

A Structured Approach to Stress Testing Residential Mortgage Portfolios

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Presentation Outline

Motivation

The stress testing framework

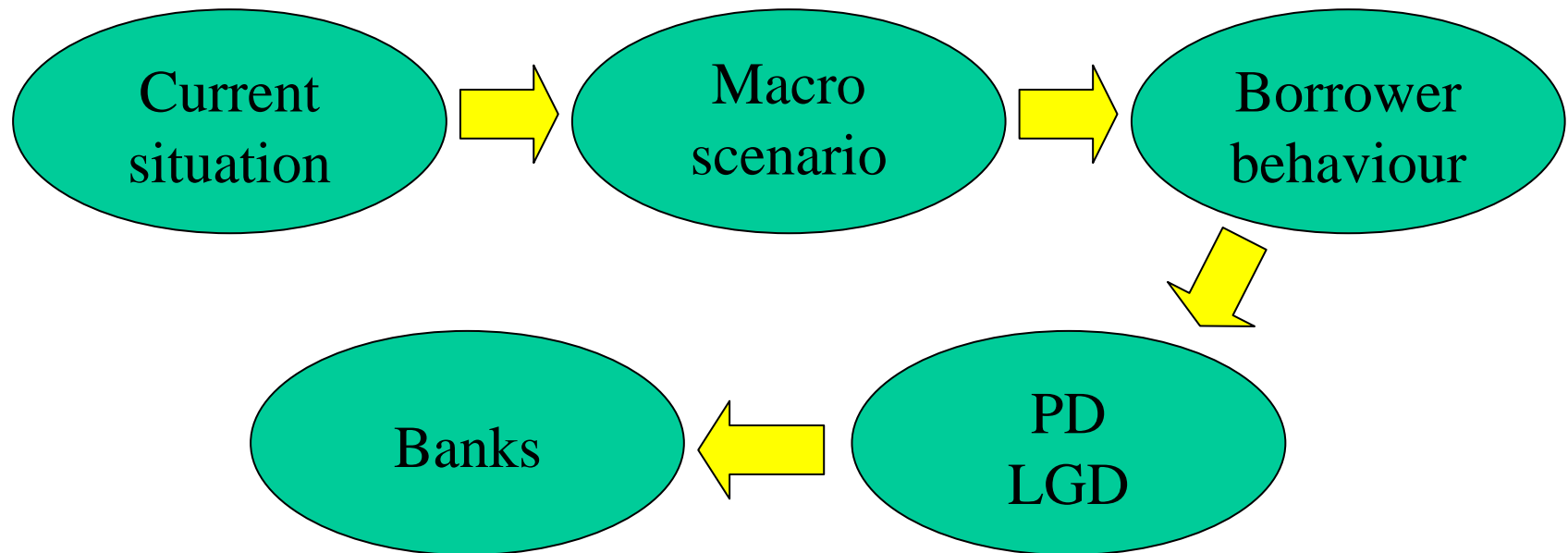
- What has gone before
- Our initiatives

The framework in more detail

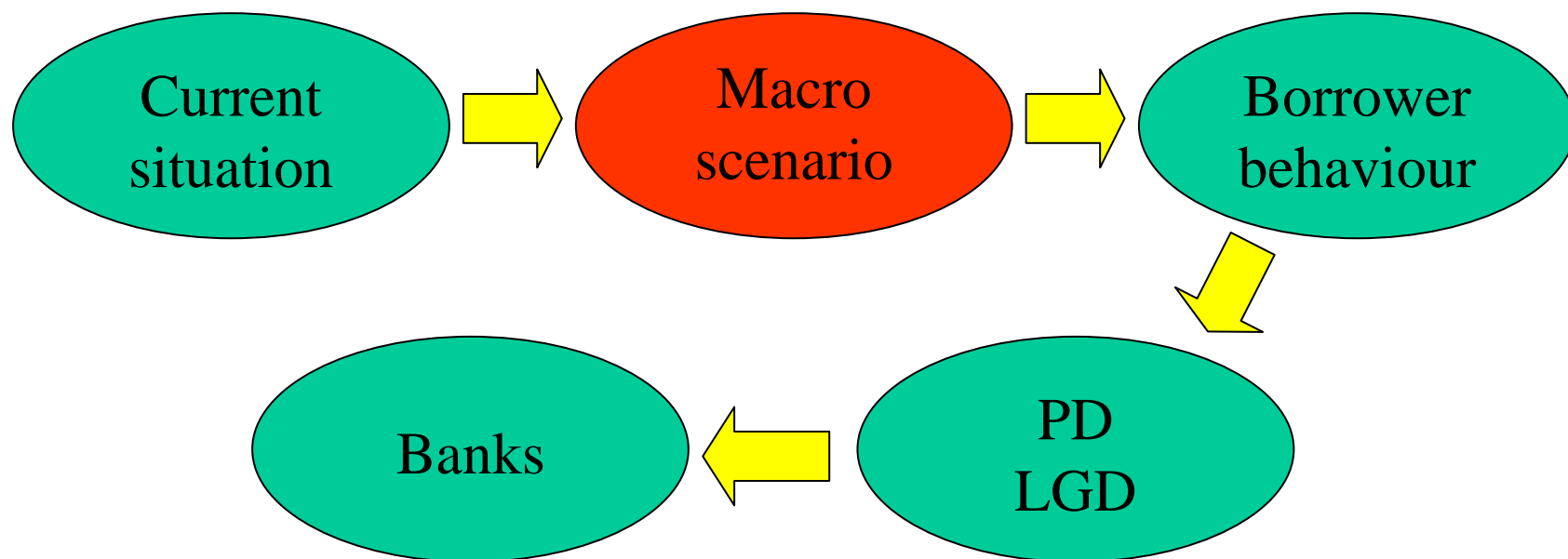
- Macro state generator
- Borrower behaviour
- Insights
- A working example

Conclusion

The Stress Testing Framework



The Stress Testing Framework



The Macro State Generator

Three variables:

- **House prices**
- **Interest rates**
- **Unemployment**

Single period (static)

Cumulative change over three years

Need means, standard deviations and cross-correlations

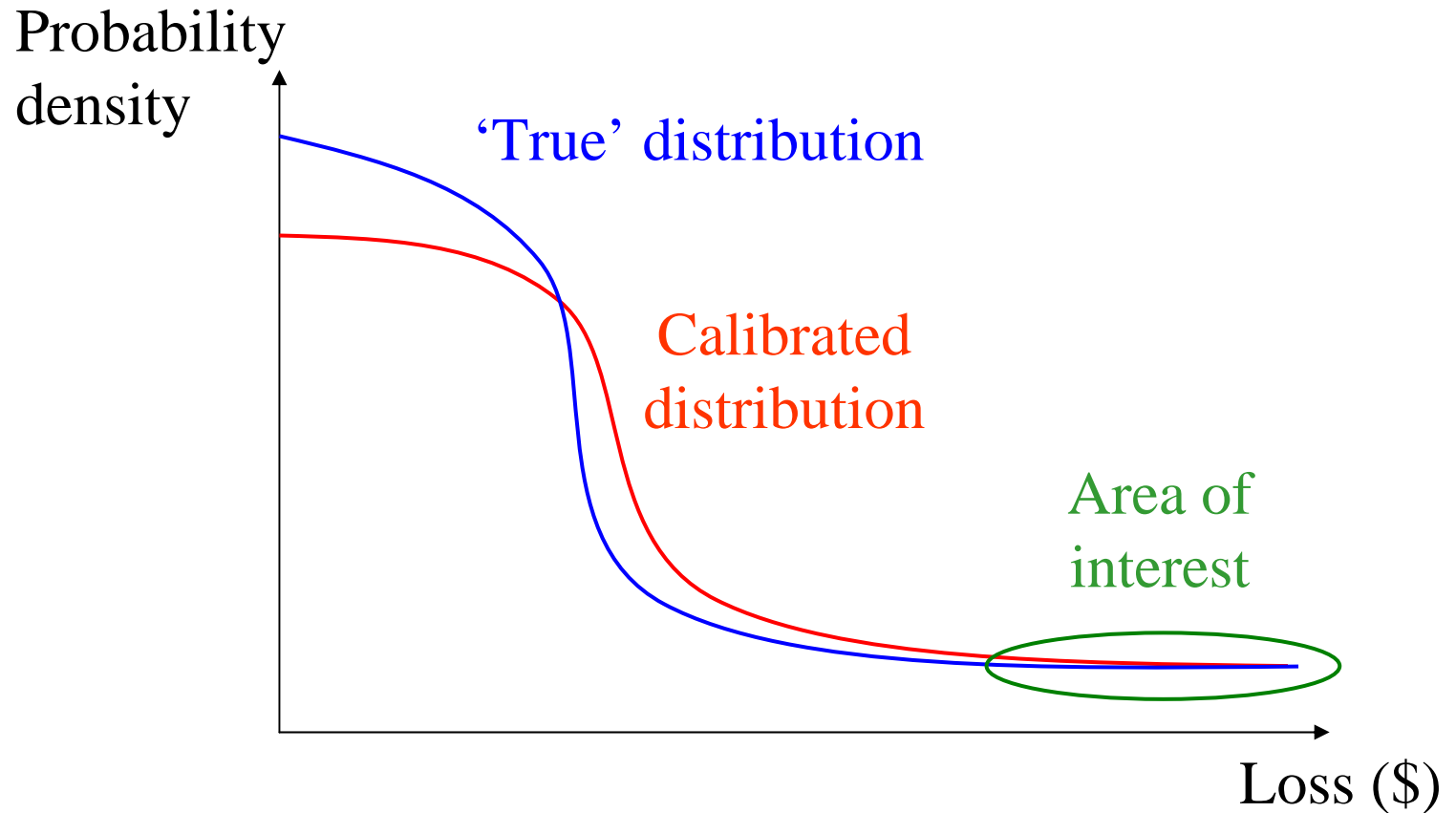
The Macro State Generator (cont.)

	Mean <i>(percentage points)</i>	Standard deviation <i>(percentage points)</i>
Unemployment	0	3.0
Interest Rates	0	2.5
House prices	7.5	17.0

Note: All values are three year cumulative changes

The Macro State generator (cont.)

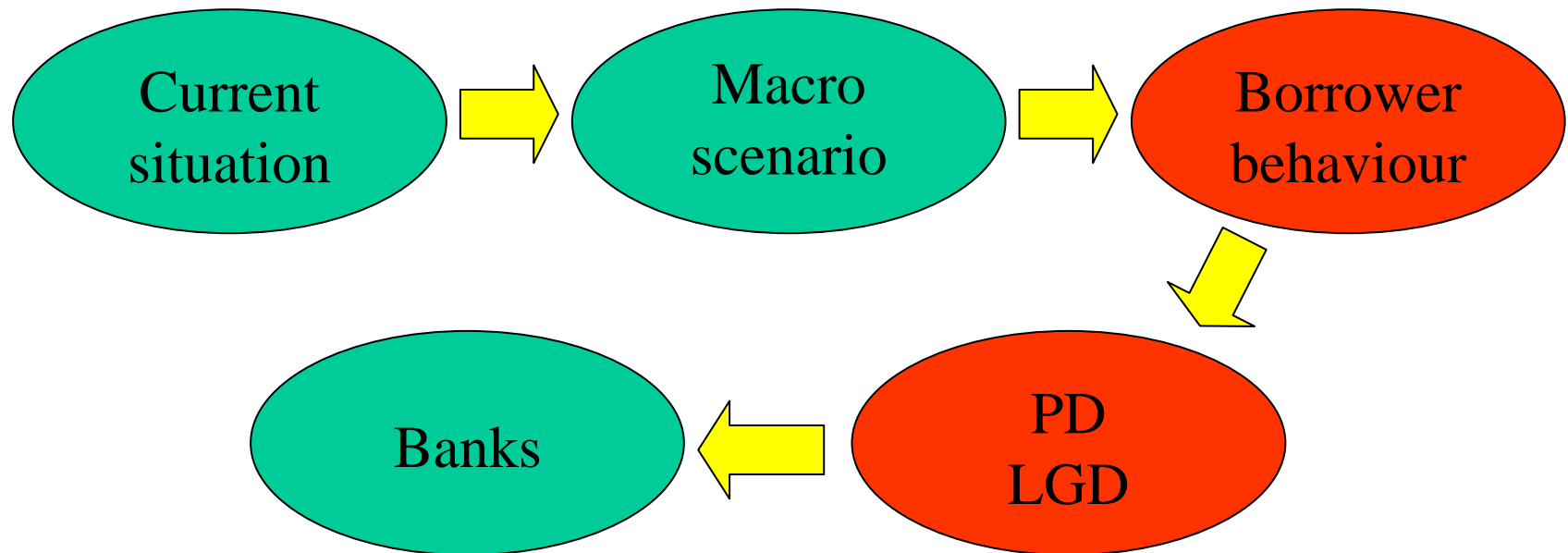
Stylised loss distribution



The Macro State generator (cont.)

	Correlation coefficient	
	Unemployment	Interest rates
Interest Rates	+0.3	-
House prices	-0.5	-0.3

The Stress Testing Framework



Borrower Behaviour

Joint default

- **Can not service loan**
- **Loan value higher than house value**

Sensitivity to interest rates and unemployment increases

- **Used UK 1990-93 housing crisis**
- **Tested against NZ FSAP results**

Loss given default

- **House price index**
- **Individual house price**
- **Foreclosure discount**
- **Transaction costs**
- **Time value**

Insights

**Higher interest rates and lower house prices
main driver of large credit losses**

**Duration of portfolio important risk
determinant**

**Loss distribution clustered close to zero,
but has a long tail**

Working Example: 2003 FSAP

Scenario 1: 'single factor test'

- House prices down 20%
- Unemployment up 4 %pts

Scenario 2: External credit rating shock

- Sharply higher interest rates
- Exchange rate depreciation
- 15% decline in house prices

Working Example: 2003 FSAP (cont.)

Losses

(per cent of aggregate value of housing portfolio)

	Scenario 1	Scenario 2	
		15% decline	25% decline
2003 FSAP	1.1	1.0	N/A
Our results	0.6	1.2	2.1

Working Example: 2003 FSAP (cont.)

Implied probability of equal or larger credit losses

	Likelihood (per cent)
Scenario 1	8.2
Scenario 2	
15 per cent house price fall	4.6
25 per cent house price fall	2.0

Conclusion

Introduced a framework that:

- **Systematically models credit losses**
- **Assigns probabilities to loss outcomes**

Work in progress

- **Cross-correlations and behavioural relationship**
- **Sufficiently flexible**
- **Different household/loan characteristics**
- **Other portfolios?**
- **A dynamic model?**