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The Bank of England's Approach to Top Down Systemic Stress Testing

Simulating Financial Instability
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Top down stress testing - Objectives

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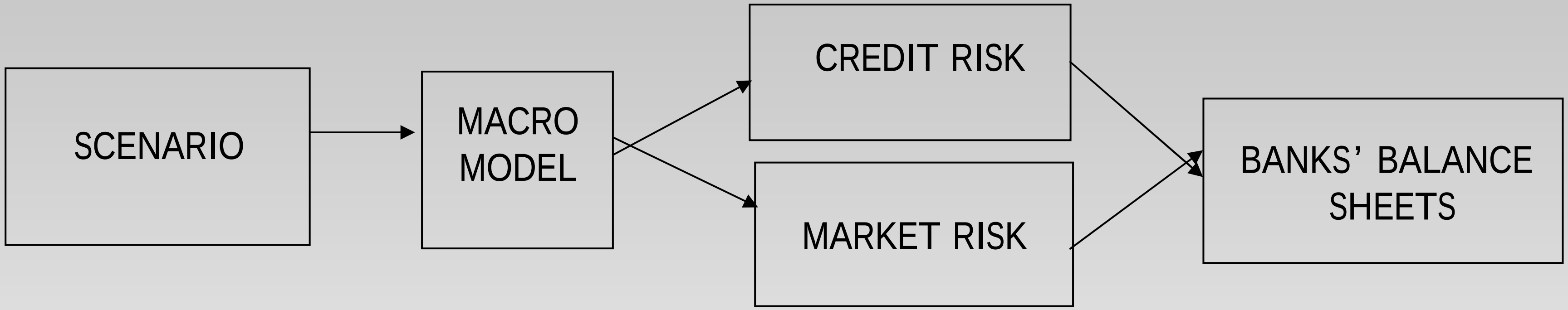
- Assessing financial <u>system</u> vulnerability to extreme but plausible shocks
- Improving understanding of risk transmission (crisis propagation)
- Identifying ‘weak spots’ and risk reduction/crisis management planning priorities
- Utilising rigorous, consistent framework
- Integrating behavioural interactions and feedbacks

Traditional ‘macro’ stress test



- Coherent ‘stress’ scenario (with policy response)
- Map propagation channels
- Macro variables → corporate/household balance sheets → expected credit losses
- Macro variables → asset price changes → expected market losses
- Assess impact on funding costs/net interest income
- Aggregate to derive major banks’ losses

Output – Severe global macro slowdown

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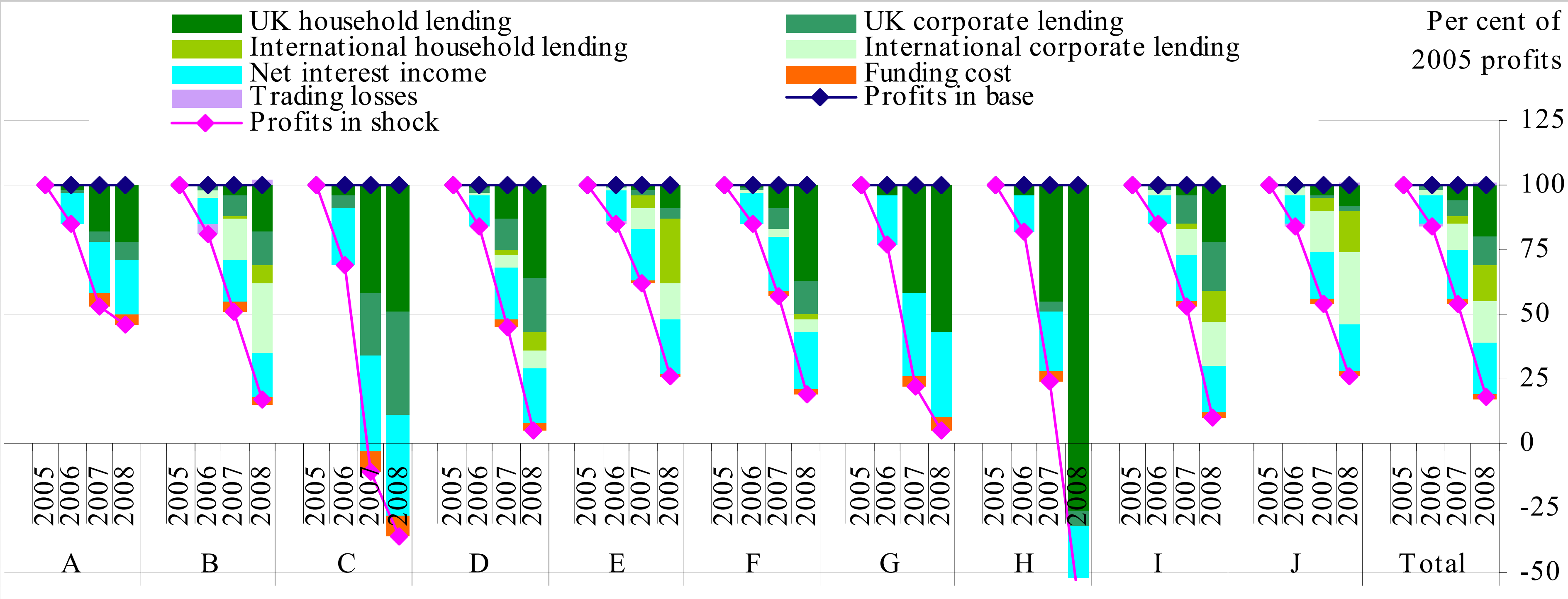
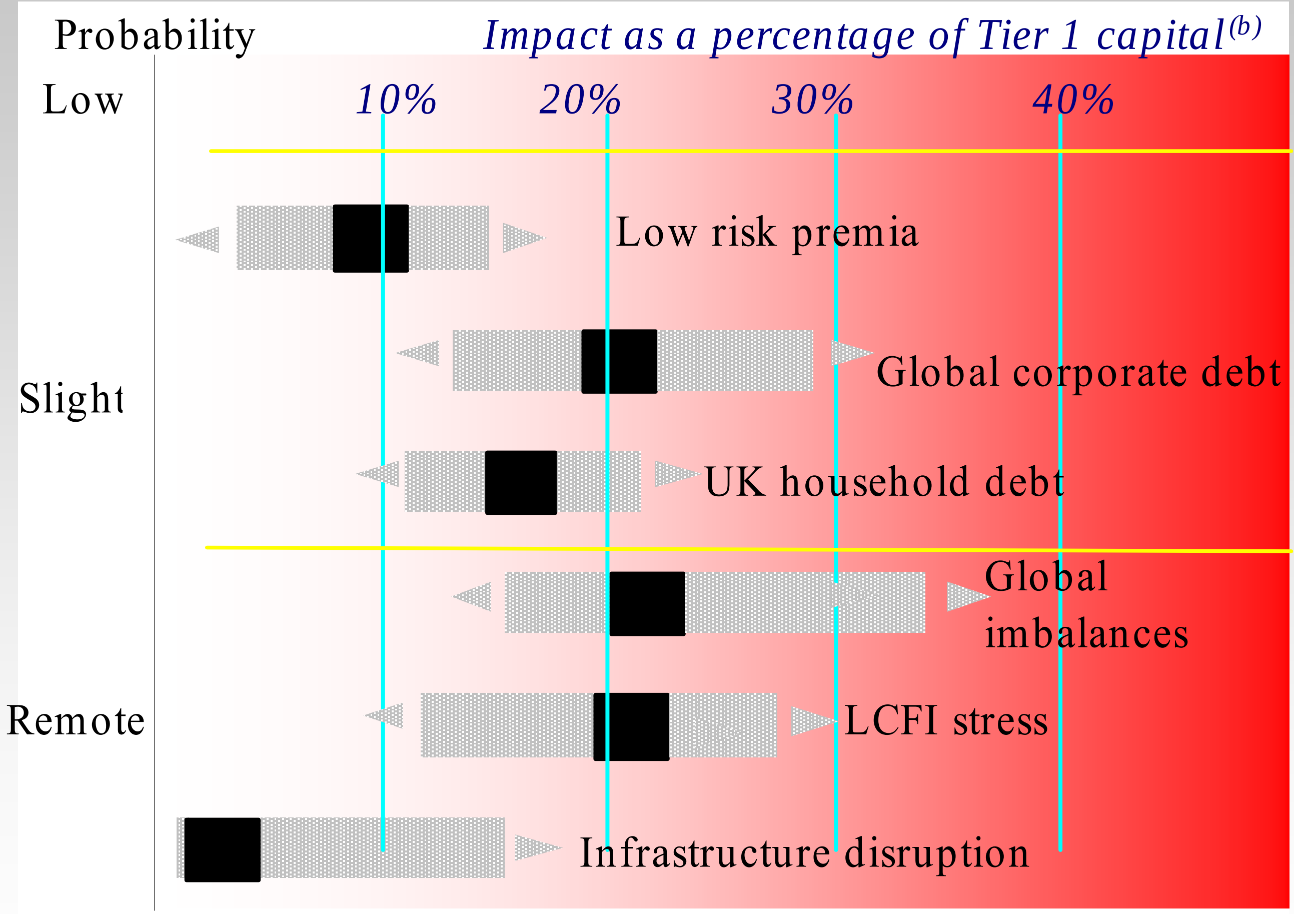


Impact put at around 50% of major banks' profits over three years

Severe stress scenarios



Source: Bank calculations, July 2006. (a) Central band shows best current quantified estimate of scale of loss under each scenario; wider bands include allowances for some uncertainties around these calibrations. A number of potential channels are not included in the bands. (b) Total impact for major UK banks of individual scenarios over a three-year horizon, relative to base. The impact is expressed as a percentage of current Tier 1 capital but, given UK banks' current profits, does not necessarily imply a loss of capital.

Merits of Traditional Approach

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- Coherent macro scenarios and approach
- Facilitates sensitivity analysis
- Aids intuition/narrative
- Comparison with ‘bottom up’ results

Limitations

- Absence of feedback/system interactions

  - market liquidity impact/disruption

  - network effects/contagion

  - financial accelerator/credit crunch
- So results often relatively linear (‘extreme’ scenario = scaled up ‘moderate’ scenario)
- Yet financial instability highly non-linear
- Single events (probability zero). Cannot produce distribution.

Risk Transmission Map

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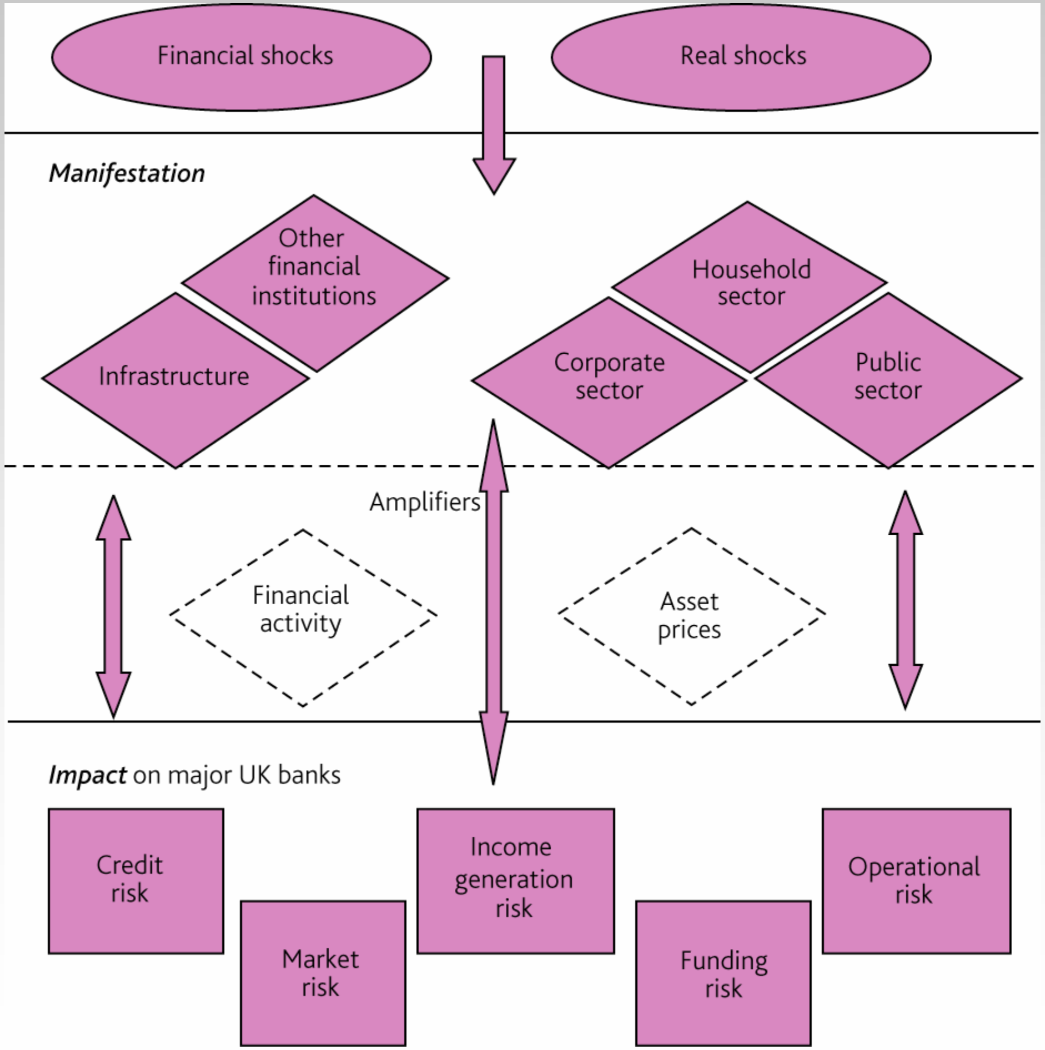
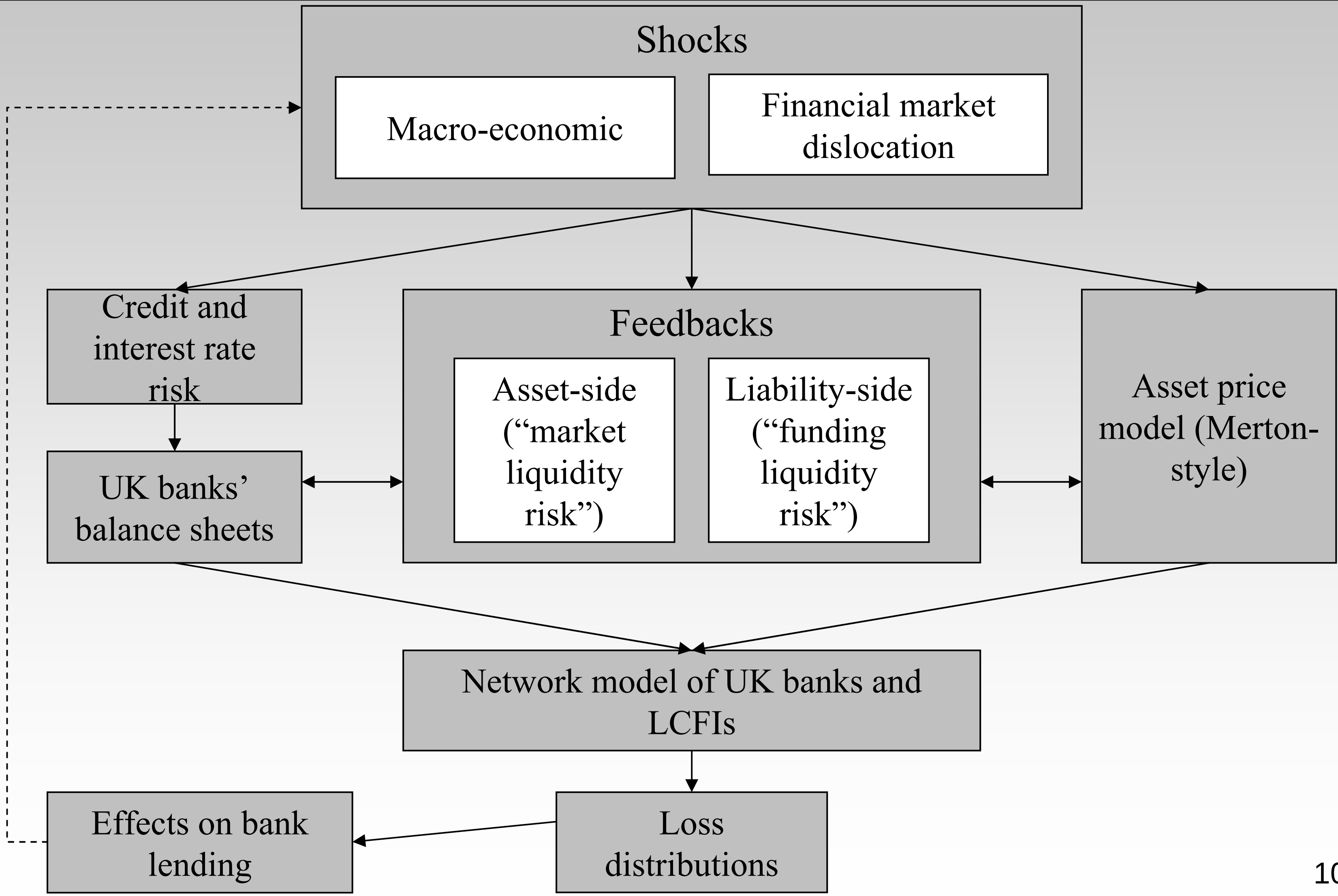


Channels explicitly quantified in stress scenarios

	Low risk premia	Global imbalances	Global corporate debt	UK household debt	LCFI stress	Market infrastructure disruption
Credit risk, exposures to:						
UK households	●	●		●		
UK corporates	●	●	●			
Overseas households	●	●				
Overseas corporates	●	●	●			
Counterparty credit risk, exposures to:						
LCFIs					●	●
Other financial institutions						●
Market risk in trading book	●	●				●
Income generation risk	●	●	●	●		●
Funding risk	●	●	●	●		●
Operational risk						●
Macroeconomic feedback effects						
Market liquidity disruption						

(a) A circle denotes that a channel is quantified - fully or partially – in the stress scenario impact estimates.

A New Approach



New Approach – Key Features

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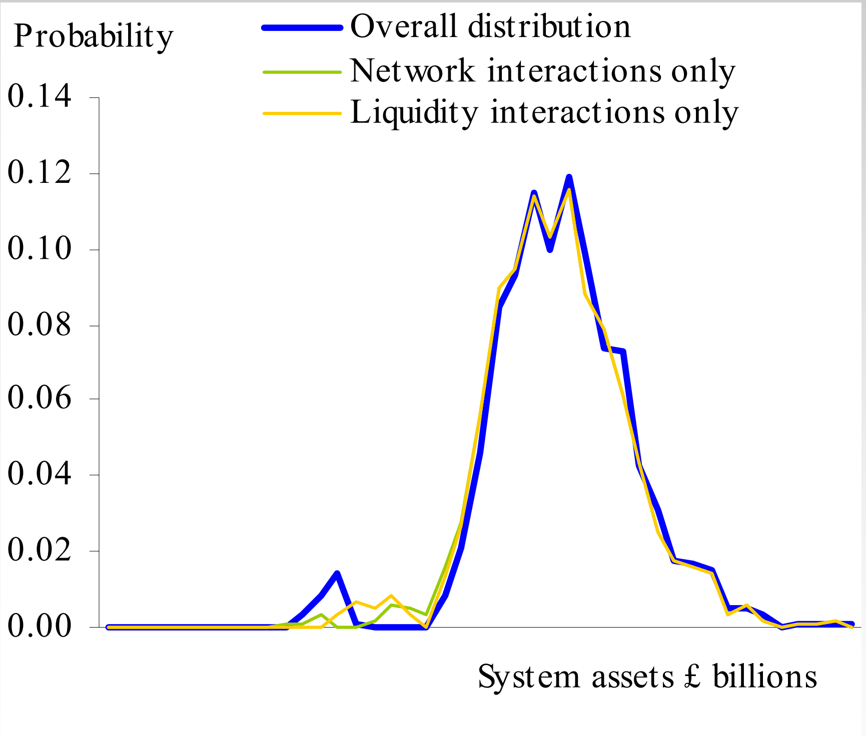
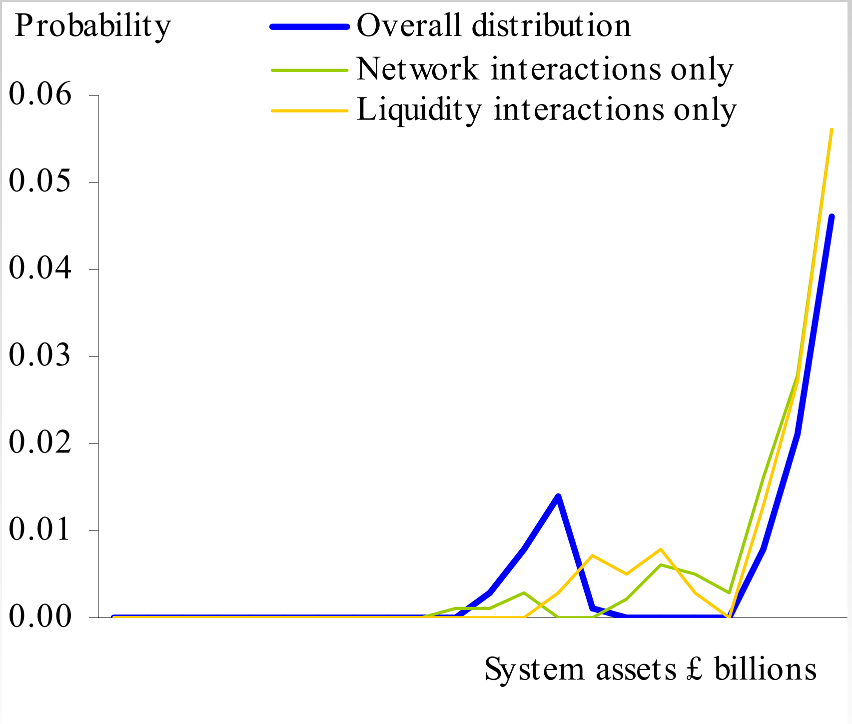
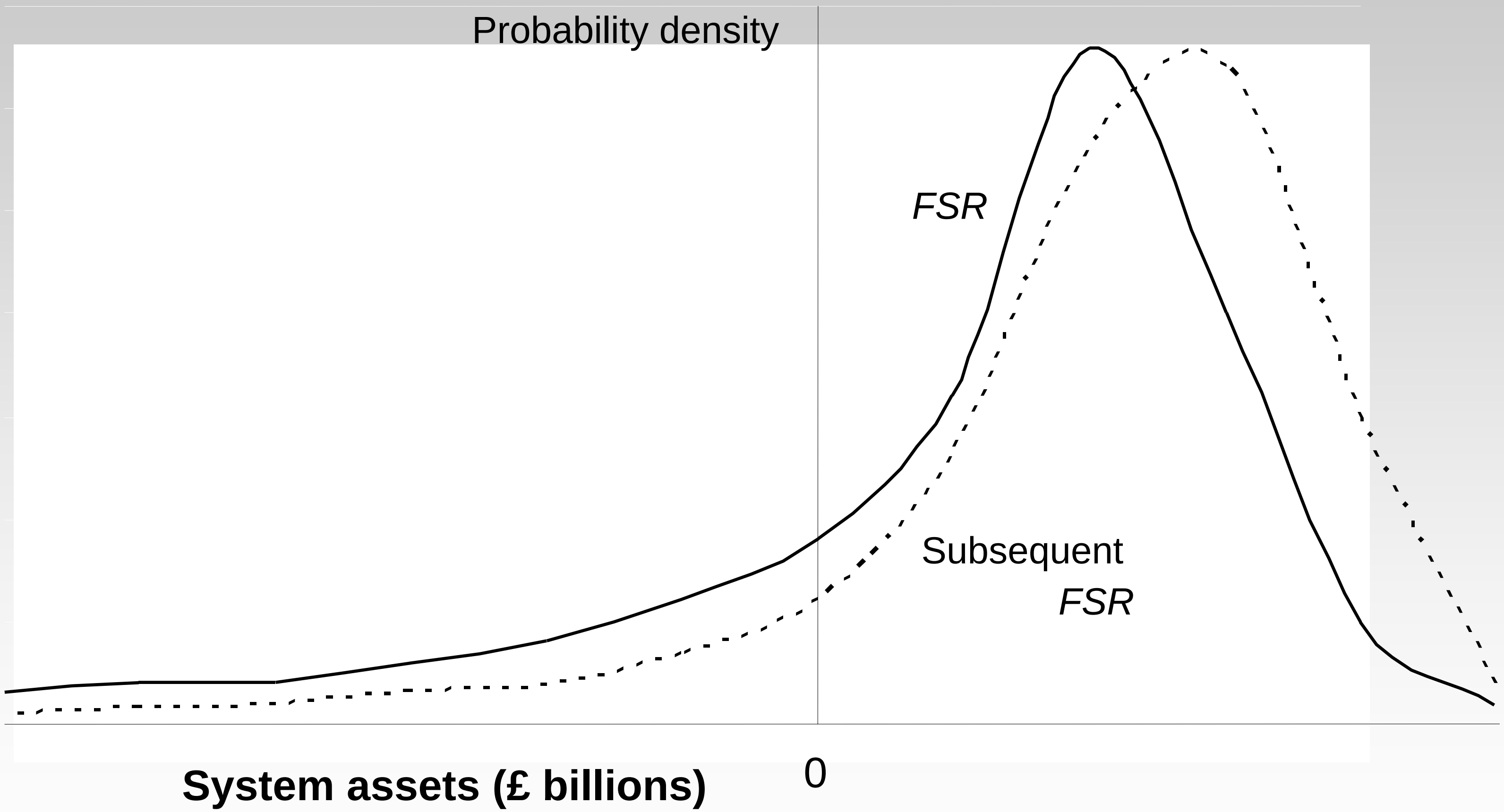
- Suite of models
- Endogenous funding/market liquidity risk
- Network interactions/contagion risks
- Financial sector/macro feedbacks
- Distributional results as well as scenario

The distribution of banking system assets





Aggregate loss distribution of the UK Banking System



Some Issues

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- Analytically challenging: modelling non-linear tail events with strategic interactions
- Data limitations (off balance sheet/risk transfer etc)

A medium-term aim

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- Rigorous ‘top-down’ stress tests
- Comparison/integration with ‘bottom up’ stress testing to improve ‘systemic’ analysis
- Interactive ‘systemic’ stress testing
- Improved assessment of systemic vulnerabilities
- Better targeted risk reduction
- Focused crisis management planning