Theory and practice in risk-based capital assessment methodology

Jimmy Skoglund, Ph.D
Risk expert
SAS Institute
Agenda

- An overview of the capital assessment process
  - Challenge of
    - Long-term risk assessment
    - Risk integration
    - Risk communication

- Capital assessment methodology for
  - Credit risk
    - Migration & collateral value risks
    - Default process and LGD measurement
    - Portfolio credit risk and capital planning
Agenda cont’d

• ALM risk
  – Traditional ALM risk clearing & performance measurement
  – Integrating ALM in dynamic long-term capital planning
    – Challenge of modelling customer behavior
      » Customer loan structure transition
      » Customer investment policy

• Operational risk
  – Measurement tools
  – Process self-assessment
  – Components in the operational risk framework
An overview of the capital assessment process

Migration to a regulatory environment with risk based capital assessment

What challenges does this pose?
- Beyond rating system since volatility is undesirable
- Capital stability requirement imply a long-term capital planning process
- Which require - a long-term risk assessment e.g., covering a business cycle

Methodological challenge - measure risk accurately through time
An overview of the capital assessment process cont’d

- Conceptual view – ’actual capital is based on long-term risk assessment’
- Implications for implementation of capital in business control
  - Credit granting
  - Risk-adjusted pricing
  - ...
- Who is best positioned to hold buffers - the bank or the debtors?
An overview of the capital assessment process cont’d again

- **Level of capital defined by a set of economic scenarios the bank wants to survive**

- **Which imply ..**
  - Define Key economic factors driving losses, rwa, results,…
  - As well as factor their impact!

- **Key for**
  - Risk integration
  - Risk communication & financial planning
Capital assessment methodology for credit risk
Risk identification

- RWA and losses are procyclical
  - Due to:
    - Rating migrations (exposures, guarantors,..)
    - Value of exposures and, in particular, collateral
- In EC approaches e.g., risk in net interest income
  - Business risk in FMI
Credit migration and default risks

A note on rating methodology

- Statistical power of rating decays fast with horizon
  - Preferred approach is
    1) short-term scorecard type assessment
    2) methodology for long-run systematic migrations volatility

- Effect of pro-cyclicality largely independent of rating methodology
  - E.g., empirical migration matrices used by rating agencies
Credit migration and default risks cont’d

Rating migration risks experienced in practice
- Systematic risk
  - All segments
  - Capture broadly correlation
- Non-diversifiable Idiosyncratic risks
  - Large corporations
- Domino effects or default contagion
  - ‘Traditional credit analysts view’
  - Allows replication of loss events
LGD part 1: Collateral value and volatility

- LGD display significant dependence on economic cycle
  - Mainly through dependence on collateral values e.g., property prices

- Accurate PIT LGD measurement
  - Validation of process(es) for valuation of collateral

- Capturing volatility in LGD as well as correlation with rating migration
  - Mapping collaterals to set of collateral evolution models e.g., historical property-, financial indices
LGD part 2: Multi-tier LGD measurement

- Basel definition of default does not coincide with events (or timing) yielding actual losses
  - Firm bankruptcy
  - Legal re-structuring (ch. 11)
  - Customer settlement
- Time dimension of default for troubled assets that needs to be parameterized
  - E.g., measurement of transitions between default states – work out process
Application: Pro-cyclicality in IRB-A and NII

- Large retail and SME portfolio collateralized with physical assets
- Portfolio segmentation is the basis for capital allocation granularity
  - Internal transfer pricing
- Models & calibration
  - Migration risks
    - Systematic factors drive stochastic migration matrices
  - Collateral value risks
    - Map collateral to indices
  - ... 
  - Calibration: 20 years of data & expertise
IRB-A capital relative risk projections

- 99% level potential IRB-A capital at 10 years planning horizon
- Simulation based approach to scenario analysis
  - Model explicitly
    - Ratings migration
    - Collateral values
    - Defaults
    - Default transition process
    - ...
- Conclusion – good credits are at a higher risk of requiring more capital in the future
  - Essential with long-term capital planning for good quality portfolios
Net interest income – relative risk projections

- 99% lower limit on NII at 10 years planning horizon
  - Basis for economic capital
- Same effect as Basel II IRB-A capital
  - Good grades are more risky
- However, less significant than for Basel II IRB-A
  - Not capture successive quality depreciation - loss rates
Capital assessment methodology for ALM risk
Background: Traditional ALM risk clearing and management

- ALM and credit risk is separated at a clearing centre i.e., the two legs
  - Customer (loan)
  - Funding, are matched!
- Allows loan performance measurement solely on credit risk
  - E.g., credit risk adjusted performance measurement
  - Loan originators have no influence on funding
- ALM risks is managed at Treasury level
  - Interest rate risk P&L
  - Cashflow structure
Integrating ALM and credit risk

- Long-term capital planning perspective
  - Necessary to integrate ALM and credit risk

- Assuming determinism in behavior e.g.,
  - Customer savings account volumes
  - Loan structure
  This is simply a matter of extending the portfolio segmentation for credit risk....

- In practice though customer optionality enters in
  - Choices of loan structure,
  - Investment policy,
  - and in particular through changes in these over time

Furter segmentation on
- Volumes
- reset times
- maturities
As well as liability volumes....
Challenges in integrating ALM and credit risk in long-term capital planning

What makes ALM and in particular integration of ALM and credit risk complex is

- Loan structure optionality at reset times
- Prepayment options
- Options to transfer from less to more profitable accounts i.e., allocation of funds
- Early withdrawal options
- ...

Behavioural models

- Set of key factors triggering actions e.g., renegotiate mortgage, reconsider investment allocation
Capital assessment methodology for operational risk
Operational risk measurement tools

- A structured approach to operational risk measurement
  - Three measurement tools
    - Internal loss
    - External loss
    - Self-assessment (scenario)

- Lack of data in risk identification process
  - Process self-assessment
    - Qualitatively structuring a banks process
‘Theoretical’ operational risk framework

- Structured approach to risk identification
  - Bottom-up risk measurement to allow subsequent capital allocation

- Validation process
  - Business process level
    - Measuring quality in the process self-assessment via internal data
  - Bank and business unit level
    - External data and other benchmarks (i.e., top-down)
Questions