

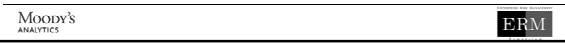
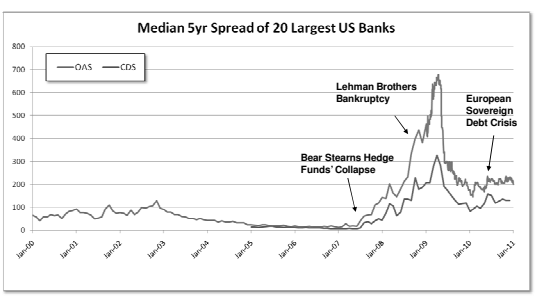


The Next Challenge in the Evolution of Portfolio Management: Accounting for Liquidity in Pricing and Risk Assessment



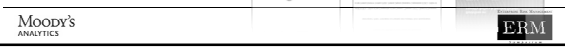
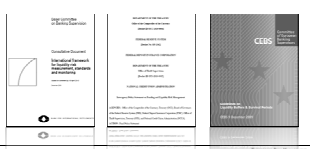
Yashan Wang and Yaakov Tsaig, Quantitative Portfolio Research

Bank Funding Costs Continue to be a Major Concern



Regulatory Emphasis on Liquidity Risk Management

- » Basel: "...the maintenance of a sufficient cushion of high quality liquid assets to meet contingent liquidity needs."
- » Fed: "...a cushion of liquid assets, and a formal well-developed contingency funding plan (CFP) as primary tools for measuring and managing liquidity risk."
- » CEIOPS: "The introduction of a liquidity premium is being proposed to eliminate the mismatch between assets and liabilities, especially in times of crisis."



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Characterizing the "Perfect Storm"

"Basel III" characterizes an acute short-term stress scenario for determining the resilience of the balance sheet:

- » a significant downgrade of the institution's public credit rating;
- » a partial loss of deposits;
- » a loss of unsecured wholesale funding;
- » a significant increase in secured funding haircuts; and
- » increases in derivative collateral calls and substantial calls on contractual and noncontractual off-balance sheet exposures, including committed credit and liquidity facilities.

Moody's ANALYTICS ERM

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Case Study: Countrywide Taps Backup Lines as a Source of Funding Liquidity

The chart displays three data series: Bank OAS (solid line), Rate Paid (dashed line), and Countrywide Rating (dotted line). The left y-axis represents Spend in billions of dollars, ranging from 0 to 250. The right y-axis represents Moody's Rating, ranging from Caa-C to Aaa. The x-axis shows time from March 2006 to July 2008. Two key events are highlighted: on August 16, 2007, Countrywide draws on a \$11.5 billion syndicated credit facility, and on July 1, 2008, Bank of America completes the acquisition of Countrywide.

Moody's ANALYTICS ERM

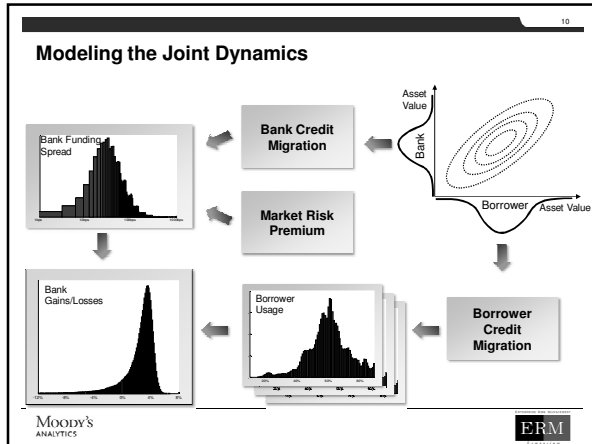
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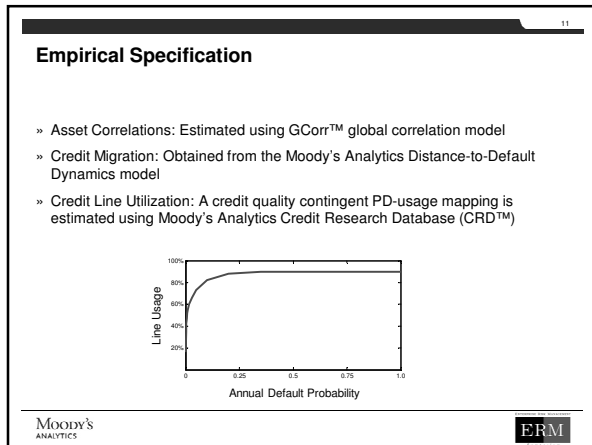
Economic Guidance

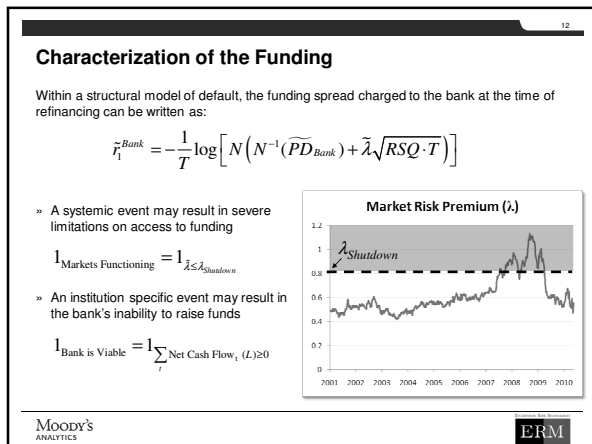
Regulatory mandate identifies key drivers of funding liquidity risk, but a formal framework and quantitative guidance are limited:

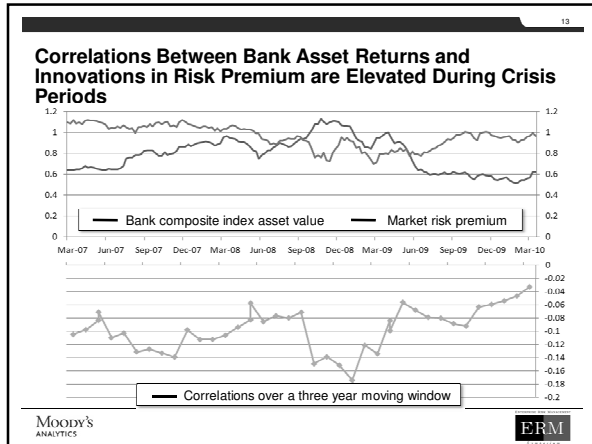
- » How to quantify the size and composition of a liquidity reserve needed to absorb losses and fund obligations in a crisis event?
- » How to account for the inherent linkages between supply of funds and demand for funds on both sides of the balance sheet?
- » What is an appropriate liquidity risk charge for different assets and liabilities across the balance sheet?

Moody's ANALYTICS ERM







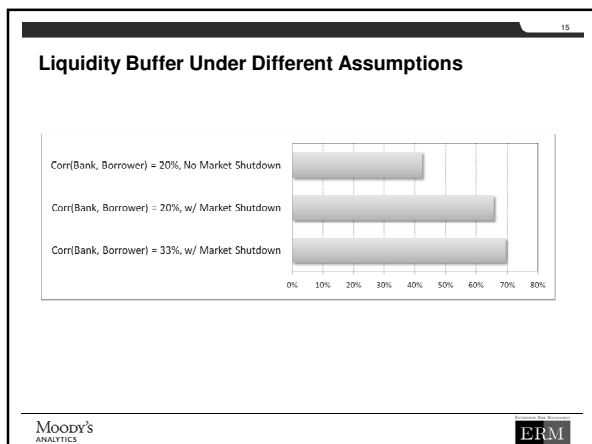


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Case Study: Liquidity Provisioning for a Portfolio of Homogeneous Borrowers

Bank Characteristics	Borrower Characteristics
Maturity of short-term debt: 1 year	No. of Homogeneous Borrowers: 1,000
Cost of long-term debt: 1.2%	Maturity of credit line: 2 years
1 year default probability: 25bps	Contractual Usage Fee: 2%
LGD: 50%	1 year default probability: 1%
RSQ: 35%	RSQ: 25%



Moody's ANALYTICS ERM



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Incorporating Funding Liquidity Costs in Pricing and Performance Measurement

Commercial Margin	} Fair Value Spread = 233bps
Credit Spread 154bps	
Contingent Liquidity Spread 79bps	
Reference Rate	

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Extensions to the Framework

Borrower defaults and credit losses



- » An integrated analysis of credit and liquidity capital

Heterogeneity in asset composition and funding sources

- » Account for funding diversification, e.g., demand deposits, time deposits
- » Quantify the impact of embedded optionality on the liquidity profile of the balance sheet

Secured funding and asset sales

- » Account for linkages between collateral value, haircuts, and systematic factors

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Summary

We introduced an economic framework to quantify:

- » the amount of liquid assets a financial institution should hold in order to absorb potential losses due to adverse funding conditions
- » the cost of holding liquidity reserves attributed to individual exposures

Accounting for linkages between borrowers' funding needs, bank's liquidity requirements, and the market price for risk is imperative in understanding liquidity risks

The economic framework is extensible and facilitates an integrated risk analysis

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