Dealer Inventory and the Cost of Immediacy

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Motivation

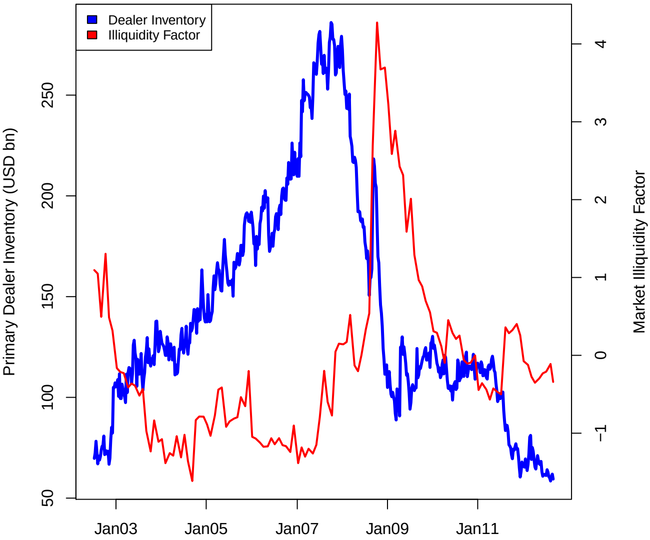
"Bank broker-dealers are responding to the impacts of regulation by changing their models. As a result of more discerning capital allocation within the banks, there is a shift to running smaller inventory, but increasing turnover."

- ICMA, (Hill, 2014). Based on a broker-dealer survey.

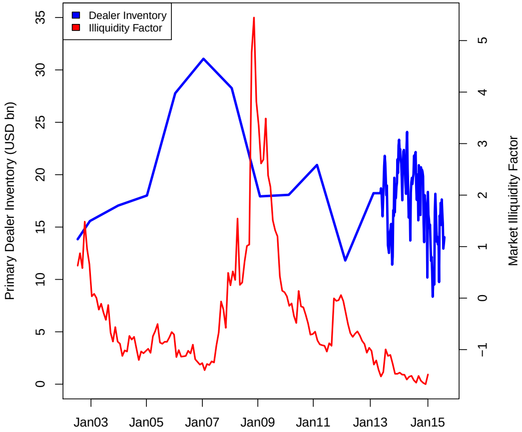
"The vast majority of managers also pointed to a diminished presence by the Wall Street broker/dealer community as a long-term factor causing strain in corporate market liquidity."

- Towers Watson, 2012. Based on a fund manager survey.

Motivation - Dealer Inventory vs illiquidity



Motivation - Dealer Inventory vs illiquidity

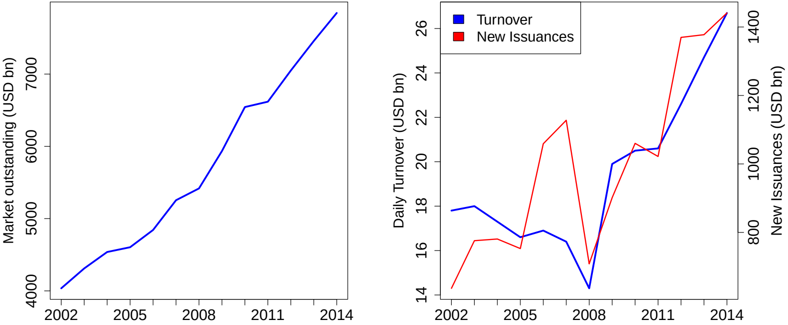


Corporate bond inventory as calculated by Goldman Sachs.

Motivation

- Corporate bond inventories and market liquidity decreased during the crisis.
- Liquidity has bounced back but inventories are still low (80% decrease).
- The inventory decrease is a reaction to anticipated tighter regulation i.e. Basel III and the Volcker Rule (see Towers Watson survey and others).
- Have dealers changed their pricing and behavior when providing immediacy?

The size of the market



Contribution

- Natural experiment: index exclusions (recurring and information-free event)
- The decrease in market marker inventories has increased the cost of immediacy.
- The cost of immediacy was 6 times higher during the crisis, and 3 times higher after the crisis compared to before.
- The effect is stronger for risky bonds.

Related Literature

Market making under the Volcker Rule.

- Ongoing debate about the effect of a ban on proprietary trading.
- A SIFMA sponsored study by Oliver Wyman (2012) analyzed the cost of a less liquid market.
- SEC testimony by Richardson (2012) and Johnson (2012) argued that the Volcker Rule might not hurt liquidity.
- Duffie (2012) predicts that the cost of immediacy will go up (at least in the short end).

Related Literature

Corporate bond index rebalancing - monthly effect.

- Newman and Rierson (2004), Chen et al. (2009).

Corporate bond event study - cumulative returns.

- Bessembinder et. al (2011), Ambrose, Cai, Helwege (2012), Cai, Helwege, Warga (2007).

Dealer inventories - cost of immediacy.

- Garman (1976), Stoll (1978), Amihud and Mendelson (1980), Ho and Stoll (1981).

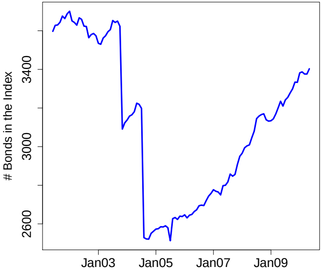
Index tracking - tracking error.

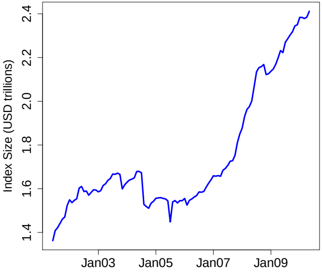
- Shleifer (1986), Harris and Gurel (1986), Blume and Edelen (2004).

Natural experiment - Index Tracking

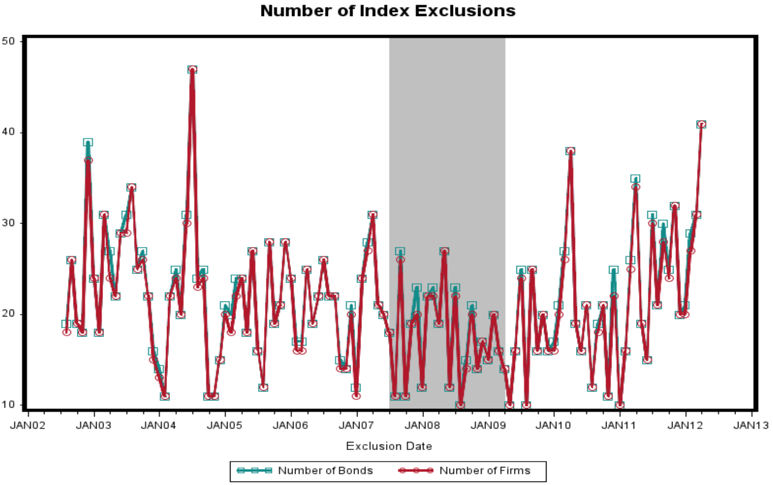
- Index trackers seek to minimize their tracking error and transact close to the rebalancing date.
- Bond index trackers sample the index.
  - 80% invested in the index and up to 20% outside the index.
- The Barclay Capital corporate bond index (Lehman index):
  - All investment grade bonds above a certain size.
  - Rebalanced at the last day of each month.
  - The mechanical index rules make exclusions and inclusions information-free events.

Index Tracking

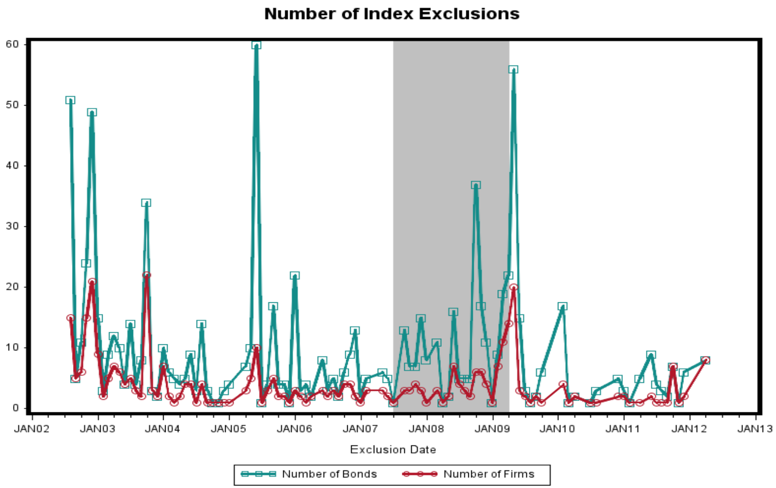




Index Tracking - Maturity



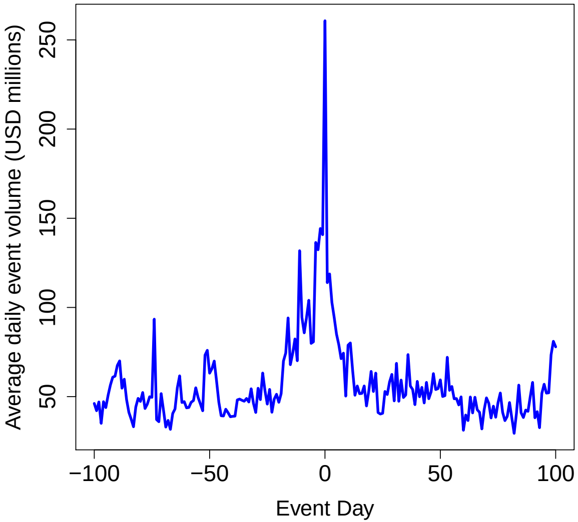
Index Tracking - Downgrade



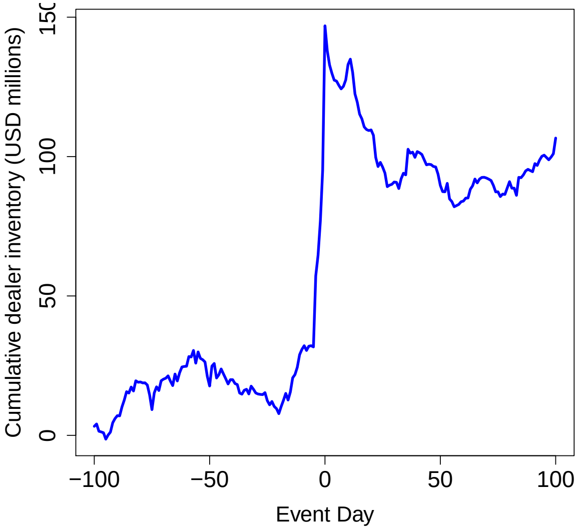
Index Tracking

Reason	N	Average amt. ($1,000)	Average Duration	Average Coupon
Maturity< 1	1,998	547,124	0.92	5.9
Called	257	319,406	0.78	7.4
Downgrade	912	601,028	5.0	6.9
Other	1,773	252,425	5.8	6.7

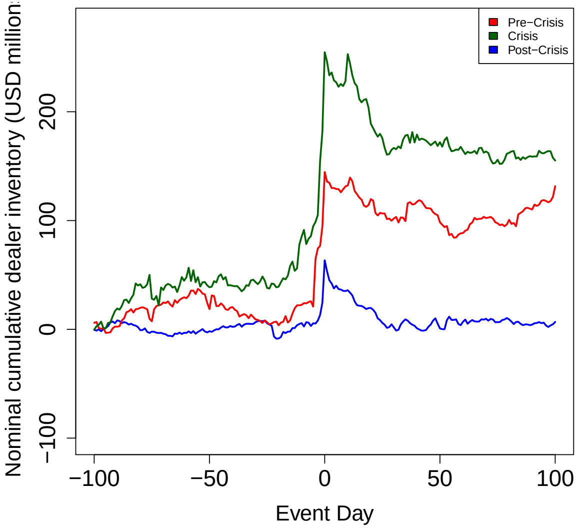
Downgrade exclusion - Volume



Downgrade exclusion - Inventory

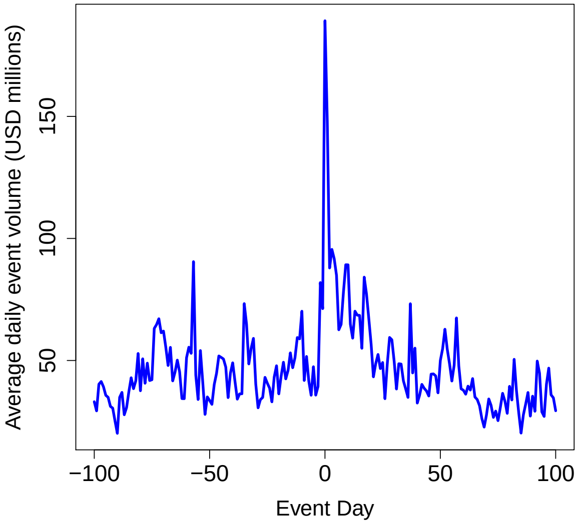


Downgrade exclusion - Inventory

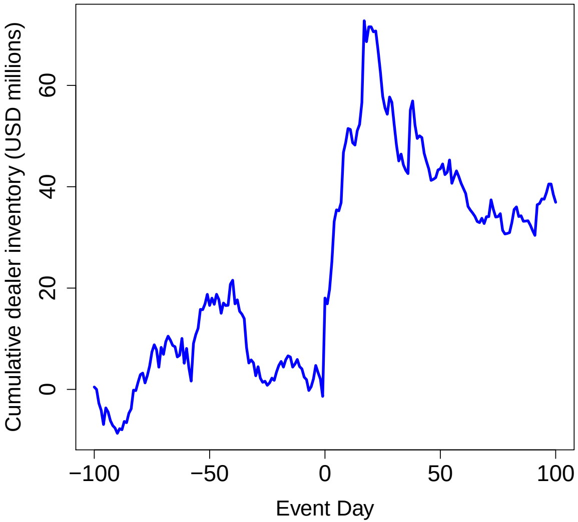


Crisis is here from June 2007 to Aug 2009.

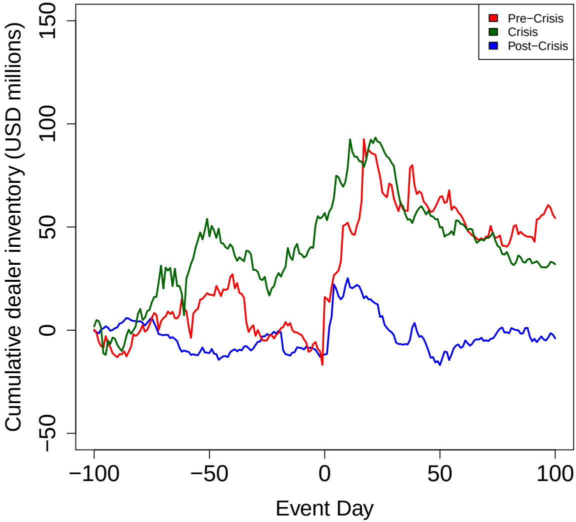
Downgrade date - Volume



Downgrade date - Inventory



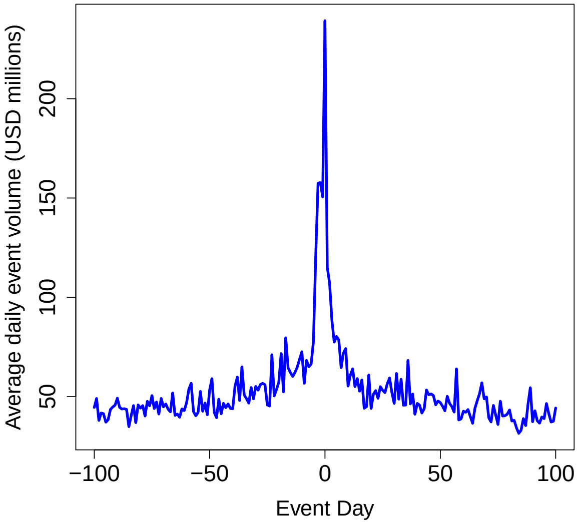
Downgrade date - Inventory



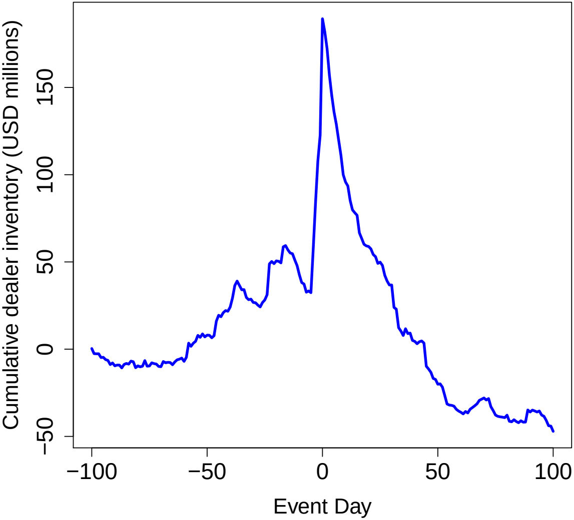
Downgrade - Summary

- Index trackers do sell out very close to the rebalancing date.
- Dealers provide immediacy and trade against the index trackers.
- Before the crisis dealers kept the bonds on inventory and after the crisis they unload over a couple of weeks.
- Dealers are less likely to provide immediacy at the downgrade date than at the index exclusion date.

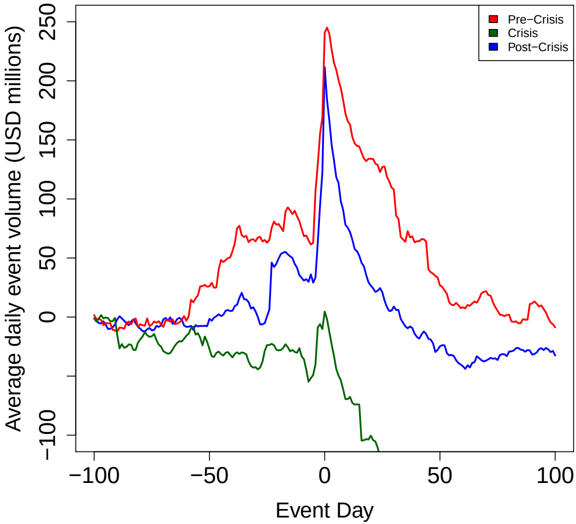
Maturity exclusion - Volume



Maturity exclusion - Inventory



Maturity exclusion - Inventory



Maturity - Summary

- Index trackers do sell out very close to the rebalancing date.
- Dealers provide immediacy and trade against the index trackers.
- During the crisis dealers also unload own holdings after index exclusion.
  Maybe as a way to secure funding.
- Behavior is more or less the same before and after the crisis.
  BUT the costs are not!

Event returns

- Enhanced TRACE historic data from 2002 to 2012.
- Calculate abnormal returns using a rating and maturity matched index as benchmark or a matched portfolio.
- In order to mimic the dealer returns the pre-event price is a dealer-buy price and the post-event price is a dealer-sell price.

Event Returns - Maturity exclusion / pre-crisis

[0, t]	N	Intertemporal Bid-Ask	Abnormal Returns
		EW	EW
1	1,044	17.07	6.25
		(4.47)***	(3.57)***
2	1,023	18.54	4.12
		(5.38)***	(2.12)**
3	1,026	21.77	4.59
		(5.09)***	(2.48)**
4	1,023	24.65	3.26
		(5.78)***	(1.60)
5	998	28.19	1.46
		(6.08)***	(0.63)

Event Returns - Maturity exclusion / crisis

		Intertemporal Bid-Ask	Abnormal Returns
[0, t]	N	EW	EW
1	324	57.84	41.13
		(6.26)***	(4.64)***
2	309	64.14	40.91
		(5.51)***	(3.92)***
3	298	61.88	30.92
		(4.46)***	(2.47)**
4	300	71.42	36.92
		(4.06)***	(2.72)***
5	290	71.04	28.22
		(4.60)***	(2.35)**

Event Returns - Maturity exclusion / post-crisis

[0, t]	N	Intertemporal Bid-Ask	Abnormal Returns
		EW	EW
1	663	20.39	16.98
		(7.02)***	(7.00)***
2	644	23.43	17.80
		(7.65)***	(7.32)***
3	620	24.64	16.99
		(6.66)***	(6.43)***
4	594	26.19	17.42
		(5.71)***	(4.85)***
5	593	27.79	18.99
		(6.35)***	(4.26)***

Event Returns - Downgrade exclusion / pre-crisis

[0, t]	N	Intertemporal Bid-Ask	Abnormal Returns
		EW	EW
1	430	260.17	165.32
		(2.09)**	(1.67)*
2	424	283.64	150.20
		(2.55)**	(1.84)*
3	430	249.44	103.60
		(2.93)***	(1.66)*
4	425	228.80	101.56
		(2.87)***	(1.78)*
5	425	239.24	92.66
		(3.14)***	(1.72)*

Event Returns - Downgrade exclusion / crisis

$[0, t]$	N	Intertemporal Bid-Ask	Abnormal Returns
		EW	EW
1	170	314.94	484.95
		(2.15)**	(2.43)**
2	166	304.22	455.56
		(1.55)	(1.68)*
3	159	427.93	577.42
		(1.56)	(1.68)*
4	151	262.03	481.63
		(1.34)	(1.69)*
5	144	266.80	532.38
		(1.22)	(1.52)

Event Returns - Downgrade exclusion / post-crisis

		Intertemporal Bid-Ask	Abnormal Returns
$[0, t]$	N	EW	EW
1	145	188.89	182.81
		(2.22)**	(2.60)***
2	139	337.12	290.90
		(2.88)***	(3.42)***
3	129	446.76	330.24
		(2.60)***	(2.62)***
4	127	524.63	355.55
		(2.61)***	(2.30)**
5	128	608.37	380.08
		(2.45)**	(1.81)*

The Cost of Immediacy - regression analysis

- We regress the intertemporal bid-ask spread on:
  - Primary dealer inventory of corporate securities to market size.
  - Corporate bond market illiquidity (Dick-Nielsen et al 2012). Idiosyncratic part not explained by dealer inventory.
  - Bond characteristics and other controls.

The Cost of Immediacy - regression analysis

Bid-Ask spread regression:

	Maturity < 1		Downgrade	
Intercept	38.73***	-	947.54***	-
	(3.87)	-	(102.18)	-
Inventory (pct)	-6.98***	-7.93***	-250.93***	-334.20***
	(1.25)	(2.22)	(34.49)	(59.48)
Illiquidity*	26.27***	25.37***	0.038	157.18***
	(1.05)	(1.42)	(26.34)	(50.16)
Controls	No	Yes	No	Yes
R^2	0.32	0.37	0.08	0.26
N	1,381	1,381	614	614

The Cost of Immediacy

- The results are the same for the abnormal returns.
- The results are robust to switching in idiosyncratic dealer inventory for idiosyncratic illiquidity.
- The inventory decrease means an increase in trading costs of around 100% for the downgraded bonds and 15% for the low-maturity bonds.

Conclusion

- The cost of immediacy increased as dealer inventory levels have decreased.
- The higher costs of immediacy could be a side-effect of anticipated tighter regulation.
- Market liquidity has returned to pre-crisis levels, hence less urgent trading has not been impaired notably by decreasing inventories.
- Fire-sale like trading have become more costly which renders financial liquidity buffers less effective.

The Cost of Immediacy - transitory effects

	Maturity < 1	Downgrade
Inventory	-7.09***	-343.1***
	(2.22)	(59.12)
Illiquidty*	24.29***	182.1***
	(1.47)	(51.77)
ΔInventory % (2m)	57.9***	2584.8***
	(18.59)	(522.54)
ΔInventory % (6m)	-27.8**	-1206.1***
	(12.02)	(367.70)
Controls	Yes	Yes
R^2	0.37	0.29
N	1,381	614