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# A Global Liquidity Factor for Fixed Income Pricing

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Andreas Gintschel, *JPMorgan*  
Christian Wiehenkamp, *Goethe University Frankfurt*



# Introduction

- Liquidity adjustments in MCEV reports
- Ernst & Young (2009):

		No liquidity premium	Liquidity premium
Risk-free rate	Swap rate	Allianz	Aviva
		Munich Re	AXA
		Hannover Re	CNP
		Mediolanum	Fortis
		Scor	Generali (not Italy and Czech)
		Zurich	Groupama
			KBC
			Old Mutual
			Vienna
	Government bonds		Friends Provident
		Generali (Italy and Czech)	Eureko *
			Lloyds TSB
			HBOS
			ING *
			Prudential *
			Standard Life
		Storebrand	
		Legal & General *	

\* Top-down EEV methodology used.

# Introduction

- **Aim:**
  - Obtain an easily implementable measure for identifying liquidity effects in fixed income markets
- **Finding:**
  - Liquidity component backed out from a sample of corporate and credit default swap (CDS) spreads contains systematic information for all bond returns
  - Identification of a market wide liquidity factor
  - Bond prices decline in response to decreasing liquidity, albeit to differing degrees

# Implications of Findings

- **Investment Management**
  - Reaping of liquidity premium for long-term investors
  - Identification of liquidity sensitive assets for optimizing portfolio transition
- **Valuation**
  - Accommodate accounting standard setters' demand of adjusting market values for liquidity effects using market inputs (FASB Statement No. 157)
  - Discount rate calculation (UK insurance & IAS 19)
- **Risk Management**
  - Alternative metric for liquidity risk assessment

## CDS vs. Bond Spreads

- No-arbitrage idea for a Credit Default Swap (CDS)
  - **Portfolio I**
    - Defaultable bond with interest  $c$  and maturity  $T$
    - CDS on that bond with spread  $s$
  - **Portfolio II**
    - Default-free coupon bond with same face value, payment dates and coupon  $c-s$
- But: **Prices & spreads are different for the two positions**
- Empirically investigated by **Longstaff et al. (2005)**: **non-default component b/w CDS and corporate spread attributed to liquidity**

# At the Repo Window

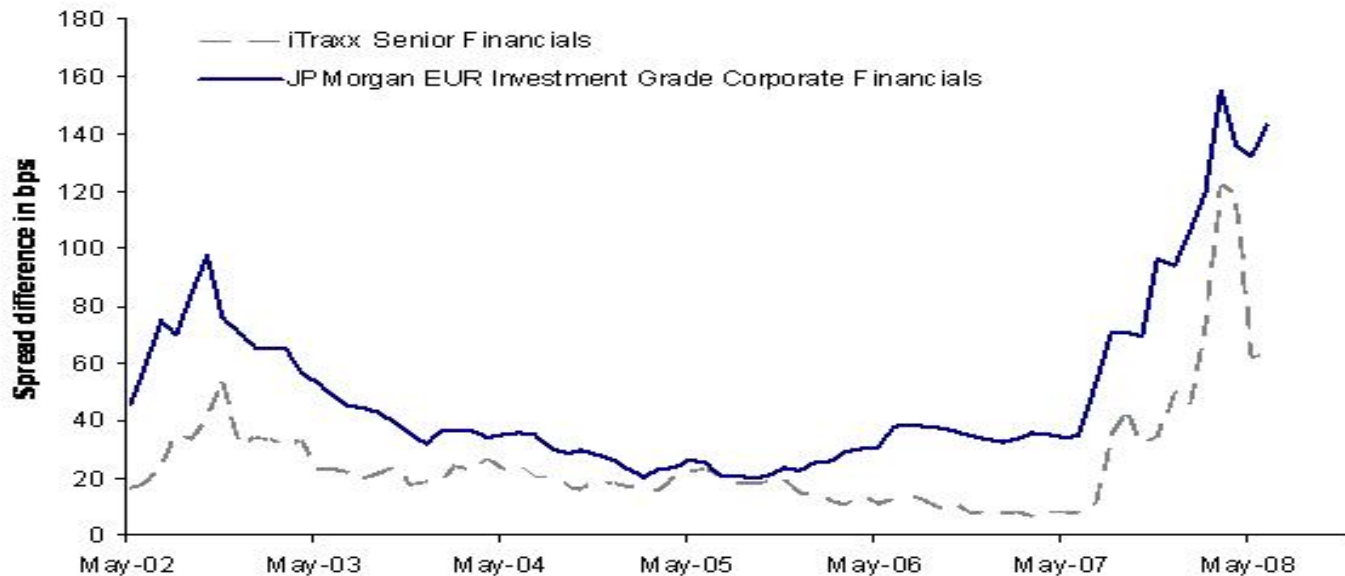
- Difference in liquidity b/w government and synthetic government bond not surprising when looking at a central bank's repo window
- Different haircuts applied to synthetic and true government bond

	Cat. I		Cat. II		Cat. III		Cat. IV		Cat. V
	(gov. Bonds)		(sub.-sovereign)		(bank & corp.)		(unsec. bank)		(ABS)
Res. Mat.	Fixed C	Zero	Fixed C	Zero	Fixed C	Zero	Fixed C	Zero	all Coupons
0-1	0.5	0.5	1	1	1.5	1.5	6.5	6.5	12
1-3	1.5	1.5	2.5	2.5	3	3	8	8	12
3-5	2.5	3	3.5	4	4.5	5	9.5	10	12
5-7	3	3.5	4.5	5	5.5	6	10.5	11	12
7-10	4	4.5	5.5	6.5	6.5	8	11.5	13	12
>10	5.5	8.5	7.5	12	9	15	14	20	12

Source: ECB. (2008).

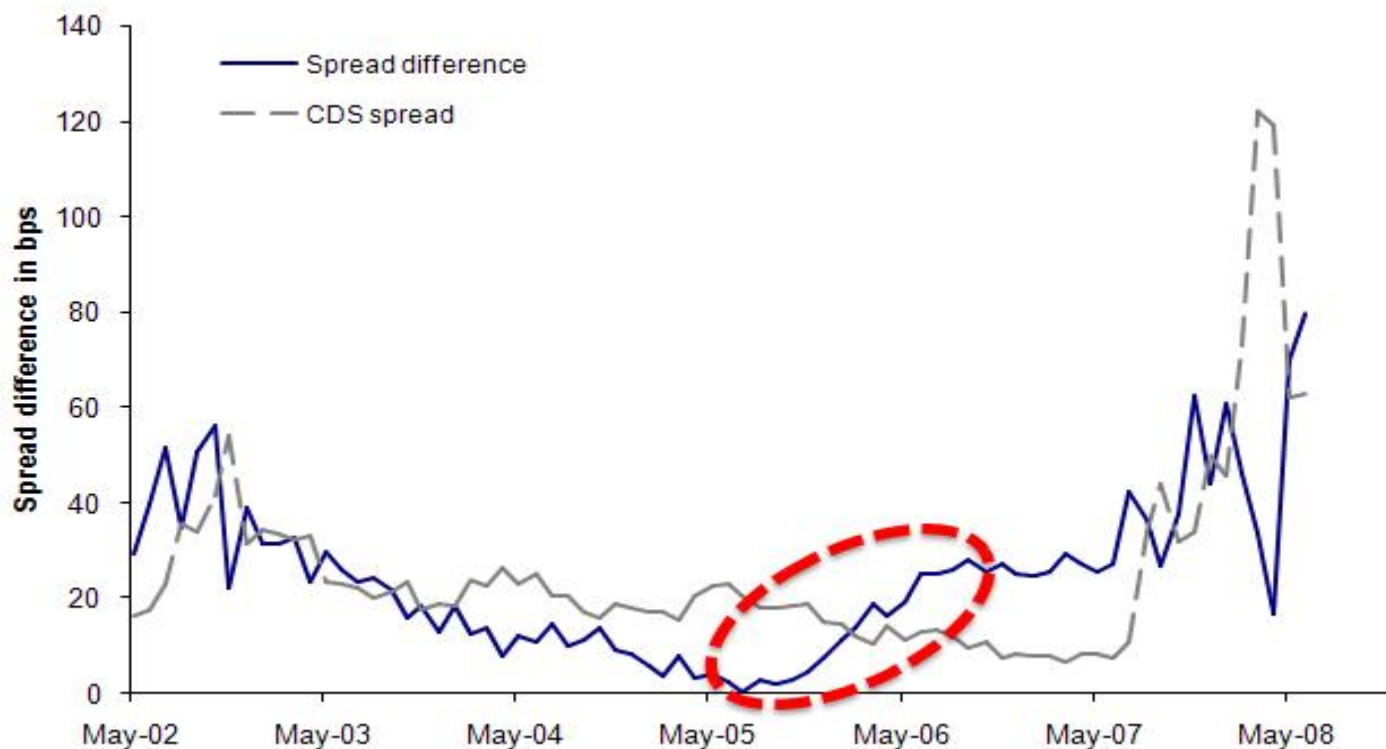
# Base Proxy for Liquidity Premium

- Difference between
  - Government **Spread of the JPMorgan EUR Investment Grade Corp Financials Index** (avg spread 50bps)
  - **CDS spread of the iTraxx Europe Senior Financials** (avg spread 26bps)





# CDS Spread and Spread Difference



- Spread difference  $> 0$  w/ avg = 24bps
- Liquidity price rose long before CDS spreads increased



# Main Result

- Sample: wide range of fixed income indices (CorpIG, HY, Pfandbriefe, EMBI, ...)

$$R_{i,t} = \alpha_i + \underbrace{\beta_i^{(1)}}_{\text{Avg: } -5.33} \Delta Liqui_t + \underbrace{\beta_i^{(2)}}_{\text{Avg: } -3.89} \Delta Rates_t + \underbrace{\beta_i^{(3)}}_{\text{Avg: } -5.76} \Delta Default_t + \underbrace{\beta_i^{(4)}}_{\text{Avg: } 0.07} R_t^{MSCIw}$$

	Coefficients of				
	1	MSCI	Δ Rate	Δ Liqui	Δ Def
HY US	0.007 *	0.159 *	-1.715 *	<b>-17.8235*</b>	-16.0749*
Pfandbriefe EUR	0.003 *	-0.015	-4.463 *	<b>-1.283 *</b>	-0.521
...					

Note: Estimation results for a sample of test assets

- Liquidity statistically and economically significant
- **Neg. coeff. => Return goes down as liquidity dries up**

# Maturity

- Analyzing impact of *maturity* on sensitivity to liquidity
- ECB haircuts (increasing in maturity) => Expecting bigger liquidity effect for longer mat.

Maturity	Liquidity Coefficients		
	EUR	GBP	USD
1-3	-2.586 *	-0.409 *	-0.558 +
3-5	-3.481 *	-0.654 *	-1.047 *
5-7	-5.142 *	-1.685 *	-2.154 *
7-10	-4.169 *	-2.708 *	-3.393 *
10+	-7.785 *	-4.331 *	-3.271 *

Note: Coefficients per maturity class when regressing returns on factors

- E.g. change from 3-5 to 5-7 years category corresponds almost exactly to change in ECB haircut

# Rating

- Analyzing impact of *rating* on sensitivity to liquidity
- Better rating => Smaller effect of liquidity changes

Rating	Liquidity Coefficient					
	EUR		GBP		USD	
	'02 - '07	'02 - '08	'02 - '07	'02 - '08	'02 - '07	'02 - '08
AAA	-	-	-1.390 *	-1.543 *	-0.529 +	-0.724
AA	-2.805 *	-3.898 *	-1.868 *	-2.897 *	-0.907 *	-1.234 *
A	-2.697 *	-4.323 *	-2.165 *	-3.233 *	-1.133 *	-2.384 *
BBB	-6.864 *	-6.597 *	-3.361 *	-3.110 *	-3.699 *	-4.141 *

Note: Coefficients per rating class when regressing returns on factors

- Flight to quality

## Conclusion

- Liquidity component from CDS and bond indices significantly relates to bond returns
- Central bank haircuts reflected in market data
- Flight to quality
- Important implications
  - Investment management: Identification of liquidity sensitive assets
  - Valuation: Accommodate accounting standard setters demand for liquidity adjustments
  - Market-based alternative for liquidity risk assessment