



Discussion:

- Liquidity Risk of Corporate Bond Returns
 - CDS Spreads & Equity Liquidity
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5th Annual Credit Risk Conference



Commonality: importance of market liquidity to returns

- Recent evidence from bond markets
 - Treasury spreads
 - Evidence from CDS & corporate bonds
 - Longstaff, Mithal & Neis (2005)
 - Chen, Lesmond & Wei (2007)
 - Mahantil, Nashikkar & Subrahmanyam (2007)
 - De Jong & Driessen (2005)
 - Illiquidity is of particular concern for corporate bonds
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Potential illiquidity of corporate bonds

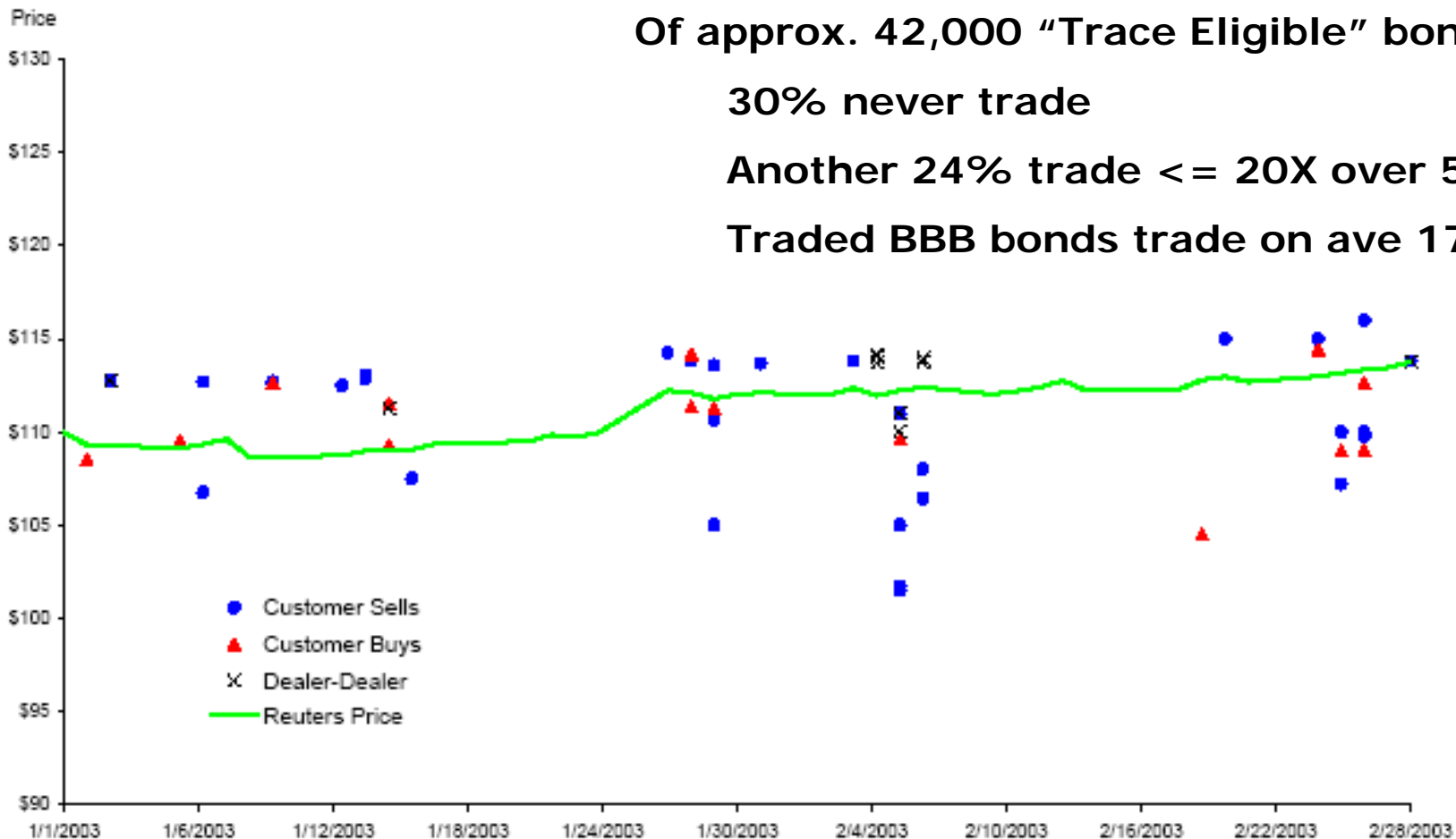
Transaction history for a sample bond, Goldstein, Hotchkiss & Sirri (RFS 2007)

Of approx. 42,000 "Trace Eligible" bonds,

30% never trade

Another 24% trade $\leq 20X$ over 5 yr period

Traded BBB bonds trade on ave 17% of days





Liquidity Risk of Corporate Bonds

Main Findings

There is unconditional liquidity risk in corporate bond returns

- Equity market liquidity (price impact, Amihud 2002)
- Treasury market liquidity (EW bid-ask spread of off the run treasuries (Goyenko (2005)))

Liquidity risk of high yield bonds has a significant conditional component during stress times



Liquidity Risk of Corporate Bonds

Data constraints

Requires sufficient time series of corporate bond returns:

Lehman monthly quotes (1973-1997)

+ NAIC: insurance company transactions (1994-2003)

Changing population of bond characteristics, over time & between samples

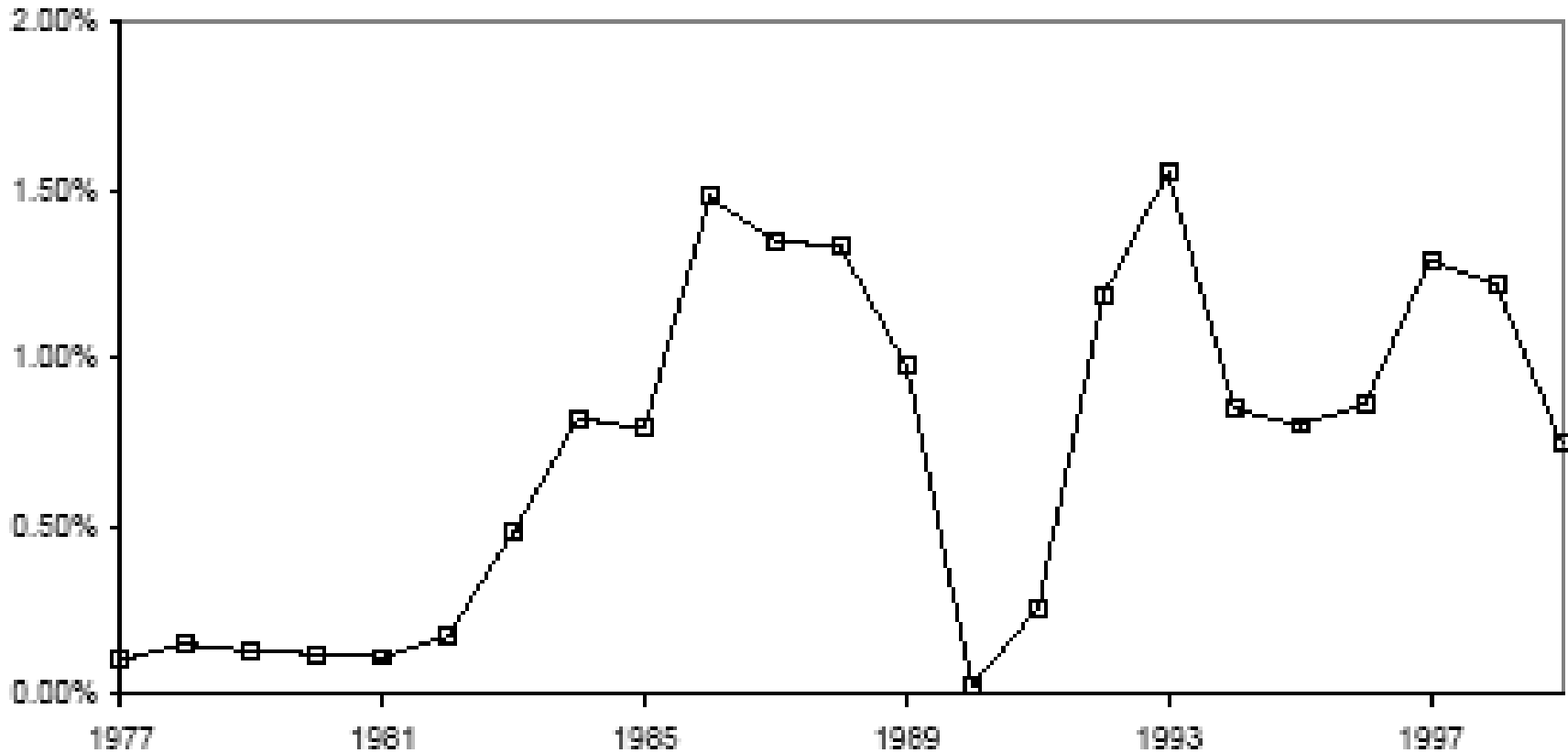
Growth in HY market (1980's)



Liquidity Risk of Corporate Bonds

Growth in HY market

HY bond issuance as % of total stock market capitalization
(Holstrom & Kaplan (2001))



Main Finding #1: unconditional liquidity risk in corporate bond returns



Dependent variable is monthly bond portfolio return

	coeff	SE	
Constant	107.4 ***	(11.19)	
Investment grade dummy (IG)	-44.0 ***		
IG * Term	52.6 ***	(1.23)	Term = LT govt - 1 mo Tbill returns
Junk * Term	35.1 ***	(3.61)	
IG * Default	41.4 ***	(2.00)	Default = IG - LT govt bond returns
Junk * Default	41.5 ***	(5.94)	
IG * innov in stk mkt illiquidity	-22.8 *	(13.44)	
Junk * innov in stk mkt illiquidity	-134.0 ***	(39.70)	
IG * innov in govt bond illiquidity	-1,098.1 ***	(313.46)	
Junk * innov in govt bond illiquidity	-2,946.9 ***	(937.12)	
# Obs		2,510	

Liquidity Risk of Corporate Bonds

Main Findings: Unconditional results

Default variable has similar effect on IG
and HY

Breakpoint in liquidity risk betas at BBB
to BB cusp



Liquidity Risk of Corporate Bonds

Main Finding #2: conditional liquidity risk for HY

Dependent variable is monthly bond portfolio return

	Regime 1			Regime 2	
	Coeff	T-stat		Coeff	T-stat
Constant	81.6	(9.91)		196.2	(6.38)
Term	41.1	(10.33)		40.8	(3.01)
Def	60.1	(7.13)		58.2	(3.89)
Equity mkt illiquidity innovation	-81.1	(1.81)	↔	-619.7	(5.04)
Govt bond mkt illiquidity innovation	-1355.6	(18.31)	↔	-4147.7	(35.94)



Liquidity Risk of Corporate Bonds

Conditional liquidity betas

Economic magnitude – much more important during “stress” times

The two liquidity risks become more correlated during stress times (0.041 vs. 0.348)

Economic meaning to “Stress” periods (cover 25% of data, largely in earlier time period)

Attempts to link to macro variables

- examine more extreme stress periods

- use the probability directly

- exclude HY new issues

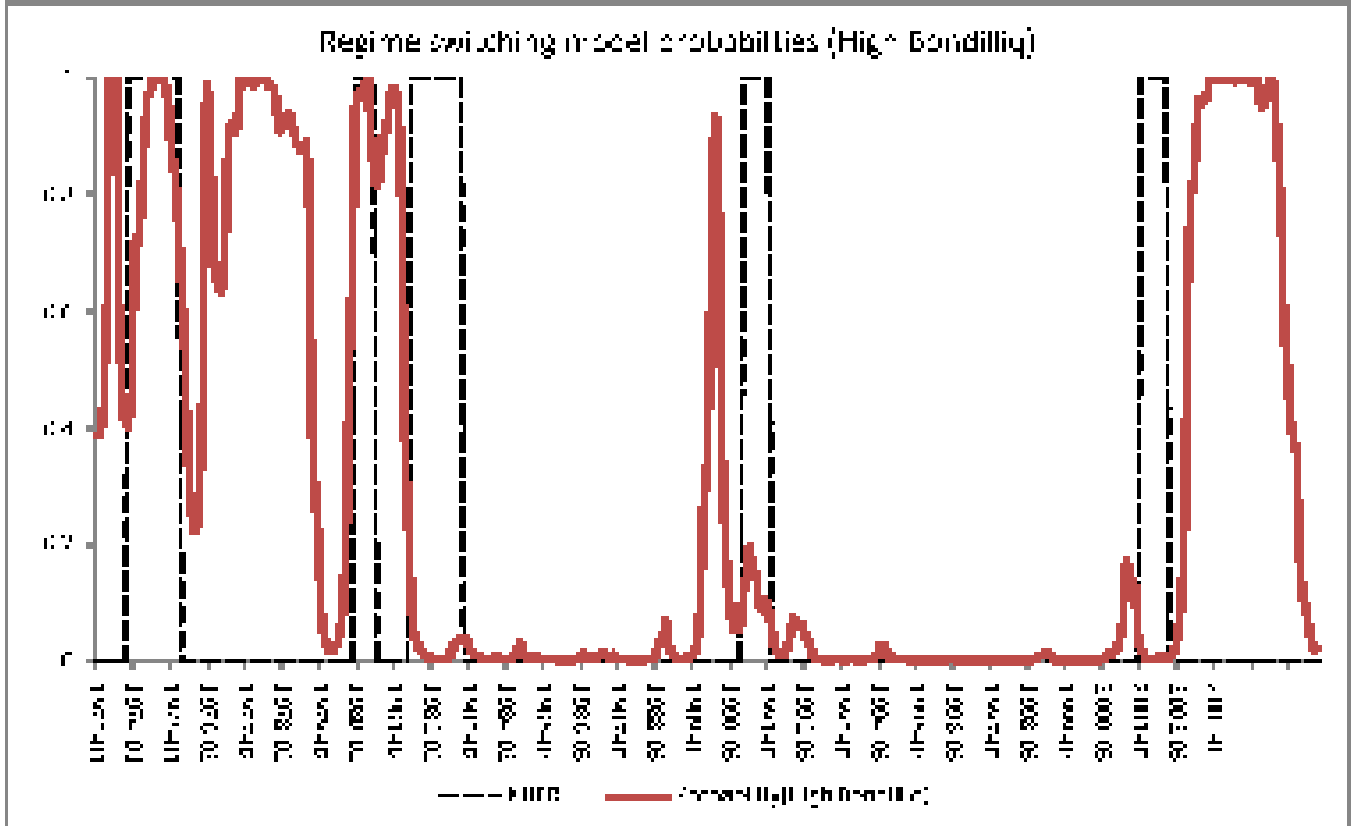
- examine relationship to corporate bond market illiquidity



Liquidity Risk of Corporate Bonds

Conditional liquidity betas

Fig.4. Probability of high illiquidity regime estimated from a regime switching model.
For details on the regime switching model refer table 4. We use the model to estimate the probability of being in regime 2 interpreted as the high illiquidity regime. NBER recession dates are shown.





Hedging Credit: Equity Liquidity Matters

Main Findings

Model:

- *CDS hedging costs are proportional to the delta of the CDS with respect to the stock price*
- *As stock price falls, the absolute hedge ratio rises, thereby increasing hedging costs proportionately.*

Empirically:

- *Equity market illiquidity is a strong explanatory variable for CDS spreads, even after controlling for other default related factors*
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Hedging Credit: Equity Liquidity Matters

Main Findings

Dependent variable = $\ln(\text{CDS spread})$

	<u>coeff.</u>	<u>t-stat</u>	
Intercept	4.82	51.53	
Distance to default	-0.09	-17.48	} credit variables
3 mo. T-Bill rate	-2.77	-0.88	
Illiquidity: (Amihud (2002))	332.32	3.09	} equity market illiquidity
Illiquidity: Zero return days	0.05	3.82	
Illiquidity: Bid ask spread	9.48	0.88	
			} accounting variables
R^2	0.49		
N	1,452		
Clusters	195		



Hedging Credit: Equity Liquidity Matters

Empirical tests

Dataset: constant maturity CDS spreads from Bloomberg, 2001Q3 to 2005Q1

- changing population of firms over time?
 - 4 unique firms in 2001 ; \approx 200 in 2004
 - 91% are investment grade
 - increase in lower credit over time
- spreads decline over sample period
- report spreads by rating
 - dramatic \uparrow in spreads at high yield cusp
- Variations in CDS contracts by rating category?



Hedging Credit: Equity Liquidity Matters

Empirical tests

Based on model, impact should vary with contract maturity

Impact of IG threshold?

Liquidity in other markets?

Does liquidity of corporate bond market matter?

physical settlement most widely used



Summary

Liquidity risk matters!

- *Bond returns contain a liquidity component*
- *CDS spreads themselves contain a liquidity component*

Importance of understanding behavior around extreme events

More data means more direct examination of corporate bond market liquidity directly