

Monitoring Liquidity

Optimizing and controlling liquidity in small to medium banks

- practical insights -

Our intention:

This presentation wants to display the status quo of liquidity monitoring in a regional bank where it is tried to fulfill the minimum requirements for risk management (MaRisk - Mindestanforderungen an das Risikomanagement) set by the BaFin while at the same time paying respect to business management and limited resources in the risk management process.

Contents

- **Kasseler Sparkasse and it's institutional framework**
- LaR as a solution for short-term liquidity risk monitoring
- Restructuring assets and liabilities using LaR
- Approach for the analysis of long-term liquidity risk
- Conclusions

Kasseler Sparkasse – some figures

employees: approx. 1.000

branches: 80

balance sheet total: approx. 5.000 Mio. €



Treasury / Trading: 5 employees

Controlling: 4 employees

Internal Auditors for risk management: 3 employees

The banking crisis - Consequences for Kasseler Sparkasse

short-term liquidity:

There have not been any disturbances in short-term liquidity. Due to our robust liquidity reserves and retail market access there have been some good opportunities in the repo markets.

long-term liquidity:

Momentarily almost 100% of our long term liquidity originates from our local retail customers. During the crisis the retail business proved to be a very stable and reliable source of liquidity.

The banking crisis - Consequences for Kasseler Sparkasse

market liquidity:

In several segments we felt a considerable lack of market liquidity. This was especially true for mortgage bonds (Pfandbriefe) for which we did not expect illiquidity. In two cases repo agreements were not fulfilled in time by our repo partners.

secondary effects:

Profit margins in the retail markets are under extreme pressure due to attempts of several banks to enter the retail markets to regain access to liquidity. On the other hand it seems to be possible to increase profit margins in credit transactions.

Liquidity management organization

Daily liquidity transactions:

Treasury

Structural liquidity transactions:

Treasury

Risk monitoring and reporting:

Controlling

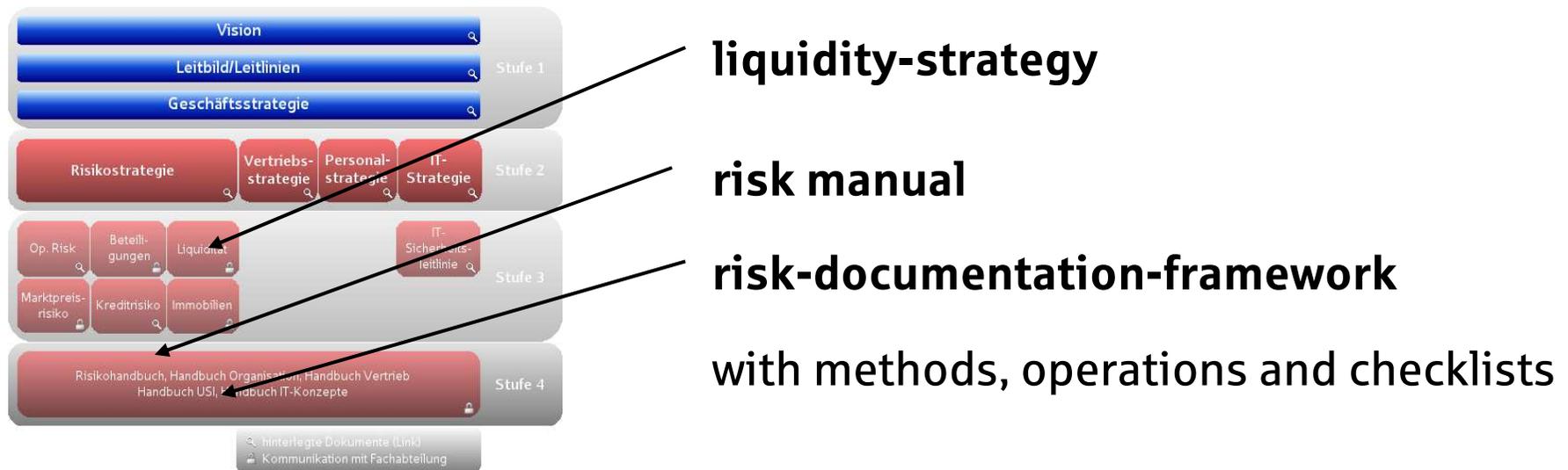
Auditing:

Risk Management Team of the internal auditing department

Documentation and strategy

The liquidity-strategy is implemented as a sub-strategy to the risk-strategy. The risk-strategy is a sub-strategy to the business-strategy.

The framework for liquidity management and monitoring is more clearly defined in several methodically and operationally relevant documents as well as in several checklists.



Reporting

Quarterly liquidity reports by treasury and controlling to the executive committee.

Overview in the monthly internal capital adequacy assessment report (for the executive committee and the board of directors).

Discussion of the liquidity situation in the monthly risk committee.

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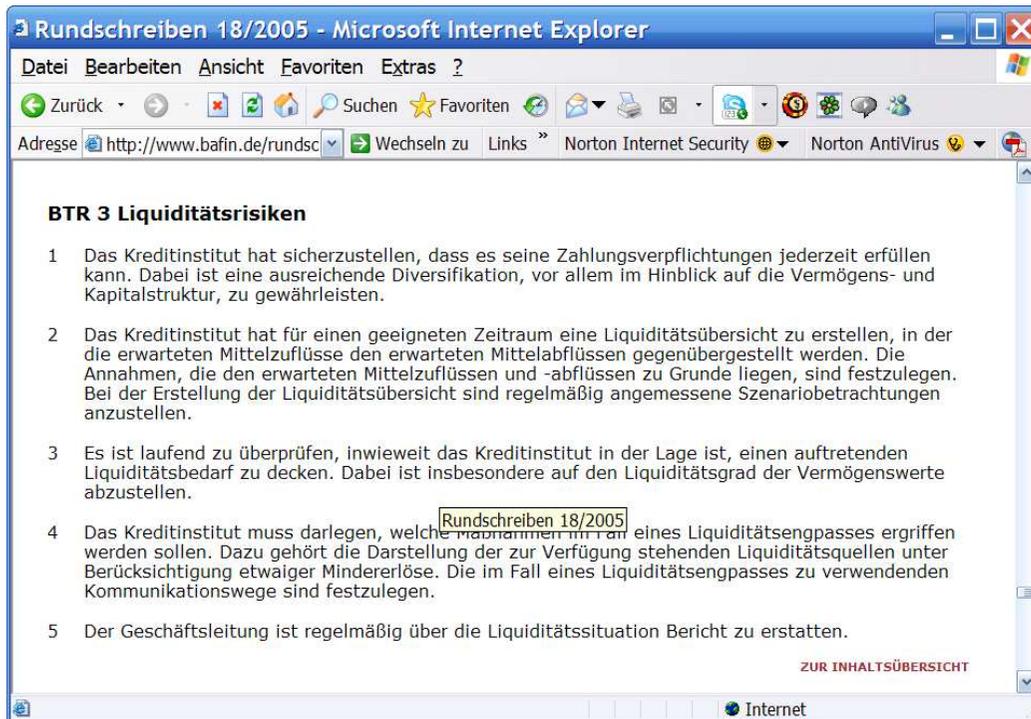
Old wisdom – new approaches

„Wer die in laufender Zeit fällig werdenden Zahlungen aus eigener Hand macht, ohne das zeitliche Eintreten von Einnahmen und Ausgaben vollständig regulieren zu können, muss andauernd einen „Kassen-Vorrath“ und diesen in einer Größe halten, mit welcher auch der ungünstigen Verumständung begegnet werden kann.“

Karl Knies, Geld und Credit II. Abteilung - Der Credit, Leipzig 1876

„Who tries to meet due payments on his own behalf without being completely able to control the timing of income and spending must have – and must have all of the time – a „cash stock“ which is appropriate even in bad circumstances.“

Liquidity risk - the MaRisk



The MaRisk obliges banks to make sure liquidity risks are considered, covered by sufficient systems and are appropriately integrated in the banks risk-management and assessment process.

The following slide shows the most important points:

Regulatory demands for Liquidity risk measurement:

- Ability to maintain sufficient liquidity all of the time.
- **Creation of a liquidity overview – including scenarios – in which the expected inflows of liquidity are compared with the expected outflows of liquidity.**
- **Constant examination of the ability to cover emerging needs for liquidity.**
- Contingency planning.
- Liquidity reports.

LaR as a solution for risk monitoring

The continuous monitoring of the ability to cover occurring liquidity demands is easy if the potential demand is identified.

But usually the question of how the demand – which is the sum of liquidity leaving and entering the bank – can be estimated, remains to be solved.

LaR as a solution for risk monitoring

Problem:

It is difficult to predict our customers behavior. Nevertheless reliable information concerning their payments is necessary. This is due to our business model which concentrates 100% on retail customers and small to medium borrowers.

Instruments like maturity lists, estimates of cash flows or the calculation of „planned“ liquidity cash flows are not sufficient.

The preparation of scenarios („What is the worst thing that might happen?“) is very difficult and regularly enters the realms of fantasy.

LaR as a solution for risk monitoring

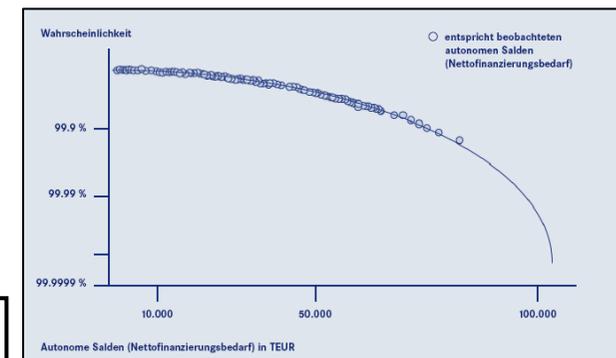
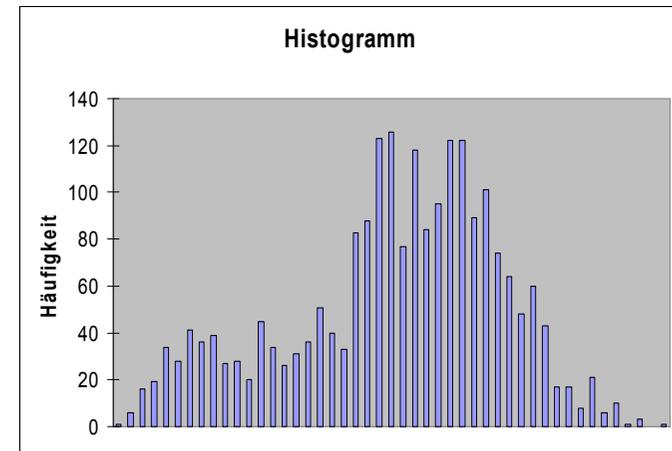
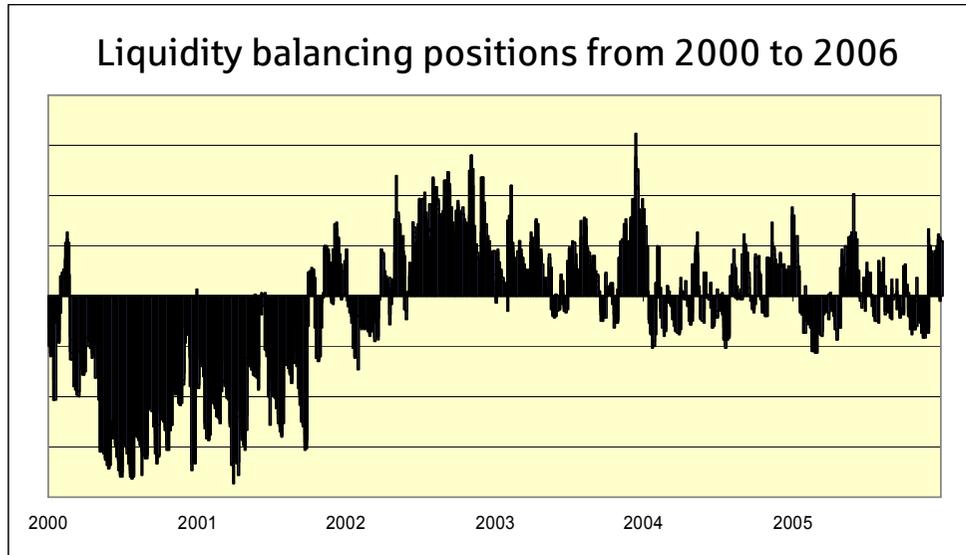
Liquidity at Risk...

...describes the expected liquidity deficit from all autonomous payments* during one normal business day, which will not be exceeded with a given probability.

* Autonomous payments are payments whose amount and timing are not within the influence of the banks liquidity management. (Usually money market transactions used to influence the banks liquidity position are excluded by this definition. In our case this is not true for positions in the trading or banking book which are assumed to be autonomous.)

LaR is calculated with extreme value theory, a theory originally implemented to estimate the scale of natural disasters. We use a software implementation of the peaks over threshold method. Due to the concentration on practical insights we do not discuss the statistical details in this lecture.

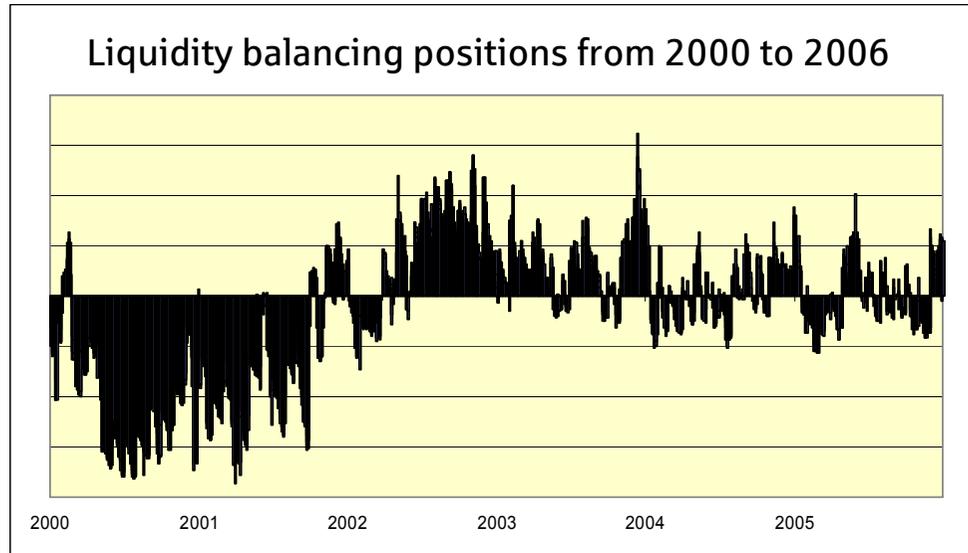
LaR as a solution for risk monitoring



With X% probability the liquidity deficit will not be higher than Y €.

estimation
with LaR model

LaR as a solution for risk monitoring



The most difficult part is the collection of the necessary data to calculate the row of autonomous payments. All payments entering and leaving the bank as well as all money market transactions must be considered.

Once the monitoring of these payments is organized, the process is mostly automatic. The measurement of liquidity risk with LaR is – in comparison with other risks like credit or market risk – very easy and does not need much time.

LaR as a solution for risk monitoring

With the discussed method the net funding requirements can be estimated.

It is possible – not unlike the VaR for market risk – to quantify the behavior of customers using statistically advanced methodology and to attach a probability to their behavior.

The result is a realistic and objective estimate of net funding requirements. Methods for back testing are applicable.

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Restructuring using LaR

assets		liabilities	
customers	1.000 Mio. €	customers	800 Mio. €
	5,4%		4,8%
securities	500 Mio. €	bank liabilities	700 Mio. €
	5,0%		5,2%
	5,27%		4,99%

riskless yield curve: flat at 5%

own credit spread: flat at 0,2%

margin: 0,28%

(4,2 Mio. €)

In this isolated view all rates are determined without regard to transformation and credit risk. These influences are separated analytically.

Restructuring using LaR

assets		liabilities	
customers	1.000 Mio. € 5,4%	customers	800 Mio. € 4,8%
securities	500 Mio. € 5,0%	bank liabilities	700 Mio. € 5,2%
	↑ 5,27%		4,99%
pot. liquidity reserves			
stocks		50 Mio. €	
fixed-interest (Repo / ECB)		200 Mio. €	
floaters (Repo / ECB)		100 Mio. €	
promissory notes		150 Mio. €	

Restructuring using LaR

The securities portfolio is subdivided into 3 classes:

First Class Liquidity: (example: floaters, German government bonds)

Securities which can be sold immediately without impact on P/L or which can be used without problems in the repo market. Applicable only for securities of very high liquidity and outstanding rating.

The amount of first class liquidity is determined by LaR.

Second Class Liquidity: (example: bonds, mortgage bonds)

Securities which can be sold immediately but which might have impact on P/L.

Securities for which repo agreements might be difficult. These securities usually yield higher liquidity spreads.

Restructuring using LaR

Third Class Liquidity (example: promissory notes , investment funds)

Securities with potential liquidity which might affect P/L but might be liquidated in an appropriate time frame.

Liquidity spreads will usually be higher than for second class liquidity.

Securities in the second and third class are an additional cushion for extreme situations, which might not be recorded statistically by LaR.

If liquidity problems are not to be feared securities of the second and third class liquidity can be used in repo transactions.

Restructuring using LaR

Problems of liquidity reserves:

refunding spreads

Refunding spreads are a problem for liquidity reserves because the financial standing of securities used for liquidity reserves is usually better than our own financial standing. This is usually the case because liquidity reserves have to be exceptionally good securities. The problem of refunding spreads arises as soon as liquidity reserves have to be financed by interbank borrowing.

costs in terms of very low liquidity premiums

Low liquidity premiums are the case because liquidity reserves must consist of exceptionally good securities. The yield of the liquidity reserve portfolio usually tends to be below average due to the lack of liquidity spreads.

Restructuring using LaR

The use of LaR enables the bank to reduce the first class liquidity portfolio to the necessary minimum.

measures:

- investment of free liquidity in securities with higher **liquidity** spreads*
- reduction of the overall securities portfolio with simultaneous reduction of interbank borrowing
- in case of an insufficient liquidity reserve the reserve **must** be raised to the level indicated by LaR

*It would be wrong to take interest rate transformation, higher credit risk or alternative assets into account in this calculation. The investment in these asset classes is always a question of asset allocation and should be separated from liquidity considerations. This is possible due to the availability of most asset classes in the derivatives market.

Restructuring using LaR

investment in securities with higher liquidity spreads

customers 1.000 Mio. €	5,40%	customers 800 Mio. €	4,8%
securities 500 Mio. €	5,05%	bank liabilities 700 Mio. €	5,2%
↓	5,28%		4,99%
stock		50 Mio. €	
fixed-interest (Repo / ECB)		50 Mio. €	interest margin:
floaters (Repo / ECB)		50 Mio. €	0,29%
promissory notes		350 Mio. €	(4,45 Mio €)

Restructuring using LaR

reduction of interbank borrowing

customers 1.000 Mio. € 5,4%

securities 300 Mio. € 5,0%

5,31%

customers 800 Mio. € 4,8%

bank liabilities 500 Mio. € 5,2%

4,95%

interest margin: 0,36%

(4,6 Mio. €)

Restructuring using LaR

For the Kasseler Sparkasse this approach led to considerable positive consequences. We were able to enhance profits by reducing interbank borrowing. The first class liquidity was estimated prior to the banking crisis but proved to be sufficient throughout the crisis.

We would advise to supplement the described strategy with repo market activities which are not very common among Sparkassen in Germany. In robust market circumstances these can be used to work with second and third class liquidity in the repo market.

Guideline:

First class liquidity should reflect the need for liquidity estimated by LaR. Less liquidity would be dangerous – a surplus in liquidity expensive.

Conclusions regarding LaR

The use of LaR enables us to meet regulatory guidelines while at the same time balancing liquidity costs and liquidity reserves.

For an efficient and economically sound implementation of the concept of LaR some changes in the classic liquidity management were necessary.

A strict separation of risks – especially a separation between interest rate risk, credit risk and liquidity risk is essential. Otherwise the potential benefits of LaR might be misinterpreted.

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Concepts for long-term liquidity monitoring

The standard model for long-term liquidity risk usually tries to implement liquidity cash-flows.

This usually makes it necessary to analyze many different data sources. Even more critical is the necessity to make many assumptions. This is especially true for future customer behavior.

Once a complete liquidity cash-flow is generated, liquidity gaps can be identified and liquidity transformation can be managed.

The implementation of these systems is usually a very complex task.

A simplified approach

Analyzing the structural liquidity of Kasseler Sparkasse we found almost no reliance on interbank borrowing.

The implementation of complex models for long-term liquidity monitoring via cash-flow based models was not appropriate in this context. This is especially true because cash-flow based models are very sensitive concerning the modeling of current and future retail customer behavior.

Notwithstanding these reservations it was necessary to gain an estimate of our risk profile, possible threats and to find a solution for the integration of liquidity risk in our ICAAP.

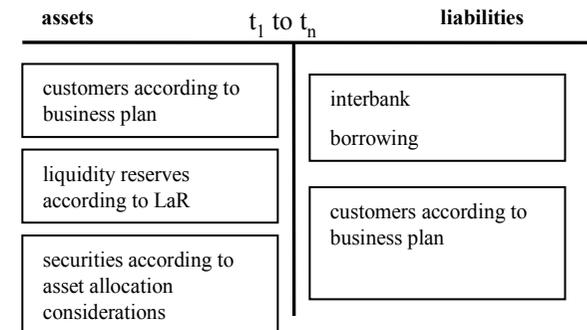
A simplified approach

Considering the institutional framework and our risk situation we developed a simplified model to assess our long-term liquidity risk.

The next slides show this model's steps.

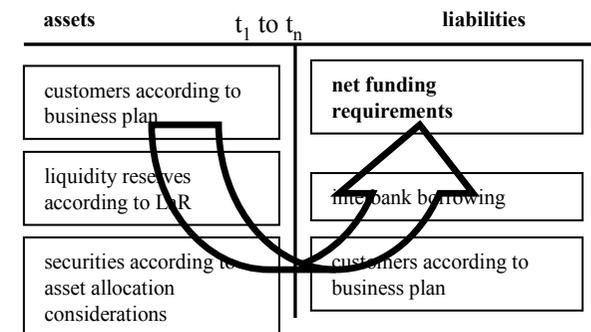
Six steps to estimate long-term liquidity risk

1. Data collection



Modeling of margin and volume for t_1 to t_n
result: interest margin.

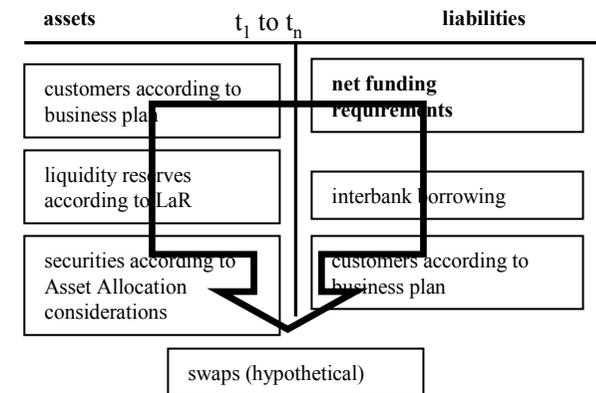
2. Isolation of net funding requirements



Modeling the net funding requirements under the assumptions of our business forecasts.

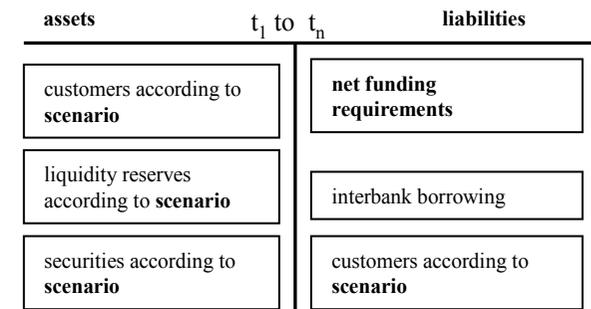
Six steps to estimate long-term liquidity risk

3. Elimination of interest rate transformation



Arithmetical elimination of interest rate transformation effects via swap portfolio.

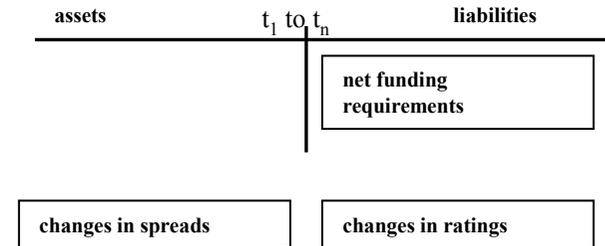
4. Use of business scenarios



Simulation of volume and spread for the net funding requirements for all relevant scenarios.

Six steps to estimate long-term liquidity risk

5. Scenarios for net funding requirements and respective spreads



Simulation of changes in interbank spreads and our own rating.

Result: Changes in the spread (costs) of the net funding requirements.

6. Consideration of net funding costs in ICAAP

By comparison of the results of steps 4 and 5 with those of step 1 it is possible to isolate liquidity induced costs for our P/L and/or economic capital and take these effects into consideration in our ICAAP.

Six steps to estimate long-term liquidity risk

Advantages:

Easy implementation

No mock precision

Easy communication

Disadvantages:

Reduction of the complete net funding requirements into one time bucket and therefore insufficient differentiation of liquidity time buckets.

The management of liquidity transformation is not possible using this model. This is especially true for banks with a high degree of interbank borrowing.

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Conclusion

Simple, yet valid approaches to measure short- and long term liquidity risks do exist.

These approaches do not only fulfill regulatory demands. They enable banks to improve their business situation.

There certainly exists much more demand for discussion between practitioners, scholars and regulators concerning the translation into practice and the further development of these approaches. A common theory for liquidity risk management still waits to be developed.

Literature

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