Scenarios and stress tests, in practice

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Content

1. The right scenario for the right purpose
   - Scenario types
   - Levels of stress
   - Stressed metrics

2. Strengths and limitations
   - One among several complementary approaches to manage risk
   - Development areas

3. Connection with management decisions
   - Appetite for risk management
   - Risk planning
   - Finance and capital planning
1. Different scenarios for different purposes

Unconditional scenarios / Sensitivity analyses

**Purpose**:
- Test model robustness per model (Pillar I) and at portfolio level (Pillar II),
- Test sensitivity to model assumptions

**Process**
- Portfolio content: **unchanged** (as-is)
- Economic environment: **unchanged**
- Model input parameters: **changed**

**Ex**: What if
- PD increased/decreased by 10% in major rating classes per borrower type?
- Prepayment assumptions increased by 10% in major asset classes?
- Recovery or cure rate increased/decreased by 10% in major collateral types?
- Correlation increased/decreased by 10% between some asset types?
1. Different scenarios for different purposes

Conditional scenarios :

**Purpose**
- Assess the impact of changes in the portfolio and / or the environment

**Process**
- Portfolio content : **changed**, to include forecasts in
  - business volumes (growth, exit decisions, etc)
  - appetite for risk, including actions to mitigate risk or reduce capital demand
- Economic environment : **changed**, to include changes in credit drivers based on
  - expected economic parameters (translated via models or expert opinion), or
  - derived from current market prices (Market opinion)
- Model assumptions : **unchanged**
1. Stress test for Credit Risk- Scenario definition

**Unconditional Scenarios (Sensitivity Analysis)**
- Intuitive outcomes
- Easy to understand by a broad audience
- Can be performed rather quickly
- Not economic sensible

**Hypothetical Event (Scenario Analysis)**
- Extreme or plausible scenarios that have not yet happened
- Inclusion of management actions
- Labour intensive
- Subjective expert judgment
- Realism vs comprehensibility
1. Different scenarios for different purposes - Summary

Scenarios
EL / credit cost / EaR / EC / RWA /…)

Unconditional
(“as-is”)

- PD
- EAD
- LGD

Portfolio parameters
- Correlations, Sharp ratio, Risk free rate, etc
- Collateral values, Cure rate etc
- K factor, PFE’s, etc

- Banks
- Corporates
- SME’s
- Retail etc

Conditional
(“to-be”)

- Portfolio
- Environment

- Business volumes, returns
- Risk appetite, mitigations
- Economic
- Market

- Economic (PD, EAD, LGD, correlations)
- Market (PD, LGD, Correlations)

MODELLING support

MANAGEMENT support
1.2. Different levels of stress: Base, Adverse, Reverse

Depending on purpose, different stress levels are applied, to test P/L or B/S sensitivity or resistance to extreme situations.
1.3. Different metrics for different purposes

**Min/Target capital ratios:** Tier 1, Liquidity, Leverage

**Risk Appetite:** Max. earnings-at-risk, capital-at-risk, RWA-at-risk, …

Cascading down per **Business line** (volumes)

**Bank business lines**
- Commercial Banking *(per product)*
- Retail Banking *(per country)*
- Direct Banking *(per country)*

**Credit Metrics:** Consistent with performance reports *(Exposure, EL/EAD, ECAP/EAD, RWA …)*

Cascading down per **Risk type** (concentrations)

**Credit Risk**
- Event Risk
- Systemic Risk *(per asset class, industry, geography)*

**Market Risk**
**Operational Risk**
**Business Risk**

**Credit Metrics:** Consistent with **Risk Appetite** *(E@R, C@R, RWA@R)*
1.3. Different metrics for different purposes

1. **Earnings**
   -Margins and fees
   -Volumes (Business strategy, market demand, prepayments, etc)
   -PIT Accounting losses (credit costs, impairments)

   ➔  Earnings at risk?

2. **Buffer between capital demand and availability**
   -Stressed Pillar I (regulatory) Capital
   -Stressed Pillar II (economic) Capital
   -Stressed profits and volumes

   ➔  Tier one ratio, liquidity ratio, leverage ratio?

3. **Capital Value**
   -TTC Expected losses
   -Economic capital
   -Economic profit

   ➔  Capital value?
1.3. Conclusion: Process for conditional scenarios

1. Split the portfolio into risk buckets of regions/industries/assets types that are homogeneous and relevant for ING business profile.

2. For each bucket, define base (incl. alternatives) and adverse macro-economic assumptions, using:
   - Expert opinion on Economic drivers (GDP growth, Unemployment, House prices, etc).
   - Market information (Spreads, Equities, Indices, …).

3. Transform assumptions into Credit drivers (EDF, Asset value, prepayment, etc) per bucket.

4. Adjust these drivers to replicate the internal process for model update (Delta EDF/PD, time lag to update ratings or collateral values).

5. Apply these credit drivers to the expected portfolio including changes in:
   - Business strategy (Growth, Exit, Acquisitions).
   - Risk strategy (Appetite for risk, Available Capital, models updates).

6. Calculate the impact of the multiples scenarios, and report based on business buckets.

7. Advise on:
   - Allocation of financial resources to optimize return on risk.
   - Actions to optimize/remedy if appetite for risk or capital limits are exceeded.
2. Strengths and limitations

Point-in-time and forward looking
- More easy to integrate in finance / business planning

Can be used in combination with other portfolio management perspectives
- Historical (backward looking) or forward looking?
- Default based or market based?
- Point-in-time or through the cycle?

Underlying assumptions
- Likewise in modelling, assumptions are multiple and not easy to communicate

Development areas:
- Methodology,
- Technology,
- Governance,
- Connection across risk types,
- Communication
3. Connection with management decisions: 2 different perspectives

**Bank perspective**

- Identify vulnerabilities of the portfolios: captures risks beyond normal market conditions
- Make accessible to a broader audience the difficult subject of risk management
- Evaluate the financial stability of the bank under severe but plausible scenarios
- Assist senior management on allocation of financial resources and planning of mitigation actions

**Regulators perspective**

- Compare results across institutions and industries (banking, insurance, pension funds)
- Assess response time of institutions
- Trace vulnerabilities in the local financial system (systemic risk)
- Lately provide security and a comfortable feeling to the market
3. Connection with internal management decisions

## Risk Planning
- Are the risks within our appetite?
- Where is our portfolio vulnerable?
- How can these risks be mitigated?
- How can we optimize allocation of financial resources?

## Capital Planning
- Are our capital ratios sufficient to remain financially viable?
- How can we bring our ratios back to the desired level?

### Measurement
- Review of appetite for risk
- Sale of positions
- Early risk mitigation

### Management
- Issue new equity or release of RWA
- Contingent capital plans
- Balance-sheet optimization (local/central; tier 1, liquidity, leverage)
CONCLUSION

1) Scenarios / stress tests is one of the various complementary tools to manage portfolio risk.

2) If necessary developments are made, it will probably become the most efficient approach to
   • Connect
     • Risk with Finance and Business decisions,
     • Risk management across risk types,
   • Communicate internally and externally.