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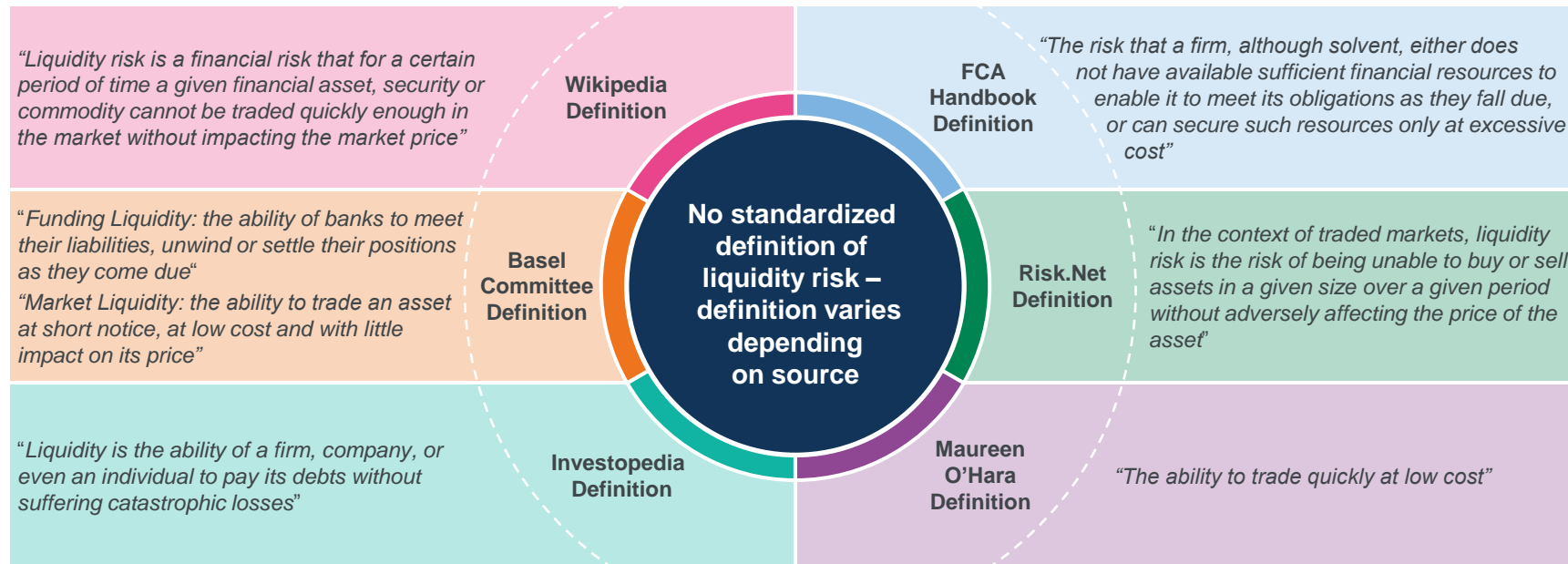
Liquidity Risk Optimisation for UK Insurers

Mark Jordan, Aviva UK

Ben Mabley, Goldman Sachs



What is Liquidity Risk?

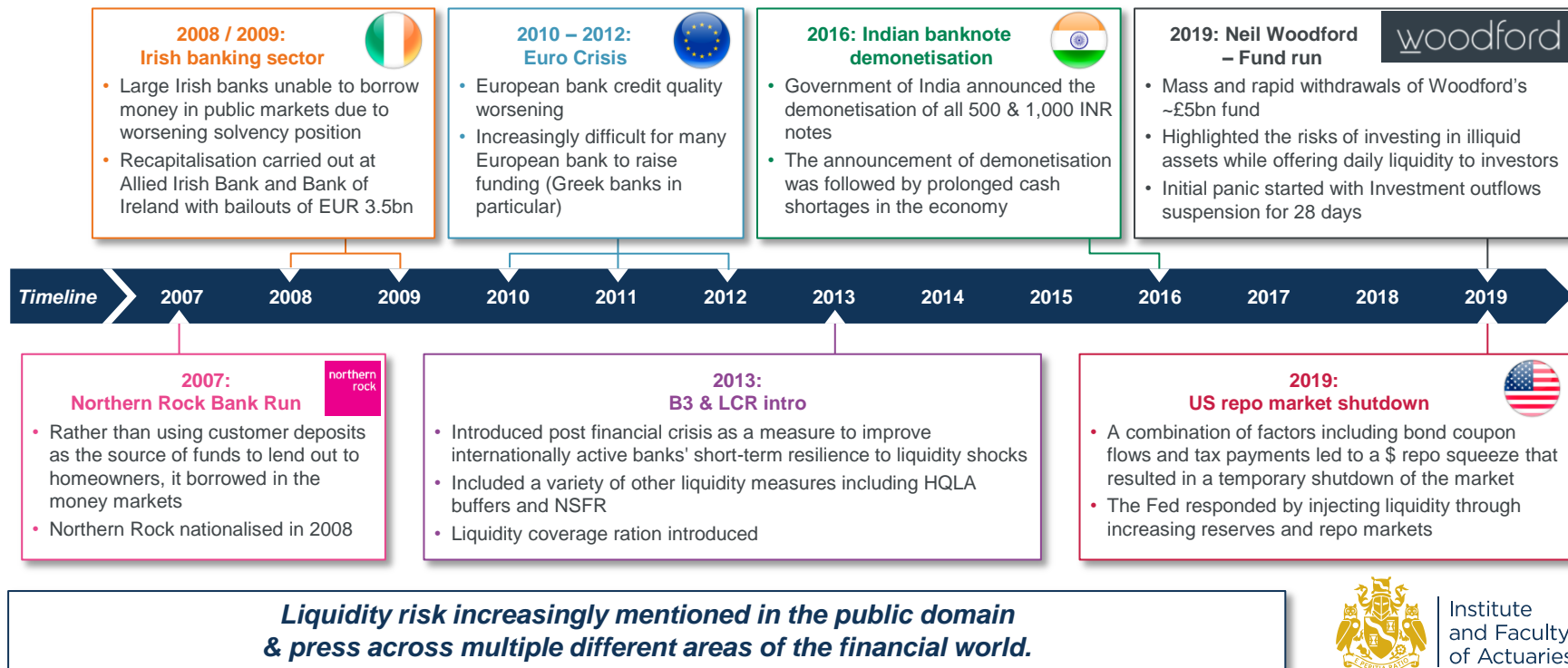


**Liquidity can take many different facets such as;
market liquidity (interbank and asset market), funding liquidity and central bank liquidity.**

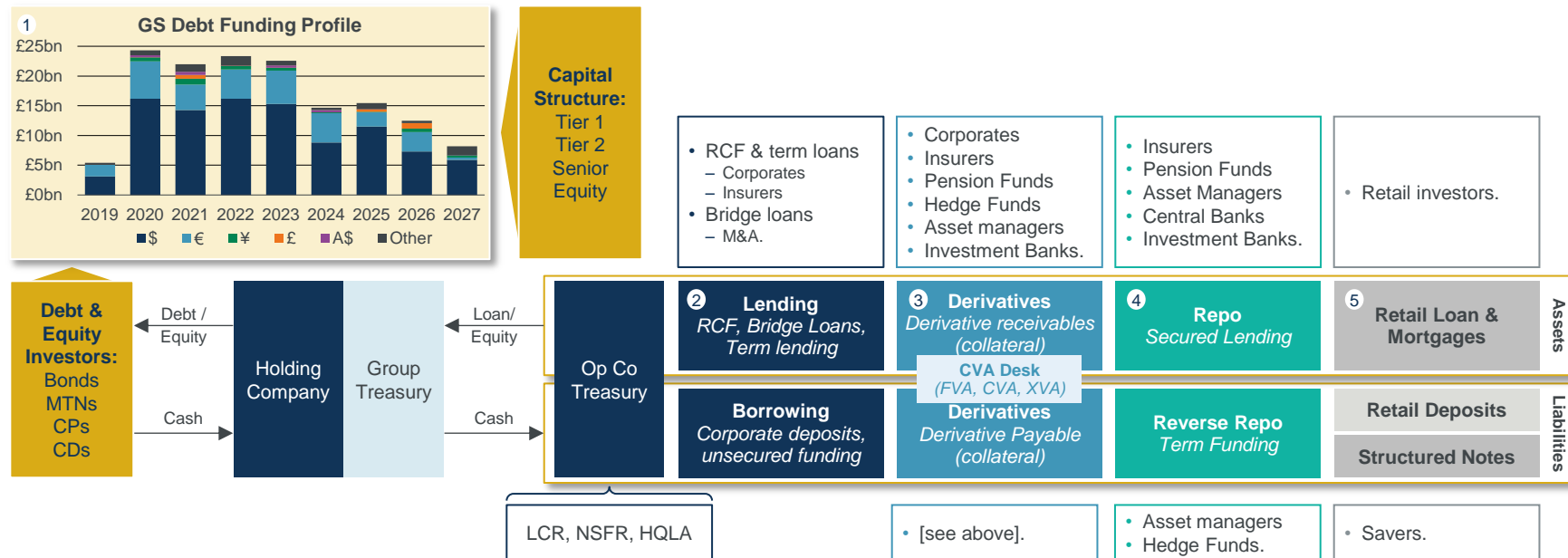


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Liquidity risk – A Trip Through Modern History...



Liquidity Risk Management – A Bank's Perspective

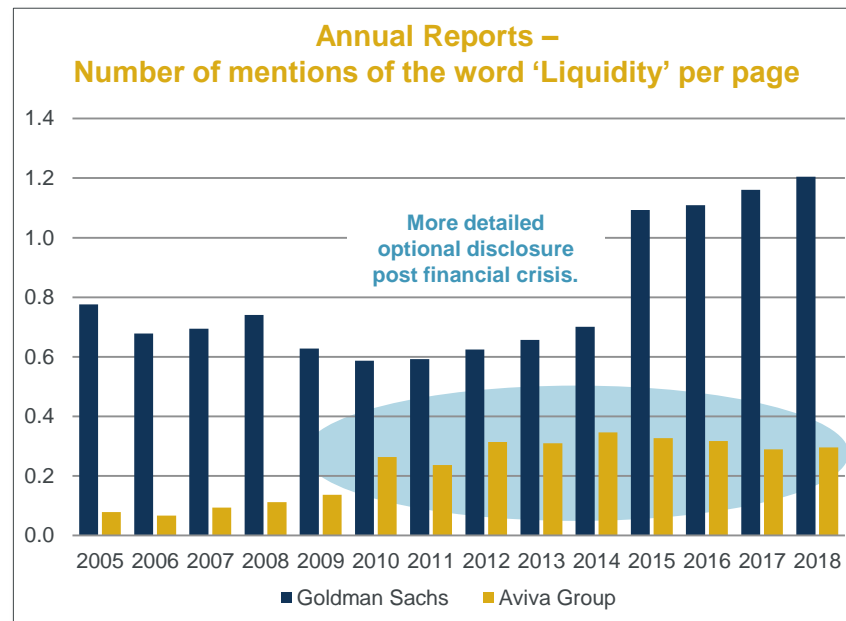
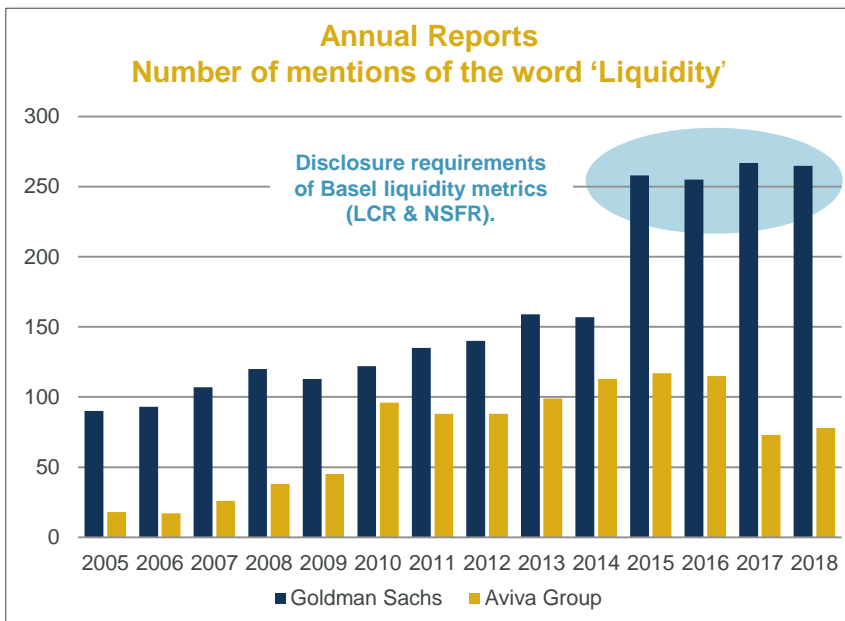


Every bank runs its liquidity & funding profile in a different manner – no one size fits all. Management of liquidity risk has become increasingly complex and is split between multiple departments.



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How Important is Liquidity Risk to Banks & Insurers?



General trend since the financial crisis for both banks & insurance companies to increase the quantum & detail of disclosure with respect to liquidity risk.



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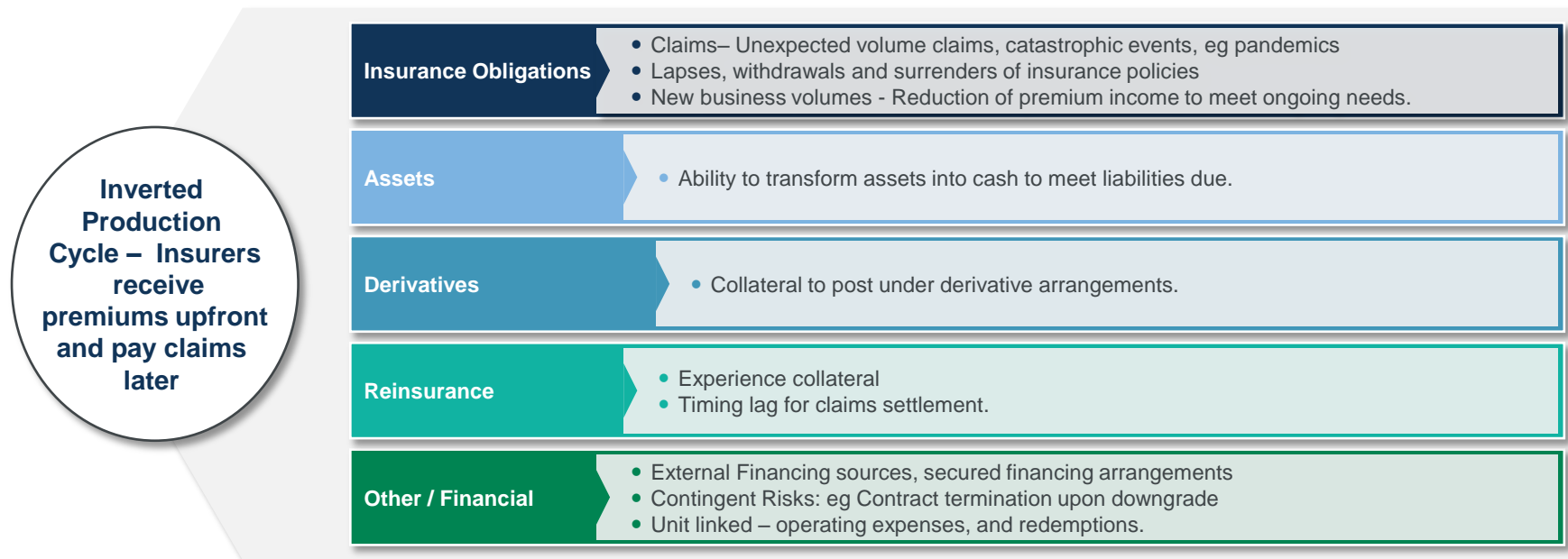
Liquidity Risk Quantification – A Bank's Perspective

Ratio	① Funding Valuation Adjustment ('FVA')	② Liquidity Coverage Ratio ('LCR')	③ Net Stable Funding Ratio ('NSFR')
Formula	Expected funding cost of entering into a derivative over its full lifetime	$\frac{\text{HQLA}}{\text{Total net cash flow amount}}$	$\frac{\text{Available amount of stable funding}}{\text{Required amount of stable funding}} > 100\%$
Numerator considerations	N/A	<ul style="list-style-type: none"> Includes HQLA level 1 [100% weighting], 2A [85% weighting] & 2B [75 / 50% weighting] 	<ul style="list-style-type: none"> Different weightings for different forms of available stable funding (100% / 95% / 90% / 50% / 0%)
Denominator considerations		<ul style="list-style-type: none"> Total net cash outflows = Total cash outflows – min [total cash inflows, 75% of gross outflows] Calculated over 30 day period 	<ul style="list-style-type: none"> Different weightings for different forms of required stable funding (100% / 85% / 65% / 50% / 15% / 10% / 5% / 0%)
Time period	Projected lifetime of derivative	30 day stress period	Average over 1 year
Disclosed?	In some cases - Implicitly part of balance sheet	Yes	Yes
Introduced?	1 st January 2013	1 st January 2015	1 st January 2018
Minimum Requirement	N/A	Step-up affect from [60%] in 2015 to [100%] in 2019	>100%

HQLA		
Level 1	Level 2	Level 3
Coins & bank notes Sovereign / central bank Central bank reserves	Some sovereign / central bank Corporate debt (AA- & above) Covered bonds (AA- & above)	Qualifying RMBS Corporate debt (A+ to BBB-) Qualifying common equity shares



Potential Causes of Liquidity – Insurer's Perspective



Understanding Liquidity Risk – why is it topical?

Illiquid Assets

- Recent trend for investing in illiquids has been particularly marked for annuity providers
- Incentivised by the search for yield (in a low rates and spread environment); and matching adjustment benefit to invest in illiquid assets that match long-dated liabilities

Group Fungibility

- Particularly Matching Adjustment portfolios for life insurers, assets are effectively ring-fenced and not available to meet other liabilities

Derivative Activity

- Insurers can enter into derivatives to manage their exposure (typically interest rate, inflation & cross currency swaps)
- Increased derivative use, for example cross-currency of non-GBP assets
- Liquidity for collateral margining - EMIR Mandatory Central Clearing
- Firms investing in overseas assets for increased returns, volumes and diversification. Needs to be [???

Pension Reform

- Abolition of compulsory annuitization (2014 Budget)
- Increases likelihood of surrenders of pensions savings products.



Liquidity Risk Management Framework

Solvency I

- Prudent' valuation of liabilities reflecting accounting practices
- Simplistic capital requirements
- No provision for risk review
- Liquidity Risk approach
- Liquidity Risk not included.

Solvency II

Risk Based Approach

- Firms must identify and manage their risks and have adequate capital to support those risks

Liquidity Risk Approach:

- Quantitative: Not incorporated into the standard formula
- Qualitative: Article 132: Prudent Person Principle: which requires firms "to ensure the security, quality, [and] liquidity...of the firm as a whole".

Supervisory Statements SS5/19

Liquidity Risk Management Framework

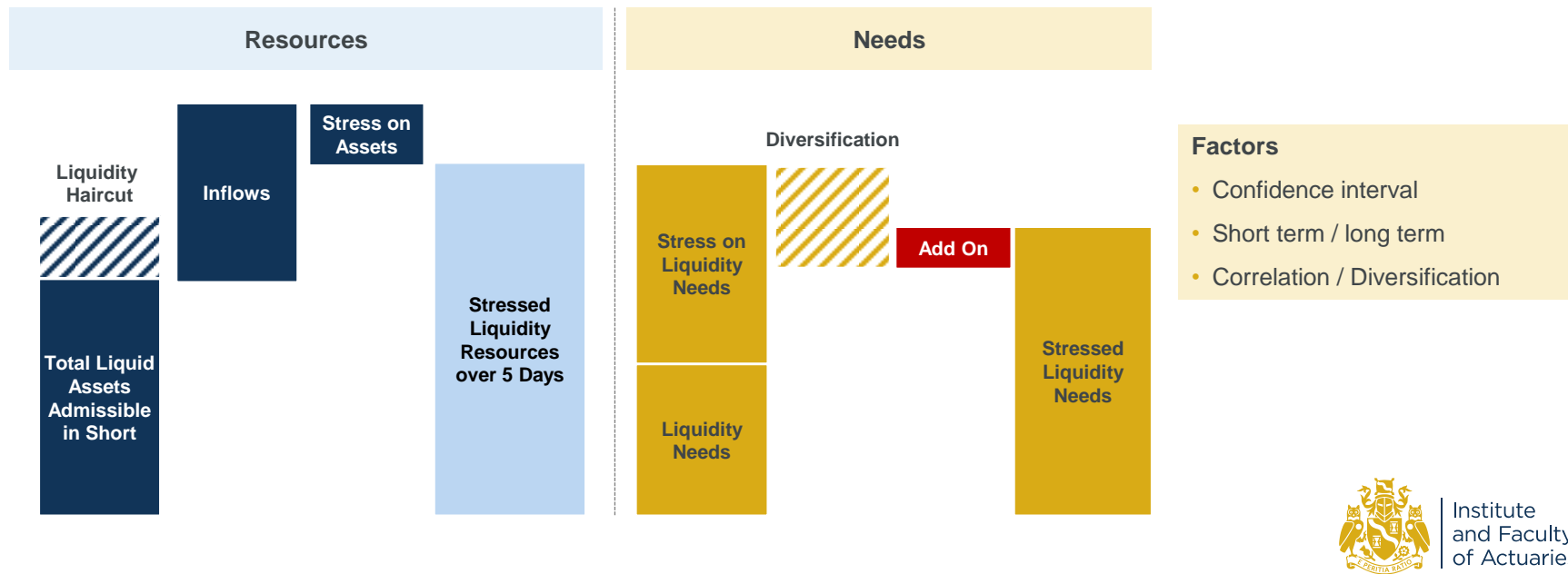
- Systems, controls and processes
- Identification of material liquidity risk drivers
- Scenario analysis and stress testing
- Liquidity Buffer
- Quantitative metrics and tools for measuring and monitoring liquidity risk drivers
- Effective contingency planning.



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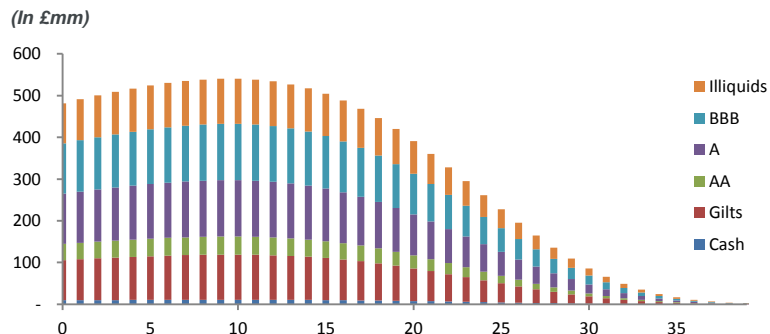
Liquidity Metrics

- **Liquidity Buffer:** Excess of Stressed Liquidity Resources over Stressed Liquidity Requirements
- **Liquidity Coverage Ratio:** Stressed Liquidity Resources / Stressed Liquidity Requirements

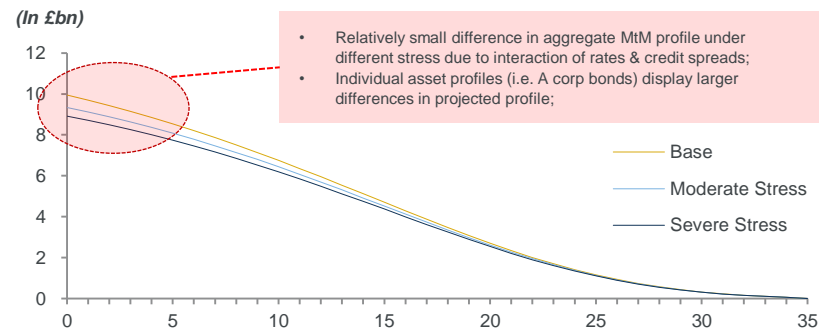


Quantifying Liquidity Risk (I)

Annuity Fund - Cash flow Profile



Annuity Fund – Projected Asset MTM Profile



Asset Class	GBP	USD	Rate Spread	Credit Spread
Cash	100%	0%	100bps	0bps
Gilts	100%	0%	100bps	25bps
AA	100%	0%	100bps	75bps
A	50%	50%	100bps	125bps
BBB	50%	50%	100bps	200bps
Illiquid	100%	0%	100bps	225bps

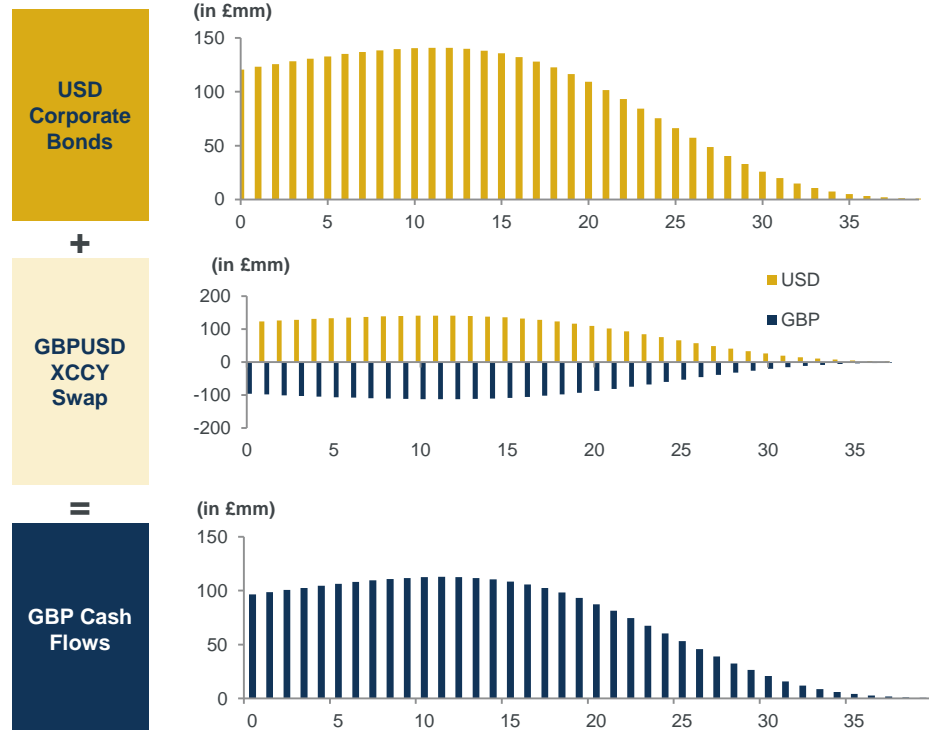
Scenario	Rates (in bps)			Credit Spreads (in bps)			
	USD LIBOR	GBP LIBOR	Swap spread	AA	A	BBB	illiquid
Moderate Stress	-100	-75	-	+100	+150	+200	+225
Severe Stress	-250	-150	-	+200	+300	+400	+450

We define an annuity fund profile with a PV of £10bn and using a matching adjustment rate of 100bps.

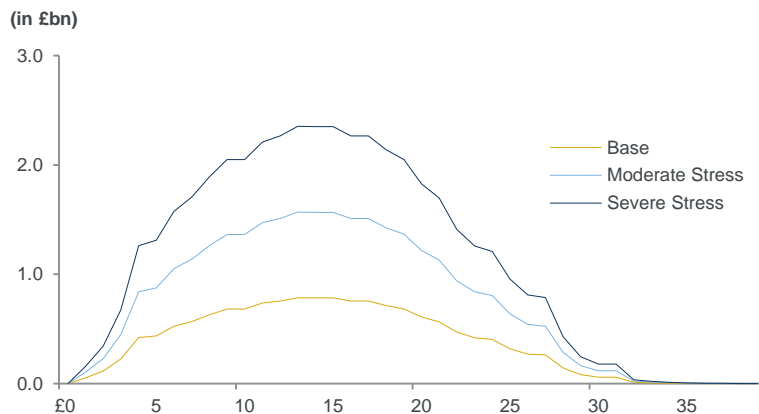


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Quantifying Liquidity Risk (II)



Illustrative Projected Cross-Currency Swap MTM Profiles



Risk	Sensitivity
Spot FX	~£35mm / 1%
GBP Rates	~\$5mm / bp
USD Rates	~\$5mm / bp
XCCY Basis	~\$5mm / bp

XCCY swap format.

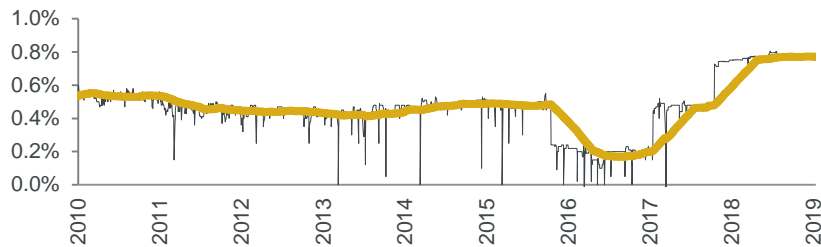
- Non-resettable format;
- Proceed asset swap to term;
- Non-default adjusted CFs swapped back to term



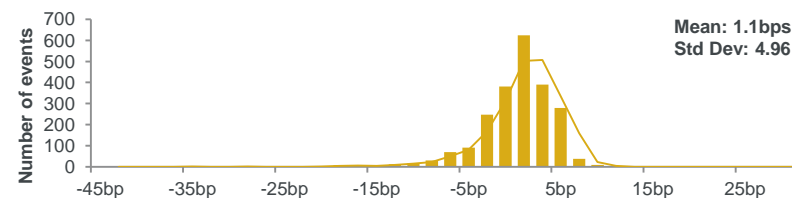
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Measuring Liquidity – Funding Rate / Repo Rate

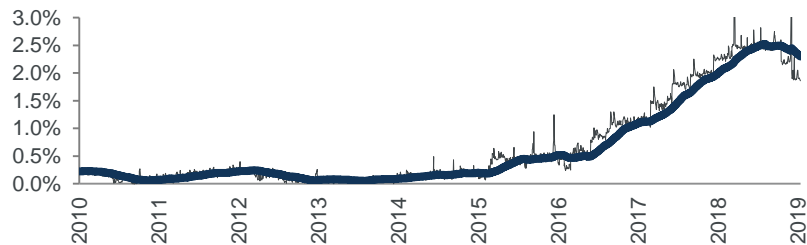
Gilt Overnight Funding



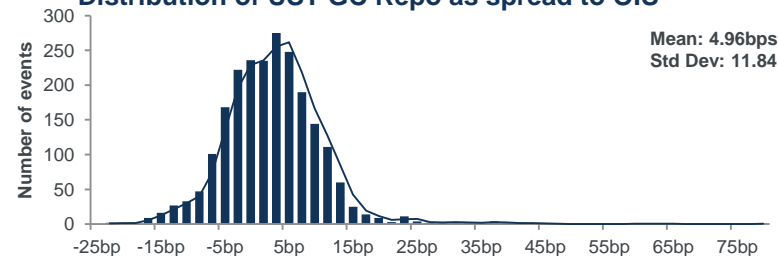
Distribution of UKT GC Repo as spread to OIS



US Treasury Overnight Funding



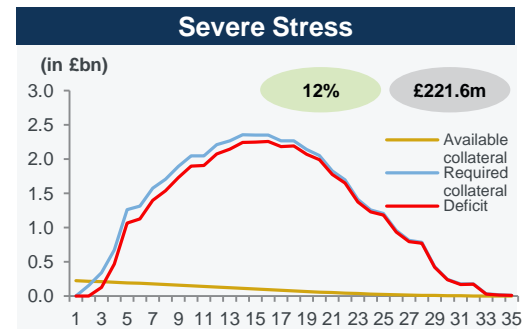
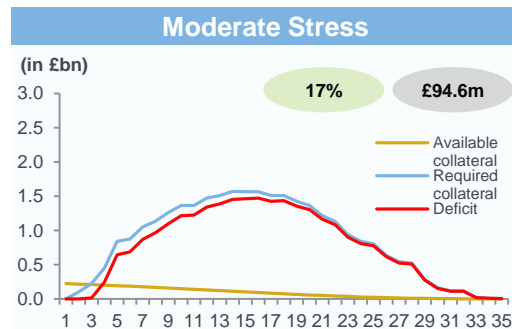
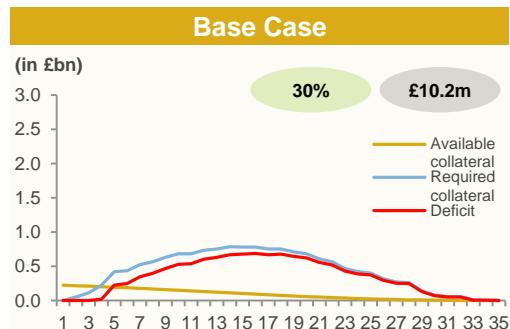
Distribution of UST GC Repo as spread to OIS



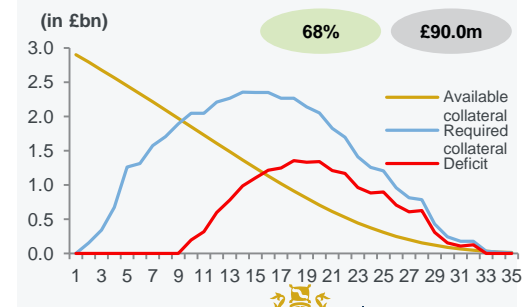
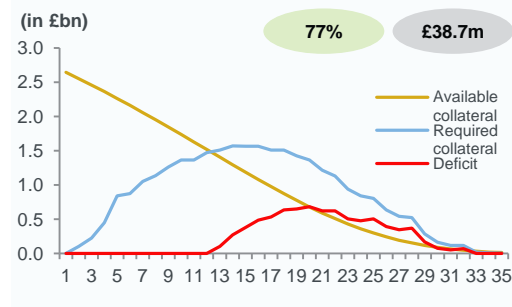
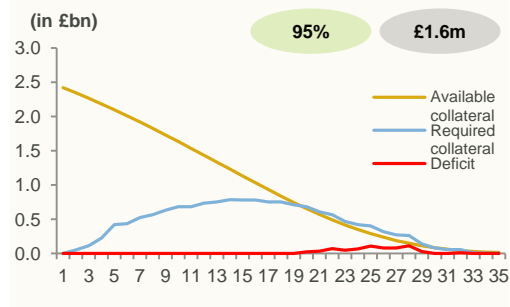
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Quantifying Liquidity Risk (III)

Cash-only
CSA



Cash & Gilt
CSA

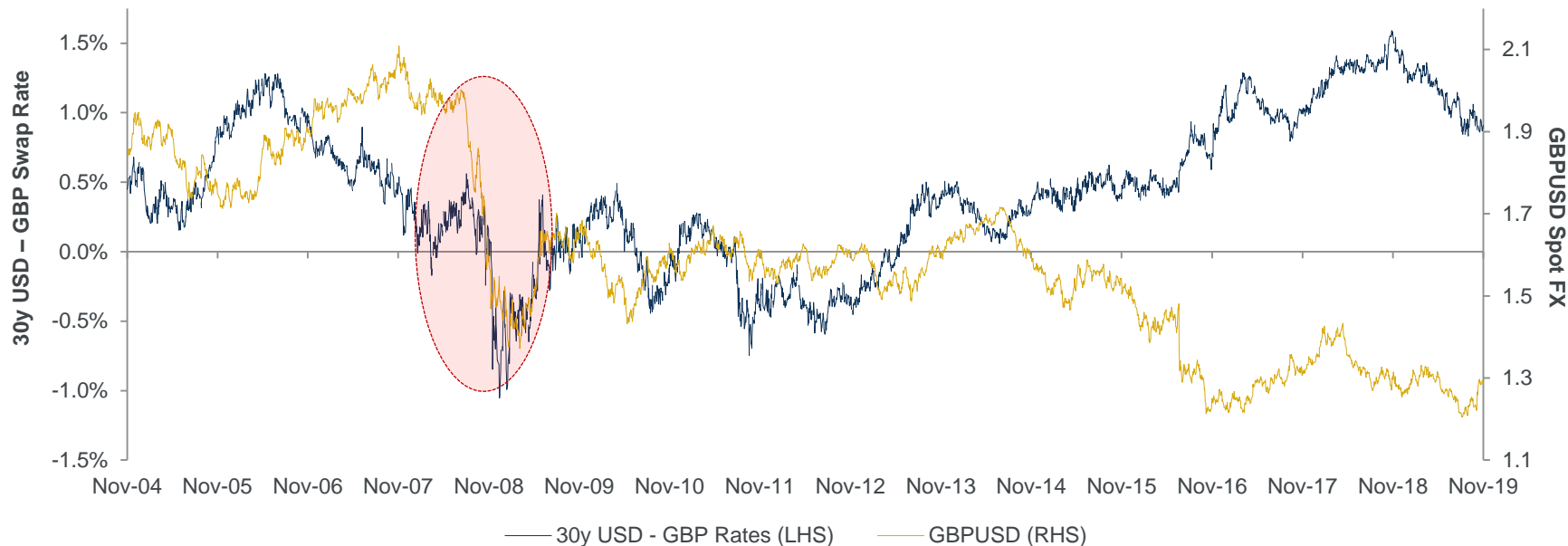


● Average coverage ratio ● Expected funding cost / funding reserve (in £mm)



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Quantifying Liquidity Risk (IV)



History shows us that there have been periods where GBPUSD depreciates and USD vs GBP Rates diverge significantly for prolonged periods of time – this can lead to large collateral calls.



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Liquidity Solutions

	Cash CSA	Corporate Bond CSA	SPV
Eligible collateral under CSA	<ul style="list-style-type: none"> ■ Cash 	<ul style="list-style-type: none"> ■ Investment grade corporate bonds ■ Symmetric CSA. Insurer can post: BBB+ IG credit & above. Insurer can receive USD IG credit 	<ul style="list-style-type: none"> ■ Underlying collateral
Key Pricing Drivers	<ul style="list-style-type: none"> ■ Bank SLR & RWA ■ Bank liquidity reserves ■ Market risk 	<ul style="list-style-type: none"> ■ Corporate bond funding levels ■ Bank SLR & RWA ■ Bank liquidity reserves ■ Market risk 	<ul style="list-style-type: none"> ■ Corporate bond funding levels ■ Bank SLR & RWA ■ Bank Liquidity reserves ■ CVA ■ Other running expenses
Liquidity reserve impact	Spread dilution due to liquidity set aside	Spread dilution due to liquidity set aside	Spread dilution due to liquidity set aside
Pros / Cons (from insurer's point of view)	<ul style="list-style-type: none"> ✓ Transparent pricing currently across a number of banks ✓ Likely to have existing documentation in place ✗ Insurers may need to retain a liquidity pool in order to meet future potential collateral requirements – this may create a return drag ✗ Extreme market conditions may result in a collateral calls in excess of the liquidity pool, creating a reliance on short-dated repo 	<ul style="list-style-type: none"> ✓ Larger pool of eligible assets that can be posted as collateral ✓ Likely no drag on portfolio return & MA spread from liquidity reserve ✗ Potential collateral and unwind valuation disputes between counterparties ✗ Divergence in pricing methodologies between different bank counterparties ✗ Potential for insurer to be posted corporates and be exposed to corporate credit risk in the instance of a counterparty default 	<ul style="list-style-type: none"> ✓ Some operational elements more straight-forward - collateral calls are delegated ✓ Maximum loss and funding outlay limited to the initial investment amount ✗ Limited recourse ✗ Potential downgrade risk on collateral eligibility in SPV ✗ Additional running expenses ✗ Counterparty default on a non-standardised SPV can be a challenging process





Any Questions?

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