



Capital Management Infrastructure

Date: May 2010

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Eurobanking 2010, Utrecht

Objective of capital management

- Assure regulatory capital adequacy at all times
 - Tier 1 ratio = Tier 1 capital / Risk Weighted Assets (RWA)
 - Capital ratio = Total capital / RWA
 - Leverage ratio = Tier 1 capital / Adjusted assets

- Monitor implications on profitability
 - Return on Equity (ROE) = Net income / Shareholders' equity

Previous infrastructure

- Large workbooks of several interlinked spreadsheets
 - Columns for the time dimension (quarterly)
 - Rows corresponding to line items of financial accounts (large number of line items)
 - Development of the line items from quarter to quarter entered directly in the cells or cross-linked to other rows

- Wildly growing trees of versions
 - Different assumptions and scenarios in separate sheets or workbooks
 - Special workbooks for various presentations
 - Lots of redundant data and formulas
 - Ensuring consistency between versions work intensive and prone to errors

- In-transparent and difficult to maintain / update

- Only one user can effectively work with such a model

Understanding the requirements of the tool

- Support the production the forecasts of various time horizons and temporal aggregation
- Allow multiple users update the model and produce output
- Allow for flexibility in the needs for presentations and assumptions
- Flexibility to allow new types of events affecting the capital ratios
- Ensure audit trail and reduce risk of accidental “updates” and errors
- Support answering questions like
 - What are the assumptions of the projections?
 - Exactly what has been included in the projections?
 - What has changed since last presentation? Why?

Design principles

- Design philosophy
 - Simple (apply Occam's razor)
 - Transparent
 - Flexible

- Data management principles
 - Minimize data redundancy
 - Separation of data, calculation and presentation

Understanding the minimum data requirements

- All three regulatory ratios can be calculated using four variables
 - Tier 1 capital
 - Total capital
 - Risk weighted assets
 - Adjusted assets

- Return on equity requires two additional variables
 - Shareholders' equity
 - Net income

- Distinguish between stocks and flows
 - All variables except net income represent stocks (or levels) whereas the net income is one type flow that causes the amount of shareholders' equity, tier 1 capital and total capital to change

Definition of an event as the unit of data

Event ID	0	1	2	3	Projection
Event name	Actual	Profit	M&A	Growth	
Period	0	1	1	1	1
Shareholders' equity	100	15			115
Tier 1 capital	120	15	-20		115
Total capital	150	15	-20		145
Risk weighted assets	750		50	25	825
Adjusted assets	2'500		100	75	2'675
Calculated ratios					
Tier 1 ratio	16.0%				13.9%
Capital ratio	20.0%				17.6%
Leverage ratio	4.8%				4.3%

- An event causes a change in the level of at least one of the (five) stock variables that are monitored. It occurs in one period.
- Synchronize time aggregation with management cycle (monthly data)

Additional data requirements

- Keep an “audit trail” of previous assumptions when updating
 - Never over write old data with new data
- Additional information required to create “audit trail”
 - Record ID
 - Update ID
 - Update date
 - Signature
- Allow all data (stocks and flows) to be stored in the same table
 - Type (stock or flow)
- Facilitate presentation and transparency
 - Category name

Summary of data model

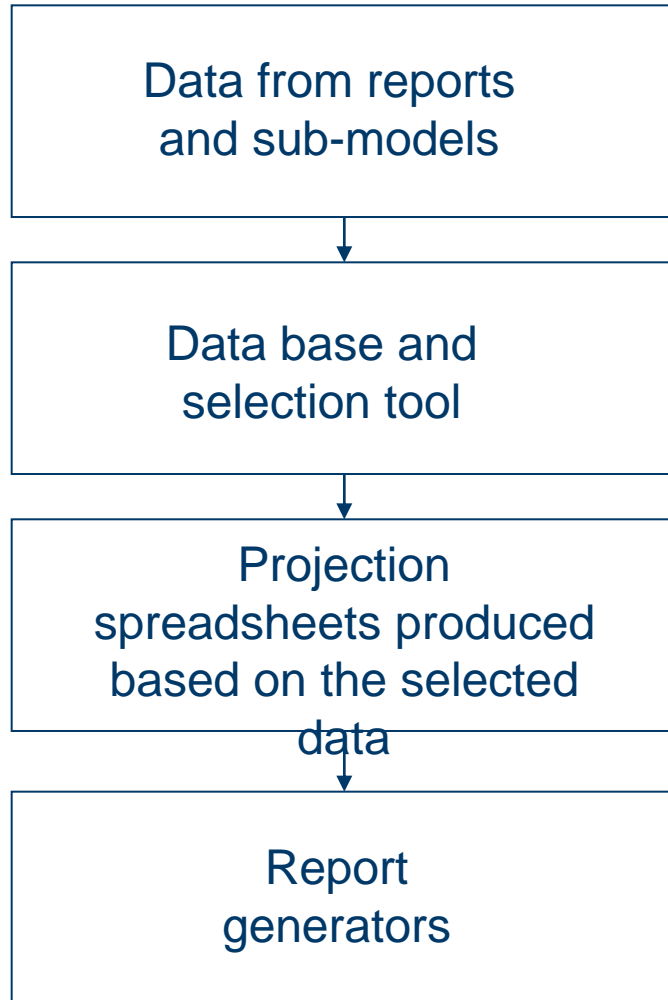
■ Data base information

- Record ID
- Event ID
- Update ID
- Event name
- Category name
- Month
- Type (stock or flow)
- Update date
- Signature

■ Amount or change in the amount of each of the five variables

- Shareholders' equity
- Tier 1 capital
- Total capital
- Risk weighted assets
- Adjusted assets

Overview of system design



- Data from reports and sub-models are stored in a data base
- To produce a forecast for a specific period select latest available updates of relevant events
 - Latest available updates at an earlier point in time could be selected for comparisons and “back testing”
- Use the selected events to automatically produce a set of spreadsheet models for the projections
- Use report generators to produce the desired temporal aggregation and aggregation of events into broader categories

Does it fulfill the requirements?

- Support the production the forecasts of various time horizons and temporal aggregation
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Conclusion

- Allowed development of a more structured process by increasing the transparency and distributed ownership of sub-processes
- Similar design could be used for many other forecasting situations