INTERNATIONAL MONETARY FUND

MONETARY AND CAPITAL MARKETS DEPARTMENT

Strengthening Capital Markets Regulation—National Progress and Gaps

Prepared by Cristina Cuervo, Jennifer Long, and Richard Stobo

DP/2022/012

2022
JUN

DEPARTMENTAL PAPER

INTERNATIONAL MONETARY FUND

MONETARY AND CAPITAL MARKETS DEPARTMENT

DEPARTMENTAL PAPER

Strengthening Capital Markets Regulation—National Progress and Gaps

Prepared by Cristina Cuervo, Jennifer Long, and Richard Stobo

Cataloging-in-Publication Data
IMF Library

Names: Cuervo, Cristina, author. | Long, Jennifer A., 1972-, author. | Stobo, Richard, author. | International Monetary Fund, publisher.
Title: Strengthening capital markets regulation – national progress and gaps / Prepared by Cristina Cuervo, Jennifer Long, and Richard Stobo.
Other titles: National progress and gaps | International Monetary Fund. Monetary and Capital Markets Department (Series).
Description: Washington, DC : International Monetary Fund, 2022. | 2022 July. | Departmental Paper Series. | DP/2022/012 |Includes bibliographical references.
Identifiers: ISBN 9798400208072 (paper)
9798400210983 (ePub)
9798400211089 (Web PDF)
Subjects: LCSH: Capital market. | Financial institutions -- State supervision.
Classification: LCC HG4523 .C8 2022

The authors would like to thank Tobias Adrian and Aditya Narain for their support and intellectual direction, Marina Moretti and other IMF colleagues for inputs and feedback, and Carol Franco for excellent support. This paper was prepared by a team composed of Cristina Cuervo, Jennifer Long and Richard Stobo, led by Jay Surti, and drew on work by Argyris Kahros, Jennifer Elliott, and Eija Holttinen.

Publication orders may be placed online or through the mail:
International Monetary Fund, Publication Services
P.O. Box 92780, Washington, DC 20090, U.S.A.
T. +(1) 202.623.7430
publications@IMF.org
IMFbookstore.org
elibrary.IMF.org

Contents

FIGURE

BOX

This page intentionally left blank

Acronyms and Abbreviations

AE	Advanced Economies
ATS	Alternative Trading Systems
AUM	Assets Under Management
CCPs	Central Counterparties
CFTC	Commodity Futures Trading Commission
CNAV	Constant Net Asset Value
CPMI	Committee on Payments and Market Infrastructure
CSDs	Central Securities Depositories
DeFi	Decentralized Finance
DLT	Distributed Ledger Technology
ECB	European Central Bank
ESG	Environmental, Social, and Governance
ETFs	Exchange-Traded Funds
EU	European Union
FATF	Financial Action Task Force
FMIs	Financial Market Infrastructures
FSAP	Financial Sector Assessment Program
FSB	Financial Stability Board
GFC	Global Financial Crisis
IOSCO	International Organization of Securities Commissions
LIBOR	London interbank offered rate
MCM	Monetary and Capitals Market
MMFs	Money Market Funds
NBFI	Nonbank Financial Intermediation
OTC	Over-the-Counter
PFMI	Principles for Financial Market Infrastructures
SEC	Securities and Exchange Commission
SROs	Self-regulatory Organizations
SupTech	Technology Used for Supervision

This page intentionally left blank

Executive Summary

Capital markets play an important role in supporting economic activity, and their resilience is vital to financial stability. Capital markets are playing an increasingly central role in financing the global economy and hedging economic risk, especially with the significant and rapid growth of nonbank financial intermediation (NBFI) over the last two decades.[1] The global financial crisis (GFC) and subsequent developments spotlighted key vulnerabilities and shock transmission channels in capital markets. The resulting regulatory reform agenda covered areas such as over-the-counter (OTC) derivatives markets, liquidity in money market funds (MMFs) and other investment funds, and the regulation of financial market infrastructures (FMIs), including central counterparties (CCPs).

This departmental paper distills key findings regarding the regulation and supervision of capital markets from IMF bilateral financial surveillance. Its analysis is based on assessments conducted during 2015–20, in the context of the Financial Sector Assessment Program (FSAP), of risks, vulnerabilities, oversight, and crisis management of these markets, including their infrastructures, intermediaries, and participants. Since the GFC, the FSAP itself has evolved, with an enhanced focus on financial stability. Correspondingly, besides core issues related to the institutional framework for regulation and supervision, the FSAP has focused on the "financial safety net" to manage the failure of a significant counterparty; the resilience of CCPs, whose growing prominence reflected the incentivization of central clearing by the post-GFC regime; asset management, notably the vulnerability of MMFs and other investment funds, particularly bond funds; and trading venues, with a focus on whether the scope of regulation adequately covered equity, debt, and derivatives markets, besides traditional exchanges.

Progress in reform areas identified during the GFC has been significant, albeit further work is needed on reducing procyclicality and on safety nets and crisis management arrangements. This work has become urgent in view of the rapid growth of NBFI. On asset management, closing regulatory gaps is vital to sizing financial stability risks in some countries even as most securities regulators stand to benefit from access to a wider range of regulatory tools, especially in preventing and managing the systemic impact of liquidity shocks.[2] The need for enhancing stress testing by the industry and supervisors to ensure adequate and timely identification of vulnerabilities in investment funds is common to many countries. On market intermediaries, progress has been significant in strengthening regulatory and crisis management frameworks vis-à-vis significant dealers through enhanced capital requirements and safety nets to deal with failure. Greater clarity regarding consistency of banking and securities arrangements would add further resilience. For CCPs, margin models may need further calibration to avoid exacerbating procyclicality during stress. On the safety net, direct access for CCPs to central bank liquidity merits further examination, potentially as part of a similar examination for the NBFI sector more broadly. On crisis management, greater international coordination is needed given the significant cross-border nature of clearing.

Emerging challenges are raising the bar. Many countries have taken some steps to embed cyber resilience into core supervision and have enhanced arrangements to reduce and manage the risk of trading disruption, with some also increasing focus on venues' technological and operational resilience. On fintech, starting with the early regulatory challenge posed by crowdfunding, authorities are now grappling with a range of innovations, including crypto assets and other applications of Distributed Ledger Technology (DLT), such as to clearing and settlement. Challenges in ensuring appropriate supervision of decentralized finance ('DeFi') are likely to grow, for example, if use of self-executing "smart contracts" becomes widespread.[3] The cessation

[1] FSB 2021c.

[2] Policy options to address these challenges are explored in IMF 2021b.

[3] DeFi refers to financial services that eliminate or reduce the role of centralized processes in risk taking, decision-making, or recordkeeping, for example, through use of a distributed ledger to execute transactions through smart contracts or to record changes in ownership.

of the London interbank offered rate (LIBOR) and other widely used financial benchmarks provides a good test of international collaboration and of regulatory regimes' ability to anticipate and avert market disruption and will be a source of valuable guidance about good practices related to controlled cessation of systemically important benchmarks. Finally, focus on climate change will increase in the period ahead given the risks to financial stability and to the achievement of wider public policy objectives if its impact is not appropriately reflected in financial statements, valuations, and issuer disclosures on which investors depend.

Looking ahead, additional focus is likely to be warranted on bond markets, accounting and auditing standards, and the impact of changing business models on investor behavior. The instability experienced in key bond markets, default of potentially systemically significant entities in some jurisdictions, and large outflows from emerging market bond funds during the pandemic are prompting reflection about vulnerabilities and potential policy responses. High-profile corporate failures and fraud cases have led to questions about whether audits are sufficiently robust, suggesting that renewed focus on relevant international standards may be warranted. Dramatic movements in trading activity and valuations have also been observed in some markets, prompted by changing retail investor behavior, facilitated by zero-commission business models remunerated by "payment for order flow." Many jurisdictions are reflecting on potential vulnerabilities and how to respond amid signs that the commission-free model may become more broadly adopted.

A key question cutting across several of these areas is the need to regularly assess the adequacy of the regulatory perimeter vis-à-vis capturing the necessary range of actors, activities, and instruments. Work is ongoing or pending in many jurisdictions to secure post-GFC commitments to regulate key market participants and infrastructure providers in exchange-traded and OTC derivatives and in trading venues for equities and bonds beyond traditional exchanges. Fundamental gaps in regulatory coverage of the asset management sector appear to exist in some countries. More explicit consideration may be needed of which derivatives are within the regulatory perimeter, to manage potential risks in relation to commodity, climate, emissions, and other carbon-related futures, options and other derivatives, and of whether systemically important benchmarks and their administrators are covered. On fintech, the coverage of crypto assets will be relevant for more jurisdictions in the years ahead and new questions are likely to arise as the use of DLT and associated DeFi applications such as smart contracts evolve.

This array of challenges makes the repeated FSAP finding of insufficient resourcing of supervisory authorities– even in some of the world's largest and most sophisticated markets—a matter of significant concern for the period ahead. Post-GFC reforms implied a material increase in the scope of entities and activities within the regulatory perimeter and raised expectations of the supervision needed to assess and mitigate risk. Yet securities and derivatives regulators rarely saw a commensurate increase in resources. With emerging and new challenges and the likely widening of the perimeter, it is ever more important for regulators to have a wider range of specialist expertise and to ensure that supervisory techniques and technology keep pace with the evolution of increasingly technology-enabled markets. In some jurisdictions, resource challenges are compounded by the lack of operational independence, which would limit authorities' ability to effectively supervise and respond to risks. Further progress on these key aspects of the institutional framework underpinning securities and derivatives regulation must, therefore, remain a priority.

1. A Longstanding Challenge

A. Securities, Derivatives, and Financial Stability

Securities and derivatives markets are an important driver and enabler of economic activity as well as a source of wealth for investors and financial institutions; hence, stress or disruption therein can pose material risks to financial stability. Capital markets provide a significant source of funds for economic activity and a means for investors to generate wealth. Derivatives are an important tool for hedging risk. The largest capital market in the world, in the United States, accounts for 73 per cent of that country's funding of nonfinancial firms.[1] In the second half of 2020, the notional amount of interest rate derivatives contracts outstanding was USD466.5 trillion.[2] However, several events—from the recapitalization of the hedge fund Long-Term Capital Management in 1998, to the failure of Lehman Brothers in 2008 with significant open positions in over-the-counter (OTC) derivatives markets and the attendant "breaking of the buck"[3] by the Reserve Primary money market fund—have shown the potential for financial stability challenges.

After the GFC, and consistent with G20 commitments, significant enhancements were made to the international regulatory standards for these markets. The standards sought to give effect to commitments which included ensuring that all firms whose failure could pose a risk to financial stability should be subject to high-quality regulation and supervision; OTC derivatives should be centrally cleared through CCPs and higher capital charges applied where they are not; and enhanced tools should be in place for the resolution of systemically important financial institutions, including those operating across borders.[4]

Since the GFC, there has been growing recognition that risks to financial stability can arise in or be transmitted through nonbank financial institutions and through securities and derivatives markets. This recognition has been reflected in policy work by the Financial Stability Board (FSB), for example, on shadow banking,[5] and in enhanced international standards for financial market infrastructures (Principles for Financial Market Infrastructures—PFMIs) by the International Organization of Securities Commissions (IOSCO) and the Committee on Payments and Market Infrastructures (CPMI).[6] The need for continuing international focus in this area has been highlighted by events during the COVID-19 pandemic, such as the instability experienced in short-term funding and bond markets in 2020, including significant outflows from emerging market bond funds and default on bond payments by potentially systemically significant issuers.[7]

B. Insight on Progress and Emerging Issues

This paper draws on common themes from securities and derivatives markets assessments carried out in the context of the FSAP during 2015–20 to establish where countries stand and identify key remaining challenges.[8] The paper sets out the core risks to financial stability which the assessments initially sought to

[1] SIFMA (2021).

[2] BIS (2021). To give an indication of scale, recent IMF data indicated U.S. GDP at USD22.94 trillion and China's GDP at USD16.86 trillion.

[3] "Breaking the buck" refers to the net asset value falling below USD1 per share.

[4] G20 (2009).

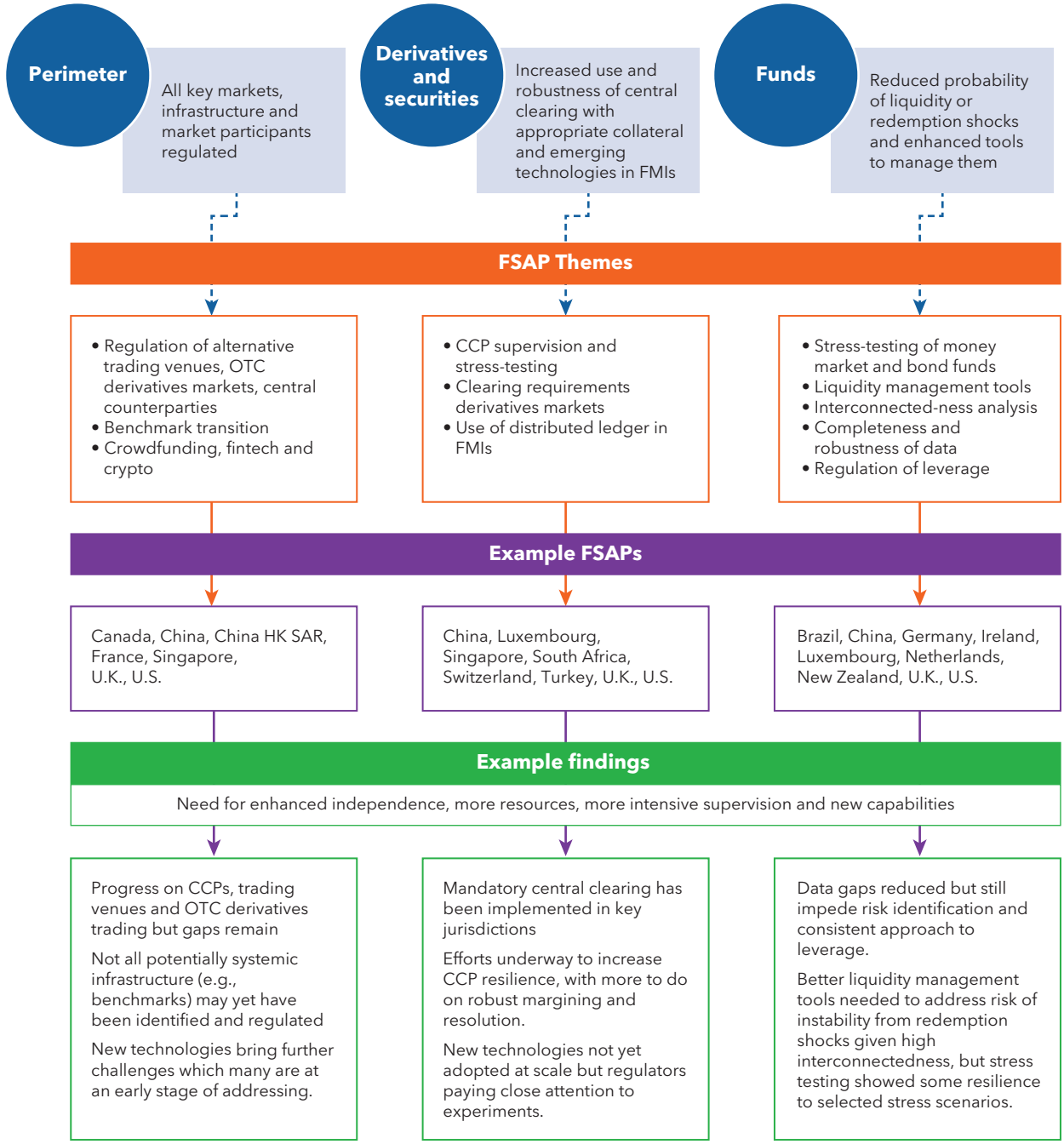
[5] FSB (2017b).

[6] Such as BIS CPMI-IOSCO (2017).

[7] FSB (2020), IMF (2021e), and PBoC (2018).

[8] The paper uses common themes from these FSAPs to extrapolate findings on progress made and remaining gaps across securities and derivatives markets globally. Taken together, the jurisdictions covered are a representative sample of the securities and derivatives sector as a whole, and the findings should be interpreted in that light.

Figure 1. How FSAPs Addressed Post-GFC Securities Reform Agenda



Source: IMF staff.

address in the light of post-GFC reforms and key findings in relation to vulnerabilities, regulation, and supervision. It discusses findings in relation to those issues that emerged after 2015 and were covered in some of the assessments and identifies newly emerging issues which may also warrant consideration by regulators. A consistent theme in the paper is that individual countries' circumstances have an impact on the relevance of particular topics for financial stability, which is a key consideration when FSAPs scope their approach. Therefore, different themes have been covered in different jurisdictions for the sample of FSAPs considered, see Figure 1.

The paper discusses key themes regarding these core issues and other emerging issues for the period ahead arising from this horizontal review. Chapter 2 sets out key findings of assessments in relation to the institutional framework underpinning regulation and supervision. Chapters 3, 4, and 5 summarize key findings in relation to the regulation and supervision of asset management, market intermediaries, and market infrastructure respectively. Chapter 6 discusses the treatment of key issues which came to prominence since 2015 and identifies newer emerging issues for the period ahead. Chapter 7 reflects on conclusions from the review on core and emerging issues and their potential implications for securities regulators.

Box 1. Analysis and Assessment of Securities Markets in the FSAP

Established in the wake of the 1990s Asian financial crisis, the FSAP is a joint program of the IMF and the World Bank that provides in-depth assessments of financial stability and development. From the perspective of the IMF, (modalities of) coverage of securities regulation and supervision in the FSAP reflects the sector's importance for financial stability.

The GFC prompted reflection on the FSAP and consequent changes to enhance its focus on key challenges to financial stability, including in securities and derivatives markets. This reorientation of the FSAP was achieved through an enhanced focus on three pillars: risks and vulnerabilities, the regulatory framework and supervisory oversight, and the availability of safety nets to manage and resolve financial crises. For securities and derivatives markets, specific areas of focus for the regulatory framework and oversight pillar within the existing international standards framework were identified in collaboration with IOSCO.[1]

More recently, the FSAP's approach to securities markets has shifted from detailed assessments of compliance with international regulatory standards to more targeted reviews that are tailored to countries' markets and risk profiles. Our sample of FSAPs in 19 countries contains only three detailed assessments of implementation of the IOSCO *Objectives and Principles of Securities Regulation*,[2] (one a follow-up to an earlier, detailed assessment), with the rest being focused technical notes on securities and derivatives in 16 countries and relevant cross-cutting themes (cyber and fintech) in two others (Annex 1). In addition, dedicated assessments of FMIs were carried out in 17 jurisdictions, of which four took the form of detailed assessments of observance of the CPMI-IOSCO *Principles of Financial Market Infrastructures*,[3] and the remaining 13 were focused technical notes.

FSAPs in this cycle took place at a time of completion and implementation of post-GFC reforms. In the United States, for example, the Dodd-Frank Act provided a framework for reform, with detailed rules under development by the Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC) at the time of the 2015 FSAP, with some rules yet to be finalized at the time of the 2020 FSAP. In the European Union (EU), legislation was enacted to regulate CCPs and Central Securities Depositories (CSDs). Efforts to strengthen the regulation of securities and derivatives trading venues and intermediaries, as well as hedge fund managers and collective investment schemes, were hampered by missed implementation deadlines in several jurisdictions. The 2017 China FSAP found that enhanced regulation of OTC derivatives markets, among other areas, was needed.

[1] IMF (2017f).
[2] IOSCO (2017a).
[3] BIS CPMI, and IOSCO (2012).

Box 1. Analysis and Assessment of Securities Markets in the FSAP *(continued)*

Beyond assessing a common core of issues, the scope of individual FSAP assessments was tailored to the specific characteristics of the market. For example, assessments of risks and vulnerabilities arising from interconnectedness in the asset management sector were carried out in jurisdictions which were home to significant asset management sectors—in this paper's sample, Ireland, Luxembourg, and the United States. The assessment of market intermediary regulation and supervision in Sweden focused on cross-border supervision given the high level of interconnectedness among the Nordic countries and their financial institutions. The 2020 US FSAP explored the potential impact of LIBOR cessation given that the United States is home to the world's largest interest rate swap market.

In asset management, FSAPs explored the vulnerabilities in MMFs evident in the GFC but also the potential risks arising from maturity transformation, particularly in bond funds. As the prudential regime for banks was tightened after the GFC, awareness grew of the potential for maturity transformation through other financial services and hence the potential impact of liquidity/redemption shocks in funds.

The securities and derivatives assessments undertaken in 2015–20 show the benefits of a risk-focused, stability-oriented approach, which will be further enhanced in the period ahead. This approach has allowed for assessments to address a common core of issues in a way that is appropriately tailored to the characteristics of countries and their markets. It has been able to accommodate both pre-existing and emerging issues. Connecting better the risks and vulnerability analysis to assessments of the regulatory and supervisory frameworks, and using focused technical notes to supplement earlier, detailed assessments of standards, were important enablers of this approach. This is most evident in asset management, where FSAP findings and their implications informed a separate MCM paper on risks and implications for policy.[4]

FSAPs have also focused on the implications of liquidity mismatches in the nonbank sector for the resilience of securities and money markets, the potential need for appropriate liquidity backstops, and corresponding operational considerations, starting with the 2015 US FSAP and also subsequently in the 2018 euro area, 2020 Denmark and the United States, and 2016 and 2022 UK FSAPs.

[4] IMF (2021c).

2. Institutional Framework

The institutional framework remains a core area of focus for regulators. Without the right institutional underpinnings, it is highly unlikely that jurisdictions will have the necessary capability to identify and manage risks. International standards set benchmarks for the institutional arrangements for regulation and supervision of financial services.[9]

Independence of supervisory authorities is a foundational requirement for effective supervision, yet challenges persist in this regard.[10] In some instances, the method of appointment of senior staff or more direct political involvement in policy, supervision, or enforcement calls into question the authority's independence and impartiality. In some jurisdictions finance ministries are represented on the boards of regulatory authorities, have the power to review decisions made by such authorities, or are the final decision-maker in relation to the granting or revocation of licenses rather than delegating such decisions to the supervisory authorities. In other cases, institutional arrangements appear to give financial services industry stakeholders too great an opportunity to influence supervisory judgements. Examples include self-regulatory organizations (SROs) not being subject to sufficient oversight, or market participants being over-represented on SRO decision-making panels or on bodies responsible for enforcement decisions. Looking ahead, given the prevalence of these issues, strengthening of practice in this area is likely to remain a key priority.

The adequacy of resources available to supervisory authorities is a significant source of concern, including in jurisdictions with the world's largest and most sophisticated securities and derivatives markets.[11] Some authorities have seen their mandate broadened considerably following the GFC, with responsibility for authorizing and supervising a larger number of entities while developing and implementing new regimes, with nothing close to a commensurate increase in funding. This gives rise to "sticking plaster" responses. Resources are moved to address the need for more intensive supervision in one area, only to create gaps in other areas. The increased need for authorities to have access to a broader range of specialized expertise, such as in cyber and broader operational resilience, often compounds the problem of overstretched resources. Looking ahead, resource constraints are likely to become even more challenging with the emergence of climate-related and other environmental, social, and governance (ESG) issues, fintech (including DeFi) and other developments requiring specialist expertise. Adequacy of resourcing with the necessary expertise must, therefore, remain a focus for securities regulators in the period ahead, though potentially with an increased emphasis on the adequacy of the technology used for supervision (SupTech) as well as human resources. As supervision becomes increasingly technology-dependent, authorities' own technological resilience could become an increased source of risk meriting consideration.

One positive development is the significant effort deployed in enhancing international cooperation. Examples of such efforts exist both within economic and currency unions and across countries. An example of the former are the efforts at more consistent regulation and supervision within the EU. It is also clear that efforts are being undertaken to ensure sufficient alignment on key areas of post-GFC reforms and the phasing of their implementation between the United States and EU authorities, to the benefit of both policymakers and market participants. This cross-border co-operation has been similarly evident in preparations for the cessation of LIBOR and other benchmarks.[12]

[9] The standards are generally not prescriptive and instead take the form of principles and outcomes. They are also neutral with respect to regulatory architecture, for example, whether supervisory authorities should be cross-sectoral or sector-specific, or whether prudential and conduct of business mandates should be combined or separated.

[10] See, for example, the FSAP reports for Brazil, China, France, Ireland, Thailand, and the United States 2015 and 2020.

[11] See, for example, the FSAP reports for Brazil, China, France, Ireland, and the United States (2015) and (2020).

[12] See Section 6 and the U.S. 2020 and U.K 2022 FSAPs.

3. Asset Management Regulation and Supervision

Financial stability risks from the asset management sector can only be understood and addressed by regulatory frameworks of sufficiently broad scope. An important example is the regulatory perimeter which, evidence indicates, can be defined too narrowly.[13] In one case all discretionary portfolio management, equivalent to about half the assets under management in the jurisdiction, was outside the perimeter (at the time of the FSAP assessment), though the jurisdiction had plans to change that. In another, only funds marketed to retail investors were within the perimeter, and there was little understanding of, or data on, the remainder of the market, making it hard to assess the potential scale and source of risk. In one jurisdiction where the perimeter is more appropriate, inconsistency of reporting requirements across fund types has led to gaps in the authorities' understanding of the evolution of risk in some areas. While securities regulators have made significant progress in enhancing the granularity and quality of data available, limitations remain.[14]

Even jurisdictions with more mature regulatory frameworks still typically face challenges with implementing sufficient measures to prevent and manage liquidity risk.[15] In many jurisdictions a very narrow range of liquidity management tools is explicitly provided for.[16] In some countries, potentially useful tools such as swing pricing are explicitly prohibited. In some countries where a range of liquidity management tools seem to be tacitly permitted, the authorities do not universally appear to have the power to require that they be included in fund rules or implemented either in specific cases or across the board in extreme circumstances. In some cases, the only liquidity management tool the authorities could require to be used is a suspension of redemptions, a significant intervention that authorities would be reluctant to make. In such situations there are real benefits from adapting regimes to allow for a mix of tools to be used.

As the prudential regime for banks was tightened after the GFC, the potential for maturity transformation through other financial services and hence the potential impact of liquidity/redemption shocks in funds increased. Analyses of interconnectedness in key jurisdictions underline that investment funds are typically highly interconnected with each other and/or with other financial institutions.[17] The potential for stress in corporate bond funds and emerging market funds, and for this to be transmitted within and beyond the asset management sector, underlines the importance of having sufficient tools in place to mitigate the stability risks if these events crystallize.[18]

[13] Jurisdictions in which FSAP assessments of asset management regulation and supervision were carried out typically fell into one of two broad groupings: (1) countries with smaller markets and less-developed regulatory frameworks, where assets under management are predominantly invested domestically with the potential to amplify the impact of wider economic shocks on the sector and vice-versa, and (2) countries with significant domestic and international markets and mature regulatory frameworks, where assessments of vulnerabilities through stress tests and interconnectedness analysis often inform the targeting of assessments of the regulatory and supervisory framework.

[14] See, for example, the FSAP reports for Brazil, Ireland, New Zealand, and Switzerland.

[15] See FSAP reports for Brazil, Germany, Luxembourg, The Netherlands, the United Kingdom, and the United States.

[16] For a fuller description of available liquidity management tools, see IMF (2017g), page 20, Box 2.

[17] See FSAP reports for Ireland, Luxembourg, Japan, and the United States 2020.

[18] Stress testing of bond funds carried out in the context of the FSAP suggests that some funds would experience difficulties in meeting redemptions under stress scenarios and that policy measures to both prevent and manage redemption shocks would be needed, with potential for contagion where funds need to draw down credit lines from banks. See also Chapter 6 for emerging issues in EMDE bond markets and bond funds. Liquidity risks and potential policy responses are discussed further in IMF (2021c).

Challenges remain from the continuing use of the Constant Net Asset Value (CNAV) valuation methodology in MMFs.[19] Further steps can be taken by securities regulators who oversee significant MMF sectors to address the risks arising from the CNAV approach. This includes regulator-led stress testing of the likelihood and impact of CNAV MMFs "breaking the buck" in stress scenarios, as previously occurred in 2008.[20] More generally, efforts aimed at reducing the likelihood of destabilizing redemptions, such as encouraging an end to prime MMFs' use of CNAV pricing, should continue.

[19] See FSAP reports for China, Ireland, Luxembourg, and the United States 2020.

[20] Vulnerabilities seen in the GFC were further explored in recent FSAPs through stress testing in jurisdictions with significant domiciled MMFs. In the particular scenarios and jurisdictions considered, the stress tests carried out for the FSAP did not indicate a significant risk of funds "breaking the buck" as happened in 2008. However, this finding is scenario-dependent and given underlying vulnerabilities remain, periodic stress testing by authorities will be needed.

4. Regulation and Supervision of Market Intermediaries

Avoiding threats to financial stability arising from the prudential failure of a significant intermediary or misconduct on a scale sufficient to impact investor confidence is a key goal of securities regulators. A scenario involving the failure of a significant intermediary, particularly one carrying market risk, could give rise to risk to counterparties, and potentially to customers, if safety nets, such as investor compensation schemes, are inadequate. A scenario leading to widespread mis-selling or other misconduct could impact investor confidence even without the failure of an intermediary.

Prudential oversight of significant intermediaries has improved and functioning of safety nets in the event of failure clarified, but further action is needed to ensure a coordinated response to the failure of an intermediary that belongs to a banking group.[21] Some countries have taken steps to enhance early warning measures of elevated risk of failure, and others have strengthened capital requirements for broker-dealers. Scope remains for enhancing robustness of safety nets by increasing funding and strengthening the operation of investor compensation schemes. Jurisdictions should also strive for greater clarity regarding the interaction between deposit guarantee schemes and investor compensation schemes in cases where there are potential claims on both entities in relation to the failure of a banking group and a potential need for coordination. More broadly, it is not always clear whether banking supervisors and securities supervisors have a shared understanding of the prudential treatment of a bank-owned intermediary[22] or a shared view of how the failure of such an entity would be managed. This is particularly important in countries where different regulatory authorities are responsible for banking and securities markets.

A key challenge for intermediary supervision is maintaining sufficient coverage of the range of different business models and scale of entities in relation to multiple regulatory objectives.[23] There are indications that the intensity of supervision of one or more categories of intermediary is insufficient in many jurisdictions. Moreover, increasing prudential scrutiny in some areas has sometimes been achieved by reducing it in other important ones. For example, scrutiny of investment advisers may be intensified, but only at the expense of reduced oversight of other intermediaries, without this being clearly justified by a change in risk profile (see Chapter 2 for a discussion about regulators' lack of resources). Besides financial stability, supervisory authorities are typically also responsible for market integrity and investor protection objectives and may have a regulated population ranging from entities that are domestically systemically important, or affiliates of global systemically important financial institutions, to a multitude of small, owner-operated entities. The latter may pose significant conduct risks, and hence require supervisory resources, even if their likely impact on financial stability is small.

[21] See, for example, FSAP reports for Canada, China, France, Ireland, Japan, Thailand, and the United States 2020.

[22] For example, the interaction between the capital regime applied by securities regulation to a securities entity within a banking group and that applied on a consolidated basis by a banking supervisor to the whole group.

[23] See, for example, FSAP reports for Brazil, China, France, Germany, Ireland, Luxembourg, Netherlands, New Zealand, the United Kingdom, and the United States.

5. Regulation and Supervision of Financial Market Infrastructures

A. Context

Post-GFC, concerns about the impact of failure of a significant counterparty on the OTC derivatives market became the focus of regulatory consideration of market intermediaries, and CPSS-IOSCO developed international standards to address relevant risks.[24] Specifically, the concern about failure of counterparties translated into a focus on the arrangements for handling the failure of a significant dealer and the triggers that might prompt such a failure, which included both a prudential failure and a conduct event of such significance as to prompt a widespread loss of investor confidence. CCPs are now covered by enhanced regulatory oversight, and certain OTC derivatives contracts are subject to mandatory clearing, reinforced by incentives to clear centrally in the capital regime for banks.[25] Regimes aim toward CCPs being able to withstand shocks, including the failure of one or more major participants.

Assessments in this period explored two key challenges. First, whether the scope of FMI supervision was sufficient to meet post-GFC expectations, and second, whether the infrastructure for trading, clearing and settlement was sufficiently resilient to operational challenges and extreme market conditions including, for CCPs, the failure of major participants. Key reforms to the regulatory oversight of market infrastructure took effect during this period although in many jurisdictions detailed implementation is still ongoing. Growing recognition of the importance of infrastructure's operational resilience to the functioning of markets made this an area of focus in some FSAPs in larger markets towards the end of the period.

B. Central Counterparties

The increased prominence of central clearing activity puts greater focus on sound regulation, supervision, and oversight of CCPs to ensure financial stability. Recovery and resolution arrangements for CCPs, as well as crisis management planning and communication, remain priorities. There is also merit in strengthening cooperation frameworks, both domestically—in the case that multiple authorities are involved in the supervision and/or oversight of CCPs—and across jurisdictions, especially where a foreign infrastructure provides clearing services for market participants to such an extent as to render it systemically important. While there has been much progress in adopting and adhering to the international standards set out in the PFMI, for many jurisdictions there is still progress to be made to improve the robustness of CCPs. Stress testing methodologies can be strengthened via the further inclusion of sufficiently extreme market scenarios, and financial system interconnectedness should be sufficiently taken into account to ensure that system-wide risks are adequately analyzed. This may require efforts to expand the coverage and quality of the available data.

Analyzing interdependencies is important to assess the resilience of CCPs, including the robustness of risk management frameworks and adequacy of recovery and resolution planning. The high concentration and cross-border nature of central clearing activity make it increasingly relevant to have a clear picture of the interdependencies that exist due to shared clearing member participation across CCPs, as well as the

[24] See G20 (2009) and, for example, BIS CPMI-IOSCO (2017).

[25] The Bank for International Settlements defines a CCP as: "An entity that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the performance of open contracts." BIS CPMI (2016).

reliance on a small number of financial institutions for critical (for example, custodial) services. These interdependencies should be taken into account when considering, for example, operational risk and ensuring continuity of services in the case of a crisis event.[26]

There is generally room for CCP risk management frameworks to be improved and made more robust. In particular, margin models should adequately and holistically address concerns over procyclicality to avoid exacerbating financial strain for clearing members and their clients during times of stress. Sensitivity analyses of models should be performed regularly, and authorities should conduct validation assessments to make sure that models are sufficiently robust. Beyond this, risk management frameworks should include a consideration of a wide range of risks, beyond those of credit and liquidity, including reputation and competition risk. Stress testing should be an integral part of the framework incorporating scenarios that are sufficiently extreme.[27]

Increased regulatory focus is being placed on the adequacy of crisis management and on recovery and resolution planning for CCPs. Common areas for improvement include the formation of crisis management groups that allow for coordination across authorities—within and across jurisdictions—and the creation of tools supported by binding rules and regulations or backed by formal agreements. Any plans and processes need to be regularly tested and interdependencies be properly considered to ensure continuity of critical services.

Increasing CCP access to central bank services is a priority in several jurisdictions. The FSAP for Sweden, for example, called on the Riksbank to consider offering FMIs central bank access to collateralized overnight liquidity, in particular for CCPs. The assessment for the euro area called on the Eurosystem to harmonize its policy on CCP access to central bank deposit accounts and liquidity facilities to allow for a level playing field, regardless of whether a given CCP has a banking license.

C. Trading Venues

While a number of countries have implemented reforms to enhance the oversight of secondary markets, including more forms of trading venues across a wider range of asset classes, gaps and challenges remain. For example, by the 2020 FSAP the US Commodity Futures Trading Commission had moved to a final registration regime for "swap execution facilities," while the US Securities and Exchange Commission had yet to put in place a regime for securities-based swaps. The Securities and Exchange Commission requires enhanced disclosures of the operating model of equity alternative trading systems (ATS), and very recently proposed extending the scope of regulation of ATS to include systems trading government debt, repurchase agreements, and reverse repurchase agreements.[28] The China FSAP found that a regulatory regime needed to be developed for non-exchange equity trading venues in China. In the EU, a wider range of bond and derivative trading venues now fall within the scope of regulation. Across several jurisdictions, frameworks are more robust in the face of potential drivers of risk in equity market trading, including algorithmic trading and associated practices, and requirements governing the suspension and resumption of trading in times of unusual volatility or other extreme market conditions. Ensuring appropriate coverage of venues across equity, bond, and derivative markets, taking account of the characteristics of those markets, will remain important as markets and trading practices evolve.

[26] CPMI, IOSCO (2021).
[27] BCBS, CPMI, IOSCO (2021).
[28] SEC (2022).

D. Operational Resilience

While many authorities recognize the importance of operational resilience, fewer have implemented a systematic response; hence, challenges remain in relation to prevention and ensuring understanding and mitigation of the adverse impact of infrastructure outages.[29] The heavy reliance on technology of trading venues and other FMIs has increased awareness of the need to not only avoid operational outages, but also manage the impact and ensure an orderly recovery where an incident occurs. In this regard, the dedicated IT resilience supervisory programs in place in several jurisdictions are beneficial despite their differing degrees of sophistication and intensity.[30] It is also possible to address the issue as a subset of business continuity or crisis management contingency planning. In some jurisdictions changing patterns of trading further concentrates risk arising from trading venue disruption at specific parts of the day, particularly opening and closing auctions. Where opening or closing prices are not available, there can be consequences for funds and derivatives instruments that depend on them for valuations. This issue is likely to be relevant in more markets over the forthcoming period. In the meantime there is value in ensuring that operational resilience supervision pays sufficient attention to these potential stress points; that authorities and FMIs understand the wider implications of operational outages and how to reduce or manage them; and that crisis simulation exercises are considered for plausible events that could give rise to significant disruption, such as simultaneous failure to close in multiple key venues, to ensure that the full range of dependencies are understood and means to reduce impact are identified and implemented.

[29] FSB, CPMI IOSCO (2022a).

[30] See, for example, FSAP reports for Canada, the U.S 2020 and, more recently the United Kingdom (2022).

6. Emerging Issues

This chapter reflects on emerging issues that merit continued attention from securities regulators and consideration in relevant forthcoming FSAPs. Key emerging issues considered in FSAPs in recent years that did not directly relate to the post-GFC risk areas and reforms were fintech, virtual assets, cyber-resilience, and benchmark transition. This section sets out findings on these topics and considers how they are likely to evolve and inform securities regulators' oversight priorities. It then discusses other issues that warrant increased focus in the period ahead, alongside those identified in Chapters 3–5, climate change, bond market resilience, accounting and audit standards, and issuer participation in public markets. This reflects factors such as the significant growth in debt markets and the expected impact on financial markets and on market participants of climate change, among others.

A. Fintech and Cyber-Resilience

Supervisors have been addressing the implications of fintech in securities markets, particularly the emergence of alternative platforms for start-up capital raising and intermediation in relation to the offer of securities through crowdfunding platforms.[31] Authorities typically seek an appropriate balance between facilitating capital-raising by companies not yet large enough to list their securities on exchanges, and the need to protect investors appropriately given the elevated potential for capital loss in such investments. While these entities are often complex to regulate and supervise, fintech activities in securities markets have—until recently—rarely been of a scale or nature to pose material financial stability risks. While it seems unlikely at present that crowdfunding specifically will need further significant attention in the near-future, regular horizon scanning vis-à-vis other fintech innovations and assessments of financial stability and investor protection implications of new capital-raising strategies remain paramount.

Jurisdictions continue to assess how to address the challenges posed by more mainstream use of crypto assets, and this looks set to be a continuing area of focus.[32] Crypto assets[33] play an increasingly prominent role in the financial sector. As is often the case with the provision of financial services through novel and innovative means, for example, through new technology, a first challenge for authorities and market participants is to determine the extent to which existing regulations apply, and whether any adjustments to the perimeter and to the formulation of detailed requirements is needed. In a number of jurisdictions there is clarity that at least some services in relation to some crypto assets that have the characteristics of securities (for example, by conferring ownership or profit rights in an enterprise) are covered by existing laws relating to securities and/or derivatives.[34] However, practical challenges arise in their application, for example in relation to how custody or safeguarding rules apply where regulated firms hold private keys for assets, or whether there is a need to adapt settlement finality provisions to reflect the particular role played by "miners" in finalizing transactions. Importantly, many crypto service providers operate across borders, making the task for supervision and enforcement more difficult. Some jurisdictions[35] are also exploring regimes, particularly for actors

[31] See, for example, FSAP reports for The Netherlands, Singapore, and the United States 2020, and more recently, for Hong Kong SAR (2021) and the United Kingdom (2022).

[32] See, for example, FSAP reports for France, Singapore, the United States 2020 and, more recently, the United Kingdom 2022.

[33] Also referred to as "virtual assets."

[34] Uncertainty remains in many regulatory frameworks as to what assets would qualify as securities, being this a case-by-case assessment in many instances.

[35] In the EU, for example, a proposal for a Regulation on Markets in Crypto-Assets was published in September 2019.

or assets whose status under existing regulations is less clear, prompted in part by the Financial Action Task Force standards in relation to anti-money laundering requirements for virtual asset service providers.[36] This issue is likely to remain an area of focus as crypto assets continue to move into the financial mainstream.[37]

The related issue of Distributed Ledger Technology (DLT) is of particular relevance to FMIs and is likely to remain material in the period ahead, alongside consideration of the emerging role for "decentralized finance" (DeFi).[38] Authorities and FMI operators alike are exploring the benefits and risks of implementing DLT, particularly for payments and securities clearing and settlement systems via permissioned platforms. A key issue in the application of this emerging technology is an evaluation of how appropriate existing regulatory frameworks are in ensuring sufficient supervision over FMIs that employ such novel systems. To the extent possible, international standards are used to evaluate the risks and benefits with an aim to ensure that application of DLT in FMIs will be compliant with the PFMI.[39] Going forward, authorities are keen to see standardization in DLT to avoid operational fragmentation and lack of interoperability. Though adoption has thus far been limited, DLT can potentially provide market efficiencies through digitization and automation of processes. Other applications of DeFi may require consideration in the period ahead and may pose challenges for regulators and supervisors alike, for example, some distributed ledgers support self-executing "smart contracts." As the FSB has noted, these developments carry potential efficiency benefits as well as potential financial stability risks. For example, they may challenge supervisory authorities in determining accountability and ensuring resolvability in a devolved system where a responsible party may be difficult to identify and subject to limited regulatory grip.[40] Further, smart contracts and other DeFi applications may not be easy to link to a particular jurisdiction and may operate across jurisdictional boundaries, making international consensus and collaboration on regulation and supervision potentially challenging, even as it becomes crucial to effective risk mitigation.[41] IMF analysis suggests that the amount of collateral "locked" in DeFi platforms has risen significantly, reaching USD100 billion as of September 2021.[42]

Cyber-resilience is an area deserving of enhanced focus, while broader operational resilience merits continued attention in the period ahead. Authorities in jurisdictions with the largest and most developed markets are generally acutely aware of the need for cyber-resilience and address these issues explicitly in their supervisory oversight. In some cases, authorities are also well integrated into wider national efforts to combat cyber-threats. Some implement very structured and targeted supervisory programs, with cyber-security considered as part of wider operational resilience. Nevertheless, it is not always easy for supervisory authorities to access the necessary expertise in-house, and some over-rely on either their existing staff responsible for the authority's own information technology, or on ad hoc external expertise. In some instances, the supervisory response does not seem commensurate with the threat or potential impact on the financial system if an attack on market infrastructure were successful. In the period ahead, cyber-resilience will continue to need to be considered alongside other aspects of operational resilience. These include effective management of technological change, recovery from incidents driven by causes other than cyber-attacks, and other external factors well-illustrated by the change in operating conditions and methods triggered by the global pandemic.

[36] FATF guidance on Virtual Asset Service Providers first adopted in 2019 was updated in 2021. See FATF (2021).

[37] See IMF (2020a), (2022a), (2022b).

[38] See, for example, the U.S. 2020 FSAP report.

[39] In 2017, the CPMI published an analytic framework for reviewing and analyzing the use of distributed ledgers in payments, clearing, and settlement activities.

[40] FSB (2019b).

[41] Such features may also undermine the effectiveness of capital flow management measures including those that may play a role in the overall regulatory framework for capital markets (see forthcoming IMF Fintech Note, "Capital Flow Management Measures in the Digital Age").

[42] IMF (2021d).

B. Benchmark Transition

Interest rate benchmarks are widely referenced in interest rate swaps and a range of other financial contracts. For some benchmarks, such as LIBOR, with insufficient transactions in the underlying market, participant banks' submissions used to calculate the benchmark were increasingly judgement-based estimates rather than transaction data. This reliance on estimates can make the benchmarks susceptible to manipulation. In 2012–16 authorities in several jurisdictions brought enforcement actions against financial institutions for such manipulation.

Experiences such as the discovery of historic manipulation and the increasing fragility of underling volumes have highlighted vulnerabilities arising from the limitations of estimate-based benchmarks such as LIBOR. This realization in turn led to recognition that alternative approaches would be beneficial. The reputational risk from alleged manipulation and penalties where it was detected also made financial institutions less willing to provide estimate-based submissions to the benchmarks.

In some jurisdictions this episode prompted a regulatory response. For example, the EU and United Kingdom introduced requirements for benchmark administrators to be authorized and implement procedures to avoid or manage potential conflicts of interest. The regulations allowed for certain benchmarks widely used in financial markets to be deemed "critical." They gave supervisory authorities powers to compel administrators to continue producing or ensure orderly cessation or transition of such critical benchmarks, and to compel regulated financial institutions to make submissions to them for a specified time. The regulations have since been amended, with the United Kingdom introducing powers for the regulator to require changes to critical benchmarks in certain circumstances, and the United States and EU introducing (LIBOR-specific, in the case of the United States) legislative measures to enable replacement rates to be specified in certain circumstances.

It then became clear that an orderly transition to alternative rates with different characteristics would be needed, with the end of 2021 identified as a target date. Efforts were set in train internationally to design and encourage an orderly transition to alternative reference rates and, in 2017, the UK Financial Conduct Authority announced that it did not plan to require panel banks to continue submitting to the LIBOR administrator beyond the end of 2021. Alternative reference rates were identified, generally based on compounded risk-free or near risk-free rates in overnight transactions. These rates have the advantage of being grounded in transactions rather than estimates, but do not as such replicate the different forward-looking term structures available under the current reference rates.

The potential for significant market disruption arising from the cessation of the LIBOR benchmark warrants consideration. Benchmark transition is a good test of the extent to which regulatory and supervisory regimes are capable of taking a forward-looking approach to identify and mitigate harm without having established rules or precedent to rely on. In the case of LIBOR, the UK regulations and proactive supervisory effort enabled the authorities to support a managed and orderly transition. Issues arising during the LIBOR transition are likely to be pertinent in other jurisdictions where LIBOR or similar rates have been relied on, particularly given that US dollar LIBOR is due to continue until 2023, or where other benchmarks are widely referenced in financial instruments. There may also be a need to consider whether the transition of benchmarks can be managed effectively where they are administered from jurisdictions in which neither systemically important benchmarks nor their administrators are regulated and assess future challenges in relation to other benchmarks in light of the findings.[43]

Preparing for the cessation of LIBOR and other similar benchmarks meant designing alternative reference rates, putting in place the infrastructure to support trading in instruments referencing the new rates, and working out how to deal with "legacy" references to LIBOR. Once the new rates were settled on, action

[43] See FSAP reports for the United States 2020 and, more recently, the United Kingdom (2022).

was needed by market participants to design contracts and instruments referencing them, taking into account their different characteristics, to ensure that services such as clearing were available for them, and to build sufficient liquidity in markets referencing the new rates to enable them to function once the old rates cease to be available. In parallel, extensive work was undertaken, particularly under the auspices of the International Swaps and Derivatives Association, to put in place "fall-back" arrangements for existing contracts referencing LIBOR and other rates once those rates were discontinued or declared unrepresentative of the underlying market. In the United States, reflecting the significance of US dollar LIBOR, there was a concerted policy effort to design alternatives and remove obstacles to their adoption, but less of a focus on supervisory tools as a means of assessing and mitigating risks arising from the readiness of infrastructure providers and market intermediaries for the transition.

Most LIBOR settings ceased at the end of 2021, but with significant new issuance referencing US dollar LIBOR continuing through 2021, continued effort may be needed to secure an orderly transition when US dollar LIBOR ends in 2023. In March 2021, the UK authorities and the benchmark administrator confirmed that LIBOR would end or cease to be representative in all currencies other than US dollars on December 31, 2021, but that some US dollar settings would continue until June 30, 2023. Nevertheless, the FSB noted in July 2021 that activity in US dollar LIBOR-based derivatives had grown since 2017 and that the US securitization issuance remained primarily LIBOR based. It underlined the importance of accelerating transition and efforts to address remaining "tough legacy" contracts and indicated it would report again in mid-2022.[44]

C. Climate Transition and "Green" Finance

A key emerging issue for securities and derivatives markets in the years ahead will be the risks from and response to climate change and the associated development of "green" finance.[45,46] Efforts are underway to increase the coherence and robustness of international standards for the classification of activities, the disclosure of material information related to climate change and energy and ecological transition and classification of securities and investments as "green." Supervisors will increasingly be expected to ensure that institutions not only address climate risks but also respond to and accurately disclose their approach to climate transition policy in ways that do not give rise to "greenwashing" of activities and financial instruments, despite imperfect data. This will bring challenges for regulatory and supervisory authorities, financial institutions, and other corporate issuers through what is likely to be a constant evolution in international standards.

Climate change and transition policy add extra dimensions to the timely and accurate disclosure of material information by issuers on which securities markets depend. It is a longstanding feature of public securities markets that an initial offer of securities must include the disclosure of material risks and other information relevant to investors' decisions, supplemented by ongoing disclosure requirements. Issuers, investors, and regulators are grappling with how climate change and energy and ecological transition need to inform and feature in such disclosures.[47] The need to do so is illustrated by the fact that an issuer's assets may experience a significant loss of value, or even become a valueless "stranded asset," as a result of either climate

[44] By April 2022 there were signs of progress, with the FSB indicating that the majority of US dollar OTC derivatives and capital market products were now referencing SOFR, the replacement reference rate. FSB (2022b).

[45] The definition of "green" may entail a variety of concepts across the world—often differentiating "green" from a greenhouse gas emissions (or carbon intensity) perspective and "green" from an environmental sustainability perspective (in a broader sense, including biodiversity and circular economy considerations). The sectorial and asset-based application of these various meanings of "green" is therefore reflected in the work on taxonomies (and more broadly sustainable finance classifications), as detailed in OECD (2020).

[46] Although not a focus in securities and derivatives assessments in the period to 2020, FSAP assessments are increasingly considering climate-related issues and the 2021 FSAP Review confirmed the need to build on this foundation in the period ahead. IMF (2021a) Box 2 summarizes work to date and planned future approach.

[47] IOSCO (2021a).

change itself (for example, if a particular form of agriculture were no longer viable in a given location) or energy and ecological transition (for example, if a jurisdiction were to remove subsidy from or prohibit coal mining).[48]

Jurisdictions will need to determine how to give effect to evolving international climate disclosure standards, how to ensure that financial statements appropriately reflect climate risks and impacts, and that audits appropriately reflect the climate dimension. Various initiatives have sought to codify what constitutes adequate disclosure, and efforts are also underway under the auspices of the newly-formed International Sustainability Standards Board to bring enhanced consistency to standards and pave the way for enhanced integration with international accounting standards.[49,50] Adoption of the existing standards has to date been largely voluntary and implementation of variable quality.[51] However, some jurisdictions are now making the use of such disclosure frameworks compulsory for at least some categories of issuer.[52] Compulsion can enhance coverage, potentially raise standards and remove some of the competitive distortions which may arise where disclosures are voluntary and made without reference to a common standard. However, where compulsion is limited to entities that are publicly owned, this could introduce other distortions in competition between publicly- and privately-owned entities and even potentially incentivize private ownership structures. Consideration will also need to be given to whether the scope of audits and audit standards are sufficient to ensure that climate-related disclosures are accurate and appropriately reflected in financial statements. The challenge of verifying the accuracy of disclosures related to climate-related risk and impact is significant, given uncertainty regarding the effects of climate change, the difficulties of providing assurances on forward-looking risks and the lack of data. Attention should also be devoted to risks stemming from a fragmentation of market practices and policy developments on climate information architecture, as alignment or at least interoperability of national approaches is vital to the effectiveness of these measures.

Asset managers including operators of collective investment schemes will face challenges in ensuring that portfolios are consistent with mandates and that asset valuations are realistic once climate-related factors are considered. Climate change and transition policy can reduce the value of certain assets (such as those related to fossil fuel extraction) and make the valuation of assets and liabilities challenging. This brings the risk of shocks to the value of funds and portfolios which would impact not only asset managers and their clients but potentially also banks that extend credit lines to them. Jurisdictions will need to reflect on whether their current regulatory and supervisory approaches address these challenges[53] and whether the scope, underlying rationale and methodology of stress-testing practices needs to be enlarged to adequately cover climate-related scenarios.

As existing futures and derivatives markets grow and new instruments emerge, jurisdictions may need to review the scope of their regulatory perimeter and consider whether operational resilience in these markets is sufficient to deal with extreme events. For example, there may be an expanded market for futures and other derivatives of water, climate variables, emission allowances, or other carbon pricing mechanisms. Jurisdictions will need to ensure that their regulatory perimeter encompasses the appropriate range of such instruments, which may not previously have been caught where scope was limited, for example, to futures and other derivatives where the underlying investment was a security or other financial instrument. Climate-related physical or policy shocks could trigger extreme movements in these markets, testing the operational resilience of infrastructure providers in particular. The potential for extreme and unexpected

[48] See NGFS (2019) for a comprehensive discussion of physical and transition risks.
[49] See ISSB Technical Readiness Working Group (2021a), (2021b,) (2021c).
[50] See also IMF (2021f).
[51] See TCFD (2021).
[52] See IPSF (2021) and Toronto Centre (2021).
[53] IOSCO (2021b).

movements in commodity derivative markets, though not in this case climate-driven, was underlined by the period during the coronavirus pandemic in which some oil derivatives had negative prices due to storage and other capacity constraints.

Investor interest in green finance is growing and, in some jurisdictions, actively encouraged to support the Paris Agreement climate goals, but the risk of greenwashing is high and could have significant consequences. Public policy, investor preference and reputational risk are all driving interest in investments which contribute to or are at least consistent with meeting Paris climate goals and development of associated products and services, from "climate-friendly" collective investment schemes to sustainability benchmarks. For financial institutions this creates opportunities for differentiation and new product niches which are potentially beneficial for investors and may contribute to public policy goals. However, without a consistent way to determine which activities, assets and products are compatible with which climate-related objectives, a reliable way to verify whether claims are delivered in practice, and appropriate disclosures to investors to inform decision-making, it is hard to be confident that investor preferences or public policy goals are met. This could have potential financial stability consequences in scenarios where, for example, significant pension funds invest in assets which transpire not to be compatible with the claimed climate-related objectives and may consequently need to be written-down or written-off.

Regulatory and supervisory authorities will face challenges in identifying and applying appropriate standards while supporting infrastructure is put in place and evolves as new scientific evidence emerges. While various standards exist for green or "climate-bond" issuances, and for catalogues of projects or taxonomies of activities and their environmental objectives, authorities will need to act before there is any definitive international standard or full "interoperability" of existing standards.[54] While particular challenges arise where claims of climate-related benefits are made, to deliver public policy goals, supervisory authorities may need to consider the much broader canvas of the climate-related characteristics of other investments which make no such claims, as well as disclosures by a broad range of corporate issuers and other financial market participants. Determining the standards applicable and ensuring they are consistent with available scientific evidence and supervising their use by financial institutions is likely to require specific expertise that may not be readily available within authorities and exacerbate resource challenges by further increasing pressure to spread available resource more thinly.

D. Debt Markets and Other Emerging Issues

The market stress that began in core funding markets in March 2020 was stabilized through a swift and significant policy response, but this involved material risk and the potential of engendering moral hazard. In emerging market economies, the shock manifested as a shortage of US-dollar cash, so central bank responses focused on more traditional monetary policy responses or measures to provide dollar liquidity. In some advanced economies (AE), central banks additionally purchased risk assets, including commercial paper, asset-backed securities and corporate bonds, sometimes through purchases of high-yield bond exchange-traded funds. Some AE central banks also introduced targeted liquidity facilities for specific entities such as dealers or MMFs, while others also changed dealer leverage rules, allowed use of bank buffers to support lending, or temporarily modified the leverage ratio. To facilitate access to US dollars in cash, several central banks introduced or extended the frequency and tenor of existing swap lines, and the Federal Reserve also introduced a temporary repo facility to allow foreign monetary authorities to enter repurchase agreements directly with the Federal Reserve. While effective, these measures increased G7 central bank assets by USD7 trillion in the eight months from February 2020, compared to about USD3 trillion in the year following the collapse of Lehman Brothers in 2008. They could potentially lead to moral

[54] For an overview of existing standards see G20 SFWG (2021).

hazard if market participants do not fully internalize their liquidity risks in expectation of central bank intervention. The intervention and the risks associated with it have prompted consideration of how the need for such a backstop could be reduced in future.

Analysis of causes and amplifiers of this stress episode shows the continuing relevance of fund liquidity management and interconnectedness, the adequacy of CCPs' margin requirements and operational resilience. Analysis by international standard setters[55] underlines the importance of robust and continuous risks and vulnerabilities assessments, including stress testing of MMFs and bond funds, particularly high yield and emerging market funds; consideration of the adequacy of liquidity management tools for open-ended funds; analysis of the interconnectedness between NBFIs and banks; adequacy of CCP margin models, including anti-procyclicality measures; and operational resilience of both infrastructure and liquidity providers.

In addition, more explicit consideration of the tailoring of regulatory frameworks to debt markets and the ability of dealers and other participants to respond to liquidity shocks may be warranted. It may be beneficial to explicitly consider whether jurisdictions' regulatory regimes are well-calibrated to the specificities of their debt markets, including their liquidity profiles, both in relation to traditional execution channels and the smaller but growing segment traded electronically, and to consider whether such regimes need to be modulated in times of stress. Consideration may need to be given to whether and how dealers and other market participants take account of the implications of significant margin calls in stress scenarios, their liquidity preparedness, and the adequacy of data available to regulators about the NBFI sector on this topic. The transparency, predictability and anti-procyclicality of CCP margin requirements and the appropriateness of margin models for non-centrally-cleared transactions may be beneficially reviewed, as could the interaction between margin calls and redemption pressures on MMFs. The effectiveness of the mechanics of settlement and the management of settlement fails under stressed market conditions could be given fresh consideration. Finally, it may be useful to ensure that interactions between spot and futures and other derivatives markets are explicitly considered to identify and mitigate avoidable dislocations or transmission of shocks.

More generally, business model changes that can lead to changes in the behavior of market participants, the resilience of bond markets, and the adequacy of audit standards and oversight warrant closer attention in the period ahead. Turbulence in US markets connected to "meme" stocks following the transition of intermediary business models to commission-free dealing, with revenue gained from payment for order flow, suggests that changing intermediary business models can create or expose wider vulnerabilities in securities markets, for example in relation to margining practices and settlement times and processes.[56] Turbulence in key bond markets during the coronavirus pandemic has also prompted reflection on whether additional policy measures are necessary to ensure market resilience.[57] In addition, high-profile corporate frauds and failures have raised the question of whether audits are being conducted to sufficiently robust standards and whether enhanced oversight is required,[58] a question that will also be increasingly relevant to audits of nonfinancial information given the climate change and broader ESG agenda.

Focus may also need to be placed on the extent and terms of issuer participation in public markets. As various commentators have noted, capital raising through public markets appears to be less attractive than in the past, with fewer listings and more de-listings occurring in many jurisdictions, notwithstanding the increase in initial offerings seen in some jurisdictions and sectors in 2020–21.[59] If this decline continues, equity trading may become even further concentrated in a few stocks at a time when valuations may be subject to change as the impact of climate change and transition become increasingly material and given

[55] FSB (2021c), IOSCO (2022).
[56] See SEC (2021) and ESMA (2021).
[57] See FSB 2020 and FSB (2021b).
[58] See for example ESMA SMSG (2021).
[59] EC (2020).

other significant policy changes being contemplated, for example, in relation to the regulation of "bigtech" firms or significant changes to international corporate taxation regimes. These changes in turn will bring further challenges in ensuring that corporate disclosures are appropriate and sufficient to support investor decision making.

7. Conclusions

Countries have made significant progress toward addressing financial stability risks identified during the GFC, but more remains to be done. Even the most advanced jurisdictions still typically have work to do on implementing established international standards, and further policy tools may need to be implemented to adequately address liquidity mismatch in the asset management sector. In other jurisdictions more fundamental measures are still needed to ensure the appropriate scope and intensity of regulatory and supervisory oversight.

The emerging issues addressed since 2015 will likely evolve rather than recede in significance, and while other new issues will arise, areas warranting increased focus are already apparent. Challenges to technological and wider operational resilience will remain and evolve as jurisdictions emerge from the pandemic. New applications of DLT and DeFi will emerge alongside the potential growth of crypto assets. The impact of climate change and transition will need enhanced focus. And there is a case for closer consideration of bond market resilience, audit standards, changing investor behavior in a zero-commission context, and whether the regulatory perimeter is sufficiently broad.

The challenges ahead underline the urgency of addressing weaknesses in supervisory independence and resourcing. Continuing challenges on the adequacy of resourcing and ability for supervisors to determine and obtain the necessary expertise are a material obstacle to effective oversight. The problem could become even more acute in the period ahead, with drivers including an expanding regulatory perimeter, the need to expand and upgrade SupTech to facilitate supervision of increasingly complex and automated markets, the need for broader expertise in areas such as technological innovation and resilience, climate impacts and other facets of sustainability, and the continuing need for international cooperation to address financial services delivered cross-border in contexts such as virtual assets and DeFi where this may prove particularly challenging.

Annex 1. FSAP Securities Assessments 2015–20—Countries and Scope

This paper is based on a sample of the securities and derivatives assessments carried out in FSAPs that took place between 2015 and 2020. It includes all the assessments relating to the "S29" countries (that is, those which since 2013 have been subject to mandatory participation in the FSAP). Of the S29 countries, 16 are covered individually, with a further four countries' policies (Austria, Belgium, Italy, Spain) covered by the eurozone assessment. The sample also includes New Zealand, South Africa, and Thailand, which were added to the revised "S47" list of jurisdictions with mandatory assessments, on a 10-year cycle, in May 2021.[60]

Key to Annex Table 1.1.

Document Type	Scope
DAR: Detailed assessment of observance of the requirements of the relevant standards	**AM:** asset management
	FMI: market infrastructure
TN Risk: Technical note exploring risks and vulnerabilities	**MI:** market intermediaries
TN Reg: Technical note exploring regulation and supervision	**VA:** virtual asset service providers

[60] For a full list of S29 jurisdictions, plus changes to the FSAP participation cycle agreed in 2021, see IMF (2021a).

Annex Table 1.1. Overview of Securities and Derivatives FSAP Assessment Sample, 2015–20

Country/Area	Year						Document Type	Scope
	2015	2016	2017	2018	2019	2020		
Australia					✓		TN Reg	FMI
Brazil				✓			TN Reg	AM, FMI
Canada					✓	✓	TN Reg‡	MI, FMI
China			✓				DAR	AM, MI
China				✓			TN Reg	FMI
Denmark*							TN Risk/Reg	Systemic liquidity
Eurozone*				✓			TN Reg	MI, FMI
France*+					✓		TN Reg	MI, VA
Germany*+		✓					DAR	FMI
Germany*+		✓					TN Reg	AM
Ireland*+		✓					TN Reg	AM
Ireland*+		✓					TN Risk	AM
Ireland*+		✓					DAR follow-up	MI
Japan			✓				TN Reg	MI
Luxembourg*+			✓				TN Reg	AM
Luxembourg*+			✓				TN Risk	AM
Luxembourg*+			✓				DAR	FMI
The Netherlands*+			✓				TN Reg	AM, FMI
Norway	✓						TN Reg	FMI
Norway						✓	TN Reg	Cyber-risk supervision
New Zealand			✓				TN Reg	AM, FMI
Singapore					✓		DAR	FMI
Singapore					✓		TN Reg	FinTech
South Africa	✓						TN Reg	FMI and OTC derivatives
Sweden*			✓				TN Reg	AM, FMI, MI (cross-border)
Switzerland					✓		TN Reg	AM, FMI
Thailand					✓		DAR	AM, MI
Turkey			✓				DAR	FMI
UK*		✓					TN Reg	AM, MI, FMI
UK*		✓					TN Risk	FMI
U.S.	✓						DAR	AM, MI
U.S.						✓	TN Reg	AM, FMI, MI, VA
U.S.						✓	TN Risk	AM

**Country/area is European Union member or was a member at the time of the assessment*
+Country is eurozone member
‡Unpublished

References

Bank for International Settlements (BIS) Committee on Payments and Market Infrastructures (CPMI). 2016. Glossary. Basel, October.

Bank for International Settlements (BIS). 2021. *Global OTC Derivatives Market Statistics*. Basel, May.

Bank for International Settlements (BIS) Committee on Payments and Market Infrastructures (CPMI) and Board of the International Organization of Securities Commissions (IOSCO). 2012. *Principles for Financial Market Infrastructure*. Basel and Madrid, April.

Bank for International Settlements (BIS) Committee on Payments and Market Infrastructures (CPMI) and Board of the International Organization of Securities Commissions (IOSCO). 2017. *Resilience of Central Counterparties (CCPs): Further Guidance on the PFMI*. Basel and Madrid, July.

Bank for International Settlements (BIS) Committee on Payments and Market Infrastructures (CPMI) and Board of the International Organization of Securities Commissions (IOSCO). 2021. *Review of Margining Practices*. Basel and Madrid, October.

Bank for International Settlements (BIS) Committee on Payments and Market Infrastructures (CPMI) and Board of the International Organization of Securities Commissions (IOSCO). 2022. *Central Counterparty Financial Resources for Recovery and Resolution*. Basel and Madrid, March.

Committee on Payments and Market Infrastructures (CPMI) and Board of the International Organization of Securities Commissions (IOSCO). 2021. *Implementation Monitoring of PFMI: Level 3 Assessment of FMIs' Business Continuity Planning*. Basel and Madrid, July.

European Commission. 2020. *Primary and Secondary Equity Markets in the EU: Final Report by Oxera Consulting*. Brussels, November.

European Securities and Markets Authority (ESMA). 2019. *Advice: Initial Coin Offerings and Crypto-Assets*. ESMA50-157-1391. Paris, January.

European Securities and Markets Authority (ESMA). 2021. *ESMA Warns Firms and Investors About Risks Arising from Payment for Order Flow and from Certain Practices by "Zero-Commission Brokers,* ESMA35-43-2749. Paris, July.

European Securities and Markets Authority Securities and Markets Stakeholder Group (ESMA SMSG). 2021. *Own Initiative Overview Report on the Wirecard Case*, ESMA22-106-3194. Paris, February.

European Union (EU). 2016. *Regulation on Indices Used as Benchmarks in Financial Instruments and Financial Contracts or to Measure the Performance Of Investment Funds*. Regulation (EU) 2016/1011, 2021 consolidated text. Brussels, June.

Financial Action Task Force (FATF). 2021. *Virtual Assets And Virtual Asset Service Providers: Updated Guidance For A Risk-Based Approach*. Paris, October.

Financial Stability Board (FSB). 2010. *Implementing OTC Derivatives Market Reforms*. Basel, October.

Financial Stability Board (FSB). 2017a. *Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities*. Basel, January.

Financial Stability Board (FSB). 2017b. *Assessment of Shadow Banking Activities, Risks and the Adequacy of Post-Crisis Policy Tools to Address Financial Stability Concerns*. Basel, July.

Financial Stability Board (FSB). 2019a. *Cyber Incident Response and Recovery: Progress Report to the G20 Finance Ministers and Central Bank Governors Meeting in Fukuoka, June 8-9, 2019*. Basel, June.

Financial Stability Board (FSB). 2019b. *Decentralised Financial Technologies: Report on Financial Stability, Regulatory and Governance Implications*. Basel, June.

Financial Stability Board (FSB). 2020. *Holistic Review of the March Market Turmoil*. Basel, November.

Financial Stability Board (FSB). 2021a. *Progress Report to the G20 on LIBOR Transition Issues: Recent Developments, Supervisory Issues and Next Steps*. Basel, July.

Financial Stability Board (FSB). 2021b. *Policy Proposals to Enhance Money Market Fund Resilience*. Basel, October.

Financial Stability Board (FSB). 2021c. *Enhancing the Resilience of Non-Bank Financial Intermediation: Progress Report*. Basel, November.

Financial Stability Board (FSB). 2021d. *Global Monitoring Report on Non-Bank Financial Intermediation*. Basel, December.

Financial Stability Board (FSB) Committee on Payments and Market Infrastructures (CPMI) and Board of the International Organization of Securities Commissions (IOSCO). 2022a. Central Counterparty Financial Resources for Recovery and Resolution. Basel and Madrid, March.

Financial Stability Board (FSB). 2022b. *FSB Statement Welcoming Smooth Transition Away from LIBOR*. Basel, April.

Group of Twenty (G20). 2009. *Leaders' Statement: The Pittsburgh Summit September 24-25 2009*. Pittsburgh, September.

G20 Sustainable Finance Working Group (G20 SFWG). 2021. *2021 Synthesis Report*. Rome, October.

International Monetary Fund (IMF). 2014. *Review of the Financial Sector Assessment Program: Further Adaptation to the Post-Crisis Era*. IMF Policy Paper, Washington, DC, September.

International Monetary Fund (IMF). 2015a. *South Africa Financial Sector Assessment Program Technical Note – Reforms in the OTC Derivatives Market*. Country Report 15/52, Washington, DC, March.

International Monetary Fund (IMF). 2015b. *United States Financial Sector Stability Assessment Detailed Assessment of Implementation of the IOSCO Objectives and Principles of Securities Regulation*. Country Report 15/91, Washington, DC, April.

International Monetary Fund (IMF). 2015c. *Norway Financial Sector Stability Assessment Technical Note – Oversight and Supervision of Financial Market Infrastructure and Selected Issues in the Payment System*. Country Report 15/254, Washington, DC, September.

International Monetary Fund (IMF). 2016a. *United Kingdom Financial Sector Stability Assessment Technical Note –Supervision and Systemic Risk Monitoring of Financial Market Infrastructures*. Country Report 16/156, Washington, DC, June.

International Monetary Fund (IMF). 2016b. *United Kingdom Financial Sector Stability Assessment Technical Note – Fund Management and Equity Trading Platforms: Regulation, Supervision and Systemic Risk Monitoring*. Country Report 16/161, Washington, DC, June.

International Monetary Fund (IMF). 2016c. Germany Financial Sector Stability Assessment Technical Note – Fund Management: Regulation, Supervision and Systemic Risk Monitoring. Country Report 16/193, Washington, DC, June.

International Monetary Fund (IMF). 2016d. *Germany Financial Sector Stability Assessment – Detailed Assessment of Observance on the Eurex Clearing AG of the CPSS-IOSCO Principles for Financial Market Infrastructures*. Country Report 16/197, Washington, DC, June.

International Monetary Fund (IMF). 2016e. *Ireland Financial Sector Stability Assessment Technical Note – Asset Management and Financial Stability*. Country Report 16/312, Washington, DC, September.

International Monetary Fund (IMF). 2016f. *Ireland Financial Sector Stability Assessment Technical Note – Update on the Assessment of Implementation of the IOSCO Objectives and Principles of Securities Regulation*. Country Report 16/314, Washington, DC, September.

International Monetary Fund (IMF). 2017a. *Turkey Financial Sector Stability Assessment Detailed Assessment of Observance – Assessment of Observance of the CPMI-IOSCO Principles for Financial Market Infrastructure*. Country Report 17/45, Washington, DC, February.

International Monetary Fund (IMF). 2017b. *Kingdom of the Netherlands Financial Sector Stability Assessment Technical Note – Securities Supervision – Selected Issues Regarding the Regulators, Auditor Oversight, and Collective Investment Scheme Management*. Country Report 17/9,. Washington, DC, April.

International Monetary Fund (IMF). 2017c. *Kingdom of the Netherlands Financial Sector Stability Assessment Technical Note – Regulation, Supervision and Oversight of Financial Market Infrastructures: Responsibilities and EUROCCP Financial and Operational Risk Management*. Country Report 17/92, Washington, DC, April.

International Monetary Fund (IMF). 2017d. New Zealand Financial Sector Stability Assessment Technical Note –Regulation and Oversight of Financial Market Infrastructures. Country Report 17/115, Washington, DC, May.

International Monetary Fund (IMF). 2017e. *New Zealand Financial Sector Stability Assessment Technical Note – Fund Management: Regulation, Supervision and Systemic Risk Monitoring*. Country Report 17/11,. Washington, DC, May.

International Monetary Fund (IMF). 2017f. *Use of Supervisory Standards in the Financial Sector Assessment Program – Understandings with Standard Setting Bodies*. IMF Staff Paper, Washington, DC, July.

International Monetary Fund (IMF). 2017g. *Luxembourg Financial Sector Stability Assessment Technical Note – Fund Management: Regulation, Supervision and Systemic Risk Monitoring*. Country Report 17/257, Washington, DC, August.

International Monetary Fund (IMF). 2017h. *Luxembourg Financial Sector Stability Assessment – Detailed Assessment of Observance of the CPSS-IOSCO Principles for Financial Market Infrastructures*. Country Report 17/260, Washington, DC, August.

International Monetary Fund (IMF). 2017i. *Luxembourg Financial Sector Stability Assessment Technical Note – Risk Analysis*. Country Report 17/261, Washington, DC, August.

International Monetary Fund (IMF). 2017j. *Japan Financial Sector Stability Assessment Technical Note – Regulation and Supervision of Securities Firms*. Country Report 17/284, Washington, DC, September.

International Monetary Fund (IMF). 2017k. *Sweden Financial Sector Stability Assessment Technical Note – Regulation and Supervision of Cross-Border Securities Activities*. Country Report 17/308, Washington, DC, October.

International Monetary Fund (IMF). 2017l. *Sweden Financial Sector Stability Assessment Technical Note – Supervision and Oversight of Financial Market Infrastructure*s. Country Report 17/310, Washington, DC, October.

International Monetary Fund (IMF). 2017m. *The People's Republic of China Financial Sector Stability Assessment Detailed Assessment of Observance of the IOSCO Objectives and Principles of Securities Regulation*. Country Report 17/404, Washington, DC, December.

International Monetary Fund (IMF). 2018a. *The People's Republic of China Financial Sector Stability Assessment Technical Note – Systemic Oversight of Financial Market Infrastructures*. Country Report 18/192, Washington, DC, June.

International Monetary Fund (IMF). 2018b. *Euro Area Policies: Financial Sector Stability Assessment Technical Note – Supervision and Oversight of Central Counterparties and Central Securities Depositories*. Country Report 18/227, Washington, DC, July.

International Monetary Fund (IMF). 2018c. *Euro Area Policies: Financial Sector Stability Assessment Technical Note – Insurance, Investment Firm, and Macroprudential Oversight*. Country Report 18/230, Washington, DC, July.

International Monetary Fund (IMF). 2018d. *Brazil Financial Sector Stability Assessment Technical Note – Supervision and Oversight of Financial Market Infrastructures*. Country Report 18/342, Washington, DC, December.

International Monetary Fund (IMF). 2018e. *Brazil Financial Sector Stability Assessment Technical Note – Fund Management: Regulation, Supervision and Systemic Risk Monitoring*. Country Report 18/358, Washington, DC, December.

International Monetary Fund (IMF). 2019a. *Australia Financial Sector Stability Assessment Technical Note – Supervision, Oversight and Resolution Planning of Financial Market Infrastructures*. Country Report 19/52, Washington, DC, February.

International Monetary Fund (IMF). 2019b. *Switzerland Financial Sector Stability Assessment Technical Note – Regulation and Supervision of Asset Management Activities*. Country Report 19/188, Washington, DC, June.

International Monetary Fund (IMF). 2019c. *Switzerland Financial Sector Stability Assessment Technical Note –Supervision and Oversight of Financial Market Infrastructures*. Country Report 19/190, Washington, DC, June.

International Monetary Fund (IMF). 2019d. *Canada Financial Sector Stability Assessment Technical Note – Oversight of Securities Market Intermediaries*. Unpublished.

International Monetary Fund (IMF). 2019e. *Singapore Financial Sector Stability Assessment – Detailed Assessment of Observance: CPSS-IOSCO Principles for Financial Market Infrastructures*. Country Report 19/225, Washington, DC, July.

International Monetary Fund (IMF). 2019f. *Singapore Financial Sector Stability Assessment Technical Note – FinTech: Implications for the Regulation and Supervision of the Financial Sector*. Country Report 19/225, Washington, DC, July.

International Monetary Fund (IMF). 2019g. *France Financial Sector Stability Assessment Technical Note – Select Topics in Financial Supervision and Oversight*. Country Report 19/325, Washington, DC, October.

International Monetary Fund (IMF). 2020a. *Regulation of Crypto Assets*. FinTech Note No. 19/03, Washington, DC, January.

International Monetary Fund (IMF). 2020b. *Canada Financial Sector Stability Assessment Technical Note – Oversight of Financial Market Infrastructures and FinTech Developmen*t. Country Report 20/022, Washington, DC, September.

International Monetary Fund (IMF). 2020c. *United States Financial Sector Stability Assessment Technical Note – Securities: Fund Management; Equity and Derivatives Trading; and Virtual Assets and Virtual Asset Service Providers*. Country Report 20/243, Washington, DC, August.

International Monetary Fund (IMF). 2020d. *United States Financial Sector Stability Assessment Technical Note – Risk Analysis and Stress Testing the Financial Sector*. Country Report 20/247, Washington, DC, August.

International Monetary Fund (IMF). 2020e. *United States Financial Sector Stability Assessment Technical Note – Supervision of Financial Market Infrastructure, Resilience of Central Counterparties and Innovative Technologies*. Country Report 20/249, Washington, DC, August.

International Monetary Fund (IMF). 2021a. *2021 Financial Sector Assessment Program Review: Towards a More Stable and Sustainable Financial System*. IMF Policy Paper, Washington, DC, May.

International Monetary Fund (IMF). 2021b. *People's Republic of China Hong Kong Special Administrative Region Financial Sector Stability Assessment Technical Note: Implications of Fintech for the Regulation and Supervision of the Financial Sector*. Washington, DC, June.

International Monetary Fund (IMF). 2021c. *Investment Funds and Financial Stability*. Monetary and Capital Markets Departmental Paper No. 2021/18. Washington, DC, September.

International Monetary Fund (IMF). 2021d. *Global Financial Stability Report*. Washington, DC, October

International Monetary Fund (IMF). 2021e. *Multi-Sector Bond Funds in Emerging Markets – Easy Come, Easy Go*, Monetary and Capital Markets Department Global Financial Stability Notes No. 2021/05. Washington, DC, December.

International Monetary Fund (IMF). 2021f. *Strengthening the Climate Information Architecture*. Staff Climate Note 2021/003. Washington, DC, September

International Monetary Fund (IMF). 2022a. *Keeping Pace with Change: Fintech and the Evolution of Commercial Law*. FinTech Note No. 22/01. Washington, DC, January.

International Monetary Fund (IMF). 2022b. *Blockchain Consensus Mechanisms*. FinTech Note No. 22/03. Washington, DC, January.

International Monetary Fund (IMF). 2022c. *Fast and Furious Fintechs—Challenges for Financial Stability*. Chapter 3 of The Global Financial Stability Report. Washington, DC, April.

International Monetary Fund (IMF). 2022d. *United Kingdom Financial Sector Stability Assessment*. Country Report 22/57, Washington, DC, February.

International Organization of Securities Commissions (IOSCO). 2009a. Regulation of Short Selling. Report of the Technical Committee, Madrid, June.

International Organization of Securities Commissions (IOSCO). 2009b. *Principles on Outsourcing by Markets*. Report of the Technical Committee, Madrid, July.

International Organization of Securities Commissions (IOSCO). 2009c. *Principles for Direct Electronic Access to Markets*, FR08/10. Report of the Technical Committee, Madrid, August.

International Organization of Securities Commissions (IOSCO). 2011a. *Principles for Dark Liquidity*, FR06/11. Report of the Technical Committee, Madrid, May.

International Organization of Securities Commissions (IOSCO). 2011b. *Principles for the Regulation and Supervision of Commodity Derivatives Markets*, FR07/11. Report of the Technical Committee, Madrid, September.

International Organization of Securities Commissions (IOSCO). 2011. *Regulatory Issues Raised by the Impact of Technological Changes on Market Integrity and Efficiency*, FR09/11. Report of the Technical Committee. Madrid, October.

International Organization of Securities Commissions (IOSCO). 2012. *Policy Recommendations for Money Market Funds*, FR07/12, Madrid, October.

International Organization of Securities Commissions (IOSCO). 2013. *Technological Challenges to Effective Market Surveillance: Issues and Regulatory Tools*, FR04/13, Madrid, April.

International Organization of Securities Commissions (IOSCO). 2013. *Principles for the Valuation of Collective Investment Schemes*, FR05/13, Madrid, May.

International Organization of Securities Commissions (IOSCO). 2013. *Principles for Financial Benchmarks*, FR07/13, Madrid, July.

International Organization of Securities Commissions (IOSCO). 2013. *Regulatory Issues Raised by Changes in Market Structure*, FR13/13, Madrid, December.

International Organization of Securities Commissions (IOSCO). 2015. *Risk Mitigation Standards for Non-Centrally Cleared OTC Derivatives, Report of IOSCO*, FR01/15, Madrid, January.

International Organization of Securities Commissions (IOSCO). 2015. *Mechanisms for Trading Venues to Effectively Manage Electronic Trading Risks and Plans for Business Continuity*, FR31/15, Madrid, December.

International Organization of Securities Commissions (IOSCO). 2016. *Good Practice for Fees and Expenses of Collective Investment Schemes*, FR09/16, Madrid, August.

International Organization of Securities (IOSCO). 2017a. *Methodology for Assessing Implementation of the IOSCO Principles and Objectives of Securities Regulation*. Madrid, May.

International Organization of Securities Commissions (IOSCO). 2017b. *Good Practices for the Termination of Investment Funds*, FR23/17, Madrid, November.

International Organization of Securities Commissions (IOSCO). 2018. *Recommendations for Liquidity Risk Management for Collective Investment Schemes*, FR01/18, Madrid, February.

International Organization of Securities Commissions (IOSCO). 2018. *Mechanisms Used By Trading Venues To Manage Extreme Volatility And Preserve Orderly Trading*, FR13/18, Madrid, August.

International Organization of Securities Commissions (IOSCO). 2019. *Statement on Communication and Outreach to Inform Relevant Stakeholders Regarding Benchmarks Transition*. Madrid, July.

International Organization of Securities Commissions (IOSCO). 2019. *Update to the IOSCO Peer Review of Regulation of Money Market Funds*. Madrid, October.

International Organization of Securities Commissions (IOSCO). 2021a. *Report on Sustainability-related Issuer Disclosures*, FR04/21, Madrid, June.

International Organization of Securities Commissions (IOSCO). 2021b. *Recommendations on Sustainability-Related Practices, Policies, Procedures and Disclosure in Asset Management*, FR08/21, Madrid, November.

International Organization of Securities Commissions (IOSCO). 2022. *Operational Resilience of Trading Venues and Market Intermediaries during the COVID-19 Pandemic: Consultation Report*. CR01/22. Madrid, January.

International Platform on Sustainable Finance (IPSF). 2021. *State and Trends of ESG Disclosure Policy Measures across IPSF Jurisdictions, Brazil, and the US*. Brussels, November.

International Sustainability Standards Board (ISSB) Technical Readiness Working Group. 2021a. *Climate-Related Disclosures Requirements Prototype*. London, November.

International Sustainability Standards Board (ISSB) Technical Readiness Working Group. 2021b. *Climate-Related Disclosures Prototype Technical Protocols Supplement*. London, November.

International Sustainability Standards Board (ISSB) Technical Readiness Working Group. 2021c. *General Requirements for Disclosure of Sustainability-related Financial Information Prototype*. London, November.

Network for Greening the Financial System (NGFS) 2019. *First Comprehensive Report- A Call for Action. Climate Change as a Source of Financial Risk*. Paris, April.

Organisation for Economic Co-operation and Development (OECD) 2020. *Developing Sustainable Finance Definitions and Taxonomies*. Paris, October.

People's Bank of China (PBoC). 2018. *China Financial Stability Report 2018*. Beijing, November.

Securities Industry and Financial Markets Association (SIFMA). 2021. *2021 Capital Markets Fact Boo*k. New York, July.

Taskforce on Climate-related Financial Disclosures (TCFD). 2021. *2021 Status Report*. Basel, October.

Toronto Centre. 2021. *Climate Change Issues for Securities Supervisors*. Toronto, May.

US Securities and Exchange Commission (SEC). 2021. Staff Report on Equity and Options Market Structure Conditions in Early 2021. Washington, DC, October.

US Securities and Exchange Commission (SEC). 2022. SEC Proposes Amendments to Include Significant Treasury Markets Platforms Within Regulation ATS. Washington, DC, January.

World Bank Group. 2019. *Thailand: Assessment of Observance of the IOSCO Objectives and Principles of Securities Regulation*. Washington, DC, June.

PUBLICATIONS

Strengthening Capital Markets Regulation–
National Progress and Gaps

DP/2022/012

ISBN 979-8-4002-0807-2