

Framework for Liquidity Risk and Cost Management: steering clear of the liquidity gap and navigating through the competitive environment

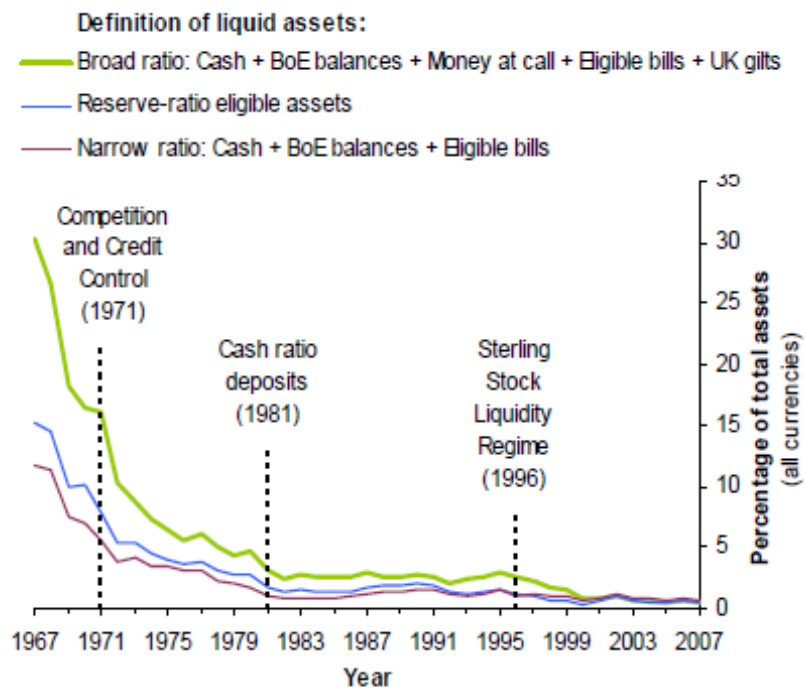
PRMIA Munich

April 15th 2010



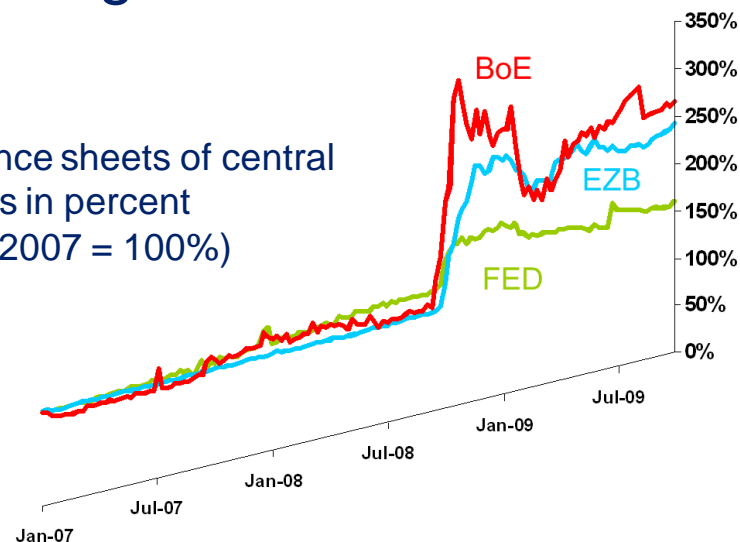
Global stress scenario: liquidity shortage

Liquidity in British Banks



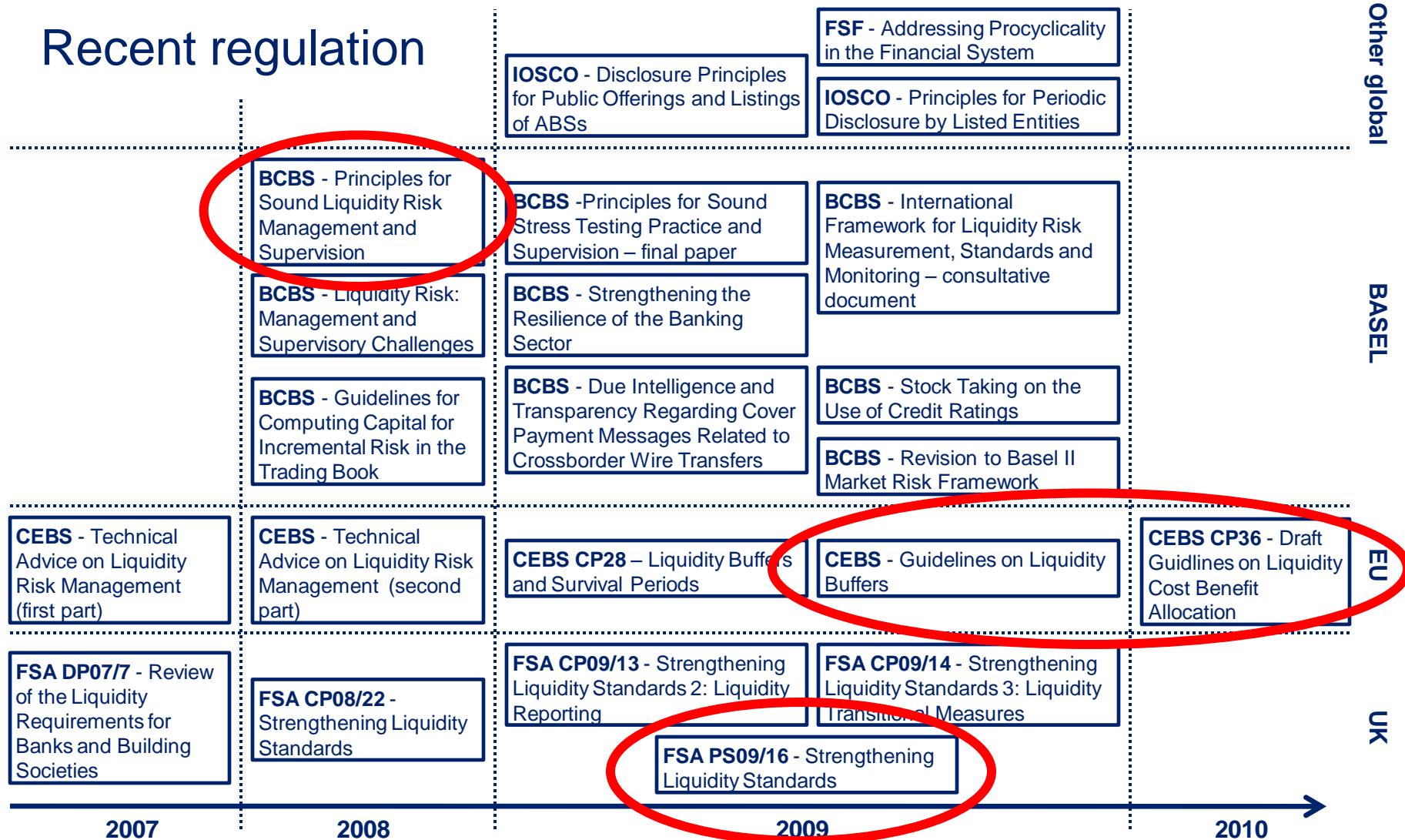
Sources: Bank of England data and calculations.

Balance sheets of central banks in percent (Jan 2007 = 100%)



- Idiosyncratic risk can lead to systemic risk
- Economic damage
 - Bail out
 - Transmission failure
 - Economic downturn

Recent regulation



...and further relevant documents...

Regulation perspectives

- Common goal: to make the economy more efficient
- Regulation as a corrective tool (for risk pricing)
- Reduce the systemic risk in the financial sector
 - Identification and assessment of risks to financial stability
 - Surveillance of key risk indicators from banks and the economy
 - Issuance of risk warnings and recommendations
- How may liquidity risk guidance be applied in practice?
 - Benchmarking: setting limits on the tracking error of a „market funding portfolio“ to reduce the systematic risk
 - Individual guidance taking into account the specific business model
 - Legislative actions
 - Regulators themselves are in the learning process

FSA proposal: pro-active, continuous regulation

Supervisor Dashboard

Filter Dashboard

Select Firm Name: Firm1 | Select Reporting Basis: DLG | Select Reporting Date: Jul 31, 2009

FRN: Peer Group:

Key Metrics and Downgrade Triggers

Key Metrics	Value
Retail funding ratio:	88%
Wholesale funding:	77%
Off BS Assets:	£132 mn
Off BS Liabilities:	£115 mn
Overnight funding:	£110 mn
SLS Usage:	£92 mn

Downgrade Triggers	Increment	Cumulative
Notch 1	11,816	11,816
Notch 2	10,170	21,986
Notch 3	4,050	26,036
Notch 4	4,884	30,920
Notch 5	2,017	32,937
Notch 6	1,787	34,724
Notch 7	942	35,666
Notch 8	635	36,301

Key Risk Indicators

Name	Actual	Target
Cash-flow survival days - No collateral	61	62
Cash-flow survival days - Government Asset Collateral	70	80
Cash-flow survival days - Highly Liquid Asset Collateral	87	92
Cash-flow survival days - All High Quality Asset Collateral	71	75
Commitments to Size of Balance Sheet ratio	59%	60%
Annualised Growth Rate in Total Balance Sheet	2%	7%
Highly Liquid Asset Collateral to Balance Sheet Ratio	60%	65%
High Quality Asset Collateral to Balance Sheet Ratio	33%	35%
Government Asset Collateral to Balance Sheet Ratio	13%	14%

Tripartite Weekly Reports

Entries: 1 - 2

Name	Description
Archive	
New ver.xls	

Analysis of EMR Assets and Liabilities

	Assets	Liabilities
Asset Back Securities	-	£9,683.34
Cash & Central Bank Reserves & deposits	£5,671.43	-
Conditional Liabilities	-	£2,951.65
Covered Bonds	-	-
Dated Capital	-	-
Derivatives cash margin given/received	£2,566.36	-
Free client cash	-	-
FX Forward Position (Flows)	-	-
Government & Central Bank Unsecured Deposits	-	-
Loans & Deposits Individuals (Retail Banking)	£178,106.09	£52,433.21
Loans & Deposits with all enterprises (Corporate Banking)	£18,225.12	£2,681.35
Loans & Deposits with Group	-	-
Loans & Deposits with Non-UK Credit Institutions	-	-
Loans & Deposits with UK Credit Institutions	£7,381.44	-

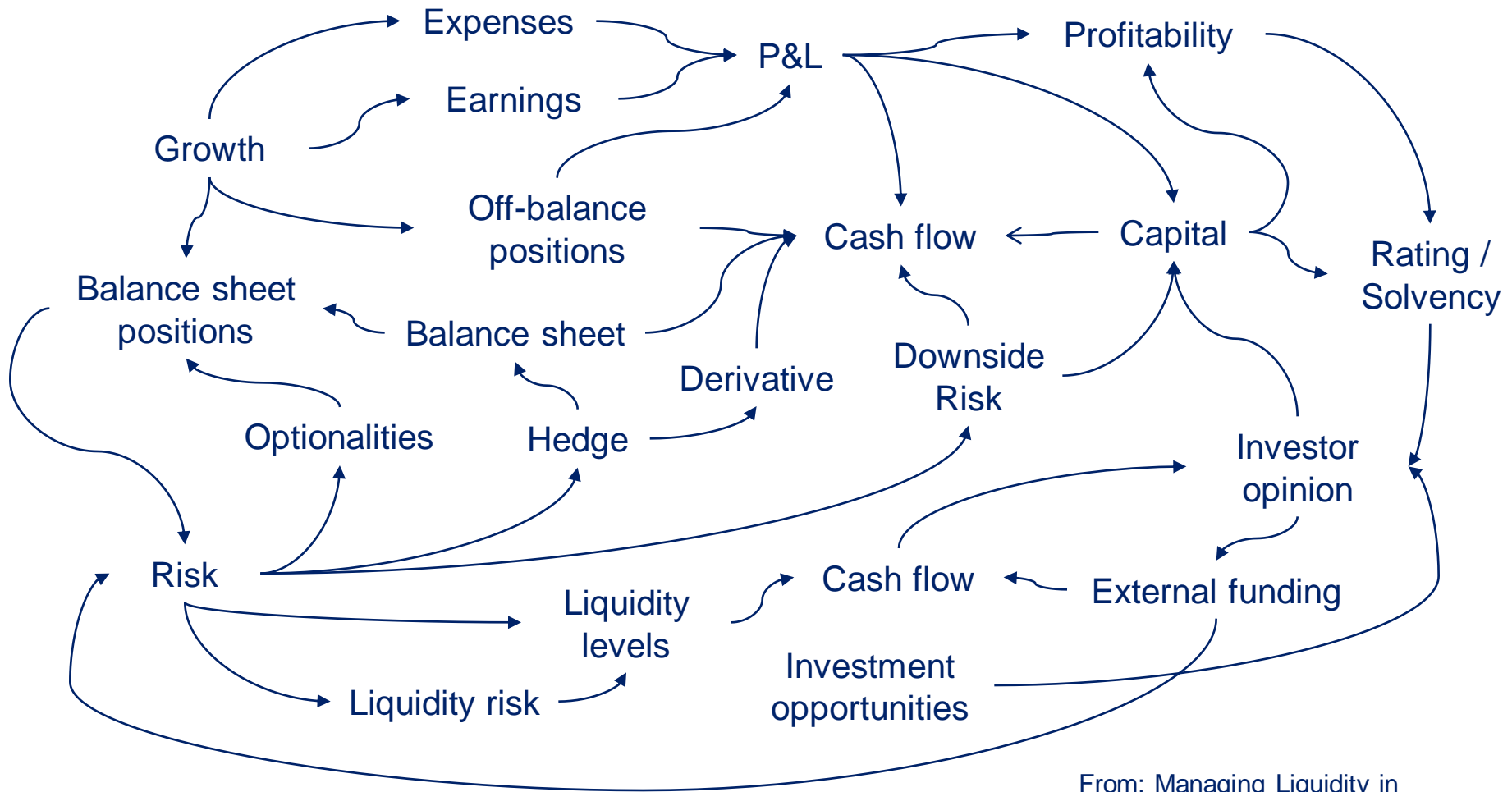
Liability Profile

Liability Profile

- Customers - Individuals: 60%
- Repo Highly Liquid Securities: 12%
- Repo High Quality Securities: 9%
- Asset Backed Securities: 9%
- Unsecured Other Wholesale: 3%
- Repo Other Assets: 2%
- Customers - Large Enterprise: 2%
- Conditional Liabilities: 2%
- Covered Bonds: 2%
- Client Free Cash: 2%
- Structured Issuance: 2%
- Unsecured Credit Institutions: 2%
- Unsecured Governments & C: 2%
- Unsecured Non-bank Finan: 2%
- Customers - SME: 2%
- Dated Capital: 2%
- Group: 2%
- Net Derivatives Margin: 2%
- Non-dated Capital: 2%
- Primary Issuance: 2%

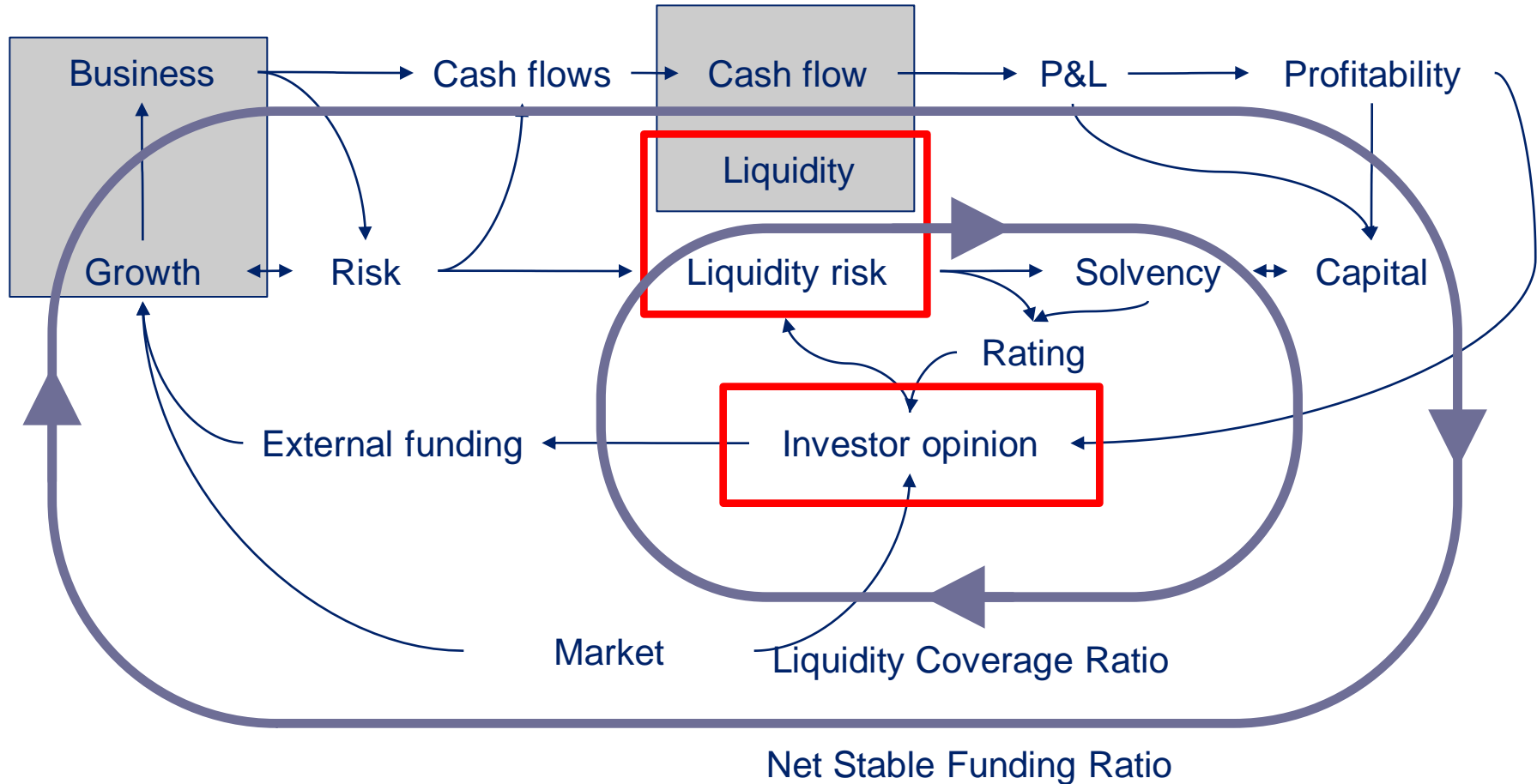
Screen shot of FSA regulator BI tool (prototype), PS09/16 (2009)

Liquidity – a complex network of dependencies



From: Managing Liquidity in Banks, R. Duttweiler, 2009

Cycles of growth and sustainability



Funds Transfer Pricing

Internal market for interest, funding (and liquidity)

- Funding Cost

{	Risk-free rate	}
{	Liquidity spread	}

Cost of Carry based on **anticipated** holding periods

- Prepayment penalties (Internal)
 }

Only for customer credits
- Opportunity costs for liquidity options (credit commitments, call/put options)
 }

Mostly based on expected cash flow, often neglected
- Collateral Costs
 }
- Liquidity Buffer Costs
 }

Often treated as fixed cost, attribution to trade difficult

- Avoid double payments

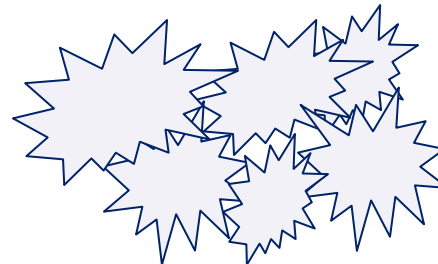
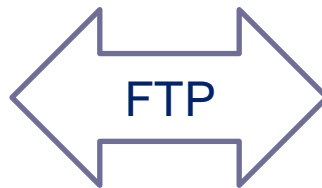
Regulators opt for consistent internal prices of liquidity

Pricing of Liquidity: Attribution of Opportunity Costs

- Business decisions need to **consider the Price of Liquidity**
- Attribute Cost of Liquidity (additional cost of carry, calculated on net level) to the business units **on trade level**
- Re-credit supplier of liquidity
- Calculate:
 - Level, composition and cost of **group-wide** Liquidity Buffer
 - Attribution to assets and liabilities **on trade level**

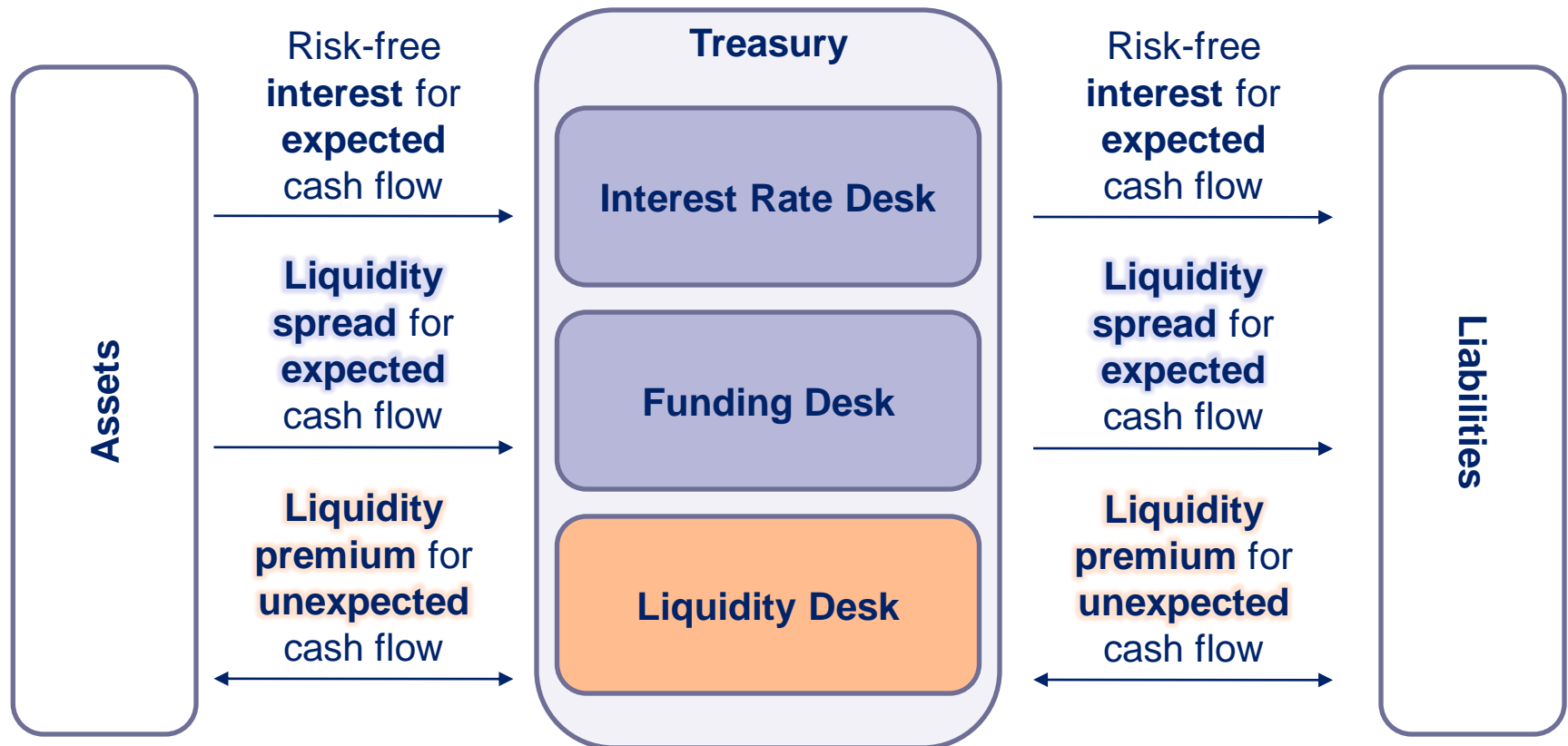


Group-wide Liquidity Management



Liquidity Cost of single trade

Funds Transfer Pricing for Liquidity



Extending the Marktzinsmethode – Internal market for liquidity

Appropriate Level of the Liquidity Buffer

Cover unexpected cash flow (Counterbalancing Capacity)

- BCBS – cover possible outflow under defined **stress scenarios**
liquidity risk coverage ratio (LRCR) = Stock of high quality liquid assets / Net cash outflows over a 30-day time period ≥ 1
- **LaR** – cover high quantile of cash account movements, extreme values stochastics of cash account fluctuation
- **Historical (or MC) simulation** – cover high quantile of simulated portfolio outflow in (historical) liquidity risk factor scenarios

Stress scenarios	LaR	Simulation model
- Regulatory approach - Simple assumptions on scenario impact on business	- Easy access to cash account data - Few model assumption	- Advanced model similar to market risk models - Estimations base on mrkt data
- Scenario selection difficult	- Interpretation and attribution of risk to trades difficult	- Definition of risk factors, sensitivities and data complex


Pile cash and high quality assets to survive medium term crisis

Composition and Cost of the Liquidity Buffer (1/2)

- Characteristics for high quality liquid assets
 - Low credit and market risk, low correlation with risky assets
 - Reliable valuation, active and sizable market
 - Central bank eligibility desirable
- Assets meeting these criteria
 1. Cash, central bank reserves, government bonds
 2. High quality corporate and covered bonds ?



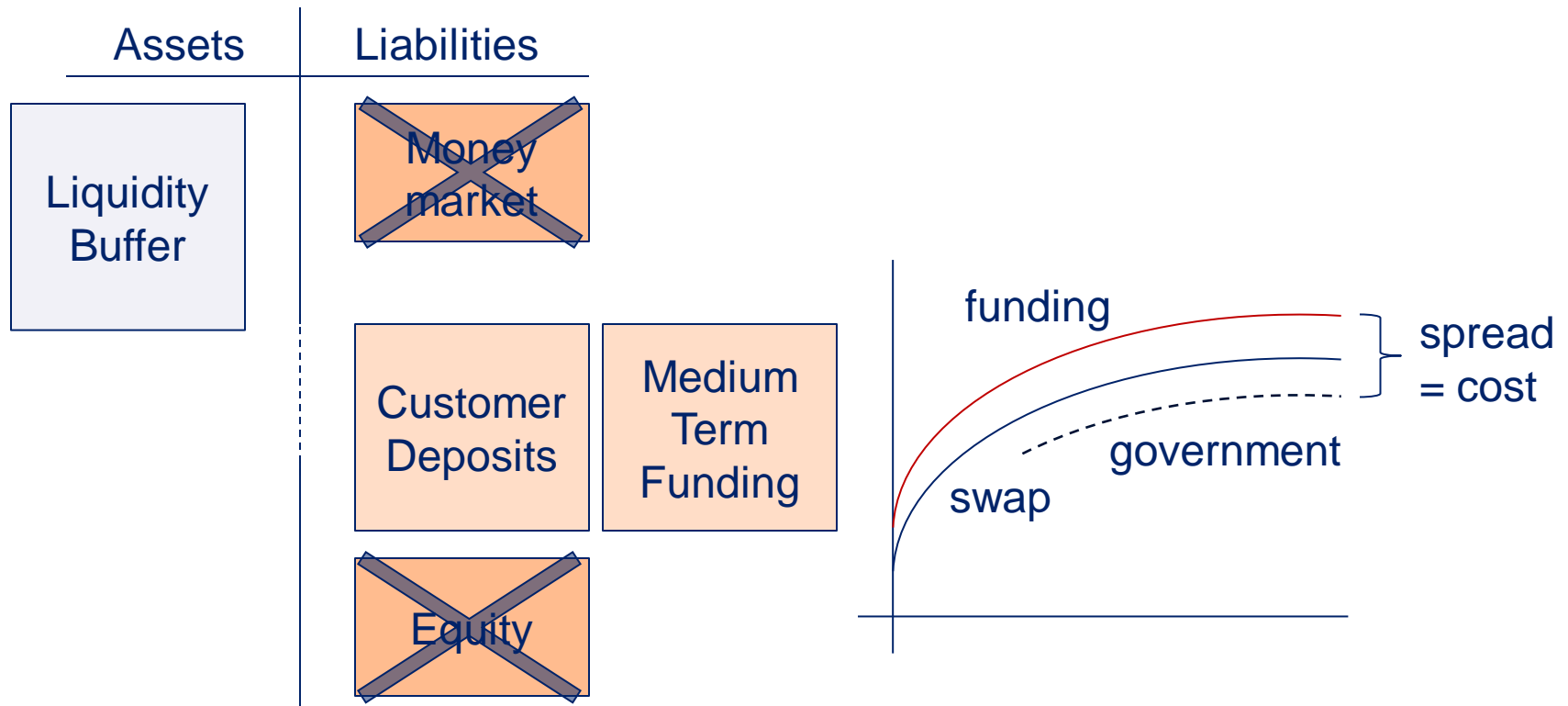
Economic impact of investment decisions?



How to fund the Liquidity Buffer?

-
- Cost of Liquidity Buffer = Return of Liquidity Buffer - Funding Cost (...?)

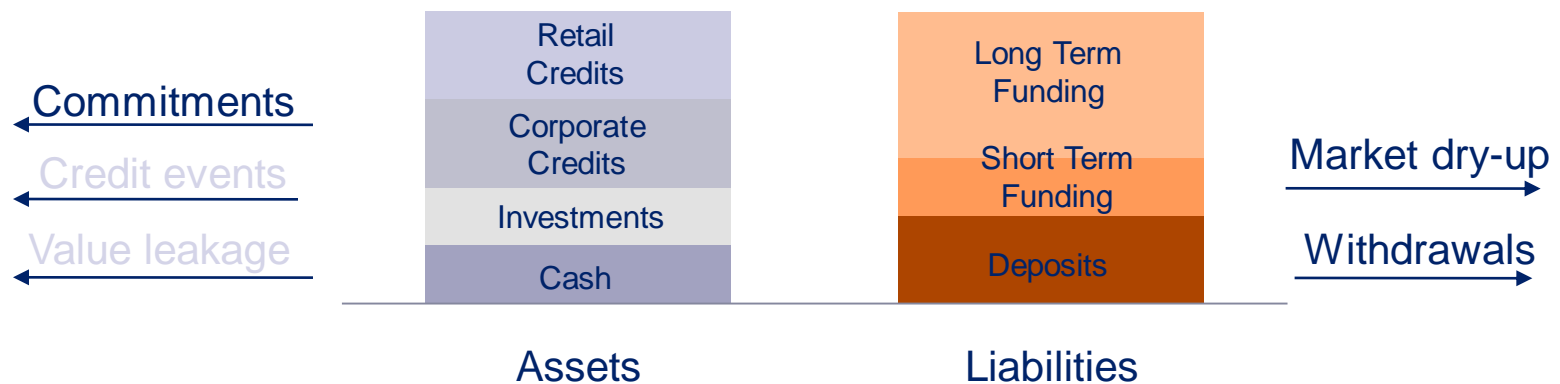
Composition and Cost of the Liquidity Buffer (2/2)



Costs of Liquidity Buffer need to be calculated

Pricing of Liquidity: Attribution of Opportunity Costs (1/2)

- Charge for **unexpected** cash flow



- Instrument classification necessary (FSA and QIS forms)
- Measures for uncertainty
 1. Calculated volatility (with normal distribution assumption)
 2. Extreme value statistics (with inappropriate data series)
 3. Expert opinion depending on business model and/or defined stress scenarios (as for the calculation of the level of the LRC buffer)

Pricing of Liquidity: Attribution of Opportunity Costs (2/2)

Example calculation (stress test value approach)

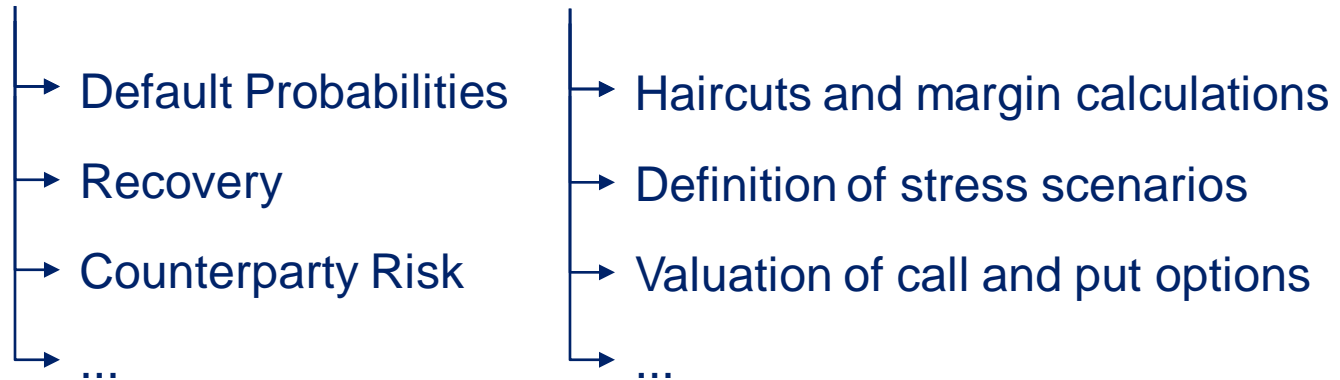
- Customer deposit: FTP rate = $1\% + 0.8\% - 0.27\% = 1.53\%$
Interest Rate: Money market rate = 1%
+ Liquidity Spread: $60\% * 100\text{bp}(10\text{Y}) + 20\% * 60\text{bp}(5\text{Y}) + 20\% * 40\text{bp}(3\text{M}) = 0.8\%$
- Liquidity Premium: Liquidity Weight * Liquidity Buffer Cost = 0.27%

Liquidity Weight = Individual cash outflows / Notional / All cash outflows (LRC)
 \approx Class cash outflow / Class Notional / All cash outflow (LRC)
- Re-credit sources of liquidity → based on investment objective for Liquidity Buffer
- Should/can Liquidity Premium be fixed at origin?
- More open questions...

Practical model for Pricing of Liquidity needed

Outlook: Holistic Risk Management

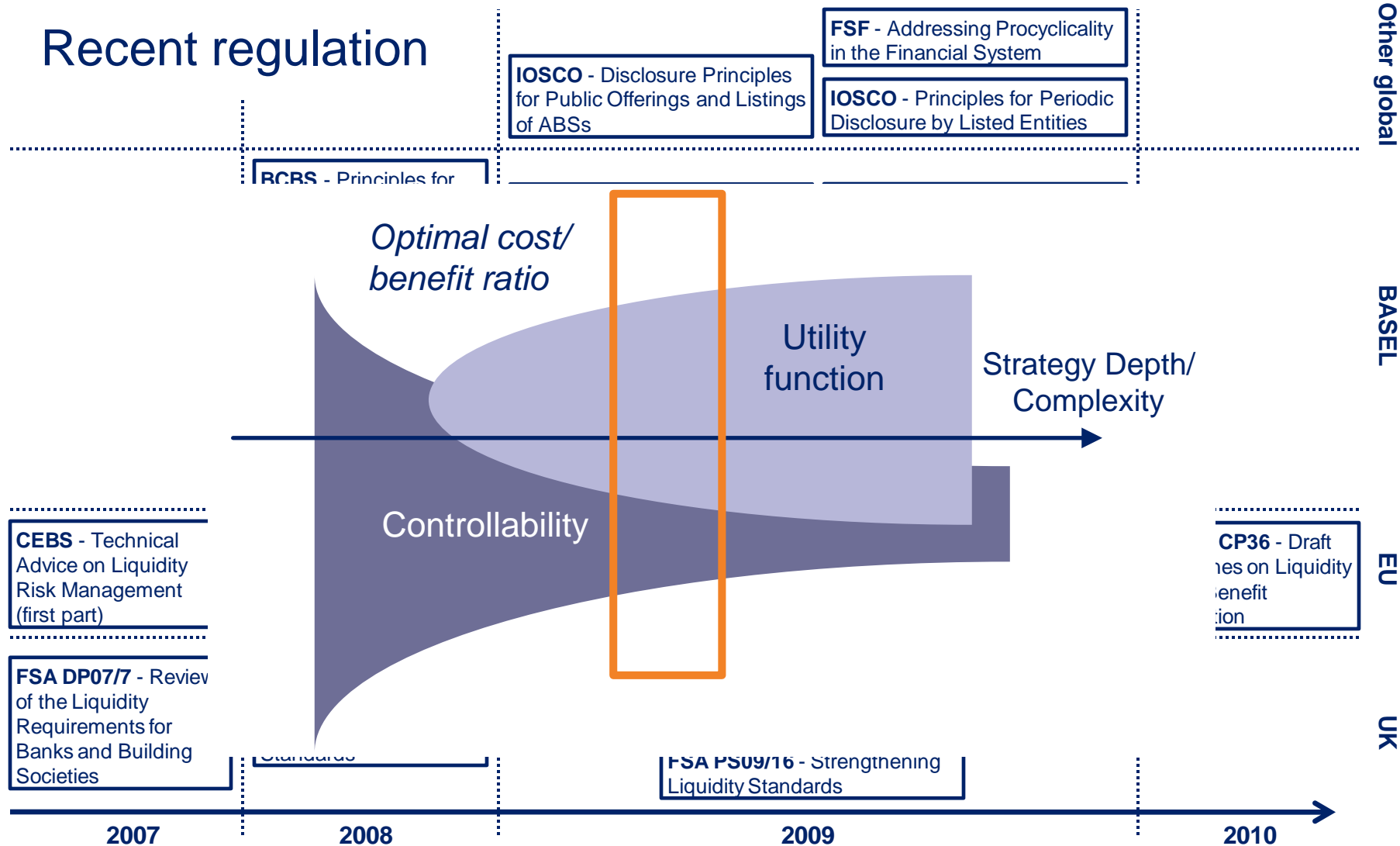
Links to Credit Risk and Market Risk Models



→ Regulators will ask for a „consistent“ methodology

The future (Liquidity) Risk Manager must know it all

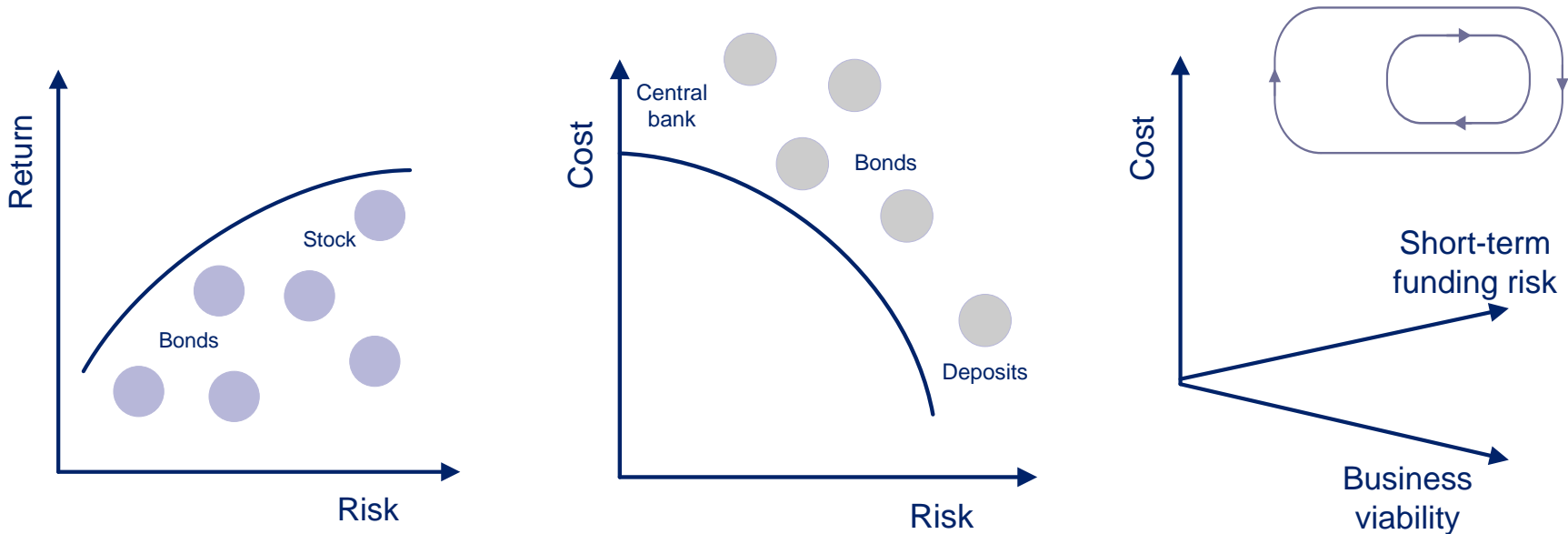
Recent regulation



...and further relevant documents...

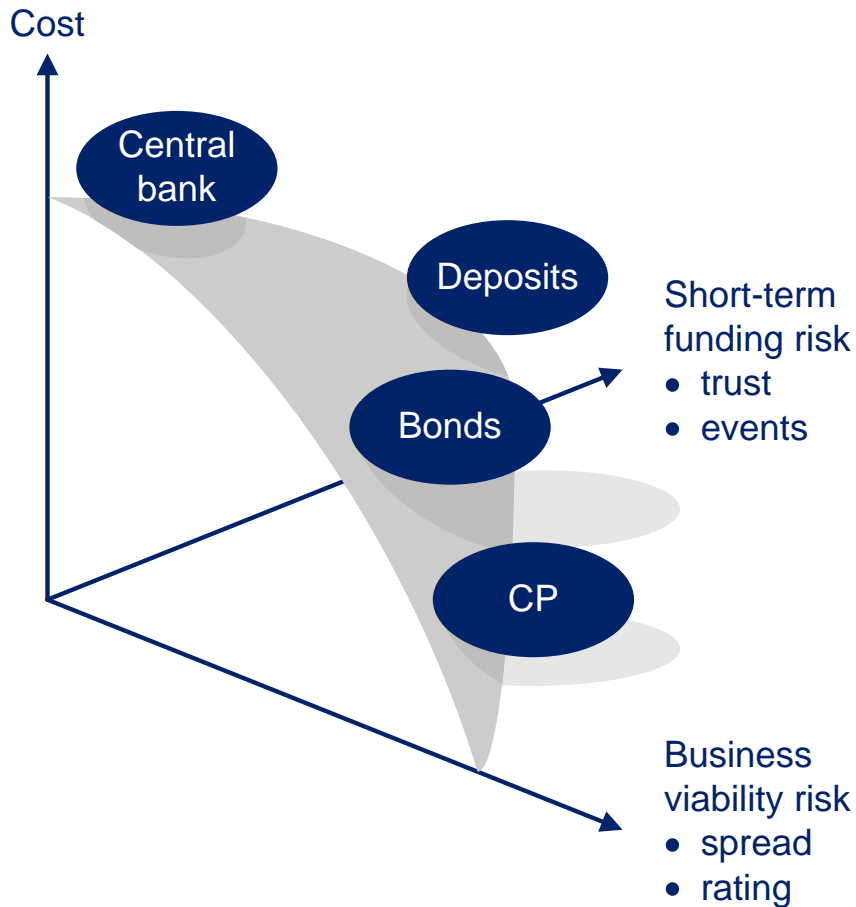
Tasks of an „inverse portfolio manager“

Consider actively managing a funding portfolio for a given (static) asset portfolio:

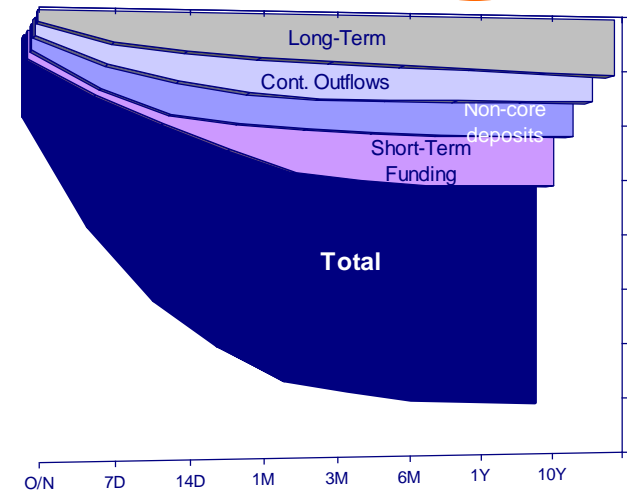


Of course, this is a highly simplified representation; one would have to consider the asset and liability side simultaneously adding at least one more dimension to the diagram

Inverse „portfolio theory“ of funding

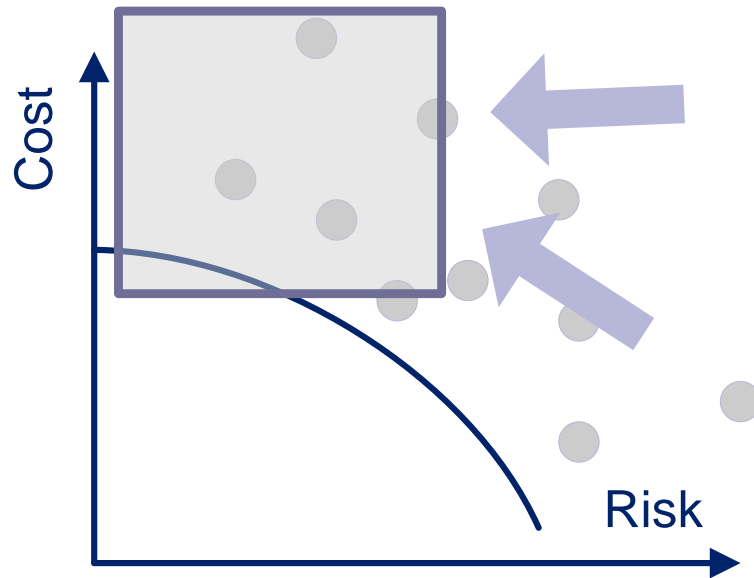


Assets	Liabilities
Loans	Equity
Securities	Preferred Stock
Shares	Bonds
Cash	Deposits



Regulatory influence

A regulatory framework based on guiding principles must somehow restrict the refunding space

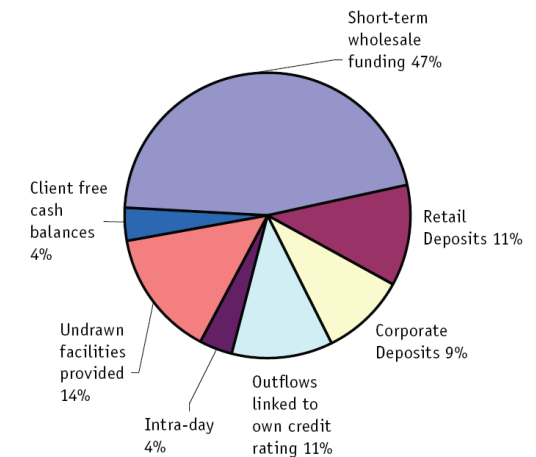


Buffer of assets:

Total assets buffer of high-quality government bonds, central bank debt and reserve balances	X% of total BIPRU exposure values
--	-----------------------------------

Gross wholesale funding profile (percentage of total funding):

EMR ²¹ row reference		1 week v	1 month v	3 months v	1 year v
48	Unsecured lending from credit institutions	X ₁	X ₂	X ₃	X ₄
51	Unsecured non-bank financial	X ₁	X ₂	X ₃	X ₄
53	Unsecured group borrowings	X ₁	X ₂	X ₃	X ₄
n/a	Other unsecured wholesale funding flows	X ₁	X ₂	X ₃	X ₄
43	Secured transactions with market	X ₁	X ₂	X ₃	X ₄
44	Secured transactions with group	X ₁	X ₂	X ₃	X ₄



- Challenge to optimal manage refunding cost
- Increasing competition

Thank you for your attention!

Your contact at d-fine

Dr Oliver Hein

Head of ALM Solutions

Senior Manager, Frankfurt

+49 (0)69 90737 324

oliver.hein@d-fine.de



d-fine GmbH

Opernplatz 2

60313 Frankfurt

Deutschland

Tel +49 (0) 69 90737 0

www.d-fine.de

d-fine Ltd

28 King St

London, EC2V 8EH

United Kingdom

Tel +44 (0) 20 7776 1000

www.d-fine.co.uk

d-fine Central Europe s.r.o.

Staromestská 6/D

801 03 Bratislava

Slovakia

d-fine Hong Kong Ltd.

No. 32 Hollywood Rd,

Central, Hong Kong Special

Administrative Region

People's Republic of China