Stress testing market-based finance

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Financial Resilience and Systemic Risk, LSE Institute of Global Affairs-
Financial Markets Group Conference

30 January 2019

* The views expressed are my own and should not be taken to represent those of the Bank of England or its policy committees.
Motivation

- Market-based finance (MBF) is the provision of finance to the real economy by non-bank financial institutions (corporate bond funds, insurers, pension funds), including via financial markets.

- MBF is becoming an increasingly important source of finance to the real economy:
  
  - MBF has grown by over 50% since 2008 and accounts for just under half of global financial system assets.

  - “Second phase of global liquidity” (Shin, 2013).

  - Nearly all net finance raised by UK private companies since crisis has been through equity and bond issuance.
Market-based finance has grown rapidly

Cumulative net flow of financing raised by UK PNFCs

- Bonds, equities and commercial paper (a)
- Total (b)
- Loans

Sources: Bank of England and Bank calculations.
(a) Data cover funds raised in both sterling and foreign currency, converted to sterling. Seasonally adjusted. Bonds and commercial paper are not seasonally adjusted.
(b) Owing to the seasonal adjustment methodology, the total series may not equal the sum of its components.
Motivation

• Resilience benefits: lower leverage, reduced reliance on short-term debt finance.

• But we do not know how MBF will respond under a severe stress. Behaviour during past episodes of stress may not be a good guide to future behaviour!

• Policy questions:
  
  – Through what mechanisms could systemic risks be a concern in MBF?

  – Where are the potential ‘tipping points’?
Stress testing – market-based finance

Traditional stress tests: do banks have sufficient capital to absorb losses?

Stress testing MBF: is there potential for a dislocation in asset prices – fire sales?

Shock (e.g., Corporate sector defaults increase)

Solvency constraints bind

Funding constraints tighten (e.g., margin calls on collateralised positions or fund redemptions)

Forced sales of risky assets
Lower prices
Higher volatility

Higher borrowing costs
Restricted credit supply

Solvency constraints bind
Funding constraints tighten

Restricted credit supply
Higher volatility
Lower prices
Forced sales of risky assets
The model
Model structure

Cash providers

Intermediary

MMF

Comm. Bank

Dealer Bank

Hedge Fund

Pension fund

Inv. fund

Insurer

Arbitrage

Long-term investors

Long-term investors

Arbitrage

Intermediary

Cash providers
Securities financing markets: Repo

Secondary Asset Markets: Gov’t bonds, corporate bonds and equities

- Comm. Bank
- Dealer Bank
- Hedge Fund
- Pension fund
- Inv. fund
- Insurer

Securities financing markets: Repo
# Model structure: agents’ objectives and constraints

<table>
<thead>
<tr>
<th>Objective / role in the model</th>
<th>Leverage / solvency</th>
<th>Short-term liquidity</th>
<th>Investors redeem</th>
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<tbody>
<tr>
<td>Pension fund</td>
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</tr>
<tr>
<td>Life insurer</td>
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<tr>
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<tr>
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<tr>
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<tr>
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<tr>
<td>MMF</td>
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</table>

- **Leverage / solvency** indicates whether the agent is subject to leverage constraints.
- **Short-term liquidity** indicates whether the agent needs short-term liquidity.
- **Investors redeem** indicates whether investors redeem from the agent.
Exogenous shock

Agents react to shock

Compute D&S across funding and asset markets

Iterate prices until all markets clear

Initial equilibrium

1 month

New equilibrium
Stress scenario

Deteriorating corporate outlook
(Higher default probability, lower expected dividend growth)
Stress scenario

Deteriorating corporate outlook
(Higher default probability, lower expected dividend growth)

Binding leverage constraint for broker-dealer
Stress scenario

- Deteriorating corporate outlook (Higher default probability, lower expected dividend growth)
- Binding leverage constraint for broker-dealer
- Binding capital constraint for commercial bank

Graph showing:

- Initial equilibrium
- Deteriorating corporate outlook
- Binding leverage constraint for broker-dealer
- Binding risk-based capital constraint for commercial bank

Graph labels:

- Gov't bond
- Corporate bond
- Equities
Impact of alleviating constraints

Impact on value of traded securities in the model

<table>
<thead>
<tr>
<th>Size of injection (£bn)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
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Absolute impact:

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‘Bang for buck’ ratio:

<table>
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<th>Size of injection (£bn)</th>
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<td>Insurer capital</td>
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Conclusion

- We present a model that can be used to assess the resilience of the UK’s system of market-based finance.
  - Focus interactions/spillovers in asset and funding (repo) markets.
  - Where are the key ‘tipping points’?

- Next steps:
  - Greater within-sector heterogeneity.
  - Dynamics and links to real economy; integrate with macro-stress tests.
  - Use the model as a guide for developing summary indicators of resilience.