed).[17] To support implementation—and, if necessary, enforcement—of the PFMI, the Swiss authorities should look to address gaps identified in the CPMI-IOSCO assessment.

19. The criteria used to identify FMIs that should be subject to regulation, supervision and oversight by Swiss authorities are defined in legislation, which is publicly available. Criteria for determining the systemic importance of a FMI are also defined in legislation, and are consistent with those specified in the PFMI. FINMA and the SNB publicly disclose on their websites the FMIs that are subject to their supervision or oversight.

20. FMIs operated by the SNB or on its behalf are subject to SNB oversight if they are deemed to be systemically important. FMIs operated by the SNB or on its behalf (regardless of whether they are deemed to be systemically important) are not authorized or supervised by FINMA. Currently the only FMI operated by or on behalf of the SNB is SIC, which has been designated as systemically important. SIC is subject to limited provisions in the FMIA, and the full set of special requirements for PSs specified in the NBO.[18] In accordance with PFMI Paragraph 1.23, there are some requirements within the PFMI that the SNB does not apply to SIC, relating to functions that are provided by the SNB.

21. The FMIA provides specific provisions for foreign CCPs or TRs that have been recognized by FINMA. FINMA may recognize these foreign FMIs if, among other things, they are subject to appropriate regulation and supervision. For foreign FMIs that are designated to be systemically important in Switzerland, the SNB may, after consulting with FINMA, waive the obligation to meet the special requirements specified in the NBO if the FMI is subject to equivalent supervision and oversight abroad and the competent supervisory and oversight authorities cooperate with the SNB. The SNB has granted this exemption for all foreign FMIs that have been designated as systemically important.

[16] This report, *Implementation monitoring of PFMI: Assessment report for Switzerland*, was published in January 2019.

[17] Under Article 86 of the FMIA, in the event that a TR (or any other FMI) wished to return its authorization, it would be required to present a liquidation plan to FINMA (and systemically important FMIs are required to establish wind-down plans).

[18] A larger set of special requirements specified in the NBO applies to FMIs that are only subject to the oversight of the SNB, covering certain issues that would otherwise be subject to FINMA's supervision.

Approach to Oversight and Supervision

22. The roles, objectives and regulations of FINMA and the SNB are clearly defined and disclosed. FINMA's broad objectives, established under the Federal Act on the Swiss Financial Market Supervisory Authority, are to protect creditors, investors, and insured persons, as well as to ensure the proper functioning of the financial market—thus contributing to sustaining the reputation and competitiveness of the Swiss financial center. In its supervision of FMIs, FINMA focusses on the functioning of markets; the objective of sustaining the 'competitiveness of the Swiss financial center' is viewed as secondary objective that is an outcome of the primary focus. The NBA defines the SNB's mandate in its oversight of FMIs as contributing to the stability of the financial system.

23. FINMA and the SNB publicly disclose certain information about their approach to supervision and oversight. Both authorities also discuss their supervision or oversight activities at a high level in their annual reports.

24. FINMA and the SNB take a risk-based approach to supervision and oversight. The intensity of FINMA's supervision is based on a categorization of the FMI (based on its relevance, size, complexity and risk structure), as well as a rating based on an assessment of the FMI's observance of regulatory requirements and potential emerging risk and issues. SIX x-clear and SIX SIS are subject to the most intense level of supervision, including an annual assessment of their observance of the requirements in the FMIA. The SNB concentrates its activities on aspects of an FMI's operations that have the largest residual risks, in accordance with the FMI's current risk profile. The SNB conducts an annual assessment of domestic systemically important FMIs (including SIC) against the special requirements in the NBO. Both FINMA and the SNB communicate their expectations of the FMIs and their priorities for the coming year in annual assessment letters.

25. FINMA should finalize its work to refine its supervisory approach for FMIs, in particular its approach to consolidated group supervision. The FMIA gives FINMA powers for consolidated supervision of FMIs that are part of a financial group. FINMA intends to set quantitative and qualitative requirements regarding potential financial and operational risks at a group level (which will also cover non-regulated companies that are part of the group). This work will be important given the integrated nature of SIX Group. FINMA is also developing its approach for supervision of TRs. TRs were established as a category of FMI within Swiss legislation with the introduction of FMIA. At present the only Swiss-domiciled TR is SIX TR, and FINMA's supervision of the other FMIs within SIX Group covers certain elements of the TR's operations (e.g., IT and cyber risks, which are managed across the Group).

26. The Swiss authorities have regular meetings with SIX Group. Meetings are held with a range of staff at SIX Group and different levels of seniority. FINMA also conducts on-site visits on specific topics. The authorities also require the FMIs to provide certain data and documentation, including relevant policies, procedures and contractual frameworks.

27. The authorities should consider introducing regular discussions with FMI participants and/or market participants more broadly. Supplementing existing arrangements for engagement with market participants with periodic direct engagement on FMI matters could provide useful insights for the authorities.

28. FINMA uses external supervisory audits as part of its supervision. This approach, which is used across the range of FINMA's supervisory responsibilities, acts to extend the reach of FINMA's resources (see Paragraph 34). The annual supervisory audit is conducted by an external audit firm selected and paid for by the FMI, although the FMI's choice of auditor is subject to veto by FINMA. The scope of the audit is agreed with FINMA and, at least in the case of systemically important FMIs, differs year-to-year. The SNB receives the results of the audits for these FMIs and may request that certain items be included in the scope. For SIX Group, a single supervisory audit is conducted across the SIX FMIs. For the systemically important SIX Group FMIs, SIX x-clear and SIX SIS, FINMA uses the supervisory audit as a confirmation tool, rather than a primary source of information.

29. The SNB requires a detailed annual audit of SIX Group covering IT and operational risk and security matters. The focus of the audit, which is determined by the SNB in consultation with FINMA and SIX Group, changes year-to-year. This audit is conducted by a specialized audit firm with expertise in IT and operational risk matters. As with FINMA's supervisory audit, the audit firm is chosen and paid for the FMI, and the SNB may veto the choice of auditor.

30. Authorized FMIs must obtain prior approval or authorization from FINMA for material changes to their operations. For systemically important FMIs, FINMA must consult with the SNB prior to giving approval or authorization. Such changes include, among other things, the outsourcing of 'essential services' and substantial changes to risk management models.[19] The FMIO establishes requirements that FMIs must address in their agreement with outsourcing providers, and the Swiss authorities assess the FMIs' approach to meet these requirements. The authorities also have the power to audit an FMI's outsourcing provider directly. With respect to validation of model changes, FINMA and the SNB make use of risk validations from the FMI, may require additional external audits to validate the model, and can also draw on internal specialists from other teams.

31. For supervision and oversight of recognized foreign FMIs, FINMA and the SNB largely rely on the activities of the home authorities of the FMI. FINMA and the SNB engage more closely with foreign authorities relevant for CCP interoperability; in these cases the relevant authorities have previously jointly communicated expectations to the interoperating CCPs. The SNB also considers in more detail the payment, settlement and liquidity arrangements of foreign FMIs for transactions cleared or settled in Swiss francs, and discusses these with the primary regulator of the FMI. In addition, FINMA requires recognized TRs to provide a periodic audit covering their policies and procedures regarding confidentiality, receipt and administration of data. The authorities' arrangements for cooperation with overseas authorities are described in Paragraph 39.

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[19] Essential services include those necessary for the continuation of important business processes (in particular in the areas of liquidity management, treasury, risk management, master data administration and accounting, personnel, information technology, and legal and compliance).

Powers and Resources (Responsibility B)

Powers

32. **FINMA and the SNB have the authority to obtain information from FMIs in a timely manner.** This includes provision of data and documentation to enable the SNB to assess the systemic importance of an FMI.[20] Supervised or overseen FMIs and their auditors are required to provide FINMA and, as relevant, the SNB with all information and documentation necessary for the authorities to carry out their tasks, and are required to notify the authorities of certain events or incidents. Legislation also provides FINMA and the SNB with the authority to carry out audits (either directly or through a third party) of FMIs subject to their supervision or oversight.

33. **FINMA and the SNB have powers to induce change or enforce corrective action.** FINMA's powers include, among others, issuing rulings, preventing persons from acting in a management capacity, confiscation of profits, and revocation of authorization or recognition. The SNB also has certain enforcement powers. Although these powers are more limited than FINMA's, they include the ability to issue enforceable orders to systemically important FMIs in the event of non-compliance with regulatory requirements. There would be consultation between FINMA and the SNB in the event that one authority intended to use its enforcement powers with respect to a systemically important FMI.

Resources

34. **FINMA should increase the resources it dedicates to FMI supervision.** FMI supervision is conducted within FINMA's Department for Financial Market Infrastructures and Derivatives. The Supervision Unit within the Department, which comprises three staff, is responsible for the ongoing supervision of SIX Group, SIX x-clear, SIX SIS and SIX TR, engagement in cooperative arrangements for CCPs that are recognized in Switzerland, and supervision of exchanges and MTFs. The Department also includes a Legal Unit, which comprises five staff and has responsibilities for authorization and recognition of FMIs and authorization of changes to FMI operations and rules, as well as trading and derivatives regulation. FINMA takes a risk-based approach to resource allocation and, as discussed above, can make use of external supervisory audits to extend its reach. Nevertheless, given its broad scope of responsibilities and the systemically important nature of several of the FMIs it supervises, it does not appear that the Financial Market Infrastructures and Derivatives Department (particularly the Supervision Unit) has sufficient resources to fulfil its supervisory responsibilities. Resource requirements are not likely to diminish in the coming years, as the Department will be called on to support FINMA's recovery and resolution work for FMIs (see also Paragraph 62), and there are several major projects ongoing at SIX Group that will require significant supervisory attention.

[20] For PSs, this disclosure obligation only applies to systems that settle payments in excess of CHF 25 billion (gross) per financial year. The SNB requires these statistics to be provided regularly, and has determined that no domestic PS other than SIC is systemically important at this stage.

35. The SNB appears to have sufficient resources to meet its responsibilities. The SNB's Oversight Unit, which comprises 10.4 full-time-equivalent (FTE), is responsible for oversight of systemically important FMIs, SNB input on FMI recovery and resolution, and FMI policy issues. Resources are primarily focused on ensuring the SNB fulfils its oversight responsibilities regarding domestic FMIs. The SNB's Oversight Unit also employs staff with expertise in information and cyber security, can access resources with specific skills in other departments within the SNB and may make use of external auditors.

36. FINMA and the SNB have established internal governance arrangements to support their supervision and oversight of FMIs. Within FINMA, an internal committee has been established to discuss assessments of, and take material decisions concerning, supervised FMIs. This committee comprises the Heads of the FMI Legal Unit, the FMI Supervision Unit, and the Financial Market Infrastructures and Derivatives Department as well as, for certain decisions, the Head of the Markets Division. FMI assessment letters are discussed with CEO of FINMA. Certain key decisions are made at the level of the FINMA Board, such as the re-authorization of the important Swiss FMIs under the FMIA. The SNB Governing Board has ultimate responsibility for the SNB's FMI oversight and policy activities, and has final responsibility for decisions regarding the designation of systemically important FMIs and systemically important business processes, and the issuance of any orders in the event that a FMI did not comply with regulatory requirements. Approval for material decisions is required from the Head of the Financial Stability Unit or the Head of Department, and in some cases the Governing Board. The Oversight Unit reports at least annually to the Governing Board about its oversight of domestic and foreign FMIs, and the FMI assessment letters (produced only for domestic FMIs) are provided to the Board.

37. The SNB's oversight of SIC is conducted separately from its role as SIC system manager. The Banking Operations Unit fulfils the SNB's responsibility as SIC system manager. The Oversight Unit and the Banking Operations Unit are separated within the SNB's organizational structure and report to different members of the Governing Board. There is an escalation process in case of disagreement between the Oversight Unit and Banking Operations Unit, ultimately up to the Governing Board. The Oversight Unit holds regular meetings with the Banking Operations Unit, as well with SIC AG and with relevant areas of SIX Group. Responsibility for ensuring compliance with relevant regulatory requirements is split between SNB Banking Operations and SIC AG; this split is documented.

Cooperation in Normal and Stressed Circumstances (Responsibility E)

38. FINMA and the SNB cooperate closely in their supervision and oversight of FMIs. Legislation permits, and in some cases requires, FINMA and the SNB to cooperate with each other, including by sharing information. This cooperation is also supported by an exchange of letters, which covers the split of responsibilities between the two authorities. FINMA and the SNB cooperate in practice, including by meeting jointly with SIX Group regarding matters that concern both authorities, holding regular coordination meetings, coordination of the annual supervisory audit, and by sharing the results of their assessments and coordinating regulatory priorities.

39. The Swiss authorities also cooperate with foreign authorities, with regards to Swiss and foreign FMIs. This cooperation is supported by legislation, which permits information sharing with foreign authorities subject to certain conditions. FINMA and the SNB have established bilateral and multilateral cooperative arrangement with foreign authorities with respect to SIX x-clear which, as discussed in Paragraph 5, provides services in multiple jurisdictions. FINMA has also recently established a CMG for SIX x-clear, to support recovery and resolution planning for the CCP; FINMA is currently developing the cooperation agreement for the group. The Swiss authorities also participate in several cooperative arrangements and CMGs for foreign FMIs that are recognized in Switzerland. These cooperative arrangements are summarized in Appendix VI. Access by foreign authorities to data held in FINMA-authorized TRs is addressed in the FMIA.

40. FINMA and the SNB should finalize their ongoing work to develop crisis management cooperation plans. FINMA and the SNB are currently mapping the cooperation required across a wide range of potential FMI crisis events. The project, which is currently expected to run into early 2019, will cover cooperation between Swiss authorities and with foreign authorities. This work is important as FINMA and the SNB do not currently have detailed documented crisis management plans to support cooperation between the two authorities in the event of a financial or operational crisis involving a systemically important FMI. It was recently decided that the Swiss Financial Crisis Committee (comprising senior executives from the Department of Finance, FINMA and the SNB) will be responsible for coordination among the authorities in the event of an extreme crisis affecting a Swiss FMI. The ongoing FINMA-SNB project could usefully provide the relevant planning and documentation to support the work of this Committee on FMI matters, in addition to covering cooperation arrangements for crises that may not require the involvement of the Committee. Given the range of cooperative agreements with overseas authorities in place to support oversight of SIX x-clear, mapping crisis coordination plans and making those plans appropriately transparent to the relevant foreign authorities will also be important. Once the project has been finalized, the crisis management coordination arrangements should also be regularly tested.

ANALYSIS OF SELECTED ISSUES

A. Governance of SIX Group FMIs and SIX Organizational Structure

41. Strong governance arrangements are essential to ensure effective risk management at FMIs. SIX Group is a user-owned, for-profit group (with the exception of SIC AG, which operates according to a non-profit, cost-recovery model which includes a certain return to equity holders). The Securities & Exchanges business unit applies a "target profit" model, under which it provides services on a cost-recovery basis plus mark-up. The Group operates in a highly competitive environment, particularly in the exchange, clearing and CSD spaces. SIX Group has interests in a range of businesses, covering payments and data services, as well as a strong focus on fintech and innovation and, given the integrated business structure, it is essential that incentives always align to prioritize strong risk management at the FMIs (for SIC AG, oversight of the risk management function—including definition of the risk appetite—lies with its independent Board).

42. SIX x-clear and SIX SIS should ensure that the independence of their governance arrangements support sound risk management. FMI risk management decisions should be taken without undue influence from business decisions, including those of the SIX Group more broadly. Governance arrangements should also be structured so that sufficient attention can be given to FMI risk matters by the appropriate board of directors. The current structure of SIX Group and the governance arrangements for SIX x-clear and SIX SIS are summarized in Appendix VII. The SIX Group Board of Directors has responsibility for determining the risk appetite of the Group and its high-level policy framework, while FMI-specific issues are the responsibility of the Board of Directors of the SIX x-clear and SIX SIS (FMI Boards). SIC is discussed separately below.

43. It is unclear whether the composition of the Boards of Directors of SIX x-clear and SIX SIS supports a strong and independent focus on FMI risk management, or the placement of a high priority on stability and public interest considerations. Membership of the Board of SIX x-clear and SIX SIS is identical. Two of the five members of these Boards are independent. The other three members sit on the Executive Board, and include the Head of the Securities & Exchanges Division, who has responsibilities for a broad range of financial infrastructures, including exchanges and MTFs. A CPMI-IOSCO PFMI Assessment in January 2019 found that for CCPs and CSDs the content of the legal, regulatory, and oversight frameworks in Switzerland is broadly consistent with PFMI Principle 2 (Governance), with only minor gaps in some areas; however, it is unclear whether in practice said Board composition provides sufficient independence from business decisions, including the Group's broader business decisions.[21] Greater independence could be achieved by amending the composition of the Boards and taking steps to clarify their roles and responsibilities:

- *Composition:* Changes to composition to improve independence could include increasing the number of independent members so that they comprise a majority, and reviewing the current membership of SIX Group executives. An alternative may be to increase the influence of the independent board members within the current structure of the FMI Boards—and decrease the influence of executives—on risk management decisions; such arrangements would need to be carefully structured and implemented, clearly documented, and regularly reviewed by both SIX Group and the Swiss authorities to assess their effectiveness. SIX should also consider differentiating, at least to some extent, the membership of the Board of Directors of SIX SIS and the Board of Directors of SIX x-clear. FINMA and the SNB should meet regularly with the independent members of the FMI Board, and should consider meeting periodically with the SIX x-clear Risk Advisory Committee.

- *Roles and responsibilities:* It is important that the Group Board continues to have sight of the systemically important infrastructures that the Group operates (in part reflecting that resource allocation decisions are taken at the Group level). However, the responsibilities of the FMI Boards and the Group Boards should be clearly demarked, so that FMI risk matters are clearly the responsibility of the FMI Boards. SIX should consider establishing specific objectives for the

[21] Level 2 assessments do not evaluate either FMIs' compliance with implementation measures, or the effectiveness of national authorities' application of the legal, regulatory, or oversight frameworks to FMIs (for example, through supervisory practices).

FMI Boards that place a high priority on the safety and soundness of the FMIs and explicitly support financial stability and other relevant public interest considerations. SIX could also consider establishing separate Board risk committees for the FMIs.

44. At a management and staff level, SIX Group has made some improvements to its risk governance arrangements since the 2014 FSAP. Risk management functions have been separated from the business units and a separate Group-wide risk management unit has been created, headed by the Group CRO. The Group CRO, who previously reported to the Group CFO, is now a member of the Executive Board. The Group risk management unit has a wide remit (including financial risk, operational risk, project risks, legal, compliance, physical and information security and business continuity). The unit's responsibilities include providing second line functions in FMI risk management—risk management is operationally conducted within the business unit (e.g., monitoring of credit lines, reviewing daily risk situations), while the centralized unit has responsibility for proposing methodology and parameters (subject to FMI Board approval). A new remuneration scheme has been introduced so that members of control functions are not subject to profit-related performance indicators.

45. SIX implemented changes to its organizational structure in 2018. Notable changes included: merging SIX Group's securities post-trading business (which operated SIX x-clear and SIX SIS) and its exchange business into a single Securities & Exchanges business unit; re-organization of the banking services (payments) business line; establishing a dedicated innovation unit; and the sale of the international cards business. The merger of the post-trading and exchange business lines brings all SIX Group entities that are regulated under FMIA within a single business unit, under one SIX Group executive. Given the different objectives and issues that arise for trading venues and FMIs, the merger further heightens the importance of independent governance arrangements for the systemically important FMIs, SIX x-clear and SIX SIS.

46. The SNB should monitor the effectiveness of SIC governance arrangements, which have been revised as a result of the restructure of SIX Group. The recent restructure resulted in greater integration of SIC AG (with respect to its operations, as well as aspects relating to governance and services) within SIX's Banking Services business line (which also covers broader payments issues including retail product innovation). SIC AG continues to have its own Board of Directors, comprising representatives of system participants, of SIX Group and of the SNB. The restructure has shifted some matters that were not directly related to the operation of SIC outside the governance responsibilities of the SIC AG Board. However, some senior staff members within SIC now have dual-hat positions, working for both SIC AG and within the broader banking services business line. Steps have been taken to mitigate potential risks associated with this, including to ensure that those staff have contracts directly with SIC AG. SIC AG continues to have its own IT management and operations teams. Certain compliance and risk functions are performed by the SIX Group risk function; the statutes of SIC AG and SIX acknowledge that the SIC AG Board has responsibility for these matters as they pertain to SIC; it will be important to ensure that the SIC AG Board has appropriate oversight of these functions.

47. As part of its resolution planning responsibilities, FINMA will need to consider whether the organizational structure of SIX Group appropriately allows for resolution of the systemically important FMIs. In addition to the issues discussed above, the SIX FMIs have a number of interdependencies with SIX Group: staff and IT services (including data center management) are provided by separate subsidiaries within SIX Group; and there are financial dependencies such as the provision of liquidity and settlement services by SIX SIS to SIX x-clear, and the provision by SIX Group of a credit line to SIX x-clear and SIX SIS. These dependencies are managed on a 'business as usual' basis through formal contractual arrangements, service level agreements, and joint liquidity and default management testing across SIX x-clear and SIX SIS. However, they may present additional challenges in resolution. The Swiss FMI resolution framework is discussed in Paragraph 62. With respect to SIC, the SNB Banking Operations Unit is beginning work to formalize the severability of SIC AG on a firm level from the rest of the SIX Group. On a technological and operational level, the SIC system is already separable and a roadmap for such a project has been drawn up.

B. Selected Topics in SIX Group FMI Risk Management

48. The Swiss authorities have conducted a program of work over several years to assess and enhance the SIX Group FMI's observance of the PFMI. The SIX Group FMIs have made changes to enhance their observance in several areas including, for instance recovery planning, liquidity risk management, and disclosures; in some areas the authorities are still working with the SIX Group to implement changes. The arrangements of SIX x-clear and SIX SIS to manage credit, liquidity, investment and general business risks are summarized at a high level in Appendix VIII. At a high level, the FMIs appear to generally observe the requirements of the PFMI in these areas (although, as noted above, this report does not include a deep dive into the Principles). However, some observations are listed below. The FMIs also have further work to do to ensure their recovery arrangements fully meet the requirements in the Principles; this is discussed in the Section C.

49. The planned introduction of a new clearing platform for SIX x-clear will result in further significant changes to the financial risk management of the CCP. The new system will replace the existing systems (SECOM and CLARA—which is used for the Norwegian branch, as well as add-ons that have been made to these systems) with a single system covering the whole CCP. This project will include a replacement of core clearing risk management models, including margining and stress testing. Subject to regulatory approval, SIX x-clear intends to launch the new system in late 2020. This project presents an opportunity to update and enhance the CCP's risk models. However, it is also a significant undertaking and the authorities will need to monitor the project closely to ensure that SIX x-clear fully implements the relevant regulatory requirements. The SNB has indicated it may seek its own external validation in addition to the validations that SIX will seek; given the significance of this change SNB is strongly encouraged to adopt this approach.

Liquidity Risk

50. Improvements have been made to the liquidity risk management framework of SIX x-clear and SIX SIS since the 2014 FSAP. Liquidity is managed across the two FMIs. Daily liquidity stress testing is undertaken at a Cover 2 level for both SIX x-clear and SIX SIS individually, as well as collectively. The stress tests appropriately assume that settlement must occur on the intended settlement date. However, SIX x-clear and SIX SIS should refine certain other assumptions in the liquidity stress testing model. For example, the FSAP had open questions regarding assumptions taken about availability of excess collateral and market movements, and whether the model is sufficiently conservative. SIX intends to make amendments to these assumptions in early 2019. SIX should ensure that the revised assumptions have a sound analytical basis and are sufficiently conservative. Notwithstanding the rule regarding the ability to retain excess collateral, SIX should also consider analyzing the adequacy of its liquidity resources in a situation in which it did not have access to excess collateral, as anticipated by the CPMI-IOSCO Resilience Guidance.

51. Additional liquidity resources have been introduced. These include a committed credit line from SIX Group. SIX SIS has also entered into multicurrency FX swap agreements with commercial financial institutions. SIX has taken measures to enhance the reliability of these arrangements by setting minimum credit quality criteria for its providers, and diversifying the providers across jurisdictions. The SNB is establishing an emergency FMI liquidity facility that will support access to FX liquidity in certain currencies, although provision of FX liquidity through this facility will not be guaranteed (see Paragraph 69). SIX is also beginning discussions about access to liquidity with certain other central banks, including in currencies not covered by the SNB emergency facility or the multicurrency FX swap agreements, which would provide significant advantages. Although payment obligations in these other currencies are of relatively low value, in the event that SIX is unable to access central bank liquidity it should consider other arrangements to enhance its access to liquidity in these currencies (e.g., by extending its multicurrency FX swap agreements).

52. The SNB intends to conduct a full review of the SIX x-clear and SIX SIS liquidity framework in 2019. This will provide a useful in-depth review of the current approach, which is the result of several years of development.

Default Management—Porting and Testing

53. SIX x-clear should undertake further analysis and/or testing of portability in the derivatives segment. SIX x-clear is technically able to port. However, there is a high concentration in client clearing in the derivatives segment (with respect to both x-clear clients and non-clearing members) in CLARA and this could potentially delay the effectiveness of arrangements to port the positions and collateral of clients and non-clearing members following the default of a large general clearing member (GCM) or clearing administrator. One way this could be assessed is through a default management test. More generally with respect to client clearing and tiering, in 2017 SIX x-clear conducted analysis of the potential for a client failure to cause a GCM default, and concluded that the risk of this was not high. It would be useful to repeat this analysis regularly across the CCP.

54. SIX should include participants in its default management tests. The annual default management test considers the default of participants at both SIX x-clear and SIX SIS. Previous tests have considered the simultaneous default of clearing participants in the equities and derivatives segments, and a coming test will focus on a liquidity stress event. As part of the annual exercise, SIX undertakes test trades with the brokers that would be involved in the close-out process. Since the process to return to a matched book does not directly involve all clearing participants more generally, SIX does not include all participants in the test (focusing on including participants that serve as market makers for the auctioning process in case of a participant's default). However, other elements of the default management process will involve participants (e.g., porting the positions and collateral of the defaulting participant, and payment of top up contributions), and this involvement may increase with the addition of new recovery tools. More generally, the involvement of participants would have the effect of increasing awareness of the default management process.

Management of Dependencies of Commercial Service Providers

55. SIX should analyze its dependencies on commercial banks as service providers and, where required, take steps to diversify or establish back up arrangements. There is evidence of this being done in some cases—for example, it has sought to diversify the providers of FX liquidity swaps. However, there are some instances in which SIX relies on a limited number of commercial service providers, which may create operational vulnerabilities. To manage USD funds, which is a significant currency for SIX SIS, SIX uses a single custodian bank to conduct its investments (these investments are made subject to the restrictions and limits specified in SIX's investment policy). SIX x-clear and SIX SIS have a general exclusion of liability for financial losses from the default of a cash or custodian bank and ICSD/collateral management service providers such as Clearstream Banking Luxembourg, in which any losses from the default of this provider would be allocated to participants.[22] However, the use of a single provider for USD presents operational vulnerabilities. In the Norwegian branch SIX x-clear relies on one liquidity provider for intraday settlements, and largely relies on two cash collateral banks—one of which is also a large provider of client clearing services in the branch. This in part reflects the structure of the Norwegian market, but should be kept under review. SIX should more broadly seek to review such dependencies across the range of the FMIs' operations and where necessary diversify its arrangements or, at a minimum, ensure that it has reliable back-up arrangements that could be implemented in a timely manner.

56. SIX has taken some steps to manage interdependencies, where it has multiple sources of exposure to a counterparty. SIX uses 'risk equivalents' to monitor credit exposures across the whole of SIX Group. This measure is reported internally, and can trigger escalating approval requirements for extensions of credit. There are also limitations on using members of SIX x-clear as placement banks, and the liquidity stress testing model removes liquidity that would have been provided by the defaulting participants from the available resources.

Procyclicality

57. SIX x-clear should use the replacement of its clearing systems to introduce a holistic approach to managing and assessing procyclicality in its margin models. Although the current

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[22] This exclusion of liability does not extend to placements, where if secured placement is not feasible cash can be held with a placement bank unsecured. For such placements, the unsecured exposure is subject to a CHF 40 million limit and for SIX x-clear a newly introduced loss-allocation tool could be used (see Paragraph 61).

margin models incorporate some methods to manage procyclicality, the CCP does not appear to have a holistic, documented, board-approved approach for assessing and limiting procyclicality. In addition, there is a risk that SIX x-clear's risk coefficient margin add-on could create unanticipated cliff-edge effects. The add-on is triggered by a reduction in a participant's credit rating, and can result in a material increase in margin requirements. Although the methodology for this add-on is transparent to participants, it is possible that in extreme conditions a credit rating downgrade may not be anticipated, and therefore the application of the add-on may not be predictable. It is important for a CCP to be able to protect itself and its other participants against deteriorating credit quality of a particular participant; however, SIX x-clear should consider alternative methods to mitigate this potentially large step change in margin requirements.

C. FMI Crisis Management

Recovery

58. SIX x-clear and SIX SIS have established recovery and wind down plans, and SIC AG has established a recovery plan. The FMIA requires systemically important FMIs to draw up recovery plans that set out the measures they will use to maintain continuity of their systemically important business processes (as designated by the SNB) in a crisis.[23] Since the operation of the SIC system depends on SIC AG and the SIX Group more broadly, the SNB has required SIC AG to develop a recovery plan for SIC (although no wind down plan is required). The SNB oversight unit consults with SNB Banking Operations prior to setting expectations for SIC AG regarding recovery. Elements of the recovery plans of SIX x-clear and SIX SIS are summarized in Appendix VIII.

59. Recovery arrangements have been a priority for both FINMA and the SNB over recent years. The FMIs' recovery plans are subject to at least annual review by the authorities, guided by the CPMI-IOSCO guidance *Recovery of Financial Market Infrastructures* (Recovery Guidance). The authorities have been effective in inducing changes in this area to date, and have identified further areas for improvement in each FMI's recovery plan. FINMA and the SNB are encouraged to continue to hold a strong stance regarding the full implementation of the requirements of the PFMI in this area. The costs that recovery tools can introduce for FMIs and their participants can serve as a disincentive for implementation. However, a strong recovery plan that fully meets the requirements established in the PFMI is essential for ensuring continued FMI operation even in times of extreme stress.

60. The SIX Group FMIs should continue to improve their recovery plans to ensure that each FMI fully meets the requirements of the PFMI. Although certain improvements have been

[23] As defined by FMIA, a business process is systemically important if: its non-availability can cause serious losses, liquidity shortfalls or operational problems for financial intermediaries or other financial market infrastructures or can cause serious disruptions on financial markets; and if participants cannot substitute the business process at short notice. For these business processes, FMIs are required to develop recovery and wind-down plans and establish a two hour recovery time objective, and FINMA is required to draw up resolution plans. Furthermore, FMIs are required to draw up a plan as to how these business processes are to be terminated in an orderly way in the event of voluntary cessation of business.

made over recent iterations, and the plans broadly cover the measures considered in the Recovery Guidance, further work is required. For example, with respect to the recovery plan of SIX x-clear, the CCP should ensure that the scenarios covered in the plan are sufficiently comprehensive and stringent, including going beyond what is considered "extreme but plausible." SIX x-clear should ensure that it has sufficient tools to address fully any credit losses it may face as a result of any individual or combined default among its participants, including by assessing the calibration of its Top Up contribution and considering whether additional tools are required. It should also ensure that it has sufficient tools in both its equity and derivatives segments to enable it to re-establish a matched book in extreme circumstances. SIX x-clear primarily relies on voluntary tools to re-establish a matched book, and in the Norwegian market would rely on a relatively small number of brokers to conduct a close out. SIX x-clear should consider methods to enhance the reliability of these voluntary processes, and should also consider introducing mandatory tools to achieve a matched book. Any new tools should be tested, including with participants where necessary, and when further developed the FMIs should consider more holistic testing of recovery arrangements to complement the annual default management test.

61. SIX x-clear is in the process of introducing a non-default loss allocation tool. As part of this arrangement, SIX x-clear will allocate 25 percent of its regulatory required capital to absorb non-default losses. Losses beyond this could be allocated to participants, up to a cap. This tool would cover, among other things, losses in the event of a placement bank default—unsecured exposures to which are capped. SIX should consider whether a similar tool could be adopted for SIX SIS. SIX x-clear should also ensure that the situations in which the tool could be used are sufficiently clear and transparent, both internally and to its participants. In addition, it is not clear whether SIX's arrangements to hold the capital it has allocated to cover non-default losses sufficiently meet the requirements of PFMI Principle 15; this could be usefully considered by the authorities in their planned work to assess this tool, which will take place during the recovery plan's next annual review.

Resolution

62. The FMIA establishes the insolvency and resolution regime for FMIs. The insolvency regime applies to all FMIs under the supervision of FINMA, regardless of whether they are systemically important. Additional requirements regarding resolution planning apply for systemically important FMIs, aimed at ensuring continuity of systemically important business processes and avoiding loss of taxpayer funds in resolution. FINMA, as resolution authority, is required to draw up a resolution plan for systemically important FMIs that describes how the restructuring or winding up of the FMI could be carried out. These additional requirements apply with respect to SIX x-clear and SIX SIS; they do not apply for SIC because it is operated on behalf of the SNB. FINMA's insolvency and resolution powers extend to group parent companies and significant group companies within FMI groups.[24]

[24] Significant group companies, as defined in the FMIA, are companies that perform significant functions for activities (continued)

63. FINMA should increase the resources in its Recovery and Resolution Division dedicated to FMI resolution. FINMA's Recovery and Resolution Division leads all of FINMA's recovery and resolution responsibilities. The division currently has just under one FTE dedicated to FMI matters, covering both recovery and resolution. Although this work is, and will be, conducted in consultation with FINMA's Financial Market Infrastructure and Derivatives Department and the SNB, this current resourcing does not appear to be sufficient. Given the importance of both recovery and resolution planning for the continued provision of systemically important FMI business processes, coupled with the complexity of these matters, additional resources should be allocated to enable FINMA to fulfil its mandate in these areas.

64. FINMA should progress expeditiously its planned work to develop resolution plans for SIX x-clear and SIX SIS. Resolution planning for FMIs in Switzerland is at an early stage, and significant issues need to be addressed in this work (some of which are common across jurisdictions).

65. One issue FINMA will need to consider is the adequacy of the current legal framework for FMI resolution. The Swiss FMI insolvency and resolution framework applies the provisions of the bank resolution regime, set out in the Swiss Banking Act, by analogy unless the FMIA contains provisions to the contrary. Currently the only deviations set out in the FMIA are an obligation for FINMA to consult the SNB and specific considerations in relation to a postponement of termination of contracts and exercising netting rights by FINMA. Although the provisions of the bank resolution regime are relatively high level and principles-based, further analysis is required to determine whether these powers are sufficient and provide an appropriately sound legal basis for the specific tools and powers that may be needed in the resolution of an FMI (for example, to return a CCP to a matched book and to comprehensively cover losses). As part of its planned work, FINMA plans to review the adequacy of the current regulatory provisions for the resolution of a systemically important FMI, also taking account of FSB Guidance and other future international regulatory developments regarding FMI resolution, for example in other jurisdictions.

66. As discussed above, the structure of SIX Group will also be an important consideration in assessing the resolvability of SIX x-clear and SIX SIS. Given the integrated nature of SIX Group, notably the outsourcing and other interdependencies within the Group, it is not clear the group structure facilitates resolution of individual FMIs within the Group. Greater ring-fencing of the operations of the FMIs could enhance resolvability—although other methods could also deliver a similar outcome. FINMA has indicated that this is a relevant aspect that will be considered as part of its planned work in developing the FMI resolution framework.

which require authorisation; the FMIO defines these functions to include liquidity management, treasury, risk management, master data management, accounting, HR, IT, trading and settlement, legal and compliance. FMIs must report to FINMA any outsourcing of significant functions to group companies. FINMA is required to identify and publicly list significant group companies; it has identified two significant companies within SIX Group: SIX Management AG, and SIX Group Services AG. Group parent companies do not need to be named by FINMA for the resolution regime to apply to them.

67. The Swiss FMIs are considering issues related to continuity of access by participants that are in resolution. SIX x-clear and SIX SIS are currently engaging with participants regarding such access. Entry into resolution does not lead to automatic suspension of a member of SIC, provided certain conditions are met. The SNB will be considering this issue again during a wider review of the access policy to SNB accounts and to the SIC system, which is currently underway.

Central Bank Services

68. The SNB provides settlement and deposit services to FMIs. Regulated "domestic and foreign clearing and settlement companies" are permitted to open a sight deposit account with the SNB, which is a precondition for participation in SIC. Participation in SIC enables FMIs to conduct CHF settlements in central bank money. FMIs that hold a sight deposit account may deposit CHF funds at the SNB, thus mitigating exposures to commercial investment banks. The SNB decides on the opening of a sight deposit account and reserves the right to restrict access to the giro system for monetary policy reasons.

69. The SNB is currently establishing liquidity facilities for domestic systemically important FMIs. The SNB will provide two facilities: a standing liquidity facility in CHF; and an emergency liquidity facility in CHF and some foreign currencies. Through the standing liquidity facility, the SNB will provide liquidity to FMIs up to a certain limit, against SNB repo-eligible collateral that the FMI must provide at the time that liquidity is requested. The emergency liquidity facility, which can provide liquidity beyond the cap of the standing facility, would be available only for solvent and viable FMIs, also against SNB eligible collateral. The SNB does not guarantee its provision of liquidity in foreign currencies, and FMIs are required to demonstrate that they can meet liquidity risk management requirements using private sources of liquidity. SIX Group's investment and collateral policies take into account SNB collateral eligibility criteria. The SNB expects these liquidity facilities to be in place, and tested with SIX x-clear and SIX SIS, in the course of 2019.

D. Cyber Resilience

70. Cyber resilience is a continuing focus of FINMA and the SNB's supervision and oversight of the SIX Group FMIs. The authorities have an intensive ongoing program of work in this area, which includes regular meetings with relevant staff at SIX Group and detailed annual assessments (including assessments by external auditors). Both authorities refer to international standards for cyber resilience, in particular the National Institution of Standards and Technology (NIST) Framework for Improving Critical Infrastructure Cybersecurity, as well as the CPMI-IOSCO *Guidance on cyber resilience for financial market infrastructures*.

71. FINMA and the SNB have access to expertise regarding cyber resilience. Both authorities can make use of external experts and engage with IT and cyber experts within their organizations. For example, FINMA's FMI Supervision Unit engages with IT/cyber risk experts within FINMA's banking supervision team, and can benchmark SIX Group against the approach taken by supervised banks. FINMA and the SNB also exchange information with other Swiss authorities regarding cyber risk, including the State Secretariat for International Finance (SIF) and the Reporting and Analysis Centre for Information Assurance (MELANI).

72. The Risk Committee of the SIX Group Board of Directors is responsible for oversight of cyber risks. At a management level, the Group Chief Security Officer (CSO) is responsible for cyber resilience and IT security, as well as crisis management, business continuity and physical security. The CSO's team sits within the SIX Group CRO function and the CSO reports to the CRO. The CSO regularly presents cyber risk trends to the Executive Board and to the Risk Committee of the Board of Directors. The Board of Directors has received training on cyber-risk issues.

73. SIX Group has established a dedicated cyber security program. Various initiatives being implemented cover, among other things, governance and staff awareness, testing, and interdependencies with third parties. SIX Group is also conducting extensive work on threat monitoring and intelligence. The Group has established a cyber security operations center, which operates 24/7 to monitor cyber threats. The initial focus of the center is to protect SIX Group from cyber attacks; in time SIX intends to also offer threat assessment and monitoring services to market participants. SIX also engages with MELANI and international organizations to share intelligence.

74. The authorities and SIX Group are encouraged to undertake work on cross-sectoral cyber resilience. Cross-sectoral analysis would provide greater insight into the impact of a cyber event across the financial sector, facilitating further strengthening of resilience. SIX is planning to undertake simulations of cyber or other business-continuity events with several market participants, extending an exercise it recently undertook with one Swiss bank. The SNB intends to participate in the simulations in its role as a major system participant (i.e., through its Banking Operations Division). FINMA and the SNB are also considering conducting work on this topic.

E. Fintech

75. The FMI teams at FINMA and the SNB are contributing to broader work of the authorities regarding fintech.[25] Among other things, a working group considered whether the FMIA supports the sound legal operation of innovative firms in the exchange and FMI space. The SNB's banking operations team is also considering the specific implications of fintech for SIC.[26]

76. SIX Group has a strong focus on innovation. The Group has a dedicated "Digital and Innovation" business unit, and has established a venture fund to promote innovation in the Swiss financial center. Fintech issues relevant to specific business lines are led by and worked on within the relevant business line.

[25] Fintech in Switzerland and the approach of the Swiss authorities more generally will be discussed in a separate technical note.

[26] In January 2019, the SNB decided to grant access to sight deposit accounts and to the SIC system for entities with fintech licenses provided their business model makes them significant participants in the area of Swiss francs payment transactions.

77. SIX Group has announced that it will launch SIX Digital Exchange, an integrated digital asset trading, settlement and custody service. The product scope is yet to be finalized, but will likely include tokenized versions of 'real world' securities and assets, as well as other digital assets. Digital Exchange will use distributed ledger technology; certain elements of the technology will be developed in conjunction with a third-party provider. The service will be provided by a separate subsidiary of SIX Group AG, SIX Digital Exchange AG, and will be run operationally within the Securities and Exchanges Division.

78. SIX Digital Exchange will present novel risks and regulatory issues. SIX Group has announced its intention to seek full licensing from FINMA for the service. SIX Group has announced that it intends to launch the first services about mid-2019. However, the Swiss authorities will need to conduct a thorough analysis of how the new service—and any related changes to the services of authorized FMIs—meet the relevant regulatory requirements. The authorities intend to refer to relevant international guidance concerning evaluation of risks associated with the use of distributed ledger technology by FMIs, as necessary. FINMA and the SNB are engaging with SIX Group as the project develops and, as discussed above, have the ability to access specialist external resources should that be necessary.

Appendix I. CPMI–IOSCO Implementation Monitoring Assessment

CPMI-IOSCO Implementation Monitoring Level[(a)(b)]	**Assessment results**	**Publication**
Level 1 - Assess whether a jurisdiction has completed the process of adopting the legislation and other policies that will enable it to implement the Principles and Responsibilities	Highest rating of '4' for CCPs, PSs, CSDs and SSSs, and TRs, for both the Principles and Responsibilities, indicating that final implementation measures are in force.	CPMI-IOSCO *Implementation monitoring of PFMIs: Third update to Level 1 assessment report*, June 2016
Level 2/3 - Assess whether the content of new legislation and policies are complete and consistent with the Responsibilities and implemented by the authorities	For CCPs, CSDs and SSSs, and PSs, highest rating of 'Observed' (indicating the authorities fulfil the Responsibility). 'Responsibility E' for CCPs and CSDs and SSSs, was rated 'Observed with minor gap(s) identified', reflecting that, inter-agency arrangements for FMI resolution had not yet been developed. For TRs rated 'Not ready for assessment'. As at 9 January 2015, Switzerland had not implemented a regulatory framework for TRs and there were no existing TRs operational in Switzerland.	CPMI-IOSCO *Assessment and review of application of Responsibilities for authorities*, November 2015

Source: CPMI-IOSCO.

(a) The Swiss CCP, SIX x-clear, was included in the scope of the CPMI-IOSCO Level 3 assessment report *Implementation monitoring of PFMI: follow-up Level 3 assessment of CCPs' recovery planning, coverage of financial resources and liquidity stress testing*, May 2018. The focus of the report is the consistency of outcomes of implementation of the relevant Principles and Key Considerations across the group of in-scope CCPs as a whole, rather than on each individual CCP's specific outcomes of implementation.

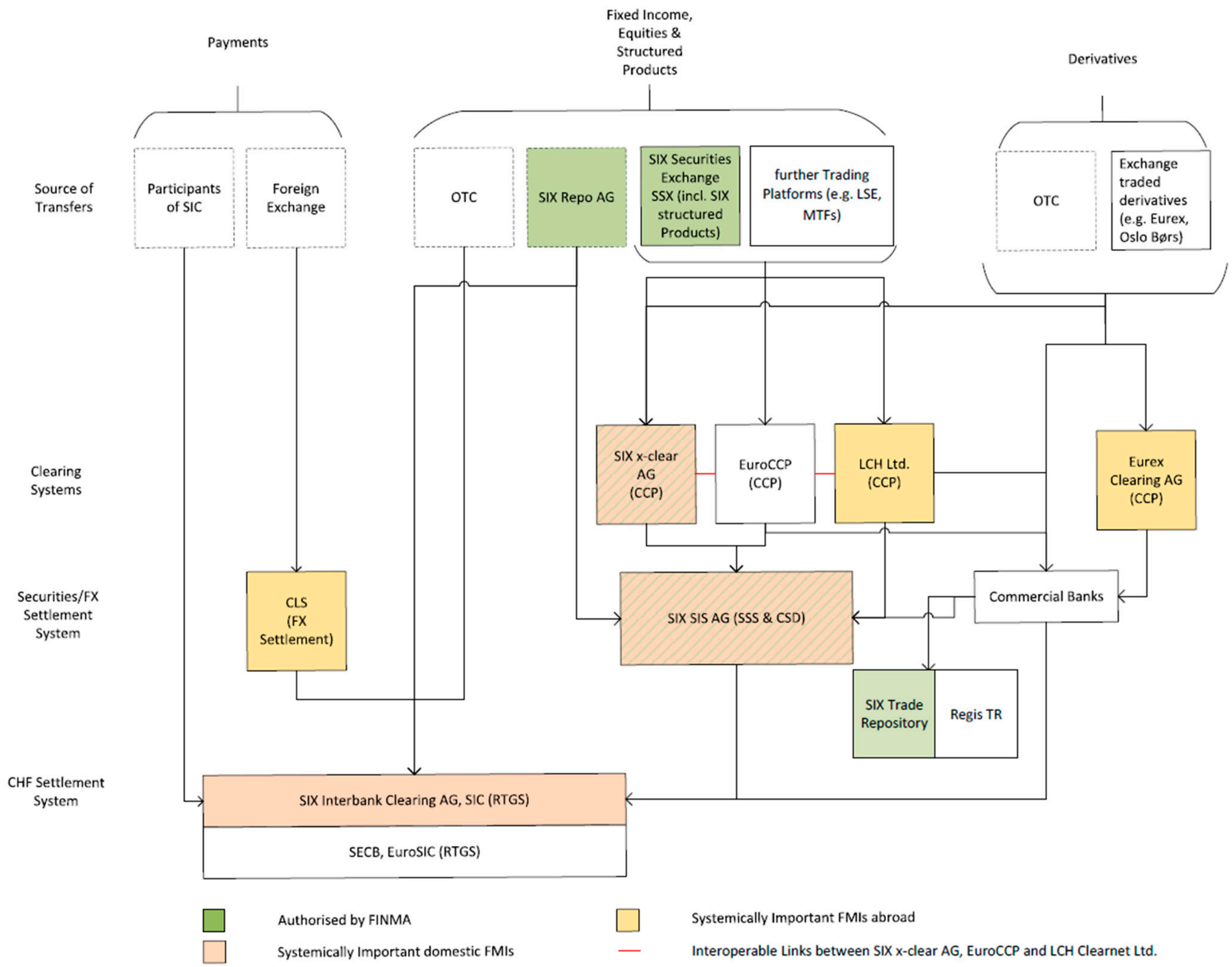
(b) A 'Level 2' assessment of the extent to which the content of Switzerland's implementation measures are complete and consistent with the PFMI was completed in January 2019: https://www.bis.org/cpmi/publ/d183.htm.

Appendix II. Status Update 2014 Recommendations

Recommendation (paraphrased)	Implementation Status
Recommendations on the supervision and oversight of FMIs	
The FinfraG should be passed by Parliament	**Implemented.** The FMIA entered into force on 1 January 2016 (FinfraG and FMIA both denote the Financial Market Infrastructure).
FINMA should fill its vacancies	**Implemented.** The vacancies at the time of the 2014 FSAP relevant to FMI regulation, supervision and resolution have been filled.
FINMA is encouraged to publicly disclose its policies related to FMIs and address FMIs specifically on its website	**Implemented.** FINMA has introduced a dedicated section on FMIs on its website.
The SNB and FINMA are encouraged to hold a firm stance on the full implementation of the new principles in Switzerland	**Implemented.** The SNB and FINMA have undertaken a program of work over several years to assess and enhance the SIX Group FMI's observance of the PFMI. See further discussion in Paragraph 48. There will be further, potentially significant, changes in the FMI space in Switzerland in coming years, including a planned replacement of the CCP's existing clearing systems and SIX Group's planned launch of an integrated digital trading and settlement system in 2019. For both projects, FINMA and the SNB will need to hold to a strong stance regarding the observance of minimum regulatory requirements.
The SNB and FINMA should upgrade their domestic and foreign cooperation arrangements to be able to handle crisis events effectively and in a timely manner	**Partially Implemented.** The SNB and FINMA have taken steps to upgrade crisis cooperation arrangements, and should complete ongoing work in this area. This issue is discussed further in Paragraphs 38-40.
Recommendations on the risk management framework of FMIs	
The independence of the risk management function of SIX x-clear AG and SIX SIS AG needs to be addressed in the governance structure of the organization	**Partially Implemented.** At a management and staff level, SIX Group has made some improvements to its risk governance arrangements since the 2014 FSAP. Risk management functions have been separated from the business units and a separate Group-wide risk management unit has been created, headed by the Group CRO (who is now a member of the Executive Board). However, further improvements should be made to the independence of the governance arrangements of SIX x-clear and SIX SIS to ensure that they support sound risk management. See Paragraphs 41-47.
SIC AG, SIX x-clear AG and SIX SIS AG should further improve their risk management framework by complying with the PFMI, as reflected in the revised NBO	**Partially Implemented.** At a high level, the Swiss FMIs appear to generally observe the PFMI. Selected topics in the SIX Group FMI's risk management practices are discussed in more detail in Paragraphs 48-57.
The risk management framework of SIX Group AG should explicitly address interdependencies that are not addressed yet	**Partially Implemented.** SIX has taken some steps to manage interdependencies, where it has multiple sources of exposure to a counterparty. SIX should further analyze its dependencies on commercial banks as service providers and, where required, take steps to diversify or establish back up arrangements. See Paragraphs 55 & 56.

Recommendation (paraphrased)	Implementation Status
The Swiss FMIs should develop a recovery plan in line with ongoing international guidance	**Partially Implemented.** SIX x-clear, SIX SIS and SIC have developed recovery plans. The FMIs should continue to improve these plans to ensure that each fully meets the requirements of the PFMI. See Paragraphs 58-61.

Appendix III. FMI Landscape



Source: Swiss authorities.

Appendix IV. Basic Statistics on FMIs

SIC				
	Number of transactions (thousands)		**Turnover** (CHF millions)	
(daily average)	2016	2017	2016	2017
Total	1,766	2,042	153,614	172,939
Source: SNB.				

SIX x-clear				
	Volume (thousands)		**Value** (CHF millions)	
Contracts Cleared (daily average)	2016	2017	2016	2017
Total	1,716,960	1,288,080	13,154	11,637
Equity	*1,700,019*	*1,273,452*	*12,368*	*10,890*
Bonds	*2,498*	*2,299*	*391*	*377*
Other	*1,3750*	*11,540*	*276*	*248*
Exchange traded derivatives	*674*	*771*	*115*	*118*
OTC derivatives	*19*	*18*	*4*	*4*
Source: Swiss authorities.				

SIX SIS				
	Volume (thousands)		**Value** (CHF millions)	
Securities held (end of year)	2016	2017	2016	2017
Total	633	640	3,153,226	3,342,215
Debt securities	*164*	*166*	*770,087*	*779,649*
Equities	*216*	*217*	*1,830,862*	*2,020,910*
Other	*253*	*257*	*552,277*	*541,657*
Delivery instructions (daily average)				
Total	123	124	24,226	23,761
Free of payment	*22*	*26*	-	-
Delivery versus Payment	*101*	*98*	*24,226*	*23,761*
○ *Debt securities*	*7*	*7*	*4,683*	*4,103*
○ *Equities*	*72*	*70*	*17.853*	*18,085*
○ *Other*	*22*	*21*	*1,690*	*1,573*
Source: Swiss authorities.				

Participation in Swiss FMIs			
	Domestic	**Foreign**	**Total**
SIX SIC	**231**	**94**	**325**
of which:			
- *Central banks*	*1*	*-*	*1*
- *Banks*	*205*	*86*	*291*
- *FMIs*	*2*	*4*	*6*
- *Other*	*23*	*4*	*27*
SIX x-clear	**46**	**37**	**83**
of which:			
- *Central banks*	*-*	*-*	*-*
- *Banks*	*46*	*28*	*74*
- *CCPs*	*-*	*2*	*2*
- *Broker*	*-*	*7*	*7*
SIX SIS	**278**	**133**	**411**
of which:			
- *Banks*	*183*	*115*	*298*
- *Brokers*	*7*	*6*	*13*
- *Other financial institutions*	*3*	*3*	*6*
- *Insurance companies**	*20*	*-*	*20*
- *Other*	*65*	*9*	*74*
SIX TR	**137**	**18**	**155**
of which:			
- *Banks*	*111*	*3*	*114*
- *Brokers*	*8*	*13*	*21*
- *Other non-financial institutions*	*2*	*1*	*3*
- *Insurance companies*	*7*	*1*	*8*
- *Other*	*9*	*-*	*9*

* Participation in the SIX SIS collateral management service

Source: Swiss authorities.

Appendix V. Overview of Key Laws Applicable to Oversight and Supervision of FMIs

Law	Scope with respect to FMIs	Authority
Federal Act on Financial Market Infrastructures and Market Conduct in Securities and Derivatives Trading (Financial Market Infrastructure Act, FMIA)	• Establishes FINMA as the supervisory and resolution authority for FMIs. Requires the SNB to designate, define standards for, and oversee systemically important FMIs. • Requires cooperation between FINMA and SNB, and with overseas authorities. • Requires FMIs to be authorized by FINMA and certain foreign FMIs to be recognized by FINMA. • Governs the organization and operation of FMIs. Establishes minimum common standards, and additional standards for systemically important FMIs (which must take account of international standards). • Requires FINMA to develop resolution plans for systemically important FMIs. • Establishes a regulatory framework for OTC derivatives.	FINMA, SNB
Ordinance of the Federal Council of 25 November 2015 on Financial market Infrastructures and Market Conduct in Securities and Derivatives Trading (Financial Market Infrastructure Ordinance, FMIO)	• Elaborates on the principles in FMIA, including on the authorization conditions and duties for FMIs, and duties of financial market participants in derivatives trading.	FINMA, SNB
Federal Act on the Swiss Financial Market Supervisory Authority	• Establishes the responsibilities, organization and supervisory instruments of FINMA, and FINMA's cooperation with other authorities. • Establishes the objectives of financial market supervision of protecting creditors, investors, and insured persons, and ensuring the proper functioning of the financial market—therefore contributing to sustaining the reputation and competitiveness of Switzerland's financial center.	FINMA

Law	Scope with respect to FMIs	Authority
Federal Act on the Swiss National Bank (National Bank Act, NBA)	• Establishes the responsibilities, powers and organization of the SNB, and its cooperation with other authorities. • Mandates the SNB to oversee systemically important CCPs, CSDs and PSs, with the objective of protecting financial stability. • Requires CCPs, CSDs and PSs to provide information to the SNB.	SNB
Ordinance to the Federal Act on the Swiss National Bank (National Bank Ordinance, NBO)	• Elaborates on the principles in the NBA, including the approach to designating systemic importance of an FMI and the special requirements that apply to systemically important FMIs. • Provides for the SNB to assess FMIs' compliance with the special requirements and specifies the procedure in cases of non-compliance.	SNB
Ordinance of the Swiss Financial Market Supervisory Authority of Financial Market Infrastructures and Market Conduct in Securities and Derivatives Trading (FINMA Financial Market Infrastructure Ordinance, FMIO-FINMA)	• Elaborates on the provisions in the FMIO relating to, among other things, trade reporting obligations and OTC derivatives clearing obligations.	FINMA
Federal Law on Banks and Savings Banks (Banking Act)	• Along with FMIA, provides the resolution and insolvency framework for FMIs • Provides FINMA powers for consolidated group supervision for FMIs that are part of a financial group • Details certain capital requirements.	FINMA

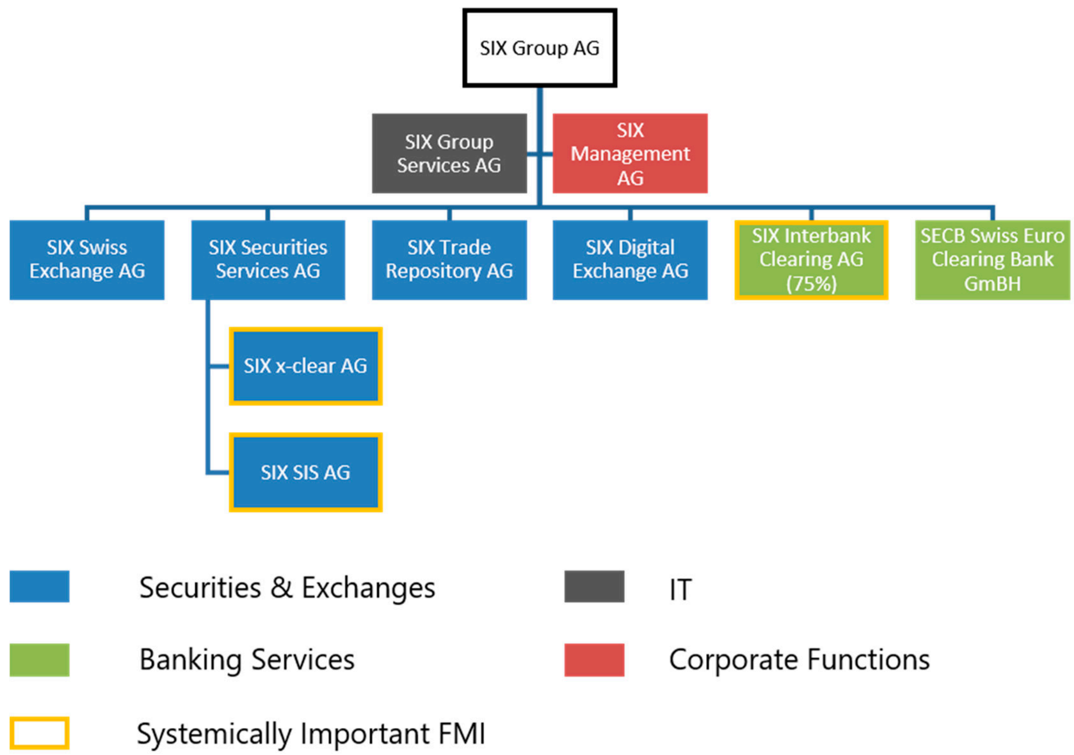
Appendix VI. Authorities' Cooperation Agreements Regarding FMI Oversight, Supervision and Resolution

Agreement / FMI	Authorities	Scope
Cooperation between FINMA and SNB	FINMA and SNB	Exchange of letters to support legislative provisions for cooperation regarding systemically important FMIs
Agreements covering Swiss FMIs		
Trade repositories	FINMA and ESMA	Authorization, recognition and supervision of TRs
SIX x-clear	FINMA and SNB, and Danish, Finnish, Norwegian and Swedish authorities	Cooperative oversight agreement
SIX x-clear	FINMA and SNB and U.K. authorities	Cooperative oversight agreement
SIX x-clear	FINMA and SNB, Dutch, French, German, Norwegian and U.K. authorities, and ECB, ESMA, SRB	Crisis management group (arrangement currently being finalized)
SIX x-clear	FINMA and SNB, Norwegian authorities	Exchange of information regarding SIX x-clear
SIX x-clear	FINMA and SNB, Dutch authorities	Exchange of information regarding clearing service providers regulated principally in the Netherlands or Switzerland, and operating in the other's jurisdiction
SIX x-clear	FINMA and SNB, ESMA	Exchange of information regarding SIX x-clear
Agreements covering foreign FMIs		
Eurex Clearing	Swiss authorities: FINMA and SNB	Cooperative oversight agreement
Eurex Clearing	Swiss authorities: FINMA	Crisis management group (participation ceased in 2018)
EuroCCP	Swiss authorities: FINMA	Cooperative oversight agreement
EuroCCP	Swiss authorities: FINMA	Crisis management group
LCH Ltd	Swiss authorities: FINMA and SNB	Cooperative oversight agreement
LCH Ltd	Swiss authorities: FINMA	Crisis management group
CLS	Swiss authorities: SNB	Cooperative oversight agreement
SWIFT	Swiss authorities: SNB	Cooperative oversight agreement
T2S	Swiss authorities: FINMA and SNB	Cooperative oversight agreement

Source: Swiss authorities.

Appendix VII. SIX Governance and Group Structure

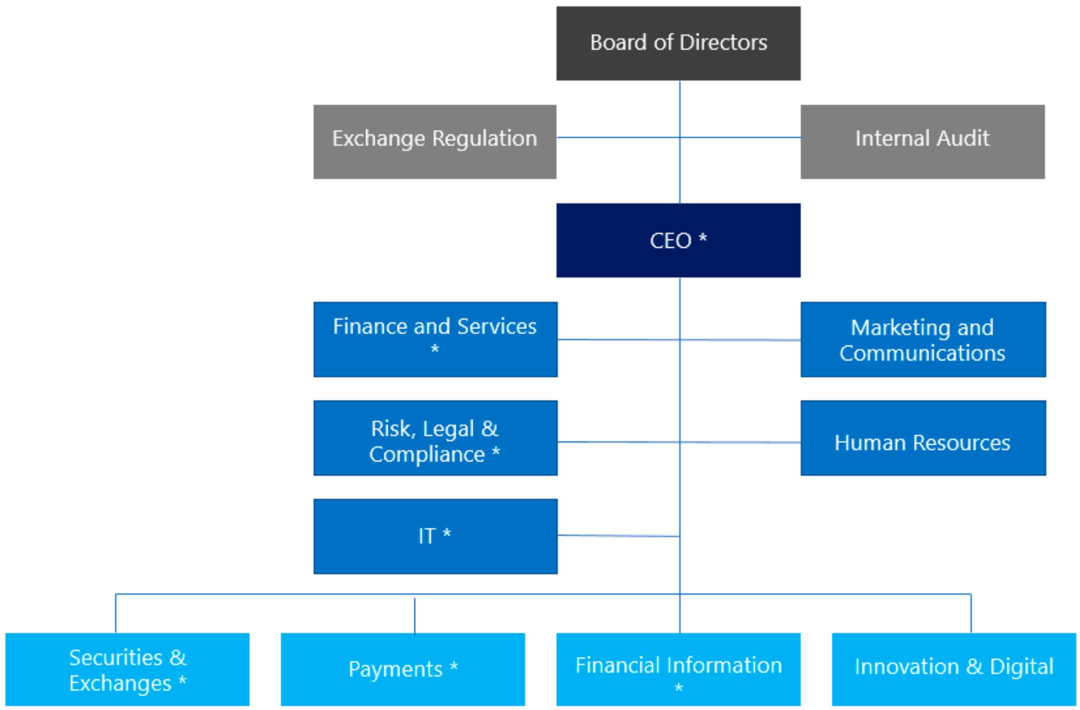
Figure 1. SIX Group Legal Structure (Simplified) October 2018



Source: IMF staff.

Notes: Excludes cards and financial information business lines; for other business lines a subset of subsidiaries is show.

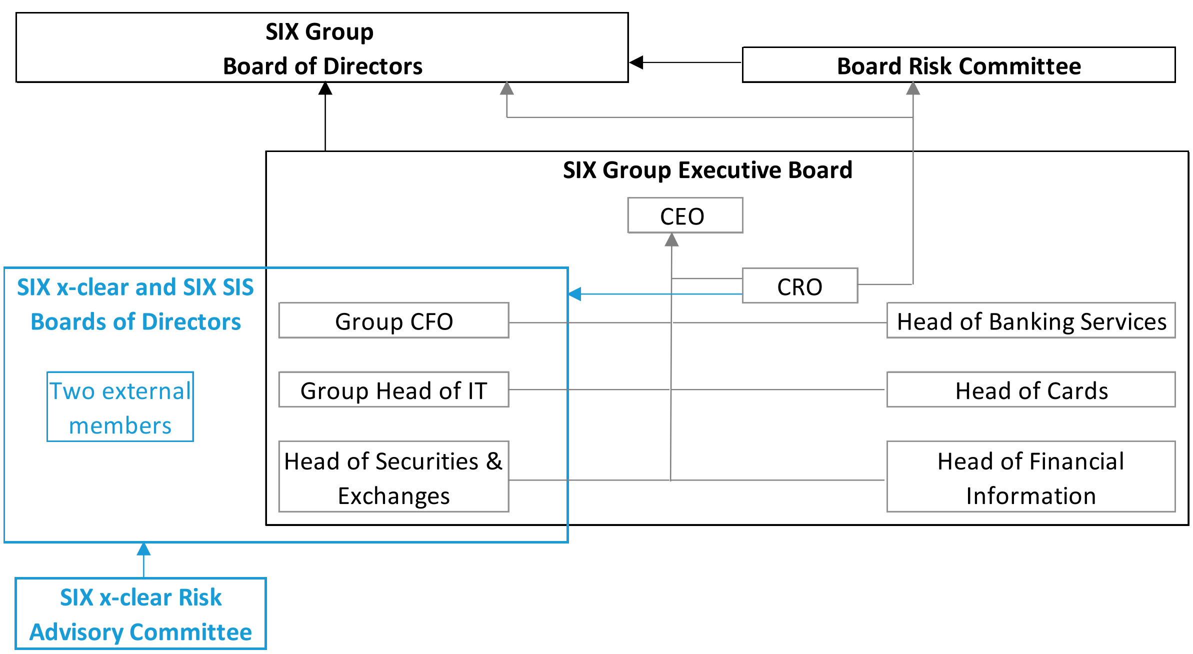
Figure 2. SIX Group Operational Structure



Source: IMF staff.

Notes: * indicates that the role or the head of the division is a member of the Executive Board.

Figure 3. SIX x-clear and SIX SIS Governance Arrangements



Source: IMF staff.

Risk Governance Arrangements for SIX x-clear and SIX SIS

Entity/Role	**Responsibilities**
SIX Group AG Board of Directors	Decides on Group risk appetite and risk policy (which provides the main principles for risk management, including the methodological framework). Appoints the Group CRO. *Composition: Chair + nine other members representing shareholders.*
SIX Group AG Board of Directors Risk Committee	Responsible for internal controls with respect to implementation of risk policy across SIX Group. *Composition: Four members of the Board of Directors. Meetings are also attended by the Group CEO, CRO and CFO.*
SIX Group AG Executive Board	Enacts risk policies and has overall responsibility for ongoing risk management within SIX Group. *Composition: Group CEO; Group CFO; Group CRO; Head Securities & Exchanges Division; Head of Banking Services Division; Head of Financial Information Division; Head of Cards Division; Group Head of IT.*
Group Risk Management Unit & Group CRO	Define systems, processes, standards and controls in accordance with Group policies. Covers financial risk management, operational risk, IT and security risk (including cyber), legal and compliance. Serves as a second line of defense. *About 95 staff, headed by the Group CRO, who reports to the CEO and the Group Board of Directors, Group Board Risk Committee and Boards of SIX x-clear and SIX SIS.*
Board of Directors of SIX x-clear AG & SIX SIS AG	Defines and approves the specific risk policies for the CCP and CSD and delegates risk management tasks, within Risk Policy and risk appetite determined by the SIX Group Board of Directors. *Composition—identical for SIX x-clear and SIX SIS: Head of Securities & Exchanges Division; Group Head of IT; Group CFO; and two external members.*
SIX x-clear Risk Advisory Committee	Advises the SIX x-clear AG Board of Directors on key risk management issues for SIX x-clear, including: significant changes to the risk model; the default procedures; criteria for new members; and clearing of new classes of instruments. The advice of the Committee is not binding but must be duly considered. Meets twice each year. *Composition: at least four members, including at least one representative of each of: direct clearing members, clients of clearing members, and independent members of the x-clear Board of Directors.*
Securities & Exchanges Division	Runs specific 'first line' operative risk management (day-to-day implementation of risk management) e.g., management and control of credit risk of daily clearing activities, by monitoring exposures and collateralization against limits.

Appendix VIII. Elements of SIX x-clear and SIX SIS Risk Control and Recovery Arrangements

SIX x-clear

Credit Risk – Member Default	• Minimum participation requirements and ongoing monitoring. ***Margin*** • Initial margin—to cover potential future exposure to a confidence level of 99 percent. SECOM model used for equities segment: VaR calculation with two-year historical lookback; subject to validation using a model based on monte-carlo simulations with a historical lookback to 2008—the initial margin requirement is set at the higher output of the two models; close out period of 2 days for equities and ETFs and 7 days for bonds. CLARA model used for Norwegian branch: monte-carlo VaR with a two-year historical lookback; close out period from 2 to 10 days. • Risk coefficient add-on to initial margin, designed to increase the defaulter pays balance of default resources, in particular as creditworthiness deteriorates. Multiplier of: 1.3 for AAA to A- rated participants; 1.8 for BBB+ to BBB-; 2.3 for BB+ to BB-; and B+ or lower is determined by case. • Other margin add-ons include: stress margin add-on, based on credit stress testing results; add-ons for large positions and concentration; wrong way risk (added to variation margin). • Variation margin—calculated every 90 minutes intraday and at end-of-day. Intraday margin calls (covering initial and variation margin) must be met within 60 minutes. De-minimis threshold for calling margin. ***Participant default waterfall*** *(beyond collateral of defaulting participant)* • SIX x-clear capital contribution to default waterfall. 25 percent of SIX x-clear's required capital would be used to absorb losses prior to the default fund contributions of non-defaulting participants. SIX x-clear is refining its approach to calculating this amount to reduce volatility and ensure the value is a sizeable proportion of the CCP's total capital. Following a drawdown, this capital contribution must be replenished after one month. Remaining SIX x-clear capital sits at the end of the waterfall in the event that all other resources are used. • Participant funded default fund, with ring fenced segments for cash products and derivatives products. Cover 2 for each segment. Stress tests are run daily, and scenarios include historical and hypothetical price changes. The value of the fund is formally reviewed monthly. Total value of each segment tends to remain stable but individual participants' contributions vary month-to-month. • Should the default fund be drawn down, non-defaulting members are required to replenish the applicable default fund segment after a 20-day cooling off period. If necessary, the stress margin add-on could be used to ensure Cover 2 during this period. • In the case of full draw-down of a segment of the waterfall a Top Up Contribution may be required from non-defaulting participants. For any 'default event' (which could include the default of multiple participants), the amount of the Top Up Contribution that may be required from each non-defaulting participant is limited to the value of that

	participant's contribution to the relevant default fund segment at the time of the default. SIX x-clear is currently consulting on a rule change that will allow it to call the Top Up a maximum of three times during a six month period (once each time for different default events). Participants must provide the Top Up contribution within 24 hours. ***Re-establishing a matched book*** • Tools to return to a matched book following a participant default include securities buy-ins on market, and cancellation of contracts (with compensation) if buy-in of securities is unsuccessful. Close-out of derivatives would take place on market through brokers, or via auction (SIX x-clear has agreements with 3 brokers to participate in the auction, at least 2 of which are clearing participants). ***Collateral requirements*** • Collateral is limited to assets that are SNB eligible collateral. • Haircuts applied, and take into account potential FX risks. • Wrong way risk is managed through limiting acceptable collateral. ***Interoperable trades*** • Margin requirements for exposures to interoperable CCPs are collected from members. Funded through a permanent inter-CCP collateral fund, comprising member contributions; includes a fixed component and additional contributions may also be called. Contributions are determined monthly, based on members' pro-rata share of initial margin. • In 2017 x-clear introduced an add-on to remove any divergence with interoperating CCPs' risk models. • Regular due diligence on co-CCPs.
Liquidity Risk	• Liquidity is managed at the level of SIX Securities & Exchanges Division. Intraday and end-of-day monitoring of liquidity requirements (up to T+4). • Daily Cover 2 liquidity stress testing conducted at level of SIX x-clear and SIX SIS individually, as well as for both FMIs collectively. Stressed liquidity needs are calculated in all currencies. Assumption that settlement will be made on the intended date. Tests currently assume a mark up to allow for increased liquidity demand in extreme but plausible conditions and a reduction in available collateral to account for excess collateral being withdrawn. ***Liquidity resources*** • Cash & securities collateral posted by members & SIX x-clear equity capital. • Majority held at SIX SIS, the main liquidity provider for SIX x-clear, in exchange for a multicurrency credit line. Collateral not held at SIX SIS is held with highly creditworthy institutions • SIX x-clear has direct access to repo market—pre-arranged and tested. • SIX x-clear access to SNB FMI liquidity facilities is being established: a standing facility, in which CHF liquidity would be provided up to a certain limit; and a (non-guaranteed) emergency facility covering CHF and certain foreign currencies. For both facilities, liquidity provision would be against SNB eligible collateral.

	• Contractually agreed uncollateralized credit line from SIX Group (total amount of loan available across SIX x-clear and SIX SIS)—subject to the condition that regulatory liquidity requirements cannot be met otherwise. The value of this credit line is excluded from Group 'free liquidity'. • Additional recovery tools are: a reduction of the haircuts applied to the broker lien; and deferral of payment obligations, which is considered a tool of last resort.
Investment & Custody Risks	• Swiss and U.K. Clearing: members' and own assets held with SIX SIS. SIX SIS deposits CHF cash primarily at SNB; FX is held with subcustodians and cash agents and large balances are diversified via overnight repos where possible, or, if not feasible, in unsecured money market transactions (subject to a cap). Norwegian branch: member's assets invested with commercial banks and VPS (the Norwegian CSD). Participants' collateral for interoperable trades is held with Clearstream Bank Luxembourg. • Minimum criteria and regular due diligence for custodians and investment counterparties. Investment counterparties subject to minimum criteria. • Investment in securities limited to securities eligible for repo with central bank. • Application of concentration and other limits. Ongoing monitoring of exposures. • CHF 40 million placement limit for unsecured exposures. Limitation of use of clearing participants for placements. Losses due to the default of a placement bank would be covered by the "Non-default loss waterfall", comprising 25 percent of SIX x-clear's required capital and, for losses beyond that, allocation to clearing participants (capped at CHF 40 million). • General exclusion for SIX x-clear of liability for failure of cash correspondents or custodians; losses would be allocated to participants.
Settlement Risks	• Use of central bank money for settlement of certain CHF (SNB) and NOK (Norges Bank) transactions. For other currencies, SIX SIS is the settlement agent, or SIX x-clear uses a commercial bank settlement bank. • Minimum criteria for selection of CSDs, custodians and settlement banks. Ongoing due diligence. • Irrevocable settlements.
General Business Risk	• Equity capital invested in liquid net assets. • Additional equity may be raised through a capital injection from SIX Group. A request would be made to SIX Executive Board; procedures are in place to support this request. • Additional recovery options could include raising of equity by an external third party, or retaining earnings (for a gradually evolving stress). • The non-default loss allocation waterfall (see Investment & custody risks) could be applied in certain events, including operational risk losses. • Insurance (including cyber insurance)

Key Elements of Financial Risk Control—SIX SIS

Credit Risk– Short Term Financing Facilities	• Participant credit risk assessment and ongoing monitoring. • Credit limits for participants and credit extensions are collateralized. • Collateral accepted from participants is limited to SNB eligible collateral. Haircuts applied.
Credit Risk– Participant Default During Settlement	• RTGS delivery versus payment settlement in CHF. • Use of suspense accounts for cross-border trades. • Right to retention and foreclosure of custody assets in event of participant default.
Liquidity Risk	• Liquidity is managed at the level of SIX Securities & Exchanges Division. Intraday and end-of-day monitoring of liquidity requirements (up to T+4). • Daily Cover 2 liquidity stress testing conducted at level of x-clear and SIS individually, as well as for both FMIs collectively. Stress tests assess all currencies and across settlement cycles. ***Liquidity resources*** • Equity capital and cash received from participants in the form of settlement liquidity and collateral pledged to cover multicurrency secured cash credit lines. • Collateral is invested with central bank or at commercial banks (subcustodians), and short-term reverse repo. • SIX SIS has direct access to repo market—pre-arranged and tested. • SIX SIS has entered into FX swap agreements (letters of intent) with four commercial banks. Each agreement covers CHF, USD, EUR. and GBP; providers are diversified across jurisdictions. • SIX SIS access to SNB FMI liquidity facilities is being established: a standing facility, in which CHF liquidity would be provided up to a certain limit; and a (non-guaranteed) emergency facility covering CHF and certain foreign currencies. For both facilities, liquidity provision would be against SNB eligible collateral. • Sub-custodians provide uncommitted credit lines to facilitate settlement in local markets. • Contractually agreed uncollateralized credit line from SIX Group (collective total amount of loan available across SIX x-clear and SIX SIS)—subject to the condition that regulatory liquidity requirements cannot be met otherwise. The value of this credit line is excluded from Group 'free liquidity'. • Additional recovery tools are: cancellation of customer credit lines; and cessation of pre-financing of corporate actions.
Investment & Custody Risks	• Minimum criteria and regular due diligence for custodians and investment counterparties, including minimum credit ratings and, for custodians, covering asset protection (segregation) in case of bankruptcy.

	• CHF cash held at SNB. If possible, cash in other currencies will be diversified across highly creditworthy financial institutions and invested in reverse repo; however, sometimes larger positions are being held overnight with custodians to initiate next day settlement. Placement limits are determined individually, depending on the counterparty's credit assessment, subject to a cap. • Investment in securities limited to securities eligible for repo with central bank. • Application of concentration and other limits. Ongoing monitoring of exposures. • General exclusion of liability for failure of cash correspondents or custodians; losses would be allocated to participants.
Settlement Risks	• Irrevocable settlements. • Settlement in central bank money for CHF transactions; commercial bank money used for all other currencies. • Minimum criteria for CSDs and custodians and ongoing monitoring. New CSDs or custodians are subject to due diligence, including through a questionnaire that considers the PFMI. • Exposure limits apply and credit is only given against collateral. • General exclusion of liabilities from default settlement bank, in which case losses would be allocated to participants.
General Business Risk	• Equity capital invested in liquid net assets. • Additional equity may be raised through a capital injection from SIX Group. A request would be made to the SIX Executive Board; procedures are in place to support this request. • Additional recovery options could include raising of equity by an external third party, or retaining earnings (for a gradually evolving stress). • Insurance (including cyber insurance).