
SNB's new approach to stress testing

Workshop for heads of financial stability
Bank of England
London, 22–23 February 2016

Robert Bichsel

SCHWEIZERISCHE NATIONALBANK
BANQUE NATIONALE SUISSE
BANCA NAZIONALE SVIZZERA
BANCA NAZIUNALA SVIZRA
SWISS NATIONAL BANK 

Classic approach: top down macro stress testing

- Stress Testing developed in early 2000's was top down macro approach:
 1. **Estimating sensitivity parameters** of banks' earnings/write-downs/losses to macro shocks (individual banks and system as a whole)
 2. **Predicting the impact of macro-shocks on banks** by using these estimated parameters
- Major drawbacks:
 - Data quality and identification issues
 - Poor fit / out of sample performance in particular at individual bank level
 - Too simplistic to adequately capture complexity and of banks' businesses and loss-drivers (e.g.: net interest income)
 - Structural breaks cannot be depicted

New approach: 'building-blocks' (BB)

- **Objective** : development of a comprehensive, reliable and versatile tool for assessing the resilience of **individual banks** and the **banking system**
- **Approach**: breaking down entire business/risk exposure in Building Blocks (BB):
 - 1 business/risk type = 1 block
 - Modelling approaches differ across blocks to reflect risk type and complexity (*see focus on IRRBB*)
 - Impact of scenario: aggregation of the results from individual blocks
 - **Differentiated approach across banks** (G-SIBs vs DoBs) and **businesses** reflecting priorities and resource allocation
- **Perspective**: assessment of financial stability (>< prudential measures)
- **State of Development**: Instrument already in use but ongoing developments/refinements

Key elements of scenario analysis using BB approach

1. Definition of scenario
2. Translation of a macro stress scenario into shocks to primary risk parameters (mix of empirics and 'expert judgment')
3. Loss: function of exposures and primary risk parameter for each block
4. Aggregation of results from individual BB

Central assumptions:

- B/S volume is held constant and static (G-SIBs and most BBs for DOBs)
- No management actions
- No interaction between BBs

Differentiation of BB approach across banks: G-SIBs vs DOBs

Sample:

- G-SIBs: 2 universal banks (UBS and Credit Suisse) representing 1/4 of domestic credit market
- DOBs: About 100 "classical" commercial banks representing 2/3 of domestic credit market

Building blocks:

- G-SIBs: 12 risk modules covering market, credit, operational, funding and business risks
- DOBs: 6 risk modules focusing on main risks (credit risks and IRRBB)

Data :

- G-SIBs: Specific granular reporting templates for each BB filled out by banks quarterly (exposures + results from sensitivity analysis)
 - DOBs: Use of existing supervisory exposure data
- > enables **comparability/standardization** and plausibility-check of banks' inputs

Focus on Interest Rate Risk in the Banking Book (IRRBB)

- **Objective:** reliable simulation of interest rate shock impact on banks' net interest income (70% of DOBs' income)
- **Focus:** individual banks and banking system
- **Modeling approach:**
 - Separate modeling of assets and liabilities to consider maturity transformation
 - Granular approach to differentiate margins / rates across products and consider shifts across products at renewal
- **Data:**
 - Cash-flows of B/S positions and linear derivatives according to repricing maturities from standard (>< specific) regulatory reporting (IRR – NPV data approach)
 - Enhancement to granularity by using granular balance sheet data
- **Validation:** Interactions with individual banks to validate the approach (plausibility checks)

Focus on Interest Rate Risk in the Banking Book (ctd.)

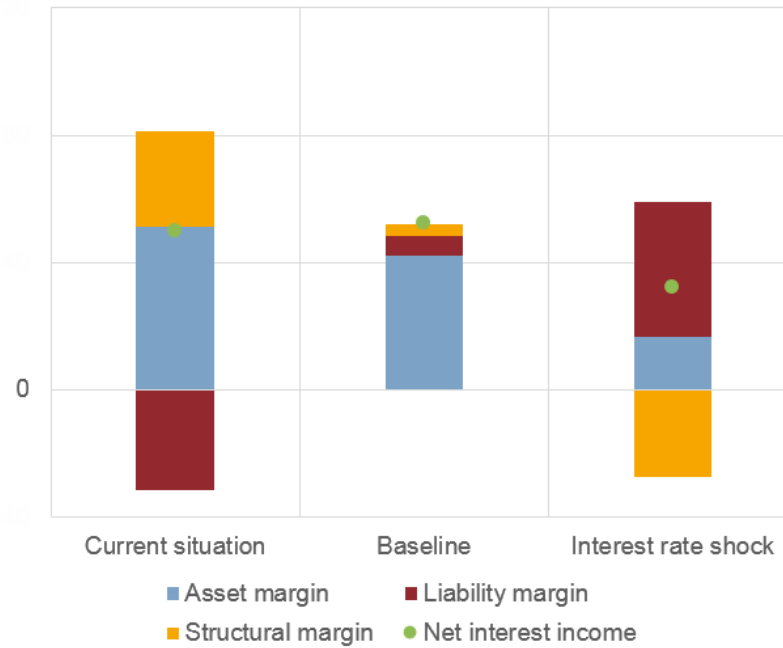
Versatile but also **challenging**:

- Can simulate the **direct** impact on net interest income of virtually any interest rate scenario
- Coupled with BB1 and BB2 (credit risk) – covers both the **direct** and **indirect** interest rate risk (ex: correction housing market)
- **Allows/requires** explicit and flexible modelling of elements such as:
 - Banks' margin on new loans
 - Margin compression due to implicit floor at zero on deposits in negative rate environment
 - Hedging strategies
 - Clients' behavior (hot money?) in the event of monetary tightening (especially now)
 - Specifics regarding implementation of monetary policy (especially now)

Focus on Interest Rate Risk in the Banking Book (ctd.)

Composition of net interest income

Bn. CHF, 5 years cumulated



Conclusion

- "Building Blocks" stress testing approach proves extremely useful
 - Is the main risk/resilience monitoring tool at SNB
 - Is here to stay >< top-down macro- stress tests
- Offers flexibility
 - Differentiated approach for different risk and bank categories
 - Can simulate the impact of a wide range of scenarios
- Disciplining effect: forces us to explicitly deal with assumptions

Conclusion (ctd.)

However:

- Development and maintenance costs are high
- Not a prediction methodology, but a what-if analysis tool
- Limited coverage (e.g. banks vs non-banks)
- Drawbacks of flexibility – coping with a large number of explicit assumptions
- Risk of becoming a 'sausage machine'

Hunger for more? Contact Roland.Goetschman@snb.ch (Project Leader)

Appendix - BB for G-SIBs: Data

	Measures	x	Fields	=	Time Series
Market Risk					
BB 1.1: Interest Rates (Trading B.) BB 1.2: Interest Rates (Banking B.) BB 2: Equity BB 3: FX BB 4: Commodity BB 5.1: Credit Spread BB 5.2 CVA (Credit Valuation Adj.)	Sensitivities (impact of infinitesimal shocks) Impact of predefined market shocks (severe / extreme) x (up / down) x (parallel / flattening / steepening)		Region Currency Underlying Curve Underlying Exposure Product Type Counterparty Sector Counterparty Rating		1'540 251 1'200 199 42 1'100 1'404
Credit Risk					
BB 6.2 Lending Risk IB BB 6.3 Lending Risk PB BB 7 Counterparty Credit Risk BB 8 Issuer Risk BB 9 Structured Credit Risk	Exposures (Gross / Net / Current / Stressed) Losses (Expected / Severe / Extreme)		Region Sector Accounting Type Loan to Value (Lombard) Concentrations		1'509 1'528 2'642 921 792
Other Building Blocks					
BB10 Business Risk BB11 Funding Risk BB12 RWA	Impact on P&L and Balance Sheet (baseline / stress) x (1-year / 2-years)		Income / Expense Breakdown Funding Sources RWA Breakdown		150 164 210
					13'652