

Practical Approaches for Stress Testing Liquidity Risk

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What is Wrong – Example 1

Hedge Fund

“I have 90% portfolio liquidity based on:

- Assumed 1/3 of daily turnover*
- Turnover is based on average of last 45 days”*

What is Wrong – Example 2

Fund of Hedge Funds

“I have no liquidity risk because all the managers I have invested with offer more frequent liquidity than what I offer to my investors”

What is Wrong – Example 3

Super Fund

“We have no liquidity issues but we do note that our illiquids haven’t been re-priced for 3 months”

What is Wrong – Example 4

Equities Fund

“We are a small cap equities manager and we have kept the same percentage portfolio weightings from the time we were small (\$200m under management) to now (\$2b under management). Hence our liquidity risk profile has never changed.”

Liquidity Definition

The amount of capital that can be redeemed* from a portfolio whereby neither remaining investors or redeeming investors are unfairly advantaged relative to each other.

* The definition should be expanded and be symmetrical to address the issue of managing additional inflows as well

Key Tests of Fairness

Key tests of fairness would include:

- Cost of liquidity
 - Are they applied fairly to both redeeming and remaining investors?
- The quality of the remaining portfolio
 - Are remaining investors left with an inferior portfolio after the redemption is delivered?

Cost of Liquidity

Costs of liquidity include:

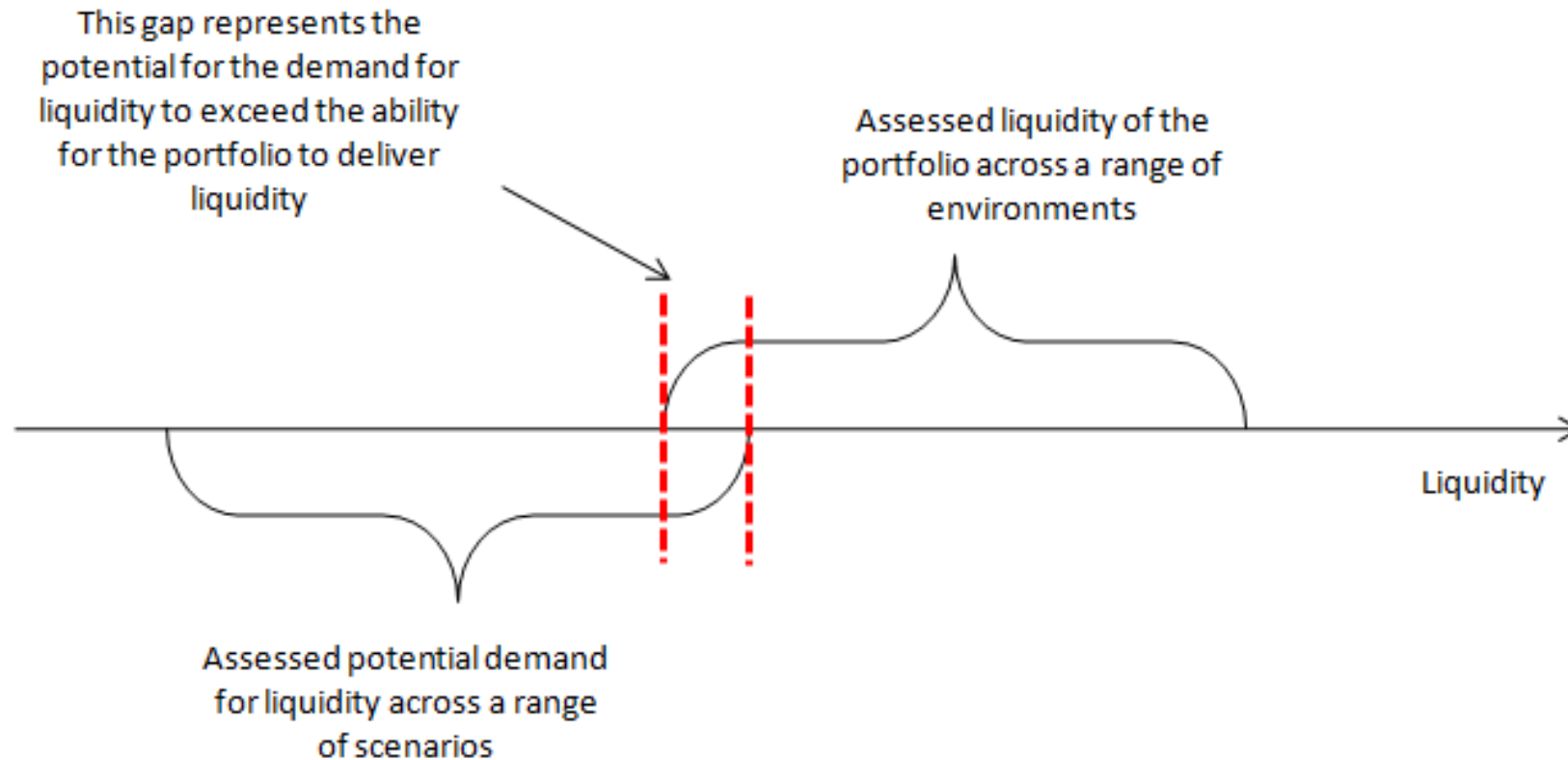
- Are the assets / instruments priced correctly?
- Transaction expenses
 - Brokerage, transaction spreads etc
- Market impact
 - Measured by slippage between '*decision price*' and executed price
- Other costs
 - Eg's include legal fees, time (for not-for-profit industry super funds) etc

Quality of the Remaining Portfolio

Key concepts of portfolio quality:

- Return profile (forward looking)
- Risk profile
- Diversification
- Meeting compliance rules (both official and unofficial)
- Liquidity itself

Liquidity Risk Defined



- Liquidity Stress Testing is the exploration of this framework
- It can be built out however you like, to complement existing risk processes

Exploring the Supply of Liquidity

Key points / tips:

- Market assets: liquidity is definitely not normally distributed (a queuing distribution)
- Consider the balance of market participants (eg. Approx 80% of convertible bonds are held by convertible bond hedge funds)
- Some products may not have frozen redemptions in the recent crisis but may have indicated to major investors that they would find it extremely difficult to deliver (eg. Credit) – all parties save loss of face by not freezing

Exploring the Supply of Liquidity (ctd)

Key points / tips (ctd):

- Consider the risks of products not delivering contractual liquidity (eg. Freezing funds)
- For some illiquid investments it is important to consider the exit mechanism (eg. Trade sale, IPO etc). Does this represent reliable liquidity?
- Be aware of when liquidity is actually delivered (ie. Notice period, settlement terms etc)

Understanding the Potential Demand for Liquidity

Parties who may require capital:

- Equity providers and investors
- Debt providers
- Other sources of demand for capital
 - Counterparty relationships (eg. Banks via fx forwards, exchanges etc)
 - Committed capital (eg. Underwritings, multi-drawdown funds etc)

Understanding the Potential Demand for Liquidity (ctd)

Equity providers and investors:

- Understand your investor base
 - Concentrated or diversified
 - High turnover track record
 - Tolerance to poor outright performance
 - Tolerance to poor relative performance

Understanding the Potential Demand for Liquidity (ctd)

Tools to manage liquidity demand risk:

- Redemption notice period
- Liquidity restrictions
 - Initial lock-up
 - Ongoing liquidity restrictions
- Transaction fees
 - Spreads or early exit fees
 - Do they go into the fund?
- Liquidity 'gates' – total redemption clause
- Side pockets – redemption is partly cash and partly a share in a pool of 'illiquid investments'

Understanding the Potential Demand for Liquidity (ctd)

Interesting observations:

- Super funds are constantly offering improved features and service (for example more frequent liquidity), in an environment of potentially higher liquidity demands (choice of fund etc)
 - ➔ Is their liquidity (demand) risk profile changing?
- Buy / Sell spreads are flawed in their current guise (fixed buy / sell spread)
 - Providing liquidity does not have a constant cost

Understanding the Potential Demand for Liquidity (ctd)

Debt providers:

- Obviously important to model the term of the debt structure
- But also need to understand embedded rules and clauses (which may prove to be catalysts):
 - For example, the right to accelerate the structure
 - Eg. Hedge fund debt arrangements often have a drawdown (loss) clause

Understanding the Potential Demand for Liquidity (ctd)

Other sources of liquidity demand:

- Full currency-hedged products may have large settlement obligations
- Products that use market overlays (eg. Alpha-transfer style products) may have large settlement requirements

Specific Issue – Portfolio Pricing

- If a portfolio cannot be priced with confidence then it is difficult to deliver liquidity in a fair manner
- There may be a tolerance permitted
 - Has this been established by the board?
 - How can this be tested?
- Hedge funds delivered cash and ownership (sidepocket investment) in a portfolio of hard to price and illiquid assets

Ongoing Review of Liquidity Risk Profile

The analysis requires ongoing review:

Underlying Assets (that supply capital)	Capital providers (who may demand capital)
<ul style="list-style-type: none">- The portfolio mix may change- The structure of a particular market may change- New markets may be entered- Different hedging techniques will affect cash flow management	<ul style="list-style-type: none">- The client base may change- An external event such as a tax ruling may alter client behaviour- Peers / competitors may change their liquidity structures

Liquidity Management Mistakes

- Many of the major mistakes made during the GFC were liquidity related:

	Hedge Funds	Fund of Funds	MIS	Super Funds
Do not have a dedicated risk manager	?	-	X	X
Relied on consultant-provided risk management	-	-	X	X
Relied heavily on historical data analysis	X	X	X	X
Did not actively manage liquidity risk	X	X	X	X
Didn't envisage that liquid exposures could become illiquid	X	X	X	X

Liquidity Management Mistakes (ctd)

- Many of the major mistakes made during the GFC were liquidity related:

	Hedge Funds	Fund of Funds	MIS	Super Funds
Relied on contractual liquidity obligations	-	X	-	X
Experienced difficulty getting assets priced	X	X	X	X
Experienced larger redemptions than they ever thought possible	X	X	X	X
Were forced to sell assets due to debt covenants / pulled debt lines	X	-	-	-

The Fallen

- Hedge funds
 - About 1000 have closed down
 - Many implemented liquidity management processes on the run, much to the chagrin of their investors
- Fund of hedge funds
 - Relied on contractual liquidity
 - Domestic funds affected by currency hedging issues
 - Difficulties in pricing their funds
 - Not structurally prepared for a liquidity event

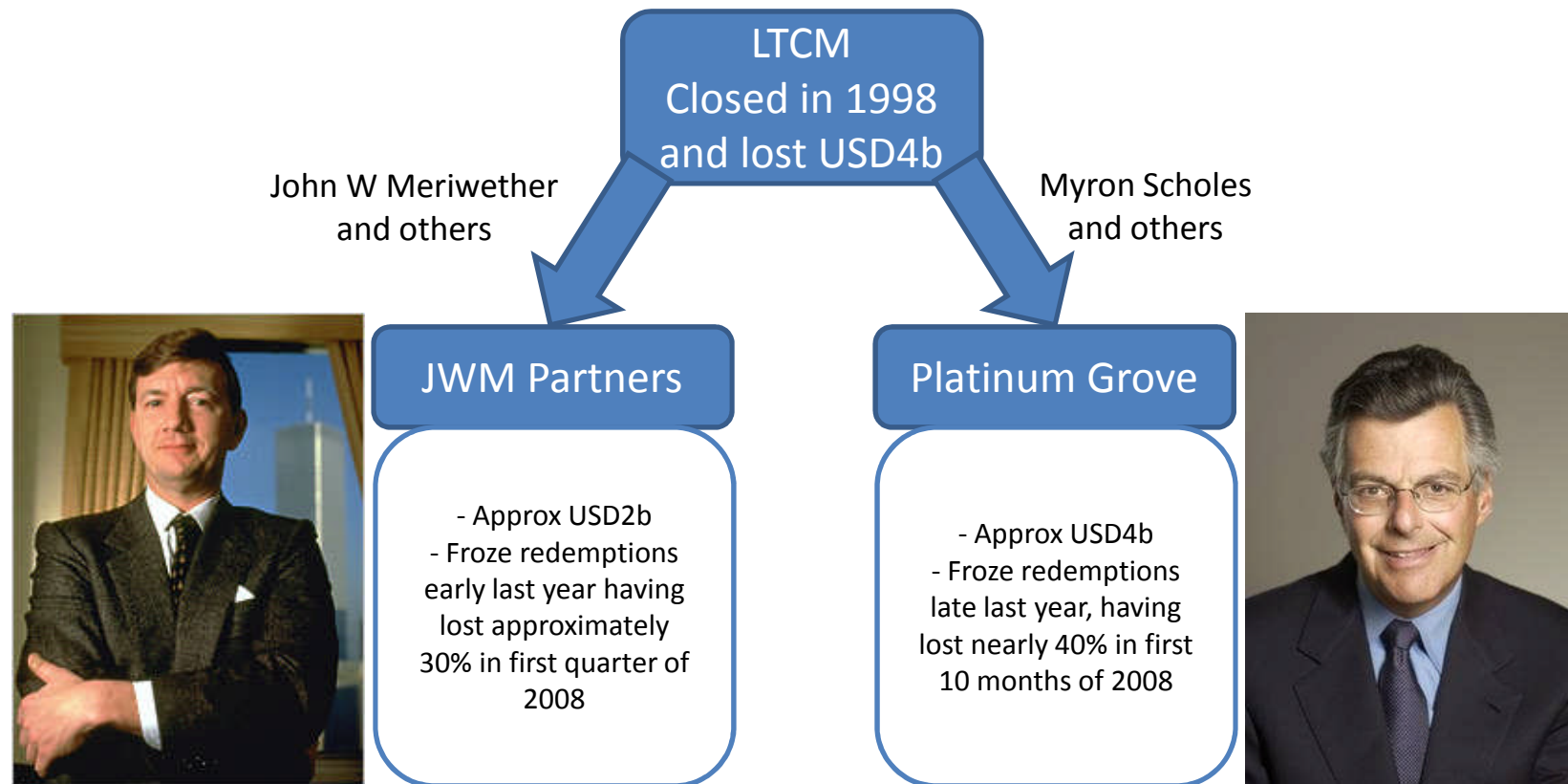
The Fallen (ctd)

- Managed investment schemes
 - Mortgages
 - Cash enhanced (with credit), yield funds
 - Hybrid funds

The Shaken

- Super Funds
 - No large scale public failures, but...
 - Bad press (eg. Alan Kohler...)
 - Unprecedented (though still modest) number of super relief applications
 - Record amount of switching (between investment options)
 - Contractual liquidity not honoured on some of their investments (eg. Fund of hedge funds)
 - FX hedging led to substantial capital calls
 - Some investments may not have frozen but were unlikely liquid (eg. Credit)

Can Liquidity Events Strike Again? You betcha!



The Role of Regulators

- All funds (registered hedge funds, MIS and super funds) are:
 - Bound to operate within the liquidity rules outlined in the Corporations Act (2001)
 - Not prescribed any formal liquidity risk management techniques
- Regulators will review relief applications
- Regulators will investigate mis-management

The Role of Regulators - Super

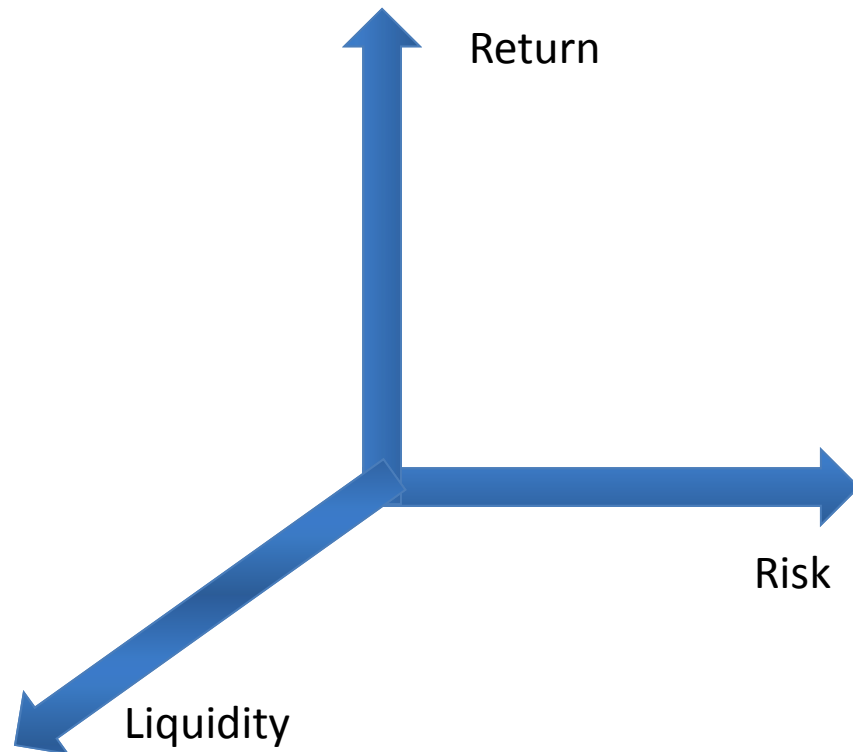
- APRA recently reviewed the liquidity management practices of the super industry
- APRA presentation at AIST Superannuation Fund Governance Conference, 5 May 2009
- The overall findings from analysis of the questionnaire responses are that trustees need to focus on strengthening and improving their current liquidity management practices
- There were 7 specific recommendations

APRA Recommendations

- Manage liquidity at the investment option level
- Undertake more comprehensive and adequate liquidity stress testing – including crisis scenarios
- Expand cash flow budgeting parameters to cover all aspects of liquidity management (not just monthly cash flow rebalancing)
- Avoid over-reliance on the historic positive cash flow from contributions
- Gain a better understanding of the impact of ‘illiquid investments’ for the purposes of portability and payment of benefits
- Better utilise membership data and its linkages to the investment structure
- Achieve a more robust balance between member investment choice and the ability to meet payment requests in the context of such choice

The Link Between Liquidity & Volatility

- When liquidity is low, what tends to happen to observed volatility?



Could this form the basis of a new MPT framework? What is the technical flaw with this concept?

Why Liquidity Risk Needs to be Actively Managed

- At a corporate level, liquidity issues tend to lead to bankruptcy more than profitability issues
- There are similar issues in the funds management industry, yet the industry tends to focus more on market risk issues than liquidity risk issues

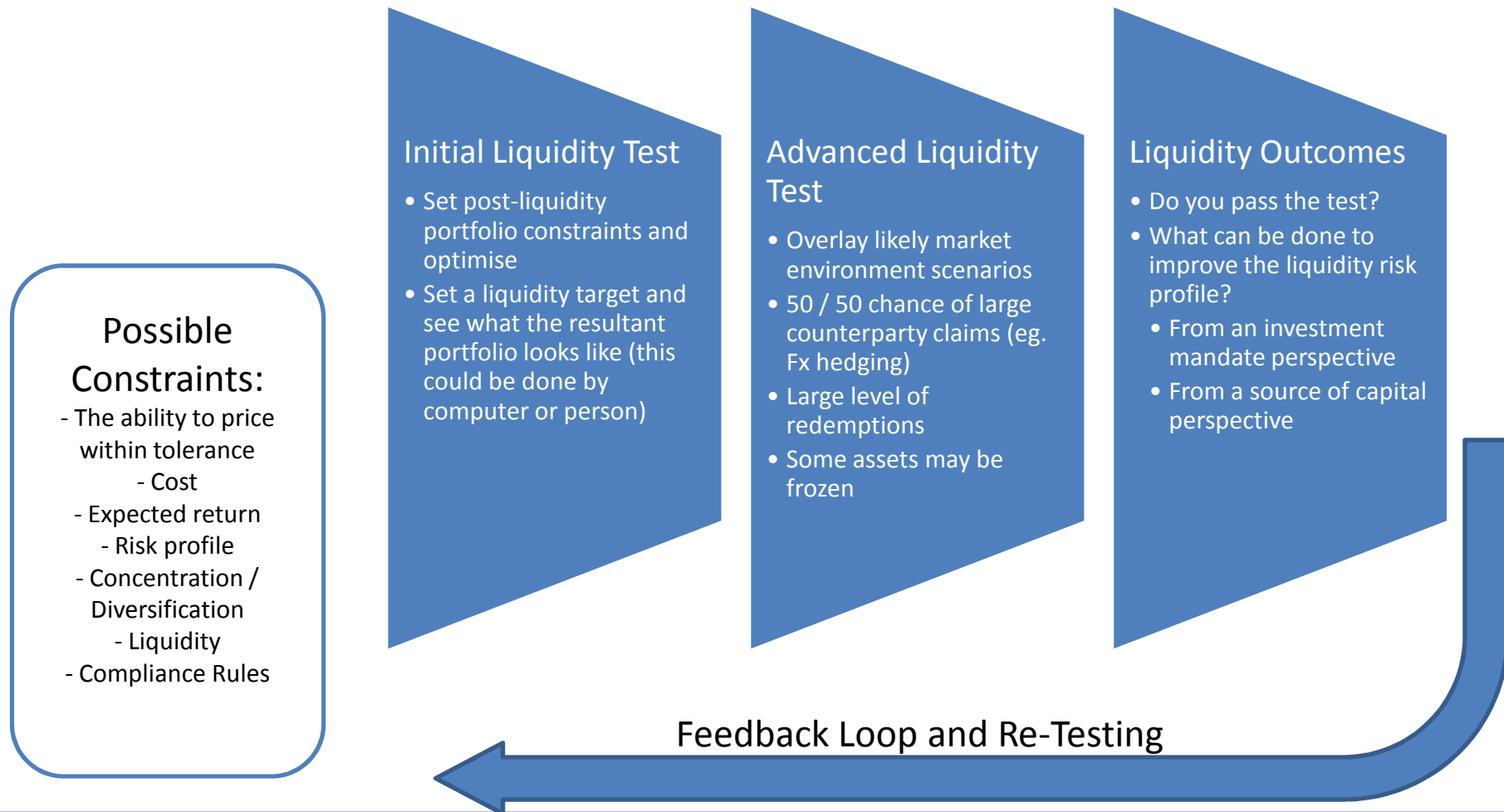
Why Liquidity Risk Needs to be Actively Managed (ctd)

- Market risk is 'easier' to assess
 - There are more outlined rules and techniques
 - There are off-the-shelf systems and processes to assist
 - There is a greater level of education on market risk
 - It is easy to produce a lot of impressive-looking information based on historical data

Why Liquidity Risk Needs to be Actively Managed (ctd)

- Liquidity risk is more difficult to assess but extremely important to manage:
 - There are less off-the-shelf system solutions
 - There is a greater level of tailoring required (each situation is different)
 - Liquidity risk should not be summarised with a single number (market risk often is, but probably should not be either)

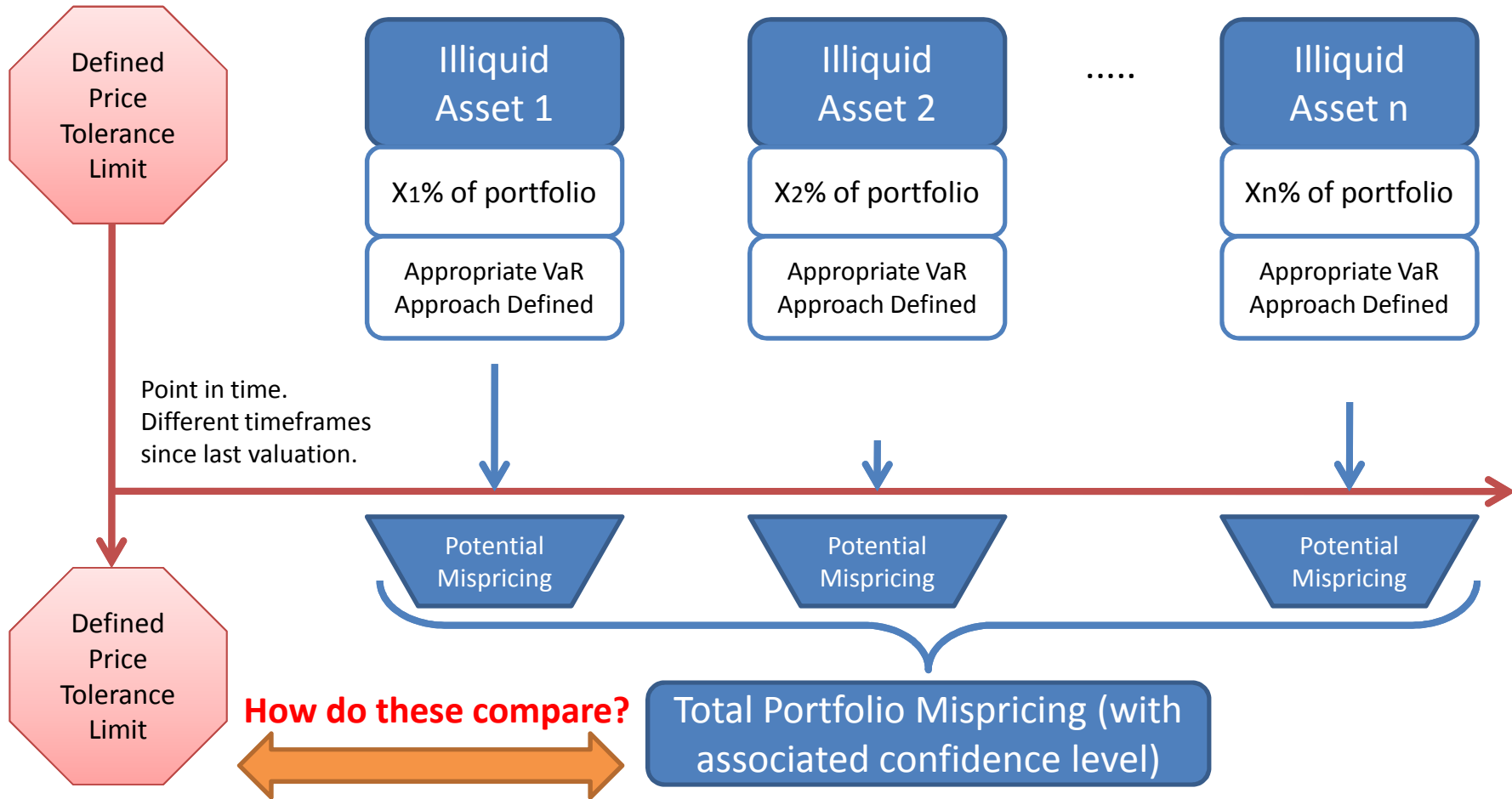
Suggested Framework for Managing Liquidity Risk



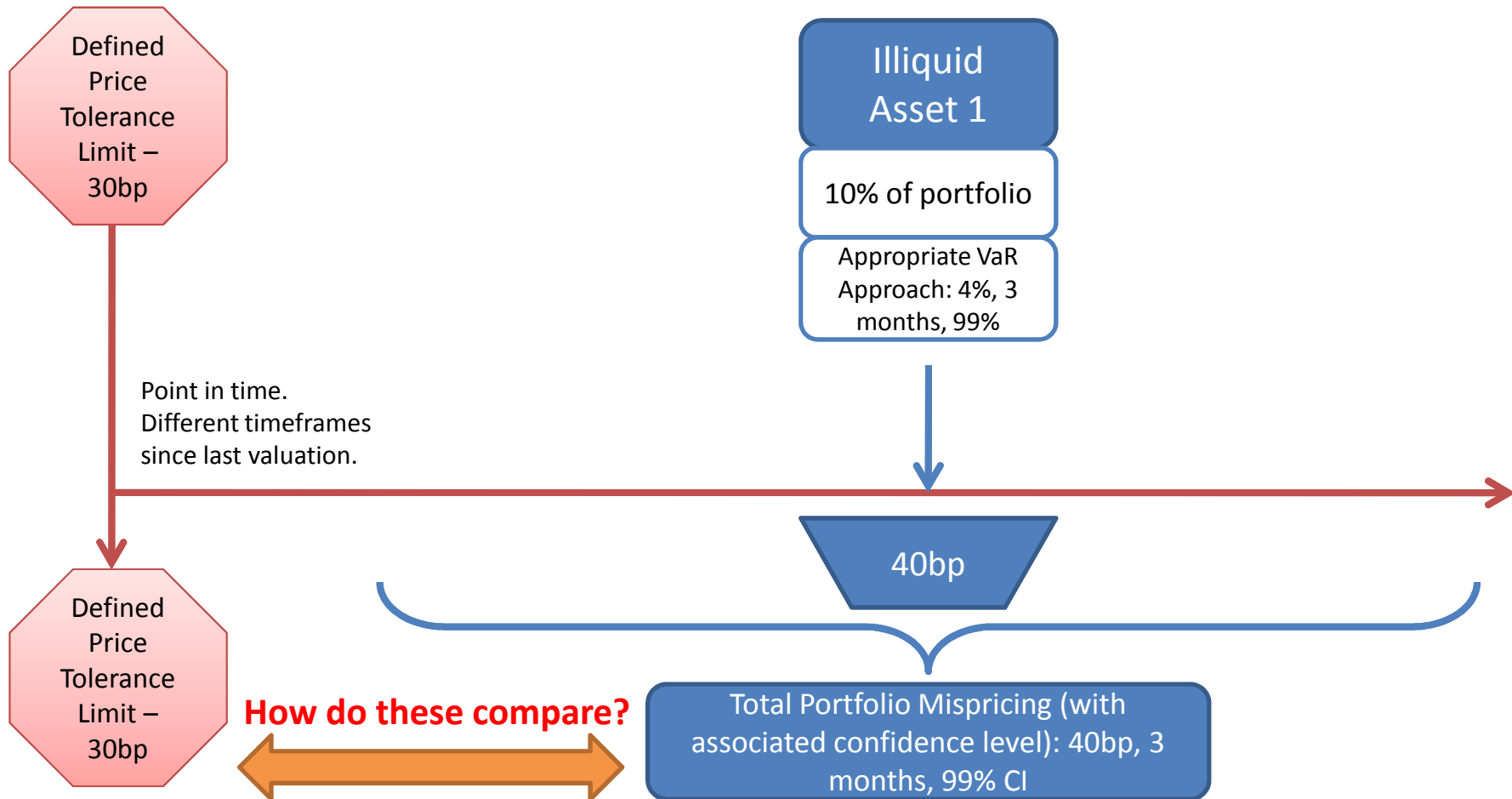
Suggested Framework for Stress Testing the Ability to Price a Portfolio Within Tolerance

- Define a price tolerance limit (eg. 30bp)
- For assets with less regular pricing frequency:
 - Determine a VaR approach that is conservative and appropriate to the asset class
 - Calculate VaR over the period since last price
 - Aggregate these VaR numbers for less-frequently priced assets and multiply to determine portfolio effect
 - Is the effect within tolerance?
 - If not, could widen tolerance limit (board / trustees would have to acknowledge this), or reduce allocation to less liquid assets

Suggested Framework for Stress Testing the Ability to Price a Portfolio Within Tolerance



Example of Framework for Stress Testing the Ability to Price a Portfolio Within Tolerance



Ramifications of Liquidity Stress Testing

For a portfolio:

- Less liquid assets are less attractive
- Assets which require additional maintenance (eg. Fx forwards for hedging) are less attractive
- Products which offer a 'false sense of liquidity' are very unattractive
- A controversial asset (eg. Uranium mine infrastructure) may affect both the demand for and supply of liquidity if it went sour

Ramifications of Liquidity Stress Testing

A stable client base is a competitive advantage:

- Could actively seek to have a more stable client base:
 - Diversifying the client base (HF's, FoHF's, MIS)
 - Communicate better
 - Portfolio composition, returns, expectations etc

Ramifications of Liquidity Stress Testing

Ramifications for a board / trustees:

- Should ensure a liquidity management process is in place
- Should be looking at results and asking questions – “What if...”
- Should have policies in place to deal with possible future events

Ramifications of Liquidity Stress Testing

The line between managing client outcomes and business (benchmark) risk is blurred:

- Underperformance of peers may lead to redemptions
 - ➔ This might be bad for the portfolio (costs, portfolio gets out of balance etc)
 - ➔ So how much should boards / trustees focus on client outcomes (sole purpose test) versus peer group analysis, particularly in an era of published league tables etc?
- There is no single answer but it is important that trustees have worked out where they stand

Legal Issues Linked to Liquidity Management

- Hedge Funds got very caught up in having to issue sidepockets
 - This appeared to be driven by legal advice to treat all investors fairly
 - It also allowed them to take new investors into 'clean' portfolios
- The threat of 'Hotel California' – you can check out but you can never leave
 - Potential for claw back if you were an early redeemer in a mis-priced or fraudulent fund
 - Has been some cases in hedge funds but some are also mooted for US pension funds and Australian super funds

Other Risks are Magnified by Liquidity Risk

- Key Person Risk
 - If a key person leaves a fund then there may be a rush to redeem
- Business Risk
 - If a fund is in a weaker position than peers, investors are likely to be more cautious (ie redeem sooner) if something goes wrong
- Investors into funds and asset managers of funds need to consider these issues

Key Issue Not Discussed

- Liquidity usually just focuses on exiting positions or funds etc
- The definition should be symmetrical ie. Consider the ability to enter positions, funds etc
- This creates a large number of issues and questions as well

Summary

- This is an extremely complex topic
- But it is one that cannot be ignored, because the downside can be severe
- Frameworks have been proposed for:
 - Understanding liquidity risk
 - Stress testing liquidity risk
- It is important that boards / trustees champion further development and implementation in these areas as well as provide a healthy level questioning