System-wide stress testing: takeaways and good practices to date

May 2026

Report to the G7 prepared by staff from Banque de France and the Bank of England[1]

Introduction

As financial markets and intermediaries have grown increasingly complex and interconnected, understanding how shocks propagate across institutions and sectors has become essential for assessing risks to financial stability. Traditional sector-based stress tests highlight vulnerabilities within specific categories of intermediaries. Yet they often fall short of capturing the cross-sectoral dynamics and interactions that can amplify stress across the broader financial system. System-wide stress testing (SWST) proves to be a valuable tool for addressing this gap, by examining how adverse shocks, liquidity tensions and market-wide pressures interact, assessing not only isolated impacts under adverse conditions but also the collective responses of banks, insurance groups and other non-bank financial intermediaries (NBFIs) as well as the associated amplification effects.

Recent system-wide exercises showcase the importance of analysing both first-round effects and the endogenous reactions that follow, revealing for instance the risk that NBFIs overestimate their access to repo market liquidity under stress. When market participants simultaneously face valuation losses, liquidity pressures, or increased margin requirements, their decisions — such as asset disposals, deleveraging, redemption management, or changes in funding strategies — may lead to adverse collective outcomes. These interactions can magnify initial shocks, creating feedback loops and spillovers that approaches focused on static balance-sheets and on a single segment of the financial system may not capture. To capture these risks, SWST provides a structured, coherent framework for analysing contagion channels, price-liquidity dynamics, and system-level amplification mechanisms. Therefore, they are well suited to drawing conclusions about the functioning of core financial markets and the real economy consequences of shocks. They are a particularly valuable tool for forward-looking scenario analysis, especially during periods of heightened geopolitical uncertainty and supply-side disruption. SWST approaches and techniques can also be used to explore more effectively risks to

[1] We would like to thank G7 members for their review and comments. This report also benefited greatly from discussions with the participants in the G7 workshop that took place at Banque de France on 23 March 2026.

individual institutions, such as banks, by better capturing NBFI risks, but these approaches are not the focus of this note.

Against this backdrop, this report synthesizes the key motivations and lessons emerging from system-wide stress tests conducted to date. The report builds on, and contributes to, the growing body of analytical work on non-bank financial intermediation and system-wide stress testing[2]. It draws lessons from exploratory exercises involving the industry: the 2023-24 BoE exercise, and the ongoing, 2025-26 French exercise (conducted by BdF, ACPR and AMF). It also draws upon model-based approaches developed by G7 central banks, such as the ISA model used in the ECB's Fit-for-55[3] and MaSTER[4] system-wide analyses, and the STRESS model developed by the Bank of Canada. It reviews methodological choices, analytical and operational considerations, the importance of co-construction with industry participants, and the practical challenges that must be addressed to ensure robust and meaningful results. Ultimately, this report aims at contributing to a coherent and actionable approach to SWST, thereby enhancing macroprudential surveillance and industry preparedness to deal with adverse macro-financial conditions.

1. System-wide exercises aim to enhance surveillance capabilities and reinforce industry preparedness to deal with adverse shocks

System-wide stress tests complement sector-specific exercises by offering a broad view of how vulnerabilities propagate across the various actors of the financial sector. While traditional sector-specific stress tests remain valuable for evaluating solvency or liquidity risks within banks, insurers, or investment funds, they may not capture certain key interdependencies that characterize modern financial systems. SWST addresses these limitations by incorporating key markets and multiple sectors, and their interconnections within a single analytical framework, allowing authorities to assess how a common shock may affect different actors simultaneously and how their management actions interact.

This system-wide perspective is particularly valuable for analysing short-term liquidity and market risks, which often materialize within a few days or weeks and spread through several channels at once. By incorporating behavioural dynamics such as margin-induced deleveraging, liquidity-driven asset sales, or shifts in secured funding conditions, SWST makes it possible to identify amplification mechanisms that would remain undetected in a sector-by-sector approach. These insights strengthen macroprudential oversight by enabling authorities to identify vulnerabilities that could propagate stress and analyse ways to reduce system-wide amplification. Because SWST evaluates vulnerabilities across markets and institutions jointly, it can improve understanding of where pressures might accumulate and how risks may spread. It therefore complements traditional monitoring frameworks by revealing early-warning signs, such as funding mismatches emerging under stress or behavioural asymmetries between market participants.

For supervisors and macroprudential authorities, this broader analytical toolkit supports more informed assessments of systemic vulnerabilities and enhances the capacity to design preventive

[2] See for example the report of the European high-level task force on NBFI.
[3] See Fit-for-55 climate scenario analysis.
[4] See Integrating contagion risk into the 2025 EU-wide stress test: a system-wide analysis with amplification effects between banks and non-banks.

interventions, when appropriate. In this regard, SWSTs aim at strengthening the collective understanding – for authorities and the industry alike – of systemic risk and informing crisis management frameworks. The French system-wide stress test aims to do so without triggering supervisory consequences for individual participants. System-wide stress testing can also provide the evidence base to support more targeted and proportionate policy design: the Bank of England, for example, used the results of its first SWES exercise to motivate its recently published discussion paper on the clearing of gilt repo. As recommended by the ESRB High Level Group[5], top-down SWSTs covering the entire EU financial system are foreseen to become part of the ESRB monitoring mandate. Such SWSTs would allow the ESRB to identify vulnerabilities at an early stage by enabling it to map how specific shocks would propagate within the EU financial system, across sectors, markets and counterparties.

System-wide exercises can benefit industry stakeholders by revealing how individual institutions' strategies interact with market conditions and other actors' reactions. Although these findings can emerge from top-down model-based exercises, the mutual benefits for the industry were apparent in the UK and French bottom-up exercises relying on its involvement (Box 1). Through participation in bottom-up data collection and projections, as well as in scenario design or feedback discussions (also present in top-down exercises), institutions reported that they gained greater clarity on how their management actions compared with those of their peers. Thus, SWST showed promise in raising industry awareness of system-wide feedback loops that may not be fully captured in more usual risk-management models. By observing how common shocks may provoke simultaneous and potentially heterogeneous behaviour across sectors, institutions become more aware of constraints that could emerge under stress and adjust their contingency planning accordingly. This shared understanding strengthens the overall resilience of the financial system by promoting more realistic expectations about liquidity conditions and funding availability during periods of turmoil.

Box 1: Industry takeaways from bottom-up exercises

The first system-wide exploratory scenario (SWES) exercise was launched by the Bank of England (BoE) in June 2023, and the results were published in a final report in November 2024.[6] A comparable system-wide exercise was launched by French authorities in October 2025, and is due to be completed in Summer 2026.[7] Feedback from participants highlighted a number of mutual benefits.

Following the first BoE SWES exercise, participants revisited internal assumptions about counterparties behaviour under stress, refined their risk management and stress-testing frameworks (e.g. to estimate cash and collateral needs simultaneously), and brought different business-areas together in a way that will leave them better prepared for future market-wide disruptions. Comparable benefits are expected from the BdF-ACPR-AMF system-wide exercise, which relies on detailed bottom-up submissions of management actions and explicit bilateral interactions, prompting participating entities to reflect on other actors' behaviour and to reassess their own strategies accordingly.

[5] See Report by the High-Level Group on the ESRB Review.
[6] See The Bank of England's system-wide exploratory scenario exercise final report | Bank of England.
[7] See The Banque de France, the ACPR and the AMF launch a first system-wide stress test on interconnections within the financial system | Autorité de contrôle prudentiel et de résolution.

A key takeaway from the first BoE SWES exercise was that participants generally overestimated both the change in initial margin required by clearing houses and the availability of new repo finance. The BdF-ACPR-AMF exercise similarly highlights the role of margin call handling, repo dynamics, and the use of money market funds as a source of liquidity. Overall, participants in the UK and the French exercises underscored the fact that system-wide stress tests can reveal both significant heterogeneity in expectations across market actors and substantial differences between ex ante assessments and actual outcomes, notably regarding margin dynamics and access to liquidity.

2. Top-down, bottom-up and hybrid approach: different approaches to industry collaboration

There are three main configurations in terms of how authorities and firms might interact when conducting stress testing exercises. Top-down exercises rely on the authorities' modelling and do not require interaction with the industry. Bottom-up exercises rely on projections submitted by firms that simulate how they would specifically respond to adverse scenarios. Hybrid system-wide stress tests aim to incorporate the strengths of both top-down and bottom-up approaches, and to collaborate strategically with the industry in order to broaden and deepen insights gained from stress testing exercises.

a. Top-down exercises

Top-down system-wide stress tests rely primarily on analytical frameworks developed by the authorities responsible for the exercise. Such models can be used to assess the impact of a given stress scenario on a specific entity, but they are also designed to capture feedback loops and the propagation of shocks through interconnected systems. By design, they do not require interaction with industry participants, though it is possible to engage with the industry at the modelling stage on the design and calibration. This has practical advantages as it allows authorities to run frequent exercises and to deploy these tools rapidly in response to unexpected changes in the macro-financial environment, and can limit the additional reporting burden on firms to the extent that the models use existing data collections. This agility is particularly valuable when sudden shifts in market conditions call for timely system-level assessments. In addition, the process of building such models naturally strengthens modelling capacities and data infrastructures, prompts improvements in data quality and cleaning processes, and fosters harmonization across reporting frameworks. Over time, it also deepens authorities' understanding of market microstructure and interconnectedness, including price-impact dynamics and the interaction between collateral valuation and margin practices. In addition, these models simplify the scenario determination phase, since supervisors can anticipate the impact of risk factors.

However, model-based approaches face data challenges and may not fully capture the heterogeneity in individual management actions. Because they are designed by authorities, they may lack detailed entity-specific knowledge and rely on behavioural assumptions which can only approximate actual reaction patterns — especially in a complex financial system where liquidity management practices, investor bases, and internal constraints vary widely between different actors. In particular, the use of aggregated or representative parameters tends to average out participant behaviour, thereby

dampening non-linear feedback loops, overreactions, and other effects that drive real-world amplification. Data gaps in certain market areas, particularly in cross-border or bilateral activities, may further restrict authorities' ability to model specific segments realistically. As a result, purely top-down exercises risk overlooking behavioural asymmetries or amplification mechanisms if they do not capture the full heterogeneity of participants' responses. These limitations underscore the importance of complementing modelling exercises with industry involvement.

b. Bottom-up exercises

Bottom-up exercises rely on projections submitted by individual institutions that simulate how they would specifically respond to adverse scenarios. As such, these exercises offer regulators a unique overview of the diversity of interconnected exposures, business strategies, internal risk-management practices and behavioural adjustments under adverse conditions. This approach can enable authorities to reconstruct a genuine system-wide picture by capturing heterogeneity between different actors during hypothetical conditions of stress. When aggregated and validated, these responses reveal how institutions' actions may interact and how risks may propagate across sectors. In doing so, these exercises can be used to collect novel data from participants, shining light on sectors/issues where regulatory data is limited. In this regard, the French exercise combines detailed supervisory data with participants' submissions designed to gather information on their intended actions, on their assumptions about counterparty behaviour, and on the day-by-day dynamics of their liquidity positions and margin flows under the prescribed stress – information that cannot be inferred from standard regulatory reporting. The SWST of private markets recently announced by the BoE[8] has set 'Filling data gaps' as one of its objectives given the opacity of private markets.

However, providing granular data and comprehensive projections may be demanding on the industry side, and ensuring consistency between different participants requires substantial analytical work on the supervisory side. Authorities must validate underlying assumptions, reconcile methodological divergences, and assess the quality and coherence of individual submissions to avoid distortions in system-wide interpretations. Furthermore, the non-binding nature of exploratory exercises can inadvertently weaken execution discipline, as institutions may not subject such projections to the same internal validation standards as those applied to mandatory reporting. Consequently, the outputs are not intended to serve as direct triggers for supervisory measures; any worrying signals would require careful cross-checking against verified data and targeted follow-up investigations before informing supervisory intervention. In addition, bottom-up approaches may suffer from a lack of market representativeness when participation is voluntary or when firms outside the supervisory perimeter (including but not limited to foreign institutions) play a significant role in key markets, yet remain absent from the sample. These gaps can limit the completeness of the system-wide picture. The collection of ad hoc data introduces a reporting burden for participating firms and the need to collect and clean the data limits the timeliness of exercises. In addition, the two-way sharing of information requires strong agreements to ensure the security and confidentiality of firm-specific data and results.

[8] See Bank of England launches system-wide exploratory scenario exercise focused on private markets | Bank of England.

Despite these challenges, bottom-up approaches provide insights that top-down models cannot replicate. By ensuring close engagement with market participants, they add to the understanding of how institutions would adapt portfolio allocation, liquidity management decisions, or funding strategies under stress — insights that are crucial for understanding potential amplification channels. They also support iterative improvements in modelling frameworks: feedback from participants and observed behavioural patterns help authorities to refine assumptions, calibrate parameters, and increase the robustness of subsequent top-down exercises. For example, asset management participants in the first BoE SWES noted that redemptions were driven by institutional investor liquidity-needs, rebalancing, and fund performance; the BoE has therefore broadened their suite of models that embed the findings of the SWES to include all three of these drivers. The BdF-ACPR-AMF exercise is similarly designed as an iterative learning process, in which bottom-up submissions and interactions with participants are used to challenge and complement existing analytical assumptions, identify modelling blind spots and refine the understanding of behavioural responses and liquidity dynamics.

While bottom-up system-wide exercises require significantly more resources than top-down SWSTs, in particular for institutions providing detailed bottom-up projections, they can enhance market participants' stress-testing capabilities and provide long-term value. SWST provides the industry with structured supervisory feedback and reveals potential frictions in market functioning that may not be easily identified from institution-focused analyses. At the same time, the collaborative processes involved in these exercises often enhance risk dialogue between regulators and market participants, improving the quality of information available to both sides. They can also fill in data gaps and the process of working with firms to collect this data can provide useful insights to ensure regulatory reporting reflects how businesses are run and managed in practice. In an environment where market-based finance plays an increasingly central role, such engagement is essential to strengthening both individual and collective preparedness for severe but plausible shocks. This productive engagement can also be achieved through less resource-intensive approaches, such as desktop system-wide exercises where market participants provide feedback on regulators' analysis.

c. Combined exercises

Hybrid system-wide stress tests may be used to combine the strengths of both top-down and bottom-up approaches. Hybrid approaches aim to overcome the challenges of top-down approaches in accurately capturing individual institutions' behaviours, and of bottom-up approaches in appropriately aggregating these behaviours[9]. By combining centralized analytical frameworks with institution-specific behavioural inputs, authorities can gain insight into both the structural channels of shock propagation and the behavioural heterogeneity that shapes system-wide dynamics. This results in richer, more nuanced insights into how severe shocks may evolve across markets. This approach was chosen for the French exercise: the top-down model underpinned scenario calibration and can be used to complete the overall market picture by modeling the actions of the rest of the world and capturing the amplification effects of reported asset sales. In parallel, bottom-up learning will inform future enhancements of the model by incorporating more realistic behaviours and insights into currently unmodeled markets. The ECB MaSTER exercise used a top-down SWST model to aggregate bottom-up

[9] See for instance Eurosystem response to EU Commission's consultation on macroprudential policies for nonbank financial intermediation (NBFI).

stress test results and calculate endogenous reactions to these impacts. This provides another example of how hybrid SWSTs may be used to provide meaningful insights into second-round contagion effects.

Furthermore, hybrid approaches preserve the benefits accruing from deep cooperation between authorities and market participants. Engagement throughout the design, execution, and quality assurance phases helps to ensure the credibility of assumptions, improves the interpretation of results, and creates a shared understanding of systemic vulnerabilities. In the context of the BdF-ACPR-AMF exercise, this collaborative framework has been useful in fostering stronger working relationships between modelling, research, and frontline supervisory teams, as well as between regulators and the entities they oversee. By bringing together professionals with distinct analytical cultures and operational mandates, the exercise has reconciled sometimes divergent perspectives and strengthened enduring channels for cross-functional knowledge exchange. This collaborative process also facilitates the dissemination of findings, promotes shared expertise and contributes to a more mature risk culture among stakeholders. Over time, hybrid SWST can become a key instrument for aligning industry practices with supervisory perspectives, ultimately reinforcing the resilience of financial markets.

3. Principles for effective system-wide stress testing

a. Setting clear objectives and scope

Defining clear objectives at the outset is essential since system-wide stress testing can serve multiple analytical purposes, each requiring its own methodological and operational architecture. A focus on short-term liquidity risk for instance requires high-frequency shocks, behavioural modelling of funding and margin dynamics, and detailed data on collateral flows. A solvency-oriented exercise, by contrast, requires a longer horizon and a framework capable of capturing the interaction between market losses, credit impairments, capital positions, and the real economy. Because the choice of the objectives to be pursued cascades into decisions about the scenario horizon, participating institutions, data needs, and modelling tools, early clarity ensures coherence and facilitates communication between supervisors and industry participants.

System-wide stress tests should ideally target the markets and entities that play central roles in the transmission and amplification of shocks, while striking a balance between cost, feasibility and representativeness. For instance, sovereign and corporate bond markets, unsecured short-term funding markets, repo markets, and derivatives markets are typically viewed as systemically relevant segments that collectively influence liquidity provision, benchmark pricing, and cross-sectoral interconnections. On the institutional side, banks, investment funds (including MMFs), insurers, pension funds, and CCPs should ideally be taken into account, as their behavioural responses can significantly shape market dynamics. Achieving an appropriate balance between representativeness and feasibility is crucial: a sample that is too narrow fails to capture key amplification channels; one that is too broad may compromise operational viability and generate costs that exceed the potential benefits. A pragmatic approach consists in identifying institutions with the most significant market footprints and complementing the sample with granular datasets covering broader exposures. The first BoE SWES, for example, used derivative, repo and securities transaction datasets to identify the most significant participants in sterling fixed income markets, and then scaled participants' returns

accordingly. Participants in the BdF-ACPR-AMF exercise were selected to ensure both a satisfactory coverage ratio of each sector and adequate representativeness of the diversity of business profiles. The selection criteria included size (in terms of balance sheet or assets under management), degree of interconnectedness with other participants and sectoral representativeness. A related trade-off arises between complexity and accuracy. The exercise needs to target sufficient markets or sectors to capture the significant complexity at play in system-wide amplifications, while developing sufficiently accurate modelling of each market.

A major development in recent years has been the relevance of stress testing of non-bank financial intermediaries from a system-wide perspective. The investment fund sector plays an increasingly important role in market-based finance and is often subject to short-term liquidity pressures that differ from those experienced by other actors. Therefore, including NBFIs beyond insurance within the scope of a system-wide stress test represents a crucial step towards a more realistic depiction of the functioning of the financial system.

b. Building "severe but plausible" scenarios

The construction of "severe but plausible" scenarios is foundational to the robustness of any stress test but proves especially critical in the implementation of system-wide stress tests. Scenarios must be tailored to the type of risks being analysed, whether they stem from abrupt market shocks, exogeneous shocks, or adverse macro-financial developments. Designing scenarios requires clear analytical intent: for instance, assessing short-term market and liquidity risks may require focusing on financial market variables such as interest rates, credit spreads, bid-ask spreads, equity prices, exchange rates, volatility indicators and market liquidity metrics. Short-term horizons are particularly relevant for tracing liquidity stress and modelling rapid feedback loops, while longer horizons may be considered when solvency interactions are relevant and consistent with the analytical purpose of the exercise. Scenarios often include simultaneous shocks that affect several asset classes to test how correlated stress may amplify system-wide outcomes.

Scenarios must be sufficiently "severe" to trigger actions to restore liquidity, adjust risk profiles, and ensure solvency, but should be grounded in historical episodes, stress indicators, or model-based distributions to maintain plausibility. Authorities typically rely on a combination of empirical evidence and supervisory judgement. This approach ensures that the scenario, whether based on an underlying or completely agnostic narrative, is not purely hypothetical and that its severity is neither overly benign nor unrealistically conservative. For example, the first BoE SWES used basic data from participants to identify a scenario that would require the majority of participants to take actions to restore liquidity and/or solvency buffers but required no individual asset price changing by more than had been historically seen over a 10-day period. In the BdF-ACPR-AMF exercise, the scenario is defined as a non-narrative market shock calibrated at a 1-in-1,000 severity over ten business days, designed to activate the transmission mechanisms of interest, while remaining within the range of plausibility established by historical precedent.

Where the scenario is focused on behaviours, it can be useful to provide information and context on why the shock is occurring. This may include relevant information on developments not captured by time series of financial market variables, such as credit rating changes or information on the credit quality of counterparties. For instance, in the BoE's first exercise, the scenario specified the default of

a mid-sized hedge fund (that would likely incur high losses due to the nature of the shock) and this drove key parts of banks' behavioural responses. Conversely, the scenario of the BdF-ACPR-AMF system-wide stress test is deliberately agnostic as to the source of the market shock: participants are required to respond to market shocks under a 'fog-of-war' assumption, without additional information beyond the evolution of market variables. This design choice aims to elicit individual reactions that are driven by participants' structural exposure to market risk and existing risk management frameworks, rather than by scenario-specific triggers or narratives. These two approaches illustrate that the degree of narrative specificity in scenario design needs to be adapted to the objective of the exercise, depending on whether it aims to test responses to identified risk scenarios or to explore reactions under heightened uncertainty.

c. Prioritizing data quality, granularity and comparability

High-quality, granular data help capture the diversity of (un)coordinated reactions across sectors and institutions, allowing for a deeper understanding of financial interlinkages and portfolio overlaps. Granular data also supports more precise scenario calibration, allowing authorities to understand how a given shock affects different asset classes and counterparties. Without detailed information, authorities risk overlooking key nodes of vulnerability or underestimating the speed at which shocks propagate. Granular data should also include detailed consolidation, as conglomerate modelling is currently a blind spot of system-wide modelling.

Model-based approaches should generally be grounded as much as possible in granular datasets already available within supervisory, statistical, or commercial infrastructures. However, even when data exists, efforts may be required to improve standardization, quality, and completeness. Data cleaning and harmonization strengthen comparability across institutions and help authorities detect inconsistencies or gaps that may distort analytical outcomes. Enhanced granularity also allows for the modelling of heterogeneity across institutions — an important aspect, as market participants may differ widely in their portfolio structures, liquidity risk management, or collateral practices. By making the analytical benefits of granular data more visible, system-wide stress tests may also contribute to strengthening incentives to further develop data collection.

System-wide stress test models entail a trade-off between national and cross-border data that calls for international cooperation. While national/supervisory data provide comprehensive coverage of institutions' balance sheets, they fall short in terms of capturing a sufficient proportion of the financial system. Cross-border data on the other hand provide better coverage at the expense of accuracy in terms of institution-level modelling.

Bottom-up exercises introduce additional data considerations, as industry participants are typically required to provide granular starting points and projections. These factors highlight the need for careful planning and consideration to minimize the reporting burden. Reporting templates must be carefully designed to ensure consistency between different participants and to avoid leaving excessive discretion that could lead to non-comparable or internally inconsistent submissions. To ensure this, the first BoE SWES sought feedback from participants on the templates before they were finalised and shared an example of what completed templates should look like. The BdF-ACPR-AMF exercise similarly relies on an iterative co-construction process with participating institutions, through dedicated workshops and rounds of feedback on both scenario design and reporting templates, to ensure

operational feasibility, consistency and interpretability of bottom-up submissions. Templates must be consistent with the methodological and behavioural constraints to be applied — for example, caps and floors on P&L items, rules governing asset sales, redemption management, or the use of new secured funding arrangements. To a large extent, SWST can leverage progress realised over the past 10 years to gather better data for supervisory purposes. The exact design of the template should both take advantage of and carefully seek to be consistent with these data in order to minimize the burden associated with the implementation of such exercises. In the case of the BdF-ACPR-AMF exercise, the systematic connection with existing supervisory data has proved very effective while also more broadly enabling more comprehensive use of existing data. Additionally, historical data provided through ad hoc data collections or pre-existing datasets are also often needed, so that authorities may establish validation processes to reconcile divergent modelling choices and ensure coherence.

Robust data-sharing mechanisms are essential, with appropriate safeguards, especially in cross-sectoral or cross-border contexts. Because system-wide stress tests rely on data from multiple supervisory authorities and market regulators, formal agreements — such as Memoranda of Understanding — are often necessary to guarantee secure, confidential, and consistent data exchange. These frameworks, including their safeguards, promote collaboration and coordination among authorities and ensure that sensitive data can be used effectively for macroprudential purposes. They also help overcome structural fragmentation in data availability by facilitating access to datasets held by different bodies.

d. Modelling approaches to system-wide stress-testing

System-wide stress test modelling has historically relied on, or blended three types of methodologies: iterative contagion models, structural equilibrium models, and market-based contagion measures (see Aikman et al. (2023) for a detailed survey of the literature on these three methodologies).

Iterative contagion models are algorithms that propagate losses in a financial system of interlinkages until no default or losses occur.[10] These contagion models generally feature two types of contagion: direct contagion through loans, repo or derivative exposures, and indirect contagion through common holdings of securities.[11] Contagion models can be enriched with a large set of behavioural assumptions. These models are easy to set up and can be gradually improved. However, they have three major drawbacks. First, they fail to include equilibrium behaviour and institutions' optimization processes. Second, they are often not stock-flow consistent from a system-wide perspective. Third, the asset price dynamic is governed by calibrated price impact functions from trading data. These functions do not specify who buys the distressed assets, assuming the existence of a sufficiently large and unconstrained rest of the world, which is a relevant hypothesis in a sectoral model but might be less so in a system-wide exercise. They assume that there is no substitution between assets and homogenous outside buyers. Finally, they provide reasonable fits for fire-sale volumes, which are an order of magnitude smaller than market depth (see Bucci et al. 2019), however larger fire sales may fall outside their validity zone, leading to price impacts which are overestimated or constant (i.e. that no longer depend on fire sales volumes).

[10] See Huser (2015) and Glasserman and Young (2016) for a literature review.
[11] See among many others: Cifuentes and Shin (2005), Gai and Kappadia (2010), Greenwood, Landier, and Thesmar (2015).

Structural equilibrium models address the limitations of contagion models. The work of Aikman et al. (2019) pioneered these developments. Their model is system-wide and flow-consistent by nature and jointly models the main sectors of the financial systems in the cash, repo, and derivative markets. However, these models are much more difficult to develop than iterative approaches and applying them to granular data could also be challenging. Price impacts in structural models result from investor demand shocks, which must be absorbed by other investors. Work on demand-system asset pricing by Koijen et Yogo (2019) and many others is a useful tool to compute price impacts by combining estimated demand elasticities with investor holdings.

Finally, one can also develop system-wide stress-test indicators based on market data instead of structural models. Contagion metrics such as CoVaR (Adrian et Brunnermeier, 2016) can monitor spillovers between financial institutions based on their stock price (see Ojea-Ferreiro, 2026) or CDS spread. These methods are easier to implement and rely on public data but suffer from severe limitations in scope (stressed entities must be listed) and are unable disentangle the various channels of contagion.

The shift towards hybrid-exercises discussed above is leading to a new set of agent-based models. These apply exogenous shocks to granular (individual firm) balance-sheet data and use empirically grounded behavioural rules to translate losses and constraints into market-level liquidity demands. These models can then be extended by explicitly modelling the price changes that result from this liquidity demand, and thus 'second-round' behaviours and amplification.

Central banks have been at the forefront of these modelling developments. The Interconnected System-wide Analytics (ISA) model developed by the ECB (Sydow et al. 2024 a, b) models liquidity contagion at the granular level between banks, investment funds, and insurers. This model has served as a basis for further developments by European national central banks (Deutsche Bundesbank, Banca d'Italia, and Banque de France). The Bank of Canada developed stress tests to assess second-round effects from climate shock in a financial system with banks, insurers, investment funds and pension funds (Bruneau et al., 2025) and is currently developing the Systemic Tensions Risk Evaluation via Simulations (STRESS) model to capture the dynamic balance sheet adjustments of banks and NBFIs (building on Hipp and Ojea-Ferreiro, 2026), to be used with multiple macro-financial scenarios. The suite of models developed by the Bank of England to embed the lessons from the SWES replicates the principal drivers of activity in gilt and sterling credit markets observed in that exercise. It estimates buy/sell orders of gilts and sterling credit for individual firms from six sectors (LDI funds, Open-ended funds, MMFs, pension funds, CCPs and dealers) and captures heterogeneity within these sectors.

e. Governance and coordination with industry participants

System-wide stress testing involves coordination between authorities and industry participants, in particular for bottom-up and hybrid approaches. In that respect, top-down exercises offer benefits in terms of scalability. Effective governance frameworks help ensure methodological consistency, clear communication, and timely execution of each phase of the exercise. A structured process for scenario design, data collection, quality assurance and analysis of the results reduces the risk of misunderstandings and helps maintain alignment between supervisory expectations and industry capabilities. Transparent governance also enhances the credibility and legitimacy of system-wide exercises by clarifying roles and responsibilities.

Close coordination with industry participants is essential for ensuring the realistic nature of behavioural assumptions as well as for identifying operational constraints that may influence the feasibility of certain actions. Workshops, bilateral exchanges, and iterative feedback loops help refine the scenario, clarify methodological choices, and increase the reliability of submissions. These interactions allow participants to gain clear visibility into the various challenges and implications of the stress test, to take full ownership of the exercise and to integrate its key lessons into their own risk management framework. Participants in the BoE and BdF-ACPR-AMF exercises emphasized the importance of iterative design and close interaction with authorities. In particular, two-round exercises and structured feedback were seen as necessary for identifying inconsistencies, test system-level coherence and progressively refining the understanding of behavioural responses under stress. Close engagement also helps policymakers build a more grounded understanding of market practices and constraints, contributing to better-targeted and more proportionate policy making.

Ex post assessments form a critical component of governance. Reviewing the performance of models, the quality of data submissions, the plausibility of methodological assumptions, and the alignment between scenario design and observed outcomes helps authorities refine future exercises. This iterative learning process is essential, given the rapid evolution of financial markets and the behavioural adaptations of institutions to a changing macro-financial environment. Continuous improvement ensures that SWST remains a relevant and effective tool for monitoring systemic risk.

f. Communication and sharing of outputs

Effective communication is central to the success of SWST, particularly when participation is voluntary or when authorities wish to encourage constructive engagement from industry participants. Clear ex-ante communication of objectives, methodological choices, data requirements, and confidentiality safeguards helps align expectations and foster participation. It also enhances transparency, reducing the risk that participants misunderstand the purpose of the exercise or fear unintended supervisory consequences.

Publishing results at an aggregate level allows authorities to share key findings without disclosing institution-specific information. Aggregated outputs can highlight system-level vulnerabilities, identify critical amplification channels, and inform risk assessment discussions among policymakers. Sharing high-level results also contributes to greater awareness among industry participants.

The outputs produced and how they are used are of particular concern for participating firms in bottom-up approaches. Clarity of communication around how SWSTs are only being used for system-wide insights (and not for assessment of individual firms or for firm-level supervision), as well as giving firms the opportunity to provide comments on draft outputs help ensure good quality participation.

Given the cross-border nature of financial activities — particularly in markets such as derivatives, repo, and investment funds — system-wide stress tests also contribute to multilateral surveillance. International bodies increasingly rely on shared insights to identify global vulnerabilities and coordinate macroprudential policy responses. Participants in the BoE and BdF-ACPR-AMF exercises emphasised that the geographical scope of a system-wide stress test involves an inherent trade-off: while broader scopes better capture cross-border spillovers and the role of global market infrastructures, more focused exercises allow for deeper engagement and greater operational feasibility. Once mature domestic system-wide frameworks are established, coordinated or cross-border SWST could enhance

the understanding of spillover risks and foster the development of consistent approaches to strengthening financial stability across jurisdictions.

Conclusion

Systemwide stress testing is establishing itself as a key instrument in macroprudential and supervisory toolkits, enabling authorities to assess how severe shocks may propagate through an increasingly interconnected financial system. By integrating short-term market dynamics, liquidity pressures, and behavioural feedback loops into a unified analytical framework, SWST can provide insights that go beyond those offered by many traditional sector-specific exercises. The experience accumulated across jurisdictions demonstrates the importance of clearly setting the objectives and scope of each exercise, calibrating scenarios that are severe but plausible, mobilizing high-quality granular data to identify contagion mechanisms, assessing costs, and defining relevant governance and communication processes. A key finding is that the resilience of the overall system can be more effectively understood by explicitly considering the roles and behaviours of investment funds, alongside banks and insurance groups, thus highlighting the benefit of a genuinely cross-sectoral and macroprudential approach. In addition, SWST makes it possible to bridge some of the surveillance data gaps and raise industry awareness regarding the usefulness of reporting. It also compels supervisors to exchange views, complement and standardize their datasets, and test their quality.

More fundamentally, SWST represents a new approach to engagement between authorities and industry, enabling joint exploration of system-wide vulnerabilities and behavioural responses to stress. By combining scenario analysis, granular data and structured interaction with market participants, SWST strengthens both policymakers' understanding of market dynamics and industry's preparedness for severe but plausible shocks. Whether through top-down modelling, bottom-up exercises, or hybrid approaches, co-construction enhances the realism of behavioural assumptions, strengthens the credibility of findings, and improves the preparedness of market participants for adverse conditions. While these exercises may be operationally demanding, with significant reporting burden, their long-term benefits — in terms of risk-management improvements, supervisory insights, and more robust policy design — can be considerable. As data infrastructures mature and modelling techniques evolve, SWST will likely continue to play a prominent role in shaping preventive macroprudential strategies and supporting coordinated action across authorities.

The approaches developed in SWSTs to date can be used to explore other risks and developments. For instance, the BoE launched a second exercise focused on private markets in late 2025 using a firm participation-led model. Insights from firm participation exercises can feed into future model-driven processes and are often useful for calibrating behavioural responses. Authorities and firms have noted that SWSTs would also be well suited to exploring risks in other public and private markets, risks that have a system-wide impact such as extreme weather events or AI, as well as hybrid stress scenarios combining financial shocks and operational disruptions. Finally, reverse stress testing is a particularly powerful tool for identifying risks and vulnerabilities that authorities and firms are not yet aware of.

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