Definition of IRRBB

31.1 Interest rate risk in the banking book (IRRBB) refers to the current or prospective risk to the bank's capital and earnings arising from adverse movements in interest rates that affect the bank's banking book positions. When interest rates change, the present value and timing of future cash flows change. This in turn changes the underlying value of a bank's assets, liabilities and off-balance sheet items and hence its economic value. Changes in interest rates also affect a bank's earnings by altering interest rate-sensitive income and expenses, affecting its net interest income (NII). Excessive IRRBB can pose a significant threat to a bank's current capital base and/or future earnings if not managed appropriately.

What is a Banking Book?

RBC 25 The Banking book is everything not in the trading book….
….and the Trading Book is positions held for trading intent

Metrics

Two metrics for assessing IRRBB:

1. Value approach – Economic Value of Equity
2. Earning approach – Net Interest Income sensitivity

EVE

Economic value (EV) – the Value Approach/Value Risk

EV estimates the amount by which the NPV of Balance Sheet will change under different future interest rate scenarios

What do you do to calculate EV?

1. Bucket your assets and liabilities into time buckets
2. Gap is the net of assets and liabilities
3. Discount the gap at the current yield curve
4. Shock the yield curve
5. The difference between the current and shocked value is the Economic Value

EVE Economic Value Equity, assumes the equity of the institution is set at overnight. Equity is effectively excluded from the cashflow.

Two Supervisory Outlier Tests under EBA guidelines for EVE. Institutions should inform the regulator when:
- the decline in EVE is greater that 20% of Own Funds under a sudden parallel +/- 200bp shock [regularly at least quarter]
or
- the decline in EVE is greater that 15% of its Tier 1 under any six of he prescribed 6 regulatory scenarios (Early Warning Indicator) [report regularly, at least annually through the ICAAP report]

Net Interest Income sensitivity – The Income Approach/Earnings Risk

Earnings measure attempts to forecast future earnings:

- balance sheet
- Interest-rate
- forecasting horizon

What do you do to calculate NII sensitivity?

1. Consider each asset and liability separately
2. Expected income/expense is modelled/accrued over a chosen time horizon (volume * rate)
3. Expected rate is initially current rate, this will change at next repricing date according to assumption
4. Overall income and expense is Net Interest Income (NII)
5. Calculation repeated using different rate and balance sheet assumptions to give an NII sensitivity

Assumptions play a enormous part in NII sensitivities

1. Dynamic Balance Sheet
2. Behaviour assumptions-prepayment, pipeline
3. Pass through assumptions
4. Modelling of NMDs
5. Provisions and NPEs

Banks generally hedge to the best estimate of likely behaviour so a large portion of risk in banking book is that these assumptions are incorrect

Economic Value

- Simple, transparent
- Not as data heavy (discounted cash flow)
- Assuming repricing is homogenous for all balance sheet items
- Instantaneous shocks
- Gives cost of closure in the short term
- Assumes value is equivalent to NPV of cash flow

Earnings

- Far more data intensive
- Heavily dependent on assumptions and governance
- A lot less transparent
- Considers how each balance sheet items reprices
- Can incorporate futures business into flow
- Shorter time horizon 1-3 years

EVE vs NII

Scope of application: Mandatory for all banks within the scope of application set out in Section III. Content: Quantitative information. Frequency: Annual, as at the bank's financial year-end. Format: Fixed. Accompanying narrative: Commentary on the significance of the reported values and an explanation of any material changes since the previous reporting period.

Table B

Scope of application: Mandatory for all banks within the scope of application set out in Section III.

Content: Quantitative information.

Frequency: Annual, as at the bank's financial year-end.

Format: Fixed.

Accompanying narrative: Commentary on the significance of the reported values and an explanation of any material changes since the previous reporting period.

In reporting currency	***ΔEVE***		***ΔNII***	
Period	**T**	**T–1**	**T**	**T–1**
Parallel up				
Parallel down				
Steepener				
Flattener				
Short rate up				
Short rate down				
Maximum				
Period	**T**		**T–1**	
Tier 1 capital				

Definitions

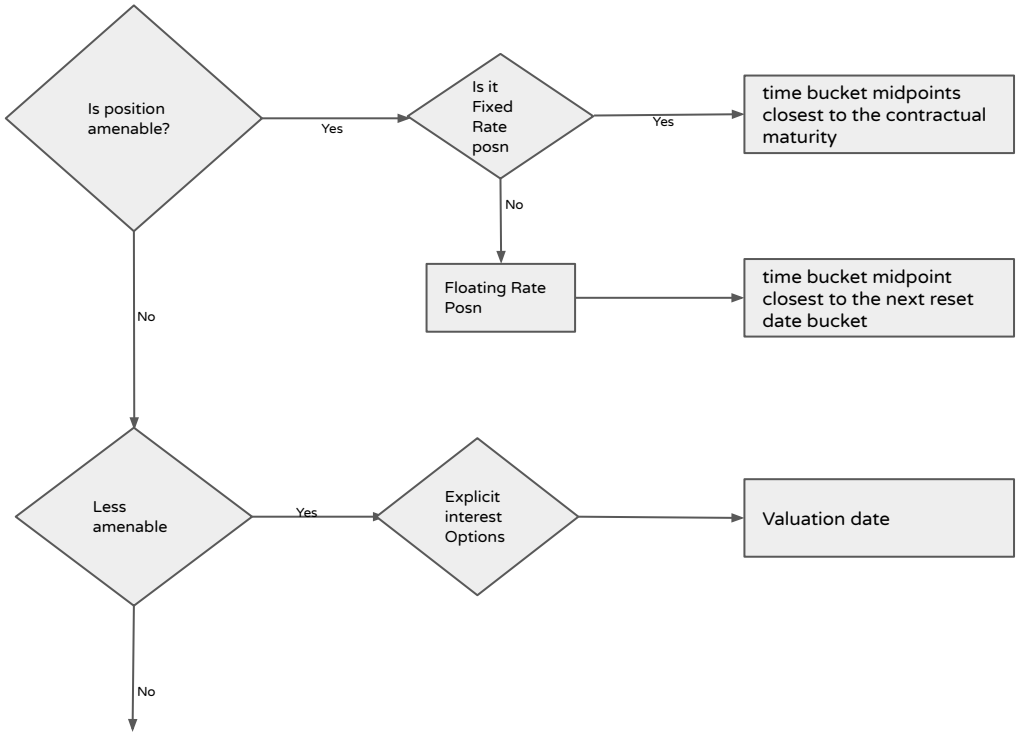
For each of the supervisory prescribed interest rate shock scenarios, the bank must report for the current period and for the previous period:

(i) the change in the economic value of equity based on its IMS, using a run-off balance sheet and an instantaneous shock or based on the result of the standardised framework as set out in Section IV if the bank has chosen to adopt the framework or has been mandated by its supervisor to follow the framework; and

(ii) the change in projected NII over a forward-looking rolling 12-month period compared with the bank's own best estimate 12-month projections, using a constant balance sheet assumption and an instantaneous shock.

Process of slotting and decomposing banking book instruments

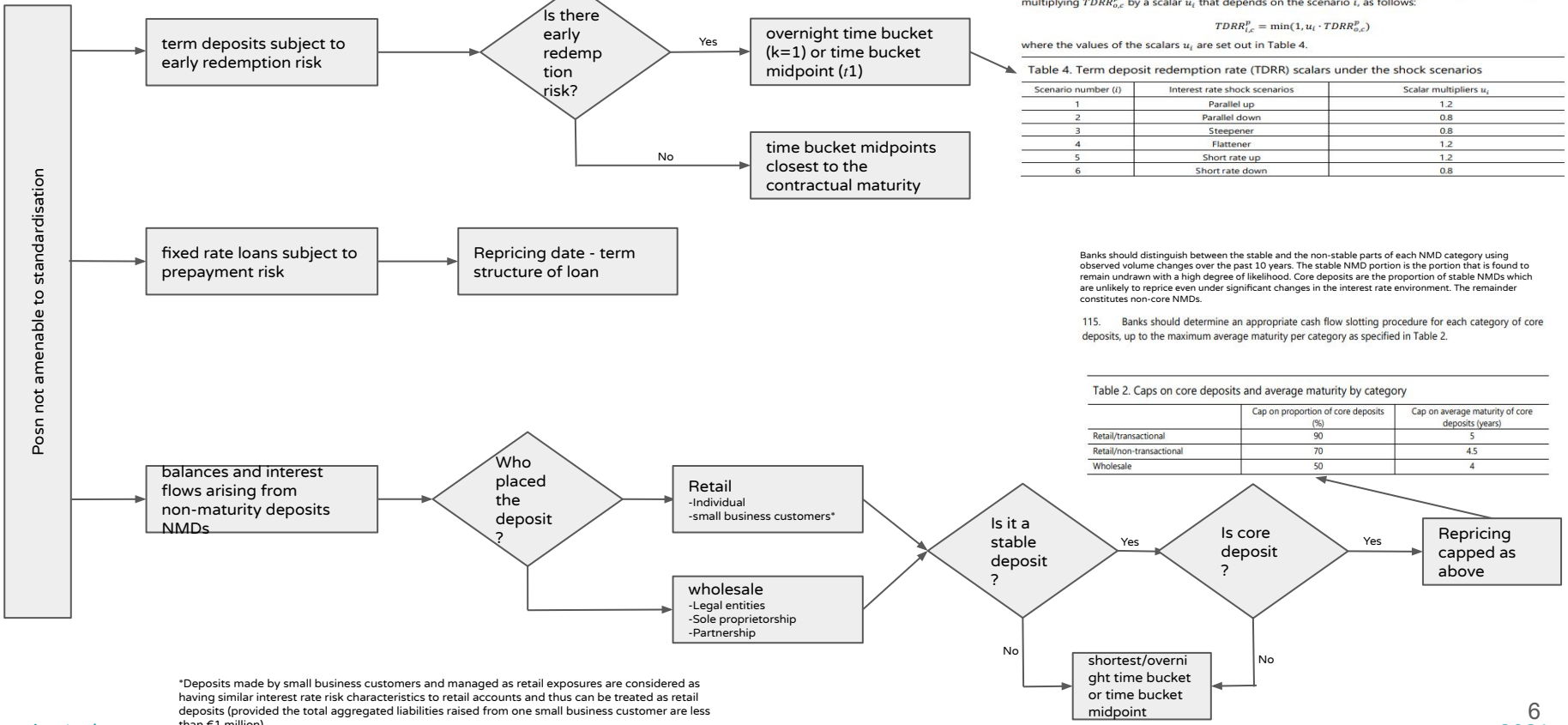
Interest rate-sensitive banking book positions are allocated to one of three categories (ie amenable, less amenable and not amenable to standardisation).



All coupon cash flows and periodic or final principal repayments should be allocated to the time bucket midpoints closest to the contractual maturity

Process of slotting and decomposing banking book instruments

Positions not amenable to standardisation include (i) NMDs, (ii) fixed rate loans subject to prepayment risk and (iii) term deposits subject to early redemption risk.



128. The term deposit redemption ratio for time bucket k or time bucket midpoint t_k applicable to each homogeneous portfolio p of term deposits in currency c and under scenario i is obtained by multiplying $TDRR^{p}_{o,c}$ by a scalar u_i that depends on the scenario i, as follows:

$$TDRR^{p}_{i,c} = \min(1, u_i \cdot TDRR^{p}_{o,c})$$

where the values of the scalars u_i are set out in Table 4.

Table 4. Term deposit redemption rate (TDRR) scalars under the shock scenarios

Scenario number (i)	Interest rate shock scenarios	Scalar multipliers u_i
1	Parallel up	1.2
2	Parallel down	0.8
3	Steepener	0.8
4	Flattener	1.2
5	Short rate up	1.2
6	Short rate down	0.8

Banks should distinguish between the stable and the non-stable parts of each NMD category using observed volume changes over the past 10 years. The stable NMD portion is the portion that is found to remain undrawn with a high degree of likelihood. Core deposits are the proportion of stable NMDs which are unlikely to reprice even under significant changes in the interest rate environment. The remainder constitutes non-core NMDs.

115. Banks should determine an appropriate cash flow slotting procedure for each category of core deposits, up to the maximum average maturity per category as specified in Table 2.

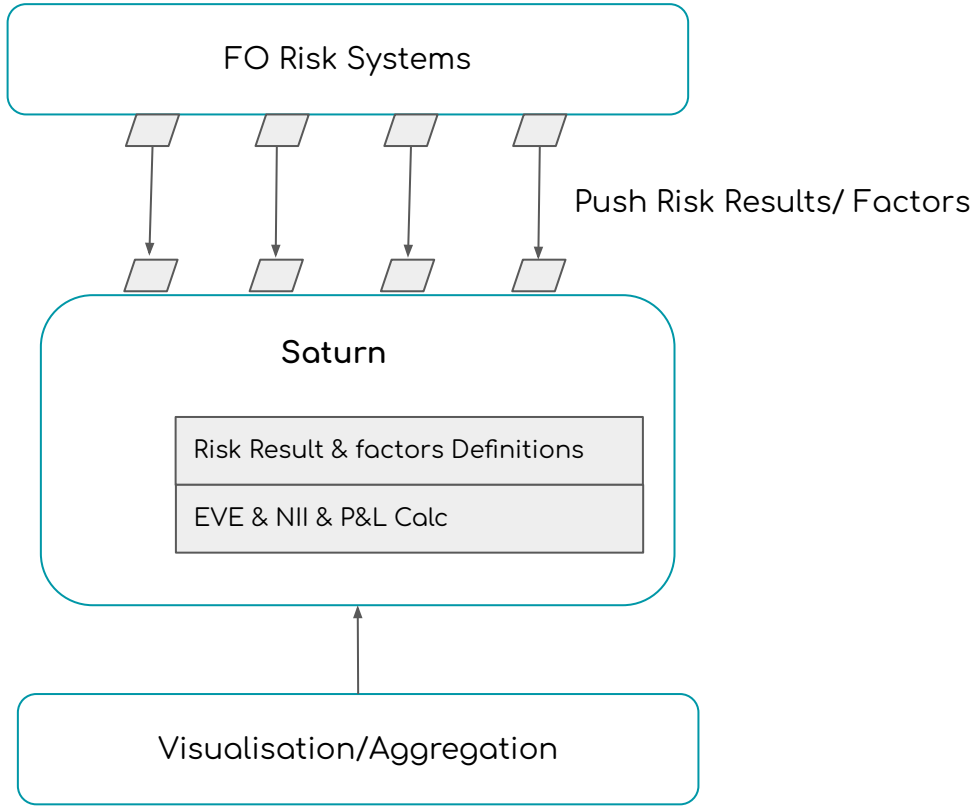
Table 2. Caps on core deposits and average maturity by category

	Cap on proportion of core deposits (%)	Cap on average maturity of core deposits (years)
Retail/transactional	90	5
Retail/non-transactional	70	4.5
Wholesale	50	4

*Deposits made by small business customers and managed as retail exposures are considered as having similar interest rate risk characteristics to retail accounts and thus can be treated as retail deposits (provided the total aggregated liabilities raised from one small business customer are less than €1 million)

How ALFA can help

- Data model with in-built DQ to make sure that input data is complete and correct at source
- Risk result and factor definitions -slotting and decomposing banking book instruments
  - Decision tree
  - Mapping the time buckets as per decision tree
- Calculate EVE & NII & P&L Calc



Risk Class	Risk Type	ALFA Risk Result Type	ALFA Risk Factor Type	P&L Explained
Interest Rates	IR Source Delta/Gamma	Trade.Result.IRSource Rate.Delta	IRSourceRate	Bucket Level = IRSourceRate.Delta (T-1) x [IRSourceRate(T) - IRSourceRate (T-1)] x 1000 **Trade Level = Sum of all buckets**
Interest Rates	IR Zero Delta	Trade.Result.IRZero.De lta	IR Zero Rate	Bucket Level = IRZeroRate.Delta (T-1) x [IRZeroRate(T) - IRZeroRate (T-1)] x 1000 **Trade Level = Sum of all buckets**
Interest Rates	IR Vega	Trade.Result.IR Vega Normal	IRVol.Normal	Bucket Level = IRVega (T-1) x [IRVol.Normal(T) - IRVol.Normal (T-1)] x 100 **Trade Level = Sum of all buckets**
Interest Rates	IR Skew Risk	Trade.Result.IRSkew.D elta	IRSkew	Bucket Level = IRSkew.Delta (T-1) x [IRSkew(T) - IRSkew (T-1)] x 100 **Trade Level = Sum of all buckets**
FX	FXSpot.Delta	Trade.Result.FXSpot.D elta	FXSpot	FXSpot.Delta (T-1) x [FXSpot(T) - FXSpot(T-1)]
FX	FXVega	Trade.Result.FXVega	FXVol	FXVega (T-1) x [FXVol(T) - FXVol(T-1)] x 100

Business Date	BookId	TradeId	Trade Type	Risk Factor name	Tenor Type	Tenor	CCy	Risk Result (T-1)	Risk Factor (T)	Risk Factor (T-1)	P&L Explained
15-10-2021	BK123	TRN123XYZ	IRSwap	USD	USD	1M	USD	**1000**	**0.2**	**0.1**	**100**

Error Handling

- ★ If no risk factors for T-1, still run the P&L explained and propogate all other attributes