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TECHNICAL NOTE

SUPERVISION OF FINANCIAL MARKET INFRASTRUCTURES,
RESILIENCE OF CENTRAL COUNTERPARTIES AND
INNOVATIVE TECHNOLOGIES

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**Monetary and Capital
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This Technical Note was prepared by IMF staff in the context of the Financial Sector Assessment Program (FSAP) in the United States held during October–November 2019 and February–March 2020. It was led by Ms. Michaela Erbenová. 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

ACH	Automated Clearing House
BNYM	Bank of New York Mellon
CA	Clearing Agency under the Exchange Act
CCA	Covered Clearing Agency under the Exchange Act
CCP	Central Counterparty
CDS	Credit Default Swap
CEA	Commodity Exchange Act
CFR	Code of Federal Regulations
CFTC	Commodity Futures Trading Commission
CHIPS	Clearing House Interbank Payments System
CME	Chicago Mercantile Exchange
CMG	Crisis Management Group
CLS	CLS Bank International
CPSS/CPMI	Committee on Payment and Settlement Systems, which changed into Committee on Payments and Market Infrastructures in 2014
CSBS	Conference of State Bank Supervisors
CSD	Central Securities Depository
DCE	Designated Clearing Entity
DCO	Derivatives Clearing Organization under the Commodity Exchange Act
DFA	Dodd-Frank Wall Street Reform and Consumer Protection Act
DTC	The Depository Trust Company
DTCC	The Depository Trust and Clearing Corporation
DVP	Delivery-versus-Payment
EA	Exchange Act
FDIC	Federal Deposit Insurance Corporation
FICC	Fixed Income Clearing Corporation
FMI	Financial Market Infrastructure
FMU	Financial Market Utility
FRB	Federal Reserve Board
FSAP	Financial Sector Assessment Program
FSOC	Financial Stability Oversight Council
FX	Foreign Exchange
GCF	General Collateral Financing
GSD	Government Securities Division of FICC
G-SIB	Global Systemically Important Bank
HVaR	Historical Value-at-Risk
ICC	ICE Clear Credit
ICE	Intercontinental Exchange
ICE U.S.	ICE Clear U.S.
IMF	International Monetary Fund

IOSCO	International Organization of Securities Commissions
IRS	Interest Rate Swap
MBSD	Mortgage Backed Securities Division of FICC
MOU	Memorandum of Understanding
MPOR	Margin Period of Risk
NSCC	National Securities Clearing Corporation
OCC	The Options Clearing Corporation
OFR	FSOC Office of Financial Research
OTC	Over the Counter
PCS Activities	Payment, Clearing and Settlement Activities
PFMI	CPSS-IOSCO Principles for Financial Market Infrastructures
PSR policy	Federal Reserve Policy on Payment System Risk
RTGS	Real Time Gross Settlement
SEC	Securities and Exchange Commission
SEF	Swap Execution Facility
SIDCO	Systemically Important Derivatives Clearing Organization under CFTC Regulations
SIFI	Systemically Important Financial Institution
SWIFT	Society for Worldwide Interbank Financial Telecommunication
SSS	Securities Settlement System
U.S.	United States

EXECUTIVE SUMMARY

The United States financial system includes several systemically important financial market infrastructures (FMIs); they are regulated, supervised, and overseen by multiple authorities.

The U.S. FMIs are crucial to U.S. dollar clearing, i.e. the payment systems Fedwire Funds Service and The Clearing House Interbank Payments System (CHIPS), and for the clearing and settlement of U.S. Treasuries, i.e., the Fedwire Securities Service and the Fixed Income Clearing Corporation (FICC). Central counterparties (CCPs) that clear exchange-traded or over-the-counter (OTC) corporate securities or derivatives are of key importance to the safe and efficient functioning of these (global) markets. Disruption of critical operations at one of the large U.S. FMIs may spread to its participants, other FMIs, markets, and throughout the U.S. and global financial systems. The Financial Stability Oversight Council (FSOC) designated eight financial market utilities (FMUs) to be systemically important.¹ These designated FMUs are regulated, supervised and overseen by the Federal Reserve Board (FRB), the Securities and Exchange Commission (SEC), or the Commodity Futures Trading Commission (CFTC), depending on their activities. In addition, the Dodd-Frank Wall Street Reform and Consumer Protection Act (DFA) authorized the FRB to promote uniform standards for the management of risks by systemically important FMUs.

The increased concentration of clearing activity, driven partly by post-crisis regulatory reforms, and a lack of short-run substitutes makes sound regulation, supervision, and oversight an imperative for financial stability. Well-functioning CCPs can vastly improve the safety, efficiency, and transparency of the financial system. The increased reliance of the U.S. financial system on CCPs underlines the importance of their resilience for U.S. and global financial stability. Mandatory clearing for certain OTC derivatives combined with the lack of substitutes may reduce the incentives of CCPs to improve risk management standards beyond minimum regulatory requirements, underlining the crucial role of regulatory oversight and internal risk governance to ensure resilience and adequate risk management.

Analysis and recommendations in this note use the CPSS-IOSCO Principles for FMIs (PFMI) as a benchmark. The note leverages the 2015 FSAP conclusions by reviewing the progress achieved in addressing its recommendations and the main supervisory and regulatory developments since then. The analysis of the regulation, supervision, and oversight of FMIs is based on the PFMI's five responsibilities for authorities, and that of risk management frameworks of four selected CCPs is based on the PFMI principles and related guidance. While the PFMI served as the basis for the evaluation, no formal assessment has been conducted against the principles. The United States has been subject to external assessments and peer reviews.

¹ The U.S. authorities use the term Financial Market Utility (FMU), defined in Title VIII of the Dodd-Frank Act as "any person that manages or operates a multilateral system for the purpose of transferring, clearing or settling payments, securities or other financial transactions among financial institutions or between financial institutions and the person." Trade repositories, which the Dodd-Frank Act defines as providing "facilities for comparison of data respecting the terms of settlement of securities or futures transactions," are not included in the term "financial market utility." FMUs are, therefore, a subset of the broader set of entities defined as FMIs. FMUs are generally referred to as FMIs outside of the United States.

The regulation, supervision, and oversight of systemically important U.S. FMUs are generally adequate and effective, but the CFTC’s rule approval process and its resources need strengthening. The Federal Reserve and SEC have sufficient powers and resources to execute their mandates. The CFTC’s effectiveness is, however, impacted by resource constraints, which need to be addressed. It is also recommended to reconsider the rule approval process for systemically important CCPs regulated by the CFTC as the current “no-objection” approach is considered not to be in line with the systemic profile of CCPs. An affirmative approval process, as in place at the SEC, combined with a public consultation, would provide a more solid and transparent arrangement. The FRB (and, under delegated authority, the Federal Reserve Banks), CFTC and SEC actively cooperate—a prerequisite for effective supervision in the U.S. regulatory landscape—but crisis management communication arrangements for FMIs could be strengthened.

Authorities have implemented the relevant international standards, the PFMI, through dedicated regulations; the mission found that there is room to strengthen the consistency of outcomes of implementation. A consistent approach does not require FMIs to use exactly the same tools, rather they can use different means to satisfy a particular principle and reach a similar risk management outcome. In analyzing the outcomes of risk management measures of CCPs, the mission found that in some cases the outcome of the implementation of risk management standards by CCPs was uneven, and potentially may impact financial stability or market efficiency, specifically regarding the independence of the risk management function, the conservativeness of the margin period of risk (MPOR), and the implementation of intraday margining rules. It is recommended that the FRB, CFTC, and SEC collaborate to analyze differences in outcomes of CCP implementation of the PFMI and adopt an appropriately consistent, conservative implementation where financial stability or market efficiency could be negatively impacted. A more comprehensive supervisory stress test for CCPs may contribute to this objective as it helps authorities understand where risks could materialize during a stress event.

The analysis of the credit and liquidity risk management frameworks of four selected CCPs shows that CCPs are generally sound, with room for further strengthening of some risk management practices as appropriate. FMIs appeared so far sufficiently robust to manage surges in volumes and volatility in financial markets during the COVID-19 crisis. The analysis focused on ICE Clear Credit (ICC) for credit default swaps (CDS); the Options Clearing Corporation (OCC) for U.S. equity and index options; the Chicago Mercantile Exchange for futures and commodity derivatives (CME Base) and interest rate swaps (CME IRS); and the Fixed Income Clearing Corporation (FICC) for U.S. government securities and agency mortgage backed securities (MBS). While risk management practices are generally prudent, certain elements could be further developed in light of international standards and best practices

Enhancing the resilience of systemically important CCPs is fundamental to reducing the likelihood that recovery or resolution plans are triggered; despite important steps made in recent years, work on CCP resolution is still at an early stage. Since the 2015 FSAP, CCPs have developed recovery plans as required by new and dedicated requirements, with guidance, from primary regulators. The Federal Deposit Insurance Corporation (FDIC) is in the process of developing resolution strategies for CCPs in cooperation with relevant domestic and foreign supervisors, for

example, but not only, through so-called CCP crisis management groups (CMGs) for CME and ICC. Coordination of the FDIC with domestic regulators is a good and necessary development and should continue, for example, to broaden resolution planning to other CCPs, further develop a policy approach on the interaction between recovery and resolution, and participate in CCP supervisory stress tests.

Finally, a review of the regulatory and supervisory framework for the payments ecosystem may be warranted so as to allow for a proactive, comprehensive and risk-based response to the potential systemic risks that these new providers may bring. As in other countries, new non-bank players are entering the payments space offering innovative services to regulated financial institutions, consumers and merchants. The current regulatory framework for payments forms a complex pattern. As a consequence, money transmitters are sometimes subject to partly diverging sets of rules and definitions and multiple and overlapping examinations depending on the location and nature of their activities. Banks are expected to manage all risks raised by third party relationships, including risks related to payments. Risks posed by other providers of potentially critical payment services (e.g., card payment schemes, electronic wallet providers, payment gateways, aggregators or platform providers) either fall outside direct supervision or are supervised only partially through third-party service provider regimes. The current regulatory frameworks may not be “future proof”, so as to ensure risk sensitivity, comprehensiveness, and consistency of requirements for the potential emergence of new payment service providers, irrespective of their status as bank, money transmitter or non-bank. The FSOC has recognized the need for authorities to evaluate potential risks to payment system integrity and operational risk, among others, as well as appropriate approaches to reduce regulatory fragmentation, while supporting the benefits of innovation.

Table 1. United States: Recommendations for FMI Supervision and Oversight

Recommendations for the regulation, supervision, and oversight of FMIs	Timing*	Responsibility
Strengthen rule approval process CFTC from a no-objection to an affirmative approval (par 22).	ST	CFTC
Add a public consultation phase into CFR 40.10 (par 22).	ST	CFTC
Evaluate whether publication of recommendations would help to promote a uniform implementation of risk management standards by designated FMUs (Par 25).	ST	FRB
Increase resources at the CFTC to strengthen focus on financial stability (par 27).	I	CFTC
Collaborate to analyze differences in outcomes of CCP risk management practices and adopt an appropriately consistent, conservative implementation of risk management standards across CCPs (par 34).	I-ST	FRB, CFTC, SEC
Develop and execute a more comprehensive systemwide CCP supervisory stress tests (par 35).	ST	FRB, CFTC, SEC
Develop crisis management communication framework for FMI primary regulators, FRB and FDIC (par 42).	ST	FRB, CFTC, SEC, FDIC
Continue steps forward in developing a deference framework for foreign CCPs (par 45).	ST	CFTC, SEC
Recommendations for the CCP's risk management frameworks		
Review the governance of the clearing house risk committee and intraday margining thresholds (CME) (par 54).	ST	CFTC, FRB, CME
Review the MPOR for CME Base (CME) (par 54)	ST	CFTC, FRB, CME
Provision for large stress exposures, in particular through provisioning for concentration risk as planned (FICC) (par 69).	ST	SEC, FRB, FICC
Continue working towards the approval and full implementation of the proposed changes to its risk management framework (OCC) (par 83).	I	SEC, CFTC, FRB, OCC
* I Immediate (within 1 year); ST Short Term (within 1 to 2 years); MT Medium Term (within 3 to 5 years)		

INTRODUCTION²

1. The objective of this note is to analyze systemic risks related to FMIs in the United States, with a focus on CCPs and new technologies. The U.S. FMIs are amongst the largest and most interconnected in the world. They are critical components of the financial system and some are systemically important in more than one jurisdiction. It is imperative that U.S. FMIs are highly resilient in order to withstand participant failures and other stress events to a very high probability. Regulation, supervision and oversight are essential tools to strengthen FMIs' resilience and maintain financial stability. Crisis management, in particular recovery and resolution planning, are important to take appropriate action when, in extreme circumstances, and all preventive measures notwithstanding, an FMI becomes non-viable as a going concern or insolvent.

2. The analysis is part of the 2020 Financial Sector Assessment Program of the United States; it does not cover the impact of the COVID-19 outbreak. It is based on the regulatory framework in place and the practices employed as of March 10, 2020. The analysis is based on discussions with the CFTC, FRB, Federal Reserve Bank of New York, Federal Reserve Bank of Chicago, SEC; discussion with U.S. CCPs, FMIs, banks, financial institutions and industry associations; and publicly available information, including published self-assessments and CCP quantitative disclosures. The onsite work supporting the findings and conclusions was conducted during October 22–November 8, 2019. Section D on new innovative technologies is based on onsite work during February 18–March 6, 2020. The FSAP team has not covered the impact of the COVID-19 outbreak on FMI supervision, CCP risk management and payment technologies. The FSAP recommendations are meant to be considered once the impact of the pandemic on the economy and the financial sector becomes clearer.

3. The note starts with an analysis of the regulation, supervision, and oversight of U.S. FMIs that were designated by the FSOC as systemically important. In 2012, the FSOC designated eight FMUs as systemically important under the DFA. The DFA assigns the regulation, supervision and oversight of the designated FMUs either to the FRB, CFTC or SEC, with specific responsibilities for each, and requirements for coordination and cooperation. The note uses the five Responsibilities of the PFMI as its reference, which require the existence of a solid legal supervisory mandate, sufficient powers and resources, transparency, adoption of the PFMI, and cooperation among authorities, both at a domestic and international level.³ Findings update the U.S. FSAP 2015 recommendations (Appendix I).

4. The second part of the note contains an analysis of the credit and liquidity risk management frameworks of four selected CCPs. The importance of CCPs has increased in recent years, due in part to the introduction of mandatory central clearing for standardized OTC derivatives in the U.S. and other jurisdictions. Disruption of critical operations at a CCP may spread to other participants, FMIs, markets, and throughout the U.S. and global financial systems. The note focuses

² The authors of this note are Froukelien Wendt (IMF), Rama Cont, and Klaus Löber (IMF external experts).

³ The PFMI were issued by the CPMI (then CPSS) and IOSCO in 2012 and are the internationally agreed standards for FMIs, including CCPs, <https://www.bis.org/cpmi/publ/d101.htm>.

on the risk management of the CME, FICC, ICC, and the OCC. All four CCPs are critical risk managers for the respective markets they serve in the U.S. The analysis uses PFMI Principles 4–7 and 13 and related guidance as a framework, covering the credit and liquidity risk management methodologies used by the CCPs, including soundness of general principles, risk incentives, sufficiency of loss-absorbing resources, default management and loss allocation procedures.⁴

5. Third, the note takes stock of the recovery and resolution of CCPs and the governing framework. On recovery, the note takes stock of regulatory and supervisory efforts in the area of CCP recovery. On resolution, the FDIC’s activities in developing and testing resolution plans are analyzed.

6. Finally, the note takes stock of new innovative financial technologies that are driving transformational change in the provision of payments, trading, clearing and settlement. The scope of the stock take includes i) new payment service providers that may (potentially) be systemically important; ii) the adoption of distributed ledger technology (DLT) by systemically important FMIs; and iii) the use of SupTech by the Federal Reserve, CFTC and SEC. The objective of the stock take is to analyze potential implications for financial stability, in particular whether the regulatory perimeter is appropriately defined to capture shifts in systemic importance of FMIs and payment services.

7. Findings of the implementation monitoring reports of CPMI and IOSCO are taken into account. A summary of the main findings of the CPMI-IOSCO implementation monitoring assessments is provided in Appendix II.

DESCRIPTION OF FINANCIAL MARKET INFRASTRUCTURES IN THE UNITED STATES

A. Overview of Financial Market Infrastructures

8. The FMI landscape in the United States consists of eight FMIs that are designated by the FSOC as systemically important (Figure 1):

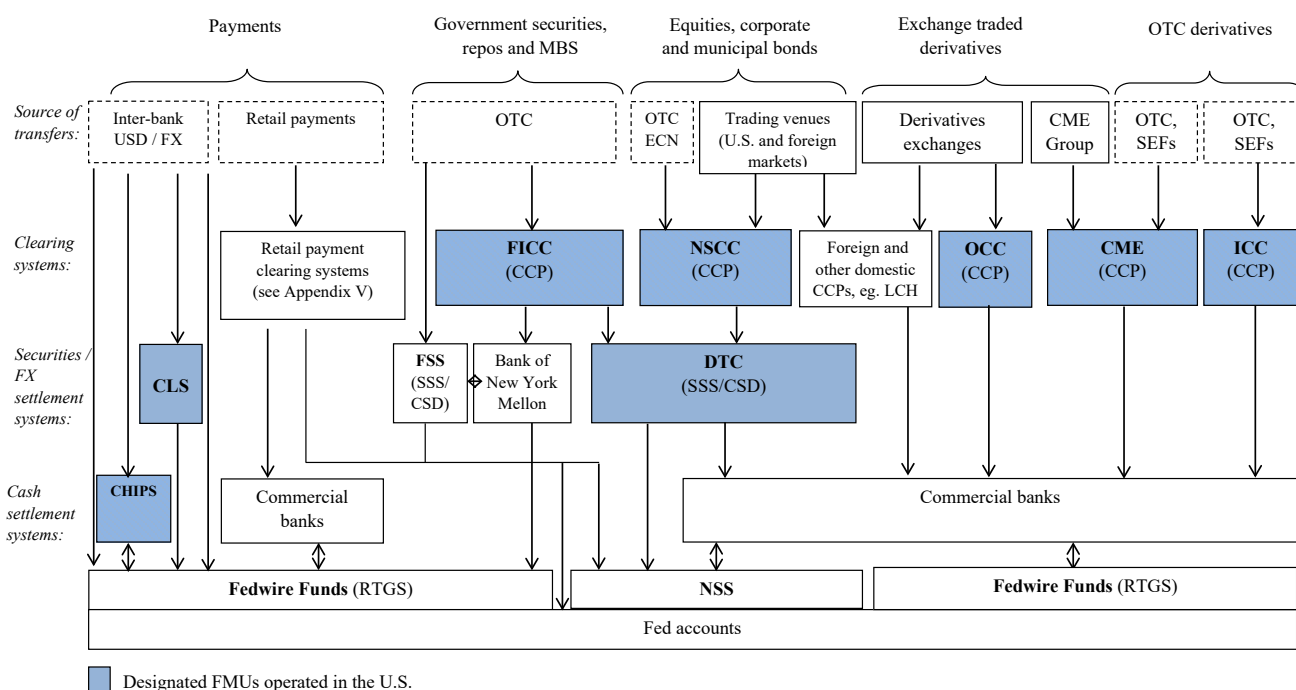
- a. **CHIPS** is a private payment system for settling large value payments among its members. It is operated by The Clearing House Payment Company and owned by its member banks and other financial institutions. An important feature is that CHIPS nets payments on a bilateral and multilateral basis which significantly reduces the funding needs of its 44 participants as of May 2019. CHIPS settled a value of US\$418 trillion in 2018. See also Appendix III for statistics.
- b. **CLS Bank International** (CLS) is chartered by the FRB under the Federal Reserve Act as an Edge corporation, which is a special-purpose entity that engages in international banking and finance. CLS offers a multilateral settlement system for FX transactions. It is

⁴ In 2017, CPMI and IOSCO issued guidance under the PFMI focusing on the resilience and recovery of CCPs, <https://www.bis.org/cpmi/publ/d163.htm>.

owned by financial services institutions in the FX industry and had 73 participants at the end of 2018. In 2018, CLS' settlement value amounted to US\$1,481 trillion.

- c. **CME Clearing** is part of CME Inc. within the CME Group, a publicly listed company. At the end of 2017 it had 61 participants in its Base segment for exchange-traded futures, futures on options, and commodity derivatives. In addition, CME lists 27 participants in its interest rate swap (IRS) segment. The value of contracts processed in 2018 was US\$33 trillion, and the total size of its prefunded financial resources (initial margin and clearing fund) was US\$136 billion in September 2018.
- d. **DTCC** is the sole securities settlement system (SSS) and central securities depository (CSD) for corporate bonds, municipal bonds, and equities in the U.S. It is a New York chartered trust company and a fully owned subsidiary of DTCC, a member-owned company. At the end of 2018, DTCC had 309 participants and it settled a value of US\$123 trillion that same year.
- e. **FICC** is the sole CCP for U.S. Treasury bonds and bills, GCF repos and MBS. It is a fully owned subsidiary of DTCC, a member-owned company. The number of FICC participants was 275 at the end of 2018, and its 2018 annual cleared value was US\$1,247 billion. The total size of its prefunded resources was US\$24.5 billion in September 2018.
- f. **ICC** is a U.S.-based global clearing facility for index, single name and sovereign credit default swaps (CDS) and the sole U.S. CCP for CDS. ICC is a fully owned subsidiary of the Intercontinental Exchange, a publicly listed company. In 2018, ICC had 29 participants, belonging to 16 bank groups, and its 2018 annual cleared value was US\$14 trillion. The total size of its prefunded financial resources was US\$33.6 billion in September 2018.
- g. **NSCC** is the only CCP in the U.S. for corporate bonds, municipal bonds and equities. NSCC is a fully owned subsidiary of DTCC, a member-owned company. The number of NSCC participants was 146 at the end of 2018 and the value cleared in 2018 amounted to US\$320 trillion.
- h. **OCC** is the only CCP for exchange traded equity options in the U.S. OCC is owned by the derivatives exchanges for which it clears transactions. At the end of 2018, OCC had 105 participants. It cleared a total of 5.2 million contracts (no value available), and the total size of its prefunded financial resources was US\$16.4 billion in September 2018.

9. Other relevant FMIs are the Federal Reserve-operated systems. The Fedwire Funds Service is the largest real time gross settlement (RTGS) payment system in the world, with 5,199 participants and a cleared value of US\$716 trillion in 2018. The Fedwire Securities Service is the CSD and SSS for U.S. government bonds. It had 1,759 participants at the end of 2018 and a total cleared value of US\$296 trillion in 2018. The Federal Reserve also operates an automated clearing house (ACH) for interbank clearing of retail transactions, and a check clearing service.

Figure 1. United States: FMI Landscape in the United States

Source: IMF Staff

10. An important change to the landscape occurred in 2016 with the withdrawal of JP Morgan Chase as clearing bank for government securities, leaving Bank of New York Mellon (BNYM) as the sole clearing bank. BNYM is one of eight U.S.-based global systemically important banks and in that capacity, it is subject to heightened capital and liquidity requirements and a resolution process that requires planning to ensure the continuity of critical services. BNYM is the sole provider of U.S. government securities settlement and triparty repo services (outstanding of around US\$2.5 trillion). These activities are comparable in importance to the FMIs that have been designated as systemically important by the FSOC.⁵

11. This change further contributed to the high interdependencies and concentration in the U.S. FMI landscape. Interdependencies exist at several levels. All FMIs, banks and other financial institutions depend directly or indirectly on the Federal Reserve Banks to settle retail and large value interbank payments. Banks, broker-dealers and their clients increasingly depend on the CCPs which are quasi-monopolies, for the clearing of certain assets. CCPs depend significantly on banks for custody, payment and liquidity arrangements. In many cases, the banks are also (large) clearing members of the CCPs and providers of client clearing, with concentrated positions in a few

⁵ See speech by J.H. Powell, The Evolving Structure of the U.S. Treasury Market: Second Annual Conference of the Federal Reserve Bank of New York, October 24, 2016, <https://www.federalreserve.gov/newsevents/speech/powell20161024.htm>.

banks (5 large dealer banks clear 80 percent of client transactions in OTC derivatives). Several systemically important CCPs are linked to other CCPs through cross-margining arrangements.

B. Overview of the Regulatory and Supervisory Framework

12. Authorities responsible for the regulation, supervision and oversight of FMIs are the FRB, the CFTC and SEC (Table 2). The FRB is the regulatory authority for payment systems and CSDs/SSSs operated by the Federal Reserve Banks and for payment systems designated as systemically important by the FSOC. The FRB also supervises FMIs that are members of the Federal Reserve System or that are chartered by the Federal Reserve. The CFTC is the regulatory authority responsible for the supervision of CCPs that clear products that fall within the CFTC legal responsibility, for example, exchange-traded futures, commodity derivatives and OTC derivatives. The SEC is the regulatory authority responsible for CCPs and CSDs/SSS that clear and settle products that fall within the SEC legal responsibility, notably government securities, corporate bonds, municipal bonds, equities, and equity derivatives, such as stock options and security-based swaps.

13. CCPs may be subject to supervision of both the CFTC and SEC if they clear products that rest within both regulators' mandates. For example, ICC's index CDS clearing is subject to CFTC supervision and ICC's single CDS clearing is subject to SEC supervision. OCC's stock option clearing is subject to SEC supervision and OCC's futures clearing is subject to CFTC supervision.⁶ A CCP subject to supervision of both the CFTC and SEC has one primary regulatory authority for purposes of Title VIII of the DFA: the CFTC is the primary regulator for ICC and the SEC is the primary regulator for OCC.

14. The DFA, the Federal Reserve Act, the Commodity Exchange Act (CEA) and the Securities Exchange Act of 1934 (EA) provide the legal basis for the regulation, supervision and oversight of systemically important FMUs. The DFA specifies that the FSOC may designate FMIs as systemically important FMUs, based on criteria provided by DFA Title VIII. The Federal Reserve Act provides the FRB with the legal basis to supervise the Federal Reserve Banks, including their operation of payment systems and CSDs/SSSs, as well as the activities of state-chartered banks that are members of the Federal Reserve System (state member banks) and Edge corporations. The DFA provides the FRB with authority to issue risk management standards for and supervise payment systems that are designated as systemically important by the FSOC. The CEA provides the CFTC with legal basis to regulate and supervise derivatives clearing organizations (DCOs), including systemically important derivatives clearing organizations (SIDCOs), which are DCOs designated as systemically important by the FSOC. The EA provides the SEC with the legal basis to regulate and supervise clearing agencies (CAs) and CAs designated systemically important by the FSOC. The FRB also has certain authorities under the Federal Reserve Act and under the EA for a clearing agency that is organized as a state member bank. Designated FMUs are subject to additional risk management standards in line with international standards, the PFMI.

⁶ Single stock futures cleared by the OCC are within the regulatory scope of both the CFTC and the SEC.

15. The DFA in Title VIII also provides the FRB with an enhanced role in the supervision of risk management standards for designated FMUs. To reduce systemic risks and provide consistency, the DFA provided the FRB with an enhanced role in the supervision of designated FMUs in order to promote uniform risk management standards. This expanded the FRB's role beyond its role as primary regulator of state member banks and Edge corporations that operate as FMIs. The FRB must be consulted by the CFTC and SEC as to the scope and methodology of DFA-related examinations of designated FMUs, and the FRB may participate, at its discretion, in such examinations and reviews of rule changes of SIDCOs and systemically important CAs that could materially affect the nature or level of risks presented thereby. The FRB is guided by its PSR policy when providing input to the CFTC and SEC. The DFA also provides the Federal Reserve with certain escalation powers to the FSOC and crisis management tools.

16. The DFA authorizes the FRB to authorize a Federal Reserve Bank to establish and maintain deposit accounts for and provide services to designated FMUs, and in unusual and exigent circumstances, under certain conditions, emergency liquidity. Reserve Banks may extend account services and pay earnings on account balances to FMUs that are designated as systemically important by the FSOC. Conditions are set in Regulation HH to ensure that an FMU account does not create undue credit, settlement, or other risks to the Reserve Bank. For example, a designated FMU must (i) be in a sound financial condition; (ii) meet supervisory agency requirements; (iii) be in compliance with FRB policies; and (iv) meet account obligations. All CCPs that are designated as systemically important by the FSOC do have an account at the Federal Reserve for the deposit of their U.S. dollar cash collateral. The CCPs for which the CFTC is the primary regulator were able to open a house and client account after the CFTC issued an order to exempt Federal Reserve Banks from certain requirement in the CEA. The Treasury has recommended to the FRB "review what risks may be posed to U.S. financial stability by the lack of Federal Reserve Bank deposit account access for certain FMUs with significant shares of U.S. clearing business, and an appropriate way to address any such risks."⁷

17. Some non-designated FMIs also may comply with the same risk management requirements as designated FMUs. Certain non-designated FMI, for example, in the CFTC regime, ICE U.S., the Minneapolis Grain Exchange and Nodal Clear (Table 2) and LCH SA in the SEC regime, have opted to comply with enhanced requirements consistent with the PFMI to be classified as qualifying CCPs.⁸ Foreign CCPs that trigger U.S. registration requirements must comply with the applicable legal requirements.

⁷ Treasury Report, A Financial System That Creates Economic Opportunities • Capital Markets, 2017, page 165.

⁸ Clearing members may apply reduced capital requirements for their exposures to qualifying CCPs, see BCBS Capital requirements for bank exposures to central counterparties, April 2014.

Table 2. United States: Regulatory Landscape for the U.S. FMIs

Primary regulator		Federal Reserve	CFTC	SEC
Application of enhanced risk management standards	By FSOC designation	<ul style="list-style-type: none"> The Clearing House Payments Company, L.L.C., on the basis of its role as operator of the Clearing House Interbank Payments System (CHIPS) CLS Bank International 	<ul style="list-style-type: none"> Chicago Mercantile Exchange (CME) ICE Clear Credit L.L.C. (ICC) 	<ul style="list-style-type: none"> Depository Trust Company (DTC) Fixed Income Clearing Corporation (FICC) National Securities Clearing Corporation (NSCC) Options Clearing Corporation (OCC)
	By policy or regulation	<ul style="list-style-type: none"> Fedwire Funds Service Fedwire Securities Service 		
	By FMI opt-in or through being subject to home country supervision		<ul style="list-style-type: none"> 9 Foreign CCPs (of which 3 exempt) ICE Clear U.S. Minneapolis Grain Exchange Nodal Clear 	
Other FMIs that are not subject to enhanced risk management standards		<ul style="list-style-type: none"> Federal Reserve retail payment services 	<ul style="list-style-type: none"> CX Clearinghouse, L.P. North American Derivatives Exchange, Inc. Eris Clearing, LLC LedgerX, LLC 	<ul style="list-style-type: none"> Clearing agencies that are not CCPs and CSDs

Source: U.S. FSAP 2015 with updates.

18. In 2017, the Treasury outlined that if a systemically important FMU is resolved under Title II of the DFA, the Federal Deposit Insurance Corporation (FDIC) would be the resolution authority.⁹ While the FDIC would be the resolution authority for CCPs resolved under Title II, it does not have supervisory powers with regard to CCPs.

⁹ U.S. Department of the Treasury, A Financial System That Creates Economic Opportunities Capital Markets, October 2017.

ANALYSIS OF SELECTED ISSUES

A. Supervision and Oversight of FMIs

19. This section analyzes the extent to which the regulation, supervision, and oversight for FMIs are in line with the five responsibilities of the PFMI. The objective is to benchmark the regulatory, supervisory, and oversight framework in the U.S. against international standards and analyze whether there are gaps or issues of concern that could enable the buildup of systemic risk.

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

20. As required under Responsibility A, the U.S. legal framework defines and publicly discloses the criteria to identify FMIs that are subject to regulation, supervision and oversight. The Federal Reserve Act specifies its authority over Federal Reserve-operated systems and as well as the activities of state member banks and Edge corporations. The CEA and EA provide respective criteria for identifying CCPs that need to be registered as DCOs at the CFTC, and CCPs and CSDs that need to be registered as CAs at the SEC. In addition, the DFA outlines criteria to identify systemically important FMUs which need to be designated and comply with increased risk management standards. These criteria are (i) the value of transactions processed or carried out; (ii) the FMU's exposure to its counterparties; (iii) the relationship, interdependencies or other interactions of the FMU with other FMUs; and (iv) the effect that the failure of or a disruption to the FMU would have on critical markets, financial institutions or the broader financial system. The DFA provides the FRB, CFTC, and SEC with authority to issue risk management standards for and supervise the payment systems for FMUs that are designated as systemically important by the FSOC and for which the agency is the primary regulator under the DFA. The acts are all publicly available as are the associated regulations. The legal framework also defines and publicly discloses the division of responsibilities among authorities.

Powers and Resources (Responsibility B)

21. The FRB, CFTC and SEC have sufficient supervisory powers to regulate and supervise designated FMUs. All authorities have standard setting powers. Their supervisory tools include approval of rules changes and annual examinations of designated FMUs. As required by the DFA, a designated FMU shall provide notice 60 days in advance to its primary regulator of any proposed change to its rules, procedures, or operations that could materially affect the nature or level of risks presented by the FMU. Authorities have sufficient powers to obtain information for ongoing monitoring of the FMIs and for analyzing rule filings. Finally, authorities have sufficient powers to conduct onsite and offsite examinations.

22. It is, however, warranted to reconsider the CFTC rule approval process for SIDCOs and introduce an affirmative approval process and a public consultation. SIDCOs must submit proposed rule changes to the CFTC with at least 60 days' notice before the proposed change takes effect, in line with DFA section 806(e). The rule may only take effect if the CFTC does not object

(Code of Federal Regulations (CFR) § 40.10).¹⁰ Although there is no evidence of a lack of scrutiny at the CFTC, the no-objection approach could be strengthened in recognition of the systemic importance of SIDCOs, to limit chances that certain important changes could be overlooked or not given the attention needed due to resource or other constraints. The systemic importance of the ICC and CME calls for a watertight approach, which replaces the ‘automatic unless an objection’ approval after 60 days by an affirmative approval for all proposed rule changes (comparable to the SEC’s approach).¹¹ Furthermore, the SEC’s approval process includes a public comment period, which is not in place for CFR §40.10. It is recommended to include this public comment period for CFR §40.10 rule changes to allow stakeholders to formally express their opinion.

23. The legal framework provides primary regulators with a sufficient range of powers to induce change where needed. The CFTC has measures to ensure that a DCO addresses any issues identified by the examinations, which include escalating the issue to the DCO’s management and Board of Directors, and if this is insufficient, sue the DCO in a federal court for civil monetary penalties, issue a cease and desist order, or suspend or revoke a DCO’s registration. The SEC may initiate and conduct investigations of CAs. Following an investigation, the SEC has the authority to, among other things, suspend or revoke a CA’s registration; impose limitations on a CA’s activities, functions or operations; or impose financial sanctions. The FRB, CFTC, and SEC all have authority under the provisions of subsections (b) through (n) of section 8 of the Federal Deposit Insurance Act in the same manner and to the same extent as if the systemically important CCP were an insured depository institution and the FRB, CFTC or SEC were the appropriate Federal banking agency for such insured depository institution.

24. The FRB has powers to execute its enhanced responsibilities under DFA Title VIII, including to escalate matters to the FSOC and undertake direct action towards a designated FMU for which it is not the primary regulator with FSOC approval. The FRB has a range of powers in relation to designated FMUs for which it is not the primary regulator. First, the CFTC and SEC have to consult annually with the FRB regarding the scope and methodology of examinations conducted under the DFA. The FRB may, in its discretion, participate in any DFA-related examination led by the CFTC or SEC. The CFTC and SEC also have to consult with the FRB regarding the review of certain/material rule changes proposed by the designated FMU. In addition, the FRB may determine that regulations of the CFTC and/or SEC are insufficient to prevent or mitigate risks and may escalate this matter to the FSOC. The FRB may, after consultation with the FSOC, recommend the primary regulator to undertake an enforcement action against a designated FMU; if the CFTC/SEC does not do so, the FRB can escalate the matter to the FSOC again. Under certain conditions (including a finding that a designated FMU’s action or condition poses an imminent risk of substantial harm to financial institutions, critical markets, or the broader U.S. financial system), the FRB may also take enforcement action directly against a designated FMU, after consultation with the primary regulator and after an affirmative vote of a majority of the FSOC. Finally, the FRB and FSOC

¹⁰ For less material changes a self-certification procedure is in place where the CFTC should approve the rule change, unless it finds that the change is not compliant with the CEA or CFTC rules (CFR § 40.6). CFR §40.6 does have a public comment period.

¹¹ With a few exceptions for those rule changes that are designated as insubstantial.

may require data directly from a designated FMU in whatever form and frequency they need for financial stability purposes and the FRB may, after an affirmative vote of a majority of the FSOC, prescribe regulations that impose a recordkeeping or reporting requirement on a designated FMU for which the CFTC or SEC is the primary regulator.

25. While the DFA Title VIII sets a high hurdle for the FRB to use formal powers that require escalation to the FSOC, the FRB is regularly engaged with the CFTC and SEC on a variety of matters affecting FMUs. With respect to designated FMUs for which the CFTC or SEC is the primary regulator, the powers of the FRB to bring about change in line with its responsibilities under DFA Title VIII require escalation to the FSOC, and therefore, the support at the highest level of the supervisory agencies represented. This is useful in cases of imminent risk to the U.S. financial system but may be less suitable for the FRB's ongoing execution of its responsibilities under DFA Title VIII. The high hurdle of escalation, when the FRB's action aims to prevent or mitigate liquidity, credit, operational or other risks to the financial markets or the financial stability, while not facing an imminent threat of substantial harm, could result in not fully applying these powers where necessary, potentially undermining the overarching objective of Title VIII. The FRB may evaluate whether publication of recommendations would help to promote a uniform implementation of risk management standards by designated FMUs. For example, the FRB's Financial Stability Reports could duly address the need for a strong supervision over CCPs' risk management, given their systemic nature. It would be important to consider the potential effects of making public certain information related to CCPs.

26. Since the 2015 FSAP, the FRB and SEC increased the number of staff dedicated to supervision of designated FMUs, up to a level that seems sufficient to execute their mandate. At the FRB, staff numbers increased over the last years up to around 100 full-time equivalents (FTEs), shared by the FRB, the Federal Reserve Bank of New York, and the Federal Reserve Bank of Chicago. The FRB has a dedicated department consisting of an oversight team for all systemically important domestic FMIs, a quantitative risk analysis team, and an FMI risk and policy team. The Federal Reserve Banks of New York and Chicago have dedicated local teams for the oversight of designated FMUs in New York and Chicago, respectively. The SEC's Office of Clearance and Settlement consists of lawyers, economists, and quantitative analysts. Since the introduction of the DFA, staff increased from approximately 15 to approximately 40, hiring particularly additional economists and quantitative analysts. In addition, the SEC's Office of Compliance Inspections and Examinations has a subgroup of approximately 20 staff dedicated to conducting examinations and inspections of CAs.

27. By comparison CFTC resources are considerably less than those at the FRB and SEC and may benefit from increases. Staff resources increased but not in line with increased responsibilities. The CFTC allocates 70 staff members to the Division of Clearing and Risk which supervises 16 domestic and foreign CCPs through examinations, risk surveillance, and development of policies and regulations. These 16 include the largest and most systemic CCPs in the world (CME, ICC and LCH Ltd). In addition, the division uses its resources to conduct certain surveillance activities for futures commission merchants (FCMs), which follow its mandate for financial integrity of the clearing process, but which are less relevant for CCPs' resilience and for addressing systemic risks. Resources are further under pressure due to new registrants, and regulatory and supervisory

challenges related to new technologies. For example, Eris Clearing and Ledger X are recently registered DCOs that offer clearing of crypto-currency contracts and have been the focus of considerable effort by CFTC staff.

Adoption of the PFMI (Responsibility D)

28. The CFTC and FRB adopted regulations to implement the PFMI in 2013 and 2014 respectively. The CFTC Part 39 Regulations incorporate the PFMI for SIDCOs (Subpart C). The FRB has implemented the PFMI through Regulation HH, which is an enforceable rule applicable to designated FMUs for which it is the primary regulator. The PSR policy describes the FRB's policy expectations for certain other FMIs, including FMIs operated by the Federal Reserve Banks and designated FMUs for which the CFTC and SEC are the primary regulator.

29. An important development since the previous FSAP has been the introduction of the SEC's rules for covered clearing agencies (CCAs) in 2016 to implement the PFMI. In 2012 and 2014, the SEC adopted rules that partly reflected the PFMI and that were aimed at CAs (Rule 17Ad-22(a)-(d) and Regulation SCI). In 2016, it also adopted Rule 17Ad-22(e) for CCAs. With the latter it finished formally the adoption of the PFMI in its regulations. This also addressed the finding of the CPMI-IOSCO implementation monitoring exercise of 2015 that assessed the SEC as 'broadly observed' for PFMI Responsibility D, because the SEC had not adopted the PFMI fully in its regulations at the time of the CPMI-IOSCO assessment (Appendix II).

30. Recent rule changes by the CFTC further align requirements for systemically important CCPs with the PFMI. In January 2020, the CFTC issued rule changes for DCOs and SIDCOs. The rules address certain shortcomings identified in the CPMI IOSCO implementation monitoring report of 2015, notably through requirements on cross-margining. Other alignments are, for example, that a DCO would be explicitly required to have a program of enterprise risk management that it is explicitly not allowed to include excess margin in calculations of the largest financial exposure, that margin model validations should take place at least annually, and that default management tests should include participants. Also, rules around CCPs' public quantitative disclosures are tightened.

31. Given the regulatory framework with multiple primary regulators, the enhanced role of the FRB under DFA Title VIII is essential for promoting a uniform implementation of risk management standards by all systemically important FMUs. Prior to the DFA, no single authority was overseeing all critical systems from a systemic risk perspective. Rather, the supervision and oversight of FMIs was spread across regulators depending on the system's charter or the markets it cleared for. The DFA provides the FRB with a role in the oversight of the compliance of systemically important and designated FMUs in the U.S., with the implementation of the PFMI requirements in a consistent manner, contributing to a comprehensive understanding of the complex FMI landscape in the U.S., and its interdependencies. The promotion of uniform risk management standards contributes to financial stability and allows authorities, through cooperation, to look across systemically important FMUs. This provides opportunities to leverage authorities' individual perspectives to gain a broader view and understanding of the various risks and how these risks are managed.

32. The FRB’s oversight approach to fulfil its responsibilities is rigorous. The FRB and Federal Reserve Banks of New York and Chicago determine the supervisory agenda on an annual basis with help of a risk-based planning tool, which reflects the PFMI as reflected in Regulation HH and provides a heat map that outlines high risk areas and/or areas where more information is needed. The scope includes all designated FMUs as well as the Federal Reserve operated systems. The Fed’s supervisory activities for FMIs for which it has direct responsibility (CHIPS, CLS, DTC, Fedwire Funds Service, and Fedwire Securities Service) result in ratings using the ORSOM methodology.¹² The governance around this supervisory process is strong with regular review by the FMU Supervisory Committee (FMU-SC). Follow-up actions are undertaken through interactions with the FMIs for which the Federal Reserve is the primary regulator or indirectly through the relevant primary regulator of the designated FMU.

33. The mission found that this rigorous approach does not, so far, necessarily result in consistent outcomes from the application of the PFMI. As mentioned in Responsibility D, authorities should apply the principles consistently within and across jurisdictions, including across borders, and to each type of FMI covered by these principles. A consistent approach does not require FMIs to use exactly the same tools in their risk management approach. Rather, CCPs can use different means to satisfy a particular principle, as outlined in the PFMI report (paragraph 1.19), taking into account the specifics of the markets and clients they serve. In analyzing the outcomes of risk management measures of CCPs (see section B) the mission found that in some cases the outcome of the implementation of risk management standards by CCPs was uneven, and potentially may impact financial stability or market efficiency, specifically regarding the independence of the risk management function, the conservativeness of the MPOR, and the implementation of intraday margining rules.

34. It is recommended that the FRB, CFTC, and SEC collaborate to analyze these differences in outcome of CCP practices, and adopt an appropriately consistent, conservative implementation of the PFMI where financial stability or market efficiency could be negatively impacted.¹³ The regulations provide the CCPs with a certain amount of discretion in the implementation of the risk management requirements. In many cases, U.S. systemically important CCPs have adopted practices significantly above the requirements, however, this is not necessarily the case for every CCP regarding every risk management requirement. Authorities may investigate differences in outcomes where these differences potentially may impact financial stability through dependencies between CCPs and market participants, create an unlevel playing field, or otherwise may have negative consequences.¹⁴ Consistency in outcomes of CCP implementation may positively influence cooperation among authorities, including with the FDIC. Authorities may apply more

¹² In 2016, the FRB approved the use of the ORSOM (Organization; Risk Management; Settlement; Operational Risk and Information Technology (IT); and Market Support, Access, and Transparency) rating system in reviews of FMIs by the FRB and, under delegated authority, the Federal Reserve Banks.

¹³ In line with other CFTC-SEC harmonization efforts, for example <https://www.sec.gov/news/press-release/2019-125>.

¹⁴ As outlined in Responsibility D a consistent application of principles is important because different systems may be dependent on each other, in direct competition with each other, or both.

demanding requirements if and when they deem it appropriate to do so. They may do so on the basis of specific risks posed by an FMI or as a general policy (PFMI paragraph 1.19).¹⁵

35. A tool to inform authorities' views of financial stability is a systemwide CCP supervisory stress test. The CCP stress tests performed by the CFTC in 2016, 2017, and 2019 were new and important steps that contributed to a better understanding of CCPs' resilience and contagion channels. These tests covered different CCPs, products and risks over time. It is recommended to start conducting U.S. supervisory stress tests that include all systemically important CCPs, and knock-on effects on clearing members, liquidity providers, and other FMIs where relevant. Such a macroprudential supervisory stress test would not supersede internal stress testing conducted by CCPs. As outlined in the CPMI-IOSCO guidance on supervisory stress testing of CCPs such stress tests would help authorities better understand the macroprudential risks that could materialize if multiple CCPs were to face a common stress event.¹⁶

36. A key aspect of the supervisory stress test would be the use of a standard set of stress scenarios, which allows for an evaluation of the collective response of all systemically important CCPs from a credit risk perspective, a liquidity risk perspective, or both. Such an exercise is not less demanding than the Comprehensive Capital Analysis and Review (CCAR) for banks, and requires data sharing among SEC, CFTC, and FRB. The FRB is ideally positioned to oversee such an exercise, it has the necessary expertise, and could in addition leverage the analytical capabilities and data expertise of the FSOC Office of Financial Research (OFR). If current information sharing arrangements do not allow for sharing the data that is needed for the test, authorities will need to construct new arrangements to facilitate this. Involvement of the FDIC is recommended to take into account specific elements relevant for CCP resolution planning.

37. Continued work on interdependencies between CCPs and clearing members is warranted. Interdependencies have increased in recent years due to a reduction in clearing members providing client clearing and liquidity services. International work on interdependencies could be leveraged to develop a regular revisit of the dependencies of CCPs on liquidity providers, custodians, settlement banks, and other service providers, for example, in conjunction with the CCP supervisory stress test.¹⁷

38. Finally, multi-CCP drills can help identify operational risks involved in default management for large members which belong to more than one CCP. U.S. CCPs periodically conduct default management drills involving risk management staff supplemented, in the case of derivatives CCPs, by traders seconded from member firms. An example of a cross-CCP, cross-border

¹⁵ See FSOC Annual Report 2019, <https://home.treasury.gov/index.php/news/press-releases/sm843>. The Council recommends that the CFTC, Federal Reserve, and SEC continue to coordinate in the supervision of all CCPs designated by the Council as systemically important FMUs. Relevant agencies should continue to evaluate whether existing rules and standards for CCPs and their clearing members are sufficiently robust to mitigate potential threat to financial stability.

¹⁶ CPMI IOSCO Framework for supervisory stress testing for CCPs, April 2018 <https://www.bis.org/cpmi/publ/d176.htm>.

¹⁷ See reports of the FSB Study Group on Central Clearing Interdependencies of 2017 and 2018.

drill has been the exercise conducted by CME, LCH SwapClear and Eurex Clearing in 2017. Authorities may encourage CCPs to conduct these drills domestically and on a cross-border basis to further understanding of potential default execution problems and address these proactively.

Cooperation Among Authorities (Responsibility E)

39. Distribution of regulatory and supervisory responsibilities among multiple authorities requires intense and effective cooperation. As requested by DFA 813, the CFTC, SEC, and FRB jointly developed a risk management supervision program for designated CCPs and CSDs/SSSs with the aim to improve consistency in oversight programs and promote robust risk management with the overall objective to support financial stability.¹⁸

40. Cooperation and coordination among the FRB, CFTC, and SEC generally work well. In line with DFA Title VIII, the FMUs submit for approval to their primary regulators proposed changes that could materially affect the nature or level of risks presented by the FMU. The CFTC and SEC then consult with the FRB before taking any action on such rule changes. In addition, the CFTC and SEC consult with the FRB as to the scope and methodology of their annual DFA-related examinations of designated FMUs. The FRB actively engages in the approval of proposed rule changes and participates in the examination processes with the CFTC or SEC. Information is shared under bilateral memoranda of understanding (MOUs) between the authorities and information sharing barriers have been removed. Within the Federal Reserve System, cooperation and coordination among different supervisory departments is addressed through the FMU-SC as an internal coordinating body for designated FMU supervision that meets at least quarterly.

41. This cooperation supports consistent communication towards the FMIs; CCPs that are supervised by both the CFTC and SEC still face differences in rule filing processes which contribute to their administrative costs. Although parallel rule filings generally do not result in contradictory requirements, there is substantial overlap in administrative requirements for CCPs that are supervised by both the CFTC and SEC, notably the ICC and OCC. Rule changes need to be filed with both the CFTC and SEC. As rule filing requirements and procedures are different the rule filings place an administrative burden on the CCPs.

42. It is recommended to develop a dedicated communication plan to prepare for an FMI related crisis. A Crisis Communication Framework (CCF) has been established under the FMU-SC, which is regularly tested within the Federal Reserve. It is important that the FRB, FDIC, CFTC, and SEC strengthen the cooperation arrangements at all levels to manage financial and operational crisis events related to FMIs. The existing infrastructure crisis management arrangements can be leveraged. Such an arrangement would facilitate effective and timely communication and potentially avoid losses or reduce the size of financial losses following crisis events. Routine tabletop exercises enhance the probability of an effective implementation of the plan when a crisis occurs.

¹⁸ See FRB, SEC, CFTC, Risk Management Supervision of Designated Clearing Entities, July 2011.

43. International cooperation and coordination among CCP authorities has significantly increased in recent years through the Crisis Management Groups (CMGs) for CCPs.¹⁹ The FDIC and CFTC have co-hosted CMGs on an annual basis for CME and ICC since 2017. CMG membership includes domestic and foreign supervisors and resolution authorities. Discussion points have focused on matters relevant for CCP recovery and resolution, such as default management and recovery tools, CCP recovery and wind-down plans, review of the U.S. resolution framework and potential resolution tools, considerations for resolution strategy development, and available tools and resources to support resolution. The CFTC, FDIC, SEC and FRB also participate in cooperative arrangements and CMGs of foreign CCPs, including those managed by the Bank of England for LCH Ltd. and ICE Clear Europe. These arrangements include crisis communication protocols.

44. In addition, the FRB, CFTC, and SEC participate in bilateral dialogues with authorities of certain overseas clearinghouses, including Eurex Clearing AG, ICE Clear Europe, LCH Ltd., and LCH SA. The SEC has also entered into an MOU with the Belgian authorities in relation to Euroclear Bank (exempted under the EA). This is relevant given that some large foreign FMIs are highly interconnected with U.S. banks, their clients, and markets and through interdependencies (potentially) relevant for the stability of the U.S. financial system.²⁰

45. The CFTC's efforts in contributing to a global deference and cooperation framework are important to address market fragmentation.²¹ **The SEC should consider further developing its deference framework as well.** Deference has been identified by the G20 leaders as a tool that authorities may use to help make reforms across jurisdictions interact better and facilitate meeting the G20 reform objectives of 2009.²² International reports characterize a global deference framework by strong cooperation and information sharing among authorities, application of comparable rules (e.g., based on the PFMI) and safeguards to ensure that the home authority is carrying out its responsibilities appropriately and that host authorities can have sufficient comfort that their regulatory requirements are met.²³ The CFTC's draft proposals for deference take these features into account. It is recommended that the SEC consider steps to further develop a deference and cooperation framework for foreign CCPs through its exemption powers under the EA.

¹⁹ CMGs are formed for CCPs that are systemically important in more than one jurisdiction, pursuant to the Financial Stability Board's Key Attributes of Effective Resolution Regimes. CMGs have the objective of enhancing preparedness for, and facilitating the management and resolution of, a financial crisis involving a particular financial institution.

²⁰ See, for example, Daniel Maguire, CEO LCH testimony before the House Committee on Agriculture Subcommittee on Commodity exchanges, energy and credit, <https://agriculture.house.gov/UploadedFiles/HHRG-116-AG22-Wstate-MaguireD-20190626.pdf>.

²¹ Former CFTC Chairman Giancarlo's White Paper of October 2018 proposed a new approach to deference by distinguishing between systemically important and less systemically important CCPs. In May 2019, the CFTC proposed concrete rules on deference to authorities of non-domestic CCPs providing services in the U.S.

²² A Narrative Progress Report on Financial Reform, page 4, <http://en.g20russia.ru/documents/#p2>.

²³ From Report of the OTC Derivatives Regulators Group (ODRG) to G20 Leaders on Cross-Border Implementation Issues, November 2015.

B. Resilience of Selected CCPs

46. This section analyzes key elements of the credit and liquidity risk management frameworks of CME, FICC, ICC, and OCC that are relevant from a financial stability perspective. The CCPs' rules and practices are benchmarked against the PFMI principles 4–7 and 13. The assessment does not address all elements of the principles but focuses on margining, stress testing, the sufficiency of the loss-absorbing resources and default management procedures. In the absence of access to non-public data the findings could not be verified by data on real positions and exposures. The analysis of the credit and liquidity risk management frameworks of four selected CCPs shows that CCPs are generally sound, with room for further strengthening of some risk management practices as appropriate.

General Findings on Risk Management Frameworks of U.S. CCPs

47. Over the last years, initial margin methodologies of U.S. CCPs have become more similar with the widespread adoption of risk-based portfolio margin models. Most U.S. CCPs have now adopted a “portfolio margin” approach in which baseline margin requirements are determined based on the Value at Risk (loss quantile) of a clearing member’s portfolio over the MPOR, at some confidence level which may be 99 percent or higher. This portfolio loss quantile is estimated using historical or simulated scenarios or through a parametric Value at Risk approach. Importantly, the calculation allows for “offsets” across positions, with estimated losses in some positions being netted with estimated gains in other positions, allowing for hedging or diversification effects which reduce initial margin compared to the case where positions would be margined separately, as was previously the case in some CCPs. The nature and magnitude of this reduction in margin depends on the magnitude of correlations among portfolio components, which may break down during a stress scenario. This dependence of margin levels on correlation assumptions can be addressed by ongoing monitoring, back-testing, and scenarios for use in stress-testing procedures.

48. U.S. CCPs address the potential cost of closing out portfolios of defaulted clearing member portfolios by including add-on charges in initial margin requirements, such as “concentration charges” and/or “liquidity charges” in initial margin requirements. These add-on charges are components of a CCP’s overall margin requirement that are typically calculated to supplement statistical models. The use of these charges is an important issue given the concentration of CCPs’ exposures across a few large clearing members, especially for derivatives CCPs given the variation of liquidity across instruments. Such concentration charges are systematically included in margin requirements by ICC (for CDS), OCC (for listed equity options, index options, and futures) and CME. FICC is in the process of developing and implementing a concentration charge. The inclusion of adequately calibrated concentration charges in margin requirements also addresses concerns related to the constant MPOR used by CCPs, which has been sometimes criticized by market participants.²⁴

²⁴ See, for example, <https://www.jpmorgan.com/directdoc/ccp2019.pdf>.

49. The mission found that the outcomes of implementation of risk management standards differs across U.S. CCPs, which could be subject to further joint analysis by the CFTC, FRB and SEC (see also paragraph 33). Specifically, while the overall methodology underlying portfolio margin requirements is broadly similar across CCPs, implementations are not equally conservative, as illustrated by disclosures on the magnitude and frequency of margin breaches with different levels of margin breaches for different CCPs.

50. CCP loss waterfalls vary across derivatives and securities CCPs, reflecting different appetites among CCPs for the “defaulter-pays” vs. “loss mutualization” approach. Derivatives CCPs, such as ICC, CME, or OCC separate the initial margin pool from a mutualized default fund, whereas securities CCPs, such as FICC, have a single mutualized collateral pool, resulting in a greater exposure of clearing members to each other’s default losses. These differences cannot be clearly related to the asset class or the nature of clearing activities. Default fund allocation rules, which affect risk incentives for clearing members, also vary across CCPs: some CCPs (ICC and CME IRS) allocate default fund contributions proportionally to stress exposure to members net of margin, while others (OCC and CME Base) allocate based on a combination of initial margin, open interest and volume.

51. Stress testing practices also vary. All major U.S. CCPs periodically evaluate their exposure net of initial margin to all clearing members, across a range of “extreme but plausible” stress scenarios. The magnitude of the largest of these exposures determines the size of the CCP default fund via the Cover 1 (or Cover 2) principle. The choice and severity of these stress scenarios varies across CCPs, reflecting different market characteristics, which can make comparisons difficult, although there are certain historical crisis scenarios that are common to various CCPs. ICC and CME IRS use stress test outcomes to allocate default fund contributions across clearing members proportionally to stress loss over margin, while FICC uses stress tests as a monitoring tool with no automatic impact on collateral requirements.

52. The level of CCPs’ contribution to default losses or “skin-in-the-game” remains an issue of discussion globally. As stated by the CPMI-IOSCO guidance “a CCP should determine and expose an amount of its own financial resources to absorb losses resulting from a participant default and the custody and investment of participant assets that would enhance confidence that the CCP’s design, rules, overall strategy and major decisions reflect appropriately the legitimate interests of its participants and other relevant stakeholders.” The objective is for the CCP’s contribution to provide incentives for risk management to the CCP, rather than providing a sizable buffer against default losses. The current level of capital of most CCPs remains small compared to their collateral pool (less than 1 percent), so even contributing 100 percent of the CCPs’ capital would remain, in the mission’s judgment, a negligible contribution to the loss waterfall. For CCPs, such as FICC and OCC, which are member-owned or operate as a utility, constituting such a capital cushion would be effectively equivalent to requesting higher contributions by members to a mutualized collateral pool, which is already in place, so the issue mainly concerns non-utility CCPs. ICC and CME do provide a contribution of their own capital to the loss waterfall, before any losses are affected to non-defaulting members’ default fund contributions.

53. Transparency of CCP risk management differs across CCPs. Clearing members require, for their risk management, the ability to estimate collateral requirements under various risk scenarios, which implies some visibility into the CCP margin methodology. Feedback obtained from private sector participants suggests that transparency of CCP risk management remains a concern of clearing members.²⁵ Clearing members can use the SEC and CFTC's rule change process to obtain greater transparency into CCP practices, however, as outlined in the discussion under Responsibility B, not all rule changes require a public consultation. Since 2016, CPMI IOSCO Public Quantitative Disclosures by CCPs have provided useful information on the activity and risk profile of major CCPs. However, in some instances these disclosures remain insufficiently detailed to serve as inputs for the quantitative assessment of the risk faced by clearing members. While some CCPs engage in further voluntary disclosures on their risk management to clearing members, for example, via detailed model description documentation and margin analytic tools, the mission considers that other CCPs, could benefit from further transparency, for example, concerning the methodology underlying collateral requirements, rule changes and the clearing of new instruments. The presence of clearing members' personnel on CCP boards, risk committees and advisory councils is often cited as a useful way of engaging with clearing members but may not necessarily be the appropriate channel for such disclosures, given the confidentiality restrictions which apply to board and committee members.

54. The mission found that some differences potentially may impact financial stability or market efficiency:

- a. **Independence of the risk management committee:** CME, FICC, ICC, and OCC all set up a separate risk committee but the rules for the chairperson of the risk committee differ. Where, CME appointed a trading member of CME exchanges as the chair of the Clearing House Risk Committee, committee chairs for FICC, ICC, and OCC are independent board members of the CCP (with the CCP being a different legal entity). Although CME considers that this trading member is an independent board member of CME's board of directors,²⁶ it is recommended to review the independence of the chair of the CME CCP risk committee to ensure that the committee's judgments on risk related matters are not influenced by business considerations, which may potentially weaken the risk management line of defense.
- b. **Margin period of risk (MPOR):** Different CCPs may have different MPORs, based on calculations that take into account the type of product as well as market liquidity, history, and idiosyncrasies. For example, OCC has a minimum MPOR of two days for equity options, index options, and futures. FICC has an MPOR of three days and the two OTC derivatives

²⁵ See <https://www.jpmorgan.com/directdoc/ccp2019.pdf>

²⁶ See the applicable listing standards for CME Group Inc. as a public company <http://nasdaq.cchwallstreet.com/NASDAQTools/PlatformViewer.asp?selectednode=chp%5F1%5F1%5F3%5F3%5F8%5F3&manual=%2Fnasdaq%2Fmain%2Fnasdaq%2Dequityrules%2F> and <http://investor.cmegroup.com/static-files/60827cf0-529e-4656-a57a-d2007fa68e30>.

CCPs have a minimum MPOR of five days. CME utilizes a number of different MPORs depending on the products cleared, including a one-day, two-day, and three-day MPOR for futures products, and a five-day MPOR for OTC derivatives.²⁷ The minimum MPOR of one day for contracts at CME seems low compared to MPORs adopted by CCPs for other exchange-traded derivatives markets, domestic or abroad. Although customer margins collected on a one-day gross can provide a sufficient level of coverage to a CCP and better protect clients and mitigate systemic risks,²⁸ it is nonetheless recommended to review this for all accounts to ensure that the CCP is sufficiently protected in case large positions need to be liquidated, and to avoid negative procyclical margin calls in times of stress. Furthermore, uneven outcomes of implementation may negatively impact the level playing between competing CCPs.

c. **Intraday margin thresholds:** The implementation of intraday margin calls differs among CCPs with different thresholds applied for the level of depletion of margin before an unscheduled call is triggered. The mission considers that the absence of clear intraday margin thresholds may result in a potential impact on the liquidity positions of its participants with procyclical effects that may propagate losses through the system where interdependencies exist between CCPs and their (often common) participants.²⁹ Specifying thresholds is important to help clearing members plan and avoid margin depletion during the day. Under highly adverse circumstances, margin depletion can occur in conjunction with a participant's default, which would draw upon surviving clearing members default fund contributions and could further propagate losses through the system.

Chicago Mercantile Exchange Inc. (CME)

55. CME Base margin requirements for futures and options are calculated using SPAN.

SPAN is a scenario-based approach calibrated to target 99 percentage coverage with (complex) rules for netting across sub-portfolios with "stable structural correlations." While the minimum MPOR is one day, margin levels can be increased based on the cleared futures and options products' risk characteristics. Customer accounts are margined on a gross basis, leading to a large margin pool (currently above US\$90 billion), 70 percent of which consists of customer margin.

²⁷ In order to meet requirements of the European Union, where CME is a recognized CCP, all house accounts are margined net with a two-day MPOR, with the exception of a few contracts.

²⁸ In order to meet requirements of the European Union, where CME is a recognized CCP, all house accounts are margined net with a two-day MPOR, with the exception of a few contracts. It is recognized that customer margins collected on a gross basis using a one-day MPOR, compared to margins determined on a net basis (even where a two-days MPOR is used), could result in more margin held at the CCP level. See <https://www.cftc.gov/sites/default/files/idc/groups/public/@newsroom/documents/speechandtestimony/opamassad-20.pdf> and https://www.esma.europa.eu/sites/default/files/library/2016-429_final_report_review_of_article_26_of_rts_no_153-2013_with_respect_to_mpor_for_client_accounts.pdf and <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0822&from=EN>.

²⁹ See CCP Guidance 5.2.46. A CCP should seek to increase the predictability of its intraday margin calls in order to enhance participants' operational readiness and financial capacity to meet such calls.

56. CME Base schedules a regular intraday margin call in the middle of the trading day and should review practices as to introducing clear risk-based criteria to support unscheduled intraday margin calls.

Unscheduled intraday margin calls are triggered based on decisions by CME risk management, rather than automatically based on adverse movements of a member's margin on deposit. CME reaches out to members as appropriate to discuss exposures based on its real-time account monitoring and gives members advance notice of ad hoc margin calls. Given the number of accounts to monitor (more than 60) and the potentially high intraday turnover of positions, this may pose a challenge and lead to operational risk. Introducing risk-based criteria for unscheduled intraday margin calls accounts for intraday variation in risk exposures due to market moves or portfolio turnover reduces reliance upon a manual procedure.

57. CME contributes US\$150 million of 'skin in the game' to the loss waterfall of CME IRS and US\$100 million to the loss waterfall of CME Base. This corresponds to 0.5 percent of total default resources of the CCP for CME IRS and 0.1 percent for CME Base.³⁰ Default losses are borne by this layer after the defaulter's default fund contributions are applied and before any surviving members' default fund contributions, as recommended in Further Guidance to the PFMI.

58. CME Base and CME IRS operate default funds whose size is determined by the two largest uncollateralized exposures to clearing members. CME Base operates daily stress tests based on historical scenarios including the October 1987 crash. The default fund is sized according to the magnitude of two largest stress losses over initial margin (Cover 2), plus a minimum 10 percent additional buffer in order to avoid frequent resizing. The buffer may be adjusted as necessary based on members' portfolios and market conditions and is generally above 10 percent. The current size of the default fund is US\$3.5 billion, while the largest uncollateralized exposure to any single clearing member is US\$1.8 billion. The allocation of default fund contributions across members is not based on stress loss net of initial margin, but proportional to a weighted average of initial margin and trading volume.

59. CME Base is currently transitioning to a new portfolio margin system, SPAN 2. SPAN2 is based on a 99 percent portfolio historical VaR (HVaR) and more transparent than SPAN. The margin requirement for a given portfolio using SPAN 2 may be higher or lower than SPAN based on characteristics of the portfolio itself. As with SPAN, SPAN 2 accounts for the potential breakdown in correlations across products. CME has conducted tests in developing SPAN 2, including with member and hypothetical portfolios. The robustness of SPAN 2 margin requirements was assessed through back testing of margin requirements under various market conditions for member and hypothetical portfolios, in particular using market scenarios which address possible breakdown of correlations.

60. CME IRS margin requirements adequately address the risk of member portfolios. Margin requirements for interest rate swaps are based on 5-day 99.7 percent portfolio HVaR. This is combined with an additional concentration charge for large positions to account for the potential additional cost of liquidating positions large relative to average daily volume. This concentration

³⁰ <https://www.cmegroup.com/clearing/cme-clearing-overview/safeguards.html>

charge is computed based on periodic bids by members on hypothetical large portfolios. CME IRS perform daily stress testing of member positions and maintains a default fund whose size covers the two largest uncollateralized stress exposures of members. Unlike CME Base, CME IRS allocates default fund contributions across clearing members proportionally to their uncollateralized exposure in stress tests (stress loss net of margin): members who bring more tail risk to the CCP contribute more to the default fund, which corresponds to common practice at a number of CCPs.

61. CME Base and IRS have adequate default management procedures for their respective cleared products. CME Base and IRS have dedicated default management teams and IRS has a default management committee including participation of traders seconded by clearing members. The default management includes a procedure for hedging the defaulted members' portfolio and, for IRS, an auction designed to avoid bad bidding by exposing the lowest bidders to the first losses in the Default Fund ("juniorization").

Fixed Income Clearing Corporation (FICC)

62. FICC operates the Government Securities Division (GSD) and the Mortgage Backed Securities Divisions (MBSD). The GSD provides netting, settlement and CCP services for the U.S. Government securities market, as well as matching, netting, settlement and risk management of General Collateral Financing (GCF) repo transactions. The MBSD provides netting, settlement and CCP services for eligible pass-through mortgage-backed securities issued or guaranteed by three U.S. agencies.³¹ Settlement occurs on the Federal Reserve's Securities Service System or on the books of FICC's designated clearing bank, The Bank of New York Mellon. Each division has its own rules and members, and separate loss waterfalls.

63. Differently from most CCPs worldwide, GSD and MBSD each have a single mutualized collateral pool ("Clearing Fund") to which all members contribute. As the collateral pool is mutualized, there is no separation between initial margin and default fund. In case of a default, FICC will first use the margin provided by the defaulting clearing member inclusive of available cross-guaranty arrangements. If the loss is larger than the defaulter's margin, and if FICC exhausts its corporate contribution (or skin in the game) to the waterfall that is provided in its rules, there is the possibility that FICC would receive funds to cover (part of) the loss from its cross-margining and cross-guaranty arrangements. Then FICC will use the contributions of surviving clearing members. Pooling all collateral leads to a large "Clearing Fund" which provides FICC with more than sufficient financial resources to withstand the default of any two clearing members under extreme but plausible scenarios. At the same time, it may expose higher amounts of members' collateral to potential losses arising from default of other members.

64. FICC's initial margin calculation is based upon the total unsettled (fails) and pending (future settling) transactions of each clearing participant. Collateral requirements are based on the 99 percent historical Value-at-Risk (HVaR) of the member's portfolio over a 3-day horizon,

³¹ Government National Mortgage Association ("Ginnie Mae"), Federal National Mortgage Association ("Fannie Mae") and Federal Home Loan Mortgage Corporation ("Freddie Mac").

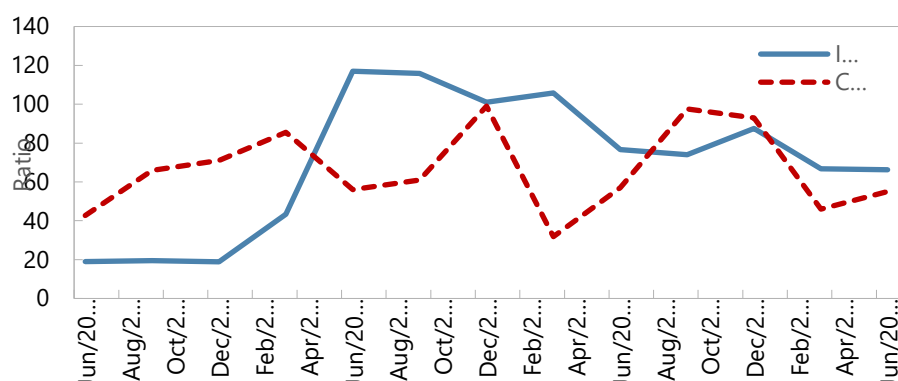
estimated based on data from a 10-year lookback window including a one year's 'stress period' (e.g., 2008). An additional haircut is applied to securities with insufficient requisite data. Collateral may be deposited in cash or government securities, to which a constant but conservative haircut level is applied (haircuts do vary per e.g., maturity and asset class). FICC's members include the largest U.S. financial institutions; the default of such members may result in extreme market moves not covered by the 99 percent HVaR and generate non-negligible close-out costs.

65. FICC monitors the adequacy of margin requirements through daily back testing and addresses any deficiency in coverage by an ex-post "back testing charge". Daily back testing monitors whether collateral requirements fail to reach a 99 percent coverage ratio across a 12-month lookback period, in which case the clearing member is required to post additional collateral ("back testing charge"). Based on the information contained in FICC's Public Quantitative Disclosures for Q1 2019, 124 margin breaches were observed in GSD in the 12-month period covering Q2: 2018–Q1: 2019, with coverage for some members dropping below 99 percent. Margin breaches may reflect situations where margin levels do not adjust to intraday turnover of portfolios or intraday market moves. Identification of the causes of such breaches may contribute to enhancing the coverage level of FICC's margin requirements.

66. Stress tests are performed for monitoring purposes but do not automatically result in further collateral requirements. GSD and MBSD perform stress testing of member exposures by looking at the maximum uncollateralized loss (rather than the 99 percent quantile) over historical and hypothetical scenarios. In the 12-month period preceding the largest uncollateralized stress exposure to a single participant and its affiliates reached US\$649 million for the GSD and US\$1,618 million for the MBSD. FICC monitors the results of its stress tests and has available methods for seeking additional financial resources, but shortfalls in stress tests do not automatically result in higher collateral requirements for members.

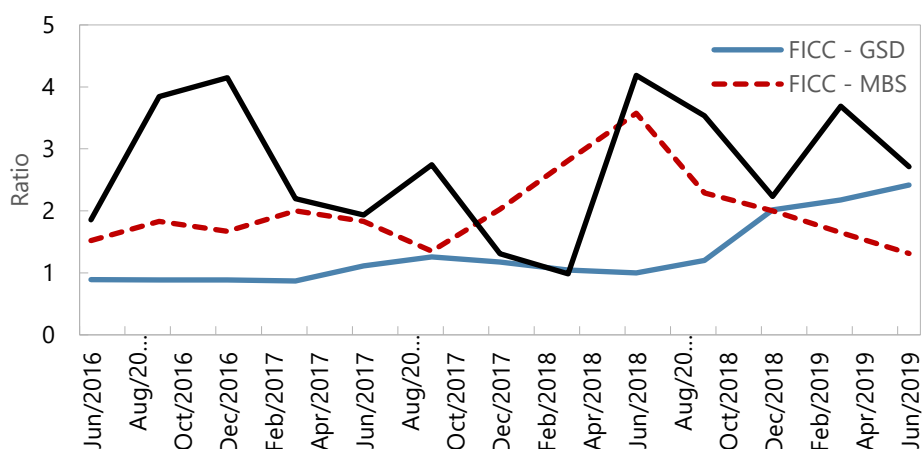
67. Liquidity risk is a major risk for a securities CCP. FICC has put in place a capped contingency liquidity facility (CCLF) to address its large liquidity exposures. For securities CCPs liquidity needs may be significantly higher than for derivatives CCPs because of the magnitude of the obligations, i.e. settling the full value of the transaction. Over 2018–2019, the GSD's largest liquidity exposure to a single participant and its affiliates was around US\$80 billion. In case of the potential default of a clearing member, liquidity risk would be addressed first by using prefunded liquid resources (which amounted to around US\$20 billion in 2018–2019): the FICC would use the cash collateral of the clearing fund and, if this is insufficient to cover the liquidity needs, repo out the securities in the clearing fund and securities deliveries that the defaulting clearing member family did not pay for. If the prefunded liquid resources are not enough to cover all liquidity needs, the FICC could use, as an ultimate step, a rules-based capped contingency liquidity facility (CCLF) (for GSD US\$105 billion and for MBSD US\$52 billion at the end of June 2019). The rules-based CCLF arrangements support the uncommitted repo agreement for FICC to comply with the Cover-1 requirement of Principle 7 (Figures 2 and 3). Once FICC declares a CCLF event, clearing members will be required to hold and fund their deliveries to the insolvent member up to a predetermined cap by entering into repo transactions with FICC until the close-out is completed. Members receive regular overviews of their individual liquidity exposure to FICC.

Figure 2. United States: Ratio of Qualifying Liquid Resources to Peak Payment Obligation for CME and ICC



Source: Public Quantitative Disclosures.

Figure 3. United States: Ratio of Qualifying Liquid Resources to Peak Payment Obligation for FICC and OCC



Source: Public Quantitative Disclosures.

68. FICC has detailed default management procedures in place. Given the large credit and liquidity exposures it faces, FICC has detailed rules and procedures for default management and liquidity risk management. Quarterly default drills are conducted, and annual exercises involve FICC Board members, an external advisor, and relevant authorities (the SEC, FRB, Federal Reserve Bank New York, FDIC, Securities Investor Protection Corporation, and New York Department of Financial Services). Clearing members are involved in liquidity testing drills.

69. It is recommended that FICC considers addressing large stress test exposures through additional collateral requirements; in particular by provisioning for concentration risk. FICC is in the process of developing and implementing a concentration risk charge to address large,

uncollateralized stress exposures. This is a welcome step to address the concentrated nature of the CCP's exposure to the largest participants and their affiliates. FICC may consider whether this is sufficient to reduce the exposures of clearing members to large uncollateralized losses of others, as such stress exposures do not automatically result in additional collateral requirements, or whether it is warranted to require members with the largest uncollateralized stress exposures to post additional collateral, resulting in higher 'defaulter-pay' resources for the CCP and a lower risk of contagion in case of default. It is noted that these measures are compatible with the current structure of FICC's mutualized clearing fund. They would simply bring the collateral requirements of members in line with the risk they bring to the "Clearing Fund", thus providing better risk management incentives to members.

ICE Clear Credit (ICC)

70. ICC is the main global clearing facility for index, single-name and sovereign credit default swaps (CDS), with 16 banks as clearing members. The 5 largest clearing members accounted for more than 40 percent of open interest, 55 percent of margin, and 38 percent of the default fund in Q2 2019. These numbers illustrate the level of concentration of risks faced by the CCP.

71. ICC has a relatively robust risk management framework. Since 2015, ICC has streamlined its initial margin requirements. In addition to the 99.5 percent portfolio Value at Risk requirement, margin requirements include a jump-to-default charge, addressing exposure to default of CDS reference entities, a liquidity charge and a concentration charge for large positions. These add-ons are in line with PFMI Principle 6 which states that "other margin add-on charges may be explicitly designed to increase the amount of defaulter-pay resources rather than increasing mutualized resources." All cleared portfolios are subject to the jump-to-default charge, liquidity charge and concentration charge, which account on average for 20 percent of total margin and can reach 50 percent for large positions. These numbers illustrate the importance of accounting for liquidity and concentration risk in margin requirements, especially for less liquid instruments.

72. ICC communicates detailed information regarding its risk management methodology to clearing members. The methodology underlying the margin requirements is simulation-based and fairly easy to communicate. The documentation and information communicated to members includes the breakdown of margin requirements into various components and are sufficiently detailed to enable members to understand and forecast their collateral requirements.

73. Intercontinental Exchange contributes US\$50 million as "skin in the game" to the ICC default waterfall. This amount corresponds to 2.2 percent of the default fund and 0.2 percent of total default resources of the CCP. Default losses are affected to this layer after the defaulter's default fund and before any surviving member's default fund, as recommended in the Further Guidance to the PFMI (6.2.5). Non-default losses are not included in this waterfall and, in a recent rule filing (which is yet to be approved), ICC has proposed to allocate a certain amount of non-default losses to members. Recently, ICC has added an insurance policy covering losses resulting

from a member default up to \$50 million after consumption of ICC's skin in the game and before the mutualized default fund of any non-defaulting clearing members.

74. ICC maintains a default fund whose size is determined by the two largest uncollateralized exposures to clearing members. ICC operates daily stress tests based on historical and hypothetical stress scenarios, including, but not limited to, the Lehman Brothers default scenario and the Brexit scenario. The default fund is sized according to the magnitude of the two largest stress losses over initial margin (Cover 2). The allocation of default fund contributions across members is proportional to stress loss net of initial margin; if the default fund allocated amount is less than US\$20 million, then the member contributes the minimum amount of US\$20 million. It is noteworthy that in the last 2 years, between 7 to 10 clearing members have contributed this minimum amount, indicating that for these members stress loss does not significantly exceed initial margin. This outcome is an explicit choice of ICC risk management, whose preference leans towards a defaulter-pay model with conservative initial margins and a low degree of loss mutualization.

75. ICC has put in place in 2019 a well-defined default management procedure with an auction process open to non-members. This includes the ability of inviting non-members and buy-side firms to participate in CDS default auctions. Given the concentrated nature of CDS markets, the liquidation of the portfolio of a defaulted clearing member may be challenging. ICC's new default management procedure includes an initial phase of hedging followed by a CDS auction open to clearing members as well as non-members capable of bidding on the defaulted member's portfolio. This is an important feature which allows in particular large buy-side participants, some of whom are active in the CDS market, to facilitate the liquidation of large CDS portfolios. The CDS auction procedure is a blind auction designed to avoid bad bidding by exposing the lowest bidders to the first losses in the default fund ("juniorization"). Non-members are vetted and asked to pledge US\$10 million to the default fund before entering the auction. The pledged US\$10 million contribution to the default fund is returned to non-members, if their submitted auction bids are competitive.

The Options Clearing Corporation (OCC)

76. OCC is the sole U.S. CCP for exchange-traded U.S. equity and index options and also clears volatility derivatives. OCC is owned by five exchanges (representing three exchange groups), and it clears for 16 U.S. exchanges. It operates as a utility, with approximately 105 clearing members. OCC's governance involves clearing members at several levels, in particular through the Financial Risk Advisory Council which vets new products and model changes and the Operations Roundtable where the clearing members can drive industry change by raising concerns and making suggestions for improving efficiency and reducing risk.

77. Since 2013, OCC has overhauled its risk management procedures, addressing previous deficiencies. OCC's previous risk management framework had multiple deficiencies which were uncovered through internal audits, independent assessments and coordinated examinations by the SEC, CFTC and FRB and have been the subject of a settlement agreement with the SEC and the CFTC

in 2019. Under the directive of the SEC and CFTC, OCC has taken major steps to improve its risk management framework since 2013.³² These changes include (i) the adoption of a sound and transparent enhanced margin methodology to align with best practices in quantitative risk management and to provide increased transparency; (ii) the inclusion of volatility risk factors in margin requirements; (iii) the introduction of a liquidation charge in 2019; (iv) a new default fund and stress testing methodology; and (v) the appointment of additional staff with risk management expertise.

78. Enhancements to OCC's initial margin methodology, including the modeling of volatility risk and a liquidation charge, better addresses the risk of options portfolios. OCC's initial margin requirements are based on a 99 percent portfolio expected shortfall estimated using scenarios simulated with an econometric model. This model has been enhanced in 2016 by including volatility risk factors, especially relevant for option portfolios, and an updated estimation methodology. In 2019 OCC added a risk-based liquidation charge which accounts for the potential cost of liquidating a defaulting clearing member's portfolio. This liquidation charge includes a concentration charge for positions which are large compared to average daily trading volume. Inclusion of the liquidation charge has increased aggregate margin requirements by more than US\$1 billion. These add-ons are consistent with the recent guidance on the PFMI which states that "other margin add-on charges may be explicitly designed to increase the amount of defaulter-pay resources rather than increasing mutualized resources." Back-testing results indicate that OCC margin requirements adequately provision for the risk of member portfolios.

79. OCC's portfolio margin approach is enhanced by explicitly modeling stressed correlation estimates and an additional charge for concentrated risk exposures. OCC's portfolio margin framework allows for netting across all instruments, including options, futures and equity holdings, and relies on assumptions related to the correlation of the underlying risk factors, in particular a one-factor model for equity returns. OCC margin requirements include in addition (i) a "dependence charge" based on estimated losses under a "high correlation" and a "decorrelation" scenario; and (ii) a charge for idiosyncratic risk. The inclusion of these additional components reflects best practices in risk management and enhances the robustness of the portfolio margin with respect to deviations from model assumptions.

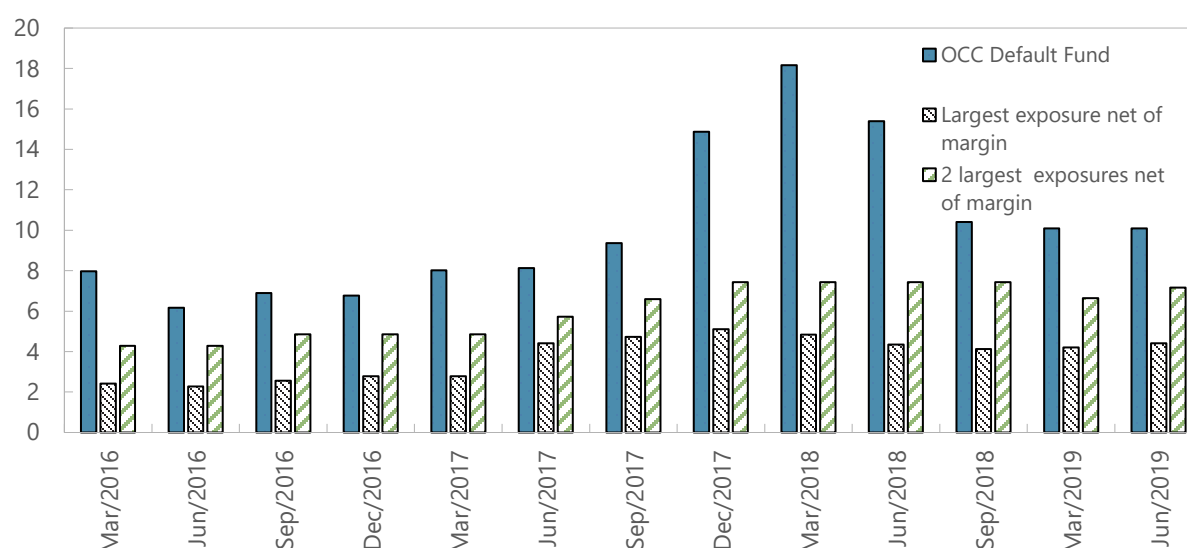
80. OCC has improved its stress testing procedures and maintains a default fund which size is determined by the two largest stress exposures in excess of margin. OCC operates daily stress tests and estimates the exposures of clearing members, in excess of required initial margin, to stress scenarios representing extreme equity market moves. Following large fluctuations in default fund levels in 2017–2018 (Figure 4), OCC has implemented a more stable stress test methodology, the use of excess margin on deposit has been dropped from stress exposure calculations, increased the coverage from Cover 1 to Cover 2 and put in place limitations on decreases in the default fund.

81. Allocations of default fund contributions are based on initial margin, volume, and open interest, not stress exposure over margin. Allocation of default fund contributions is not

³² See <https://www.sec.gov/news/press-release/2019-171>.

based on stress exposure over margin but proportional to a combination of initial margin and (to a lesser extent) volume, and open interest, a legacy practice inherited from futures markets. Initial margin does not represent the risk exposure of the CCP to a member in a stress scenario: this exposure is given by the stress exposure minus the member's initial margin. For non-directional portfolios, these two quantities are not necessarily proportional nor even commensurate. Stress loss in excess of initial margin, which measures the 'tail risk' a member brings to the CCP, can be very large for OCC members. As shown in Figure 4, in Q2 2019, the OCC default fund had a size of US\$10 billion; the largest exposure in excess of initial margin to a single member over the previous 12 months was US\$4.6 billion, and the sum of two largest exposures in excess of initial margin peaked at US\$7.1 billion. Under the current allocation scheme, members do not necessarily contribute to the default fund proportionally to the "tail risk" they bring to the CCP, which implies that the risk of members with largest stress exposures over margin is borne by other members.

Figure 4. United States: OCC Default Fund and Two Largest Exposures in Excess of Margin, 2016–2019
(in US\$ billion)



Source: OCC Public Quantitative Disclosures.

82. OCC has been communicating detailed information to clearing members and buy-side participants regarding its risk management methodology and the recent changes. The methodology underlying the margin requirements is well-documented and this information is communicated to clearing members and buy-side participants. The documentation and information communicated to members includes the breakdown of margin requirements into various components and is sufficiently detailed to enable members to understand their collateral requirements. Updates to the risk management methodology have been communicated to members on a regular basis.

83. OCC should continue working with its members and the regulators towards the approval and full implementation of the proposed changes to its risk management framework. Allocation of OCC's default fund contribution in line with members' stress exposures in excess of margin, rather than initial margin, may increase "defaulter-pay" resources and provide better risk management incentives to members.

C. Recovery and Resolution of CCPs

84. This section takes stock of recovery and resolution planning for CCPs in the U.S.

Despite all regulatory efforts to enhance CCPs' resilience there is a chance that in certain circumstances a CCP would no longer be viable or no longer able to meet legal or regulatory requirements. This may trigger the activation of recovery and/or resolution plans with the objective to sustain critical operations and services, while avoiding a bail out at the expense of taxpayers' money. Where recovery planning is the responsibility of the CCP itself and subject to regulation and supervision of the primary regulators in the U.S., if a systemically important CCP is resolved under DFA Title II the FDIC would be the resolution authority.

Recovery

85. All primary regulators have developed rules for recovery and wind down plans; implementation is supervised through the existing supervisory process. The FRB's Regulation HH §234.3, the CFTC's regulation 39.39, and the SEC's Rule 17Ad-22(e) sets out the requirements for recovery and wind down plans. In addition, primary regulators have developed relevant guidance. Recovery plans should include scenarios that could lead to uncovered credit losses or liquidity shortfalls.

86. These plans are subject to supervision by the authorities and are reviewed regularly. The FRB assesses recovery plans in a manner consistent with the overall supervisory approach for systemically important FMUs. CFTC staff created an examination plan for recovery plans and wind-down plans (for CME, ICCC, ICE U.S., Minneapolis Grain Exchange, and Nodal Clear). The SEC has reviewed CCA SRO rule filings and, where applicable, Advance Notices on recovery and wind-down plans and related filings and found them to be consistent with its rules (FICC, NSCC, DTC, OCC, LCH SA, ICE Clear Europe, and ICC).³³ CCPs need to review their plans annually (CFTC) or every two years (FRB) or earlier if material changes would affect the execution of the plans.

87. CCPs are in the process of further fine-tuning their recovery plans. CME and ICC completed their recovery plans in 2016 and are further developing them through rule changes. Both CCPs recently announced rule changes to add partial tear up and variation margin gain haircutting to their suite of tools. ICC also proposed rules that allocate the non-default losses to clearing

³³ The SEC has stated that it views recovery and wind-down plans, and material changes thereto, as proposed rule changes under Section 19(b) of the Exchange Act and, for systemically important clearing agencies, a proposed change to its rules, procedures, or operations that could materially affect the nature or level of risks presented by the CCP, therefore meaning that the SEC would have the opportunity to review any material changes to the plans in the future.

members. The recovery plans for FICC and OCC were approved in 2018, consistent with the compliance dates for the applicable SEC rule.

Resolution

88. In 2017, U.S. Treasury formally noted that if a systemically important FMU is resolved under DFA Title II, the FDIC would be the resolution authority.³⁴ Under Title II the FDIC has significant powers and flexibility in its role as receiver, including to enforce contracts of the CCP (recovery tools under the CCP's rules), set up a bridge CCP, transfer assets and liabilities to a bridge CCP, retain assets and liabilities of the CCP in the receivership, use the tools and resources provided by the CCP rules, sell assets of the receivership, and provide temporary backstop funding under certain terms and conditions. These powers are not exclusive, and an appropriate resolution process may entail using multiple powers in complementary ways.

89. The FDIC has taken on its responsibilities for CCPs through a dedicated group of staff that work on the development of resolution planning for U.S. CCPs in close cooperation with CCP supervisors. Focus is on enhancing the FDIC's understanding of possible scenarios, factors and options that may play a role during the resolution process, rather than on developing a defined resolution plan per CCP. Possible scenarios that the FDIC takes into account include (i) the default of one or more clearing members, possibly combined with financial market and/or operational stresses resulting in default losses; and (ii) operational, custodial, settlement or investment losses may result in non-default losses. Relevant factors include, for example, the legal and governance structure of the CCP, possible substitutes for certain products, managers, or clients, availability and type of financial resources, and access to central bank accounts. This approach allows for flexibility and tailoring of resolution actions to the specific CCP and circumstances, while trying to minimize procyclical effects of certain tools that may negatively impact financial stability.

90. Communication and coordination with other authorities is imperative as the FDIC does not have supervisory powers over CCPs. Unlike U.S. G-SIBs, CCPs are not required to file Title I resolution plans with the FDIC and therefore there is no equivalent process through which the FDIC can identify any deficiencies and have them remedied. The FDIC actively engages with the CFTC, SEC and FRB to understand the status and content of CCPs' recovery plans, their legal and governance structures, risk management frameworks etc. FDIC's is cooperating with the CFTC to develop scenarios, strategies and plans for CCPs of which the CFTC is primary regulator (CME, ICC), and expanded engagement with the SEC as primary regulator of FICC and OCC. At a cross-border level the FDIC participates in CMGs of non-domestic CCPs with relevance for the U.S. and is signatory in CMG cooperation agreements.

91. U.S. authorities are frontrunners in international standard setting. The FDIC is co-chair of the financial stability board (FSB) Cross-Border Crisis Management group for FMIs (fmiCBCM) that issued guidance on CCP resolution and is striving for international consensus on certain issues under discussion, such as the need for prefunded resources in resolution and the treatment of CCP equity.

³⁴ <https://www.treasury.gov/press-center/press-releases/Pages/sm0173.aspx>

The FDIC's domestic progress supports international development of guidance and implementation of the guidance in other jurisdictions.

92. Resolution for CCPs in the U.S. is still work in progress. Despite the meaningful steps listed above, work on CCP resolution in the U.S. – as is true in the rest of the world – remains at an early stage, particularly compared to bank resolution planning. Further work includes:

- a. Continued coordination with other domestic primary regulators and foreign regulators, for example, on recovery plans and CCP supervisory stress testing.
- b. Continue resolution planning for other CCPs.
- c. Setting up CMGs for other CCPs that have been determined to be systemically important in more than one jurisdiction and putting in place cooperation agreements.
- d. Develop policies on the appropriate use of resolution tools for default and non-default scenarios.
- e. Develop policies on the interaction between recovery and resolution plans, the trigger to resolution, and the process of “turning the key” in coordination with the FRB and U.S. Treasury.
- f. Address the specific features of different CCPs in resolution plans and through coordination with the primary regulator, notably legal structure (e.g., CME Inc combines the CCP and exchanges in one entity) and dependencies of CCPs on internal and external service providers (FICC's dependencies on BNYM; ICC's dependencies on services provided by other entities in the Intercontinental Exchange).

Liquidity Assistance

93. Under DFA Title VIII the FRB may provide emergency liquidity assistance to a designated FMU under certain conditions. The FRB may authorize a Federal Reserve Bank to provide emergency credit to designated FMUs in unusual or exigent circumstances and subject to certain statutory conditions and any additional conditions set by the FRB. Emergency credit can only be provided upon majority vote of the FRB after consultation with the Treasury (section 806b). The designated FMU would have to show that it is unable to secure adequate credit accommodations from other banking institutions.

D. Regulatory Opportunities and Challenges Regarding New Technologies

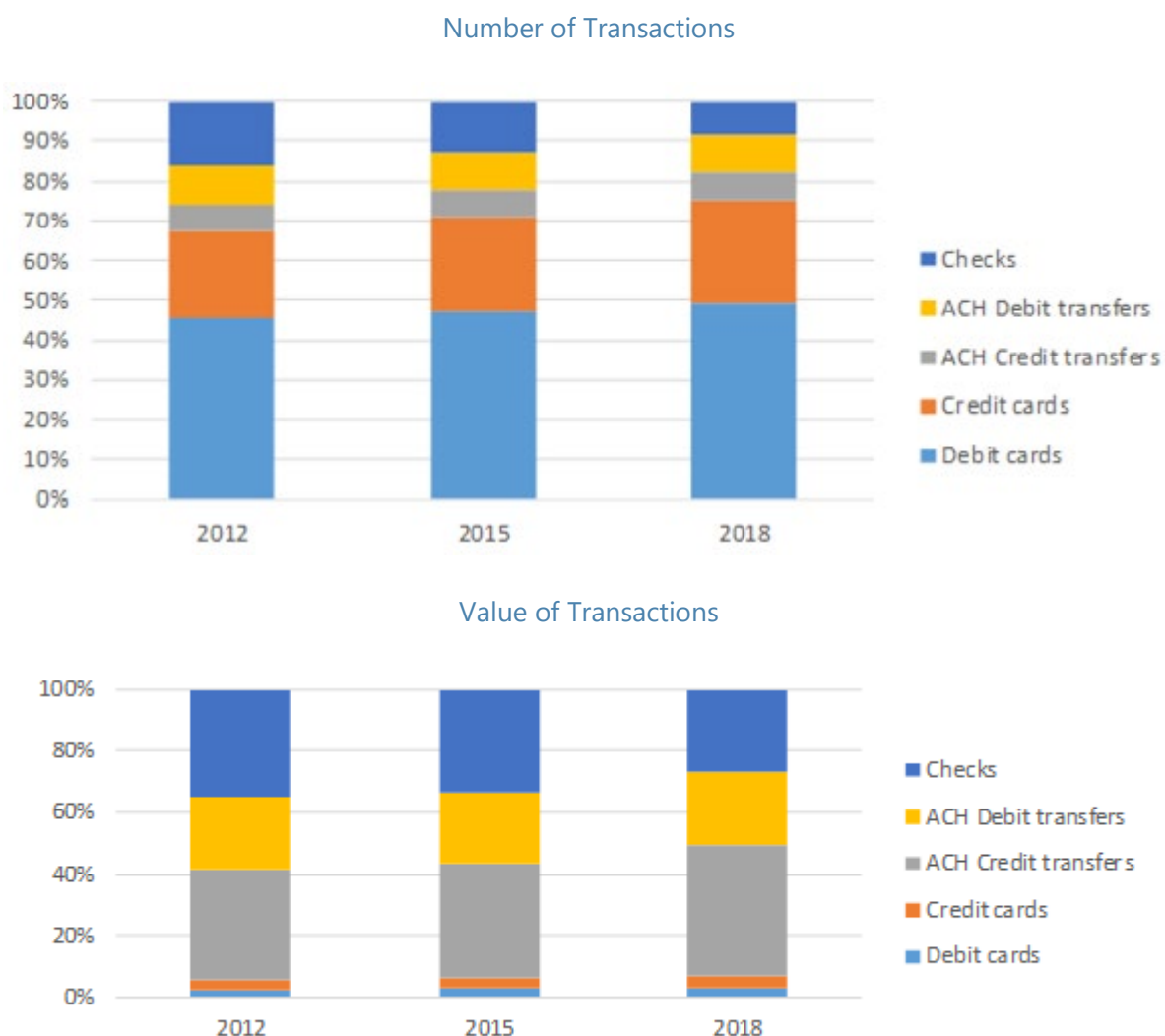
Regulation and Supervision of Non-Bank Payment Service Providers

94. The non-cash U.S. retail payment system has been traditionally dominated by depository institutions, card payment schemes and money transmitters. The most common non-cash payment types used by consumers and businesses in the U.S. comprise debit cards, credit cards, prepaid debit cards, private label prepaid cards, credit and debit transfers through ACH operators, and checks. These services are offered to customers by commercial banks, savings institutions and credit unions (collectively, “depository institutions”). General purpose card payments are made on accounts and cards issued by the depository institutions and processed by the card

payment schemes (e.g., Visa, MasterCard, American Express, and Discover). Amongst these payments instruments, the number and value of checks is declining, whereas the number and value of card payments and ACH debit and credit transfers is increasing (Figure 5). Payments are cleared and settled by banks through various clearing and settlement systems, for example, check clearing systems and ACHs, which are operated by the private sector or the Federal Reserve Banks. A more recent development has been the introduction of real-time payment systems for retail payments. The Clearing House (TCH) launched its Real-Time Payments network (RTP) in November 2017, whereas the FRB announced in 2019 that is developing a new real-time payments service called FedNow. FedNow is expected to be operational by 2023 or 2024. In addition to banks and card payment schemes, payments can also be transferred through money transmitters, which are generally non-bank firms that transfer or receive funds on behalf of individuals. The size of individual remittance transactions, both domestically and internationally, is relatively small (Appendix IV).

95. As in other countries, new non-bank players are entering the payments space offering innovative services to regulated financial institutions and to consumers and merchants. Some of the new (fintech and BigTech) entrants aim to compete with existing money transfer providers (Ripple, Calibra), while others aim to provide services complementing rather than competing with existing money transfer agents or card schemes, by offering mobile or digital wallets or by acting as payment gateways/user interfaces or aggregators (Stripe, Square, Amazon Pay, Apple Pay, Google Pay, Facebook Pay, Visa Checkout, PayPal). They try to establish themselves as additional layers such as user interfaces, payment aggregators or IT service providers, interposing themselves between banks or money transmitters and customers or merchants or providing services to existing payment service providers. In some instances, new user interfaces or aggregation services even add extra tiers on top of existing service providers to banks, such as card companies, leading to an even higher number of service layers in payments (Appendix V).

96. Only very few new players aim to challenge established payment infrastructures. Some new platforms aim to compete with payment systems such as TCH ACH, TCH RTP, and the Fedwire Funds Service, which are only accessible by banks. For example, RippleNet provides the software and the rulebook for a transfer mechanism, whereas financial intermediaries function as nodes and may partake in the consensus mechanism. These players offer a payment infrastructure outside the traditional U.S. payments system, both for US\$ and other (virtual) currencies and may be using DLT as a platform.

Figure 5. United States: Non-Cash Payments in the U.S.

Source: The 2019 Federal Reserve Payments Study.

97. So far, new payment services result in benefits for consumers and merchants; however, adding further fragmentation and complexity to the payments landscape. New services have resulted in benefits, such as ease of use, integration with accounting and inventory, and other benefits. So far, only cross-border costs seem to have decreased. At the same time very few new market entrants aim to offer end-to-end services (without relying on other companies to intermediate or provide services) to users. As a result, the U.S. payments landscape is becoming more distributed, which may decrease the risk of a single point of failure but potentially complicates the identification of vulnerabilities and undetected exposures (Appendix V).

98. Existing regulation and supervision of payment services is focusing on banks and money transmitters servicing customers. The license regimes for money transmitters are state-issued, and for banks federal or state-issued. Depending on the specific entities and how they are

organized, some aspects of payment services are subject to an activity-based regulation and supervision, such as federal consumer protection regimes, financial integrity, U.S. privacy laws, and cyber resilience. This includes requirements on AML/CFT and on suspicious activity reporting to federal authorities. Money transmitters are also subject to federal cyber resilience requirements; some states (e.g., New York) have enacted a more stringent cyber resilience regime or are currently working towards this (e.g., California). Federal and state banking authorities also have authority to supervise third-party service providers for services subject to bank regulations based on the Banking Services Company Act (BSCA). Historically, this structure has allowed for practices established at the state level to be deployed nationally, such as state consumer protection requirements that were established nationally by the Electronic Fund Transfer Act.

99. Various cooperation arrangements at the federal level are in place. The Federal Financial Institutions Examination Council's (FFIEC) is an interagency body responsible for prescribing certain uniform principles, standards, and reporting forms for federal and state examination for financial institutions supervised by the FRB, FDIC, the National Credit Union Administration (NCUA), the Office of the Comptroller of the Currency and CFPB to make recommendations to promote uniformity in the supervision of financial institutions. Additionally, the FFIEC has established a State Liaison Committee consisting of five representatives from state regulatory agencies that supervise financial institutions. The Chairman of the State Liaison Committee is a voting member of the FFIEC.

100. For interactions between state and federal level, the FSOC serves as a formal cooperation arrangement in place, in addition to state regulators' involvement with the FFIEC. Various cooperation arrangements between state and federal regulators are in place, governed by MoUs. For day to day supervision, states perform joint or alternating exams of several thousand state-chartered banks and credit unions with the FDIC, Federal Reserve, CFPB, and NCUA. In addition to state cooperation with the FFIEC, state examinations are shared with the FinCEN, and select predetermined companies' exams are shared with the CFPB. The states also share data with the Federal Reserve for systemic monitoring purposes.

101. Payment systems, card payment schemes, electronic wallet providers, payment gateways and aggregators do not require a bespoke license. Payment systems and card payment schemes are not subject to any mandatory license requirements. Electronic wallet providers, payment gateways and aggregators that perform money transmission services are required to hold money transmitter licenses in all states except Montana. Money transmission is in most states defined as selling or issuing payment instruments, selling or issuing stored value, and receiving money for transmission. Massachusetts does not include selling or issuing stored value in their definition of money transmission and subsequently does not have requirements for this activity. Bank license requirements may come into play only if the provider of these services at the same time engages in deposit taking. Card payment schemes not conducting licensable activities may be supervised indirectly through third party service provider requirements applicable to supervised banks. Likewise, payment gateways and aggregators that do not take custody of consumers' or merchants' funds are not subject to a specific regulatory regime; however, regulatory requirements may be imposed indirectly via the financial institutions using their service as a third party.

102. Exercising supervisory scrutiny on third party service providers may have limitations.

Banks are expected to manage all risks raised by third party relationships, including risks related to payments. Risks resulting from third party providers are addressed through contractual relations between regulated entities and third-party provider; under the Bank Service Company Act, federal banking agencies also may examine the services provided to such regulated entities. The requirements applicable to banks to address third party provider related risks do address certain aspects of operational risks and resilience, however, they cannot substitute for holistic oversight that covers the full range of risks that may arise in payment services or infrastructures (e.g., as laid out in the PFMI for systemically important payment systems (SIPS)). Furthermore, the ability of banks or money remitters to comprehensively understand and address the risks posed by non-regulated non-bank service providers may be limited, in particular if there are significant concentration risks or if certain third parties may acquire a dominant role in the market.

103. Risks specific to payment service providers, other than payment systems overseen by the FRB, are not fully addressed by dedicated regulatory requirements. The money transmission acts at state level are dating back to the 1970ies and are designed to protect consumer transactions sent as remittances, not payment infrastructure-like activities (such as offered by card payment schemes or certain DLT based platforms). Card payment schemes are not considered to be retail payment infrastructures and have not been designated as systemically important by the FSOC, despite processing payments with annual values of trillions of dollars through multilateral arrangements based on common rulebooks (and despite e.g., Visa considering itself to be a global payment system). RippleNet is designed as a wholesale payment system without being subject to payment system specific requirements, other than requirements posed by banks. There is, however, some limited scrutiny e.g., by FinCEN and the Federal Reserve. There is no dedicated regulatory regime for new types of digital services, such as gateway services, APIs, NFC access or digital wallet services. Consequently, opinion letters or guidance by authorities to provide certainty on the interpretation of existing rules to these new types of services may be needed. Some authorities (e.g., the State of California) make ample use of this tool, others are less flexible. This fragmentation may affect predictability of regulatory outcomes while specific new kinds of risks may not be addressed. Furthermore, requirements may no longer be suitable for new digital services, e.g., information fields in reporting requirements may not fully suit services such as token payments or may be obsolete (e.g., physical posting of license or form requirements for receipts). Finally, some market participants have cited the absence of a clear regime for the acquisition, use and sharing of data as an impediment for the development of new services.

104. Also, network or network-based application service providers (such as RippleNet) are not subject to specific regulatory requirements and do not need a specific license. Certain new services such as the offering of digital platforms/networks (e.g., RippleNet) offer services that are very similar to the ones offered by traditional payment messaging systems, without being subject to activity-specific regulation and oversight. Moneygram is using RippleNet to channel remittance payments. Digital products such as DLT networks are also offered to be used as the technical platforms on which payment arrangements operate, with the provision of network services to financial institutions being based on non-negotiable rule books and conditions. Certain service

offerings (such as Centre) provide ready-to-use platforms for the settlement of stablecoin transactions between multiple participants as a proxy for account-based money settlements, again without being subject to system risk specific requirements.

105. Risks may emerge as a result of interdependencies of critical third-party providers. At the federal level, banking agencies undertake service provider examination programs (e.g., under the BCSA), which may allow to identify certain risks to banks resulting from interdependencies with service providers. However, within the highly tiered US payment ecosystem, further interdependencies may arise, e.g., by combinations of services offered by different service providers, some of which may become critical for a particular service. The identification of such wider interdependency or concentration risks impacting banks, money transmitters or their service providers should be clearly allocated within the current regulatory remit of state and federal authorities.

106. The state regulatory framework for money transmitters is leading to inefficiencies. Money transmitter supervision is mainly state based and distributed over 49 states and 5 territories; 1 state (Montana) does not have a specific money transmitter regulation. The process of obtaining a complete set of state licenses is cumbersome and time consuming (and may take up to 6 years). Resources of supervisory bodies vary as does relevant expertise. California has 28 FTE supervising more than 100 money transmitters, some of which are already large, including some Fortune 500 companies. The situation in New York is roughly similar. Some states conduct off-site examinations only, but many states conduct on-site examinations. Money remitters can be subject to multiple inspections per year. Deadlines, reporting requirements, and financial risk requirements differ from state to state, although in practice money remitters aim to comply with the most stringent standards (seen to be California and New York). No firm reported that the differences in content of the state regimes would prevent a nation-wide establishment of a service, but the amount of additional due diligence can be significant. Unlike for banks, there is no optional Federal license regime available for non-bank payment service providers offering nationwide services.³⁵

107. The state level requirements for money transmitters do not cover all relevant prudential requirements. Money transmitter requirements cover five core elements: management, governance, financial risk, liquidity and capitalization. Proportionality of requirements (such as for capitalization) is not usually part of the regulatory rules but may be addressed through the examination process. Stored value, sale of payment instruments, and money transmission activities are subject to a combination of requirements: (i) segregation and at least 1:1 cover; (ii) additional buffers (surety bonds, minimum net worth requirements); and (iii) permissible investments. These requirements may not be very risk sensitive and in extreme cases result in a loss of consumer funds.

³⁵ The special purpose national bank (SPNB) charter (generally known as “fintech charter”) proposed by the Office of the Comptroller of the Currency would provide for an optional Federal license regime. At this stage, the SPNB charter is subject to litigation with the New York Department of Financial Services claiming that the Office does not have the authority to grant SPNB charters. A New York district court ruled in favor of the New York department. The Office has now filed a notice of appeal to the Second Circuit, seeking review of the New York district court’s decision. An additional suit regarding the SPNB charter, filed by the Conference of State Bank Supervisors, has been dismissed in favor of the Office.

The rules would benefit from including e.g., diversification requirements for the holding/investment of funds in more than one financial institution, FDIC-type of insurance for stored value cards.

108. State authorities have undertaken important efforts to increase efficiency; however, these are voluntary. There are multiple initiatives on-going to enhance cross-state coordination and standardization. The Conference of State Bank Supervisors (CSBS) has announced Vision 2020, an initiative that intends to modernize and harmonize the state regulation of non-bank financial companies and make better use of technology to coordinate the activities of state financial services supervisors. Licensing initiatives include the Multistate MSB Licensing Agreement and enhancements to NMLS functionality. NMLS is now used by 46 states for money transmission licensing, with a 47th expected in April 2020. Information sharing processes have been in place for over a decade, resulting in hundreds of multistate exams, including 82 in 2019. An examination work program has coordinated supervisory requirements, including exam procedures for cryptocurrency transmitters, which is integrated into the State Examination System. An accreditation program has been developed, and the first accredited states are expected in 2020. Multistate exam teams and information sharing are backed by coordination statutes and memoranda of understanding. All multistate exam teams have a lead state, which serves as Examiner in Charge, and coordinates all participating states.³⁶ CSBS has also developed a Model Data Security Law, Model Data Security Guidance, and a corresponding cybersecurity exam program and training that can be used with or without adoption of the law or guidance.³⁷ Despite these important coordination initiatives, standardization efforts are voluntary, and model laws are not binding. Informally states may accept the findings of another state authority for their purposes, but there is no concept of passporting a state license.³⁸ There are restrictions in some authorities' statutes that would not allow changing the current approaches, thus, there are limitations as to what could be achieved through these voluntary coordination exercises.

109. Despite gaps in the regulatory regime, currently the risks are not of a systemic nature. Apart from the ACHs and card scheme providers, current payment service providers are still relatively small, and their customers have access to many alternatives. Also, the regulatory framework and processes, whilst in some instances being cumbersome and necessitating significant due diligence to comply with various potentially overlapping requirements, does not seem to inhibit the emergence of new players in the payment space.

110. The current regulatory set-up may, however, not be fully future proof. Payment service providers which are new market entrants, and currently relatively small, may have the potential to acquire a significant market share within a short span of time. Without bespoke regulatory regimes for certain activities with a particular risk profile, systemic risk could build up and customers may be insufficiently protected. For existing players such as card schemes, which process considerable values and volumes of payment transactions, specific payment service/system risk, including

³⁶ <https://www.csbs.org/sites/default/files/2017-11/MSB-ProtocolI010512.pdf>.

³⁷ <https://www.csbs.org/unidyr9s2>

³⁸ Passporting is being discussed in the U.S. Treasury Report, 'A Financial System That Creates Economic Opportunities - Nonbank Financials, Fintech, and Innovation', July 2018.

concentration risks, may remain undetected through applicable indirect supervision for third-party service providers.

111. A dedicated regulatory regime suited for certain types of new or existing payment services may help prevent the building up of risks within and outside the regulatory perimeter. The FSOC has recognized the need for authorities to evaluate potential risks to payment system integrity and operational risk, among other, as well as appropriate approaches to reduce regulatory fragmentation, while supporting the benefits of innovation.³⁹ In view of the possibility of new and existing services becoming systemic in the future, the circumstances under which a payment service provider or its payments, clearing and settlement activities could be considered as systemically important under the DFA Title VIII could be clarified.

Distributed Ledger Technology (DLT)

112. DLT can be used as a platform for the clearing and settlement of value, including fiat currency, stable coins, virtual assets, derivatives, and securities. In the longer term, DLT platforms may potentially offer efficiency gains through digitization, integration and automatization of processes that may be more complex to achieve using traditional technology. DLT platforms used by FMIs or payments service providers are generally permissioned, which facilitates compliance with regulatory requirements, such as requirements on AML/CFT and know-your-customer (KYC). The technology can be proprietary or based on ‘open source’; the latter is seen to be more resilient to bugs and attacks due to multiparty scrutiny.

113. Adoption of DLT platforms to perform clearance and settlement activities in the U.S. has been limited. So far, application has been mainly in functionalities that are non-core to clearing and settlement activities, notably for the DTCC Trade Information Warehouse (TIW), which is a record retention and asset servicing infrastructure for OTC derivatives, and CLSNet, which is a netting calculator (calculation agent) using smart contracts for non-CLS currencies without offering settlement. Here, DLT is deployed on premise, to mitigate complexities that may arise from outsourcing or cloud usage. So far, adoption by FMI participants is in an early stage and participants link through APIs.

114. Lack of maturity and standardization in DLT may explain limited take-up. The technology is still immature (although quick advancements are made), having issues of scale and latency which make current DLT software generations not suitable for the high-volume core settlement activities of FMIs. Smart contracts are seen to be not sufficiently developed or even unsuitable for complex processes, e.g., the handling of a default of a CCP participant. Cyber resilience, although theoretically strong due to the decentralized structure and immutability of records, is not sufficiently proven in practice. A wider adoption of DLT across FMIs may be also impeded by the reluctance to replace legacy systems, resulting currently in lack of critical mass.

³⁹ FSOC Annual Report 2019, Para. 3.6.

115. A lack of standardization across different DLT variants may lead to increased fragmentation in the broader clearing and settlement landscape, with the emergence of closed loop solutions. Achieving interoperability of different DLT services and platforms, through APIs and special protocols, appears to be a critical goal, including for the support of delivery versus payment arrangements. Some firms state that they are working on interoperability protocols, which would act as a kind of interface between different ledgers.

116. The existing regulatory framework is considered to be largely technology neutral. Regulatory requirements may cover DLT platforms through (i) operational requirements for FMI (in case of in-house/on premise DLT) or (ii) through third party service provision supervision (in case of outsourcing). Vetting of vendor management programs is possible, using industry best practices such as National Institute of Standards and Technology (NIST) and International Standardization Organization (ISO). There do not appear to be major differences in the risk profile of DLT compared to traditional technologies; however, some particularities may arise from governance models, cyber resilience aspects and transparency of data in some DLT designs, which require dedicated supervisory attention on a case-by-case basis. In case of DLT outsourcing or deployment on cloud, issues concerning exercising control and risk management by financial institutions using DLT may arise.

117. Further adoption of DLT requires authorities to continue monitoring and to keep pace with developments. Regulators are monitoring initiatives primarily through entity-based supervisory activities and interagency coordination. Furthermore, all primary regulators of designated FMI (CFTC, FRB and SEC) have innovation labs that are used for close monitoring of developments. This also allows for further scaling up of DLT knowledge and expertise where needed and developing a wider perspective, which is imperative to identifying and addressing risks. Sandbox like solutions may be considered to allow innovation to develop with close monitoring by authorities and/or their staff. For example, through a no-action letter issued at the staff level (not by the Commission), SEC staff advised Paxos Trust Company, LLC it could operate a new DLT securities settlement system during a pilot period, without registering as a clearing agency and without the staff recommending an enforcement action during that period. However, not all authorities appear to be comfortable with the provision of providing special regulatory treatment to new market entrants or new technologies. Potential is seen for industry engagement and cooperation to foster standardization.

118. Attention should be placed on the potential emergence of new risks in connection with the deployment of DLT. The wide-spread use of DLT may result in a highly complex environment with strong reliance by FMI on multiple third-party services, including the possible combination of using major providers of DLT platforms and network services, DLT based third-party applications and protocols and cloud services, which may raise issues of concentration and lack of substitutability, in particular if a particular platform or network service would reach a critical threshold. Furthermore, attention may be given to data handling and data protection.

SupTech

119. The deployment by authorities of innovative technology for supervisory purposes (SupTech) is in some respects limited. Many authorities are looking into the potential, with actual deployment still at a very early and limited stage. There appears to be significant potential in the areas of automatization of data reporting, monitoring processes, and pattern detection. The SEC has already rules in place that require security-based swap data repositories (SDRs) to file financial reports in the eXtensible Business Reporting Language (XBRL) format, which is an open standard of a machine-readable format used in multiple jurisdictions. This allows the SEC staff to review and analyze data submissions more effectively. Further, leveraging existing implemented industry standardization of message formatting (e.g., Financial Information Exchange (FIX), Financial products Markup Language (FpML)) would lower the implementation burden on the side of supervised institutions and might allow to reap wider benefits of SupTech by facilitating a potential cross-agency sharing and aggregation.

120. Authorities cooperate through the Global Financial Innovation Network (GFIN) and other fora to share information on innovations in financial technologies. Over the past six months, the CFTC, the FRB, the FDIC, the Office of the Comptroller of the Currency, the SEC, the New York Department of Financial Services, the State of Wyoming, and the Arizona Attorney General announced joining the GFIN. By joining over 50 other financial authorities, central banks, and international organizations from around the globe that are members of the GFIN, U.S. authorities may contribute to knowledge-sharing on innovation in financial services, advance financial and market integrity, consumer and investor protection, financial inclusion, competition, and financial stability.

Appendix I. FSAP 2015 Recommendations and Follow-Up

Recommendations of U.S. FSAP 2015 for FMIs ¹	Current status
Given the complex framework of FMIs in the United States more robust disclosure of the applicable regulatory and supervisory framework for different FMIs, including an explanation for the different determinations, would bring additional transparency.	Completed. The US framework has been explained in a range of documents, including the CPMI-IOSCO implementation monitoring documents.
It is recommended to promptly finalize implementing the PFMI standards, through completion of rules by the SEC and implementation of these rules by the relevant FMIs.	Completed. The SEC issues CCA rules in 2016.
Ensuring sufficient number of qualified staffs will allow adequate enforcement of the enhanced rules.	Number of staffs increased at all agencies; still need for additional resources at the CFTC.
U.S. authorities should continue their discussions with relevant foreign authorities to address conflicts of law and help level playing-field concerns.	Ongoing; the CFTC has proposed new rules for deference to supervision of non-domestic CCPs providing services in the U.S.
<p>While identification of system-wide risks in relation to FMIs is currently underway, it would benefit from a more systematic approach. Identification of these risks, within authorities as well as within the FSOC structure, could further contribute to the effectiveness of the systemic risk oversight within the United States. Among the issues meriting further analysis are:</p> <p>FMIs' dependency on banking services of only a few G-SIBs: U.S. FMIs are highly dependent on services of a few commercial banks and the failure of such a service provider would pose severe distress on all or a large majority of the FMIs in the United States.</p> <p>Membership of banks in multiple FMIs: Various financial entities participate in several or all FMIs. The default of such</p>	<p>Important progress:</p> <p>FSB Study Group on Central Clearing Interdependencies.</p> <p>CFTC Stress testing of CCPs in 2016, 2017 and 2019.</p> <p>Resolution plans of banks providing services to CCPs should explicitly address these interdependencies.</p> <p>Further work needed given the concentration in clearing member services at most CCPs. No changes in policy or regulations on procyclicality.</p>

¹ See <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/United-States-Financial-Sector-Assessment-Program-Systemic-Risk-Oversight-and-Management-43057>.

Recommendations of U.S. FSAP 2015 for FMIs ¹	Current status
<p>a participant may cause severe distress at one or more FMIs and exacerbate stressed market conditions.</p> <p>Pro-cyclicality of margin calls: Collateral requirements imposed on clearing members can increase abruptly in times of sudden market volatility and exacerbate market pressures.</p> <p>Cross-margining arrangements: U.S. CCPs manage the risks related to their cross-margining arrangements as part of their regular credit and liquidity risk management framework. Although exposures of cross-margining arrangements are currently modest, risks may build up and be a channel through which credit and liquidity shocks can be distributed.</p>	<p>Proposed new rules for DCOs and SIDCOs includes requirements for cross-margining arrangements.</p> <p>In 2017, CME, LCH Ltd and Eurex Clearing conducted a default management drill.</p>
<p>It is recommended to develop a systematic approach for identifying and responding to systemwide risks related to interdependencies and interconnections among FMIs, within individual supervisory authorities and the FSOC structure.</p>	<p>In progress: the FRB, CFTC, and SEC are considering a supervisory stress test for CCPs.</p>
<p>It is recommended that central bank services be offered to designated FMUs, i.e., access to Federal Reserve accounts and settlement in central bank money, consistent with avoiding undue credit, settlement or other risk to the Fed.</p>	<p>All designated CCPs have access to a deposit account for at least cash collateral for house positions.</p>
<p>U.S. authorities are therefore encouraged to continue efforts toward and monitoring of CCP robustness, through enhanced risk management standards and robust supervision.</p>	<p>Ongoing. The CFTC proposed enhanced rules for DCOs.</p>
<p>U.S. authorities are encouraged to formalize and test crisis management arrangements for designated FMUs, where appropriate both domestically and internationally.</p>	<p>In progress. FBIIC includes crisis management arrangements for operational incidents. CMGs allow for international coordination. Dedicated crisis communication frameworks needed which are dedicated to financial or operational incidents at designated FMIs.</p>
<p>Recovery and resolution planning for FMIs should be further developed in line with international guidance.</p>	<p>Ongoing. Important progress; more is needed.</p>

Appendix II. CPMI-IOSCO Implementation Monitoring Assessment Results for Level 2 for the United States¹

Publication	Assessment results for the United States
CPMI-IOSCO, U.S. Level 2 assessment Report on CSDs/SSSs and PSs (May 2019).	The Assessment Team (AT) concluded that the United States has adopted measures applicable to systemically important PSs and CSDs/SSSs that are complete and consistent with the PFMI (highest rating for all).
CPMI-IOSCO, U.S. Level 2 Assessment Report on CCPs and TRs (February 2015).	<p>CFTC CCPs: measures to adopt PFMI are complete and consistent, except for Principles 7, 16 and 20 (broadly consistent) and Principle 12 (partly consistent).</p> <p>SEC CCPs: measures to adopt PFMI are complete and consistent, except for Principles 2,3,7,8,14,16,20 and 21 (broadly observed) and Principles 9 and 17 (partly observed).</p> <p>FRB CCPs: measures to adopt PFMI are complete and consistent, except for Principles 14 and 20 (broadly consistent). As noted in its detailed response, the FRB addressed the technical gap identified by CPMI-IOSCO regarding Principle 20 in its final amendments to Regulation HH.</p>
CPMI-IOSCO, Assessment and review of application of Responsibilities for Authorities (November 2015).	<p>For PS: The FRB is assessed to observe all Responsibilities.</p> <p>For CCPs: The CFTC and the FRB are assessed to observe all Responsibilities; the SEC is assessed to observe Responsibilities A, B, C, and E; and broadly observe Responsibility D. At the time of the Responsibilities assessment, the SEC's CCA rules were in proposal stage. These rules have since been adopted.</p> <p>For CSDs/SSS: The FRB is assessed to observe all Responsibilities; the SEC is assessed to observe Responsibilities A, B, C, and E; and broadly observe Responsibility D. At the time of the Responsibilities assessment, the SEC's CCA rules were in proposal stage. These rules have since been adopted and were assessed as part of the 2019 Level 2 assessment.</p>

¹ Level 2 assesses whether, and to what degree, the content of the legal and regulatory or oversight framework, including rules and regulations, any relevant policy statements, and other forms of implementation, is complete and consistent with the principles and responsibilities.

Appendix III. FMI Statistics

Appendix Table 1. United States: Statistics on FMIs
(2018, unless indicated otherwise)

System	Number transactions (million)	Value of transactions (US\$ trillion)	Number of participants
CHIPS	115	418	44 (2019)
CLS ¹	224	1,481	73
Fedwire Funds	158	716	5,999
NSS	1	21	1,100
Federal Reserve check clearing	4,876	9	N/A
Check clearing private	6,150	10	
EPN (credit transfers, direct debit)	9,744	25	N/A
FedACH (credit transfers, direct debit)	13,226	27	N/A
DTC (2017)	368	114	298, of which 27 foreign
Fedwire Securities Service (2017)	16	299	1,813
	Number of contracts/transactions (million)	Value of transactions (US\$ trillion)	Number of participants
FICC	50	1,247	275, of which 31 foreign
NSCC	26,741	320	146, of which 3 foreign
OCC	5,242	N/A	105
CME	33,863	33 (OTC derivatives only)	Base: 61 IRS: 27
ICE Clear Credit	13,939	13	29, which are 16 bank groups

¹ Based on the assumption of 251 business days.

Sources: BIS, Futures Industry Association, annual report CLS, disclosure frameworks CME, ICC, and OCC.

Appendix Table 2. United States—CCP Size of Financial Resources

(September 2018, US\$ billion)

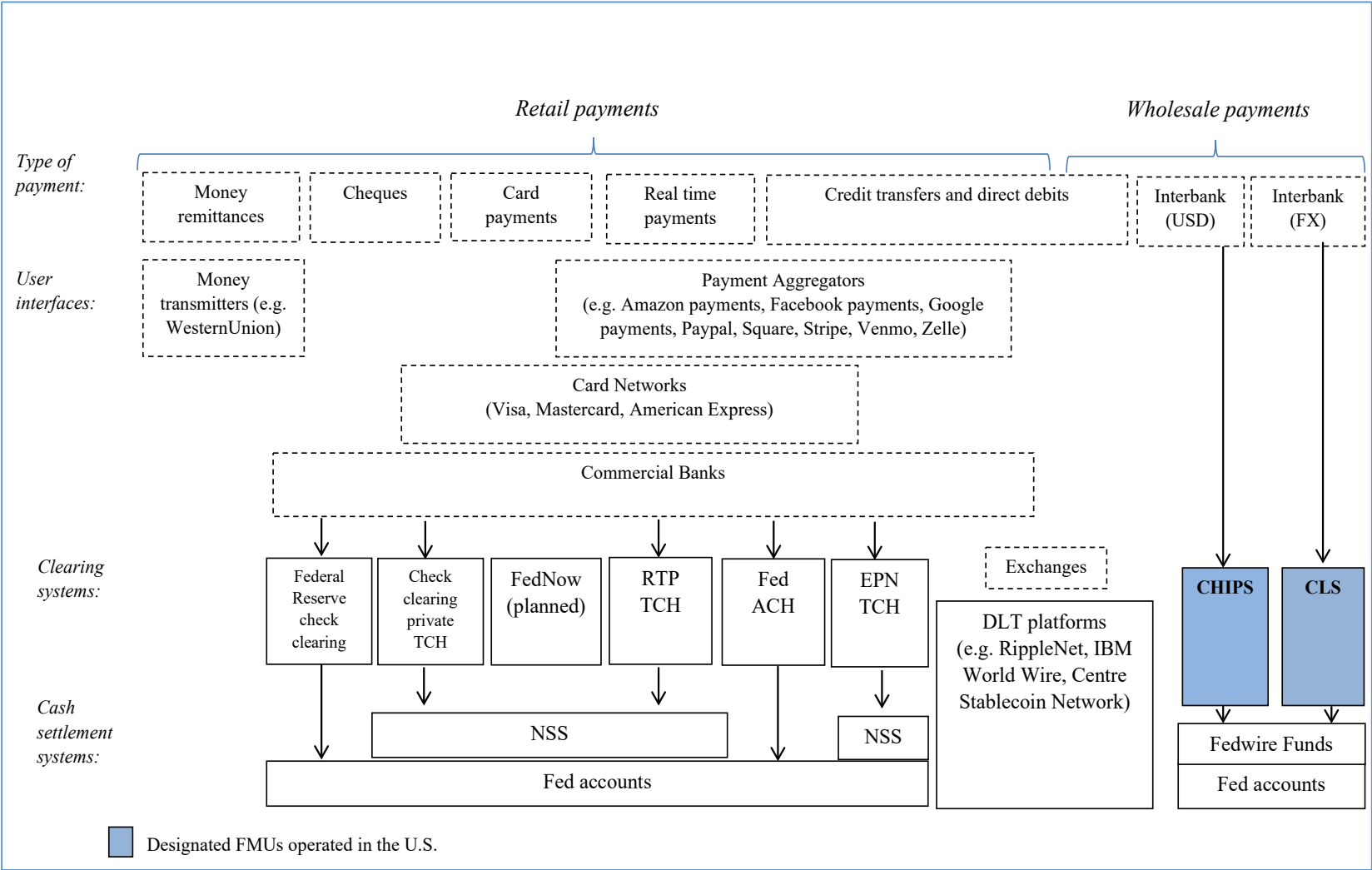
	CME Base	CME CDS	CME IRS	CME Total	DTCC GSD	DTCC MBSD	ICE ICC	OCC
Initial Margin (IM)								
IM held in cash and cash equivalents (post haircut)				33.3	0.0	0.0	19.2	4.0
<i>Cash deposited at a central bank of issue of the currency concerned - client</i>				25.1	0.0	0.0	7.0	
<i>Secured cash deposited at commercial banks (including reverse repo) - client</i>				0.1	0.0	0.0		
<i>Unsecured cash deposited at commercial banks - client</i>				3.1	0.0	0.0	1.5	
<i>Cash deposited at a central bank of issue of the currency concerned - house</i>				2.7	0.0	0.0	7.6	
<i>Secured cash deposited at commercial banks (including reverse repo) - house</i>				0.2	0.0	0.0	1.9	
<i>Unsecured cash deposited at commercial banks - house</i>				2.2	0.0	0.0	1.1	
IM held as government securities				82.4	0.0	0.0	11.9	1.3
Total liquid IM				115.7	0.0	0.0	31.1	5.3
IM held as qualifying liquid resources				122.6	0.0	0.0	31.1	5.3
Total actual IM held				127.7	0.0	0.0	31.1	6.0
Prepaid guarantee fund (GF)								
GF held in cash and cash equivalents	0.5		0.5	1.0	4.6	1.5	2.4	5.1
<i>Cash deposited at a central bank of issue of the currency concerned</i>	0.0		0.0	0.0	2.6	0.9	1.9	4.9
<i>Secured cash deposited at commercial banks (including reverse repo)</i>	0.0		0.0	0.0	0.4	0.1	0.0	0.0
<i>Unsecured cash deposited at commercial banks</i>	0.5		0.5	1.0	1.7	0.6	0.5	0.2
GF held as government securities	3.6		3.3	6.9	12.9	5.4	0.2	5.3
Total liquid GF	4.1		3.8	7.9	17.6	6.9	2.5	10.4
GF held as QLR	4.1		3.8	7.9	17.6	6.9	2.5	10.4
Total GF held	4.1		3.8	7.9	17.6	6.9	2.5	10.4
Total IM + GF held				135.6	17.6	6.9	33.6	16.4

Source: Disclosure frameworks of individual CCPs available on their websites.

Appendix IV. Non-Cash Payment Service Statistics

Noncash payment type	2015		2018		
	Number (billions)	Value (\$trillions)	Number (billions)	Value (\$trillions)	Number of cards (billion)
Debit cards	67.8	2.47	86.5	3.10	0.3
<i>Visa</i>	<i>na</i>	<i>na</i>	<i>45.0</i>	<i>1.73</i>	
<i>Mastercard</i>	<i>na</i>	<i>na</i>	<i>20.0</i>	<i>0.73</i>	
Credit cards	33.7	3.05	44.7	3.98	1.1
<i>Visa</i>	<i>na</i>	<i>na</i>	<i>25.0</i>	<i>1.96</i>	
<i>Mastercard</i>	<i>na</i>	<i>na</i>	<i>10.0</i>	<i>0.81</i>	
<i>Amex</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>0.77</i>	
<i>Discovery</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>0.14</i>	
ACH Credit transfers	10.0	32.48	11.9	40.87	
ACH Debit transfers	13.9	19.60	16.6	23.28	
Checks	18.1	29.18	14.5	25.80	
Mobile and digital wallets ¹	1.3	0.05	na	na	
Domestic money transfers	0.3	0.10	na	na	
International money transfers	0.1	0.03	na	na	
DLT platforms	na	na	na	na	
¹ The mobile wallet data (as reported in FRPS) are not mutually exclusive of card payments, or in some cases, ACH or Check payments. Sources: Aggregated data is from the 2019 Federal Reserve Payments Study and the 2016 Networks, Processors, and Issuers Payments Surveys (NPIPS). The statistics on individual debit and credit cards are from The Nilson Report.					

Appendix V. U.S. Landscape Non-cash Payment Service Providers



Source: IMF Staff.