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Actuaries and Banking

Iain Allan
Honorary Visiting Professor, Faculty of Actuarial Science and Insurance, Cass Business School
formerly Group Director, Strategy, RBS

John Young
Head of Customer Value Implementation, RBS

Iain Allan - Career

1969-74 Scottish Life/UK Provident

- Fund management

1979-91 Phillips & Drew (acquired by UBS)

- Developed international client base
- Established securities branch in Tokyo
- Integrated UBS/P&D bond sales forces in London

1994-2008 RBS, Group Strategy

- Establishment of supermarket banking joint venture with Tesco
- Acquisition of NatWest (much larger than RBS)
- Development of broad strategic partnership with Bank of China

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Iain Allan - RBS

Strategic initiatives

- Establishment of supermarket banking joint venture with Tesco
- Acquisition on NatWest (much larger than RBS)
- Development of broad strategic partnership with Bank of China

Skills required

- Prepare long-term financial plan, quantify return on investment
- Understand risks and sensitivities
- Communicate clearly with management and board

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Opportunities for actuaries in banking

Retail banking

- Recent initiatives have the potential to transform competition and innovation

Risk management

- Understanding and judgement versus 'tick-box' compliance

Professional standards

- Professionalism versus regulation (RWA optimisation, pass-fail mindset)

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Driverless cars

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Retail banking

Tinkoff Bank, Moscow

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Retail banking

Customers have not driven competition and innovation

CMA, Retail banking investigation, 2015

- Customer engagement is low
- There are barriers to searching and switching

Retail banking market investigation Summary of provisional findings report, CMA, October 2015, paragraph 64

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Retail banking

Regulation has inhibited competition and innovation

FSA, Mortgage Market Review, 2011

"So we propose that all sales involving some form of interactive dialogue between the intermediary and the consumer will be advised sales"

"If the aggregator site is collecting a breadth of information from the consumer and using sophisticated decision tree questioning in order to filter down the product range, they may be providing advice“

Mortgage Market Review: Proposed package of reforms, FSA, December 2011, paragraphs 5.52 and 5.91

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Retail banking

Encouraging competition and innovation

HMT, Fixing the foundations, 2015

"The government has also asked both the PRA and FCA to publish Annual Reports, [...] to set out clearly the steps being taken to drive more competition and innovation and to help ensure the right incentives exist for new banks to enter the market"

Fixing the foundations: Creating a more prosperous nation, HM Treasury, July 2015, paragraph 12.12

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Retail banking

Encouraging competition and innovation

FCA, Regulatory barriers to innovation, 2015

"Regulatory barriers [...] can distort competition and discourage new entrants to the market denying consumers the benefits of both new services and improved services from current providers"

Regulatory barriers to innovation in digital and mobile solutions, FCA, July 2015, page 1

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Encouraging competition and innovation

FCA, consultation papers, 2015

- *Regulatory barriers to innovation in digital and mobile solutions*
- *Smarter consumer communications*
- *Regulatory sandbox*

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Retail banking

Encouraging competition and innovation

Financial Advice Market Review, 2016

- Develop framework for firms to provide streamlined advice on simple consumer needs
- Establish advice unit to help firms develop their automated advice models
- Publish shortlist of potential new terms to describe "guidance" and "advice"

Financial Advice Market Review Final report, HM Treasury/FCA, March 2016, Recommendations 4, 9 and 17

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Encouraging competition and innovation

FinTech

- HMT ministers have promoted FinTech companies and their vision that the UK should be a leader in FinTech

Open APIs

- Current account comparison services appropriate for individual consumers
- Personal financial management across financial products

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Retail banking

Competition and innovation

- Recent initiatives should increase customer engagement and empowerment and should reduce regulatory barriers to innovation
- Together, they have the potential to transform competition and innovation in retail banking
- Banks will need to focus on product pricing and profitability and the value of customer relationships

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Banking and Actuaries

- An actuarial journey into banking
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An actuarial journey into banking

Actuarial experience at Scottish Life

- Offshore life office: Single premium bonds / derivative based
- Pricing group personal pensions / endowments
- Strategic questions around stakeholder pensions.
- Sale of business to Royal London

Actuarial interest in London

- Family "Name co" at Lloyds.
- Set underwriting appetite and put own money on the line

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An actuarial journey into banking

Moved to banking with the Royal Bank of Scotland

- Started in Group Strategy
- Developed NPV pricing models for retail bank (loans, mortgages, credit cards)
- Developed Customer Value for retail bank (Income – Costs – Expected Loss – Cost of Capital)
- Technical specialist for major regulatory investigations
- Developing CV more widely across the bank

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What is life like in a bank?

Experts exist in areas where actuarial skills apply

- Credit risk and fraud
- Capital management
- Treasury
- Market risk and derivatives
- Product teams manage operational complexity

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What is life like in a bank?

Banks operate in silos

- Focus on specific area of responsibility
- Limited cross team sharing
- Pricing focuses on short term P&L (owned by product teams)
- Pricing highly “deterministic”

Statutory roles are occupied

- Finance owns P&L accounts
- Audit owns overall risk

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It's not easy … but our toolkit is valuable

We can cross siloes

- Risk underwriting ⇔ Credit score card developers
- Reserving ⇔ Credit risk portfolio managers
- Solvency II ⇔ Basel III
- Asset – Liability ⇔ Margin management, treasury roles such as fixed rate hedging
- ALM & Investment theory ⇔ Market risk and derivatives
- We understand P&L

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It's not easy … but our toolkit is valuable

We have unique characteristics

- Longer time scales (embedded value / model office)
- Look for inhomogeneity (banks are so big they often use averages)
- Consider trade-offs
- We can consider long-term probability of ruin (not just capital optimisation)

But no open door

- Nobody knows what we do (no critical mass, no demand for perceived skills)
- We could be seen as a threat to some roles

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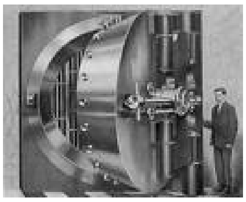
Understanding what is a bank from history

- Merchants need somewhere safe to store their gold
- Goldsmiths had big safes



- Goldsmiths hold gold securely for a fee

Deposits

- But other merchants want to borrow… the gold smith can lend out gold in his vault for another fee

Lending

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A bank is an intermediary that manages a balance sheet and margins

Borrowing and lending create a bank's balance sheet

Liability (deposits)		Asset (loans)
Lots of short-term deposits	Margin	Long-term mortgages (secured) Short-term credit cards (unsecured)

- Pay a rate to depositors to bring in savings
- Receive a rate from lenders for lending on mortgages, credit cards etc
- The difference is the margin (also net interest margin NIM) and this is what all banks strive to manage
- Suitable for a 1 year P&L view – main difference to insurance

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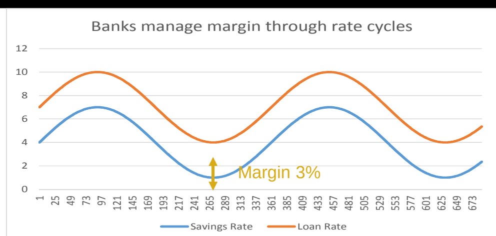
Margins needs to be maintained through different conditions

Borrowing and lending create a bank's balance sheet

Liability (deposits)		Asset (loans)
Interest 2%	Margin 3%	Interest 5%



- Need to manage the margin through all interest rate conditions
- Changing interest rates can be an opportunity or a threat:
  - Falling rates (churn, savings floor, crisis, credit bubble)
  - Rising rates (bad debts, asset values fall, less lending)
  - Need to segment balances both sides of the balance sheet to identify when to re-price

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A balance sheet creates two key risks a bank must manage

History shows risks

Next

Credit risk – Loan not repaid

Liquidity risk – Depositors all want their money back at the same time... But it's been lent out

"I'd like to make a withdrawal"

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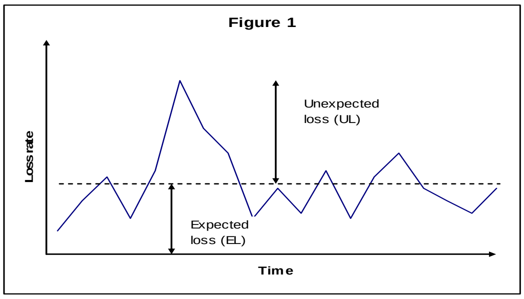
Two credit risk issues: Expected & unexpected losses

- We allow for expected losses when setting lending rates and fees … but losses will vary over time
- Peak losses occur rarely, for example during recessions, and can be large



Need a buffer in case of unexpected losses

Capital held for this risk

Day to day business – price and make decisions on expected losses

Scorecards and pricing manage this risk

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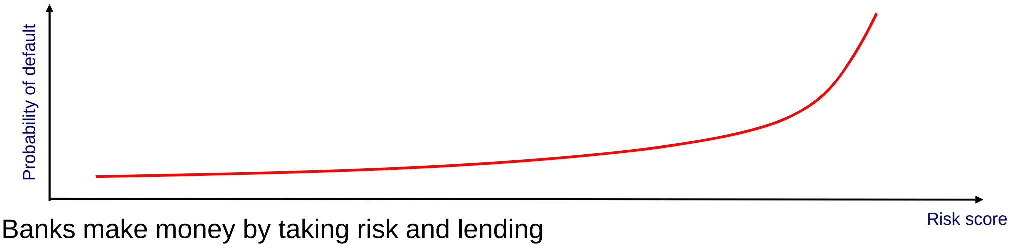
Managing expected losses with credit scorecards

The process is very like car insurance

- Score cards bring in a lot of customer data
- Score cards built by looking at the correlation of this data against historic loss
- Score cards use this past behaviour to rank customers in order of risk



- Banks make money by taking risk and lending
- The more accurately risk and expected loss can be predicted the easier it is to manage

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Credit lending decisions need to price in expected losses

The loan rate would normally allow for the following

Sustainable loan rate includes

- Expected loss
- Costs to write the loan
- Cost of funding
- Profit

If we underestimate expected loss we would underprice lending

Profit delivers a return to shareholders to compensate for capital

Note: With a growing loan book

- Normally bad debts don’t arise until a few years after a loan is written
- We may not know we have “mispriced risks” until later

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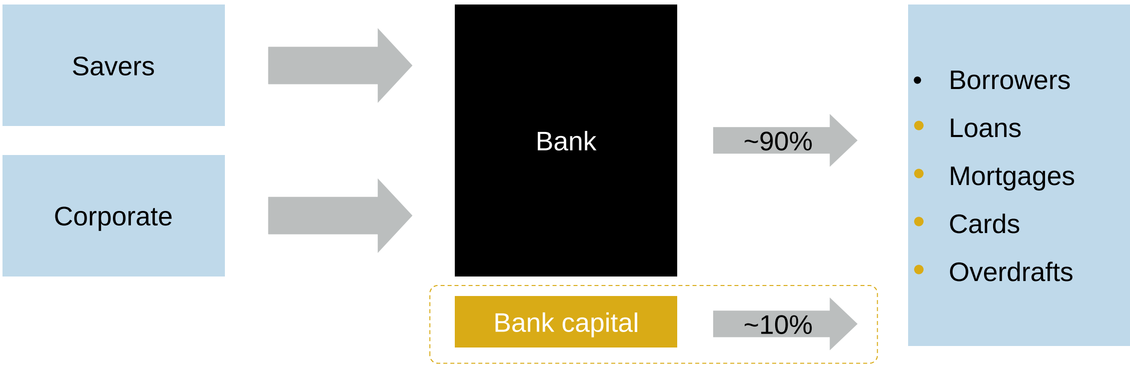
Unexpected losses must be absorbed by CET1 capital



Banks lend funds borrowed from savers and wholesale PLUS its own capital which is part of the funding mix

Banks hold capital to protect savers from unexpected losses

Banks seek to minimise their capital to maximise their Return on Equity (ROE = Profit / capital)

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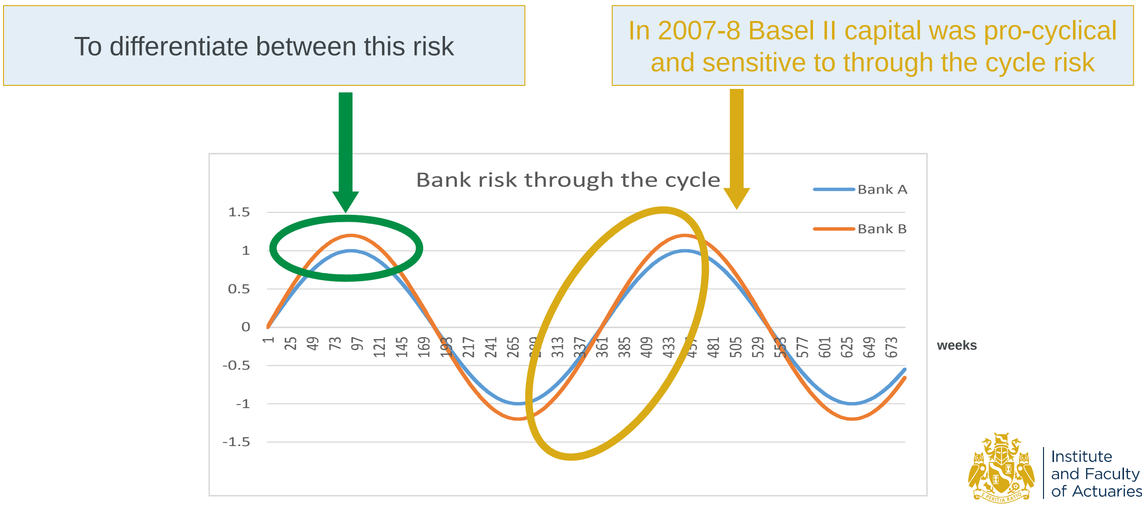
Note capital models based on own experience only works in a nice steady state world



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Basel III (2013–2018) seeks to plug some gaps

More and better definitions of Capital

- Need to hold counter cyclical capital buffers
- Introduction of leverage ratios
- Higher minimum capital requirements, especially for systemically important banks
- Stress tests introduced

- BUT …profit is an accounting concept that includes goodwill, Deferred Tax Assets, Pension Fund shortfalls etc.
- Common Equity Tier 1 capital includes retained profit
- Basel III standardises deductions to calculate Tier 1 capital
- Banks can still arbitrage this as assets can be valued in either the trading book (mark to market) or banking book (face value unless impaired)
- Also markets may not exist for mark to market securities such as CDOs during the crisis – how can the methodology tell if banks are solvent?

Brings in protection for liquidity risk

Liquidity Coverage Ratio (LCR)

- Hold enough liquid assets to cover cash outgoing for 30 days (arrange rescue)

Net Stable Funding ratio (NSFR)

- Ratio of sticky deposits to longer-term lending
- To protect against too great term mismatch to profit from normal yield curve

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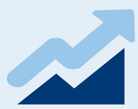
There is a second balance sheet risk a bank must manage related to liabilities

History shows risks

Credit risk – Loan not repaid



Liquidity risk – Depositors all want their money back at the same time... But it's been lent out

"I'd like to make a withdrawal"

Next

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Controlling liquidity risk – Liquidity buffer

Liquidity buffers

Easy to confuse with capital – But not the same thing

Liability	Asset
Bank: Deposits Corporate	Liquid assets
Own capital	• Lending: • Loans • Mortgages • Cards • Overdrafts

Banks hold a portfolio of liquid assets such as Government debt – Gilts

In a time of stressed cash outgoing banks can sell these liquid assets to raise liquidity

Regulators look to hold enough to cover > 30 days of stressed outgoings.

This has a cost

Gilts yield ~2%

Bank marginal cost of raising cash is ~3%

Cost ~-1% pa

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Banks need to control liquidity risk

Diversify funding

Many small depositors

- Current accounts
- Instant access savings
- Savings bonds

Corporate money

- Securitisation
- Corporate bonds

Confidence!

Regulators

- Capital
- Liquidity buffer
- Loan: Deposit
- Term matching

Government

- *Lender of last resort*
- Deposit guarantee

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Discussion topics

Credit score cards

- Similarity of credit score cards and underwriting and use of credit bureau such as experian
- Expectation of selection risks
- Pricing for risks

Capital management

- The Basel framework has encouraged a “pass-fail” mindset (eg no levels of confidence are attached to minimum capital requirements, single stress tests scenarios are run for EU wide stress tests)
- The Basel regulations have led to “optimisation” to reduce capital requirements
- Solvency II versus Basel I, II, III
- Does Solvency II carry “unseen” risks such Basel II? (e.g. model risk)
- How does probability of ruin / tail risk translate to stress testing in banks?

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Banks have a lot of specialist "siloes"

Treasury
- Manage liquidity risk
- Manage margins
- Manage fixed & variable rates
- Analogous to asset – liability management
- Lot of cohort analysis

Credit risk
- Credit score cards
- Cut off decisions
- Provisions
- Analogous to underwriting
- Provisions subtly different from reserves / claims

Capital management
- Focused on risk of ruin
- Standardised approach (prescribed) or advanced approach (own models) under Basel regulations
- "ROE" rather than NPV focus
- Analogous to Solvency II
- Increasing links to stress testing

Finance
- Income
- Costs
- Pricing
- Analogous to company actuary role

Although the main risk in banking is credit risk, operation risk is also important

ATM stats
- # Withdrawals made
- Value withdrawals made
- Weight of cash withdrawn
- Size of cash pile withdrawn
- Cost of global cash handling

Card scheme stats
- # POS terminals UK/Worldwide
- Value UK Transactions

Although the main risk in banking is credit risk, operation risk is also important

ATM stats

- # Withdrawals made 2.8bn
- Value withdrawals made £187bn
- Weight of cash withdrawn 15,000 minis
- Size of cash pile withdrawn 1,200 Km
- Cost of global cash handling $300bn

Source: BBA statistics, own calculations

Card scheme stats

- # POS terminals UK/Worldwide 1.3m / 24m
- Value UK Transactions £482bn

Source: Mastercard

Can actuaries can link these silos?

No specific "magic bullet" roles

- No reserved roles that make it easy to transition over
- Actuaries could develop careers in these siloes by applying specific skills
- More interesting to bridge siloes:
  - Develop Net Present Value models
    - Brings together pricing and credit cut off decisions
    - Brings together finance, risk and treasury inputs
  - Develop Customer Value models
    - Helps tactical and strategic decisions & split value by assets / liabilities
    - Work with product teams, finance, analytics, risk, treasury

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Discussion topics

Push factors for the profession in insurance and pensions

- Automation in insurance
- Decline in final salary schemes
- Consolidation in insurance

Pull factors for actuarial profession in banking

- Able to work across all the silos in which banks operate(eg credit risk, liquidity risk, operational risk, market risk etc)
- Actuaries are able to understand and make judgements about risks (eg short term v long term, risk v reward, acceptable tail risk)
- The broad applicability of actuarial skills in banking has not been recognised in the profession(though some actuaries have enjoyed careers in banking)

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NPV pricing and cut off models

Loans and mortgages

- Very standard approach
- Project forward contractual cashflows
- Adjust for pre-payment
- Discount cashflows after capital flows to support lending are applied

Credit cards

- Mix of contractual and behavioural
- Behavior determines balances and cashflows (transactor / revolve / spend transactor)
- Impact of “scrabble scores”
- Jamie Dimon head of JP Morgan observed that investment banking is not that complex, what’s hard is understanding how credit cards work

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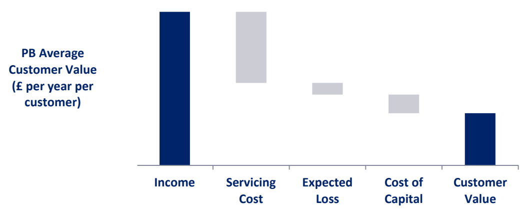
Customer Value is a measure of profitability

Customer Value is:

Income – Servicing Cost – Expected Loss – Cost of Capital

This is an Economic Value view

It is calculated at account or transaction level and aggregated to customer



Income	=	**NII**	+	**Fees**
less		*Customer Rate – Fund Transfer Price – Liquidity Clearing House adjustment*		*Directly attributable to an account*
Servicing Cost	=	**Direct Costs**	+	**Overhead Costs**
less		*c 50% of total costs applied using a unit cost model*		*c 50% of total costs spread in proportion to usage*
Expected Loss	=	**12 month forecast of bad debt**		
less		*P&L bad debt outcome, spread to good book accounts using Basel Expected Loss*		
Cost of Capital	=	**Core Tier 1 Capital * 17%**		
		Pre-tax Return on Equity, allocated by account RWA or income		

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Risk management

Understanding and judgement versus 'tick-box' compliance

HMT, New approach to financial regulation, 2010

"In the run up to the financial crisis, financial supervision relied too much on 'tick-box' compliance with rules and directives at the expense of proper in-depth and strategic risk analysis. Effective prudential regulation of firms requires an approach based on understanding of their business models, and the ability to make judgments about the risks that firms' activities pose to themselves and to the wider financial system as a whole"

A new approach to financial regulation: judgement, focus and stability, HM Treasury, July 2010, paragraph 1.7

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Risk management

RWA optimisation

Bank of England, Financial Stability Report, 2011

"Some banks have announced their intention to meet the required 9% target ratio through so-called 'RWA optimisation' - changes in risk measurement methodology that lead to reductions in reported RWAs. Such changes may not result in any improvement in underlying resilience"

Financial Stability Report, Bank of England, December 2011, page 40

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Risk management

Understanding and judgement versus 'tick-box' compliance

PRA, Stress testing, 2013

"A key aim of the stress-testing framework is to strengthen banks' own capabilities to identify and quantify risks to their businesses"

"This is not intended to be a simple 'pass-fail' regime"

A framework for stress testing the UK banking system, Bank of England, October 2013

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Risk management

Understanding and judgement versus 'tick-box' compliance

PRA, Pillar 2 capital adequacy, 2015

"This assessment may lead to firms identifying risks that are inadequately covered under Pillar 1 or not covered at all"

"The PRA continues to expect firms to carry out their own assessment of the appropriate level of Pillar 2 capital"

Assessing capital adequacy under Pillar 2, PRA, January 2015

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Risk management

Understanding and judgement versus 'tick-box' compliance

PRA, Liquidity, 2014

"The LCR is a Pillar 1 standard, in that it is a set of measures that applies to all firms in the same way" (LCR: Liquidity Coverage Ratio)

"Firms must ensure that their liquidity and funding risks are comprehensively captured and managed"

"Underlying OLAR is the PRA's expectation that firms manage their liquidity risk prudently and take responsibility for doing so" (OLAR: Overall Liquidity Adequacy Requirement)

CRD IV: Liquidity, PRA, November 2014

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Professionalism versus regulation

Limits of regulation

- 'RWA optimisation'
- 'Pass-fail' mindset
- Public disclosures

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Professionalism versus regulation

Benefits of professionalism

- The Actuaries Code
- CPD/Professional Skills Training
- TAS R: Reporting actuarial information

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