An evolving financial system: don’t leave it too late, simulate

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Bank of England

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Ten years ago, a financial crisis sideswiped households and businesses.

THE WALL STREET JOURNAL.

LEHMAN BROTHERS

Merrill Lynch

AIG

94.4%

68.2%

79.2%

Crisis on Wall Street as Lehman Totters, Merrill Is Sold, AIG Seeks to Raise Cash

The New York Times

NEW YORK, THURSDAY, SEPTEMBER 18, 2008

NEW PHASE IN FINANCE CRISIS AS INVESTORS RUN TO SAFETY

The Telegraph

UK facing worst financial crisis 'in decades'

DAILY NEWS

2.5 MILLION READERS EVERY DAY

SHOCK MARKET

CRISIS ON WALL STREET

Dow plunges 504 points

Insurance giant teeters on brink

Fear as traders await opening bell

Back then, the financial system was fragile.

A non-bank system dominated by shadow banks …

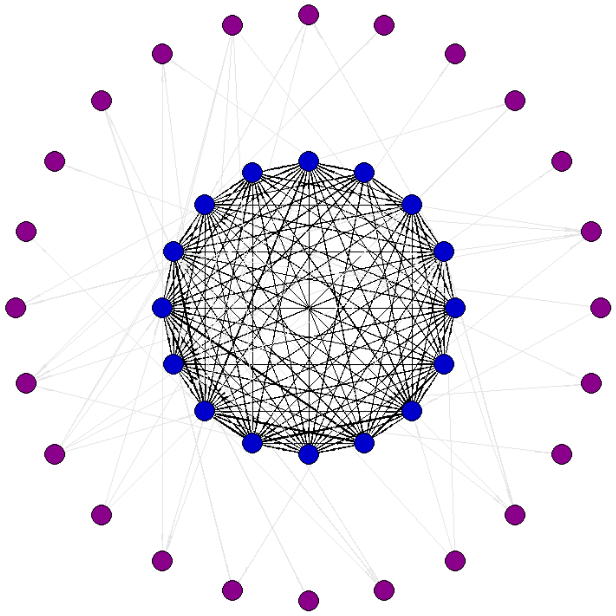
Back then, the financial system was fragile.

Shadow banks didn't contain problems, they spread them ...

Back then, the financial system was fragile.

Derivative markets spread problems too. They created an opaque web of connections. Losses could spread through the network.

Pre-reform counterparty network of UK credit default swaps(1)

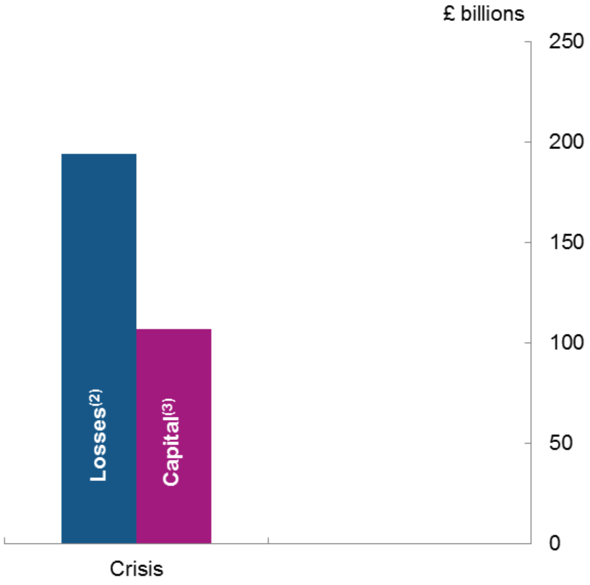


(1) Showing only the largest 16 dealers (in blue) and 24 randomly chosen other market participants (in purple). Lines denote non-zero net notional amounts outstanding between counterparties. Data as of early 2009.
Source: Depository Trust & Clearing Corporation.

Back then, the financial system was fragile.

And the banking system didn't have enough of its own money on the line to absorb the resulting losses.

Losses vs. capital for major UK banks[1]



(1) Barclays, HSBC, Lloyds, Nationwide, RBS and Santander UK.
(2) 2008-10 impairment and market losses.
(3) Basel III common equity tier-1 capital (estimated).

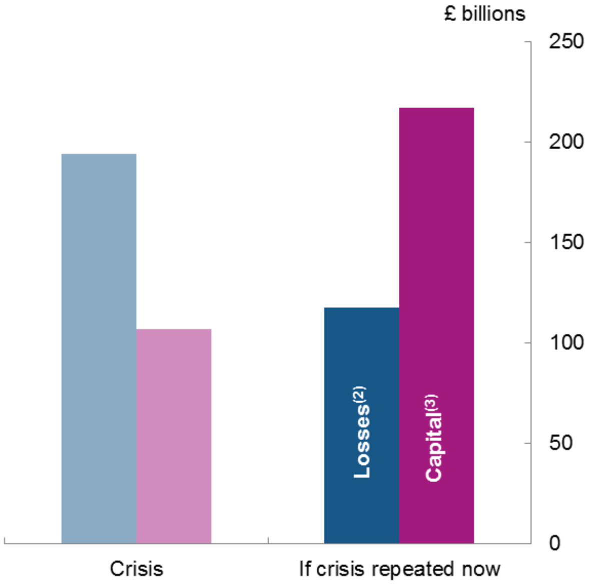
Sources: Bank of England, banks' financial reports and Bank calculations.

<u>The result</u>: taxpayer bail-outs and a credit crunch for households and businesses.

The banking system is now stronger.

Banks can absorb crisis losses with their own capital.

Losses vs. capital for major UK banks(1)



(1) Barclays, HSBC, Lloyds, Nationwide, RBS and Santander UK.
(2) Crisis losses adjusted for changes in (estimated) risk-weighted assets.
(3) Basel III common equity tier-1 capital.

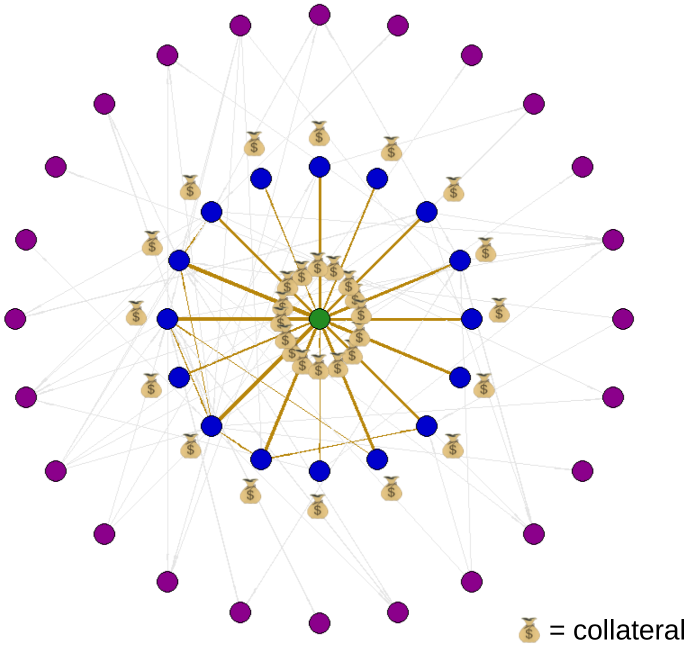
Sources: Bank of England, banks' financial reports and Bank calculations.

The result: a banking system that can serve households and businesses even in testing times.

Derivative markets are safer.

Webs of connections have been stripped back. And participants must put up security.

Post-reform counterparty network for UK credit default swaps(1)



(1) Positions as of early 2009, but cleared at current rates of clearing for new trades in order to proxy the future steady-state network. The figure shows only the CCP (in green), the largest 16 dealers (in blue) and 24 randomly chosen other market participants (in purple).
Source: Depository Trust & Clearing Corporation and Bank calculations.

Posting of collateral (margin) means that if one party goes bust, the other isn't left with a loss

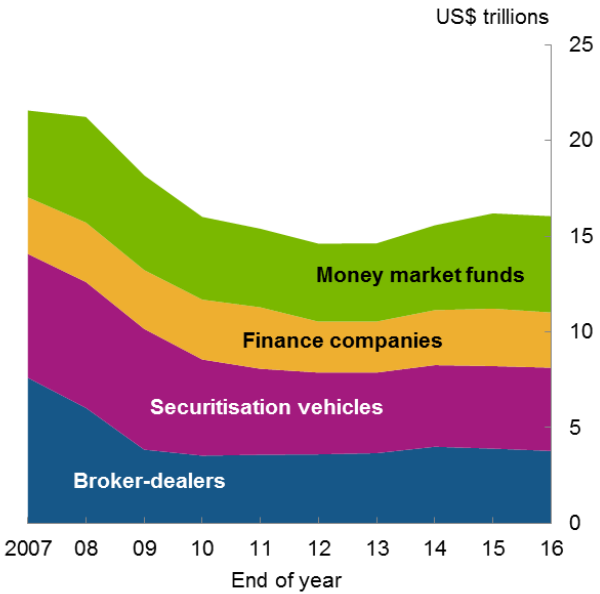
This is similar to using a house as security on a mortgage

New collateral must be posted every day as markets move and the value of derivatives change

And the system is now more diverse.

Shadow banks have shrunk and been reformed …

Shadow bank financial assets[(1)]



(1) 'Broker-dealers', 'securitisations vehicles' and 'finance companies' respectively correspond to economic functions (EFs) 3, 5 and 2 of the FSB's ‘narrow’ measure of shadow banking. Money market funds are in EF1. EF4 (credit insurance) is omitted as it is relatively small.

Source: Financial Stability Board and Bank calculations..

Structural reforms separating dealers from banks

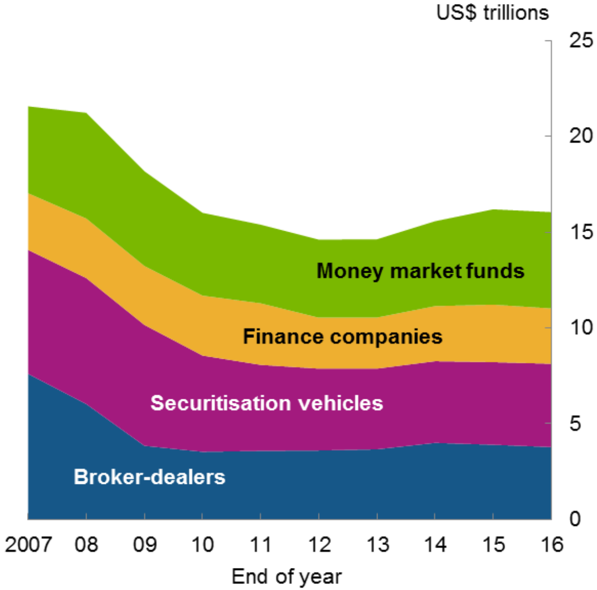
Structural reform to money market funds (fewer constant NAV funds)

Incoming requirements and incentives to make securitisations simple, transparent and standardised (STS)

And the system is now more diverse.

… and their place taken by safer non-banks.

Shadow bank financial assets[(1)]



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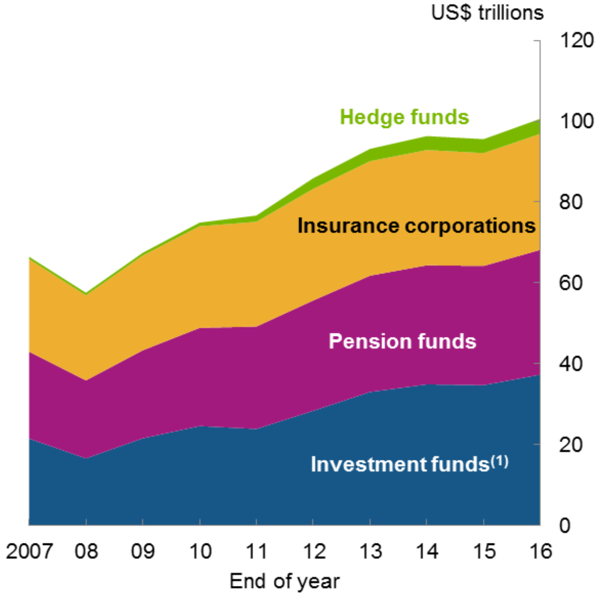
Source: Financial Stability Board and Bank calculations..

Non-bank financial assets



(1) Investment funds other than hedge funds and money market funds.

Sources: Financial Stability Board and Bank calculations.

A more diverse system can be a safer system.

But it doesn’t guarantee financial stability …

A financial system that can serve households and businesses in bad times as well as good

… so we must be vigilant.

And vigilant we are. To firesale risks especially.

Firesale risk: The risk that non-banks are forced into selling assets quickly, driving prices down and volatility up …

Sudden cash calls, for example when:

- Derivative exposures change
- Investors redeem their money at short notice

- Lower prices
- Volatile markets

- Higher borrowing costs
- Restricted credit supply

… and harming households and businesses

Our approach to monitoring the risk: Don’t wait, simulate.

Not: what has gone wrong before?

Instead: given how non-banks have changed, how could they harm the economy in the future?

Simulation 1: Cash calls on derivative positions.

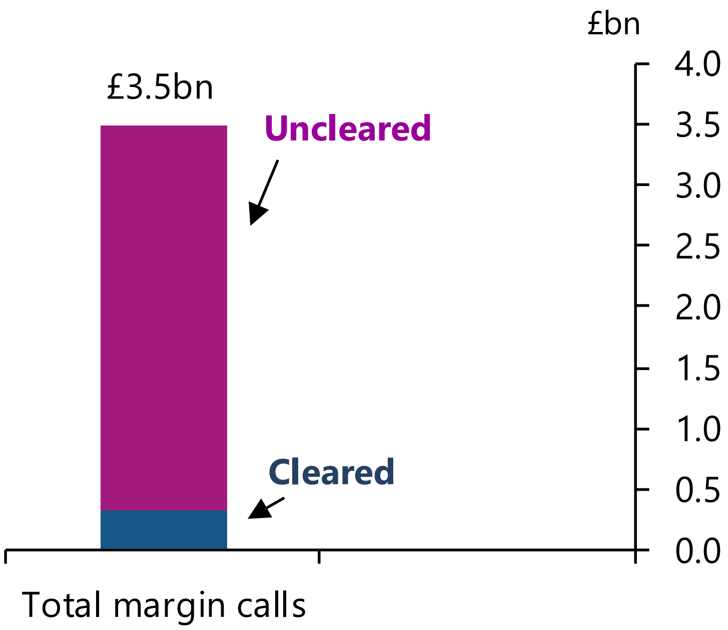
How big might be the calls non-banks face for margin to square off derivative positions after markets move?

Do they have the cash or liquid assets to meet those calls?

Or might they be forced into firesales?

Simulation 1: Cash calls on derivative positions.

Non-banks would face margin calls on derivatives following an increase in interest rates …



This simulation covers:

Margin calls on OTC forward rate agreements and single currency interest rate swaps …

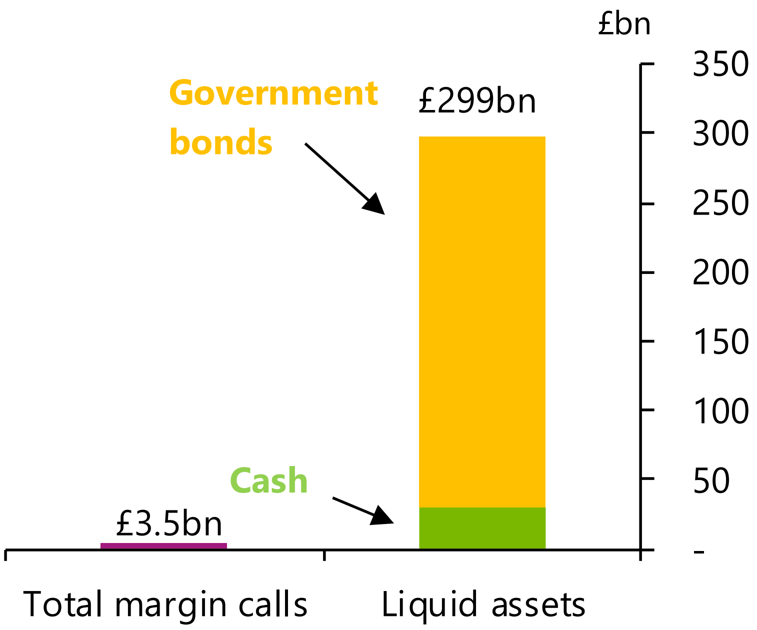
… for a selection of 73 pension funds, investment funds and insurers …

… following a 25bp increase in interest rates.

Slides amended on 26/10/2018

Simulation 1: Cash calls on derivative positions.

… but in aggregate, their liquid assets dwarf these margin calls.



But:

1. Liquid assets are also needed for other purposes.

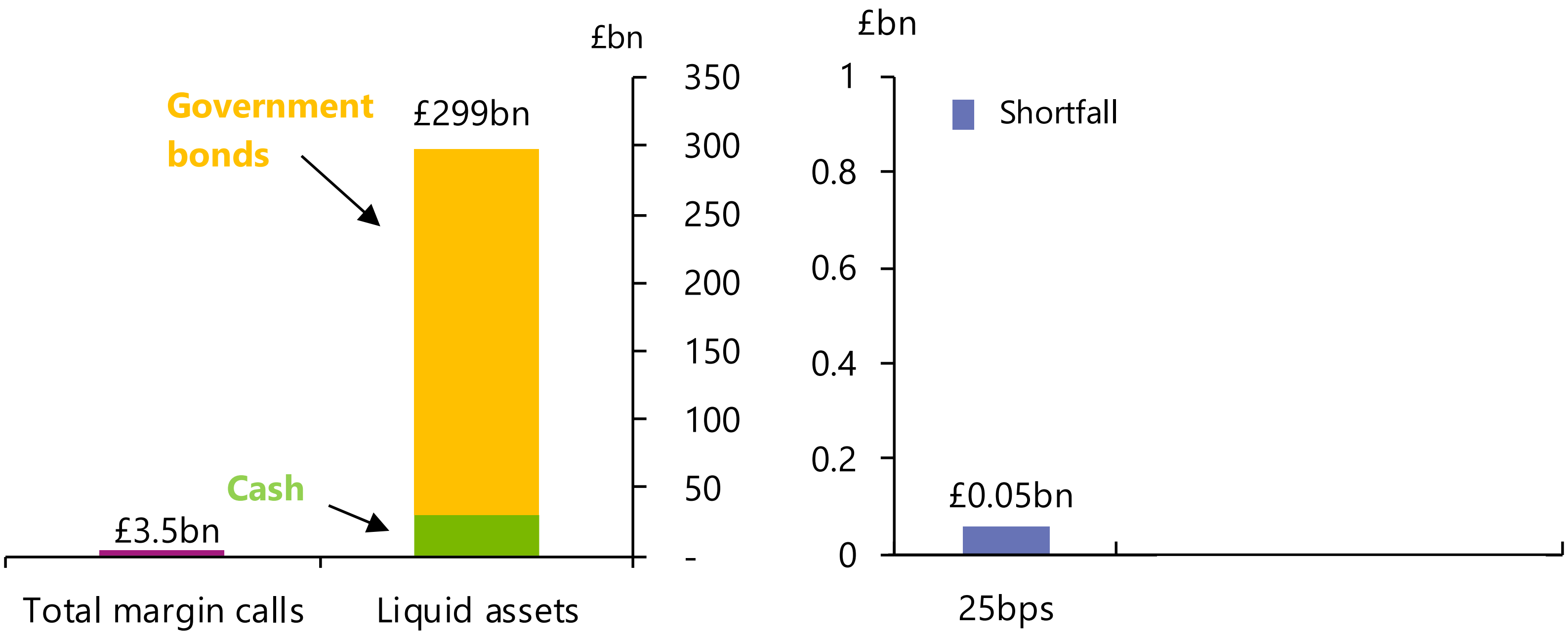
2. Margin calls on centrally cleared derivatives must be met in cash.

3. These aggregate liquid assets must be in the right place: at the firms facing margin calls.

Slides amended on 26/10/2018

Simulation 1: Cash calls on derivative positions.

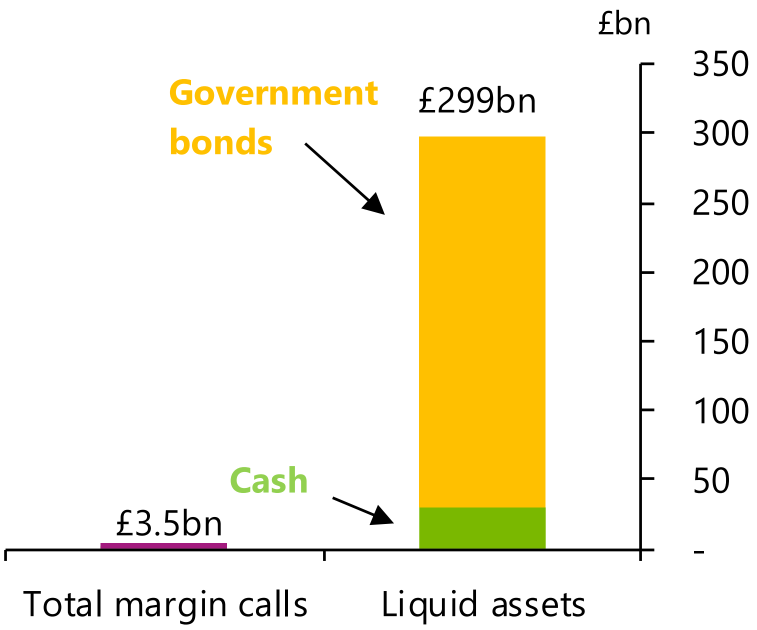
Adjusting for these things, some firms would face a shortfall …

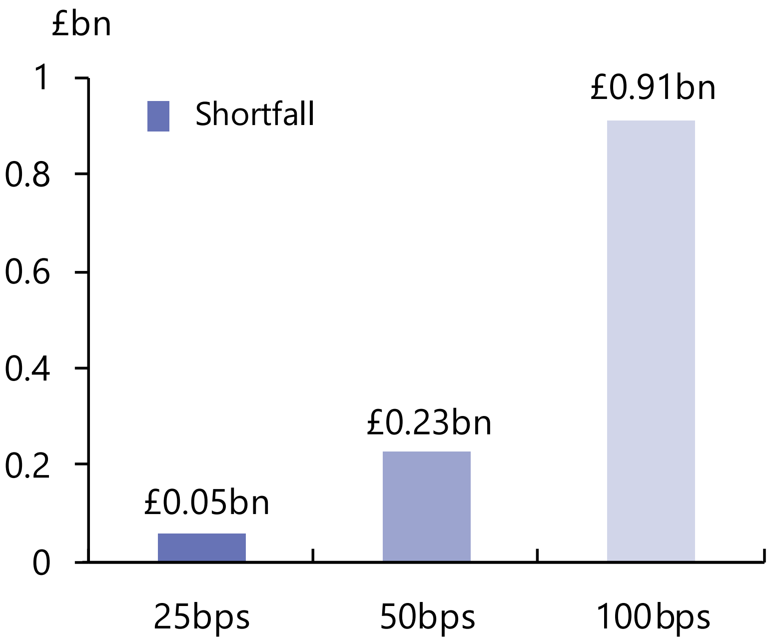


Slides amended on 26/10/2018

Simulation 1: Cash calls on derivative positions.

… and the shortfall increases with the size of the market move.



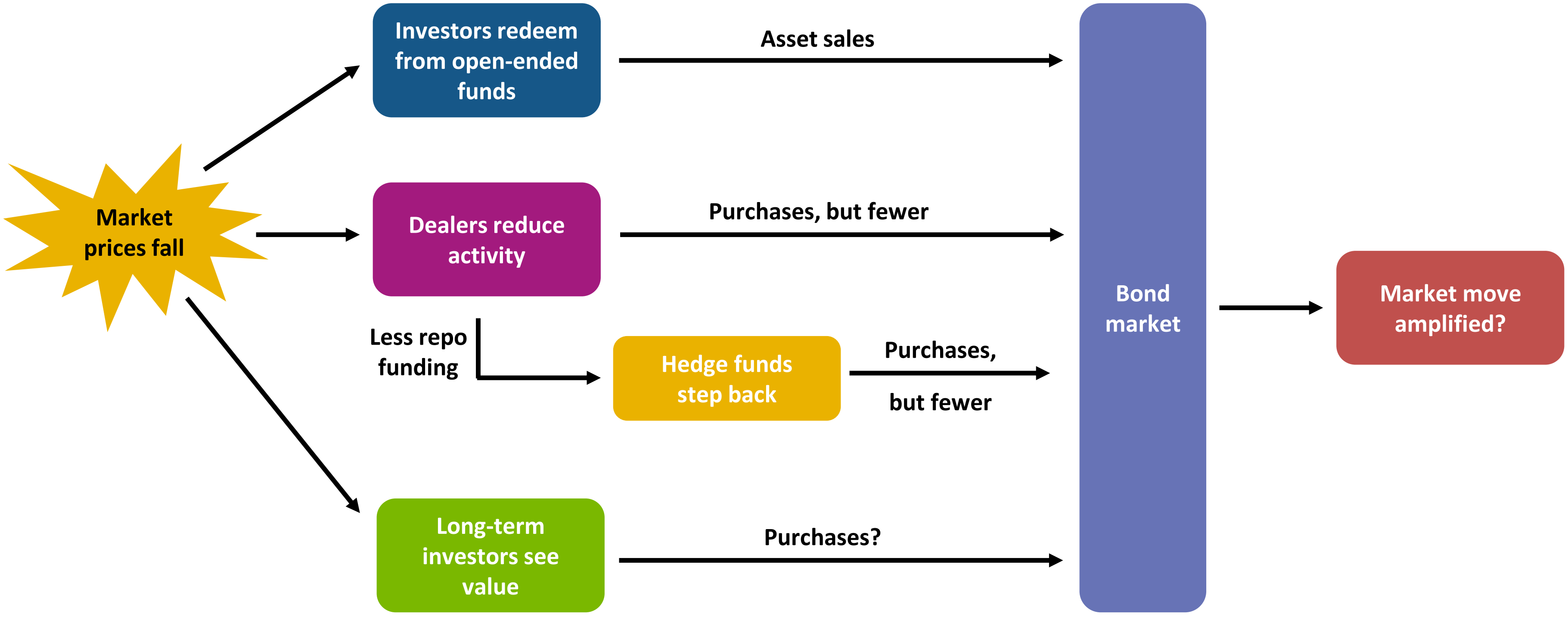


These shortfalls are small, but must continue to be monitored (by simulation) as the system evolves.

Slides amended on 26/10/2018

Simulation 2: A system is more than the sum of its parts.

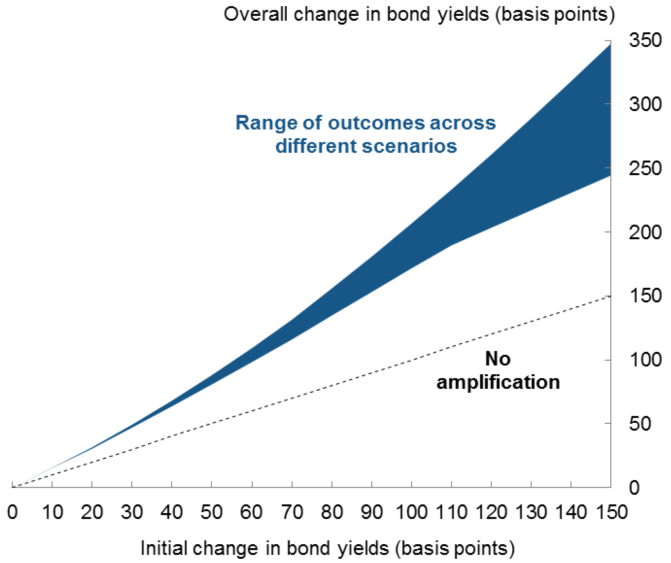
Are there feedback loops lurking under the surface in the bond market?



Simulation 2: A system is more than the sum of its parts.

How material could feedback loops be? A work in progress.

Amplification of initial price shocks(1)



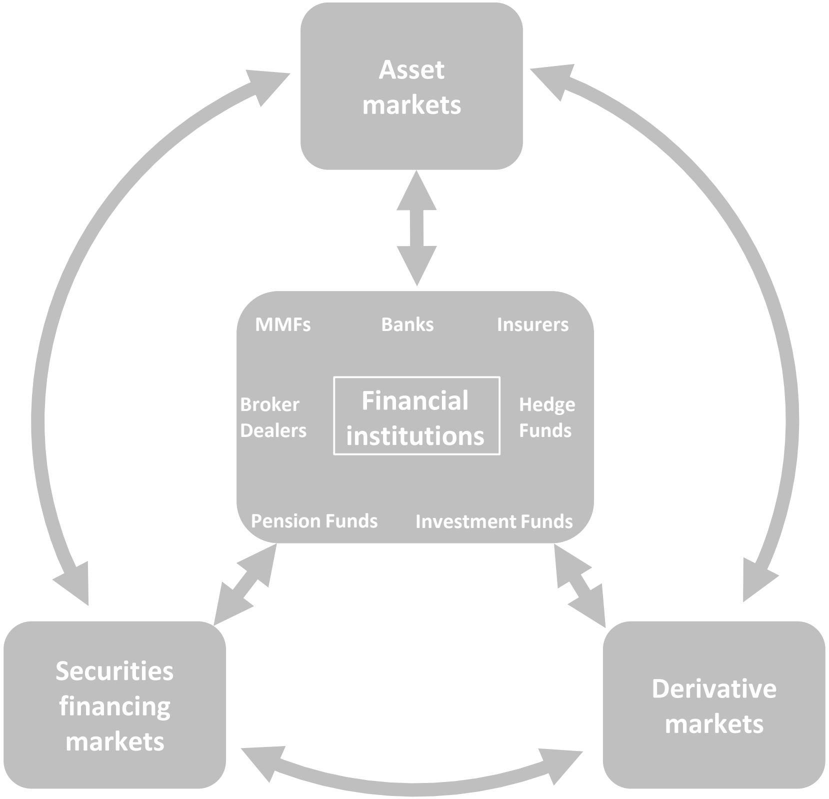
(1) For UK investment-grade corporate bonds.

Source: Bank of England.

Forthcoming Bank of England staff working paper: 'Simulating stress in the UK corporate bond market: investor behaviour and asset fire-sales' by Yuliya Baranova, Graeme Douglas and Laura Silvestri

Next steps for us: Putting it all together.

How might all parts of the non-bank system combine?



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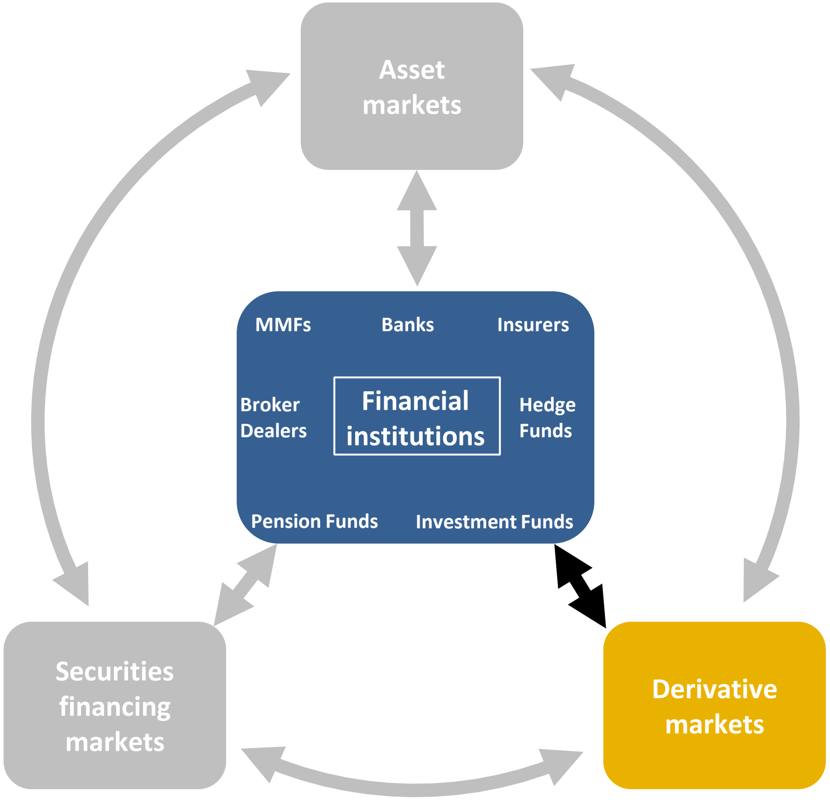
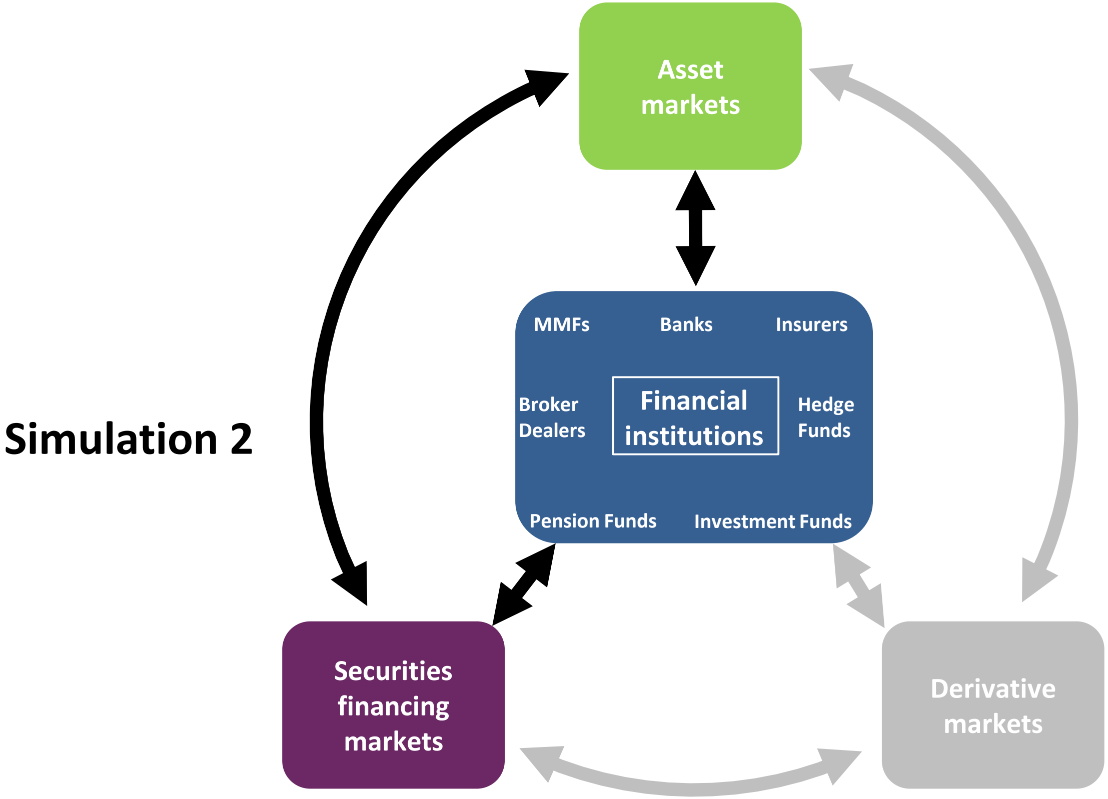
How might all parts of the non-bank system combine?



Simulation 1

Next steps for us: Putting it all together.

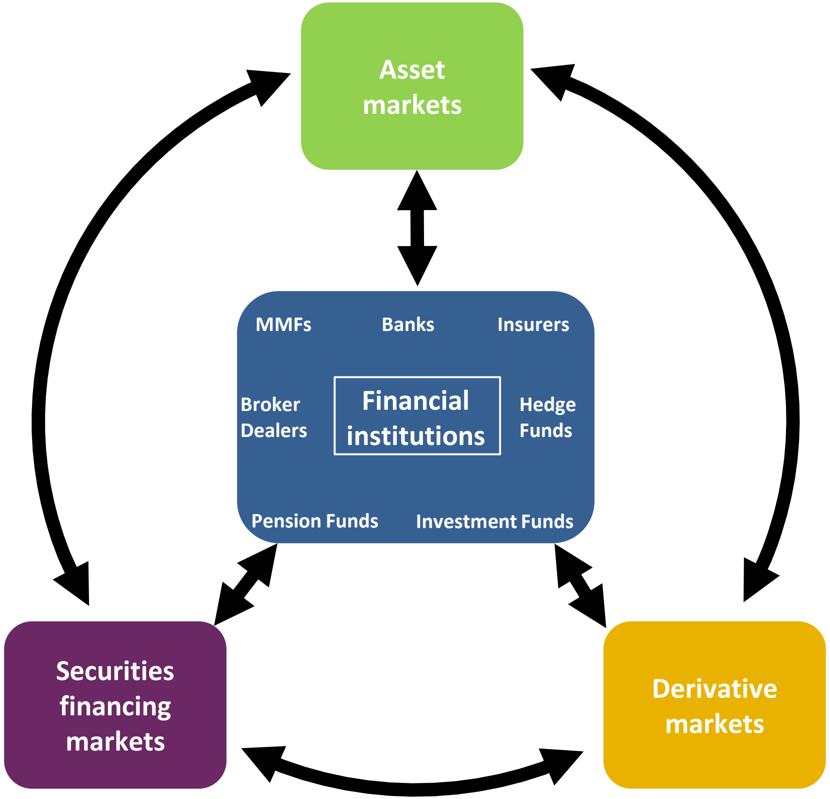
How might all parts of the non-bank system combine?



Next steps for us: Putting it all together.

How might all parts of the non-bank system combine?

System-wide stress simulation



Summary

The financial system is stronger, simpler and safer than ten years ago.

Safer non-banks have taken the place of dangerous shadow banks.

This diversity can be a source of strength, but we have to be vigilant about firesale risks.

These risks need monitoring. Not by asking whether they **have** appeared, but by asking whether they **could.**

Don’t wait. Simulate.