



DTCC

JANUARY 2021

COVID-19: IMPACT AND IMPLICATIONS FOR FINANCIAL MARKET INFRASTRUCTURES

A WHITE PAPER TO THE INDUSTRY

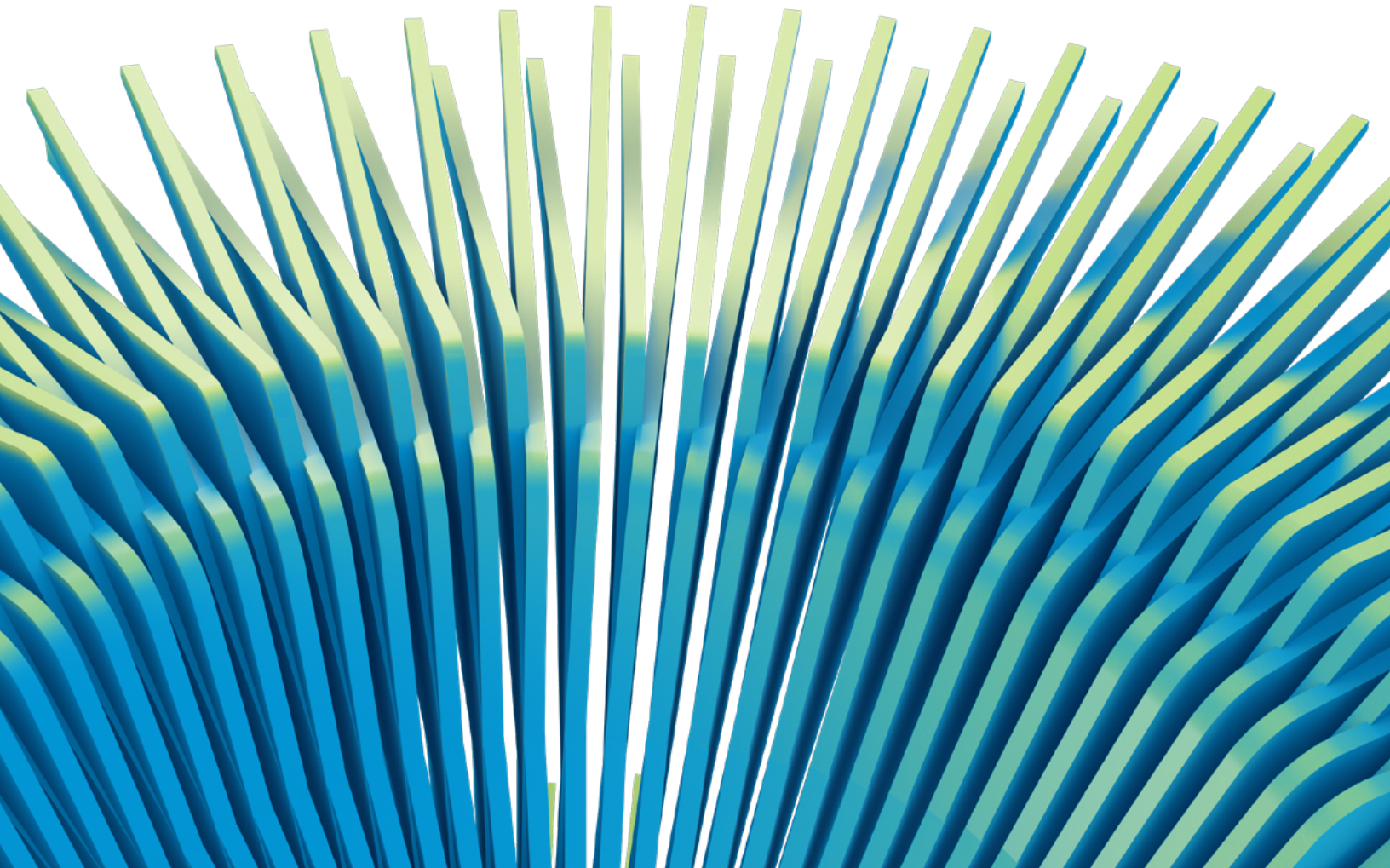


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EXECUTIVE SUMMARY

Financial market infrastructures (FMIs) provide a critical foundation for the global financial system. They help maintain orderly financial markets and access to financial services, thus supporting the provision of credit and capital to consumers, investors, enterprises and the economy as a whole.

FMIs' contribution to safeguarding financial stability comes into focus when a sudden shock hits the world's economy, as was the case when COVID-19 started spreading across the globe. While the fallout of this pandemic has caused tremendous economic and market turmoil, FMIs have continued to perform critical services as intended by their design, demonstrating – once again – their key role in supporting the financial ecosystem during a global crisis.

Although the COVID-19 pandemic has not yet run its course as of the publication of this paper, and its ultimate impact – on public health and on the global economy – remains highly uncertain, FMIs have weathered considerable stress caused by its fallout. Accordingly, this is a good time to take stock and consider the impact and implications of this pandemic to better prepare for the challenges ahead.

This paper sets out to share our insights by:

- Summarizing the initial impact of the pandemic on financial markets and FMIs, as well as immediate actions that were taken to mitigate the associated risks;
- providing an overview of a number of longer-term potential structural changes and challenges to the economy and the financial industry, and
- identifying new focus areas that are emerging as key priorities for FMIs and their participants to proactively manage risk in a post-pandemic environment.

Given the wealth of analyses that have already been published on this topic – and that will undoubtedly continue to be published in months to come – this paper deliberately looks at these topics through the lens of FMIs to provide perspectives that are both different and pertinent, yet somewhat underreported.

As we've done in the past, we intend to engage with our clients, policymakers and other key stakeholders in the coming months to raise awareness of the topic, solicit feedback and guidance and foster collaboration and information sharing. We hope you take time to read the paper, and we look forward to your feedback.

INITIAL IMPACT ON FINANCIAL MARKETS AND SECURITIES PROCESSING

Growing concerns about the magnitude of the spread of COVID-19 and its economic impact triggered a global sell-off in financial markets in February and March 2020, which was associated with surging levels of volatility and trading volumes, as well as liquidity contractions. A summary of the initial impact of these events on markets and securities processing follows.

- **One of the most immediate impacts of the emerging pandemic was a spike in volatility and trading activity**

Volatility quickly spread across the globe in the wake of the COVID-19 outbreak:

- » The S&P 500 index fell by 20% in just over three weeks (the shortest time ever for a bear market to materialize) and continued its decline by 30% in a record 30 days. The Euro STOXX 50 index recorded the quickest fall in its history.
- » From February 20 to March 9, the 10-year U.S. Treasury note yield dropped from 1.52% to 0.54%.
- » By March 23, major Asian equity markets had recorded an aggregate YTD loss of 28.2%, while risk premia in Asian bond markets had tripled.¹
- » On March 16, the CBOE Volatility Index, or VIX, closed at an all-time high of 82.69, breaking the previous record close that was set on November 20, 2008.² In Europe, the VSTOXX, which measures implied volatility of EURO STOXX 50 Index options, reached an intraday high of 90% on March 18, up from levels of around 15-20% during the first half of February.³

As a result of these extreme levels of volatility, the S&P 500 triggered level 1 market-wide circuit breakers on four occasions during March, in addition to several Limit-Up-Limit-Down halts. Automatic market-wide circuit breakers were triggered in many other jurisdictions as well.⁴

Trading volumes surged across several asset classes during the same period:

- » On the last day of February, 19.3 billion U.S. shares were traded, more than twice the average daily volume of 7.0 billion shares over 2019. The 10 highest volume days for U.S. shares by notional volume or trade count of all time occurred in 2020.⁵
- » The European Securities and Markets Authority (ESMA) reported that transaction volumes on European trading venues had reached all-time highs in 1Q 2020.⁶ Equity trade volumes in the Asia-Pacific region increased significantly as well.⁷
- » The average number of daily municipal bond transactions reached 75,000 on March 23, more than twice the volume recorded in mid-February.⁸

¹ Asian Development Bank. *Asian Development Outlook 2020 Update: Wellness in Worrying Times*. Sept. 2020.

² The all-time highest intraday VIX value was 89.53, a level that was reached on October 24, 2008.

³ European Securities and Markets Authority. *ESMA Report on Trends, Risks and Vulnerabilities No. 2*. 2 Sept. 2020.

⁴ These include Brazil, Canada, India, Indonesia, Italy, Japan, Spain, France, South Korea, Mexico and Turkey (source: Financial Stability Board. *COVID-19 Pandemic: Financial Stability Implications and Policy Measures Taken*. 15 July 2020.)

⁵ According to statistics prepared by SEC staff – see: Clayton, Jay. Remarks to the Financial Stability Oversight Council, 14 May 2020. In terms of *shares* traded, volumes in 2020 have competed with records set during the 2008-2009 financial crisis.

⁶ European Securities and Markets Authority. *ESMA Risk Dashboard*. 14 May 2020.

⁷ The value of equity trades in 1Q 2020 increased by close to 26% in the Asia-Pacific region as compared to 1Q 2019 (source: World Federation of Exchanges. *First Quarter 2020 & Full Year 2019 Market Highlights Report*. 7 May 2020.)

⁸ Clayton, Jay. Remarks to the Financial Stability Oversight Council, 14 May 2020.

At the same time, significant volumes of equity trading moved from venues where prices are not shown pre-trade (dark pools and over-the-counter markets) to transparent exchange trading, as investors sought certainty of execution during periods of liquidity stress.⁹

- **Margins increased substantially as a result of larger trade volumes and higher volatility**

Margin – collateral collected by central counterparties (CCPs) and clearing members of CCPs from market participants – is a critical element of risk management. Prudent margining reduces the risk that the failure of one counterparty causes losses or defaults for other counterparties. Similar to other periods of margin turmoil, margins rose substantially during the initial stages of the COVID-19 outbreak, due to the combined effect of higher trade volumes and elevated volatility:

- » In the cleared segment of derivatives transactions, *initial* margins at the four largest CCPs in the EU and in the United Kingdom increased from ca. €300 billion to ca. €400 billion between January and the end of March.¹⁰
- » Daily *variation* margin calls by UK CCPs in derivatives markets in March were around five times the average daily margin calls for January and February.¹¹

- **Cyber considerations**

In response to the pandemic, many financial institutions were forced to make significant changes to their cyber security practices in an incredibly short period of time. Rather than vetting these changes through internal steering committees and lengthy product evaluations, many of these changes were rolled out virtually overnight. Some of these changes/challenges included:

- » **Increased deployment of mobile devices** – Many firms were focused on purchasing laptops and tablets to support a workforce that could no longer access critical technology in the office. These devices required rapid acquisition and secure configurations. Security solutions were necessary to make sure these devices are properly monitored and scanned for potential exposures.
- » **Use of personal equipment** – In the case of employees' use of personal devices (BYOD), software deployments were necessary to install containers on these devices. Because these devices are outside the control of corporate security teams, there is increased concern of a compromise of these personal systems resulting in the installation of keystroke loggers or screen capture programs.
- » **Remote administration** – For technology administrators that could not physically access their infrastructure for support purposes and did not have the benefit of existing remote access solutions, new access points were created in an expedited manner. This has resulted in a significant increase in criminals scanning the internet looking for these remote access points. If these access points are misconfigured, they can be used by attackers to gain access to private systems.
- » **Remote printing** – Many employees will need the ability to print documents when working in a home office for a long period of time. Firms need to remind employees of their obligations to protect any sensitive data they may be allowed to print and to properly dispose of these documents. Personal cross-cut shredders are a necessity when making sure proper practices are followed for secure data destruction.

⁹ See, among other sources: (i) Bank of England Financial Policy Committee. *Interim Financial Stability Report*. May 2020; (ii) European Securities and Markets Authority. *ESMA Report on Trends, Risks and Vulnerabilities No. 2*, 2020. 2 Sept. 2020; and (iii) Ibikunle, G., et al. "COVID-19, Volatility, and Dark Trading in Financial Markets." *VoxEU/CEPR*, 9 May 2020.

¹⁰ European Systemic Risk Board. *Liquidity Risks Arising from Margin Calls*. June 2020.

¹¹ Bank of England. "What Role Did Margin Play During the Covid-19 Shock?" *Bank Overground*, 10 June 2020.

- » **Multi-factor authentication** – Many firms already require remote access solutions to leverage multi-factor authentication. For firms that hastily built remote access solutions in response to the pandemic, they may have used single-factor authentication, which is more vulnerable to attack. In these cases, firms need to revisit these activities and strengthen the authentication process.

These are just a few of the additional considerations that were necessary in the weeks immediately following the spread of the pandemic. Cyber programs were forced to adjust quickly to accommodate the massive changes in workforce locations. Firms that already had mature programs supporting their remote access capabilities were able to pivot with little increased risk and disruption. For smaller firms with less robust technology deployments, there were a large number of real-time changes required to support business operations.

“Despite these extraordinary volumes and volatility, the “pipes and plumbing” of the securities markets – i.e., the clearing agencies, exchanges, ATs and securities information processors, among other things – functioned largely as designed, and importantly, as market participants would expect. In other words, during this time of unprecedented stress, we have observed no systemically adverse operational issues with respect to our key market infrastructure.”

SEC Chairman Jay Clayton during his June 25, 2020 testimony before the Investor Protection, Entrepreneurship, and Capital Markets Subcommittee – U.S. House Committee on Financial Services

- **FMI continued to perform as expected in the face of these challenging circumstances**

FMI around the world demonstrated their resilience in the face of the challenging conditions described above. Even with trade volumes at or around record levels, processing capacity was never an issue. While a global surge in margin calls tested market participants and FMI alike, the risk management frameworks, systems, and margin models of CCPs around the world generally worked as intended and reacted appropriately to surging levels of volatility.

The uninterrupted functioning of these critical infrastructures is particularly noteworthy given that most, if not all, FMI moved their workforce to a work from home (WFH) environment in response to the pandemic.¹² Thanks to considerable investments in business continuity planning and supporting technological capabilities, this transition occurred without major reported incidents.¹³

FMI’s contribution to safeguarding financial stability in the wake of the COVID-19 outbreak has been acknowledged by the U.S. Securities and Exchange Commission (SEC), the Financial Stability Board (FSB), the International Monetary Fund (IMF) and ESMA, as well as other members of the regulatory community.¹⁴

¹² Effective March 16, approximately 95% of DTCC’s global staff was moved to WFH (Securities Processing staff being the exception).

¹³ See, among other sources: Financial Stability Board. *COVID-19 Pandemic: Financial Stability Implications and Policy Measures Taken*. 15 July 2020.

¹⁴ See: (i) Financial Stability Board. *COVID-19 Pandemic: Financial Stability Implications and Policy Measures Taken*. 15 July 2020; (ii) International Monetary Fund – Monetary and Capital Markets Department. *IMF Country Report No. 20/242 – United States Financial System Stability Assessment*. 10 Aug. 2020; (iii) European Securities and Markets Authority. *ESMA Report on Trends, Risks and Vulnerabilities No. 2, 2020*. 2 Sept. 2020; (iv) European Securities and Markets Authority. *ESMA Risk Dashboard Risk Up-Date*. 2 Apr. 2020; (v) Bank of England Financial Policy Committee. *Interim Financial Stability Report*. May 2020; and (vi) Clayton, Jay. Remarks to the Financial Stability Oversight Council, 14 May 2020.

ENHANCED RISK-REDUCING MEASURES

In the wake of the outbreak of the pandemic, DTCC added the following risk-reducing measures to enhance financial stability and support market confidence:

- **To mitigate counterparty credit risk, enhanced monitoring and surveillance procedures were implemented for members whose business models and/or capital structure were deemed particularly vulnerable to market volatility and asset dislocations**
 - » Intensified monitoring and surveillance procedures included: outreach to member banks with concentrated portfolios; weekly reporting requirements and increased due diligence with respect to selected firms; review of available news/research through multiple sources; analyzing the results of the recent stress test conducted by the Federal Reserve (CCAR/ DFAST) for early indicators of weakness at major banks, and internal assessments to identify potential sources of stress.
 - » In addition, macroeconomic and loan delinquency data released by various sources (such as the Federal Reserve, credit reporting agencies, and other private agencies that specialize in data gathering and reporting) were also monitored closely.
- **In addition to frequent and extensive communications with member firms and regulators, several coordinated outreach efforts were conducted with other stakeholders**
 - » Critical third parties were contacted to maintain an open dialogue related to emerging risks.
 - » Clearing agencies, financial market utilities, or trading markets connected to a DTCC clearing agency, were contacted to discuss their ability to cope with heightened market volatility and financial market stress.
 - » An external communication was sent to participants noting actions necessary in the event their Settling Bank is unavailable or otherwise unable to settle on their behalf.
- **A cross-functional working group was established across DTCC to help inform the firm's response to the COVID-19 pandemic with respect to a wide array of both tactical and strategic issues**
 - » The remit of this working group was to analyze and prepare for the near-term and long-term potential impacts of the pandemic, both within the various areas of the firm and across the financial services industry, and to develop action plans to address them.
 - » Regular updates on progress against such action plans were provided to DTCC's executive management team and Board of Directors.
 - » Strategic aspects of this initiative are expected to continue into 2021.

- **The processing of physical securities was disrupted for several weeks**
 - » Although the financial industry transitioned seamlessly to remote operations during the lockdown of all but essential services due to the outbreak of the COVID-19 pandemic, one area stood out. The processing of physical securities was disrupted for several weeks when staff were unable to access the vault or the building.
 - » Throughout March and April, staff supporting the processing of physical securities across the industry were unable to be on premises to handle certificates, stamp and sign documents, receive checks and process paper. The Depository Trust Company (DTC), DTCC's central securities depository subsidiary, and the industry were able to provide creative workarounds for some of the processes, but others simply had to be put on hold. These workaround solutions were inconvenient, but necessary to allow for limited processing with an elongated cycle.
 - » Given the multiple manual touchpoints in the process and a broad array of stakeholders, these limitations were apparent to beneficial shareholders, custodians, banks, brokers, financial intermediaries and transfer agents, among others. More importantly, they also illustrate the ongoing operational risks associated with physical securities processing, including delays in issuing or delivering physical certificates, as well as disruption from loss, theft and natural disasters.
 - » In spite of long-standing industry-wide efforts to eliminate physical certificates in favor of electronic records, the ultimate goal of fully dematerializing the U.S. financial markets has not yet been achieved.¹⁵ Given the current state of technology, as well as the fact that the costs and efforts required to support the processing of physical securities are significantly disproportionate to their relative value, the associated operational risks are no longer acceptable. In light of the above, DTCC published a paper in September 2020 that outlines the necessary steps to reduce, and ultimately eliminate, certificated U.S. securities.¹⁶

It should be noted that this section only provides a high-level summary of the most notable initial impacts of the outbreak of the COVID-19 pandemic on volatility, trade volumes and margin. Recently published papers by the Office of Financial Research (OFR), the FSB and the SEC – just to name a few examples – analyze in far greater detail the forces that were at play during the financial market turmoil in March. These reports are part of a growing body of research that is starting to emerge as academics, policymakers and other market participants try to better understand the combined effects of the myriad of interconnected market dynamics that materialized during this turbulent period.¹⁷

¹⁵ While most U.S. securities (including municipal and corporate bonds, U.S. government and mortgage-backed securities, commercial paper and mutual funds) are currently offered in paperless form only, dozens of countries across Europe, Asia-Pacific, Africa and Latin America have stopped issuing physical certificates altogether.

¹⁶ DTCC. *From Physical to Digital: Advancing the Dematerialization of U.S. Securities*. Sept. 2020.

¹⁷ See: (i) Office of Financial Research. 2020 Annual Report to Congress. 18 Nov. 2020; (ii) Financial Stability Board. *Holistic Review of the March Market Turmoil*. 17 Nov. 2020; and (iii) Kothari, S.P., et al. "U.S. Credit Markets – Interconnectedness and the Effects of the COVID-19 Economic Shock." *U.S. Securities and Exchange Commission Division of Economic and Risk Analysis*, 31 July 2020.

LONGER-TERM STRUCTURAL CHANGES AND EMERGING CHALLENGES

This section provides an overview of a number of longer-term structural changes and challenges that could emerge as a result of the pandemic.

1) Structural changes to the macroeconomic environment

- The COVID-19 pandemic has caused the most significant macroeconomic shock since the second world war (even though both events are fundamentally different in several respects):

The impact of stay-at-home orders had a sudden and dramatic impact on employment and GDP metrics around the globe:

- » The U.S. unemployment rate shot up from 3.5% in February 2020 to a peak of 14.7% in April 2020, substantially higher than the worst level observed during the 2008-09 financial crisis, as shown in the graph below:



Source: U.S. Bureau of Labor Statistics, Unemployment Rate [UNRATE], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/UNRATE>, January 6, 2021.

- » U.S. GDP fell by 5% in the first quarter and 9.5% in the second quarter of 2020, as the coronavirus-related shutdowns and containment measures ended 128 consecutive months of sustained economic expansion and drove the sharpest economic decline on record since the 1940s.
- » The Congressional Budget Office (CBO) has projected that it may take 10 years for the U.S. economy to fully recover from the virus' impact. The CBO forecasts a \$7.9 trillion loss in U.S. economic output from 2020 to 2030.
- » Other parts of the world saw their economies contract as well. The Eurozone's economy declined by 3.6% in the first quarter and 12.1% in the second quarter of 2020. China's economy declined by 6.8% in the first quarter and grew by 3.2% in the second quarter, making it the first major economy to record growth over that period.

- **This global macroeconomic shock triggered an unprecedented series of public sector initiatives in the form of fiscal stimulus and monetary policy measures.**

Governments around the world announced more than \$10 trillion worth of measures just in the first two months,¹⁸ which is three times more than the response to the 2008–09 financial crisis. As of July 2020, most G20 member countries have committed to fiscal stimulus packages to soften the effects of the coronavirus pandemic.

In the U.S., the passage of broad additional fiscal stimulus packages is uncertain. As such, the impact of a potential spike in consumer defaults on the banking sector, which to date have been muted by such stimulus, could be significant.

In the EU, several budgetary, liquidity and policy measures totaling €4.2 trillion were adopted both at national and Union level to, among other things, increase the funding capacity for health systems, businesses and short-time work schemes. To support the latter, the EU issued a €17 billion dual tranche bond in October 2020, representing the largest supranational transaction ever recorded, followed by a second emission for a value of €14 billion in November and a third emission of €8.5 billion in December. Further issuances are expected in 2021. Additionally, the European Central Bank (ECB) launched a €1,350 billion Pandemic Emergency Purchase Program (PEPP), to lower borrowing costs and increase lending in the euro area.

Most countries that had imposed a countercyclical capital buffer on their banks (CCyB)¹⁹ prior to 2020 decided to cut it in response to the pandemic. Countries that don't have a CCyB have eased capital requirements in other ways.

While swift and decisive action on the part of the public sector is widely credited for limiting the further spread of this shock in the near term, the further evolution of the real economy remains highly unpredictable amid huge uncertainties about the extent and speed of the economic recovery. Notably, public sector actions may end up having unintended consequences that could prove disruptive to financial stability in the longer run. Two thirds of the respondents to the DTCC Systemic Risk Barometer 2021 Risk Forecast indicated that they share this concern.²⁰

“The economy, and even more financial markets, quickly made substantial recoveries with the help of massive government support. The Federal Reserve’s balance sheet ballooned to \$7 trillion, by far an all-time high and almost double its size from a year earlier, while federal debt held by the public rose to an estimated 99 percent of gross domestic product at the end of FY 2020 from 79 percent at the end of FY 2019.”

Excerpt from the 2020 Annual Report to Congress, published by the Office of Financial Research (OFR)

All of these factors will ultimately affect interest rates, trade volumes, the profitability and viability of existing business models, as well as other market variables that collectively shape the financial ecosystem.

¹⁸ Public sector stimulus measures include, but are not limited to: guarantees, liquidity injections by central banks, loans, value transfers to companies and individuals, deferrals, and equity investments.

¹⁹ The CCyB aims to ensure that banking sector capital requirements take account of the macro-financial environment in which banks operate. Its primary objective is to use a buffer of capital to achieve the broader macroprudential goal of protecting the banking sector from periods of excess aggregate credit growth that have often been associated with the build-up of system-wide risk. Due to its countercyclical nature, the countercyclical capital buffer regime may also help to lean against the build-up phase of the credit cycle in the first place. Under Basel III countries can build in favorable economic circumstances and draw down during downturns to absorb losses and mitigate the increase in risk-weighted assets; the CCyB may be set as high as 2.5%.

²⁰ Additional survey results are available on <http://www.dtcc.com/~media/Files/Downloads/DTCC-Connection/26362-Systemic-Risk-2020>

2) Impacts on the regulatory environment and legislative agendas

The enormous impact of the COVID-19 pandemic on the global economy and financial markets worldwide may have a substantial impact on regulatory and legislative agendas.

Existing regulatory and legislative plans may shift in favor of new priorities as a direct result of the pandemic. For example, certain post-Lehman regulations that had unintended consequences in the wake of the COVID-19 outbreak – higher capital requirements being a case in point – could be rolled back to prevent future negative effects.

- **Regulatory responses** were initially aimed at maintaining financial market stability and addressing the liquidity, credit, investment and risk management needs of retail and corporate customers. Initial responses focused on relief measures offered to consumers and businesses in the context of the COVID-19 crisis, which included: (i) providing public support to promote liquidity and smooth market functioning; (ii) extending public comment periods for policy-making action; (iii) extending compliance periods for existing regulatory requirements, and (iv) granting targeted, temporary relief for businesses and the unemployed. As the pandemic has progressed, regulatory focus expanded to include statements, guidance, reprioritizations, and rule revisions intended to further promote financial market stability and safeguard the resilience of market participants.

In the U.S., the SEC focused on, among other things, monitoring market functions and system risks, and providing regulatory relief and guidance to registrants to facilitate continuing operations, including in connection with the execution of their business continuity plans. In addition, because of the intermittent COVID-19 related suspension of physical securities processing by DTC, the SEC provided limited exemptive relief to market participants from the “locate” and “close-out” requirements of Regulation SHO.²¹ The Commodity Futures Trading Commission (CFTC) took various actions to help facilitate orderly trading and liquidity in the U.S. derivatives markets, as well as to allow market participants to implement social distancing measures. Of note, the CFTC extended the compliance periods for the collection of initial margin requirements for uncleared swaps by one year for specified covered swap entities.

Regulators in Europe and Asia took similar actions as those taken in the U.S. and increased local and international coordination on both a bilateral and multilateral basis. ESMA, for example, clarified the requirements regarding the recording of telephone conversations, provided relief for a number of regulatory deadlines, including the Securities Financing Transaction Regulation (SFTR) deadline and potential postponement of the Central Securities Depositories Regulation (CSDR) settlement discipline, and coordinated the implementation of short selling measures in a number of member states. The Bank of England introduced certain VaR back-testing exceptions to mitigate the possibility of excessively procyclical market risk capital requirements, which are now due to expire. Similarly, in Asia, the Monetary Authority of Singapore (MAS) launched a grant to support Singapore-based fintech firms amid the challenging business climate caused by COVID-19.

Regulators continue to monitor developments related to the COVID-19 outbreak and we expect them to further take steps to support the orderly functioning of the financial markets.

- **Legislative priorities** have also been impacted by the COVID-19 pandemic. In the U.S., it has spurred immediate action to respond to the crisis in the form of emergency spending bills; bolstered new legislative initiatives to address issues brought to the forefront during this pandemic – including minimum living wage proposals, pandemic risk insurance, and central bank digital currencies (digital dollars); and provided new

²¹ Regulation SHO was adopted to update short sale regulation in light of numerous market developments since short sale regulation was first adopted in 1938 and to address concerns regarding persistent failures to deliver and potentially abusive “naked” short selling.

momentum to policy issues that may help responses to future pandemics, such as federal data privacy standards, as well as improving domestic manufacturing and supply chains, especially for products deemed critical for public health.

Since March 2020, Congress has passed four bills authorizing roughly \$3 trillion in spending to respond to the pandemic and stabilize the economy – while negotiations with respect to additional stimulus measures are ongoing. These bills have prioritized funds for virus testing and other public health measures, cash relief for individuals, expanded unemployment insurance, aid to the airline industry, forgivable loans for many businesses and other programs aimed at responding to the impact of the virus. Congress has generally not included provisions directly aimed at the financial services industry in its pandemic response bills to date – an indication of the strength of the sector throughout the crisis.

The EU adopted a number of amendments to its banking rules in order to facilitate lending and proposed changes to legislation for capital markets to support the recovery. In the Eurozone, the ECB is considering the launch of a digital euro, noting that the COVID-19 crisis “might accelerate changes in payment habits and increase the use of electronic payments.”

The pandemic might also strengthen the global tendency towards more nationalistic measures, which in turn could affect regulatory and legislative initiatives, as well as international cooperation within and among supervisory bodies. That said, financial markets regulators have so far sought to coordinate their responses through supranational standard-setters, such as the International Organization of Securities Commissions (IOSCO), the FSB, and the Basel Committee on Banking Supervision (BCBS).

3) The COVID-19 pandemic may exacerbate existing systemic vulnerabilities

High levels of global indebtedness and elevated asset valuations are two examples of systemic vulnerabilities that were highlighted by several central banks and research organizations prior to the coronavirus outbreak.

The massive size of government stimulus measures worldwide to mitigate the impact of the COVID-19 pandemic will inevitably exacerbate sovereign indebtedness for years to come. At the same time, several major equity markets have recovered to pre-pandemic levels within months of the coronavirus outbreak – raising concerns about the potential for a growing disconnect between financial markets and the evolution of the real economy.²²

“The expectation of continued support from central banks could turn already stretched asset valuations into vulnerabilities. [...] At the same time, policymakers have to keep in mind that rising debt levels represent a vulnerability.”

Tobias Adrian, IMF Financial Counsellor and Director of the Monetary and Capital Markets Department during a June 25, 2020 press conference on the Release of the Global Financial Stability Report Update

While these are just two examples of existing risks that are impacted by the COVID-19 outbreak, it should be noted that second-order effects may also have considerable longer-term ramifications. In this context, it is worth mentioning that initiatives to bring supply chains (especially for products deemed critical for public health) back

²² In its June *Global Financial Stability Update*, the IMF warned that global financial stability could be affected by an emerging disconnect between financial markets and the evolution of the real economy amid huge uncertainties about the extent and speed of the economic recovery from the coronavirus pandemic.

within national borders, or at a minimum make them less dependent on China as a manufacturing base, have already started:

- The Trump administration invoked a Cold War-era law to direct manufacturing of protective equipment, especially masks, and other medical devices to the U.S. (from China). U.S.-based companies, such as General Motors, have repurposed some of their production lines to produce ventilators and other medical supplies.
- Japan has set aside \$2.2 billion of its coronavirus economic stimulus package to support a shift in production outside of China.
- In the EU, an important guiding principle when drafting and implementing recovery measures will be to increase the Union's "strategic autonomy," reducing its dependence on other jurisdictions, especially in the areas of technology, defense and other strategic domains.

4) Impacts on the financial services industry

The effects of the pandemic will reverberate through the financial industry for years to come. Even in a best-case scenario, banks and other lenders may suffer substantial credit losses. Additionally, a protracted low-interest environment will continue to weigh on the profitability of the financial sector and might even contribute to further consolidation within the industry.

In a worst-case scenario, the trend of rising loan delinquencies and defaults could continue or even worsen into 2021 as stimulus measures dissipate and subsequent COVID-19 waves lead to renewed lockdown measures. The timing or speed of such stresses could impact the banking sector's capital and, in turn, could lead to another retrenchment of credit extension.

Some market participants may choose to deprioritize change and innovation initiatives as resources are refocused on maintaining business-as-usual in an economic slowdown. Previously planned transformation efforts may be delayed or suspended in favor of investing in collaboration and networking technology to adapt to a WFH environment.

At the same time, other strategic initiatives may also become more urgent or more critical, as paper-based or highly manual processes have proven inadequate for a remote work force in times of market stress, elevated volatility and high volumes. Digitalization and outsourcing are expected to accelerate as some firms no longer want to take on the operational exposure to high-risk areas within their operations, front-, middle-, and back-office.²³ This trend is reinforced by the demand for higher levels of resiliency, from clients and regulators alike.²⁴

In light of these changes, many financial services firms are expected to reprioritize their project pipeline and even change their operating models. These developments may also impact concentration and interconnectedness in the financial ecosystem. For example, the European Systemic Risk Board (ESRB) expects the number of institutions offering client clearing services to decrease in the short and medium term.²⁵

²³ See, among other sources: European Securities and Markets Authority. *ESMA Report on Trends, Risks and Vulnerabilities No. 2, 2020*. 2 Sept. 2020.

²⁴ For example, in August 2020, the SEC's Office of Compliance Inspections and Examinations issued a warning to firms to monitor functions that might be vulnerable to market turbulence as they transition to remote working (for additional details, see: <https://www.sec.gov/files/Risk%20Alert%20-%20COVID-19%20Compliance.pdf>)

²⁵ European Systemic Risk Board. *Liquidity Risks Arising from Margin Calls*. June 2020.

RISK MANAGEMENT IMPLICATIONS AS A RESULT OF THE PANDEMIC

At this point, it is worth identifying some key risk management observations and implications that are starting to emerge from this period of extended market stress to better prepare for future challenges ahead. These include the following:

1. The impact of the pandemic on markets is a real-life stress test for FMI risk models.
2. The market stress that materialized in March 2020 provided additional data with respect to the impacts of margin procyclicality and the need for CCPs to be even more transparent so that clearing members are never surprised by the size of an overnight or intraday margin call.
3. FMIs should take an enhanced sector-specific approach to managing credit risk to better evaluate the impact on individual counterparties in the context of the environment for their particular sector and peers.
4. Given the aforementioned spikes in market volatility and margin calls, FMIs should constantly reassess clearing members' available liquidity, as this can quickly change in a crisis.
5. The "new normal" creates new operational risks that must be managed on an ongoing basis.

1) The impact of the pandemic on markets is a real-life stress test for FMI risk models

The onset of the COVID-19 pandemic caused market turmoil on a global scale. Widespread market dislocations, combined with public sector interventions that also impacted prices and asset correlations, strained the ability of certain risk models that are based on historical data to produce reliable output. For instance, volatility resulting from COVID-19 created uncertainty in forward rates, origination/refi pipelines, and supply/demand dynamics that were not reflected in the historical data used to construct and calibrate prepayment models for mortgage-backed securities. Oil market dislocations that drove the settlement price for West Texas Intermediate (WTI) crude futures to a negative price for the first time in history, while short-lived, provided another example of how risk models were tested during this period of extreme volatility.²⁶

The extraordinary interventions by the public sector through Federal Reserve actions in liquidity markets, asset purchases, etc., along with several rounds of stimulus packages directly to consumers, have likely stemmed the duration and severity of the economic and financial market downturns to date. That said, these actions also have the potential to skew or mask the true economic conditions and therefore the accuracy of traditional probability of default (PD) rating models that use financial statement data as model inputs.

The correlations between macroeconomic risk factors and default probabilities have traditionally been sufficiently stable and statistically significant for credit risk models. These models were typically recalibrated on a periodic basis to account for gradual shifts over time. However, the magnitude of the sudden macroeconomic shocks that have been observed since the outbreak of the coronavirus may require a reassessment and recalibration of models to help make sure they are still fit for purpose (see subsequent section *FMIs should take an enhanced sector-specific approach to managing credit risk*).

It is important to note that models designed to function in "normal" markets should not be discarded simply because they have limitations that emerge in extreme market circumstances. That said, FMIs should have

²⁶ The inability of the Black-Scholes options pricing model to accept negative prices highlighted model limitations for risk professionals (source: Farrington, Stella. "A Positive Response to Negative Oil Prices." *Risk.Net*, 8 June 2020).

sufficient model performance monitoring, strategies and governance in place to timely identify and address emerging model risk issues.

Switching to an alternative model that is specifically designed to provide sufficient coverage in stressed market circumstances could be an example of such a model strategy. It is worth noting that the costs and additional complexities associated with developing, maintaining and testing two sets of models – one for regular market conditions and another one for periods of market stress – may be prohibitive. Additionally, it may be hard to objectively determine which circumstances constitute an appropriate level of market stress to switch from the regular to the alternative risk model. As such, increasing the frequency of data collection, model calibration, stress testing or other processes may be a more practical approach to refine models and enhance coverage levels.

The most difficult challenge for FMI in this context is not maximizing coverage levels as an isolated objective – the true goal is to achieve a desired coverage level as efficiently as possible, i.e., with the minimum amount of margin collateral that is required. This will always be a balancing act that requires expert judgment and continuous reassessment.²⁷

2) The market stress that materialized in March provided additional data with respect to margin procyclicality

Prudent margining is a key component of how CCPs help safeguard financial stability in times of market stress. A common characteristic of margin calculations is that they are risk-based, i.e., they are designed to dynamically respond to changing levels of volatility. As such, risk-based margining methodologies are naturally procyclical, meaning they tend to generate increased margin requirements during times of market turbulence.

Margin procyclicality thus has the potential to create additional pressure on firms that do not have adequate financial buffers when volatility increases – particularly as their portfolios become more directional and/or are exposed to material idiosyncratic risks. In extreme cases, this could turn a severe market shock into a liquidity issue, which might even become systemic.

Regulators have become increasingly aware of, and concerned about, the risks that excessive margin procyclicality may pose to financial stability. While the topic of margin procyclicality emerged well before the COVID-19 pandemic materialized, the extreme volatility that affected markets in the wake of the coronavirus outbreak is likely to bring it even more prominently into focus over the next few years.

Margin procyclicality can be assessed in terms of size (i.e., the relative difference between margin requirements in a low-volatility environment vs. a high-volatility environment) and velocity (i.e., the rate of change in margin requirements over time). The callout box on the next page provides additional details on two specific measures of procyclicality that the ECB employed in its October 2019 CCP margin procyclicality assessment.²⁸

²⁷ DTCC continuously looks for opportunities to further enhance its margin methodologies as part of its model risk framework. The proposed re-introduction of a VaR floor for MBS margin portfolios in circumstances where the floor amount is greater than the projected VaR amount is an example of an initiative that was initiated prior to the coronavirus outbreak to provide additional protection in times of market stress.

²⁸ Cominetta, Matteo, et al. "Investigating Initial Margin Procyclicality and Corrective Tools Using EMIR Data." *European Central Bank*, 29 Oct. 2019.

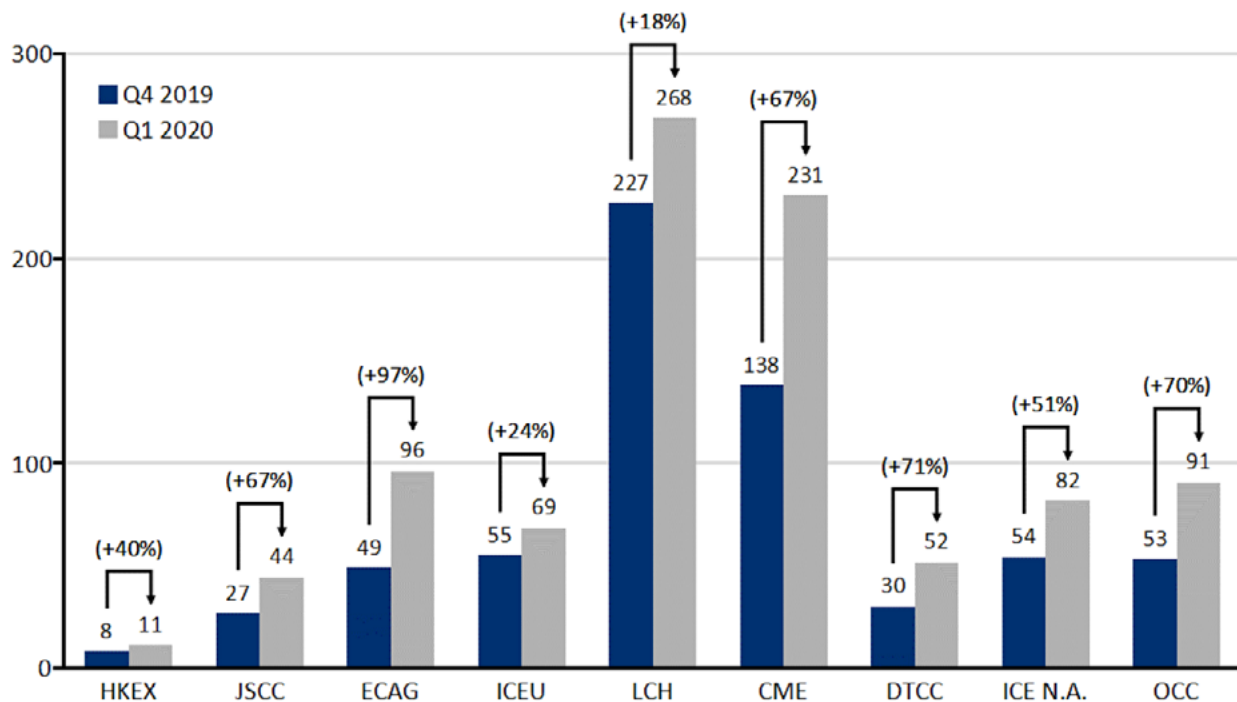
MEASURING MARGIN PROCYCLICALITY

In its October 2019 CCP margin procyclicality assessment, the ECB employed two measures of procyclicality:

1. a “peak-to-trough” measure representing the difference between the highest and lowest value of the margin simulated throughout the sample period, and
2. a “20-day average increase” measure that provides the average of the top 10% increases of margins in 20 trading days.

The first is a measure of long-term procyclicality in the sense that it measures the extremes that margin requirements can reach through a cycle. The second measure identifies short-term procyclicality, as it isolates the biggest increases that margin requirements experience in 20 trading days (i.e., approximately one month).

The CCP12, a global association of 37 members who operate more than 60 individual CCPs worldwide, performed a comparative assessment of relative margin changes from 4Q 2019 to 1Q 2020. This analysis found that, while the level of procyclicality does differ across FMIs, there is no significant difference between those that employ EMIR compliant anti-procyclical margin charges and those that do not (see chart below, which shows CPMI-IOSCO recommended quantitative disclosure 6.1.1, Total Initial Margin Required, as of quarter end – 4Q 2019 vs. 1Q 2020 in bn USD).²⁹



Lowering margin procyclicality – in terms of size and/or velocity – can be done by:

- » changing one or more existing model parameters (such as the length of the lookback period, decay factors, the way historical price fluctuations are being weighted, etc.), and/or
- » introducing additional parameters that affect the level of margin procyclicality more directly (e.g., by capping the maximum daily margin increase to a certain maximum percentage).

²⁹ CCP12. CCPs Again Demonstrate Strong Resilience in Times of Crisis. 7 July 2020.

It should be noted that lowering margin procyclicality and ensuring margin efficiency (i.e., meeting a pre-determined target loss coverage level with the minimum amount of margin needed for this purpose) are often competing objectives during a stressed period.

However, the most important goal for CCPs is to make sure that the margin they collect is sufficient to protect themselves and their members in times of stress. That overarching goal is subject to extensive governance and oversight as it is a prerequisite for CCPs to fulfill their mission of safeguarding financial stability. As such, any measures to limit procyclicality must be subordinate to maintaining an adequate level of protection in extreme but plausible circumstances. For instance, while the introduction of a margin ceiling may have a strong mitigating effect on procyclicality, it can also result in substantial under-margining during a period of market stress – and therefore may be an imprudent measure that unintentionally puts FMIs, their clearing members and the broader financial markets at risk.

As such, the real challenge FMIs face in optimizing their margin methodologies is to maintain the right balance between risk sensitivity and protecting itself as well as its clearing members. In light of the numerous tradeoffs and competing goals described above, this is a multi-dimensional challenge that requires careful analysis that must be performed on a case-by-case basis.³⁰

Finally, it is worth reiterating that margin procyclicality in itself is not inherently problematic – the potential risks associated with procyclicality can only materialize to the extent that FMI members are not sufficiently equipped to anticipate the impact of volatility spikes on their margin requirements. As such, it is important for FMIs to promote margin transparency by developing tools that allow their members to better understand their risk models and accurately project margin requirement increases under a wide range of circumstances.

³⁰ For example, following extensive internal analysis, MBSD will be introducing a floor charge given the market uncertainty/impact primarily around prepayments and the Fed purchase program. Introducing a margin floor for NSCC, on the other hand, appears to come with significant expense and limited procyclical benefits. NSCC will therefore continue to assess how margin component charges respond to changes in market volatility and settlement volumes.

DEVELOPING TOOLS TO ENHANCE MARGIN TRANSPARENCY

It is crucial for clients to have a thorough understanding of how their trading activity impacts their margin requirements, especially during periods of high volatility. As such, DTCC has developed a set of data tools and capabilities that are designed to provide clients greater margin transparency.

DTCC Risk Management as a Service (RMaaS) delivers firm-specific aggregated data to monitor risk exposure with respect to clients' current and historical portfolios. This service helps clients perform start-of-day and intraday risk monitoring as well as VaR attribution and forecasting:

- RMaaS enables clients to more effectively monitor and manage intraday risk exposure. As a result of delivering timely data and analytics, members can review up to 15-minute intraday slices to better anticipate potential intraday margin calls and manage cash positions. The service provides increased transparency by allowing firms to monitor and analyze the same intraday risk exposure data as DTCC's own Financial Risk Management department.
- DTCC's VaR Calculator delivers improved margin transparency by providing CUSIP-level position details to identify key drivers and diversification offsets with frequent intraday portfolio updates. The VaR Calculator allows a simulated volatility forecast to help with more efficient capital planning and overnight cash utilization.

Firms can use the VaR Calculator to submit hypothetical portfolios and retrieve a detailed breakdown of the simulated volatility charge from DTCC's risk engines. For enhanced pre-trade planning, firms can assess the marginal impact of a large block trade to a portfolio VaR by seamlessly adding a position and comparing the results. Additionally, firms can quickly check the simulated volatility of a portfolio in the evening to forecast volatility charges for the next morning.

RMaaS is available through the Risk Client Portal, which allows clients to view and download historical risk data, including clearing fund requirements, and create their own "what-if" portfolio and conduct market risk analyses. The service is also available to member firms via the API Marketplace, which offers a flexible delivery method to provide risk data and allows clients to access the data and functionality provided in the NSCC Risk Client Portal in a more automated fashion.*

To further enhance margin transparency, DTCC also released the detailed algorithm of its proprietary VaR formula, providing clients the ability to replicate the NSCC VaR formula within their own applications.

** DTCC's API Marketplace provides clients with a single, secure, centralized location to access Application Programming Interfaces (APIs) developed by DTCC. APIs make it easier to access information and they provide greater levels of flexibility as well as a superior client experience.*

3) FMs should take an enhanced sector-specific approach to managing credit risk

Despite a rebound in financial markets and marked improvement in unemployment numbers and certain other economic data, the ultimate length and severity of the pandemic and its impact on the U.S. and the global economy continues to be unclear. Credit risks remain elevated as financial firms' profitability, asset quality and capital positions are under pressure due to loan delinquencies and defaults, which are likely to continue to rise.

As such, FMs proactively monitor the credit standing of their members and enhance their credit risk management functions by reviewing news and research from various sources to identify and assess potential sources of stress in member portfolios.

It is becoming increasingly clear that there is a significant divergence of recovery prospects across different corporate sectors, geographies and socio-economic variables – a so-called K-shaped recovery.³¹ The extent to which banks and other financial institutions are exposed to sectors that are particularly vulnerable to the economic fallout of the pandemic (such as activities related to travel and leisure), is a key consideration in this regard. A recent McKinsey report mentions an analysis undertaken by a UK bank to quantify the probability of default (PD) change for each sector by stress testing the profit and loss of the counterparties on the basis of the expected shock and recovery trajectories for each sector, reassessing the debt repayment ability accordingly. The results proved that the PD shock can vary three or four times in magnitude.³²

Credit risk assessments therefore need to include a sector-specific lens, with a focus on firms with the greatest concentration of risk. Potential sources of stress in member portfolios have arisen from: (i) energy exposures; (ii) exposures to construction loans and Commercial Real Estate (CRE); (iii) exposures to Collateralized Loan Obligations (CLOs); (iv) having parent-entities organized as mortgage-REITs, and (v) credit card loan concentration. Additional indicators of weakness at major banks can be found by analyzing bank stress test results, as well as macroeconomic and loan delinquency data released by various sources, such as the Federal Reserve, credit reporting agencies and other specialized agencies.

Below are a few selected metrics available on delinquency trends, gathered from available sources:

- » **Mortgage Delinquency Trends:** According to Black Knight, a mortgage sector data provider, mortgage delinquency (30+ days past due) has risen sharply, reaching 7.8% in May 2020, a 131% year-over-year increase. The delinquency rate dropped slightly to 6.9% in July 2020. By way of comparison, the delinquency rate during the Credit Crisis reached a high of around 11% in mid-2009 (also per Black Knight).
- » **Auto & Credit Card Delinquencies:** According to TransUnion's Monthly Snapshot Report, accounts under hardship rose sharply in consumer loan segments in May 2020 and remained elevated in June, before declining marginally in July.³³ Large banks have also noted in their 2Q 2020 results that many customers continue to remain current, despite enrolling in the deferral programs (credit card borrowers typically have to pay only a small portion of their outstanding balance to stay current).
- » **Commercial Mortgage-Backed Securities (CMBS) Delinquencies:** Trepp, a provider of data on securitized mortgages, reported a sharp rise in CMBS delinquencies, increasing to 10.3% in May, while dipping marginally to 9.6% in July. This metric is an indicator of stress in the CRE sector, particularly in the lodging and retail segments.
- » **Trends in Criticized Loans at U.S. Banks:** S&P Global Markets Intelligence recently reported that *criticized loans*³⁴ increased by more than 50% from 4Q 2019 to 2Q 2020 at 16 of 25 publicly traded U.S. banks with more than \$50B in assets, which is another indicator of rising stress in banks' loan portfolios. While banks appear to have adequate capitalization to meet potential losses at current levels of criticized loans, these numbers should be closely monitored for any signs of a worsening trend.

³¹ Regional heat maps that include sector-level impact and recovery estimates across Asia-Pacific (APAC); Europe, The Middle East, Africa (EMEA); Latin America (LatAm); and North America can be found in: Shoemith, Jeanne L., et al. "COVID-19 Heat Map: Updated Sector Views Show Diverging Recoveries." *S&P Global Ratings*, 29 Sept. 2020.

³² Koulouridi, Efstathia, et al. "Managing and Monitoring Credit Risk after the COVID-19 Pandemic." *McKinsey & Company*, Oct. 2020.

³³ The credit reporting agency TransUnion provides "hardship" information based on the data it receives. TransUnion defines "hardship" as "a delinquency category that is hardship flagged (affected by natural/declared disaster, accounts reported as in forbearance, accounts reported as deferred or payment due amount removal, or freezing of account status and/or past due amount)."

³⁴ *Criticized loans* are loans categorized as "special mention, substandard, doubtful or loss," i.e., loans experiencing any form of credit issue.

It's important to note that the above delinquency statistics need to be reviewed with caution as the extraordinary intervention by the public sector in the form of multiple stimulus packages, forbearance on delinquent consumer payments on mortgages, etc. is potentially masking the true extent of the financial stress on consumers. The *Semiannual Risk Perspective* that was recently published by the Office of the Comptroller of the Currency (OCC) explicitly warns that the system-wide offering of proprietary relief and mandated programs coupled with unprecedented stimulus efforts is likely masking potential losses within the financial services industry, while commercial, retail, and mortgage credit risks are increasing.³⁵ Should the pandemic continue as a significant threat well into 2021 and stimulus packages wane, consumer defaults may spike well beyond recent levels, which may translate into higher loan losses for the banking sector.

FMI should closely monitor the metrics described above for any signs of a worsening trend that could point to the development of systemic issues. They should also identify members that are deemed to present a high risk of default and for which special risk mitigating actions become necessary. A targeted outreach to members with concentrated portfolios is a prudent approach to enhance credit risk management in the current circumstances.

4) Given the aforementioned spikes in market volatility and margin calls, FMIs should constantly reassess clearing members' available liquidity, as this can quickly change in a crisis

The events of the past few months have reiterated how important it is that CCP clearing members and their clients maintain sufficient financial resources to meet margin calls in a timely fashion.

The ESRB included the following observations in a recent report:³⁶

"Margin frameworks have responded broadly as expected so far, reflecting the smooth functioning of cleared and bilateral markets and timely payouts by market participants. Market participants have met margin calls in centrally cleared markets with only minor operational delays in some cases, which they promptly solved without putting counterparties at risk. [...] Clearing members have also continued to post high levels of excess collateral at CCPs, which could be interpreted as a precaution against future margin calls or, possibly, as a sign that market participants have not so far faced widespread difficulties in sourcing collateral."

While these initial observations are encouraging, continued vigilance on the part of FMIs is appropriate in light of continuing challenges related to the ongoing pandemic. As such, the report mentioned above also warns that *"Going forward, the ability of market participants to meet margin calls will depend on future levels of volatility and the ongoing resilience of their liquidity management (although solvency risks cannot be excluded)."*

A robust risk management approach by FMIs warrants an ongoing reassessment of clearing members' financial resources, particularly liquidity. A proactive approach to counterparty risk management requires risk managers to not assume that their past evaluations of counterparties are still valid, but instead to constantly reassess in the context of challenging macroeconomic developments and a stressed market environment.

³⁵ Office of the Comptroller of the Currency. *Semiannual Risk Perspective for Fall 2020*. 9 Nov. 2020.

³⁶ European Systemic Risk Board. *Liquidity Risks Arising from Margin Calls*. June 2020.

Financial firms face a tradeoff between maximizing profitability and ensuring sufficient financial resources in a crisis. Retaining a surplus of capital that is not deployed or maintaining numerous sources of alternative liquidity may be crucial in a crisis, even though it could be inefficient from a capital usage and profitability perspective.

The details of these backup resources must also be scrutinized to assess how firms are handling this tradeoff. For instance, a committed line of credit is more likely to be available in a crisis than an uncommitted line of credit. Similarly, an unsecured line of credit, while more costly and difficult to obtain for lower credit quality counterparties, represents a more reliable source of liquidity in times of stress than a secured line of credit, which is dependent on the availability or the value of underlying collateral. Liquidity resources may also be subject to limitations on their usage, which may reduce their value in a crisis. For example, liquidity that can only be used for working capital purposes is not useful when a firm faces significant margin calls for which the liquidity cannot be tapped.

FMI must assess how their counterparties have chosen to balance these tradeoffs, and whether they have allocated sufficient resources for normal times, mildly stressful circumstances, or events, such as the COVID-19 pandemic.

Even after an FMI has assessed a counterparty's preparation for a crisis, which should be done proactively well before any stressed event, the FMI must also reassess its conclusions for each counterparty once a crisis ensues. Available liquidity or funding can quickly evaporate in a crisis. Even a committed line of credit may be rescinded in times of severe stress, or the terms of funding agreements may be subject to renegotiation. As noted earlier, a secured credit line may vanish as collateral plunges in value. Obscure stipulations may render a liquidity source nonexistent in a crisis. A firm that appears to have ample liquidity ahead of a crisis may in reality be strapped for cash in a crisis as liquidity sources evaporate.

Maintaining sufficient liquidity is also a concern for all counterparties, not just those facing obvious challenges amid market turmoil. For example, the whipsawing of financial markets in March allowed many firms to generate substantial profits due to market-making activity or being well-positioned for the market gyrations. However, these market swings can generate daily or intraday need for liquidity, while a counterparty's resources may be tied up in securities that cannot be immediately converted into liquidity, creating a temporary timing mismatch and insufficient liquidity even for a highly profitable counterparty. FMIs need to ensure their clearing members can meet margin calls at all times, not just when the dust clears and firms can cash out their gains to generate additional liquidity.

5) The “new normal” creates new operational risks that must be managed on an ongoing basis

As mentioned before, FMIs have been able to successfully transition to WFH without material impact to services, thanks to thoughtful risk management practices, as well as significant pre-pandemic investments in business continuity planning and supporting technological capabilities.

FMI workforces (both employees and consultants) are working remotely in much larger numbers and for a far longer period than anticipated and there is no evidence at this point that this has increased the severity of operational issues within FMIs. In addition, many FMIs are currently in the process of developing return to office plans, which may differ considerably depending on firm-specific circumstances (including location, local public health measures and statistics, staff demographics and a wide array of other factors).

An extended WFH environment and development of return to office plans that may include a change in staffing models creates the need to develop and implement new capabilities that allow for effective identification, monitoring and managing of the associated risks. Some examples include consideration for risks to the mental and physical health of employees (i.e., impacts of decreased social interaction and families adjusting to WFH); onboarding and offboarding processes for employees; enhancing technology controls to address risks associated with new collaboration tools; and reconsideration of contingency plans that were previously based on employees working out of an office location. Given the breadth of these risks, establishing new practices requires collaboration across various Subject Matter Experts (e.g., Business Lines, Risk, Human Resources, Information Security, Technology, Legal and Compliance).

Additionally, as discussed in the first section of this paper, which describes the initial impact on financial markets and securities processing, the expected long-term industry shift to a WFH framework has introduced a number of new cyber risk considerations. As a result, financial sector firms must address these emerging risks by developing appropriate risk monitoring tools and integrating such tools into their existing cyber risk management frameworks.

FMI's will also need to evaluate strategies and controls in place to mitigate the operational risks created by a potential outage related to a critical third party. This includes consideration for testing and availability of back-up providers and failover procedures. Industry coordination may be required to enable alternate processes in the event of a critical third party outage. Standard contract clauses (e.g., force majeure) may need to be reevaluated and risk assessment, and ongoing monitoring processes may need to be adjusted to take into consideration lessons learned from the pandemic. FMI's should not underestimate the benefit of strong relationships with key third party contacts, as these individuals can serve as first responders, as well as proactive partners in addressing new and emerging risks.

CONCLUSION

The spread of COVID-19 and its economic impact triggered a global sell-off in financial markets in February and March, which was associated with surging levels of volatility and trading volumes, as well as liquidity contractions.

FMI around the world demonstrated their operational resilience in the face of the challenging conditions described above as they transitioned to a WFH environment. They continued to operate as expected and even with trade volumes at or around record levels, processing capacity was never an issue.

That said, the “new normal” creates new operational risks that must be managed on an ongoing basis. The pandemic has also provided a renewed impetus to achieve full dematerialization to eliminate the operational risks associated with processing physical securities.

The impact of the pandemic on markets constituted a real-life stress test for risk models as margin surged amid spikes in volatility. FMI contributed to safeguarding global financial stability thanks to the robustness of their financial risk management frameworks. The market stress of the past few months also provided additional data with respect to margin procyclicality, a topic that continues to be in focus. As COVID-19 continues to run its course, FMI should constantly reassess clearing members’ available liquidity, which can change quickly in times of stress.

While these are just a few key implications emerging from the current pandemic, we are looking forward to continuing an ongoing dialogue with our regulators, our peers and our clients on additional ways to better prepare for further challenges.

As such, we encourage you to share your comments and feedback with us.

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