Dr. Boris Neubert

Monitoring and Management of Liquidity Risk in Security Funds

Quant Talk
Frankfurt School of Finance and Management
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Agenda

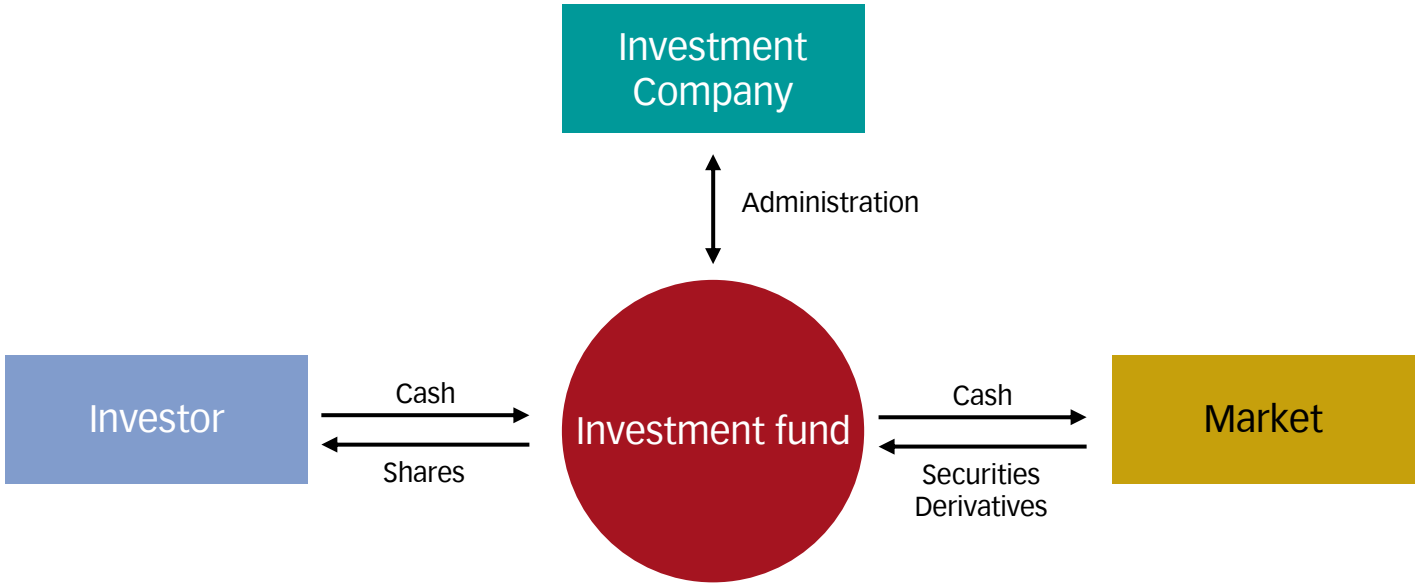
1. Definition and overview

2. Liquidity controlling based on static data

3. Conclusions

1 Definition and overview

What is an investment fund?

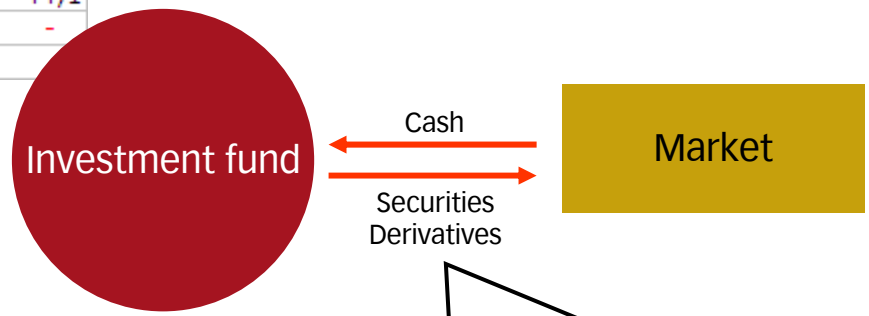


Investment fund

- special property of investors administrated and managed by third party
- strong regulation by financial supervisory authorities, e.g.
  - Directive 85/611/EC (UCITS directive)
  - Investmentgesetz (InvG, German Investment Act)
  - InvMaRisk (Minimum Requirements on Risk Management for Investment Companies)

What is an illiquid asset?

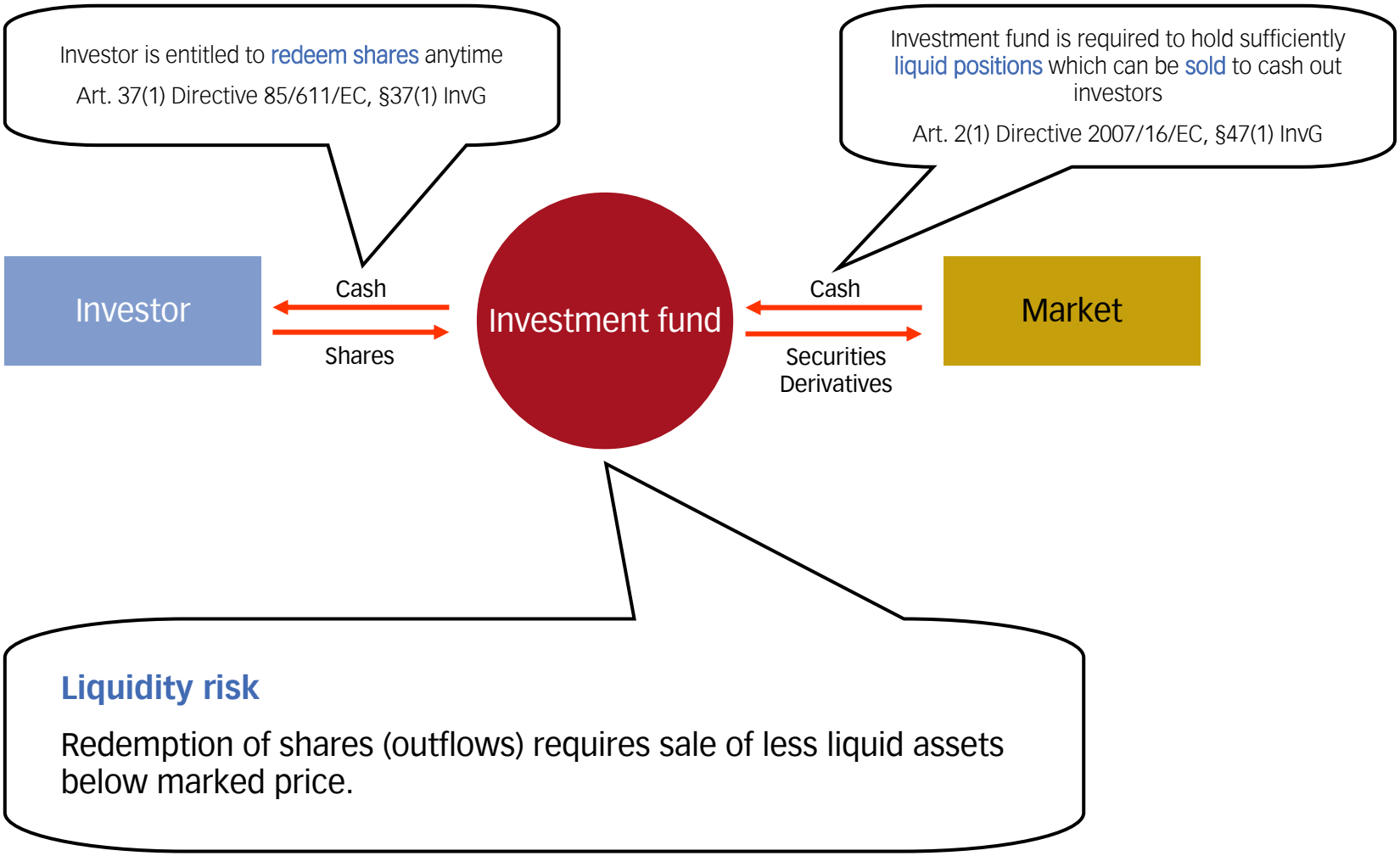
Asset	marked at	ask price
Bond A	87,4	87,0
Bond B	92,0	80,0
ABS	50,0	10,0
Stock	44,2	44,1
Fund	143,2	-
...	...	...



Illiquid asset

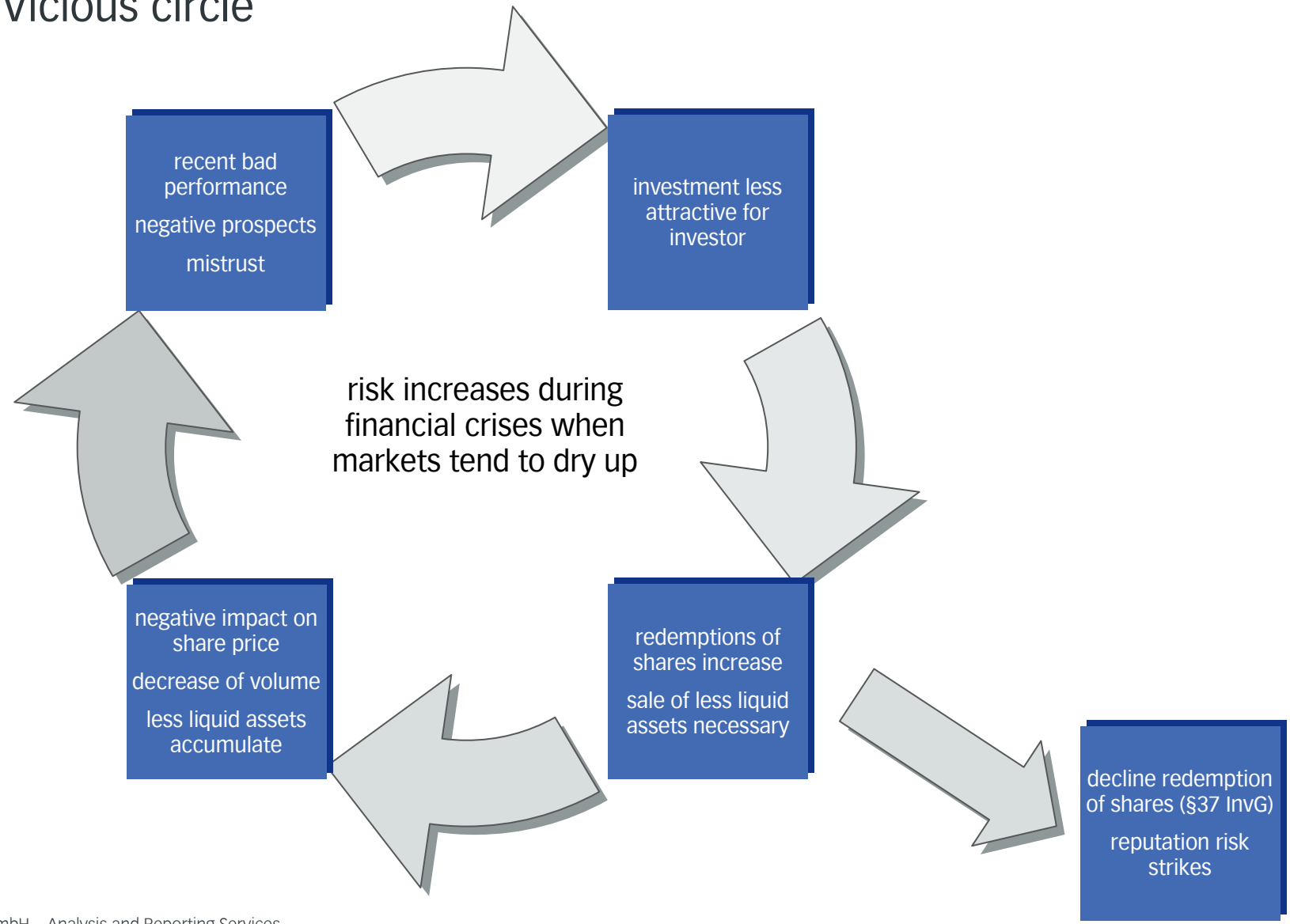
- high markdown in case of short-term liquidation
- long time to market for a sale at fair value
- high hurdles for redemption (e.g. for hedge funds, real estate funds, toxic papers)

What is the origin of liquidity risk in investment funds?



What are the drivers of liquidity risk in investment funds?

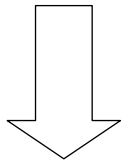
Vicious circle



Conclusion: liquidity risk controlling is a necessity

Regulatory and economic reasons

- Increased perception of regulatory requirements on liquidity controlling (cf. InvMaRisk 2010, IDW position paper 2007).
- Experiences from latest financial crisis:
  - even „healthy" assets can only be sold with markdowns
  - missing liquidity not abstract issue but concrete threat
- Monitoring of liquidity risk in investment funds is a regulatory and economic necessity.



appropriate state-of-the-art realization required

liquidity under control

2 Liquidity controlling based on static data

Various approaches for liquidity risk measurement
Exemplary selection

Barclays Capital: Liquidity Cost Scores (LCS) for US Bonds

(Bid-ask spread multiplied by the option adjusted spread duration of the bond)

For non quoted bonds the LCS is taken from a comparable bond.

Statpro approach

Similar to what is presented later

In addition, so-called haircuts may be defined for individual asset classes (pricing functions) to quantify liquidity risk as expected markdown on immediate sale.

Mathematical Theory

Acerbi, Scandolo: Liquidity Risk Theory and Coherent Measures of Risk.

Highly abstract theory of so-called coherent risk measures.

Based on assumptions about "Marginal Supply-Demand Curves" (Bid-ask price as a function of sold quantities) .

Theses on Liquidity Controlling

- Fulfillment of legal requirements is a must.
- Meaningful liquidity key figures must be consistent and reliable.
- The framework should be consistent over all funds*.
- Standard reports should be generated in an automated form.
- Ad hoc reports for risk controlling, senior management and for the requirements of the investment process should be obtainable on short notice.
- Workflows and controlling procedures should be efficient, such that there is spare capacity for actual controlling analyses.
- Acceptance by the fund management and the integration into the management process are success factors.

*framework presented here is for security funds, thus excluding property funds, private-public-partnership funds and micro-finance funds

Comparison of methods for determining liquidity

	based on market data ▪ traded volumes ▪ bid-ask-spreads	based on static data ▪ asset specific attributes (indicators)
advantages	▪ changes can be read from the market situation continuously	▪ complete: can be done for any asset anytime ▪ field-proven
disadvantages	▪ incomplete: availability of market data not given for every asset, especially not for illiquid assets ▪ market data sourcing very complex and costly	▪ assets are not assessed individually ▪ requires continuous monitoring of markets and adjustments of liquidity assessment

Function specification (1/4)

Measurement based on static data of the securities

- Sort assets into boxes (liquidity classes) according to asset specific attributes.
- Liquidity of assets in a box is determined by the box's liquidity grade.
- Grades in agreement with IFRS requirements with respect to liquidity. (→auditors like it)

green (grades 1 – 3) liquid:	contract partners can be found at any time prices are available to the public [IAS 36]
yellow (grades 4 – 6) fairly liquid:	prices hard to obtain immediate sale impossible
red (grades 7 – 8) not liquid:	prices not available sale impossible
grey (grades 9 – 10): not classifiable	bilateral contracts (e.g. OTC derivatives) missing data

- General procedure established in some German investment firms.
- Consistent and objective communication and decision making throughout the organization up to the top management.

Function specification (2/4)

Instrument types and appraisal criteria

- Bonds and Commercial Papers:
  - Instrument type
  - Type and credit-worthiness of the issuer
  - Currency
  - Amount outstanding
  - on-the-run/off-the-run
- Equity
  - Indices
  - Exchanges
- Derivatives, Certificates
  - Basis value
  - Complexity
  - Transaction form (OTC, exchange-traded)
- Target fund
  - open/closed
  - ETF?
  - Regulated/Non-regulated
  - Instruments within the fund

System of rules for the classification of individual assets

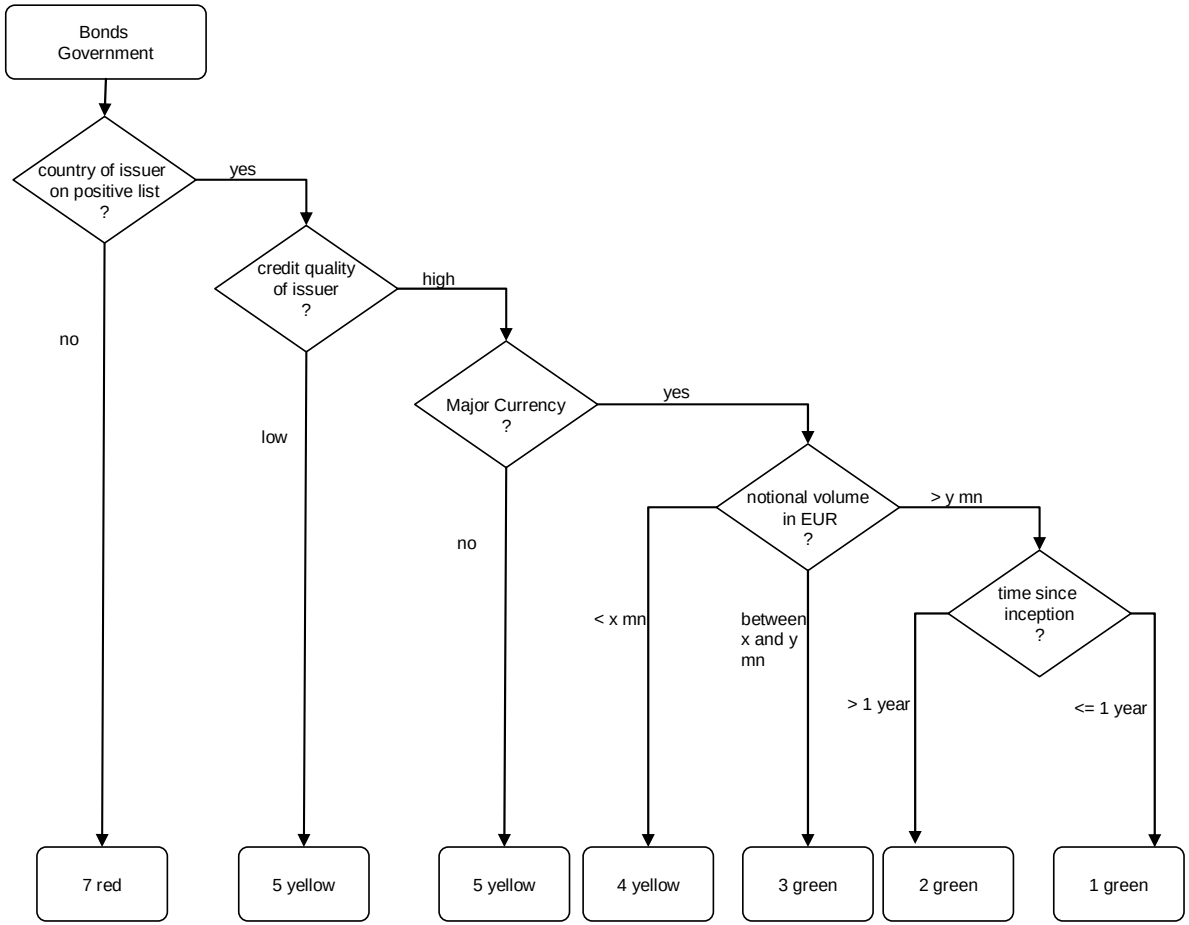
+

Accompanying list of known (il)liquid securities

e.g. target funds with a lock-up period, real estate funds which are temporarily closed for redemptions, Madoff-contaminated fund of funds, …

Function specification (3/4)

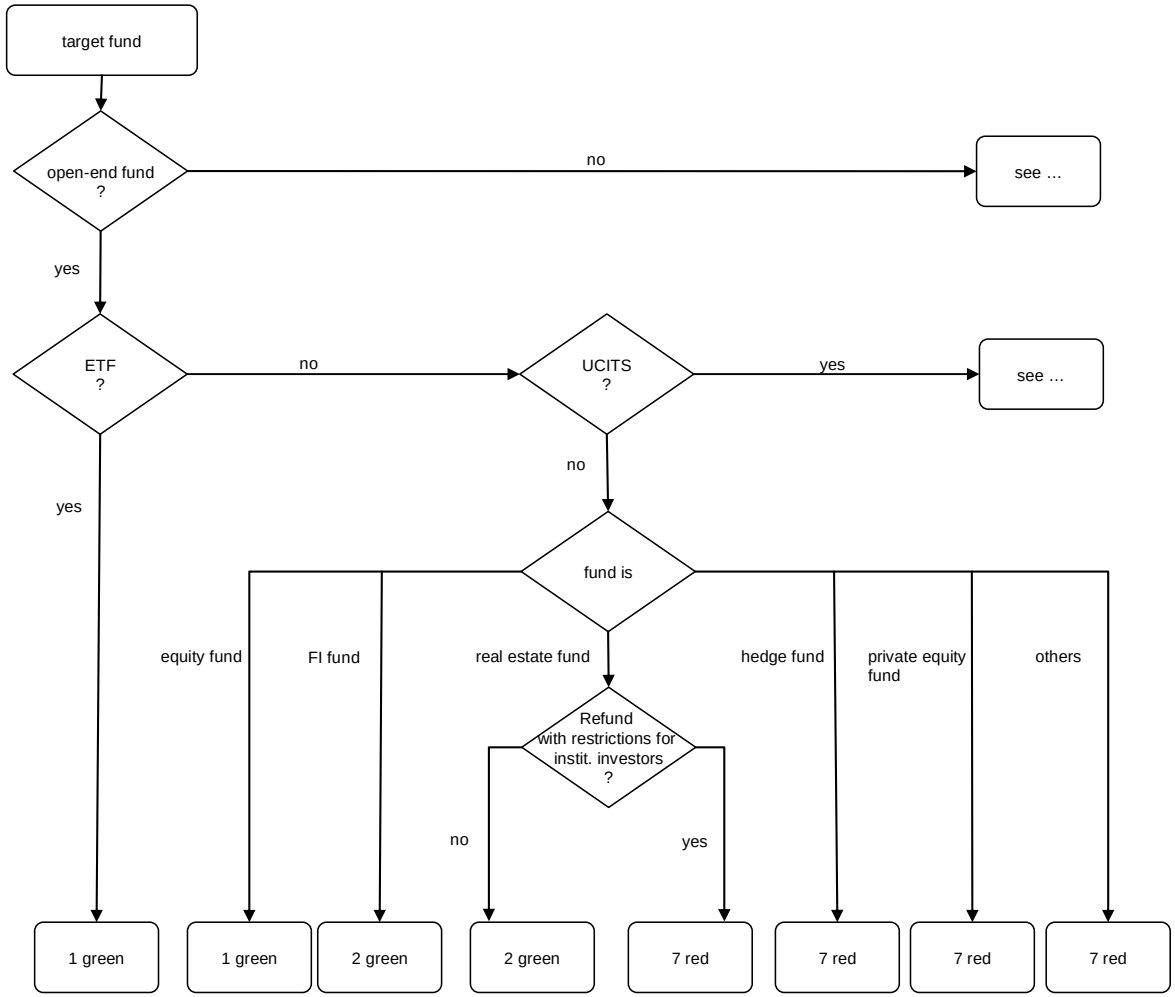
Example: Government bonds*



*IDS function specification covers all asset classes in terms of a comprehensive rules tree.

Function specification (4/4)

Example: Investment funds as assets within the fund



Reporting (1/2)

Which funds have the highest share of illiquid positions?

9/3/2009

Fund identifyer	Fund name	Fund NAV	illiquid	Graph	red	yellow	green	grey
56387	ABS-Fonds 1	204,555,673 €	95.5%		95.5%	0.0%	4.5%	0.0%
69467	USD Corporate Bonds	107,883,212 €	94.3%		31.2%	63.1%	5.7%	0.0%
81855	EUR Corporate Bonds	88,416,808 €	93.8%		35.1%	58.7%	6.2%	0.0%
20333	Laufzeitfonds 08/2010	22,479,741 €	92.1%		92.1%	0.0%	7.9%	0.0%
68293	Wandelanleihenfonds	70,878,747 €	90.8%		88.3%	2.5%	9.2%	0.0%
56648	Unternehmensanleihenfonds	93,176,032 €	90.4%		28.0%	62.4%	9.6%	0.0%
90902	Genußscheinfonds 1	96,626,581 €	90.2%		87.8%	0.0%	9.8%	2.4%
46207	ABS-Fonds 2	11,498,536 €	82.5%		82.5%	0.0%	17.5%	0.0%
51715	Tax Optimized Fund	464,370,542 €	80.3%		44.2%	36.1%	19.7%	0.0%
69124	Genußscheinfonds 2	76,346,493 €	77.1%		70.1%	7.0%	22.9%	0.0%
69531	Money Market Enhanced Fund	7,240,008 €	75.5%		0.0%	75.5%	24.5%	0.0%
92702	Top Immobilien	2,017,746,117 €	70.3%		35.0%	35.3%	29.7%	0.0%
...	...	...	...	...	...	...	...	...

Consistent overview of potential critical funds across all funds irrespective of the security classes.

Reporting (2/2)

Liquidity layering of an investment fund

9/3/2009	Fund #4			
ISIN	Name	Market Value	Liquidity	
DE000A0KAV21	BERLIN 4.250 04/22	2,349,485 €	2	
DE0001731990	RHEINL. 4.250 03/18	2,316,930 €	2	
XS0301023049	GE CAP 4.375 03/11	699,756 €	5	
XS0291394152	DAIMLE 4.375 03/10	1,162,556 €	4	
XS0307699701	DANSKE 4.750 06/12	728,952 €	5	
DE000A0SLJ42	LDKRBK 4.125 04/13	2,333,182 €	3	
XS0357836955	FORTIS 5.500 04/11	701,494 €	4	
XS0353963225	DEUT.B 5.000 04/13	234,353 €	5	
DE0008021809	BAY.HY 6.750 /	770,086 €	8	
DE000LBW28C1	LBBW 4.500 12/09	3,580,586 €	2	
DE000DXA1LF0	DEX.KO 4.250 04/10	1,401,852 €	3	
DE000A0B1QY7	WESTF. 4.375 09/14	2,389,299 €	5	
DE0003678421	DT.KRE 3.750 11/11	1,167,738 €	3	
...	...	...		
DE000A0KP056	SACHSE 4.000 09/16	2,338,664 €	3	
DE000NRW1ZM6	LAND N 4.000 11/14	2,350,254 €	3	
DE0001135226	BUNDAN 4.750 07/34	3,720,517 €	2	
XS0184468550	BAY.LD 4.375 01/14	2,369,693 €	3	
FR0010415331	REP. F 3.750 04/17	4,708,060 €	2	
DE000A0S8KS8	K.F.W. 4.625 10/12	2,449,383 €	3	
DE0002479953	DISC.C 5.250 12/10	2,072,166 €	8	
XS0352745458	LANDWI 3.750 04/13	2,308,515 €	3	
XS0253170335	DONG E 4.625 06/11	241,625 €	5	
		99,462,099 €	**2.98**	

Liquidity		%	
1		0.0%	84.0%
2		39.9%	
3		44.1%	
4		2.4%	13.2%
5		10.8%	
6		0.0%	
7		0.0%	2.9%
8		2.9%	
9		0.0%	0.0%
10		0.0%	

Scenario analyses

Risk Controller

Scenario

Expert

Change in the liquidity assessment	Change in the asset classification	Updating the single securities list
e.g. Scenario „covered bonds fairly liquid“ Adoption of the liquidity grades	e.g. Scenario „PIIGS critical“ Adoption of the rules	e.g. Scenario „Fund XYZ defers redemption“ Adoption of the single securities list

Risk Controller

Management process in practice

Initially: Fixation of the risk strategy, the procedures and the limits.

1. Review of the Reports filtered by relevance.
   - Funds with limit breaches
   - Funds on watch list
   - Further funds on request
2. Comparison with outflow scenarios (historical or indicated by sales department / exploration of realistic developments in the market or in the investors' behavior).

   → Approaches based on extreme value theory exist.
3. Identification of potentially critical funds.
4. Dialog with fund management and product management (e.g. within a liquidity committee).
5. Assessment of the situation leads to conclusion.
6. Deduction and implementation of actions (e.g. sale of critical assets, increase cash position, defer redemption of shares).

Lessons learned on decision making in the financial crisis

	assessment
sophisticated models	▪ acceptance by decision makers depends on trust on explanatory power and validity of model results ▪ complex analytics and data requirements can lead to time lags in delivering decision support
simple models	▪ clarity on inner workings and limitations furthers trust of decision makers ▪ simplicity lends itself to rapid analyses required in accelerating crisis ▪ accepted by top management as basis for wide-ranging decisions

3

Conclusions

Conclusions

1. Liquidity controlling based on static data is a field-proven method to determine the liquidity of financial instruments across all security classes under real case and stress scenarios.

2. Straightforwardness of the method is essential for acceptance within the organization.

3. Liquidity management means balancing the liquidity layering in the portfolio and liquidity needs from cash outflows in an integrated controlling process.

Appendix

References

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