

**ALMA**  
ASSET & LIABILITY MANAGEMENT ASSOCIATION

**IRRBB :**  
**Decomposing the Risks**

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14<sup>th</sup> June 2019



# IRRBB: DtR - Contents

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- Objectives
- Background (brief)
- Differing Measurement Methodologies for EVE
- The Case for pure Risk-Free-Rate (RFR) EVE
- Measuring other “IRRBB” Risks
- Conclusions

# IRRBB: DtR - Objectives

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To consider,

- Is doing IRRBB “per the regs” a suitable way to manage your risks?
- Is IRRBB trying to capture too many risk-types in one metric?
- Considering the methodologies for computing EVE.
- How and why do I think about the risks independently?

# IRRBB: DtR – (brief) Background

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## The Why?

- Too many ‘black boxes’?
- Intent to ensure comparison across firms.
  - Shock levels
  - Disclosures
  - Updated standard outlier test
- Strengthening risk management practices
- BCBS368 : Interest Rate Risk in the Banking Book
- Adoption, RTS, Publication (voluntary qualitative disclosures in advance).

# IRRBB: DtR – (brief) Background

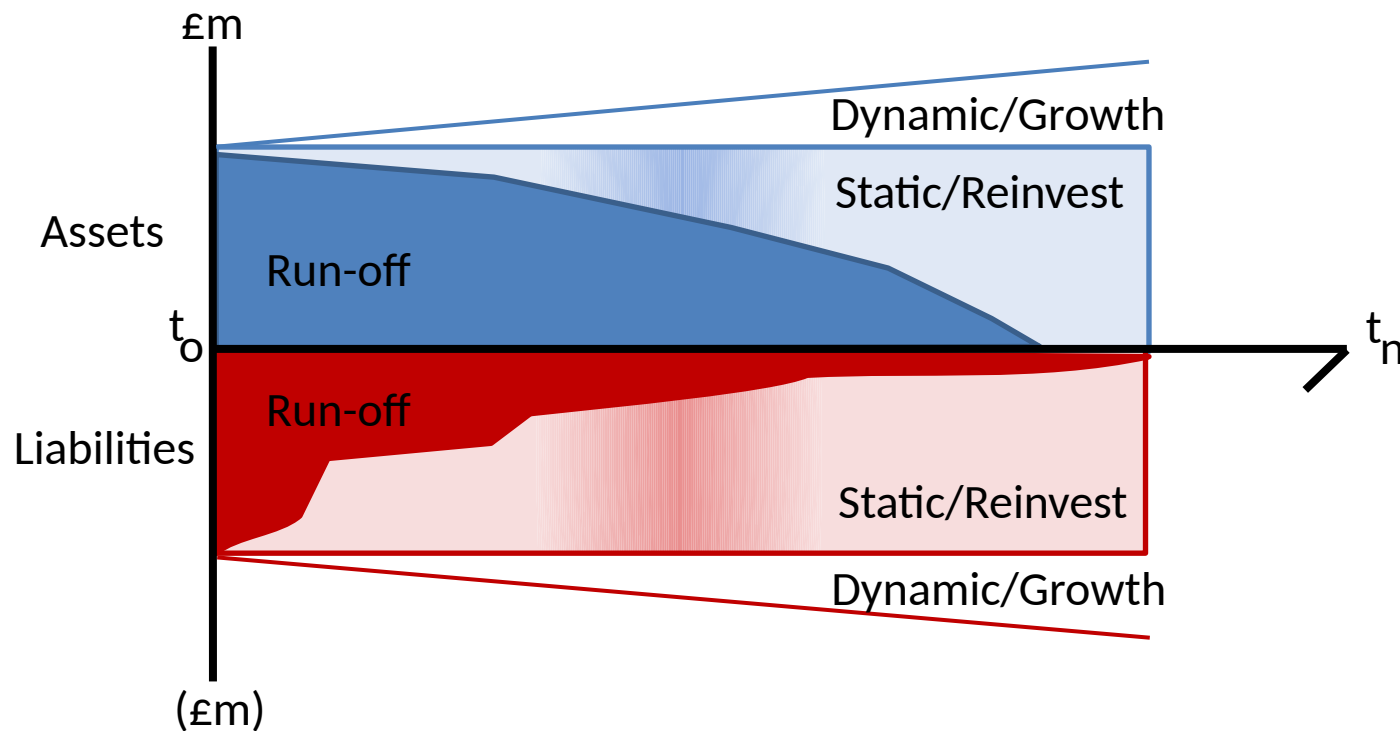
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## The What?

- Compute EVE under base case and 6 interest rate shock scenarios – run off balance sheet.
- Compute NII in base case and (at least) 2 parallel shock scenarios – static reinvestment balance sheet.
- Consider risks under a ‘dynamic’ balance sheet.
- Not directly used for P2A capital, but SOT compliance (or add on?) – gone concern basis.
- Strengthen governance of IRRBB (to board).

# IRRBB: DtR – (brief) Background

## Run-off vs. Static vs. Dynamic Balance Sheets



# IRRBB: DtR – EVE Measures

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- Methodologies for modelling future cashflows and discount factors for measuring EVE changes.
- Some simplified maths!
- I'm going to assume we're risk averse (well-hedged).

# IRRBB: DtR – EVE Measures

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Basics of EVE,

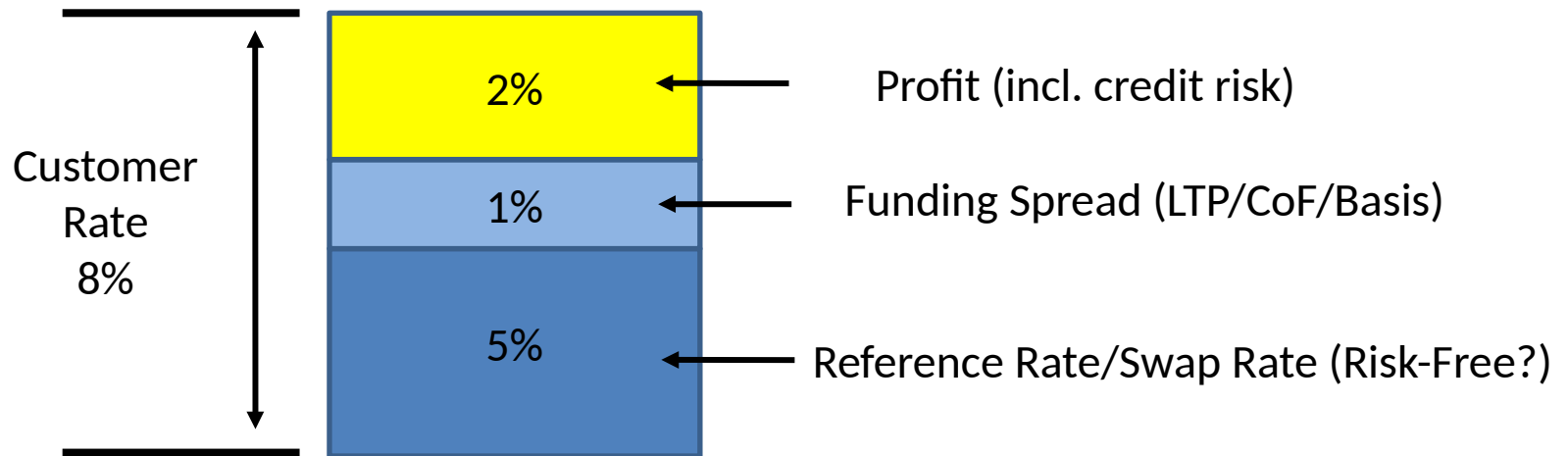
- Forecast future cashflows – at current rates.
- Run-off balance sheet
- Discount back future cashflows to establish a PV
- Shock interest rates
- Discount back (new) future cashflows with new DFs
- Measure the change in value



# IRRBB: DtR – EVE Measures

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Cashflow and discounting choices – Recap.



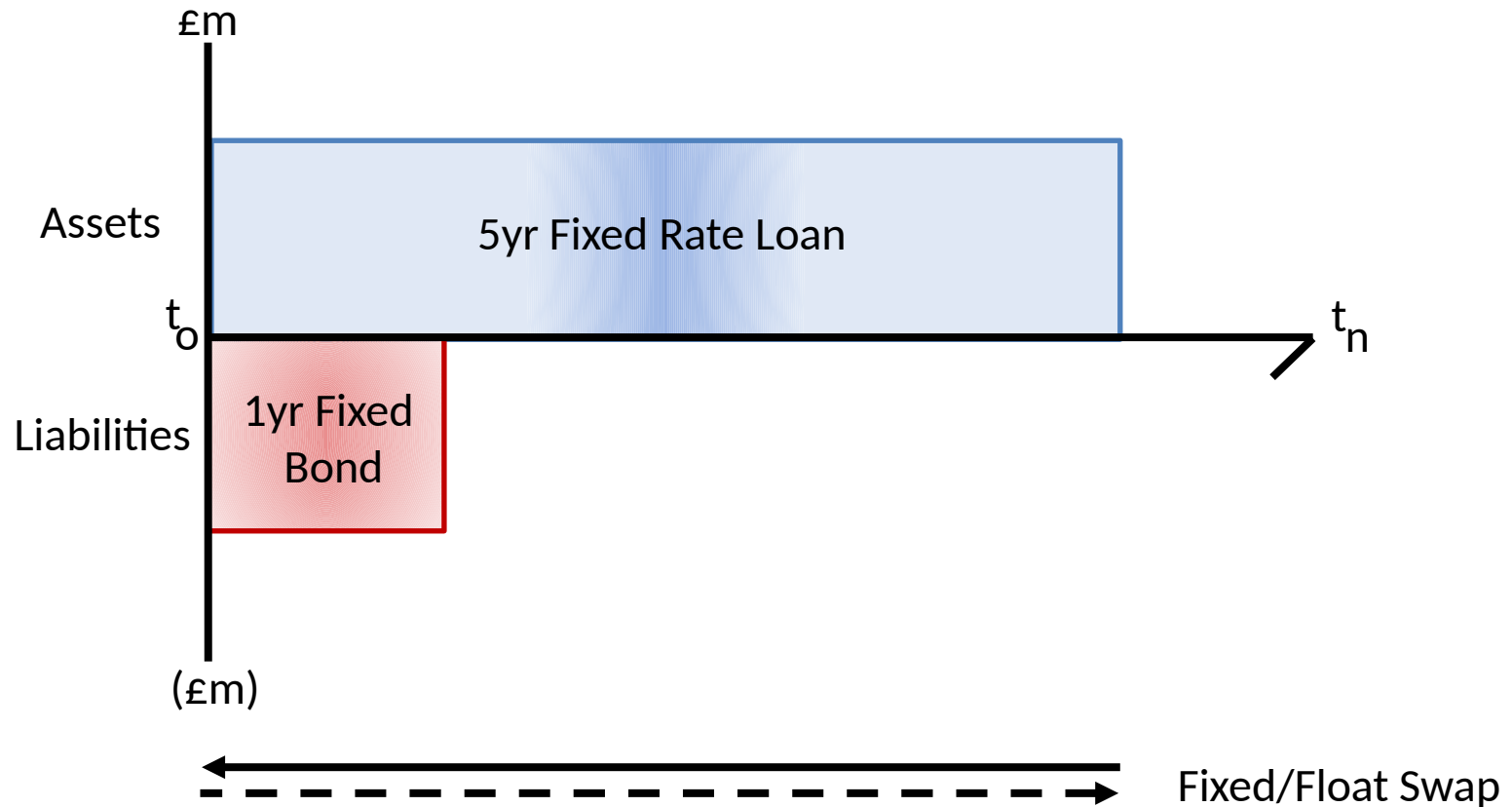
# IRRBB: DtR – EVE Measures

Cashflow and discounting choices – Recap.

Cash-flow Components	Term of Cash-Flows	Discounting Curve
Full Customer Rate	Ultimate Maturity	Risk Free Curve (Sonia)
Risk-Free-Rate + Funding Spread	Fixed Rate Period Only	Risk Free Curve (Libor)
Risk Free Rate Only	Next Reset Date	Risk Free + “Other” Margin Components e.g. term premia

# IRRBB: DtR – The Case for RFR

Worked Example (simplified).



# IRRBB: DtR – The Case for RFR

## Worked Example (simplified)

CF = Full Rate

DF = RFR

	Rate	1	2	3	4	5	Total
Loan	7%	7.00	7.00	7.00	7.00	107.00	135.00
Deposit	5%	(105.00)					(105.00)
Pay Fix	5%	(5.00)	(5.00)	(5.00)	(5.00)	(105.00)	(125.00)
Rec Float	5%	105.00					105.00
Net Gap		2.00	2.00	2.00	2.00	2.00	10.00
PV	YC = 5% Flat	1.90	1.81	1.73	1.65	1.57	8.66
PV	YC = 7% Flat	1.87	1.75	1.63	1.53	1.43	8.20
							Change
							(0.46)

	Rate	1	2	3	4	5	Total
Loan	9%	9.00	9.00	9.00	9.00	109.00	145.00
Deposit	5%	(105.00)					(105.00)
Pay Fix	5%	(5.00)	(5.00)	(5.00)	(5.00)	(105.00)	(125.00)
Rec Float	5%	105.00					105.00
Net Gap		4.00	4.00	4.00	4.00	4.00	20.00
PV	YC = 5% Flat	3.81	3.63	3.46	3.29	3.13	17.32
PV	YC = 7% Flat	3.74	3.49	3.27	3.05	2.85	16.40
							Change
							(0.92)

Change due to profit margin; the more profitable, the greater the issue.

# IRRBB: DtR – The Case for RFR

## Worked Example (simplified)

	Rate	1	2	3	4	5	Total
Loan	7%	7.00	7.00	7.00	7.00	107.00	135.00
Deposit	6%	(106.00)					(106.00)
Pay Fix	5%	(5.00)	(5.00)	(5.00)	(5.00)	(105.00)	(125.00)
Rec Float	5%	105.00					105.00
Net Gap		1.00	2.00	2.00	2.00	2.00	9.00
PV	YC = 5% Flat	0.95	1.81	1.73	1.65	1.57	7.71
PV	YC = 7% Flat	0.93	1.75	1.63	1.53	1.43	7.27
						Change	(0.44)

CF = Full Rate  
(with depo margin)

DF = RFR

Ignores future  
liability margin due  
to run-off B/S

	Rate	1	2	3	4	5	Total
Loan	7%	7.00	7.00	7.00	7.00	107.00	135.00
Deposit	6%	(106.00)	(1.00)	(1.00)	(1.00)	(1.00)	(110.00)
Pay Fix	5%	(5.00)	(5.00)	(5.00)	(5.00)	(105.00)	(125.00)
Rec Float	5%	105.00					105.00
Net Gap		1.00	1.00	1.00	1.00	1.00	5.00
PV	YC = 5% Flat	0.95	0.91	0.86	0.82	0.78	4.33
PV	YC = 7% Flat	0.93	0.87	0.82	0.76	0.71	4.10
						Change	(0.23)

Closer to the truth,  
but not run-off!

# IRRBB: DtR – The Case for RFR

## Worked Example (simplified)

CF = RFR Component

DF = RFR

	Rate	1	2	3	4	5	Total
Loan	5%	5.00	5.00	5.00	5.00	105.00	125.00
Deposit	5%	(105.00)					(105.00)
Pay Fix	5%	(5.00)	(5.00)	(5.00)	(5.00)	(105.00)	(125.00)
Rec Float	5%	105.00					105.00
Net Gap		0.00	0.00	0.00	0.00	0.00	0.00
PV	YC = 5% Flat	0.00	0.00	0.00	0.00	0.00	0.00
PV	YC = 6% Flat	0.00	0.00	0.00	0.00	0.00	0.00
						Change	0.00

Fully hedged IRR  
= zero change

	Rate	1	2	3	4	5	Total
Loan	5%	5.00	5.00	5.00	5.00	105.00	125.00
Deposit	5%	(105.00)					(105.00)
Pay Fix	5%						0.00
Rec Float	5%						0.00
Net Gap		(100.00)	5.00	5.00	5.00	105.00	20.00
PV	YC = 5% Flat	(95.24)	4.54	4.32	4.11	82.27	0.00
PV	YC = 7% Flat	(93.46)	4.37	4.08	3.81	74.86	(6.33)
						Change	(6.33)

Unhedged IRR  
= change purely due to  
policy rate expectations

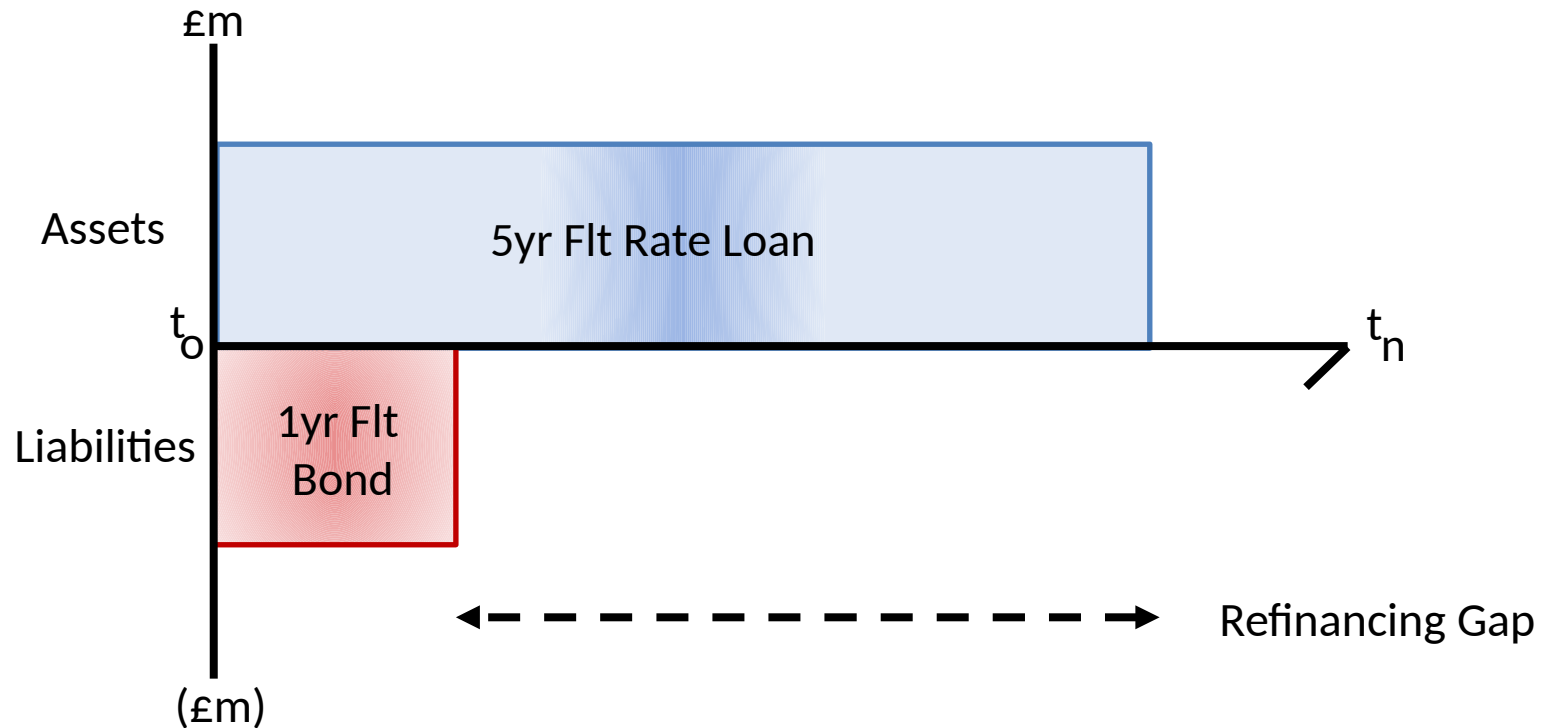
# IRRBB: DtR – The Case for RFR

Cashflow and discounting choices – Recap.

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Risk Free Rate Only	Next Reset Date	Risk Free + “Other” Margin Components e.g. term premia

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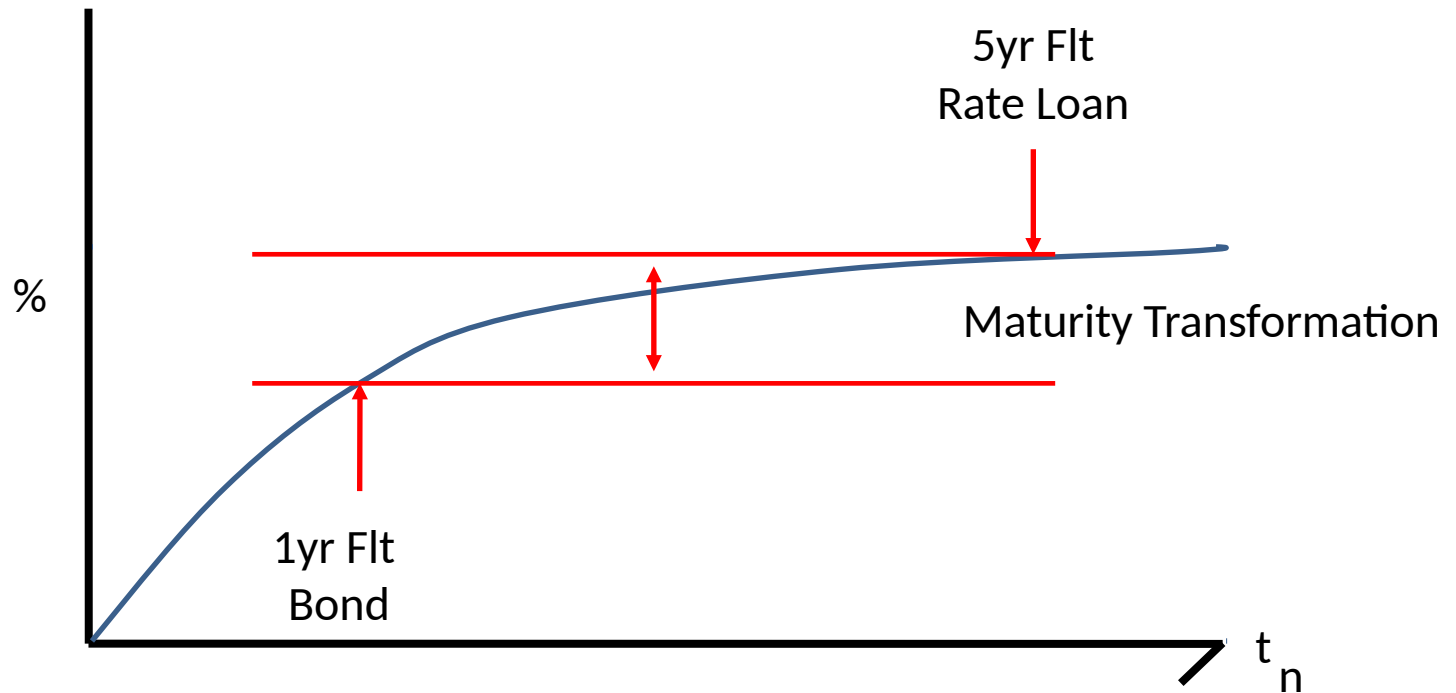
Worked Example (simplified).





# IRRBB: DtR – The Case for RFR

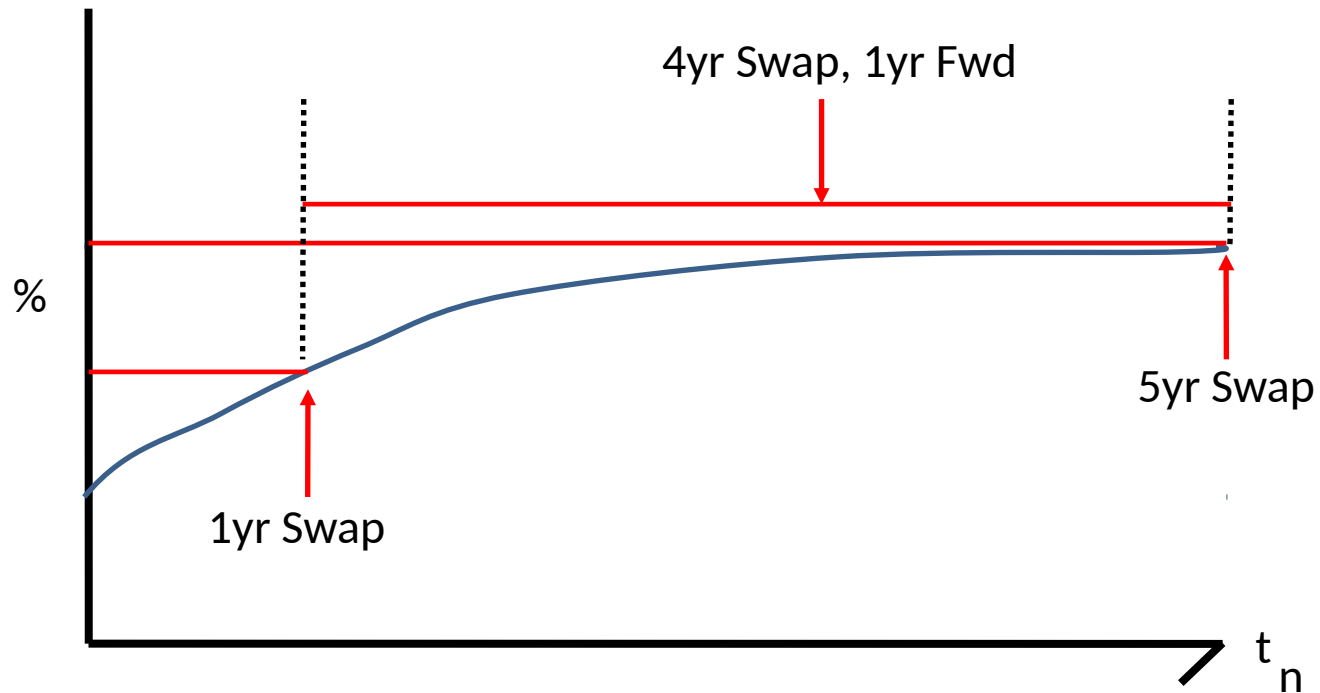
## Example Funding Curve



Maturity Transformation = profit, which creates EVE noise

# IRRBB: DtR – The Case for RFR

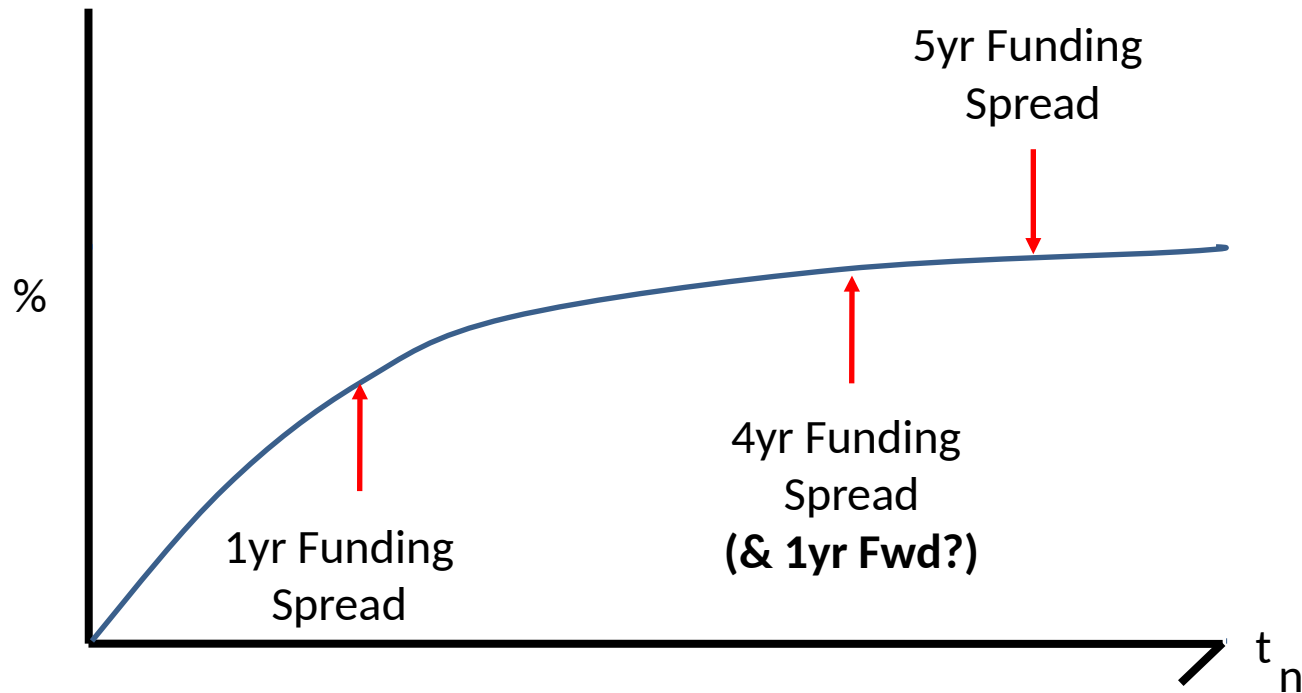
## Example IR Curve



Rolling through time on a risk-free- interest rate yield curve is very different from...

# IRRBB: DtR – The Case for RFR

## Example Funding Curve



....rolling through time on a funding spread curve. My liquidity preference – for a same tenor - doesn't necessarily increase forward in time.

# IRRBB: DtR – The Case for RFR

Cashflow and discounting choices – Recap.

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Risk Free Rate Only	Next Reset Date	<u>Risk Free + “Other” Margin Components</u> <u>e.g. term premia</u>

...and now the term of cash-flows choice doesn't really matter...

# IRRBB: DtR – Other IRRBB Risks

Outright Interest Rate Risk	Margin / Earnings Risk	Refinancing Risk	Basis Risk
Risk of a change in policy rate expectations	The risk to income of competitive landscape	Refinancing cost risk / Term mismatch	Risk in a relative change in two rate indices
IRRBB EVE Model, fixed period, using RFR only	NII modelling, Financial Planning	NII Scenario Modelling	Run-off B/S, akin to IRRBB EVE but for floating

P2A  
Hedgeable

P2B

P2B

P2A  
Hedgeable  
(Base vs. Sonia?)

# IRRBB: DtR - Conclusions

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- IRRBB suitably captures risk measures you can manage to, as long as you decompose them; EVE for outright risk only, NII for the rest.
- Basis and Outright risks are hedgeable – measure them separately from ‘business model’ risk measurement.
- BCBS368 doesn’t prescribe a basis risk methodology, but your IRRBB solution could help.
- System restraints – be careful with the EVE results if the RFR only component isn’t available.
- CSRBB?