Stress tests for non-bank financial companies as a supervisory tool of minimizing systemic risks

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Macroprudential stress tests

Macroprudential stress tests play an increasingly major role in financial sector policy making.

The financial stability authorities have prioritized the development of stress scenarios and tests that attempt to quantify losses from systemic risk amplification mechanisms.

Macroprudential stress tests can generate valuable information for policymakers, as the quantitative and forward-looking assessment of the resilience of financial entities provide useful information for risk management and decision making processes in periods of financial distress.

Macroprudential policy hopes to contain risks across the financial system as a whole. It also needs to consider the systemic risk that can build up from activities outside the banking system and develop policy responses to contain such risk.
Stress tests for insurance companies

- More weight to shocks to the **liabilities side** of the balance sheet
- EIOPA has run four European Union-wide stress tests of insurance companies
  - Bottom-up exercises
  - Impact on:
    - group balance sheet
    - own funds
    - solvency capital requirement

![Diagram showing balance sheet components and stress test impacts](image)
Stress tests for insurance companies

- **Scenario 1**
  Based on a **yield curve up shock** combined with lapse rate and provisions deficiency stress.

- **Scenario 2**
  Based on a **low yield shock** combined with longevity stress.

- **Scenario 3**
  Concentrates on a **natural catastrophe** that would expose insurers to losses from claim pay-outs in excess of technical provisions.
Stress tests for insurance companies

- **Prudential Regulatory Authority** in the United Kingdom:
  - In 2019 the PRA perform a life insurance stress test.
  - In 2015 and 2017, the PRA conducted stress testing exercises for general insurers.

- **2019 Stress Test**
  - The first scenario assumes an **additional stress** to the fundamental spread.
  - The second scenario assumes an **increase in longevity expectations**.
  - Insurance **asset shock and longevity event**.
  - Insurance asset shock and longevity event (**reverse stress exercise**).
Internationally, **IAIS** recognises the benefits of stress test exercises to measure the individual as well as the aggregate sector-wide exposure to risks.

**IAIS** proposed adding a standard for supervisors to have in place a framework for measuring the vulnerabilities.

- Introduce appropriate metrics at an:
  - **individual insurer**, 
  - **aggregate**, and
  - **sector-wide levels**

Development of an appropriate form of supervisory top-down or bottom-up stress testing applied to:

- **the market as a whole** or
- **a significant subsample**
The Stress Testing of Pension funds

- **EIOPA** core assessment refers to:
  - the direct impact of a stressed market scenario on the sustainability and funding of **Defined Benefit** (DB) pension funds.
  - the projected future retirement income of members of **Defined Contribution** (DC) pension funds.

Stress testing exercises are similar to those performed on life insurance companies and investment funds.
The Stress Testing of Pension funds

- Impavido (2011) developed a simple methodology for stress testing the funding ratio of defined benefit pension plans:
  - Excel-based template with institution-specific data used for liability valuation and stress testing of assets and liabilities of a typical defined benefit plan.
  - Such stress testing framework uses a full asset and liability valuation approach, independent of the solvency regulation specific to any given country.
  - Assets are valued at market prices.
Investment funds can exacerbate fire sales in financial systems with significant negative effects on the balance sheets of other actors in markets in three ways:

- by reducing collateral values;
- by reducing credit financing for banks, firms, and governments;
- when their own financiers or investors pull out (including lending by prime brokers that creates a bank-funds loop).

Under certain conditions, investment funds can act as systemic risk amplifiers.
The European Securities and Markets Authority (ESMA) conducted a public consultation on its draft guidance regarding liquidity stress tests of investment funds.

The consultation sets out **14 principle-based criteria** for managers’ liquidity stress tests (LSTs) to follow when executing liquidity stress tests on their funds:

1. LST should be integrated and embedded in the fund risk management framework supporting its **liquidity management**.
2. LST should be documented in a LST **policy**.
3. LST should demonstrate that the manager has a strong understanding of the **liquidity risks**.
4. LST should be conducted **at least annually** and employed at all stages in a fund’s lifecycle, where appropriate.
5. LST should provide outcomes which can be used to:
   1. Ensure the fund is **sufficiently liquid**, 2. Strengthen the ability of managers to **manage fund liquidity** in the best interests of investors, including planning for periods of heightened liquidity risk. 3. Help **identify potential weaknesses** of an investment strategy, and assist in investment decision making, 4. **Assist risk management monitoring** and decision-making, including setting relevant limits regarding fund liquidity.
6. LST should assist the manager in **preparing a fund for a crisis**, and its broader contingency planning.

7. LST should be applied to in-scope UCITS and AIFs and adapted appropriately to each fund, depending on its **nature, scale and complexity**.

8. LST should employ **hypothetical and historical scenarios**, and **reverse stress testing**. In doing so it should not overly rely on historical data.

9. LST should demonstrate that the manager is able to **overcome limitations** related to the availability of data.

10. LST should enable the manager to assess not only the **time and/or cost** to **liquidate assets** in a portfolio.

11. LST should incorporate **scenarios** relating to the liabilities of the fund.

12. LST should incorporate risk factors related to **investor type** and **concentration**, where appropriate.

13. LST on the assets and on the liabilities side of the fund balance sheet shall be combined to determine the **overall effect on fund liquidity**.

14. **Aggregate LST** should be undertaken where appropriate.
ESMA also conducted money market funds stress test, taking into account:

a) hypothetical changes in the **level of liquidity** of the assets held in the portfolio of the MMF;

b) hypothetical changes in the level of **credit risk** of the assets held in the portfolio of the MMF, including credit events and rating events;

c) hypothetical movements of the **interest rates and exchange rates**;

d) hypothetical levels of **redemption**;

e) hypothetical **widening or narrowing of spreads** among indexes to which interest rates of portfolio securities are tied;

f) hypothetical **macro systemic shocks** affecting the economy as a whole.
Stress tests for investment funds

- The binary nature of market liquidity means that in extreme market events, liquidity shocks usually occur quickly and cannot easily be predicted by any model. With this in mind, stress tests cannot be a standalone tool to be relied upon as a way of predicting future liquidity crises.

- Reverse stress tests are also employed by some managers to assess the “burn rate” of a fund. This calculates how long an open-ended fund can sustain itself with its cash and liquid assets before it experiences a problem.

- Holistic view on issues such as counterparty default, risk collateral and margin demands completes a stress test exercise.
The objective of the liquidity stress test of **IMF** on investment funds is to assess the resilience of investment funds - at the individual level or at the industry level - to severe, but plausible, **redemption shocks**.

Investment funds stress tests can be used for multiple purposes.
Stress tests for investment funds

- The **Supervisory Financial Authority of Romania** organized an investment funds stress test. The purpose of the exercise is to lead to the application of new procedures, determining an improvement of the capacity of participating funds to manage the liquidity and investment risks.

- **Bank of Ireland** has developed a macroprudential stress testing framework of investment funds. They employ a model of redemptions and fire sales adapted for the investment funds sector.

- **BaFin** has developed a stress test as a powerful tool to manage the liquidity risk. The principle of liquidity management for investment funds involves bringing the liquidity of the investment fund into line with its payment obligations.
Stress Test for CCPs

- The CCPs run **daily stress tests** based on prudential requirements.

- These stress tests focus on their own environment:
  - clearing participants,
  - cleared products, or
  - clearing activity

- **ESMA** combines market shocks with simultaneous default of market participants to gauge the resilience of CCPs.

- **ESMA** conducted three EU-wide stress tests of central counterparties in the recent years:
  - Credit risk
  - Liquidity risk
  - Combination between credit and liquidity risks with concentration risk
  - Reverse credit stress
Stress Test for CCPs

- **CPMI-IOSCO** developed a supervisory stress-testing framework focused on macroprudentially-oriented multi-CCP supervisory stress tests (CPMI-IOSCO, 2018).
  - collective response of a set of CCPs to one or more common stress events, from a credit risk perspective, a liquidity risk perspective, or both.

- Anderson et al. (2018b) argue that crucial differences in CCPs’ role, risk profile and financial structure, when compared to banks, are likely to require significant adaptation in the design of supervisory stress tests.

- Cont and Kokholm (2014) show that multiple asset classes central clearing can reduce interdealer exposures. Some studies show that central clearing limits the excess risk-taking.
Stress Test for CCPs

- Poce et al. (2018) propose a stress test methodology for CCPs that takes into account the propagation and amplification of financial distress through the network of bilateral exposures between clearing members.

- Berner et al. (2019) also interpret the current stress test practice from a network perspective, highlighting central counterparties (CCPs) as an example of a critical network hub.

- Casu et al. (2019) model a financial system with central clearing and clearing without CCPs to empirically assess the effects of the introduction of non-central clearing on counterparty, liquidity and systemic risks in the presence of central clearing.
• **Regulation** and **supervision** simply provide a framework for the financial system.

• Within that framework, everyone can contribute to the stability of the financial system by acting prudently.

“Ask not what the financial system can do for you; ask what you can do for the financial system”,

*John F. Kennedy*