Stress testing liquidity and the contingency funding plan

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PRMIA Members' Meeting

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Agenda

- **Recent developments**
- **Sound stress testing**
- **Tips, tricks and traps**

Lessons from liquidity and credit crunches

- Almost no CROs or Treasurers saw it coming
- Senior management involvement and understanding of risk issues critical - strong governance essential
- Understand the underlying risks and assumptions in models
- Look at the Firm’s balance sheet as a whole
- Challenge to plans/strategies is key
- Cross-business and cross-risk perspectives are essential – silos must be cut through
- Concentration risk has many guises
- Stress testing is a great tool – but needs to part of an integrated risk management framework
- Liquidity risk management is more than calculating ratios and filing regulatory returns

Lessons from the 2007- 2009 crisis

- Most (if not all) firms' stress testing did not envisage current circumstances
- VaR measures proved insufficient
- Risk disclosures on structured products opaque and contingent liabilities not tested
- Liquidity an invisible risk in many firms and not well-understood or critically assessed
- Risk appetite must be assessed explicitly
- Pillar 2 has proved its worth **but only** if it is embedded properly

The traditional model

- Heavy reliance on simple ratios (e.g. loan/deposit, liquid assets/deposits etc)
- Mainly a “stock” liquidity approach
- Key metric was the maturity mismatch
- Standard haircuts used to determine ‘liquidity’ of assets
- Little distinction between:
  - Finer degrees of quality/liquidity btw different assets
  - Legal entities
  - Currencies
  - Moveability of collateral
  - etc

The Australian model

- Has been around for about 10 years
- Banks have to do a daily cash flow forecast under both BAU and single-name stress scenarios
- Scenario assumptions have to be agreed with APRA
  - Very detailed, including off-balance sheet items
- Banks must be cash flow positive on a cumulative basis each day for [5] days
  - In practice, banks take the minimum as acceptable
  - Liquid assets buffer is used to absorb stresses
- Supported by A$2 bn emergency drawdown line between each of Big 4
  - As unlikely to be used except *in extremis*, is seen as a ‘gift’ to the banks
- Broadly, supervisors around the world have woken up to this model (finally!)

BCBS Paper on liquidity risk (Sep 08)

- Introduces concept of liquidity risk tolerance (i.e. risk appetite)
- Importance of allocating liquidity costs and benefits to significant business practices
  - Pricing
  - Performance measurement
  - Product approval
- More emphasis on cash flow forecasts, similar to Australian model
- More severe stress tests
- More focus on intra-day liquidity, as well as intra-group dependencies
- Other components (liquid assets, contingency funding plan etc) not new

UK FSA Consultation Paper (Dec 08)

- Follows BCBS, but more detailed and in some areas more prescriptive
- Very prescriptive on intra-group reliance (disallowed unless waiver granted)
- Pillar 2 type approach
  - Firm-specific ILAA (cf ICAAP)
  - Firm-specific ILG (cf ICG)
  - ILG is typically based on liquidity buffer (not cash flow requirement)
- More holistic stress testing, to consider impacts on
  - Cash flow
  - Liquidity buffers
  - Profitability
  - Solvency

FSA ILAA stress tests

- To cover name-specific, market-wide and a combination of the two
- Severity of assumptions set by FSA (in outline, not detail)
- Within that, firms must assess each source of liquidity risk identified by the FSA
  - Includes guidelines e.g. on relative stickiness of different types of wholesale funding
  - Introduces franchise viability risk as a new source of liquidity risk
- Frequency and extent not specified – it must be ‘proportional’

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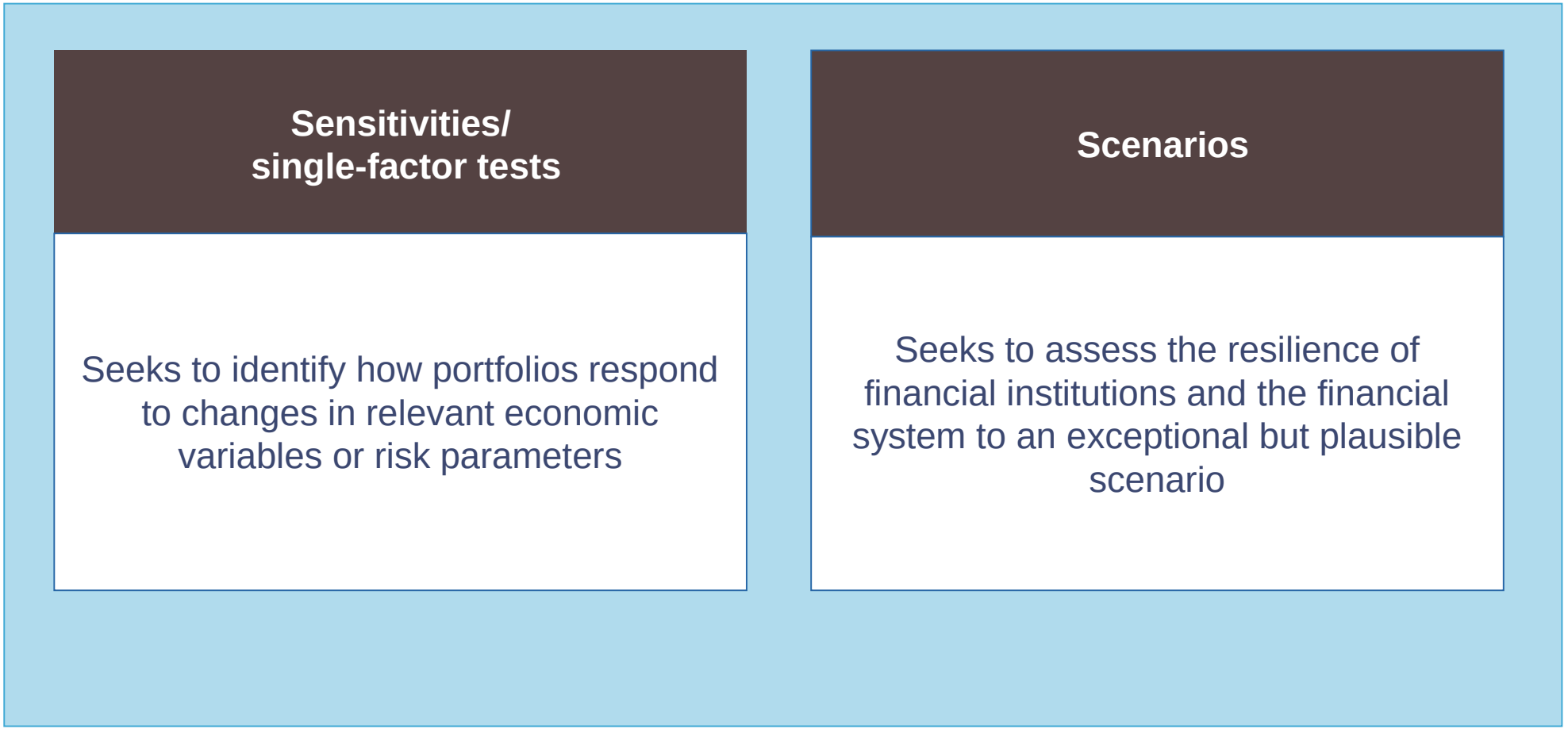
Two principal approaches to stress testing



Sensitivities / single-factor tests: not to be overlooked

Benefits

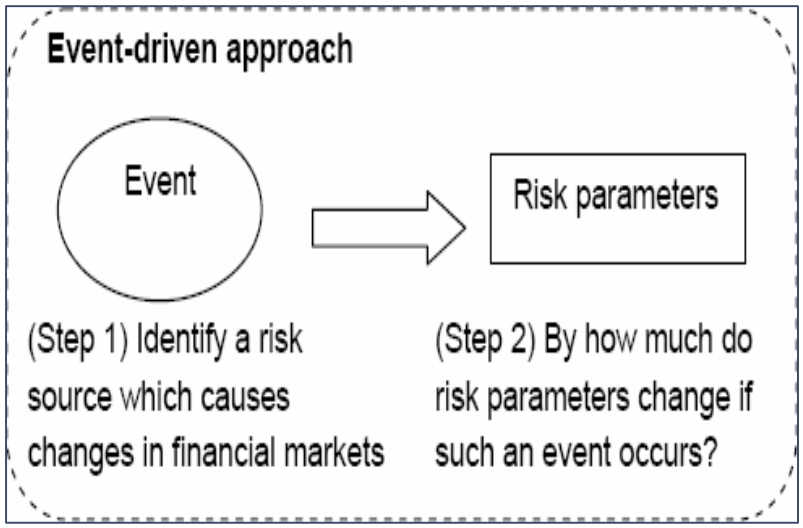
- Can be run relatively quickly
- Intuitive link between factor and outcome of the test
- Used by senior managers to form an initial view of the impact on the firm of a move in a financial variable

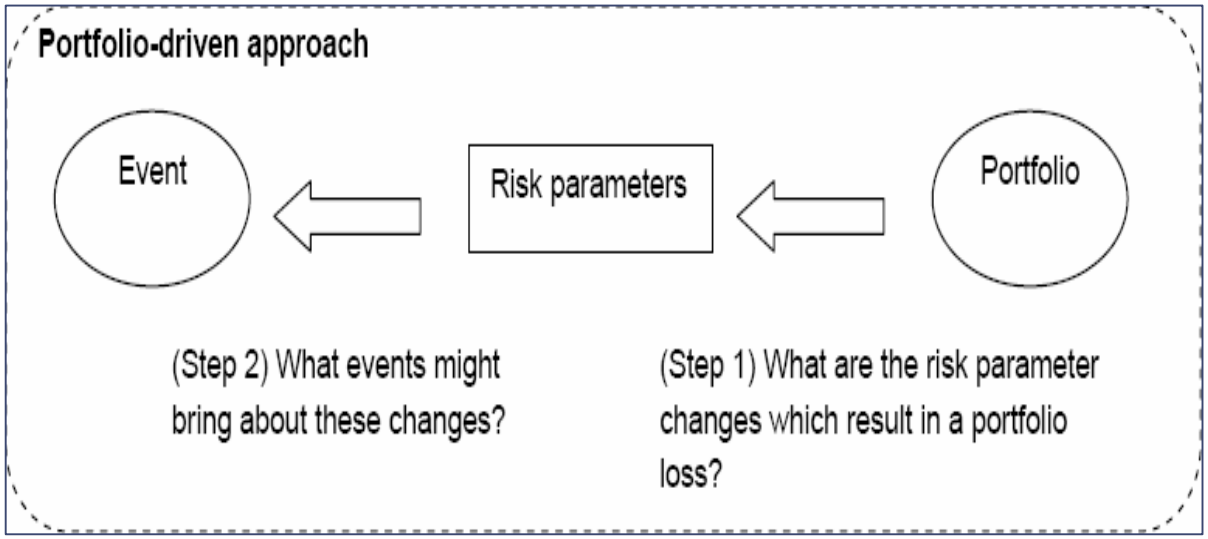
Several approaches

- Risk parameters are moved instantaneously by a unit amount (e.g. a parallel shift in interest rates by 200bp)
- Worst case historical movements for each risk factor (e.g. most significant fall in house prices in last 40 years)
- Historical dataset to determine the movement in risk factors that would result in largest loss for current portfolio

Scenario analysis

- Scenario formulated based on plausible events (e.g. Black Monday)
- Assesses how these events might affect the relevant risk factors in a firm's portfolio
- Scenarios often formulated at the request of senior management (often motivated by recent events)
- Choice of approach: either event or portfolio driven





* Source: Stress testing at major financial institutions: survey results and practice (BIS)

The three “H’s” of scenarios

Historical

- Relies on significant past event
- Tend to be more fully articulated and involve less judgement
- May be less suited to actual risk profile of institution and not adequately reflect advances in risk taking
- Based on actual data

Hypothetical

- Significant market event or macro-economic scenario that has not yet happened
- Labour-intensive and requires judgement/specialist expertise
- Might lack support from management and/or business level
- Historic data can be used to identify relationships

Hybrid

- Quite common
- Uses historical market moves as inputs but not necessarily lined to a specific crisis
- Scenarios need to balance a trade-off between realism and comprehensibility
- Qualitative discussion and business context is important
- Scenarios should not rely on mechanical assignment of probabilities

Scenario analysis process – key issues

- Obtaining senior management time for active involvement
- Getting buy-in for assessing ‘unlikely yet plausible’ scenarios as part of financial planning – “that won’t happen to us”
- Relevance of historical data
- Choosing stress-test scenarios is very subjective – individual scenarios and combinations
- Choosing relevant parameters and extent of shocks?
- Level of application and avoiding spurious accuracy
- Making it part of the management process – not a separate exercise
- What to do with the results?
- Cost/benefit of mitigation?

Reverse stress testing

For	Against
• Similar benefits to “event” scenarios • Focuses on firm specific liquidity risk drivers • Challenging	• Credible to senior management? • Time consuming • Unrealistic • Limitless possibilities • Risk of regulatory over conservatism • Unnecessary additional economic costs

Liquidity stress testing approach - example

Identify liquidity risk drivers

Erosion in value of liquid assets

Additional collateral requirements

Evaporation of funding

Withdrawal of deposits

Etc.

Design stress scenarios (and probabilities)

External scenarios: emerging markets crisis, systemic shock in main centres of business, market risk

Internal scenarios: Operational risk, ratings downgrade

Ad-hoc scenarios: e.g. country / industry specific

Model stress tests

Step 1: Quantify liquidity outflows in all scenarios for each risk driver

Step 2: Identify cash inflows to mitigate liquidity shortfalls identified

Step 3: Determine net liquidity position under each scenario

Liquidity stress testing – one bank's approach

- Major liquidity risk drivers monitored daily
- Key liquidity risk drivers
  - Outflows
    - Wholesale overnight and term funding
    - Rapid withdrawal of retail deposits
    - Potential ABCP liquidity support
  - Inflows
    - Unencumbered liquid trading assets
- Full stress testing performed monthly
- Stress testing results drive liquidity risk profile limits
- Complementary limits and analysis on broader structure indicators
- Stressed liquidity position has to be positive for all time buckets for all stress tests

Detailed considerations (recently proved!)

- Time-horizon
  - the horizon normally used is near term rather than medium term
  - longer time horizon may be more appropriate as some macro economic impact may take more time to filter through
- Unexpected illiquidity
  - many crises are characterised by an abrupt lack of liquidity in financial markets e.g. impact of heavy reliance on money market funding sources
- Lack of hedges
  - hedging instruments may be rendered invalid during stress events;
- Aggregation
  - process of aggregating the effects of stress tests performed at a risk type level raises issues regarding diversification benefits and second-round contagion effects;
- Correlations
  - levels in ordinary conditions may cease or increase under exceptional events.

Stress testing - best practices (which should be common practice by now)

Close engagement by Board and senior management

- Board and CEO involved personally in review and challenge of scenarios, impact and mitigating actions, chief risk officer having personal charge of the stress testing programme.

Scenarios which seriously challenge key profitability, business planning and capital assumptions or where mitigating action was constrained

- Scenarios should not reflect a complacent bias from a benign credit cycle, giving rise to mild scenario impacts.

Clear and accessible communication of results

- Results should be presented to senior management showing the impact of stress testing over a multi-year time horizon, the effect on a selection of metrics and the possible management actions.

Use of group-wide stress testing and scenario analysis to challenge business planning assumptions

- Clear and substantive use of stress testing outputs to challenge business planning assumptions.

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PwC framework for assessing liquidity risk management

1. Risk definition
2. Governance and oversight
3. Liquidity management
4. Measurement and monitoring
5. **Stress testing**
6. **Contingency funding plan**
7. Public disclosures

Assessing stress testing and the CFP

5. Stress testing

- Scope
- Frequency
- Review and challenge
- Use of results
- Link to CFP

6. Contingency funding plan

- Governance and review
- Responsibilities in action plan
- Triggers/Early warning indicators
- Asset reduction and financing strategy
- Liquidity cushion
- Central bank facilities
- Testing and effectiveness

UBS case study – lessons for stress testing (based on public domain data)

- Risk capacity required for growth plans not assessed
- Lack of recognition of infrastructure demands to support growth for Fixed Income business
- Silo business ownership of risks; silo risk functions
- Lack of “look through” to underlying risks
- Absence of holistic view of sub-prime risk
- VaR measures took no account of risk of sub-prime
- “Over-reliance on VaR and stress numbers”

Source: Shareholder Report on UBS’s Write Downs

Why did stress testing not work elsewhere?

- Focus on metrics rather than fundamentals
- Silo approach to risks ignored links in the chain of events
- Credit and market risks are not isolated but interact through liquidity risk
- Analysis seen as process rather than effective management technique
- Data, model and resource constraints due to underinvestment (in high growth environment)
- VaR and other risk metrics were not “fit for purposes” or limitations misunderstood
- Concentrations risks not fully understood
- Implementing Basel II as opposed to managing risk?
- “We don’t manage our business for these events – if we did we wouldn’t make any money”

Success factors and challenges to consider

- Strength of risk function and governance framework
- Liquidity is not the sole domain of the treasury department
- Coordination between risk, finance, strategy, planning and business management
- Demonstration of business benefits – often viewed as a cost, however, is an essential capability
- Ability to deliver cross-firm perspectives and see picture on a consolidated basis
- Credibility with business management
- Capability of infrastructure i.e. IT, data, models, policies, people

Key features of credible contingency funding plan

- Adequate management and reporting framework
  - Act upon the early warning signs,
  - Build in buffers and/or haircuts
  - Avoid or mitigate possible crises promptly
- Clearly documented management action plan
  - Named executives/ clearly defined roles and responsibilities
  - Alternative sources of liquidity
  - Trigger levels for action
- Evaluate a wide range of possible scenarios and test them
- Communication plan
  - Internal and external communications,
  - Prevent further escalation or contagion
- Regular sources of liquidity supplemented with contingent sources
- Board approved and wider management involved

Gaining regulatory approval for your approach to stress testing

- Clarity and robustness of base case
- Clarity on external market/economic context
- Scenario articulation
- Sufficient severity
- Transparency and understanding of results
- Senior management involvement: evidence of process is important
- Credibility and evidence for management actions
- Simple and clear presentation of results
  - Impact on risk drivers
  - Impact on liquidity buffers

Integration of stress testing with business processes

- Risk governance
  - Regular ALCO or RMC agenda item
  - Specific job function responsibilities
  - Hard limits enforced
- Part of the corporate management process
  - Annual planning cycle
  - Budgeting/forecasting
- Part of major events
  - Major investments
  - Changes in strategy
  - Market shocks
- Reporting
  - Can risk reports become superfluous?
  - Are they understood?
- Performance management
  - Value of ‘non-revenue producing’ activities and skills required
  - Incentives may be skewed

Turning an oil tanker?

In conclusion

- Stress testing is essential AND EXTREMELY VALUABLE
- REGULATORS WILL EXPECT MORE
- Strengthen AND VALUE risk management
- CHALLENGE TRADITIONAL SILOS
- Embed to meet the use test
- Implement with care
- Communicate with care

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