

Panel 2: Corporate Bonds

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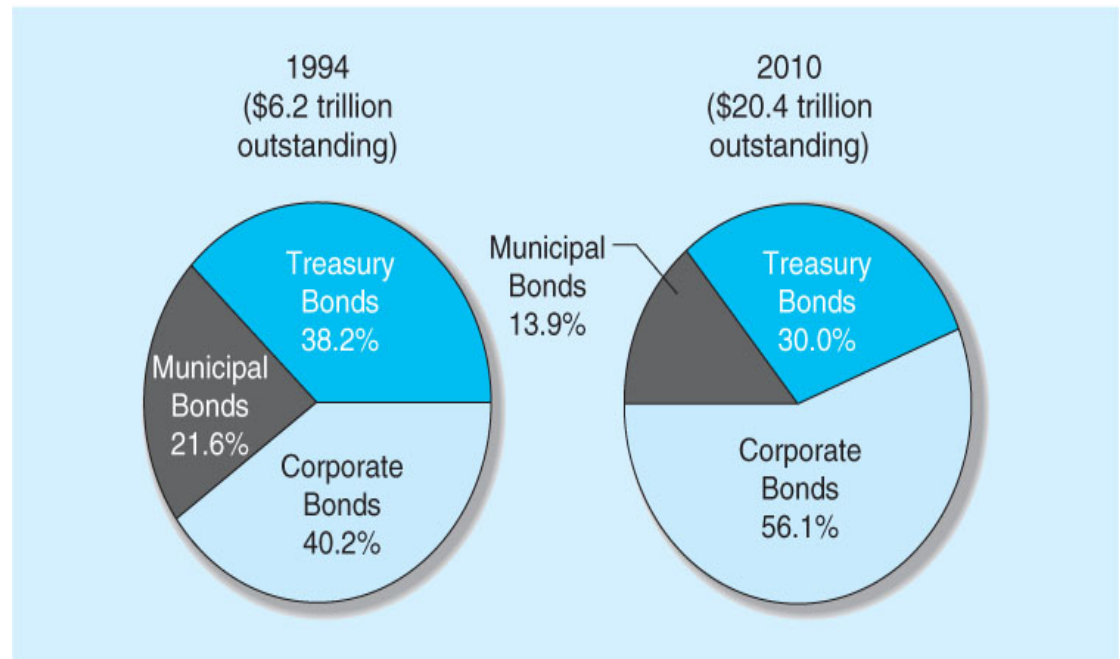
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GENERAL MARKET INFO

Size of Corporate Bond Market

- \$11.4 trillion outstanding as of 2010
- **Larger than U.S. Govt or Muni market COMBINED**

Figure 6-1 Bond Market Instruments Outstanding, 1994-2010

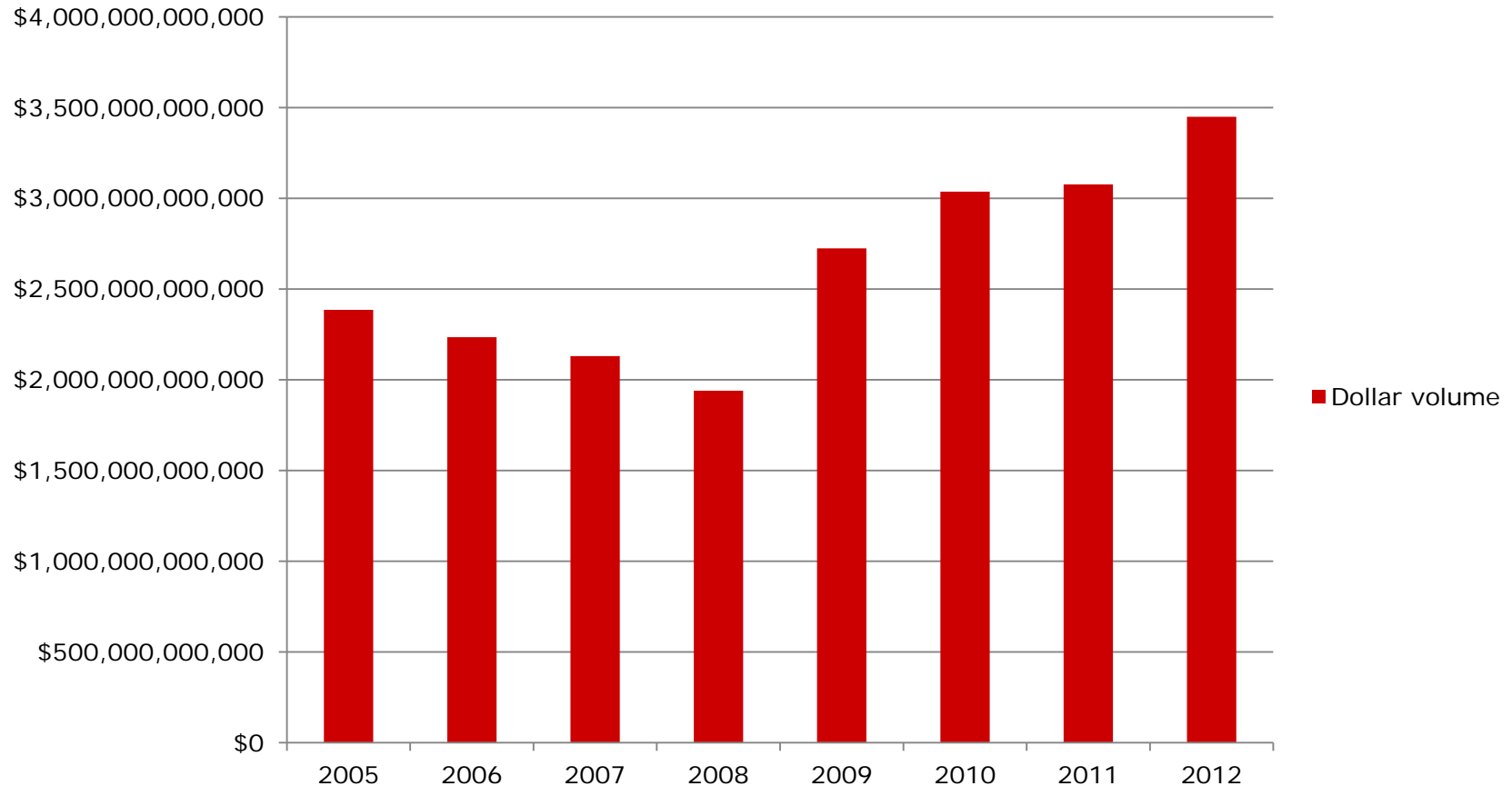


Source: Federal Reserve Board Web site, "Flow of Funds Accounts," various issues. www.federalreserve.gov

Financial Markets and Institutions : A Modern Perspective (5th Edition), by Anthony Saunders and Marcia Million Cornett, Irwin/McGraw-Hill, copyright 2012

TRACE \$ Volume

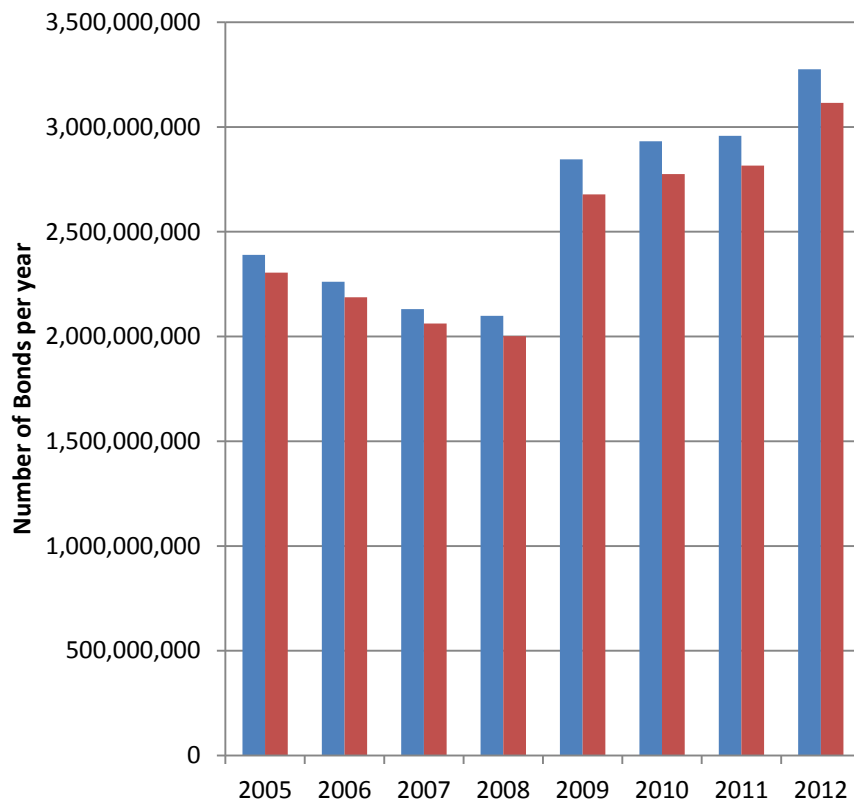
\$2 to 3.5 Trillion per year



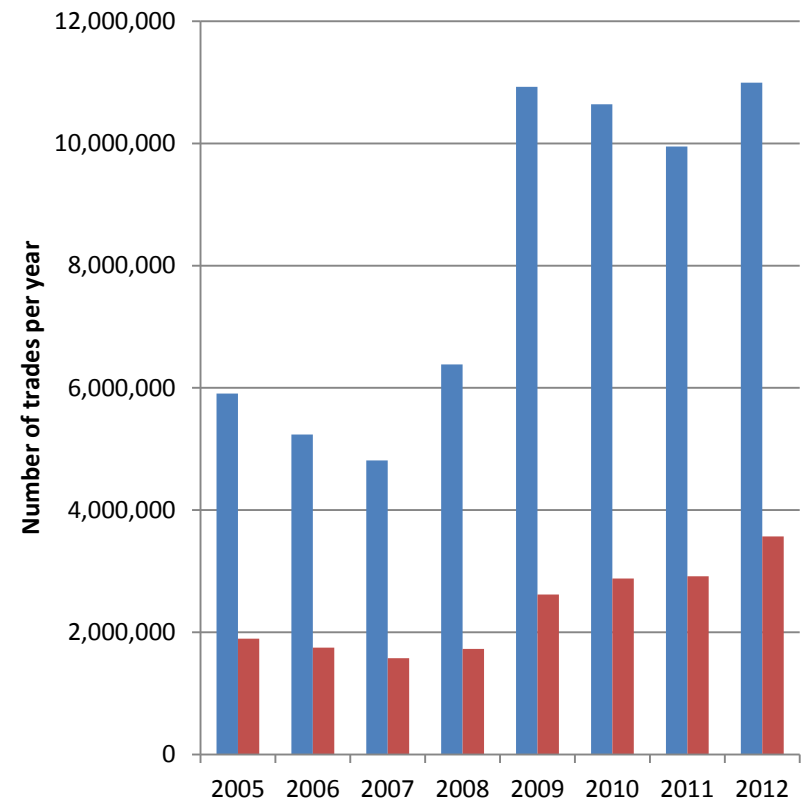
(Source: TRACE and Dr. Shane Moser, U. Mississippi)

Trace Volume and Trades: Total (blue) and Institutional (red)

Volume (2-3 billion bonds)



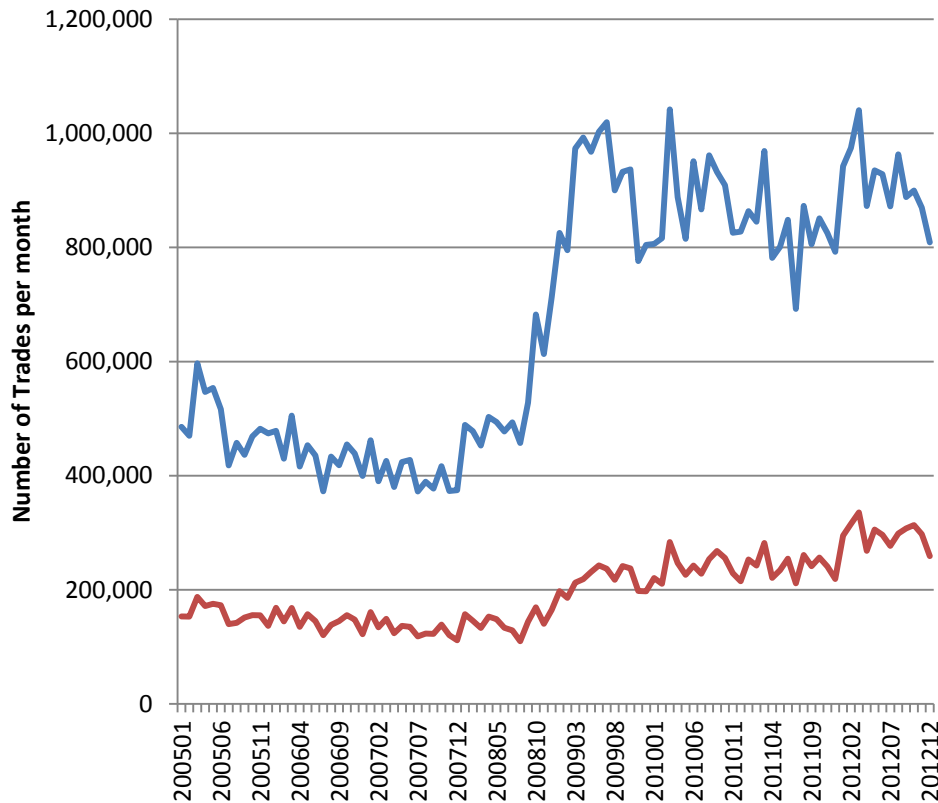
Trades (5.2-11 million)



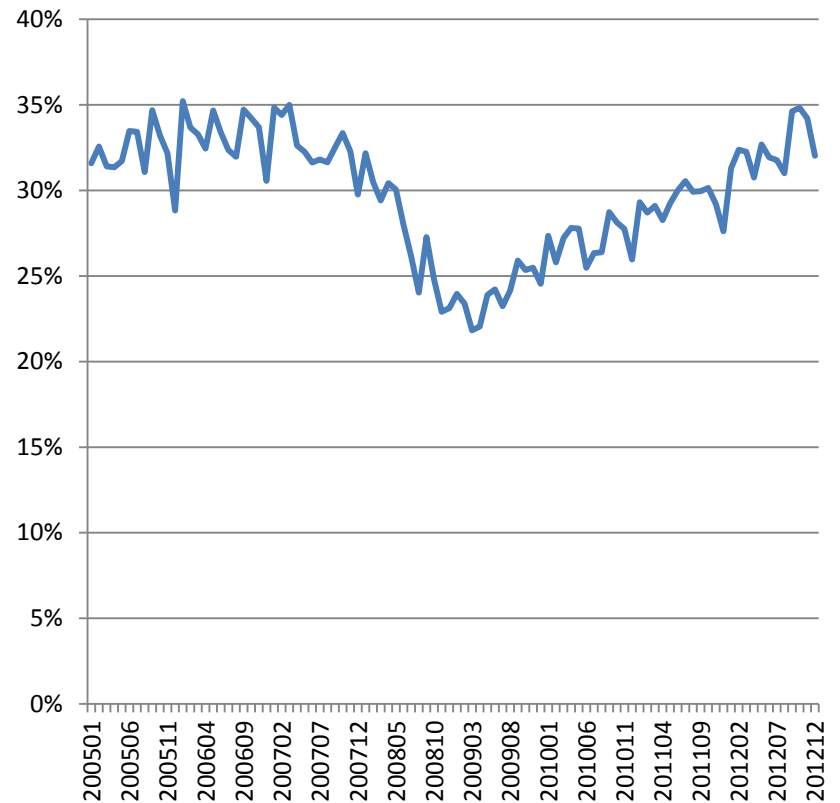
(Source: TRACE and Dr. Shane Moser, U. Mississippi)

Trace Trades per month

Trades per month



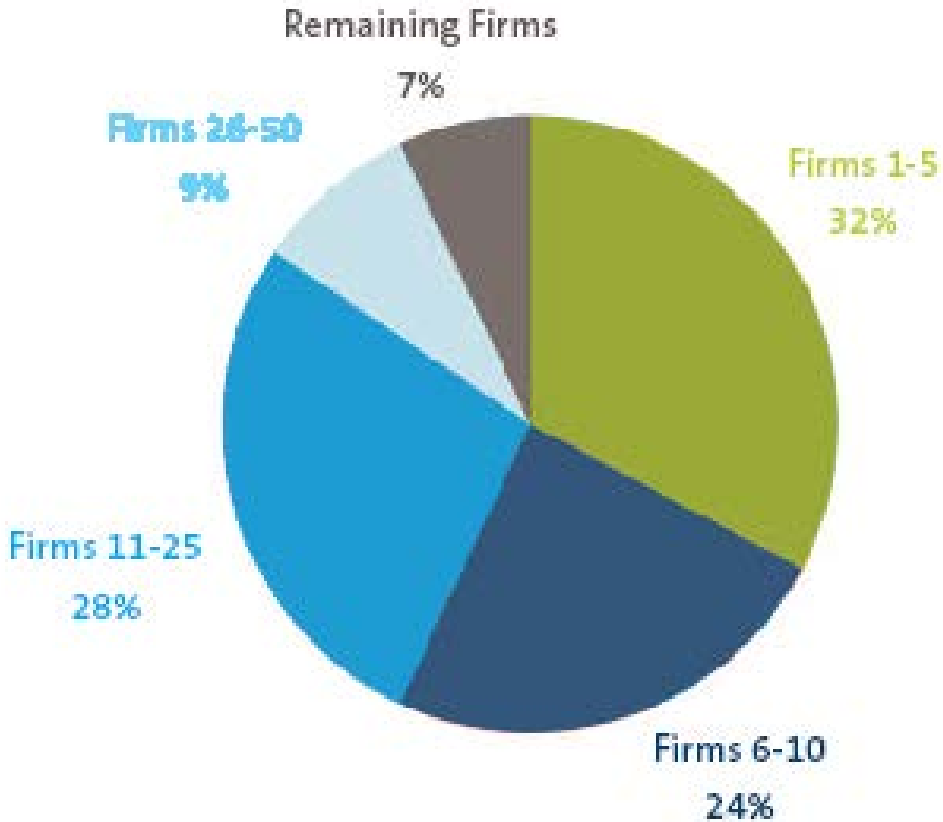
% institutional trades



(Source: TRACE and Dr. Shane Moser, U. Mississippi)

Dealer structure

Percentage of par value traded by most active dealers



Corporate bonds are Illiquid!!

- 47,629 “Trace Eligible” bonds
 - over 1,156 trading days (7/02 to 1/07)
 - 18% have **NO** trades
- Traded bonds have a median of 121 trades
 - (5th percentile = 2 trades)
 - Number of non-trading days can be very large
 - Most are highly ILLIQUID!

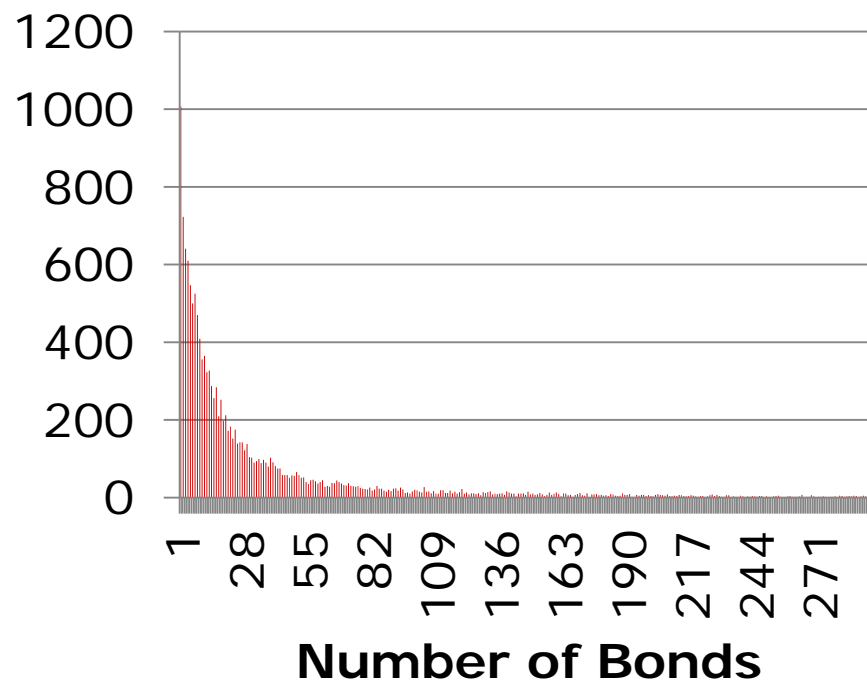
(Source: Goldstein and Hotchkiss analysis)

By Bond: Num trade in past 30 days

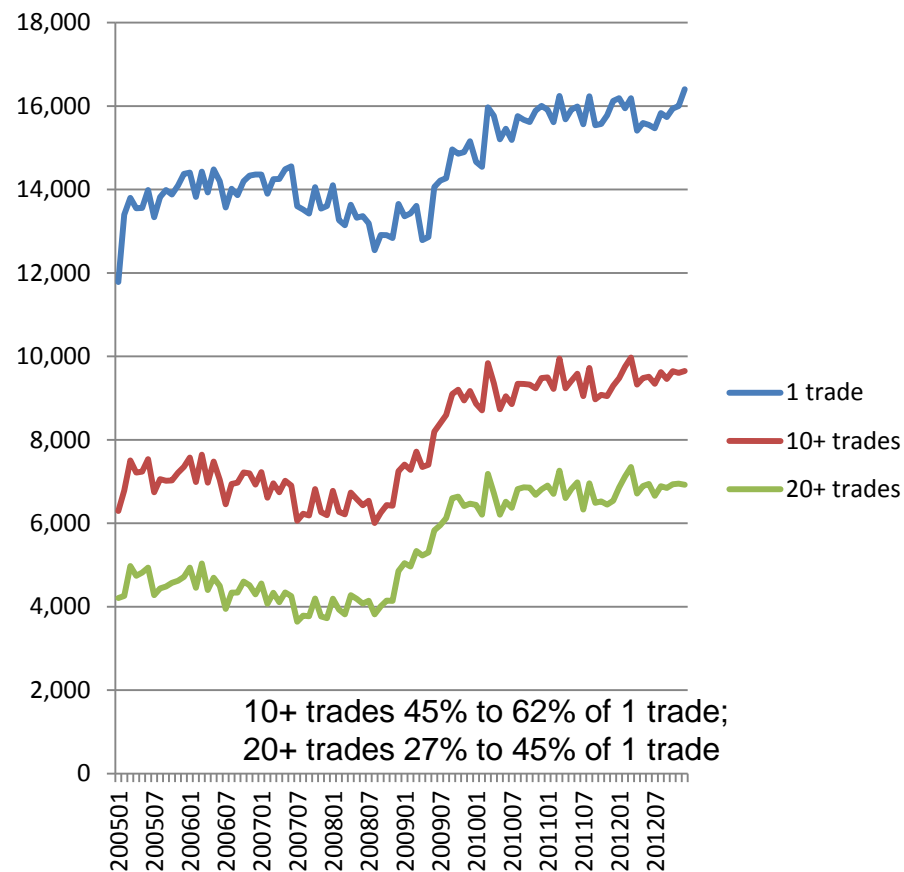
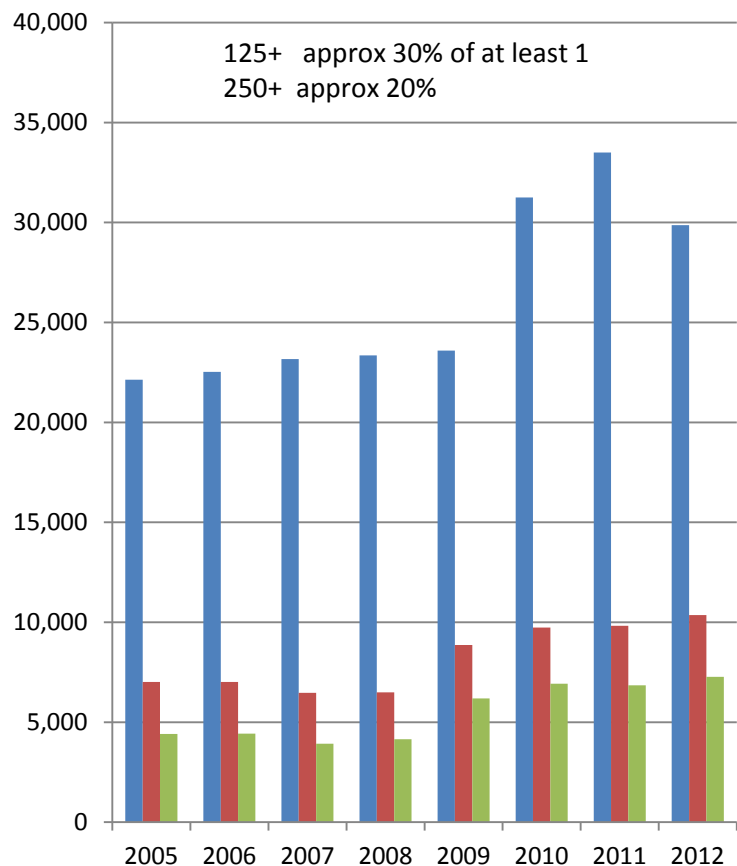
14,789 bonds: Mean is 50 trades; median 14

100% Max	4200.22553
99%	558.03951
95%	203.96047
90%	116.54148
75% Q3	41.48148
50% Median	14.62500
25% Q1	4.78125
10%	1.00000
5%	0.00000
1%	0.00000
0% Min	0.00000

Distribution by Bond of Trading Freq



Number of BONDS in TRACE by Trading Frequency



(Source: TRACE and Dr. Shane Moser, U. Mississippi)

Academic Summary

PRICE TRANSPARENCY AND EXCHANGES

Price Transparency:

TRACE Improved Trading Costs

- 5 bp to 25 bp
 - Edwards, Harris, Piwowar (JF 2007)
- 10 bp to 16 bp and Liquidity Externality:
 - 50% for those reported; 20% for those not for Insurance Company trades
 - Bessembinder, Maxwell, Venkataraman (JFE 2006)
- 22 bp to 38 bp on BBB bonds and no volume effects
 - Goldstein, Hotchkiss, Sirri (RFS 2007)

Exchanges:

Almost everything on TRACE

- 98% of NYSE trades are retail size
- NYSE conducts 19% of trades in Listed bonds
 - Edwards (2006) and Edwards and Nimalendran (2007)
- Less than 5% of bonds on NYSE
 - Edwards, Harris, Piwowar (JF 2007)

Academic Summary

LIQUIDITY

Liquidity

- Larger Transaction Costs/Lower liquidity for:
 - Older Bonds (Age)
 - Longer Maturity, Not on the run
 - Smaller Issues (Amount Outstanding)
 - Small Trade Size (Retail)
 - Lower Rating (mostly)
 - Not 144A
 - Time trend
 - Who holds bond (frequent traders)
 - Top Bond
 - Sources: Edwards, Harris, Piwowar (JF 2007), Bessembinder, Maxwell, Venkataraman (JFE 2006), Goldstein, Hotchkiss, Sirri (RFS 2007), Mahanti et. al (JFE 2008), Ronen and Zhou (JFM 2013), Goldstein and Hotchkiss (2012)

CDC Spreads (AAA-BBB)

Liquidity Group	Investment Grade			
	AAA	AA	A	BBB
A. Trading Frequency (number of trades over the previous 30 days)				
3 to 10 days	0.35	0.26	0.39	0.43
2-3 days	0.31	0.23	0.34	0.38
about 1 day	0.42	0.25	0.34	0.36
1 -2 per day	0.41	0.27	0.37	0.37
2-3 per day	0.41	0.30	0.35	0.38
3-5 per day	0.44	0.29	0.34	0.42
30 per day	0.58	0.33	0.41	0.76

Source: Goldstein and Hotchkiss (2013)

CDC Spreads (High Yield)

Liquidity Group	High-Yield				
	BB	B	CCC	CC	C

A. Trading Frequency (number of trades over the previous 30 days)

3 to 10 days	0.47	0.46	0.59	0.67	0.62
2-3 days	0.42	0.40	0.50	0.62	0.53
about 1 day	0.39	0.40	0.48	0.63	0.65
1 -2 per day	0.42	0.40	0.46	0.68	0.59
2-3 per day	0.44	0.43	0.48	0.63	0.65
3-5 per day	0.49	0.48	0.53	0.57	0.63
30 per day	0.65	0.61	0.57	0.63	0.48

Source: Goldstein and Hotchkiss (2013)

Academic Summary

FINANCIAL CRISIS

Subprime Crisis (1)

- Yield Spreads:
 - Portion due to illiquidity increased
 - Illiquidity costs increased
 - Falling liquidity and increased sensitivity to liquidity
 - Underwriter financial distress raises spreads (Bear Stearns and Lehmann)
 - Source: Dick-Nielsen, Feldhutter, Lando (JFE 2012)

Subprime Crisis (2): Liquidity Component, 2-5 year, in bp

Rating	2005-2007 (Q1)	2007-2009 (Q2)
AAA	0.9	4.5
AA	1.0	37.1
A	2.5	51.0
BBB	4.0	115.6
Spec	44.0	224.0

Source: Table 4, Dick-Nielsen, Feldhutter, Lando (JFE 2012)

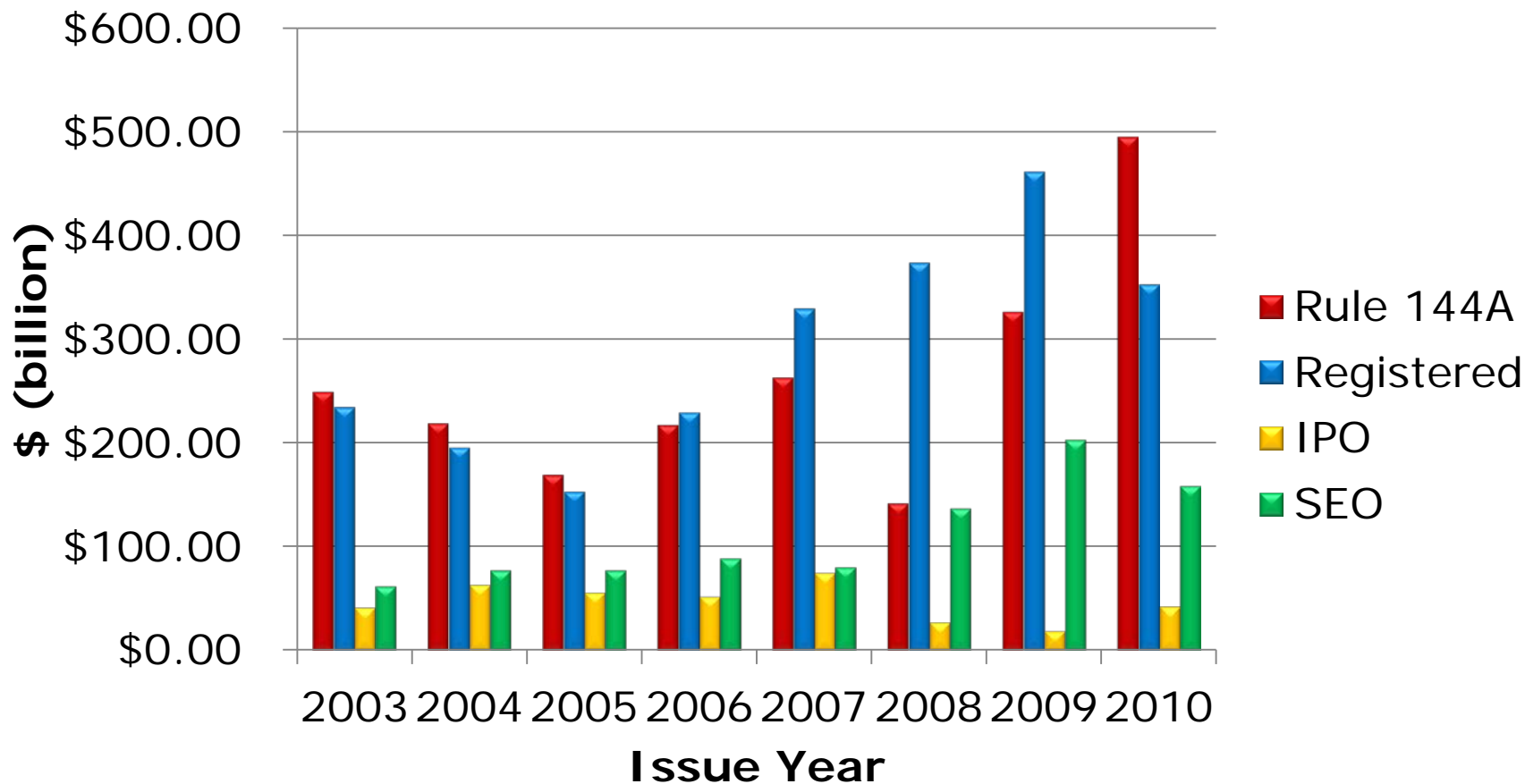
Fraction of yield spread was about 13% before, 23% to 31% after for 4-5 yr bond (across all ratings). [Table 5]

For BBB bond across all maturities, fraction of spread was 8% before, 29% after. [Table 5]

BOND NEW ISSUES

Bond and Equity Issuance

(Source: Dr. Karen Craig, U. Tennessee)



Goldstein and Hotchkiss (2012)

- **Price Dispersion:**
 - Large Price Dispersion
 - Worse during Crisis period
- **Underpricing:**
 - 45 BP for investment grade
 - 124 BP for High Yield Offerings
 - Reflects both ex-ante pricing decision and after-market price dispersion
- **Transparency & Time Trend:**
 - Associated with a reduction in underpricing and price dispersion
- **Non-syndicate members:**
 - Significant proportion of after-market trading and price dispersion
- **Dealer Inventory:**
 - No significant accumulations
 - Even for issues trading below offering price!
 - Not much difference post-crisis

Volume Findings

- **Trading volume**
 - highest on days 1&2.
 - After day 3, volume falls over the first 60 days.
 - A large number of retail (small) investors purchase bonds & entrance increases on days 3 and 4. Sales by retail investors are much smaller in number.
- **Bookrunners and other managers' market shares**
 - Fall after the first day of trading.
 - By end of second week (Day 10), non-underwriters market share is approx 45% of dollar volume, 60% of trade count.

Source: Goldstein and Hotchkiss (2012)

New Issue: Daily Trading Volume

	All bond/days					Non-zero bond trade/days					Underwriter market share	
	# bonds	Average trading volume (\$000)	Average number of trades	Median trading volume (\$000)	Median number of trades	# bonds	Average trading volume (\$000)	Average number of trades	Median trading volume (\$000)	Median number of trades	Share of volume	Share of # trades
daily trading by event day												
1	4,122	31,665	7.8	3,000	2.0	2,729	47,829	11.8	9,500	4.0	81.3%	52.0%
2	4,122	39,798	13.5	16,500	7.0	3,528	46,498	15.7	22,213	9.0	59.2%	46.0%
3	4,122	21,040	7.2	9,000	4.0	3,427	25,307	8.6	12,025	5.0	58.8%	43.5%
4	4,122	20,361	6.0	5,302	3.0	3,202	26,211	7.7	9,500	4.0	69.1%	40.9%
5	4,122	12,795	5.1	5,000	2.0	3,121	16,899	6.8	8,250	4.0	57.8%	40.0%
6	4,122	10,966	4.9	3,823	2.0	3,019	14,973	6.7	7,106	3.0	55.1%	39.5%
7	4,122	10,000	4.6	2,500	2.0	2,900	14,213	6.5	6,100	3.0	55.3%	38.9%
8	4,122	8,628	4.4	2,000	1.0	2,777	12,806	6.5	5,670	3.0	54.9%	41.9%
9	4,122	7,921	4.0	1,825	1.0	2,753	11,860	6.0	5,000	3.0	52.9%	40.6%
10	4,122	7,774	4.1	1,500	1.0	2,724	11,763	6.2	5,060	3.0	54.5%	40.0%
daily trading by event month*												
1	4,122	11,581	4.7	1,763	1.0	4,122	15,328	5.9	5,233	2.0	60.4%	41.0%
2	4,122	4,802	2.7	70	1.0	4,077	7,160	3.6	2,858	2.0	51.2%	34.7%
3	4,120	3,862	2.4	0	0.0	4,027	6,174	3.3	2,125	2.0	50.7%	33.1%
4	3,977	3,264	2.1	0	0.0	3,843	5,530	3.1	2,000	1.5	48.9%	32.6%
5	3,834	2,958	1.9	0	0.0	3,623	5,246	3.0	1,750	1.5	47.7%	32.2%
6	3,657	2,777	1.9	0	0.0	3,382	5,135	3.0	1,680	1.5	47.1%	32.1%

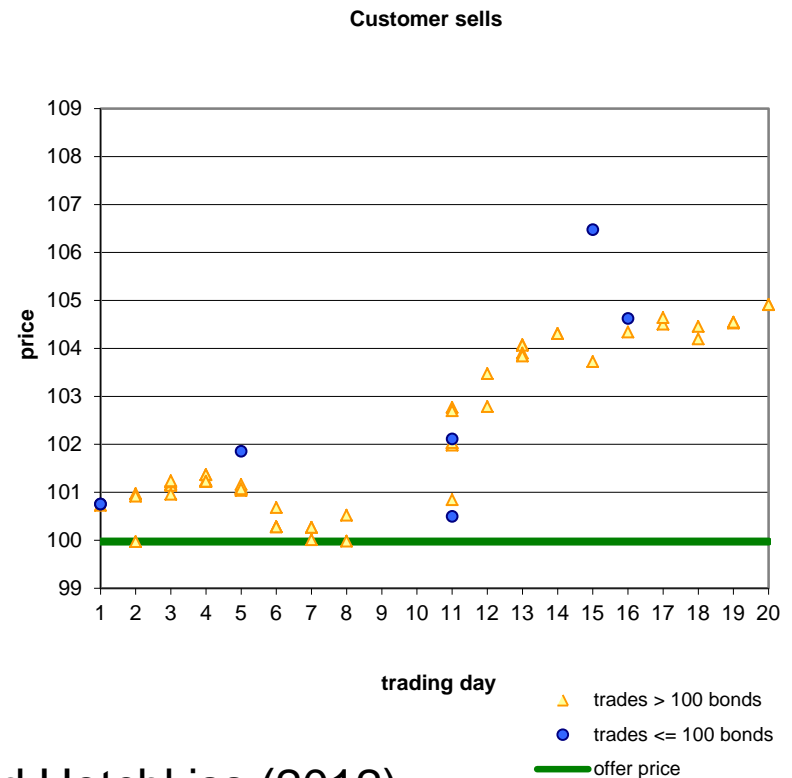
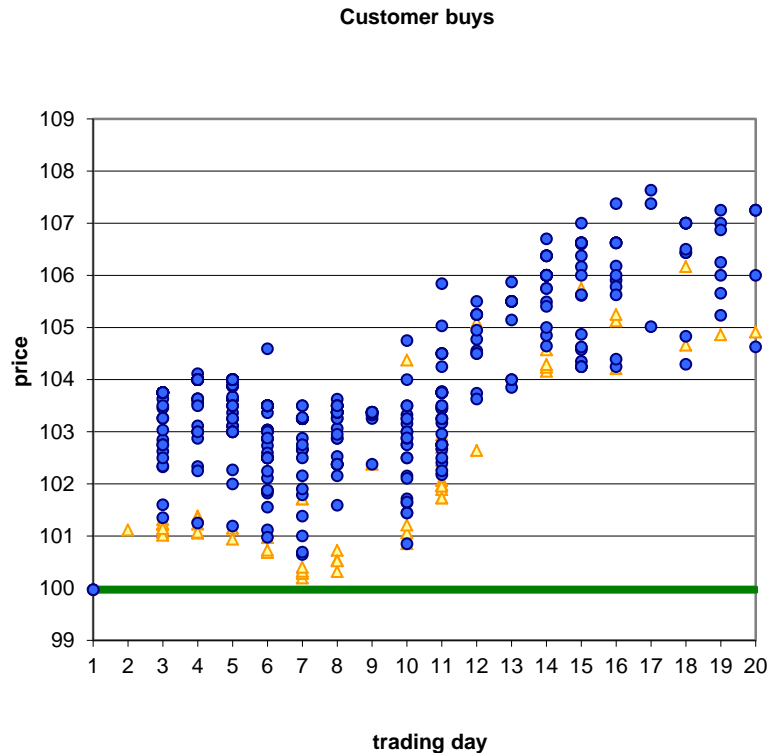
Source: Goldstein and Hotchkiss (2012)

Number of trades by trade type: Institutions first two days; retail after

Trading day	Number of trades					
	large trades (>100 bonds)			small trades (<= 100 bonds)		
	interdealer	customer buys	customer sells	interdealer	customer buys	customer sells
1	10,769	13,029	13,508	533	4,595	971
2	26,561	20,240	29,597	1,946	4,688	1,007
3	13,799	11,268	11,777	2,301	5,950	487
4	9,806	8,737	8,043	2,572	7,429	420
5	8,668	7,414	6,704	2,212	6,476	474
6	7,475	6,745	5,545	2,412	7,539	401
7	6,582	6,127	4,911	2,554	7,458	442
8	5,712	5,660	4,060	2,759	7,976	443
9	5,327	5,249	4,070	2,322	6,691	451
10	5,427	5,201	3,829	2,399	7,275	465
20	3,953	3,865	2,861	2,133	4,907	603

Source: Goldstein and Hotchkiss (2012)

BBB rated non-144A bond, disseminated at issuance



Source: Goldstein and Hotchkiss (2012)

Dealer inventory vs. bond returns

Bookrunners (% of offering amt)

Panel A:												
Trading price is above offer price						Trading price falls below offer price						
Trading day	mean %	median %	P90	% positive inventory	# bonds	mean %	median %	P90	% positive inventory	# bonds	Difference in means	Difference in medians
all underwriters												
1	0.11	0.00	2.54	40.5%	2,467	-1.03	-0.06	2.79	27.0%	204	-1.14 ^b	-0.06 ^a
2	1.08	0.57	5.51	58.5%	3,207	1.42	0.80	7.25	57.3%	506	0.34	0.23 ^b
3	1.25	0.89	6.14	60.7%	3,258	1.38	1.19	7.70	62.6%	717	0.14	0.30
4	1.33	1.00	6.63	61.4%	3,232	1.60	1.30	8.26	62.9%	803	0.26	0.30
5	1.33	1.17	7.10	61.1%	3,202	1.82	1.30	8.53	63.4%	869	0.50 ^b	0.13
6	1.39	1.20	7.33	62.3%	3,175	1.94	1.53	8.77	62.8%	911	0.54 ^b	0.33
7	1.45	1.32	7.50	62.2%	3,140	1.81	1.53	8.91	64.0%	960	0.36	0.22
8	1.41	1.29	7.61	61.6%	3,058	1.81	1.51	8.87	64.2%	1,046	0.40 ^c	0.22 ^c
9	1.37	1.29	7.63	61.8%	3,035	2.00	1.56	9.14	63.6%	1,073	0.63 ^a	0.27 ^b
10	1.33	1.27	7.63	61.7%	2,998	2.17	1.77	9.71	64.4%	1,114	0.84 ^a	0.50 ^a

Source: Goldstein and Hotchkiss (2012)

Academic Summary

INVENTORY AND HOLDING PERIOD

Inventory and Holding Periods

- Hold securities for not very long/doesn't vary much with liquidity
 - Need fewer transactions for less liquid and lower rated securities
- Holding periods: Investment grade longer by days than high yield, fewer zero holding days
- Holding period vs. Expectations, holding rating constant and controlling for previous trading:
 - Smaller with larger trades, 144A (lower ratings), shorter maturities, age, offering amount (higher ratings), not disseminated

Source: Goldstein and Hotchkiss (2013)

HOLDING PERIODS 100 bonds+

Liquidity Group	Investment Grade			
	AAA	AA	A	BBB
A. Trading Frequency (number of trades over the previous 30 days)				
3 to 10 days	6.57	8.94	8.58	8.89
2-3 days	7.59	8.48	9.11	9.48
about 1 day	7.82	8.05	8.84	9.00
1 -2 per day	7.00	8.45	8.50	8.13
2-3 per day	6.23	7.60	7.59	7.35
3-5 per day	7.09	7.49	7.07	6.58
30 per day	4.01	5.10	5.38	3.40

Source: Goldstein and Hotchkiss (2013)

Holding Period – High Yield Shorter with Rating and Illiquidity

Liquidity Group	High-Yield				
	BB	B	CCC	CC	C
A. Trading Frequency (number of trades over the previous 30 days)					
3 to 10 days	4.87	3.62	2.99	2.10	2.46
2-3 days	5.68	4.42	3.74	2.29	2.71
about 1 day	6.02	4.94	4.18	2.79	3.24
1 -2 per day	5.97	4.84	3.84	2.98	2.62
2-3 per day	5.46	4.47	3.68	3.27	2.68
3-5 per day	4.73	3.89	3.35	3.17	2.94
30 per day	3.07	2.66	2.46	2.35	2.26

Source: Goldstein and Hotchkiss (2013)

% of days with ZERO holding period – Investment Grade

Liquidity Group	Investment Grade			
	AAA	AA	A	BBB
A. Trading Frequency (number of trades over the previous 30 days)				
3 to 10 days	49%	37%	40%	42%
2-3 days	40%	33%	34%	37%
about 1 day	39%	32%	31%	36%
1 -2 per day	35%	28%	30%	35%
2-3 per day	34%	29%	30%	36%
3-5 per day	27%	28%	31%	37%
30 per day	36%	32%	33%	44%

Source: Goldstein and Hotchkiss (2013)

% of days with ZERO holding period – High Yield

Liquidity Group	High-Yield				
	BB	B	CCC	CC	C
A. Trading Frequency (number of trades over the previous 30 days)					
3 to 10 days	63%	69%	74%	84%	81%
2-3 days	56%	62%	67%	81%	76%
about 1 day	50%	56%	61%	75%	73%
1 -2 per day	47%	53%	59%	68%	76%
2-3 per day	46%	53%	60%	65%	70%
3-5 per day	48%	52%	59%	61%	63%

Source: Goldstein and Hotchkiss (2013)

Conclusion

- Large, but illiquid market
 - Transparency helped
 - Liquidity function of bond characteristics
 - Spreads don't vary with previous liquidity
 - Crisis hurt liquidity and sensitivity
 - IPOs
 - underpriced, sharp drop off in trading, price dispersion, not much inventory even if price drops
 - Holding period shorter for less liquid and high yield
-