

A Financial Systems Resilience Index for South Africa: Joining the Twin Peaks

Professor Christine Oughton
SOAS University of London
co12@soas.ac.uk

**KEY ISSUES FOR EFFECTIVE MACROPRUDENTIAL POLICYMAKING
PROGRAMME
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Outline

1. Introduction and Background
2. Concepts and Definitions
3. Influences on Financial System Resilience: Theory
4. Components of Financial Resilience Index: Data/
Empirics
5. Implications for Regulation

1. Background

- UK Coalition government of 2010 targeted ***diversity in financial services*** as policy objective – all banks had become alike
- Problem: no measure of “Financial Diversity”
- We constructed diversity index (2000-2011, updated to 2013, 2015) using firm level data for deposits and mortgage markets (Michie and Oughton)
- Relationship between diversity, stability and resilience, led to...
- Financial System Resilience Index- panel data for G7 countries, 2000-2012 (consultants to NEF 2015 *Financial System Resilience Index*)
- Now with South Africa

2. Concepts of Financial System Stability & Resilience

“Financial stability – an important condition for sustainable economic growth, development and employment creation.”

SARB *FSR* 2016(1)

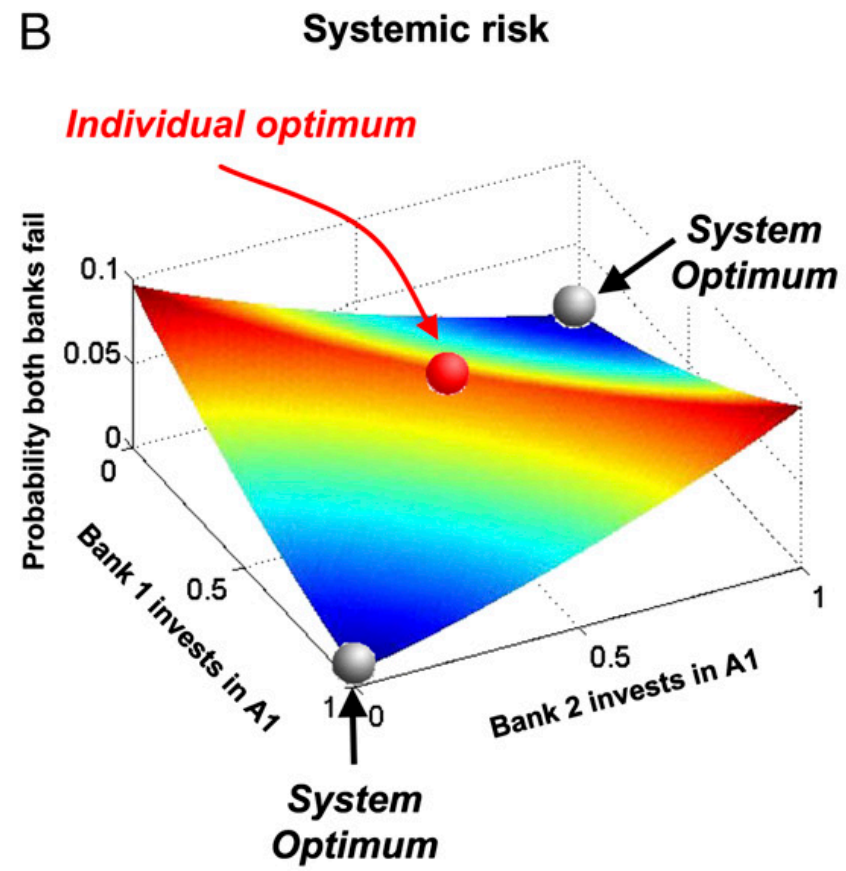
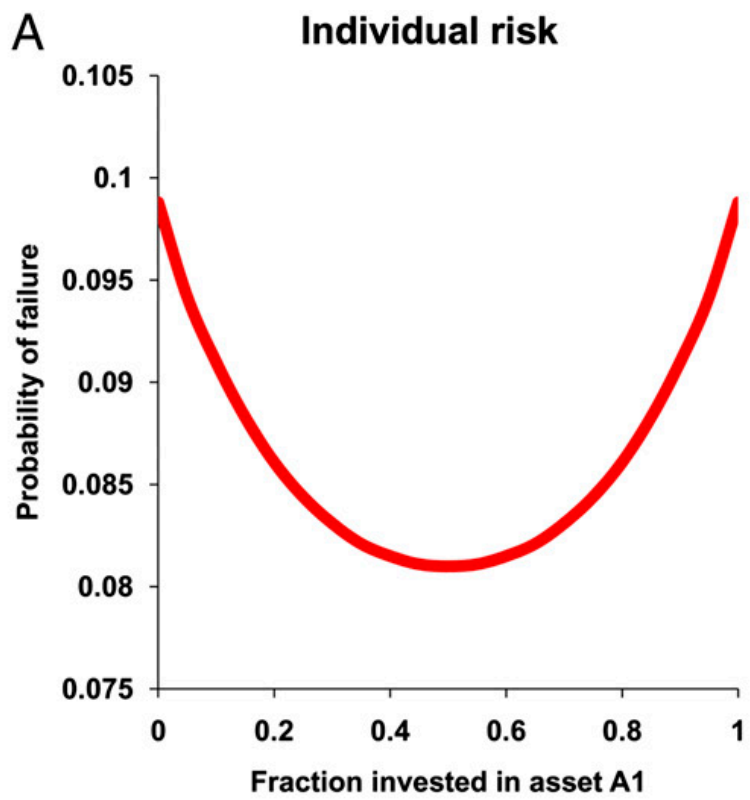
Financial System Resilience – “The capacity of the financial system to adapt in response to both short-term shocks and long-term changes in economic, social and ecological conditions while continuing to fulfill its functions in serving the real economy”

NEF *FSRI: Building a Strong Financial System* 2015

Financial System Resilience

- System resilience is not simply the sum of each individual bank's stability or resilience – systems theory
- Capacity of system to adapt rather than fixed, equilibrium concept – evolutionary approach
- Relationship between resilience and competition depends on the type of competition: creating more banks that all do the same thing can increase risk – bank diversification vs system diversity – the regulator's dilemma

In a 2-asset system with a given probability of bank failure, individual bank risk is minimised by asset diversification, but when all banks diversity in the same way, systemic risk is not optimised – it is better to have different types of banks with different objectives and strategies



Beale, N *et al* (2011) Individual vs systemic risk and the Regulator's Dilemma, *PNAS*

3. Influences on System Resilience (NEF 2015)

- Competition and Corporate Diversity (e.g. PLCs, mutuals, public savings banks)
- Interconnectedness and networks
- Size of Financial System
- Asset composition
- Liability composition
- Complexity and transparency
- Leverage

What is Diversity?

- i. Ownership and Corporate diversity
- ii. Competition – price and product
- iii. Funding Model-Balance Sheet Diversity & Resilience
- iv. Geographic Diversity

Why is it important?

- Systemic stability, resilience – the regulator's dilemma
- Enhanced competition via different business models/species – mixed oligopoly
- Some species (e.g. mutuals) less prone to short-termism
- Some species more likely to be locally rooted and adapt to local environment e.g. financial inclusion

Diversity and Regulation

- Mixed oligopoly – plcs, mutuals, cooperatives, public sector banks can lead to more competitive pricing and higher social welfare
- Mutuals and cooperatives have a stronger locally rooted base – local banks in US less involved in sub-prime
- Corporate Diversity helps resolve the regulator's dilemma
- It is important to have system diversity in balance sheet structure

Measuring Corporate Diversity

(Based on Simpson's 1949 article in *Nature*)

Different types according to different **objectives**

- Banks: shareholder-owned – profit maximisation
- Mutuals: owned by their members – maximise welfare of members
- Public Savings Banks e.g. National Savings & Investment: government owned raise funds for government, encourage saving

Measuring Corporate Diversity

Michie Oughton (2013) Corporate Diversity Index

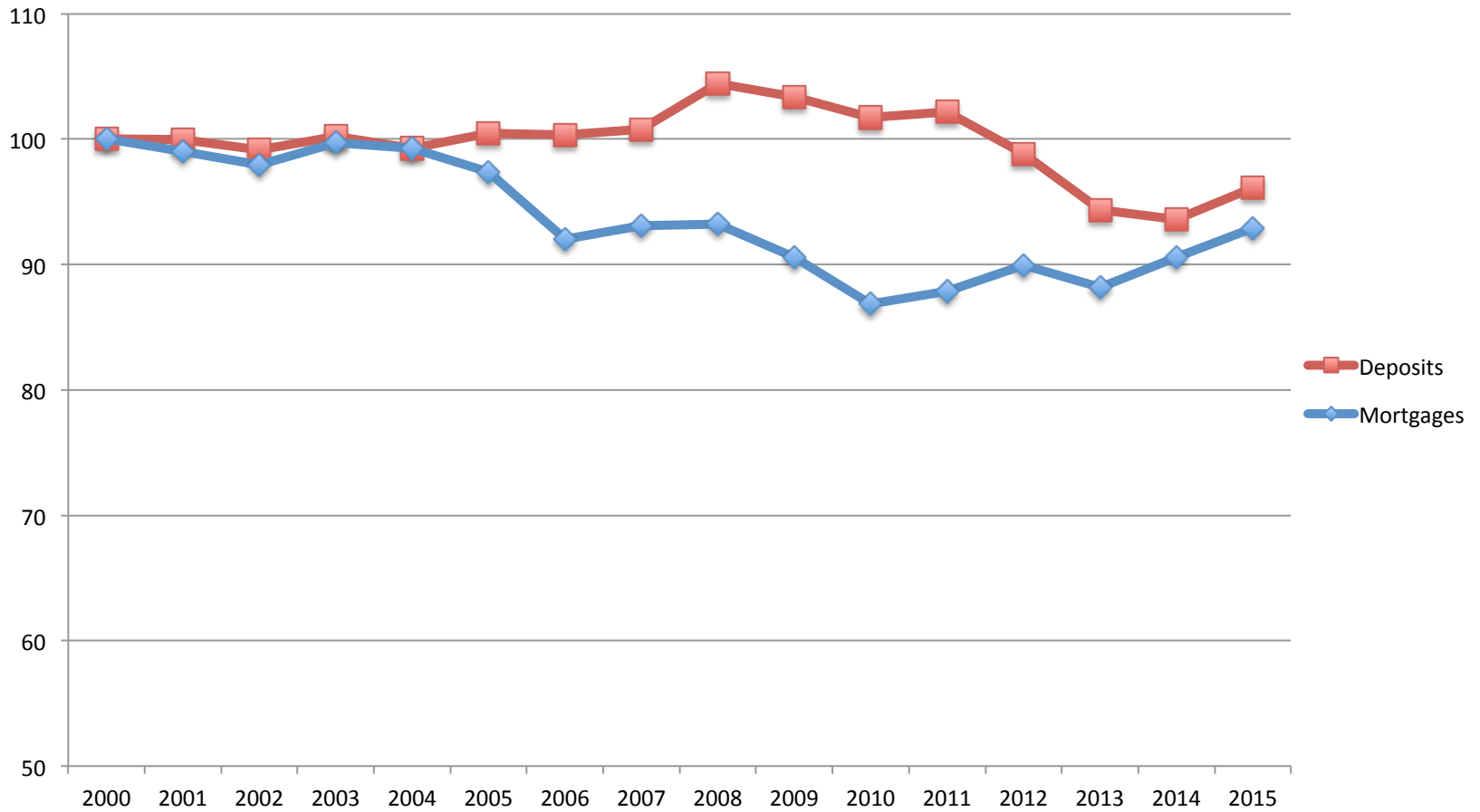
Bio-diversity Index: we define z corporate types or species and define the corporate diversity index as the share of deposits δ_i that belongs to each type:

$$CD_d = 1 - \sum_1^z \delta_j^2$$

We do the same for mortgages:

$$CD_m = 1 - \sum_1^z \mu_j^2$$

Chart 1. UK Ownership Index: Banks, Mutuels and NS&I



Measuring Competition

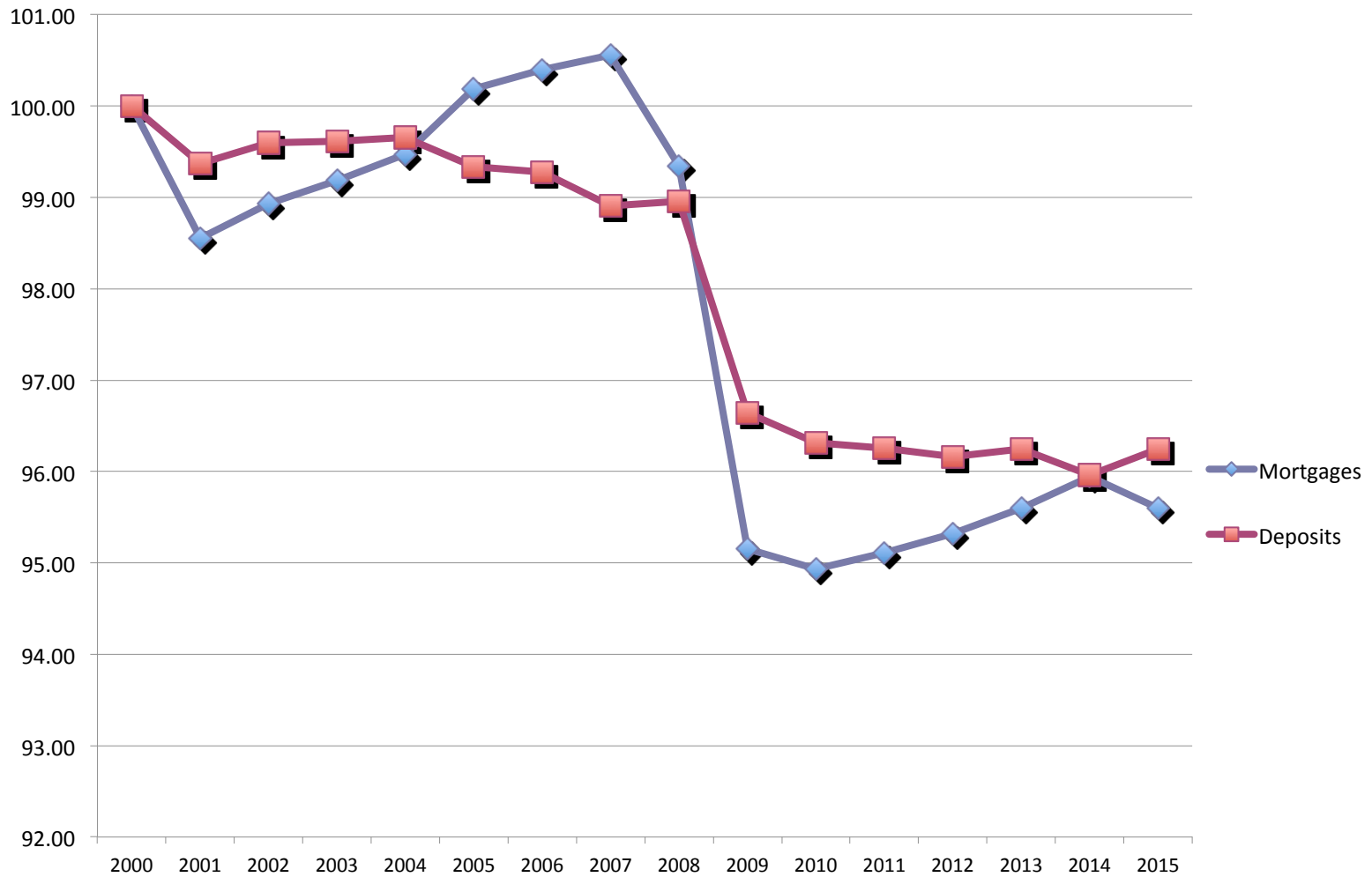
We use the standard Hirshman-Herfindahl Index:

$$HH = \sum_{i=1}^n s_i^2$$

The complement of HH gives a competitiveness index

Chart 2. UK Competitiveness Index:

Mortgage Balances Outstanding and UK Deposits



Measuring Balance Sheet Diversity and Resilience

Based on Funding Gap and the concentration of loan/deposit ratios.

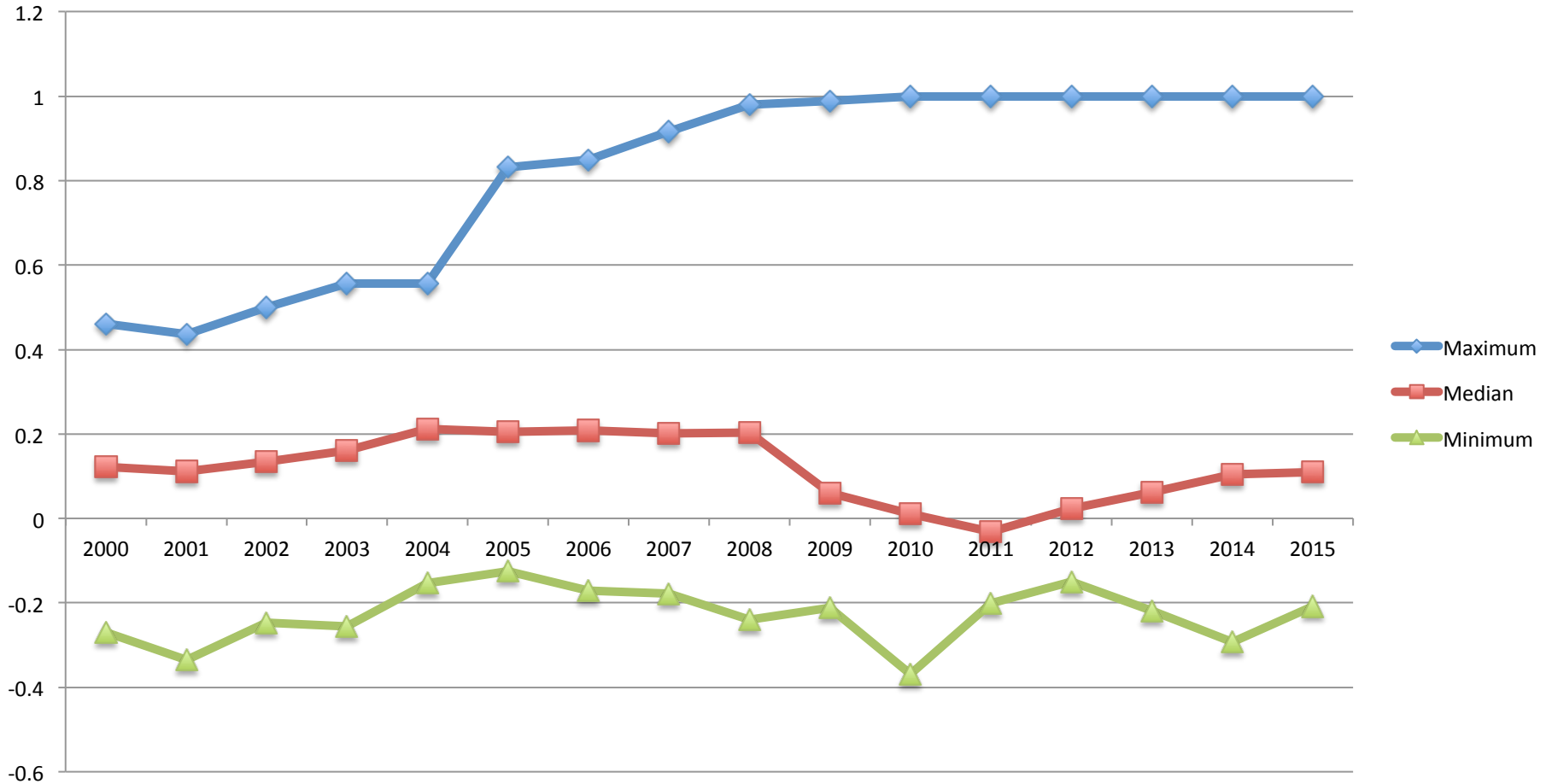
The funding gap is:

$$(L - D) / L$$

The inverse funding gap spread is:

$$\frac{1}{FGS} = \frac{1}{\left(\left(\frac{L - D}{L} \right)_{MAX} - \left(\frac{L - D}{L} \right)_{MIN} \right)}$$

Chart 3. UK Major UK Banks and Mutuels Customer Funding Gap as a Proportion of Customer Loans and Advances

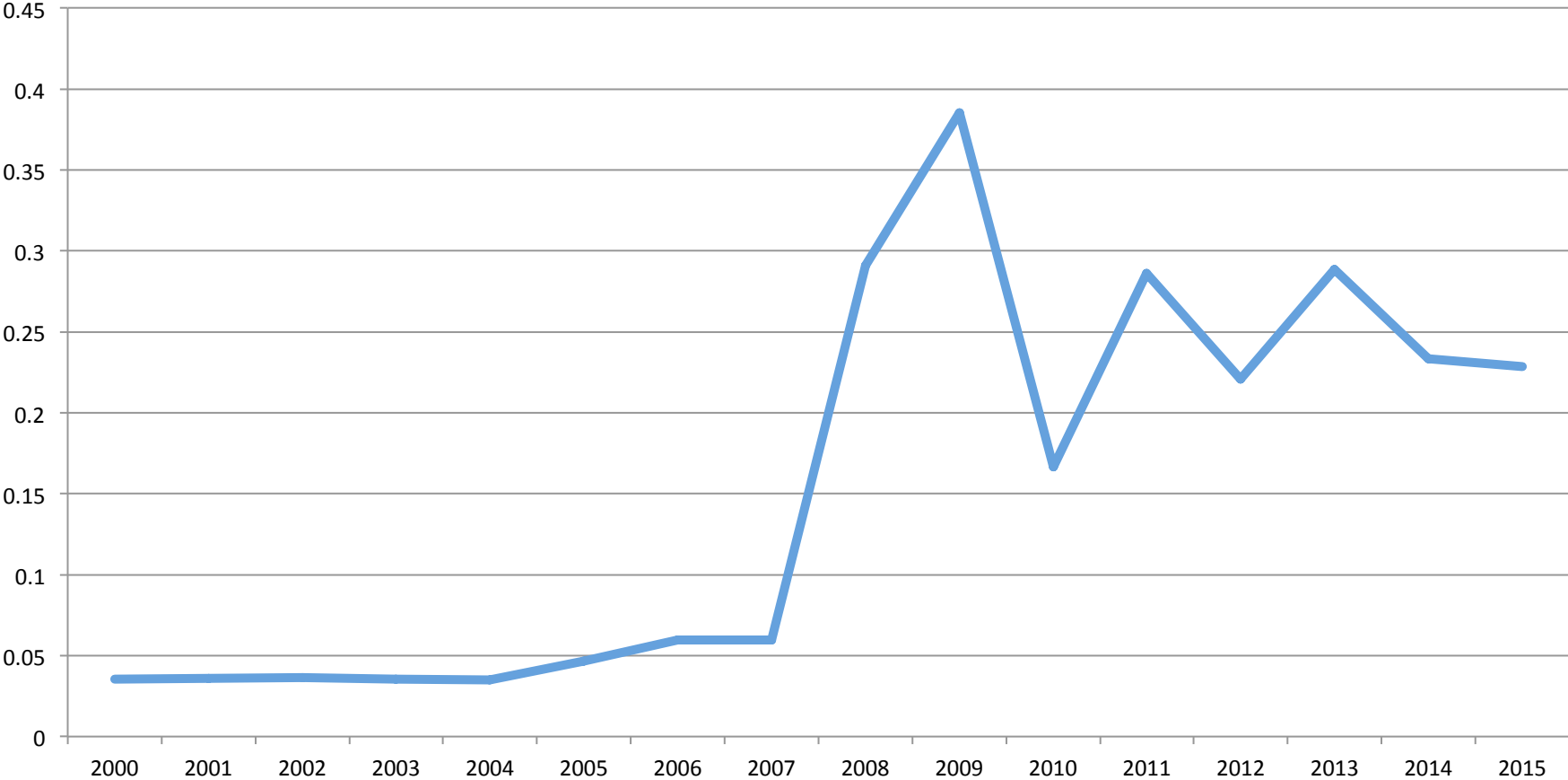


Diversity of loan/deposit ratios

Captured by a diversity index:

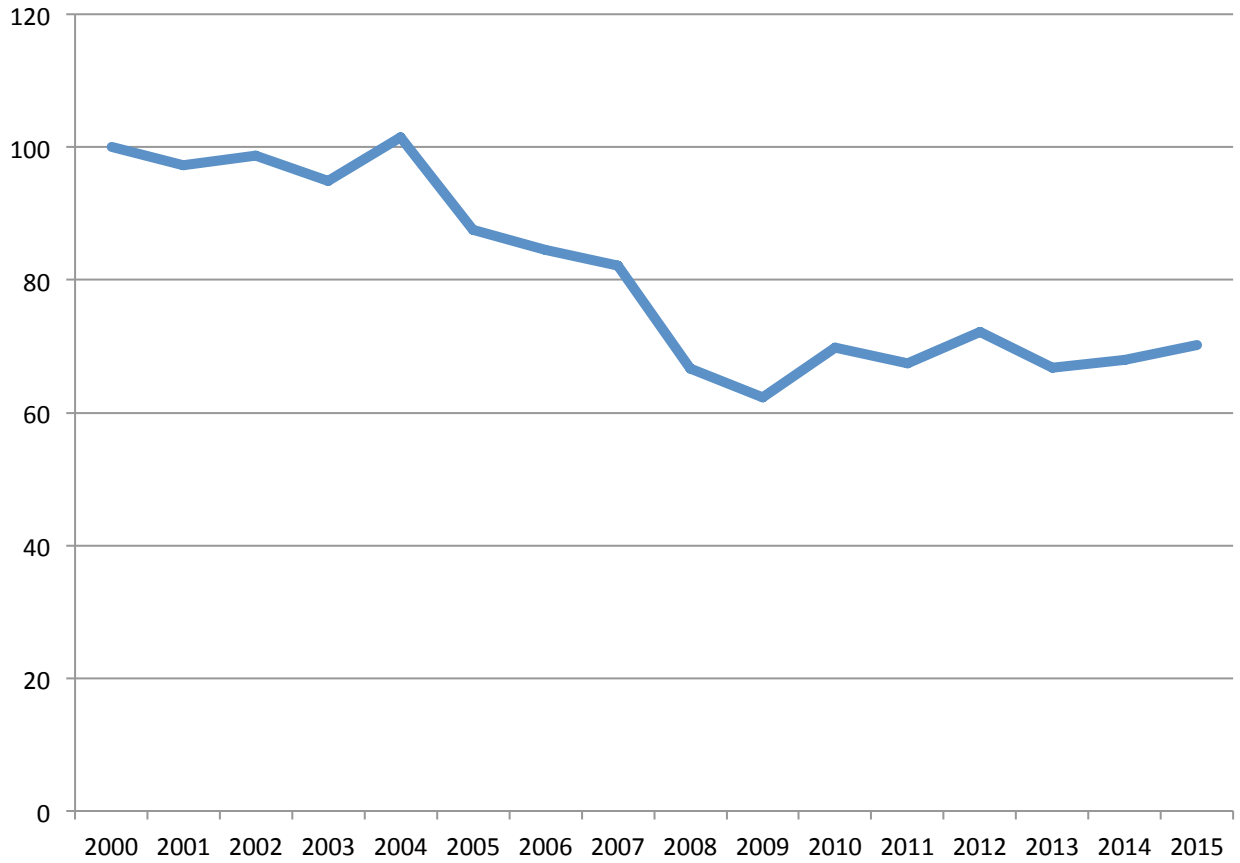
$$D_{LD} = 1 - \sum_i^n \left(\frac{\left(\frac{l}{d} \right)_i}{\left(\Sigma \left(\frac{l}{d} \right)_i \right)} \right)^2$$

Chart 4. The Hirschman-Herfindahl Index of Funding Model Concentration; the market concentration of loan to deposit ratios, UK



We combine our funding gap spread index and our L/D diversification index to form a measure of financial resilience

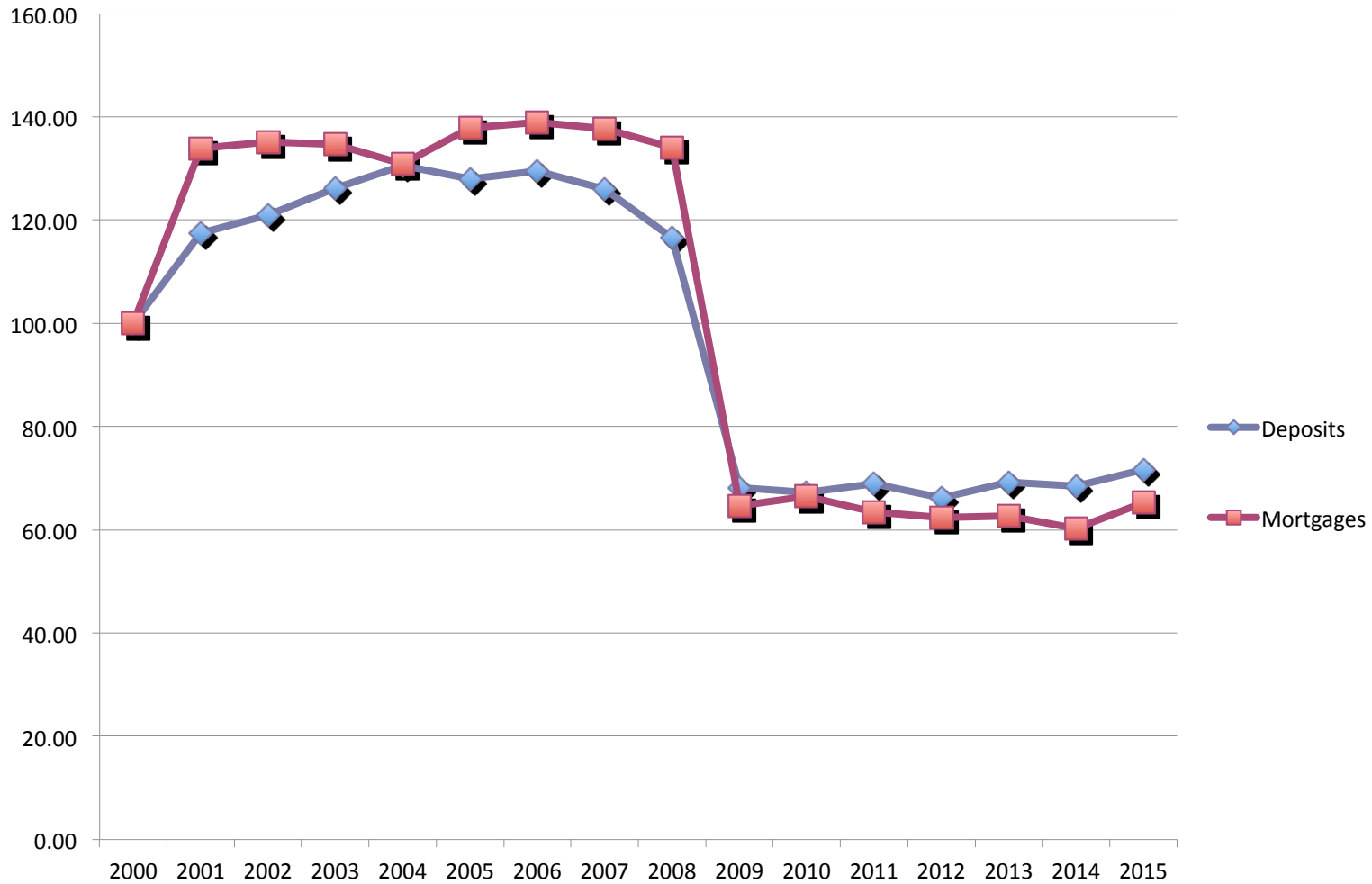
Chart 5. UK Resilience Index – Mortgages and Savings Markets



Regional Diversity: Geography

- Firms located in different regional economies may pursue different strategies tailored to their local environment
- Co-location in London leads to loss of regional diversity
- The distance of each firm's Head Office from London acts as a proxy for regional diversity
- Weighted by market share

Chart 6. UK Geographic Concentration of Head Offices and Strategic Decision Making

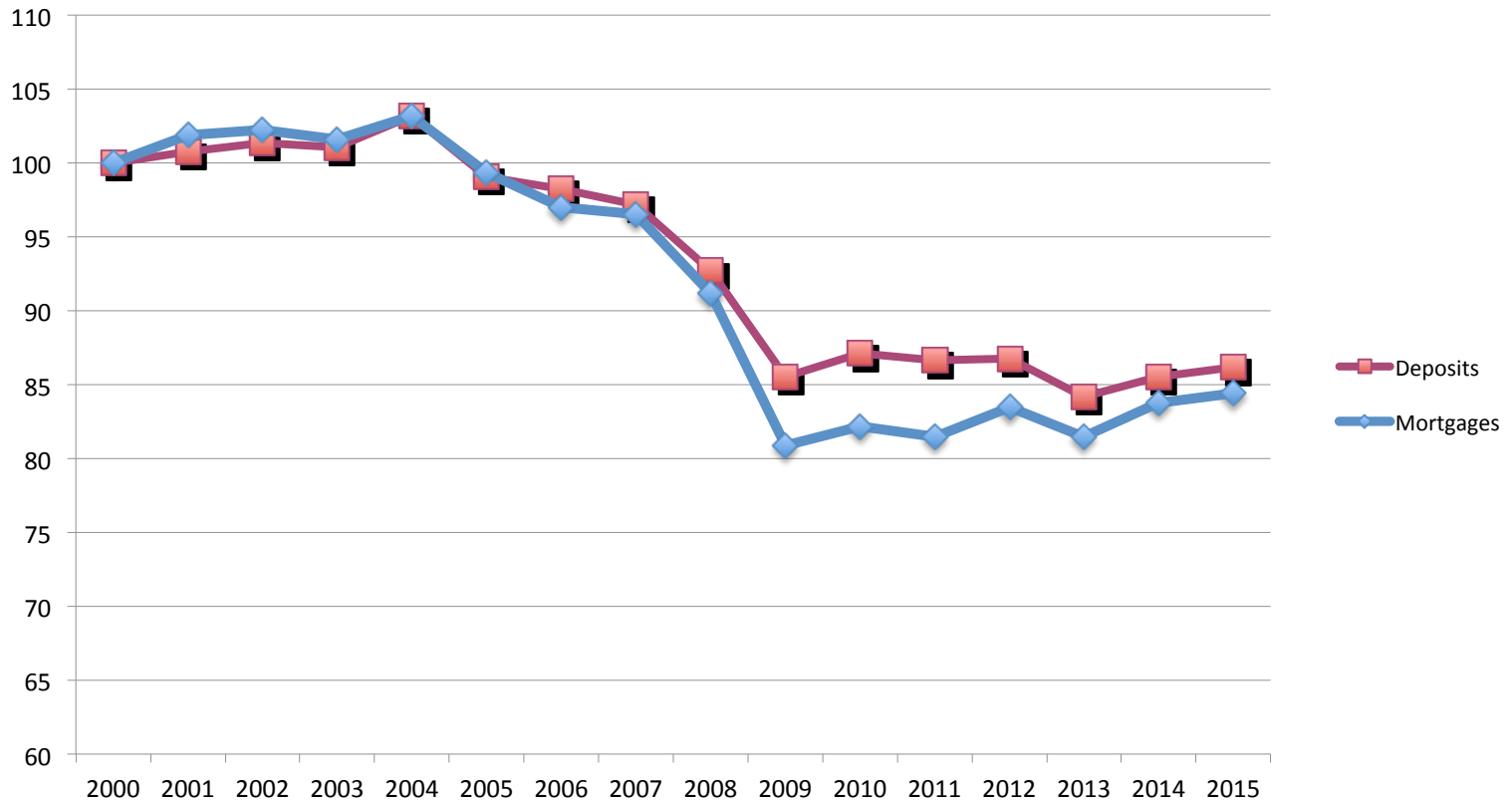


The Diversity Index

Michie and Oughton D-Index

- We combine our 4 aspects of diversity into a single D-Index

**Chart 9. UK Diversity Index for Financial Services (D-Index):
Ownership, Competitiveness, Resilience & Geographic Spread**



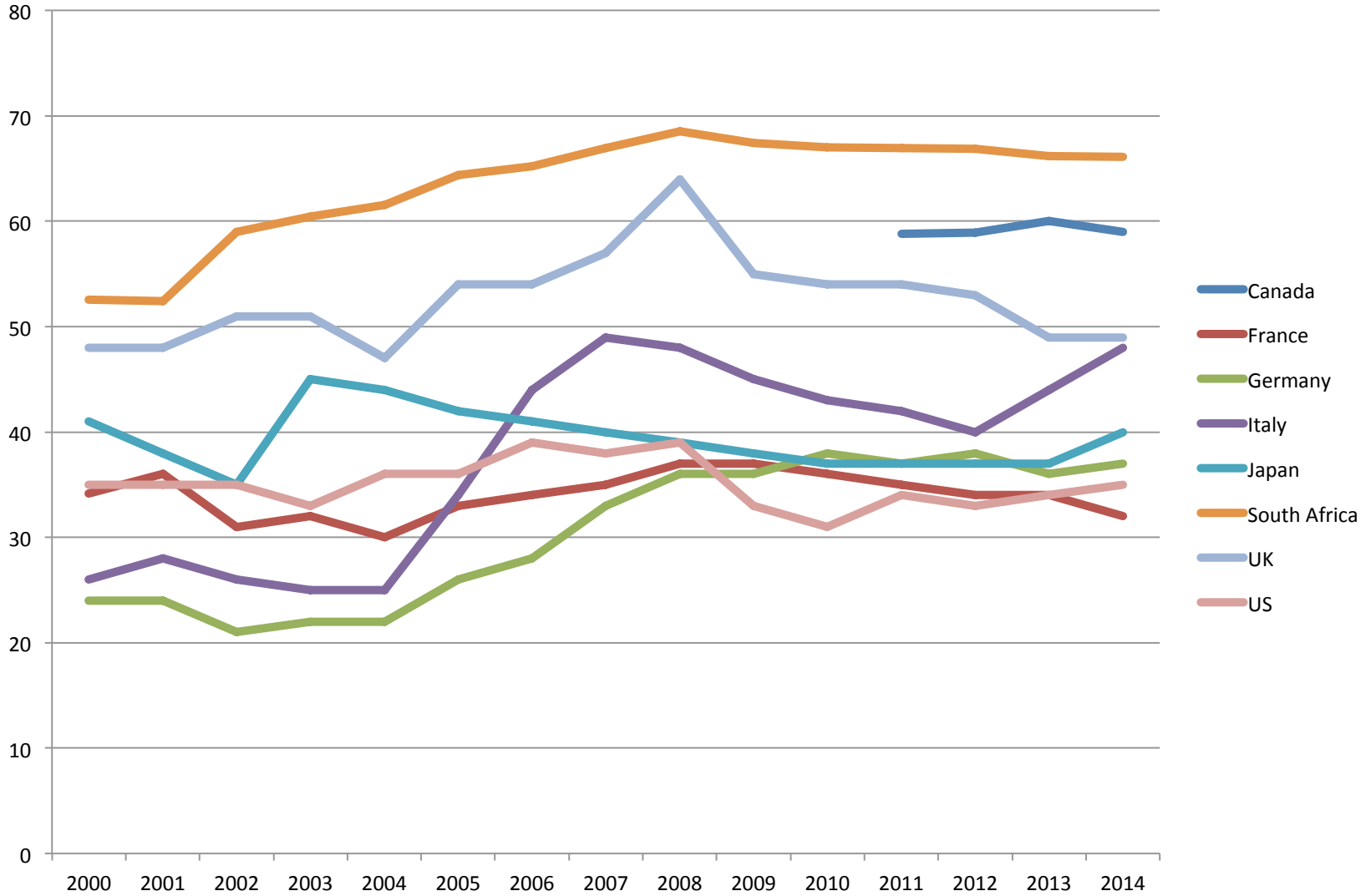
A Financial **System** Resilience Index (NEF 2015) for South Africa

- Corporate Diversity (e.g. PLCs, mutuals, public savings banks)
- Interconnectedness and networks
- Size of Financial System
- Asset composition
- Liability composition
- Complexity and transparency
- Leverage

Market Concentration

- C3 measured in assets
- South Africa has the most concentrated banking system as measured by C3 with the above 3 species. However, this ignores other public banks
- Recently, moderate improvement in concentration (C3), but still high

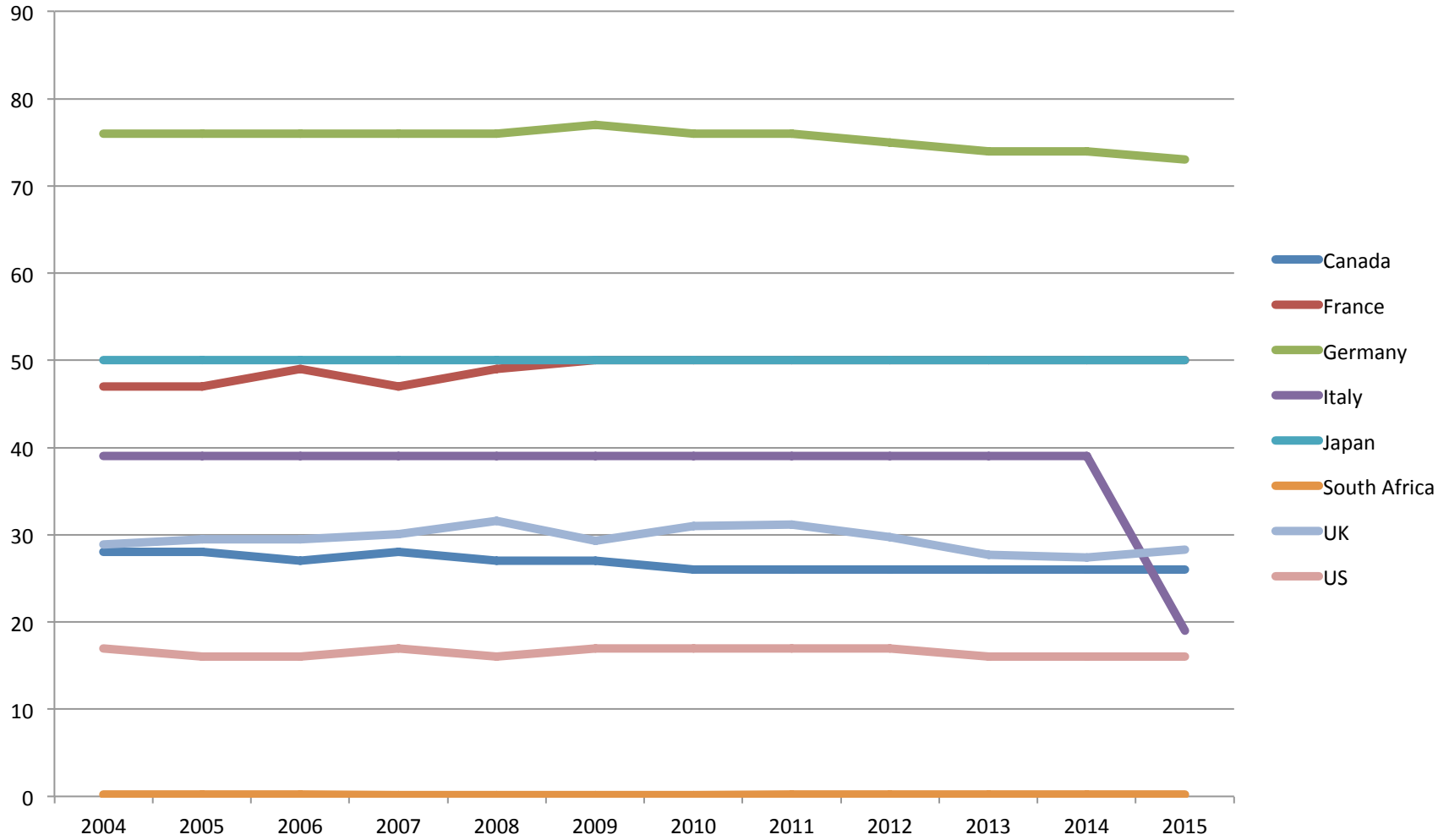
Chart 1 C3 Concentration Ratio Bank Assets %



Diversity

- South Africa has the least diverse banking system as measured by a simplified version of the Michie Oughton D-Index:
 - Share of retail deposits held by non-plc banks
- However, this ignores smaller cooperatives, Stokvels etc.

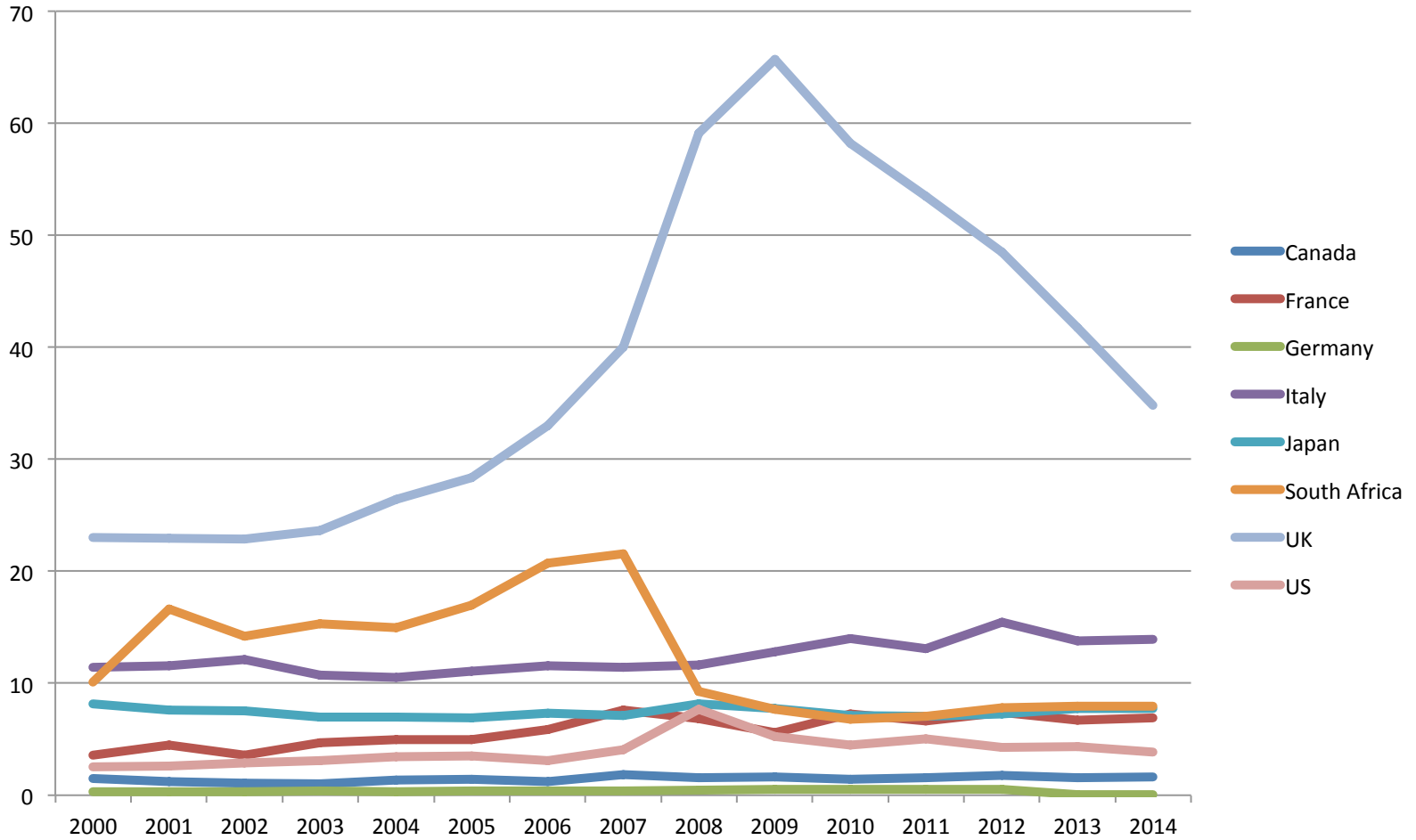
Chart 2 Corporate Diversity: % of Retail Deposits Held by Non-PLC Banks



Interconnectedness and Networking

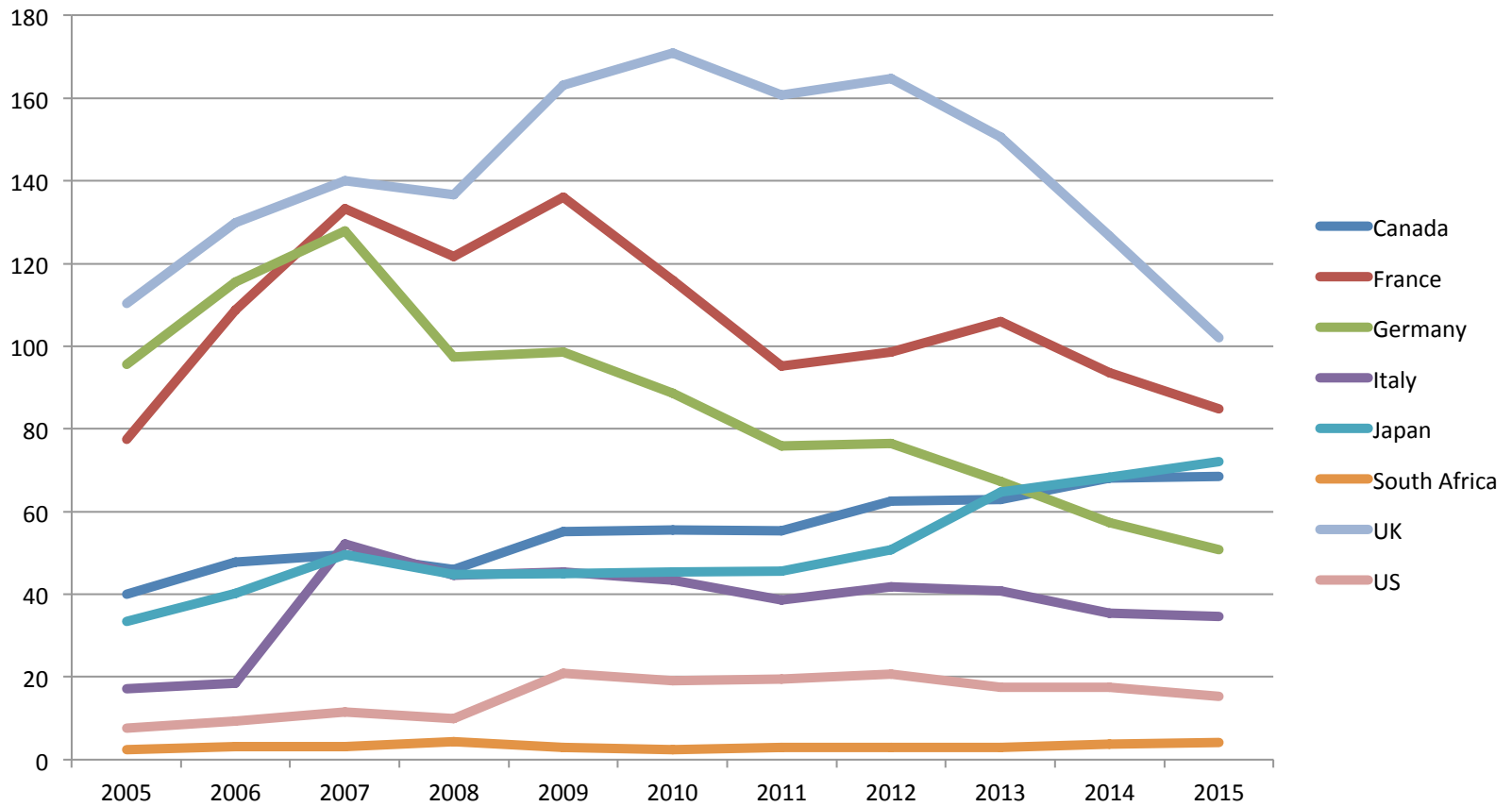
- Bank lending to other financial corporations as proportion of GDP
- Foreign Claims as a proportion of GDP
- There has been a marked fall in interconnectedness in South Africa after the global credit crunch in 2007

Chart 3 Lending to Other Financial Corporations, Excluding Banks, as % of GDP



- Moreover, South African banks are not significantly exposed to more 'foot loose' non-resident deposits

Chart 4 Banks' Foreign Claims as % of GDP



Financial System Size

- Total bank Assets as % of GDP
- Household Debt as % of Gross Disposable Income
- South Africa performs comparatively well on both measures
- Household debt increased in the run up to 2007, but has since stabilised

Chart 5 Total Bank Assets to GDP %

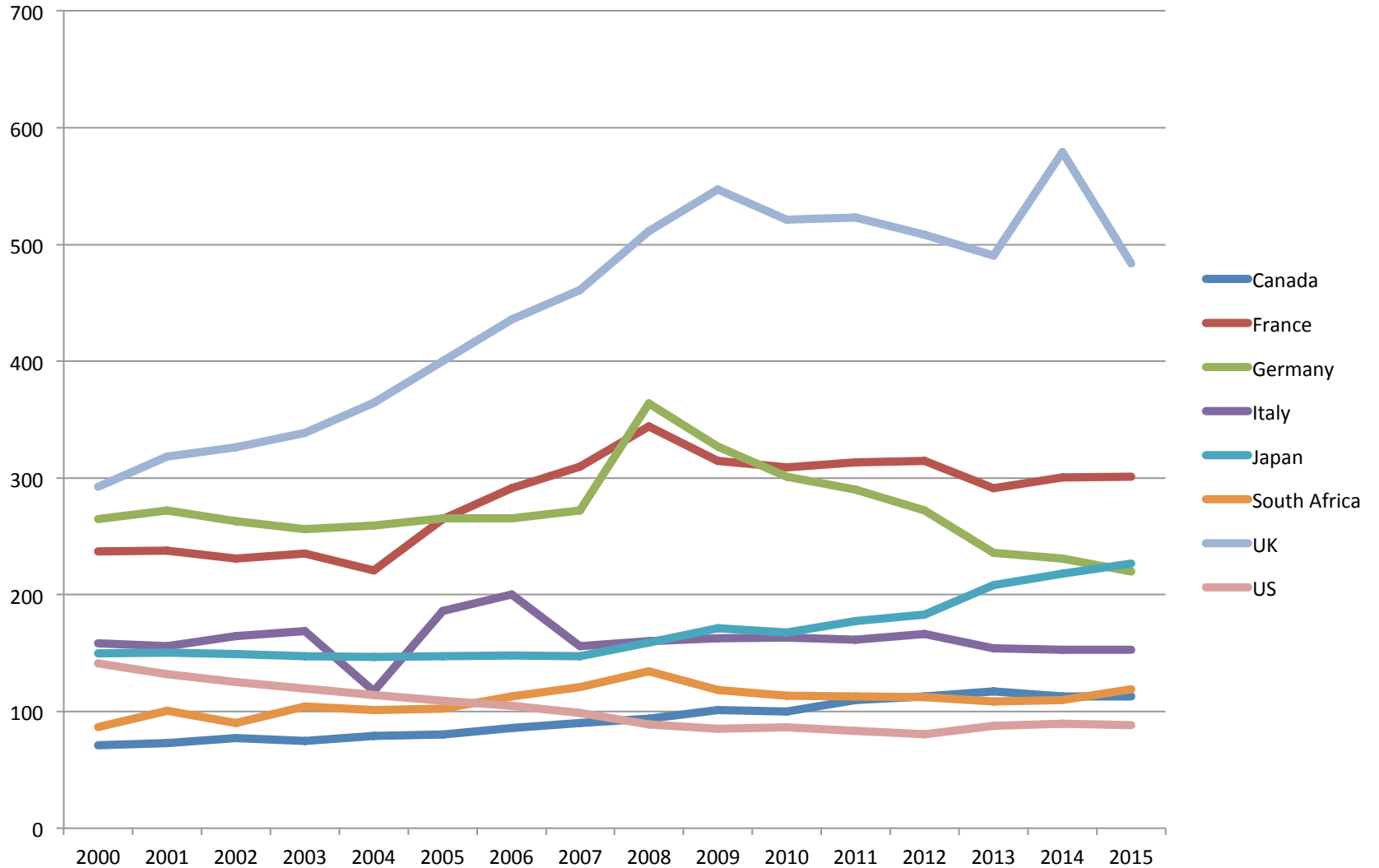
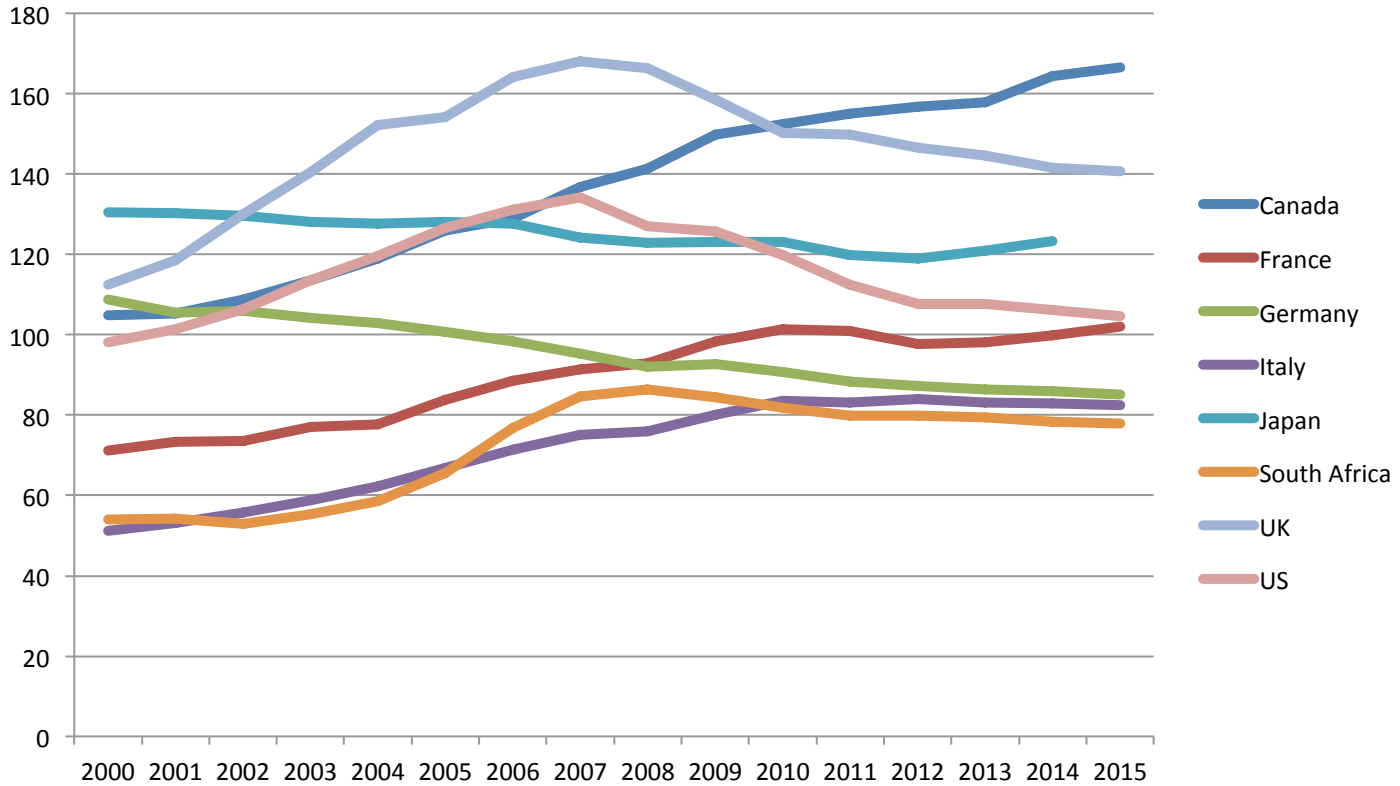


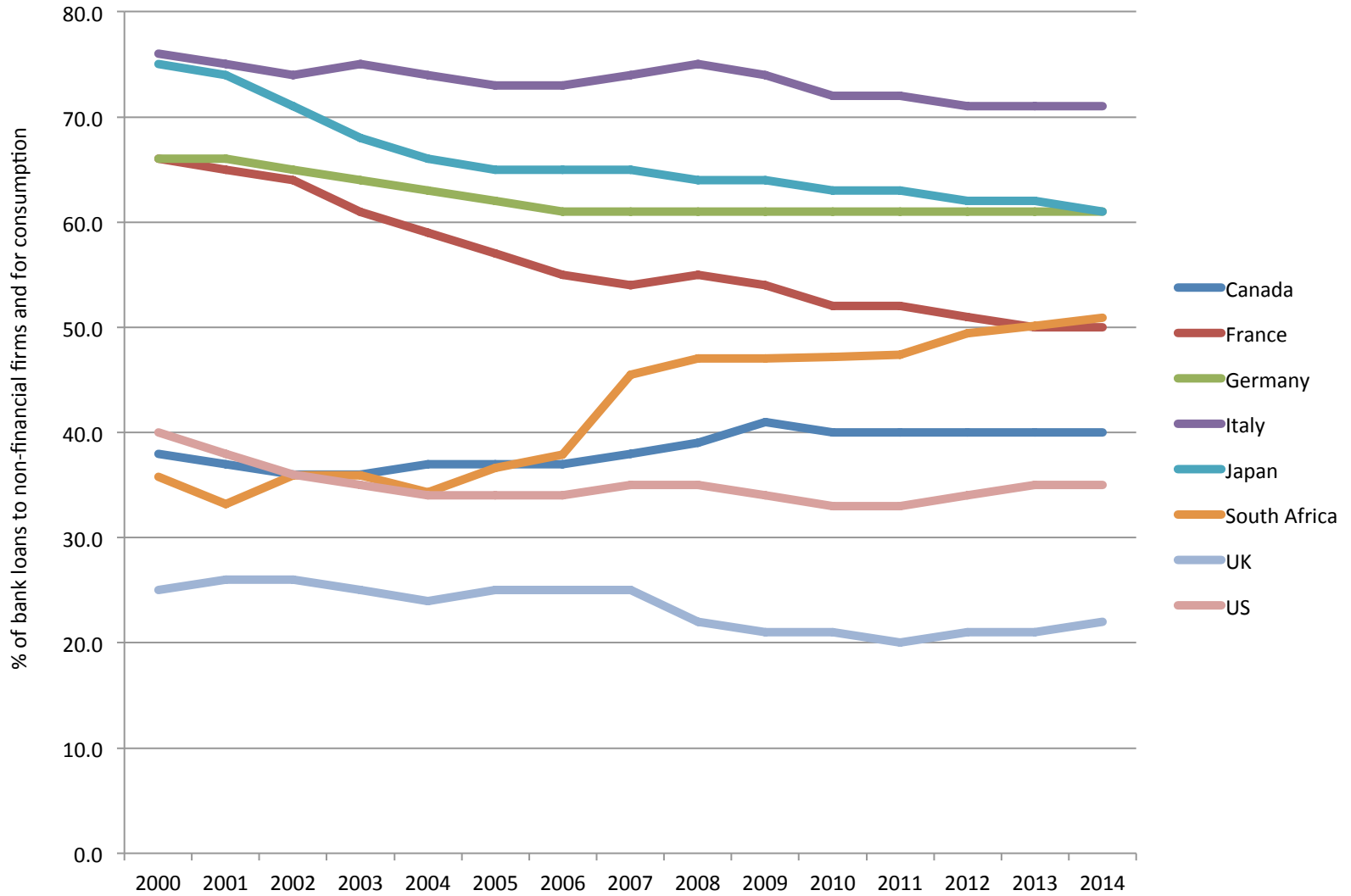
Chart 6 Household Debt to Gross Disposable Income %



Asset Composition: Does the financial sector serve the real economy?

- Share of lending to non-financial sector (real economy credit) i.e. loans to non-banks firms and consumers (excluding mortgages)
- This indicator has been improving for South Africa, on trend and is now above 50%

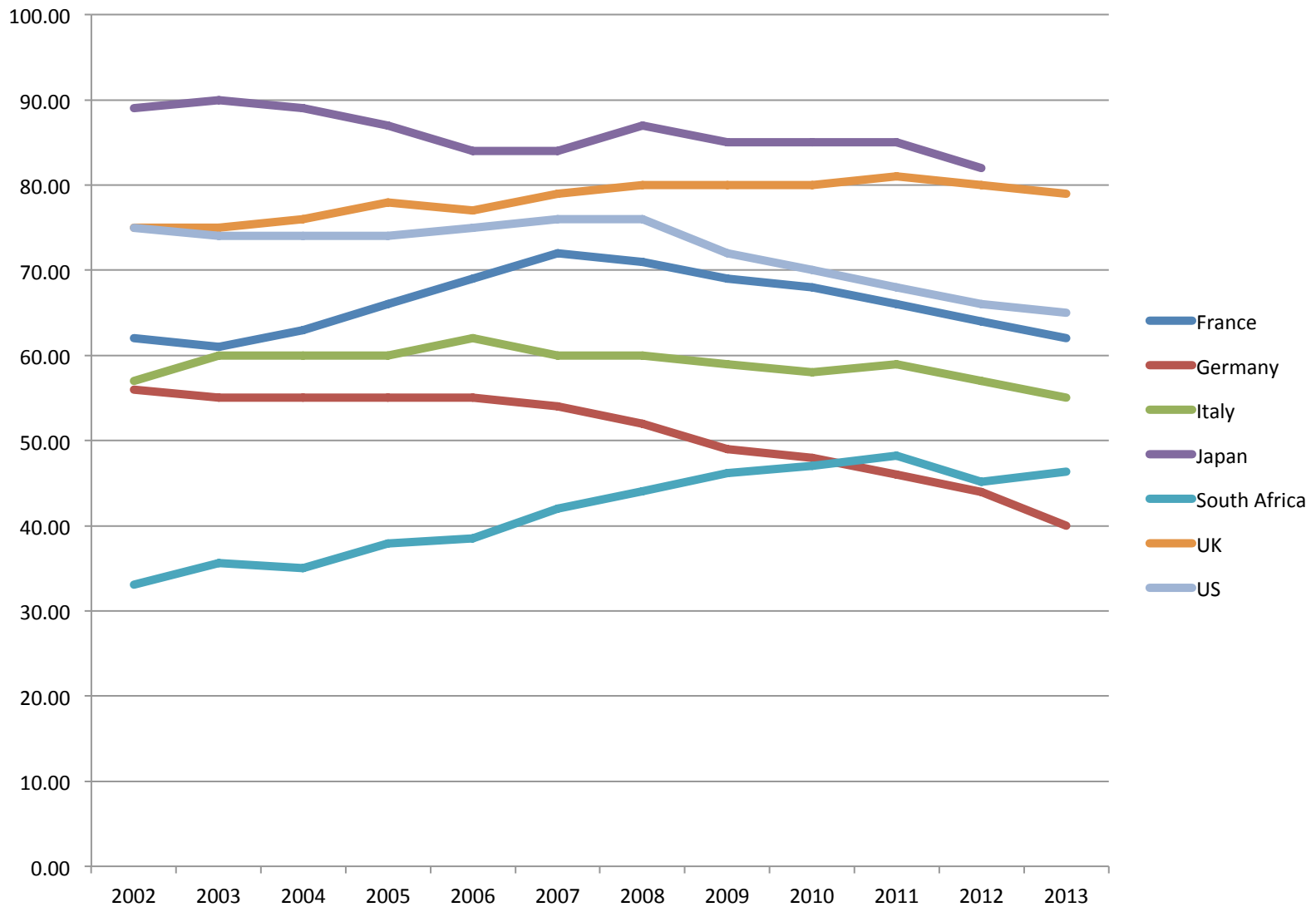
Chart 7 Real Economy Credit Ratio



Liability Composition

- IMF's measure of *broad non-core liabilities*
 - foreign deposits and funds raised by issuing debt securities, loans and Money Market Fund (MMF) shares and certain types of restricted deposits
- Proportion of board non-core liabilities to total liabilities
- This indicator is low for South Africa *cf* the G7, but there has been a moderate increase on trend

Chart 8 Broad Non-Core Liabilities Ratio %



Complexity and Transparency

- Derivatives exposure (insufficient data)
- Securitisation – a proxy for complexity and opaqueness in the financial system
- Due to regulation this measure has been falling in most countries post the financial crisis, including in South Africa where the indicator is comparatively low

Chart 9 Securitisation Outstanding as % of GDP

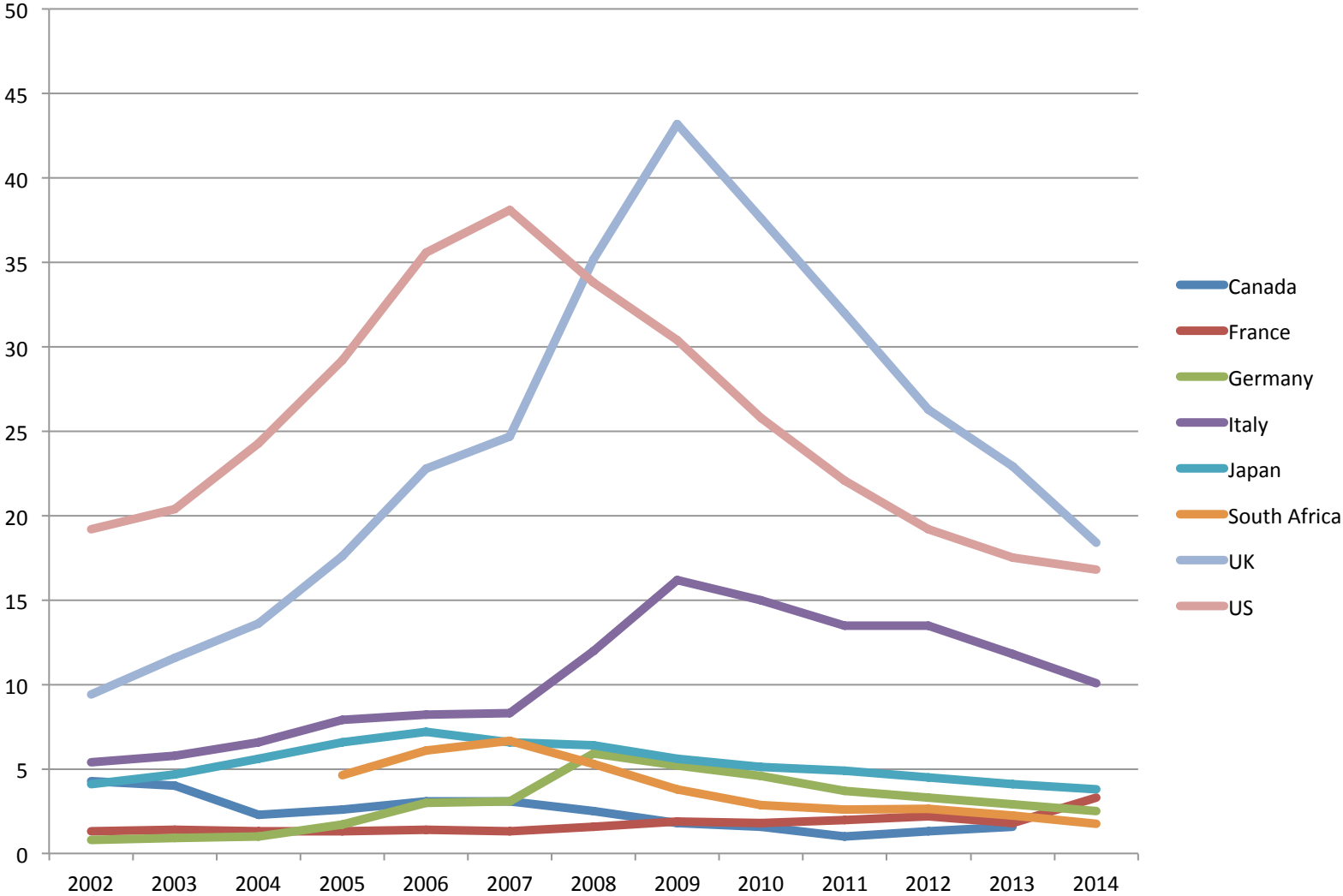
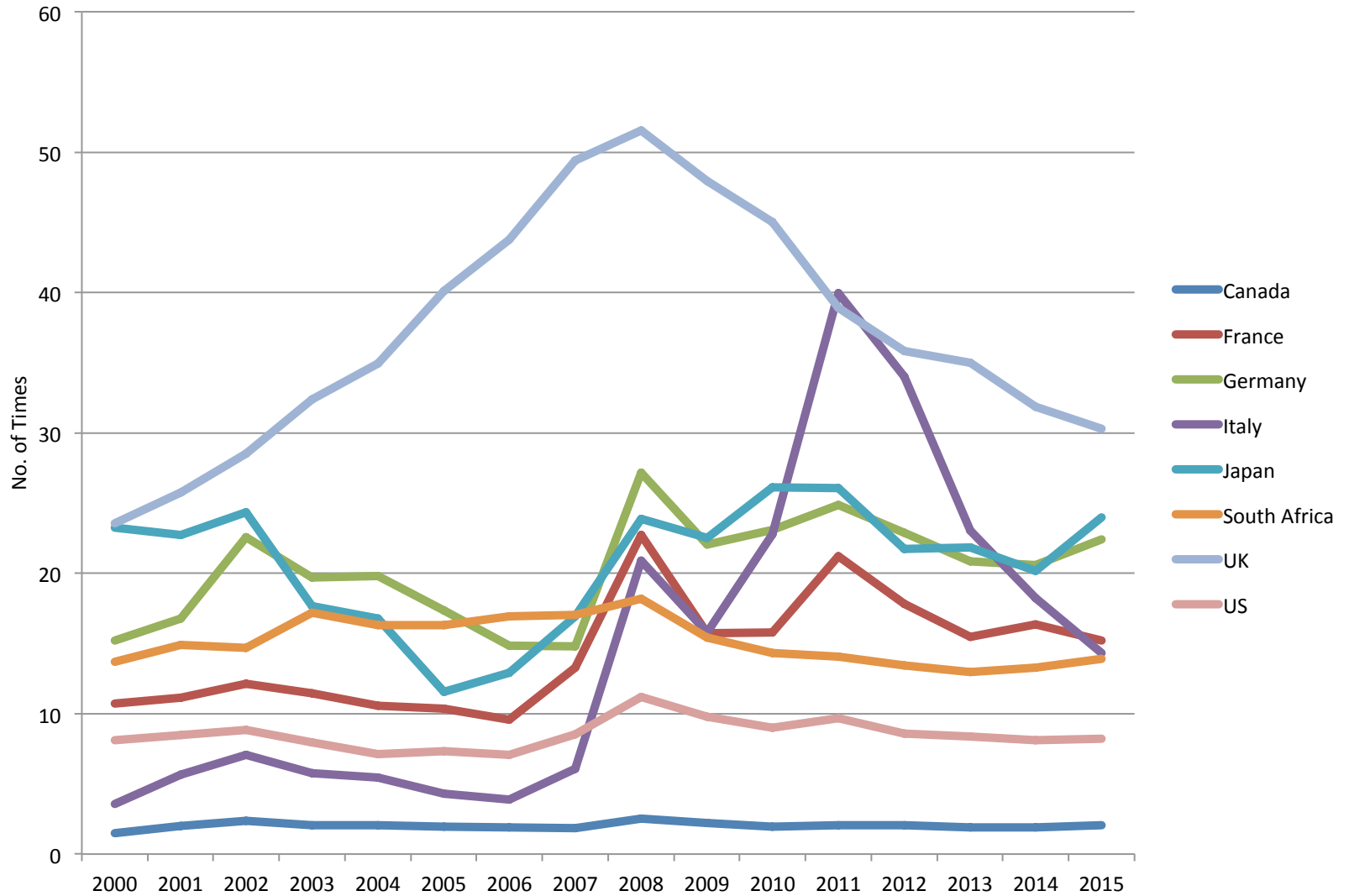


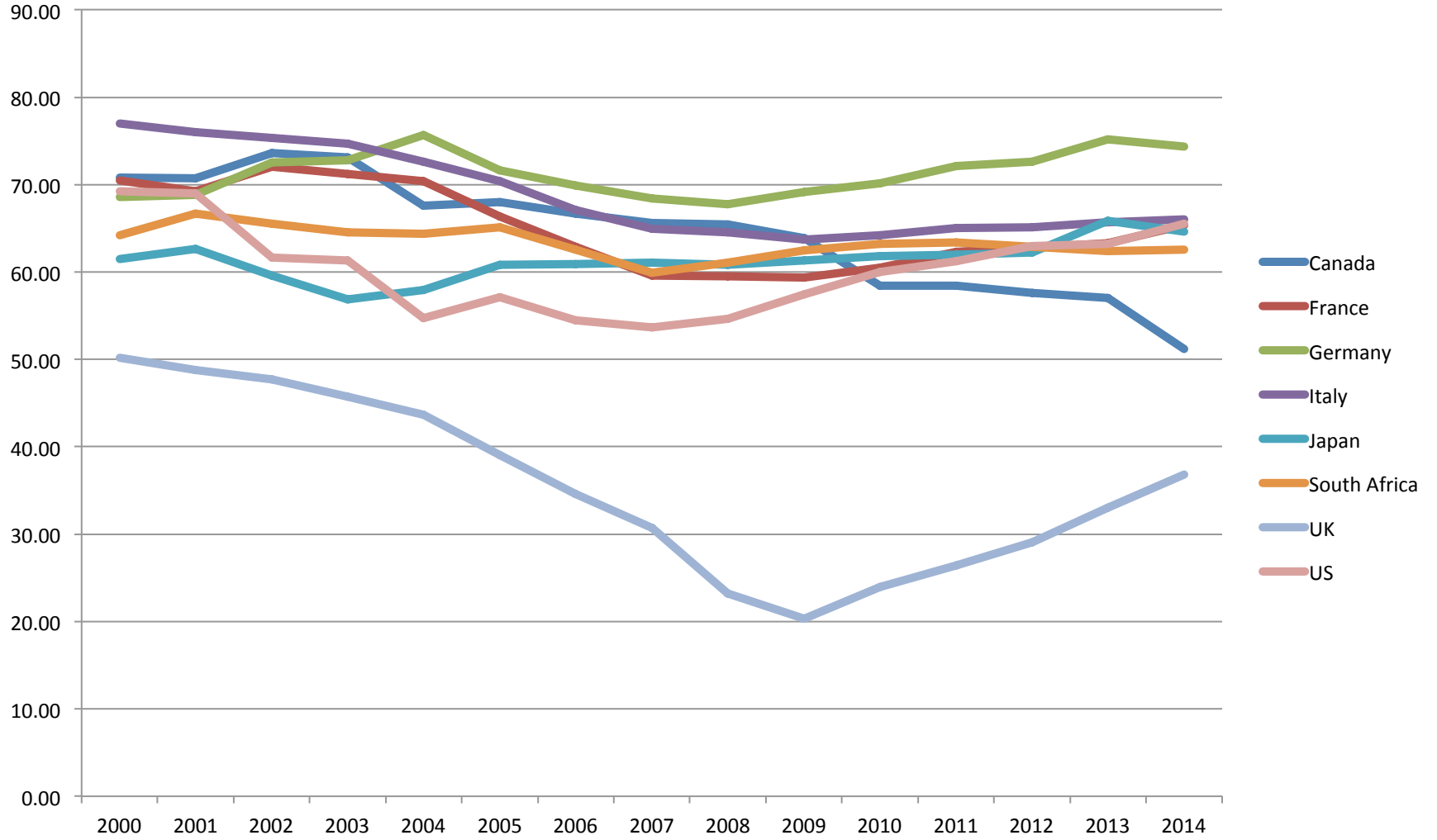
Chart 11 Ratio of Bank Assets to Equity



Leverage

- Banks capital (equity) to assets ratio
- Indicator for South Africa has changed little over time and is around the G7 average

Chart 12 Financial System Resilience Index



Financial System Resilience Index

- After standardisation the indicators were combined to form a single index with equal weights
- South Africa is ranked 6th but is in a close knit cluster of countries with an index value around 65
- Areas of concern – market concentration and lack of financial corporate diversity

Implications for Regulation

1. Promoting competition via encouraging new entrants
2. Promoting diversity of financial corporations with different objectives also promotes competition – regulation from within – e.g. mutuals, cooperatives, Stokvels
3. This second policy strand also promotes macroprudential stability i.e. it helps solve the regulator's dilemma – it joins the twin peaks
4. It (2) can also assist with the promotion financial inclusion