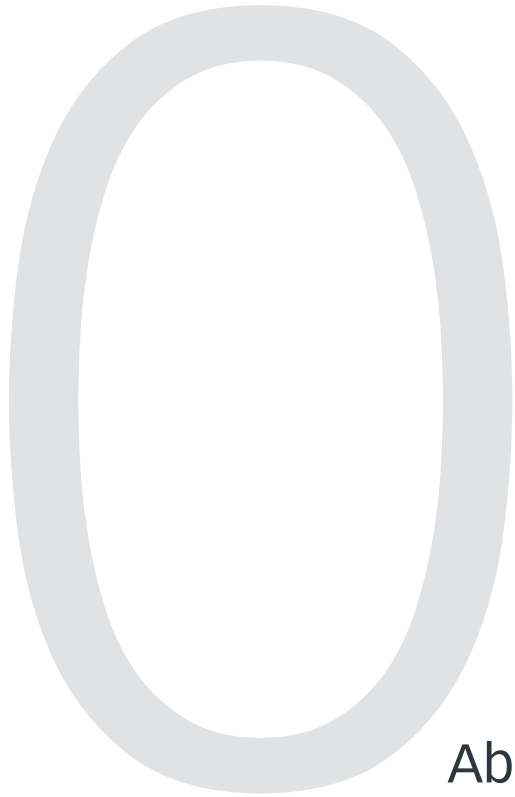


# Liquidity Risk from the Perspective of Asset Managers

PRMIA  
August 30th 2012

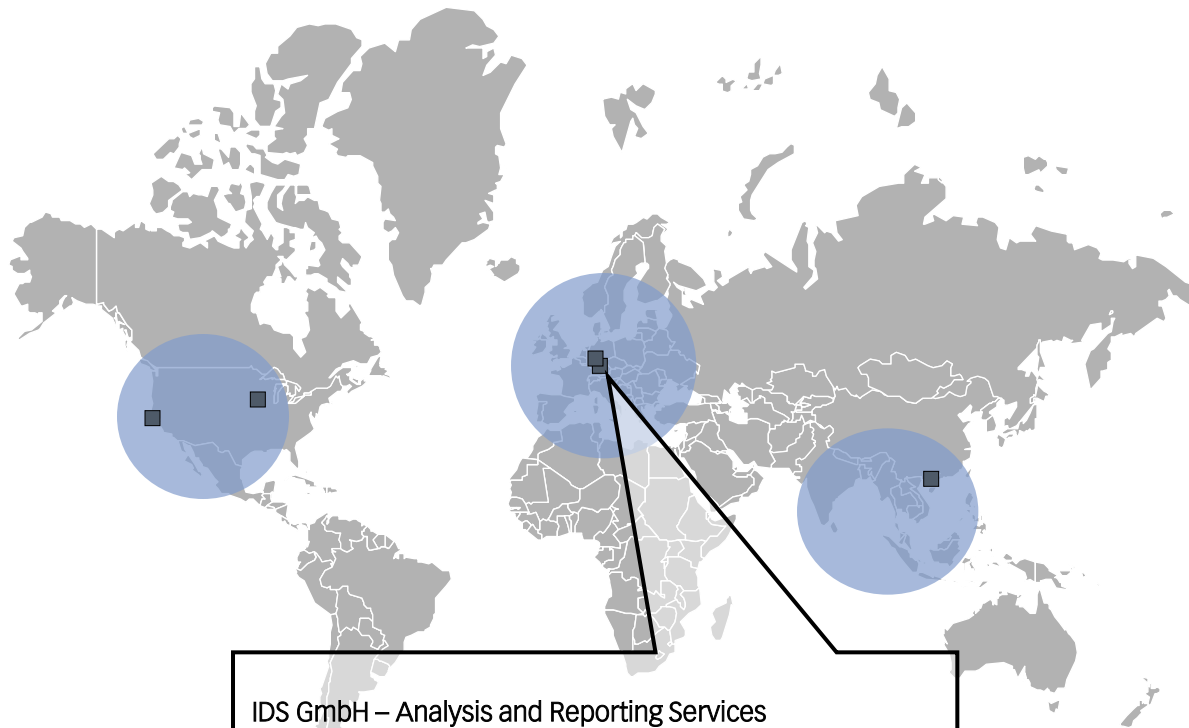
# Agenda

0. About IDS
1. Liquidity Risk issues for asset managers
2. Measuring the market liquidity of assets and portfolios
3. Assessing investors' behaviour
4. What may a liquidity risk controlling process look like?



About IDS

IDS is a managed service provider operating worldwide.



**IDS GmbH – Analysis and Reporting Services**

- 100% subsidiary of Allianz SE
- established in 2001
- Munich, Frankfurt/Main, Minneapolis, San Francisco and Hong Kong
- About 280 employees from more than 30 nations with sector-specific background

**Regions**

74% Europe  
16% Asia  
10% USA

**Industry**

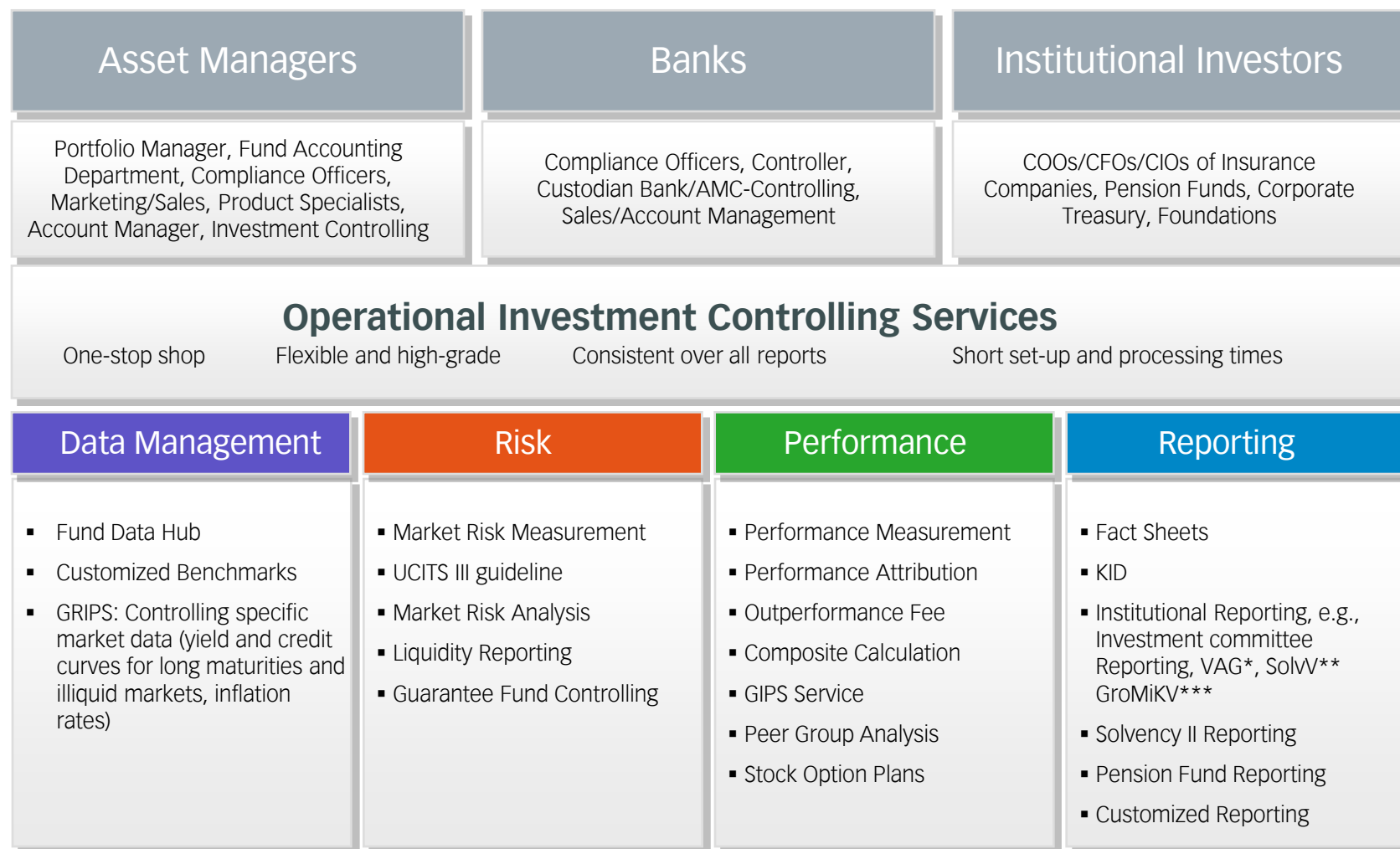
70% Asset Managers  
12% Insurance Companies  
9% Banks  
9% Other Sectors

**Segmentation**

61% Allianz Group  
39% Third Party

Statistics based on legal entities as at June 30, 2012

# IDS provides operational investment controlling services.

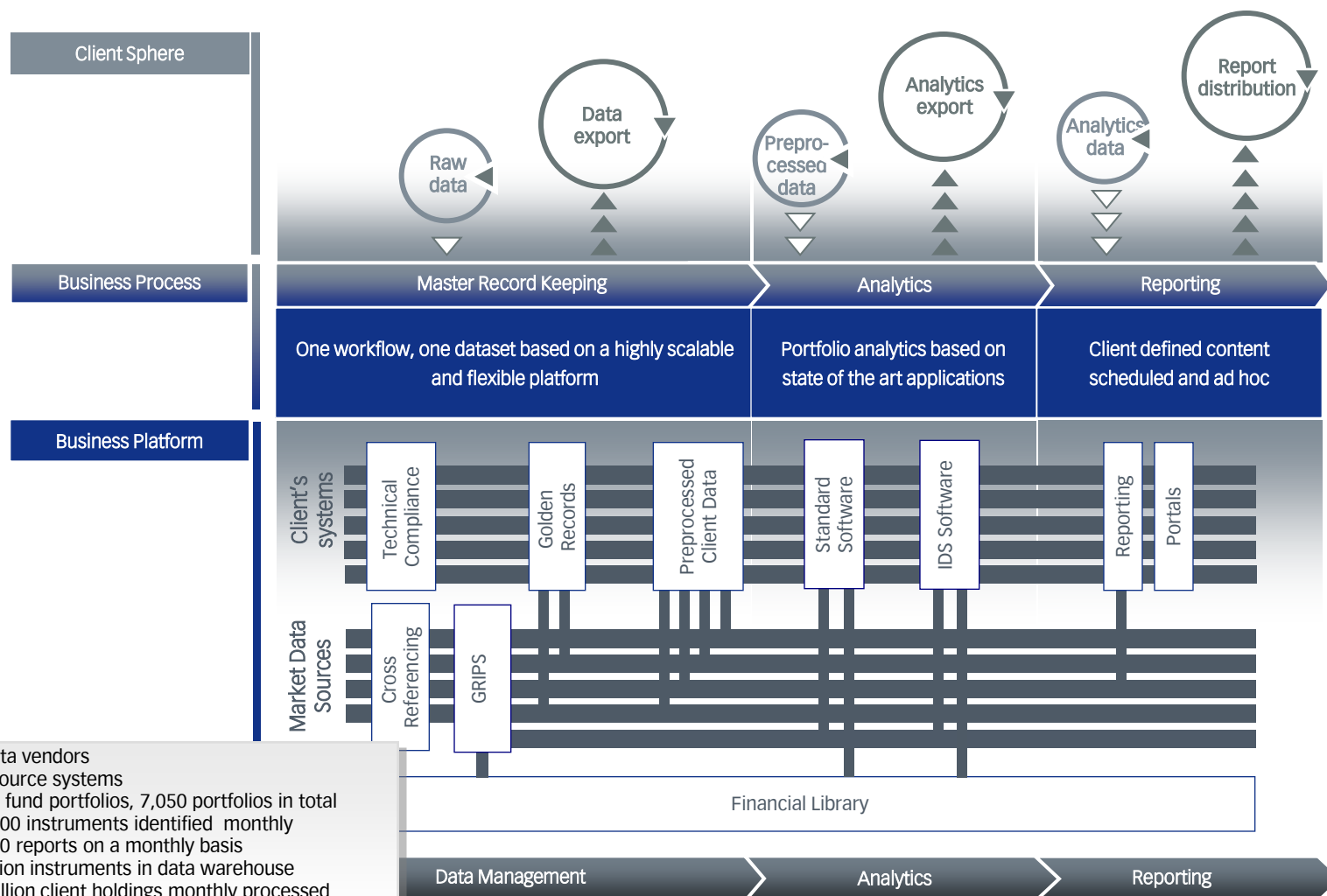


\* According to the German Insurance Supervision Act

\*\* According to the Solvency Act

\*\*\* According to section 13 and seq. of the German Banking Act and regulation governing large exposure and loans

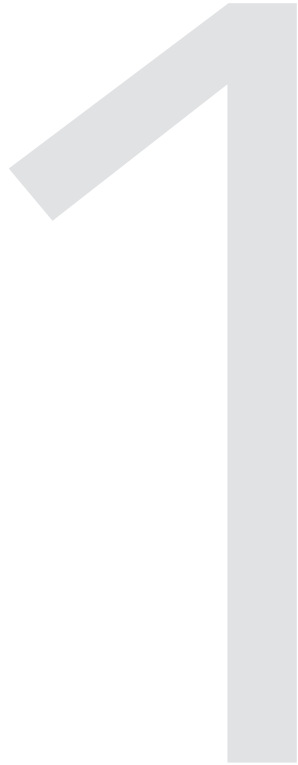
IDS offers a sustainable and scalable production platform.



50 data vendors  
 324 source systems  
 1,850 fund portfolios, 7,050 portfolios in total  
 229,000 instruments identified monthly  
 21,280 reports on a monthly basis  
 3 million instruments in data warehouse  
 50 million client holdings monthly processed  
 approx. 1,000 bn EUR assets under reporting  
 (as at June 30, 2012)

## Together with IDS our clients are successful

Client	Project	Highlights
one of Germany's largest asset management companies	full migration to the IDS platform	project completed in time (12 months) and within budget 6 new instruments implemented approx. 75% cost savings realized
one of world's largest real estate asset managers	implementation of UCITS III market risk measurement for mutual funds	project completed within one month content and layout of risk reports according to client's requirements
large pension institution	reporting for supervisory authorities and for investment controlling	sourcing of raw data from accounting systems completion of BaFin forms
internationally operating asset management group	realization of solvency calculation according to German solvency act as of Dec 16, 2006 for institutional investors	approved by audit on Jan 16, 2007 client was ahead of the market to deliver solvency reporting and strengthened relationship with major investors
one of the fastest growing US retail fund sales organizations	migration of the entire fund data handling process to the IDS platform in order to facilitate growth	optimization of processes and data quality as add-on done by IDS cost-benefit-ratio very attractive for the client



## Liquidity Risk issues for asset managers



# Regulatory Basis

## UCITS-compliant Funds

### UCITS Directive (85/611/EWG)/ Investmentgesetz (InvG)

- Shareholders may have redeemed their shares any time (i.e. every valuation day), but: redemption can be deferred.

### „Eligible Assets Directive“ (2007/16/EG)

- Instruments are eligible only if their liquidity does not compromise the ability of the UCITS to redeem shares.

### BaFin-Rundschreiben 5/2010 (InvMaRisk)

- Liquidity risk classified as „essential risk“
  - to be measured on portfolio level, for all portfolios, and for the Asset Manager as a whole
- Liquidity risk management process to be installed
- Stress tests on regular basis for all essential risks

# Key Liquidity Risks for Asset Managers

## Cash Outflows and Illiquid Assets

- Critical Scenarios
  - Investors wish to have **shares redeemed**, but the cash amount in the fund is not sufficient, and **assets cannot be sold** on short notice (or only fire sales are possible).
  - **Investment decisions** cannot be executed due to asset illiquidity (violation of limits, unwanted fund structure, bad fund performance).
- Asset Manager's Controlling will focus on ...
  - Assessment of **market liquidity of assets** (salability; maturities)
  - **Cashflows** forecast (statistics; sales activities)
- **Cost impact** of asset illiquidity is nice to have but not of key interest.

# BVI Method for Liquidity Risk Assessment

## Analysis of Assets and Cashflows

- Calculate the liquid part of a portfolio
  - Use **static** and **market data** to assess liquidity of an asset.
  - Sum up market values of liquid assets to obtain liquid part of the portfolio.
- Estimate possible cash outflows
  - BVI provides **outflow statistics**.
- Funds for which outflow estimate exceeds liquid part are subject to **further investigation** and follow-up action.

# Asset Managers' Action

Possible reactions when confronted with high outflows

- Asset fire sales
  - bad fund performance
- Defer share redemption
  - negative publicity
- AM (or parent) buy fund shares
  - entity forced to take risks that they don't want to take
- ... and at an early stage:
  - talk to sales channels/ key clients

# 2

Measuring the market liquidity  
of assets and portfolios

# Market liquidity of the „asset side“

Objects to be assessed

- Asset Liquidity
  - market liquidity of one single asset
  - market liquidity of an asset class: may serve as proxy for asset liquidity
- Portfolio Liquidity
  - aggregated market liquidity of a portfolio
  - possibly including interdependencies between assets

# Market liquidity of an asset

## Different dimensions of liquidity

- Tightness
    - costs when buying and reselling the same asset (round-turn transaction)
    - transaction costs, deviation from mid price (bid-ask-spread)
  - Depth
    - order size sensitivity of the asset price
  - Resiliency
    - time the price needs to go back to the old level after an external shock
  - Immediacy
    - time from order to execution
- Issues: data, model! → use proxies to describe asset (il)liquidity

## Measures and Proxies for Asset Liquidity

- Different dimensions and aspects of liquidity, but they are **correlated**
- Some liquidity measures available only for certain asset classes
- **Market data** for an asset or asset class ...
  - ... give **direct, quantitative** information
  - ... **move** with the market
  - ... don't show the future
  - ... are not available for all asset classes
- **Static data** and **expert knowledge** ...
  - ... give **qualitative** information
  - ... **have to be adapted** when market conditions change
  - ... can show the consequences of **expected or adverse future** market conditions



# Asset Decomposition

(statpro)

- Decompose illiquid asset into liquid ones (as for hedging purposes)
  - Bids and asks for liquid instruments can be **observed**
  - **Price formula** yields bid and ask for original instrument
- Stress test: use bid/asks from stress situations
- Additionally: **reductions deduced from asset static data**
- E.g.: illiquid **convertible bond**
  - **Interest Rate Swap** (against interest rate risk)
  - underlying **stock** (against delta exposure)
  - **Option** on that stock (against volatility risk)
  - **CDS** on issuer (against credit risk)

# Liquidity Cost Scores

## (Barclays)

- Define bond's liquidity as **cost** of immediately transforming the bond to cash and back, for „normal trade amount“.
  - Use bids and asks
  - Based on Barclays **traders' pricing**
  - Non-quoted bonds' LCS is estimated using LCS of quoted bonds with **similar characteristics** (sector, subordination, size, age, ...)

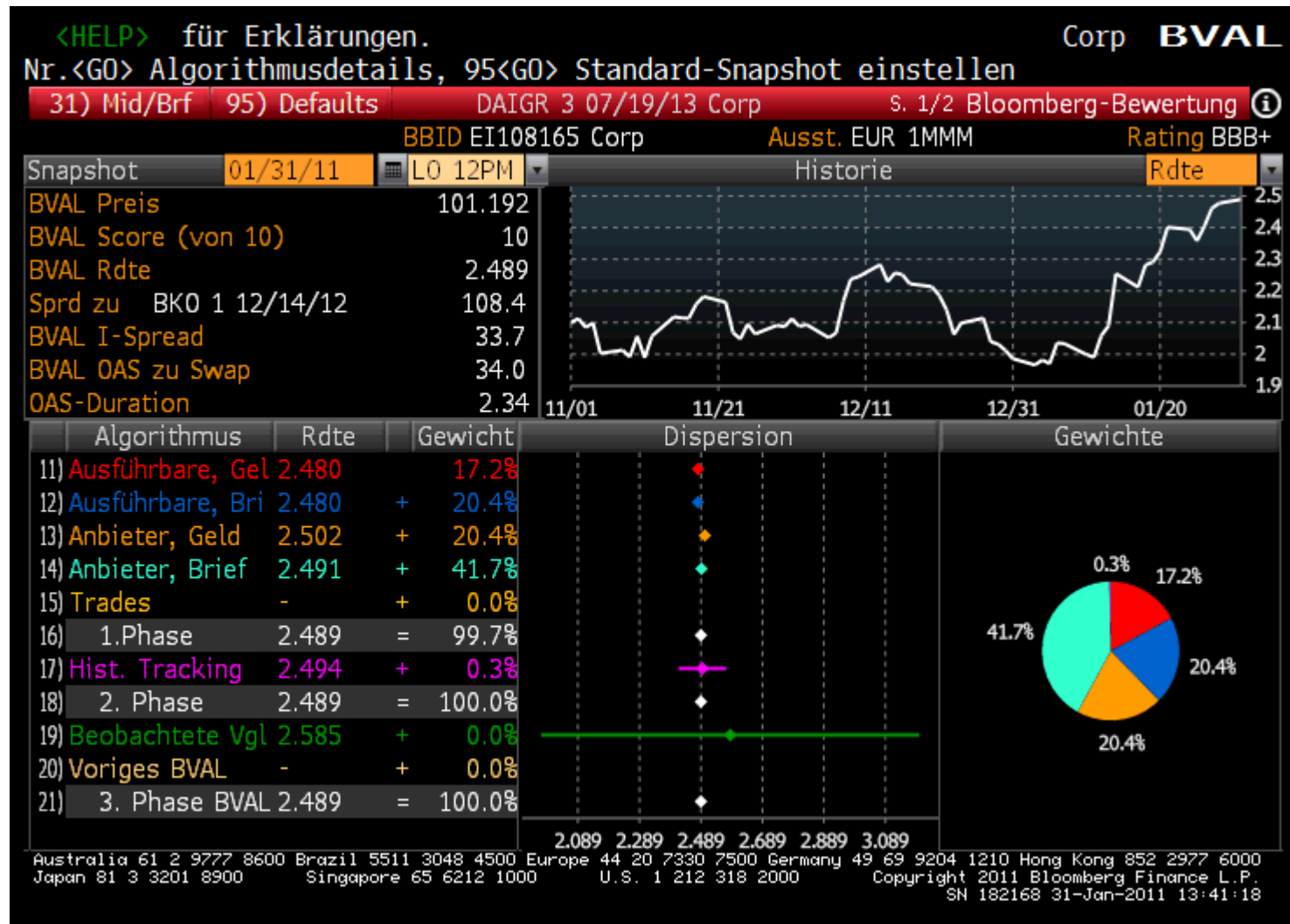
## Data Quality

### Bloomberg BVAL

- **Observation:** If an asset is infrequently traded, there are only **few market data**, and they do not have good quality.
- Bloomberg BVAL determines price for an asset based on available market data:
  - traded prices
  - indicative prices
  - similar assets
  - model prices
- **BVAL-Score** ( = data quality) indicates asset liquidity

# Data Quality

## Bloomberg BVAL (2)



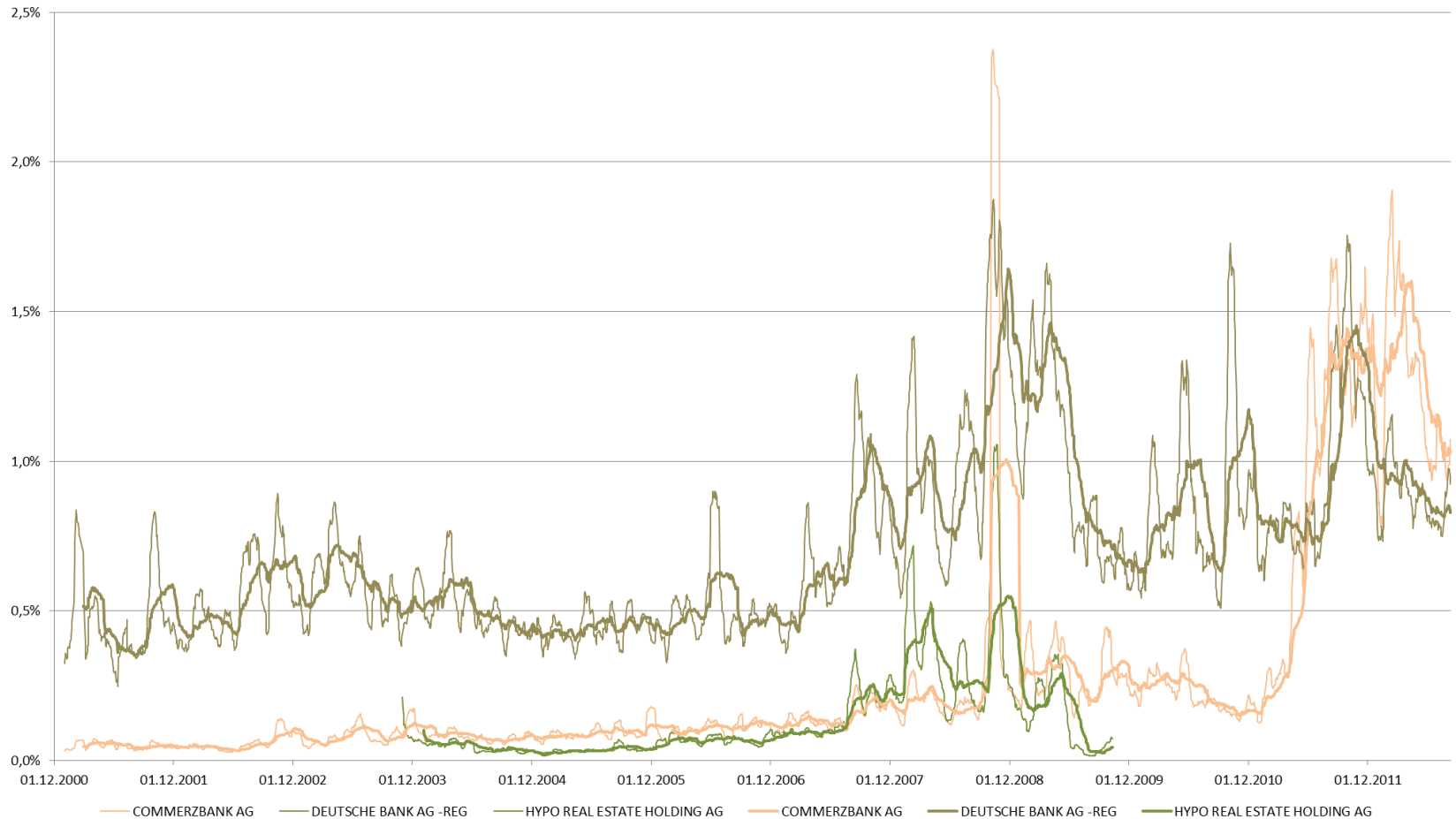
## Indicators for Stock Liquidity

### Traded Volume/ Stock Disposal Time

- Stock Disposal Time (SDT): stock holding divided by average traded amount
- Low SDT indicates that position can easily be unwound
- Warning: Traded volume **increases in a crisis!**
- Periodicity (derivatives expiry dates)
- Results will depend on free float.

# Indicators for Stock Liquidity

## Traded volume of bank stocks



Average traded volume over 20 and 60 days respectively, in percent of issued shares

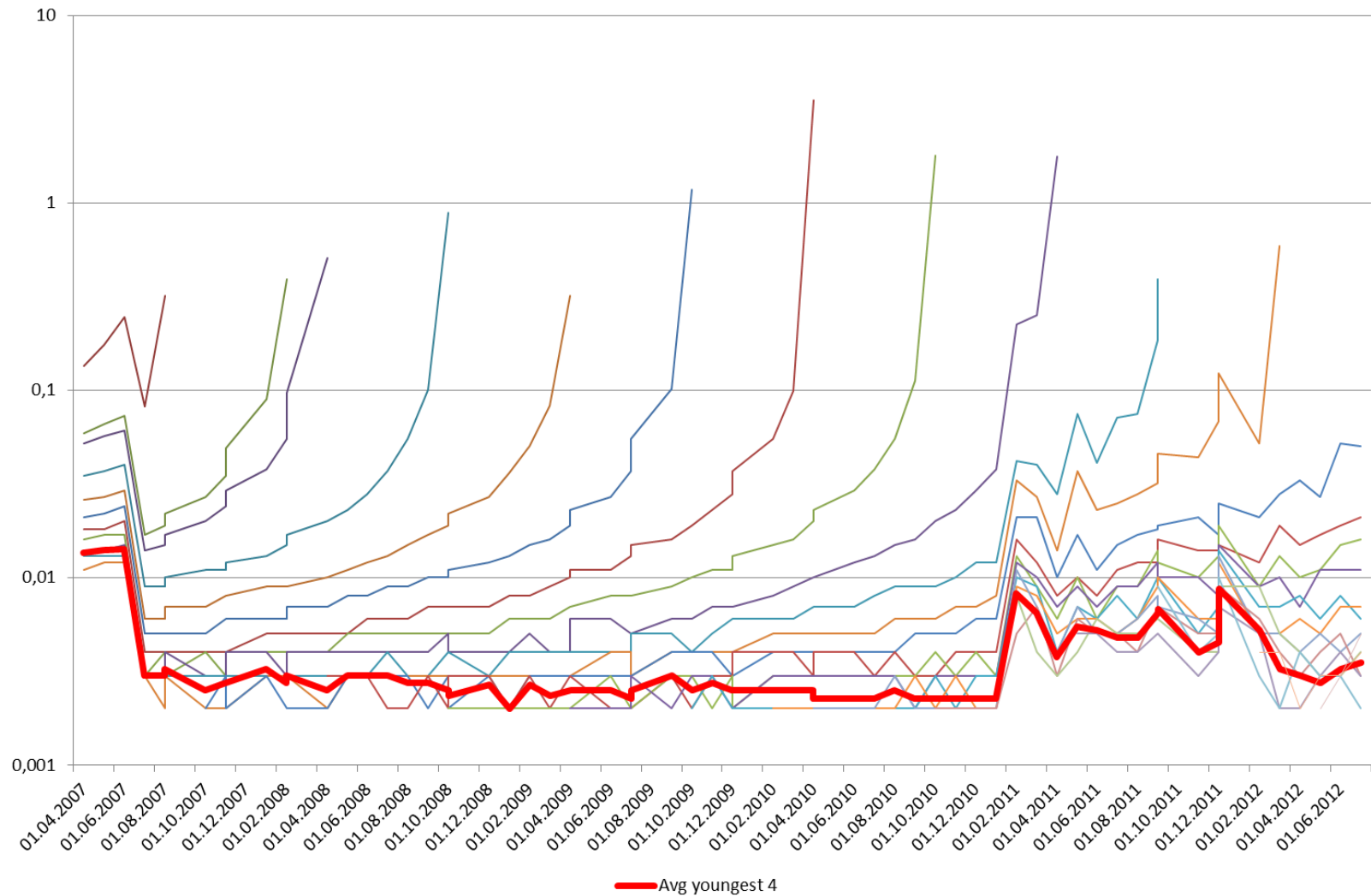
# Indicators for Bond Liquidity

## Spread between Bid and Ask Yields

- Data available for **large universe** of government and corporate bonds.
- But: Data quality has to be monitored!
- Spread depends on bond static data.
- Spread grows with age of the bond (on-the-run bonds are more frequently traded; off-the-run bonds are rather held to maturity).
- Select **representative bonds** to examine market situation.

# Indicators for Bond Market Liquidity

## Bid/Ask Yield Spread of Bobl (in percentage points)





## Measures for Liquidity Risk on Portfolio Level

- Show liquidity levels on asset basis aggregated by market value (for qualitative and quantitative measures)
- Calculate an average liquidity measure (for quantitative measures)
- Take into account interdependencies, i.e. first sell assets that are easy to sell.

### Liquidity-adjusted Value at Risk (LVaR)

- Reduce (market risk) VAR by illiquidity markdown
- Reduction can be static or random

# Mark-to-Liquidity (MtL)

MSCI (RiskMetrics)

- Liquidity as a parameter when **valuating** a portfolio
  - assumption: x% should be available in cash
  - system tells which assets to be sold first
  - extreme cases: mark-to-market (0%), immediate liquidation (100%)
- Marginal Supply-Demand Curve (MSDC) **to model order book**
  - **calibration** needed for each market
- Further **investment restrictions** can be included.
- Valuation is non-additive.

## Example: MSDC bei Mark-to-Liquidity (MtL)

MSCI (RiskMetrics)

$$m(x) = \begin{cases} S_{bid} \left( 1 - \gamma \sigma \frac{x}{V} \left( \frac{\Theta}{V} \right)^{1/4} - \frac{8}{5} \eta \sigma x \left| \frac{x}{VT} \right|^{3/5} \right), & x > 0 \\ S_{ask} \left( 1 - \gamma \sigma \frac{x}{V} \left( \frac{\Theta}{V} \right)^{1/4} - \frac{8}{5} \eta \sigma x \left| \frac{x}{VT} \right|^{3/5} \right), & x < 0 \end{cases}$$

### general

- $m(x)$ : last price hit in a trade of  $x$  stocks
- $x$ : number of stocks traded (bid if  $x > 0$ , ask if  $x < 0$ )
- $T$ : trade time horizon

### asset specific

- $\Theta$ : outstanding issued stocks
- $V$ : average daily volume
- $\sigma$ : 1-day volatility

### universal

- $\eta = 0.142, \gamma = 0.314$ : empirically estimated coefficients
- $1/4, 3/5$ : empirically estimated exponents

Quoted from: Carlo Acerbi: *Valuing Liquidity*. Web presentation on Nov 17, 2010

# 3

Assessing investors' behaviour

# Cash Flows

## Understanding the liability side

- Portfolio **characteristics** allow **coarse estimate** of customers' behavior.
  - Institutional funds, life cycle funds, ...
- **History** of cash flows allows statistical analysis.
  - **Time series analysis** explains dynamics over time.
  - **Extreme value theory** takes into account extreme outflow scenarios.
- **Current cash flow data** are a basis for **estimate** of future outflows.

## Liquidity at Risk (LaR)

- Liquidity requirement that will not be exceeded with some probability over a given period of time

# Qualitative Criteria for Future Cash Outflows

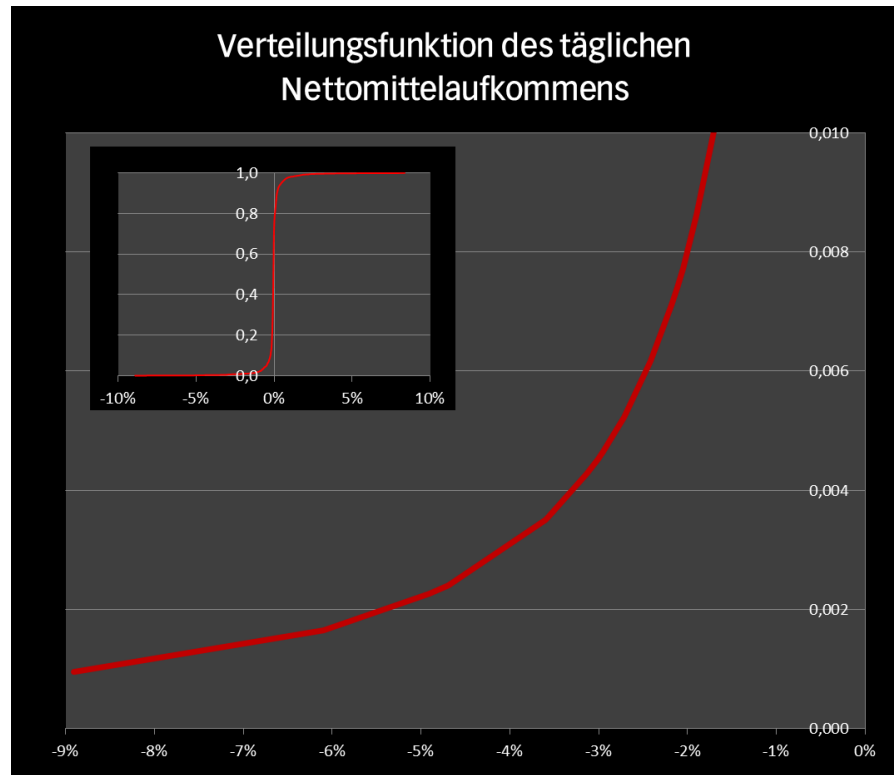
Are there indications for increased redemptions?

- **Investors' structure** (mutual funds/ institutional funds/ own funds/ seed money)
  - Direct contact to institutional investors (especially single-client funds) may keep investors in the fund, or at least help to forecast outflows.
  - Own funds can serve as buffer.
- **Fund strength** (fund performance, market performance, fund rating)
  - Outflows from funds with poor performance or invested in bear markets are more likely.
  - Bad ratings or downgrades influence investors and sales partners.
  - Changes in regulation may make a fund less attractive.
- **Sales focus**
  - Sales partners suggest redemption of shares.
  - Institutional investors announce redemptions.

# Quantitative Indicators for future cash outflows

Are there statistical forecasts on future outflows?

- Largest historical cash outflows (own data or industry data)
- Ongoing analysis of cashflows / trend analyses
- Extremal Value Theory (EVT):



## Sketch

Use time series of daily cashflows to model distribution function (fat tails)  
→ Generalized Pareto Distribution

Extrapolation on longer observation horizons (1 month, 1 quarter, 1 year)

LaR: Quantile of cash outflow for a certain period of time

Scale laws

# 4

What may a liquidity risk controlling process look like?



# Theses on Liquidity Risk Controlling

## What is Important for an Asset Manager?

- Liquidity Risk Controlling is driven by regulatory requirements.  
(For each fund, the portfolio manager himself will know best the liquidity status of his portfolio.)
  - Find solution which consumes **few ressources**: fulfill legal requirements, additional information would be nice to have.
  - Controlling Processes should be **robust** and **consistent**: Sophisticated methods need maximum data supply and data quality.
- Asset Managers have a **wide range of asset types** in their portfolios.
  - Overview reporting that covers all fund types
  - Bespoke reportings for different fund types
- **Acceptance by the fund management** and the **integration into the management process** are **success factors**.
  - Involve these departments when implementing criteria.

# Management Process in Practice

How to get the whole image?

Initially: fixation of **risk strategy, controlling procedures, and limits**

## **Ongoing monitoring and controlling of liquidity risks:**

1. Assessment of **outflow scenarios** / exploration of market development or clients' behaviour (sales, product management, risk controlling)
2. Assessment of **funds' asset liquidity** (risk controlling)
3. **Identification** of potentially critical funds (risk controlling)
  - funds with limit breaches
  - funds on watch list
4. **Review** of controlling results according to product, customer, and market conditions (liquidity committee: risk controlling, fund management, product management, sales)
5. Deduction and implementation of **actions to be taken**
  - sales activities
  - create liquidity
  - defer redemption

# Standard and Stress Scenarios

Expected and potential developments

## Standard scenario

- Market liquidity of assets **as currently observed**
- **Expected** cash outflows
- Assessment **may change over time**, due to market movements

## Stress scenarios

- **Liquidation** of certain assets or asset groups **more difficult**
- **Unexpectedly** high cash outflows
- Scenario definitions
  - „technical scenario“
  - potential adverse market developments

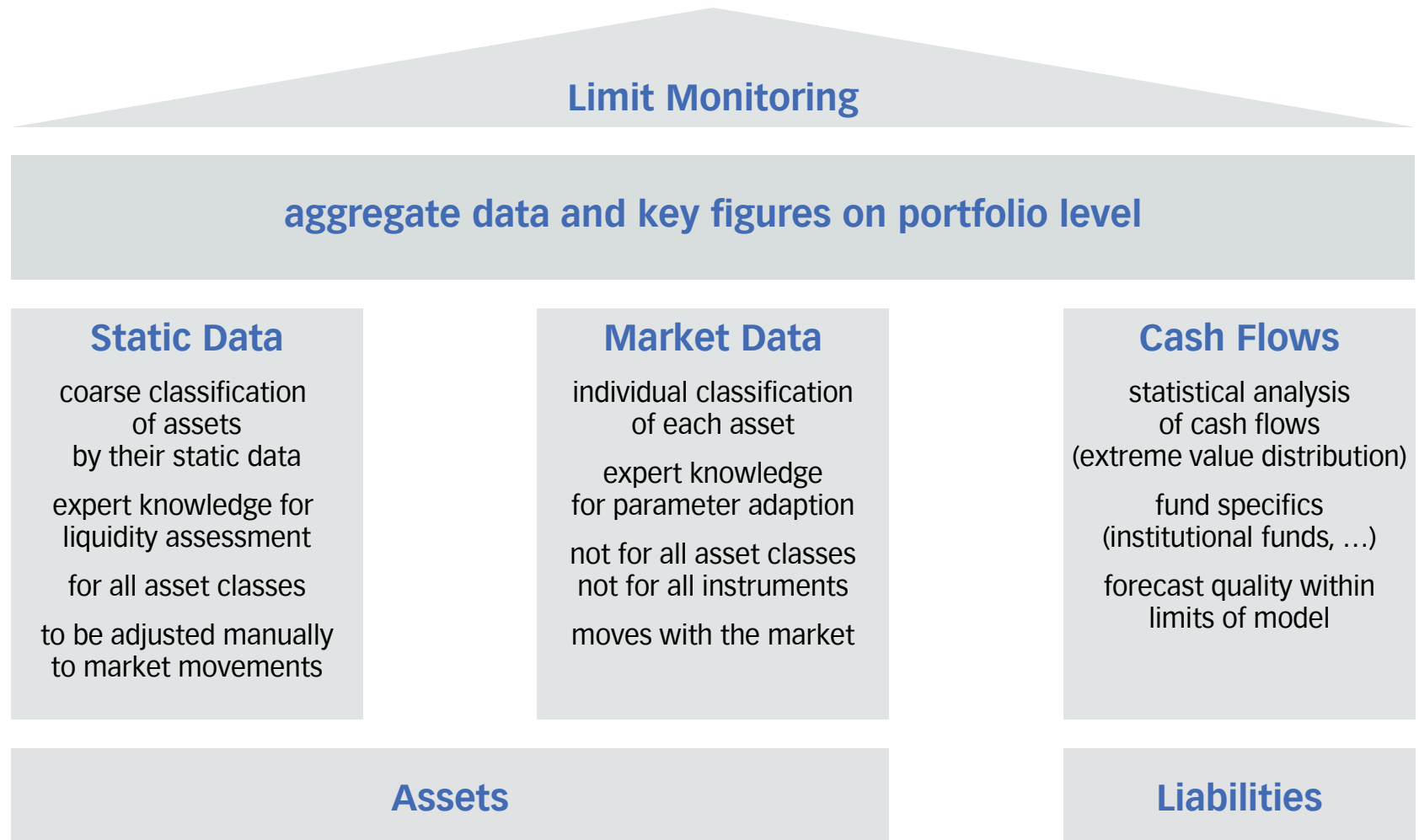
# Scenario Analyses

## Inspection of stress scenarios

- Aim: Impact of **potential market developments**?
- **Experts propose** scenarios to be investigated:
  - Makro-economic expectation
  - Opinion of portfolio managers, trading desk, etc.
- Results:
  - Which portfolios are critical under certain market developments?
  - For which portfolios a market development would have a severe impact?

# IDS Liquidity Reporting

Your toolbox for a comprehensive reporting



## IDS Liquidity Reporting

- Asset classification based on **static data**, enhanced by SDT and bid/ask yield spread
- Aggregated liquidity layers on portfolio level, plus aggregated key figures
- Criteria and scenarios **defined by asset manager** and to be changed over time
- Historical cashflows as estimate for future ones
- Limit Monitoring
- **Audit-proof** data storage

# Liquidity Risk from an Asset Manager's Perspective

## Summary

1

Liquidity risk has different aspects and several measures.

2

Industry standards are evolving, best practices are to be established.

3

Robust and simple reporting gives meaningful insight and saves resources.

# Thank you for your attention.

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## Further Questions?



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