



TC NOTES

PRACTICAL **LEADERSHIP**
AND **GUIDANCE** FROM
TORONTO CENTRE

DESIGNING AND IMPLEMENTING A SYSTEMIC FINANCIAL CRISIS MANAGEMENT SIMULATION

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DESIGNING AND IMPLEMENTING A SYSTEMIC FINANCIAL CRISIS MANAGEMENT SIMULATION

I. Introduction¹

Toronto Centre (TC) began running financial crisis management simulations (FCMS) in 2008 as part of its courses on financial crisis management. These simulations proved to be a popular and effective learning tool, and to date TC has completed more than 100 FCMS. The scope of these simulations varies. Some are narrowly designed as part of sector-specific programs to test the crisis response within the specific sector. Others are designed to explore systemic financial crises and system-wide financial crisis responses.

System-wide financial crisis management simulations (SWFCMS) delivered by TC are of two types:

Standardized simulations are intended to introduce participants in TC financial crisis management courses to the main elements of financial crisis response. The standardized simulations focus on the roles of critical agencies – particularly the supervisory authorities, central banks, depositor and policy holder protection agencies, resolution authorities, and the Ministry of Finance; the importance of coordination and communications in crisis management; and the use of crisis management tools in responding to an evolving crisis. While based on fictional countries and financial systems, the standardized simulations are designed to be realistic in their content.

Bespoke simulations are designed to reflect the actual financial system, institutional framework, and crisis management tools in the particular jurisdiction or jurisdictions where the SWFCMS is to be implemented. These simulations may be run as part of TC financial crisis management courses or as standalone exercises. These simulations essentially constitute targeted stress tests of the jurisdiction's financial crisis preparedness.

The bespoke simulations are considerably more time-consuming to prepare than the standardized simulations, as they require the detailed simulation of actual financial systems. In view of this, bespoke simulations are most appropriate once the jurisdiction has already advanced its financial crisis management frameworks, including through running some standardized simulations.² In such cases, the bespoke simulations provide tremendous learning opportunities about the jurisdiction's crisis preparedness.

This TC Note provides background on the design and implementation of bespoke SWFCMS intended to test system-wide responses to financial sector crises. The approach has evolved from TC's experience with the design and implementation of its standardized simulations, with which it owes common elements, and draws on TC's practical experience in delivering bespoke

¹ Prepared by R. Barry Johnston.

² The TC Note "Crisis Binder: An Essential Tool for Crisis Preparedness" (Toronto Centre 2019) covers some other aspects of crisis preparedness.

SWFCMS. The Note will hopefully provide useful background for jurisdictions which may be interested in organizing a SWFCMS.

This Note is outlined as follows: Section II discusses the objectives of system-wide bespoke FCMS; Section III provides an overview of the design of SWFCMS; Section IV discusses the technical and operational aspects of designing and implementing a bespoke simulation; and Section V concludes.

II. Objectives of bespoke system-wide financial crisis simulations

Bespoke SWFCMS are intended to test a jurisdiction's preparedness to respond to a systemic financial crisis. By systemic, it is understood that the financial crisis would involve a failure in the financial system that would result in serious adverse consequences for the financial system and the wider economy.

Key elements that a FCMS is intended to test include:

- The effectiveness of communication among all relevant parties during a financial crisis. Communication is an essential element of an effective crisis response. The communications to be tested include communications between and within the agencies responsible for crisis management and externally with the press and the public;
- Clarity on governance and decision-making procedures within and between the relevant authorities responsible for the crisis response. An effective crisis response requires that agencies have well-defined procedures to address a financial crisis and that they are knowledgeable about their responsibilities and those of other agencies, and can coordinate a response;
- Specific crisis management tools, including the adequacy of policy and decision-making:
 - In the supervisory agencies, including their remedial responses and decision-making on declaring financial institutions as failed or likely to fail (insolvent).
 - In the central bank (CB) on emergency liquidity assistance (ELA).
 - In the deposit insurance and policy-holder protection agencies.
 - In the authorities responsible for the closure or resolution of failed institutions, including their preparedness with the main resolution options and with the design and application of resolution tools.
 - In the Ministry of Finance.

During the SWFCMS, participants in the simulation are confronted with a stressed and potentially catastrophic financial crisis scenario. The scenario is modelled on the jurisdiction's financial system and institutional structure. Participants are expected to respond with actions, decisions, and communications to deal with the stressed situation, where their responses reflect their existing legal mandates and responsibilities. In reaching their decisions, participants have the capacity to communicate with other participants, with financial institutions, the press and the general public, and with authorities abroad.

In reaching their decisions during the simulation, participants should be aware of the broad objectives of an effective financial crisis management response, including the need to:

- Maintain the functioning of credit, money and financial markets and intermediaries

- Maintain domestic and international depositor, investor, and policy-holder confidence
- Arrive at decisions that, in addition to stabilizing the financial system, will create incentives for efficient financial market functioning
- Minimize fiscal costs

SWFCMS are fast moving, with simulation time much faster than real time. During a typical a 6-8-hour day set aside for the simulation exercise, the simulation would cover 1 week of simulation time. As a result, participants confront a highly-compressed schedule in which to assess information and to design and implement policy decisions.

Once the simulation has been completed, a post-simulation meeting should be held to review the experience with the participants and draw conclusions and lessons learnt from the exercise.³

III. Overview of simulation design

FCMS are designed to reflect the objectives of the jurisdiction in terms of what aspects of their crisis preparedness they wish to test.⁴

Participants

The participants in the SWFCMS are identified by the jurisdiction(s) that will engage in the simulation. Typically, financial crisis preparedness and response is the responsibility of a range of agencies:

- **Supervisory authorities** – oversight of financial institutions’ safety and soundness, implementation of early intervention and preventive measures in times of stress, oversight of market integrity and disclosure requirements, and identification and declaration of failure of institutions.
- **Central banks (CB)** – financial stability assessments, the functioning of the payments system, institution-specific and system-wide liquidity support, and emergency liquidity assistance (ELA).
- **Deposit/investor guarantee schemes (DGS) and policy-holder protection schemes (PPS)** – depositor/investor and policy-holder payouts in the event of the closure or restructuring of financial firms.
- **Resolution authorities** – resolution of failed institutions (the resolution authority may be one of the above authorities).
- **Ministries of Finance (MoF)** – state guarantees, fiscal costs, economic and political risks.

Crisis response is dynamic with each agency responding at different phases of the crisis and with different tools. For example:

- In the initial phase of the emerging crisis, the supervisory authorities and the CB are likely to be most active. The supervisory authorities assessing the solvency and liquidity of institutions (the emerging problems may be affecting banks, insurers, pension funds

³ Where TC runs a simulation, the TC Program Leaders (TCPLs) will prepare a report for the jurisdiction on the lessons learned from the exercise.

⁴ Where TC runs a simulation, the TCPLs will consult closely with a counterpart team from the jurisdiction in designing the simulation.

or securities firms, or some combination of them) and preparing and implementing early intervention measures; and the CB assessing the liquidity situation and possibly providing institution-specific and system-wide liquidity support.

- As the crisis deepens, the supervisory authority may have to determine if financial institutions have failed; the CB may be confronted with ELA requests, stress in the payments system and worsening system-wide illiquidity; the DGS and PPS may be facing questions about the coverage of the deposit- and policy-holder guarantee schemes and how long it may take for covered deposits and policies to be repaid; the MoF may be confronted with the need to provide guarantees to prevent a deepening of the crisis; and the resolution authority may be examining its options for resolving failed institutions.
- In the resolution phase, the resolution authority may be called upon to implement the resolution of the failed institutions; the DGS and PPS deposit/investor and policy-holder protection payouts; the MoF financial support in resolution; and the CB system-wide and bank-specific liquidity support.

Coordination among the participating agencies will be tested by the FCMS. Each agency has different powers and tools and has to operate under its own legal mandate. No single agency can resolve the crisis on its own and the evolution of the crisis will depend on how each agency responds at each phase. Uncoordinated responses can accentuate and deepen the crisis. For example, once an institution is declared failed by the supervisor, the CB may no longer be able to provide liquidity support and the institution may be placed into resolution. But what if the resolution authority has not been adequately prepared to handle the failure? The declaration of the failure may precipitate the financial crisis, as an ill-prepared resolution framework could result in the loss of depositor, investor, or policy-holder confidence. Coordination therefore needs to be forward-looking and requires participants to focus not only on the implementation of their own legal mandates and responsibilities, but the collective systemic impact of their individual decisions.

External authorities' participation in the SWFCMS should reflect the structure of the cross-border supervisory, regulatory, resolution, and support arrangements in the jurisdiction(s). In a full scope exercise, all relevant authorities should be involved. For example, if home/host relationships are to be tested, then both home and host authorities should participate in the simulation. In a less-than-full scope FCMS, the external responses may be simulated by role players for the external authorities. The function of role players is discussed in Section IV.

It is desirable that the participants in the SWFCMS are at the level of the decision-makers who would be involved in an actual financial crisis situation. This would generally mean the head or deputy head of the supervisory authority, the CB governor or deputy governor, the deputy minister, the head of the resolution authority, and the head of the DGS or PPS. Of course, these participants would be supported by the relevant crisis teams from their institutions.

Phasing

A FCMS is usually divided into phases in order to test the range of the authorities' crisis tools and responses. The following is an example of phasing and the FCM tools tested:

- **Initial "pre-crisis" phase:** for whatever reason, some small institutions are failing, individual larger institutions are approaching or breaching supervisory intervention

thresholds, and market liquidity is showing signs of stress. In the initial phase, the supervisors (this may be banking, securities, or insurance and pensions supervisors) are dealing with the failure of small institution(s) and assessing the need for remedial and early intervention measures in larger financial institutions; the CB may be employing its normal liquidity management tools to handle stress in the payments system; and the deposit and policy-holder insurers may be called upon to cover depositor or policy-holder losses in small institutions. Markets are functioning reasonably normally, but the situation is fragile and small institution failures, failures in communication, or the mishandling of liquidity stress could precipitate a rapid deterioration.

- **Financial crisis:** the situation deteriorates in the financial crisis phase, with an increasing risk of systemically-important adverse impacts on the financial sector or on the wider economy. This might be the failure of a systemically-important financial institution (SIFI – be this a bank, insurer, pension fund, securities firm, or financial market infrastructure such as a stock exchange), system-wide liquidity stresses, sharply declining asset prices, or some other malfunctioning of financial markets. Financial contagion generalizes the financial stress to solvent institutions. In this phase, supervisors are deciding whether and when to declare SIFI(s) as failed or likely to fail; CB is confronted with requests for ELA and with need to respond to the contagion and failures in normal market functioning; resolution authorities are considering the resolution options in the event of such failures; depositor and policy-holder protection agencies are likely to be facing questions about the coverage and speed of payouts; and the MoF is monitoring the situation and standing ready to assess the need for government interventions to help stabilize the financial system. The situation is extremely fragile and will spiral out of control without carefully considered and coordinated action.
- **Resolution:** the resolution phase requires the authorities to implement actions to stabilize the financial system and to allow institutions and markets to open and begin to function normally. In this phase, critical decisions are needed on the restructuring of the SIFI(s) and the application of resolution tools. Issues will include how to preserve the critical functions of the SIFI(s); solvency financing in resolution (including potentially from the government); and liquidity support so the institution can open. Secondary effects of the decisions on market, depositor, investor and policy-holder confidence will need to be assessed and addressed as part of the resolution package.
- **Post-resolution and end of simulation:** in the post-resolution phase, the markets and institutions react to the authorities' crisis response and the authorities have an opportunity to augment and modify their response. Have the authorities re-established market confidence? If not, what are their policy options? Do the resolution decisions need to be revised or clarified? Is (further) government intervention required?

Customizing

The SWFCMS should present the participants with a scenario that they can relate to/recognize in their jurisdiction. Designing elements that customize the simulationS to the jurisdiction's circumstances provide significant value added to participants compared with a standardized simulation.

Elements that help to customize the simulation include:

- Financial institution structure that is recognizable in the jurisdiction. This may include the types of institutions (size, functions); ownership and conglomerate structures of key institutions; critical instruments and markets; safety nets; designated supervisory responsibilities; payment system structure and rules; CB facilities; and financial regulations.
- Balance sheets of the institutions at the centre of the simulation that have features in common with local institutions. Features would include systemic importance; main balance sheet items and exposures; and branch, subsidiary and conglomerate structures.
- Financial market indicators that mirror local indicators and market structures.
- A narrative outlining the financial stability issues and vulnerabilities confronting the jurisdiction. The narratives can be developed by building on the tail risks identified in local financial stability reports, IMF financial sector assessments and the scenarios developed for the stress testing of the solvency of local financial institutions.
- The legal and regulatory framework, assignment of responsibilities, and policy tools that currently exist in the jurisdiction would be assumed to apply during the simulation.

IV. Technical and operational aspects of design and implementation

This section provides details on the technical and operational aspects of simulation design and implementation.

Message stream

Implementation of the FCMS is achieved through an e-mail message stream that provides the flow of information creating the crisis simulation⁵:

- The first step is to prepare an outline of the scenario, describing the structure and sequence of the crisis simulation, based on the objectives of the FCMS.
- Once the scenario is agreed in outline, the second step is to prepare a detailed narrative setting out the content and sequence of messages that would generate the scenario, and the information needed to support the messages. This narrative will anticipate and describe the authorities' expected responses at each phase of the simulation so that these decisions can be reflected in the message stream for subsequent phases. It may discuss the authorities' possible alternative actions and how these would be addressed during the simulation (see below). The detailed narrative will outline the sequence and content of messages and information that will be needed to create the narrative.
- The third step is to create the detailed information and messages that will be provided to the participants during the simulation, including for example detailed balance sheets.
- The fourth step is to determine which participants will receive which messages and information. As each participating team will be expected to perform its normal functions,

⁵ Where TC runs a simulation, the TCPLs work with their counterparts in the relevant jurisdiction(s) to prepare this flow of information. Each step may require a series of iterations to converge on an agreed structure and supporting detail. TCPLs can perform consistency checks on the information and the messages, and provide guidance and feedback to the counterparts in the preparation of the information.

they should receive only the information that they would obtain in the normal course of business. As a key objective of the simulation is to test collaboration among participants, the correct assignment of message and information is essential. Press and market reports are circulated widely. And every authority is likely to face difficult questions from the media and have to deal with social media messaging.

- Finally, it may be necessary to develop additional contingent information and messages.

The message stream generating the simulation will generally include:

- The stress events that generate the crisis.⁶
- The solvency of key financial institutions to be stressed during the simulation, usually presented as balance sheets for the institutions that evolve as the crisis develops.
- The liquidity position of the key financial institutions and of the financial system as a whole. The liquidity positions may be tracked through payments systems reports, which monitor the evolution of institution-specific and system-wide liquidity conditions and the collateral that is available to access CB facilities.
- The interconnectedness of the financial system, including deposits and loans between financial institutions, and cross-holdings of capital and other loss-absorbing instruments.
- Financial market conditions, monitored through evolving financial market indicators and reports describing financial conditions.
- Press reports and financial analysts' commentaries, providing the context for the financial crisis, describing public reactions, and commenting on the authorities' policy responses.

Tables 1 and 2 in the Annex to this Note provide examples of information that may be prepared.

The SWFCMS should challenge participants by introducing uncertainty into decision making. A way of doing this is to include in the message stream "information noise", such as:

- Speculative or false reports that obscure the underlying crisis scenario.
- "False dawns" that provide opportunities for solutions, but which turn out not to be permanent or realizable.
- Narratives that run parallel to the central crisis scenario requiring participants to prioritize the risks and their responses.

Participants will therefore receive messages creating a stressed and rapidly-evolving financial crisis situation. In addition to "information noise" there is also the problem of the absence of some information, or at least its unavailability within the very short time frames within which crises need to be managed.

"On-the-rails" design

Generally, FCMS are designed to follow a pre-specified path, known as an "on-the-rails" simulation. This approach requires the designers of the simulation⁷ to anticipate the participants'

⁶ There is no shortage of possible causal factors here, including excessive risk-taking by financial institutions, poor governance and controls in financial institutions, an adverse shock to a sector or geography to which financial institutions are heavily exposed, cyber-attacks, natural disasters, pandemics, and so on. Each of these may play out in different ways, and could therefore usefully provide starting points for a series of simulation exercises.

⁷ Again, this may be the TCPLs working with their counterparts in the relevant jurisdiction.

crisis responses and to build this into the design so that the simulation can progress smoothly from one phase to the next.

Participants are not restricted in their crisis response and may adopt a policy that is different from the one anticipated in the scenario. Different options can be followed depending on the nature of the deviation from the prespecified path.

One option is to include a default position, which specifies the assumed response used in the scenario. This default option is activated if the participants' decisions would significantly alter the path of the simulation. For example, say in phase 1 of the simulation, a bank has requested ELA and meets the requirements for it normally to be granted (systemically-important, solvent, with adequate collateral, and request for a temporary period). However, if for some reason the CB decides not to grant the ELA, and the resulting failure of the bank would significantly throw the simulation off track, the default position – that it is assumed that ELA has been granted – would be activated. The activation allows the simulation to proceed to the next phase on the pre-specified path. The post-simulation review should explore with the participants the reasons for and consequences of their decision not to grant ELA.

Another option that can be used is to have prepared different simulation paths. This approach can be applied when there is a clear binary choice facing participants. However, this approach expands significantly the work in preparing the FCMS, as not only the simulation path but the information supporting the alternative paths has to be developed in advance. Arguably, the simulation design should avoid creating unnecessary ambiguity for decision makers in the earlier phases of the simulation so as to reduce the risk of multiple paths. In the resolution (penultimate) phase there is no need to be concerned about ambiguity, and indeed it is desirable, so participants have to decide among different possible resolution options. Their decisions can then be explored in the post-resolution phase and discussed in the simulation review meeting.

A further option is to modify the simulation dynamically in response to the decisions of the participants. This is possible but to a limited extent. The designers will not be able to create a completely new simulation path with supporting information while the simulation is in progress. They can however modify the message stream in response to the decisions of participants. For example, they can exclude or modify messages that are no longer relevant, change the timing of sending the messages, follow-up the lack of a response from participants to issues raised in the message stream, and develop and send new messages that reflect the altered situation. In advance of the simulation, the designers may have prepared contingent messages in anticipation that the actions of the participants will differ from the central scenario.

Role players during the simulation

The simulation will require “game masters” responsible for administering the simulation and “role players” to interact with the participants during the simulation.⁸ The game masters and the role players are usually located in a central control room from which they can manage the simulation, and communicate with the participants and moderators (see below).

The game masters are responsible for the flow of messages to the participants and for keeping the simulation on track during the simulation. Deadlines are set, by which time policy decisions

⁸ Where TC runs a simulation exercise, the “game master” is usually a TCPL, while the role players may be either TCPLs or staff of the host authorities.

are required. The progress of participants is monitored and the role players can, if necessary, “intervene” and provide additional information that may assist the participants in reaching timely decisions.

Role players also perform the function of entities other than those represented by the participating institutions. The role players may perform the function of entities including the media, rating agencies, foreign authorities that are not participating in the simulation, commercial banks, and other market participants.

Participants

The participants are organized into teams to reflect their institutional responsibilities. It is desirable that each of the institutional teams is headed by a senior official who would be directly involved in decision-making in an actual financial crisis.

During the bespoke simulation, each of the institutional teams is expected to perform its normal functions and to behave as it would under an actual financial crisis, applying its powers and instruments as available to it under its existing legal mandate. The actual legal, institutional, and cooperative arrangements in the jurisdiction are assumed to apply. For example, information sharing among participants would be guided by the existing memoranda of understanding (MoUs) on information sharing.

The participating teams should be organized so that they can readily communicate with one another, using telephone, e-mail, and physical meetings, if they choose to do so. Communication may be facilitated by having the teams located in the same physical location, although in the case of simulations involving multiple jurisdictions, it is desirable that the participants are located in their own jurisdiction to simulate actual crisis conditions. The participants can freely contact the role players by telephone and e-mail to communicate with entities other than those represented by the participating authorities.

Prior to the simulation exercise, participants receive a briefing on what to expect during the simulation day(s) and what they are expected to do. The briefing provides:

- background material outlining the financial, structural, and economic conditions at the start of the simulation, and the starting balance sheets for the key financial institutions;
- a list of participating institutions and their contact information;
- the activities of the game master and role players, and their contact information;
- the arrangements for communications between participants and with the control room and the role players;
- the structure and schedule for the simulation, and the difference between “simulation time” and real time; and
- the role of the moderators.

Moderators

Moderators are assigned to each participating institution. The moderator’s role is to observe, record the progress, and liaise with the game master and role players as the simulation progresses. They take notes for use in the post-simulation review of the exercise. Participants are requested to copy moderators on their e-mail communications and alert the moderators and provide them with access to listen in to their telephone communications and to observe their

physical meetings. However, the participants should not consult with moderators on their communications or involve them in their decision-making.

The moderators keep the game master and role players abreast of the deliberations by the participants and identify issues that are emerging in the participants' discussions. For example, if the moderators identify that the participants are preparing to take decisions that would throw the simulation off track, they should bring this to the attention of the game master and role players. The game master and role players then have an opportunity to provide additional input as role players to modify the decisions of the participants.

Communications platform

The communications platform for the simulations⁹ has to achieve a number of objectives.

- The simulation is generated through a series of e-mail messages that are delivered to the participants. The e-mail messages need to be sequenced and timed consistent with the designed simulation, and delivered to the appropriate recipients.
- During the simulation, participants and the role players need to be able to communicate rapidly by e-mail. Many e-mail messages may be exchanged between the participants and the role players, and the role players need to be able to keep abreast of the incoming and outgoing communications to respond effectively.
- For the post-simulation review, there should be a record of the e-mail communications for reference.

Testing and contingencies

Prior to running the simulation, it should be thoroughly tested to ensure that the exercise will proceed smoothly. The test should cover the following aspects:

- That the computers, telephone lines, and internet connections have been set up and are operating in the rooms for the participants and in the central control room.
- That e-mail messages can be sent and received using the agreed communications platform.
- That participants can communicate with one another and with the control room through e-mails and telephone and have the necessary contact information and internet profiles to do so.
- That the moderators are able to communicate with the role players by e-mail and telephone.

⁹ Where TC runs a simulation exercise, it prepares and implements the communications platform in collaboration with the jurisdiction. The jurisdiction is responsible for the hardware and the functioning of the internet links and phone lines to be used during the simulation. TC is responsible for delivering the e-mail message stream. TC will advise on the software to be used reflecting their experience in delivering FCMS, though the jurisdiction may decide that alternative software would be preferred, and TC will work with the jurisdiction on their choice. For example, in view of the potential sensitivity of the FCMS, which is developed to create a realistic crisis environment, in one FCMS the jurisdiction(s) determined that there was a need for a higher level of cyber protection than provided for in the TC recommended approach. The application of the higher level of cyber protection was incorporated in the simulation, though at the cost of making the FCMS a more cumbersome exercise.

- That the assignment of messages in the message stream is correctly implemented, in terms of sequence and recipients of messages and supporting information.
- That facilities have been identified for the holding of meetings.

Notwithstanding meticulous preparations, communication systems can fail (and indeed this can be an added complication in real life). Thus, as a contingency, it is useful to have printed copies of the message stream and supporting information, which as a last resort can be provided, in an appropriate time sequence, to the participants.

Post-simulation review and follow-up

The purpose of the SWFCMS is to test the jurisdiction’s preparedness to respond effectively to a systemic financial crisis. The post simulation review provides the opportunity to discuss what has worked well and what less so, and to begin to identify the key lessons from the simulation. The review meeting should be held soon after the completion of the exercise. The participants, role players and moderators should ideally attend as each will have different perspectives. If the heads of agencies have not been able to participate in the simulation, they should attend the post simulation review to be part of the discussion on lessons learnt. Detailed notes or a transcript of the meeting should be kept, as these will be a reference for the write up of the lessons learnt report.

A report should be prepared elaborating on the lessons learned. The participants may identify issues in their internal communications and cross-institution collaboration. Box 1 provides examples of the type of questions that might be considered.

The review should examine the adequacy and the effectiveness of the implementation of the crisis management tools at each phase of the simulation, such as those outlined in the discussion on phasing in Section III, and draw lessons.

The lessons from the simulation should result in a follow-up work program. In due time, taking account of the effort to prepare the simulation, the jurisdiction may plan to hold another SWFCMS.

Box 1: Example of areas for learning in the post-simulation review

- Is the legal framework well-understood?
- Is the legal framework adequate, for example for sharing information among relevant parties?
- Is the allocation of responsibilities clear within each authority?
- Does each agency have a healthy culture for crisis-management and decision-making, for example the ability and willingness to identify quickly the options and risks of alternative strategies?
- Are adequate procedures in place for secure and effective communication between agencies domestically and internationally during a crisis?
- Is there sufficient preparedness for drafting and issuing public communications that speak to all relevant audiences, effectively targeting the necessary messages?
- Is there sufficient preparedness for coordinating public communications among the relevant authorities, both nationally and cross-border?

V. Conclusions

Bespoke FCMS provide tremendous learning opportunities, especially for jurisdictions that have developed their crisis management arrangements and wish to test their effectiveness. Participants in the simulations find them challenging and instructive.

The simulations are an invaluable, even essential, tool of crisis preparedness. The FCMS will often identify issues for the crisis preparedness framework that were not readily apparent from a review of the legal and institutional arrangements, and which are brought to the fore by their implementation during the crisis simulation. The simulation thus complements other assessments of the crisis preparedness framework, and practice helps to improve crisis preparedness before a real crisis strikes.

An effective bespoke FCMS is time-consuming to prepare. However, the effort is fully justified if as a result the weakness in the crisis management arrangements are identified and are addressed, thereby lessening the potential costs of a real crisis.

TC and its Program Leaders have built up considerable experience and expertise in designing and implementing FCMS. TC continues to refine its techniques on FCMS and its knowledge of crisis management arrangements as it works with different jurisdictions on their crisis preparedness. This expertise is reflected in its courses on financial crisis management and in the crisis simulations that it delivers.

VI. References

Toronto Centre. *Crisis Binder: An Essential Tool for Crisis Preparedness*. October 2019.
<https://res.torontocentre.org/guidedocs/Crisis%20Binder.pdf>

VII. Annex: Sample information to support a simulation

Table 1: Example of a bank balance sheet

Assets	Liabilities
Cash	ST market funding:
Interbank claims	Of which: interbank borrowing
Marketable Securities:	LT market funding
Loans to corporates	Customer deposits:
Gross	Of which: households
Specific provisions	Other
Net	Tier 2 Capital
Loans to households	Alternative Tier 1 Capital
Gross	Common Equity Tier 1
Specific provisions	Other TLAC
Net	
Holdings of TLAC issued by other financial institutions	
Other	Total liabilities plus capital
Total assets	% of liabilities in FX
% of assets in foreign exchange (FX)	
Memo: Risk-weighted assets	Memo: Capital Adequacy Ratio (CAR)
Uncommitted eligible collateral	Loss-absorbing liabilities (TLAC)
Intragroup claims	Intragroup liabilities
	Liquidity Ratios
	Liquidity Coverage Ratio
	Net Stable Funding Ratio
	Net open FX position

Table 2: Examples of financial indicators

1. Market indicators:
 - Exchange rate(s)
 - Interbank/money market and policy interest rates, long-term interest rates, interest spreads vis-à-vis major currencies
 - Stock market indices
 - Stock prices, and credit ratings for DSIBs

2. Contagion indicators for DSIBs:
 - Matrix of interbank exposures (and other forms of interconnectedness)
 - Joint probabilities of default