

# Benefits and Costs of Organised Trading for Non Equity Products

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- ▶ Background
- ▶ Market Transparency
- ▶ Electronic Trading
- ▶ Conclusions

## Background

- ▶ *"We reaffirm our commitment to trade all standardized OTC derivatives contracts on exchanges or electronic trading platforms, where appropriate, and clear through central counterparties (CCPs) by end-2012 at the latest"* (the G-20 Toronto Summit Declaration, June 26-27 2010, p.19)
  
- ▶ **Goals**
  1. Improve transparency
  2. Mitigate Systemic Risks
  3. Protect participants against market abuse

## OTC derivatives

- ▶ Equity derivatives: share options, index options, equity swaps, variance swaps, contracts for difference (CFDs), etc...
- ▶ Credit derivatives: Credit Default Swaps (CDSs)
- ▶ Interest rate derivatives: interest rate swaps, basis swaps etc...
- ▶ commodity derivatives
- ▶ Foreign exchange derivatives: forwards, options

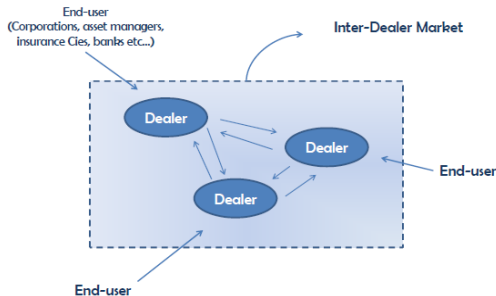
## Issues

- ▶ **Two distinct steps to achieve these goals:**
  1. Central clearing counterparties (CCPs)
  2. Centralized trading on exchanges or electronic trading platforms ("organized trading")
- ▶ The benefits and importance of CCPs have been much discussed.
- ▶ **Question:** What are the benefits/costs of organized/centralized trading?

# OTC vs Organized Trading 1/3

	<b>OTC</b>	<b>Organized Market</b>
<b>Negotiations</b>	Bilateral	Multilateral
<b>Trading Technology</b>	Telephone/Voice Brokers	Limit order market
<b>Transparency</b>	Low	High
<b>Trading Frequency</b>	Low	High
<b>Trade Sizes</b>	Large	Small


## OTC Market structure



- ▶ **Inter-dealer Brokers:** offer brokerage services to facilitate trades in the inter-dealer market (ICAP, Tradition Financial Services, GFI, Celent, Linkbrokers...)

## Equity Markets: Transparency

- ▶ **BNP Paribas limit order book on BATS at 2:28:10 p.m. yesterday:**

Book Viewer 

**BNP Paribas**

Orders Accepted: 48,734      Total Notional Value: 17,228,272

TOP OF BOOK				LAST 10 TRADES		
	SHARES	PRICE	TIME	PRICE	SHARES	
↑ ASKS	570	53.16	13:28:06	53.10	187	
	570	53.15	13:27:54	53.10	125	
	990	53.14	13:27:45	53.11	119	
	650	53.13	13:27:18	53.11	188	
	519	53.12	13:26:50	53.13	9	
↓ BIDS	650	53.09	13:26:50	53.13	7	
	1,012	53.08	13:26:45	53.13	14	
	535	53.07	13:26:45	53.13	12	
	916	53.06	13:26:41	53.13	6	
	299	53.05	13:26:28	53.13	11	

Last updated 13:28:10

- ▶ **Pre-trade-Post-trade**

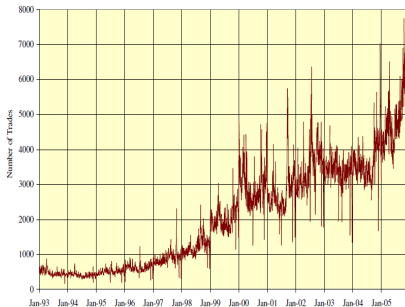


## CDS Markets: Transparency

- ▶ **Markit (data vendor): Major source of pre and post trade information in CDSs. For instance:**
  1. "Markit quotes:" "is a real-time quote parsing service that extracts indicative and live over-the-counter (OTC) pricing from email messages."(source: Markit website)
  2. Markit CDS pricing: post trade information (4 times a day)

## Equities: Trading Frequency

Figure 2-B. Average Number of Daily Transactions per Stock, 1993-2005



- ▶ **Source:** Chordia, Roll and Subrahmanyam (2008)-NYSE stocks-About 1 trade every 4sd on average

## CDS: Trading Frequency

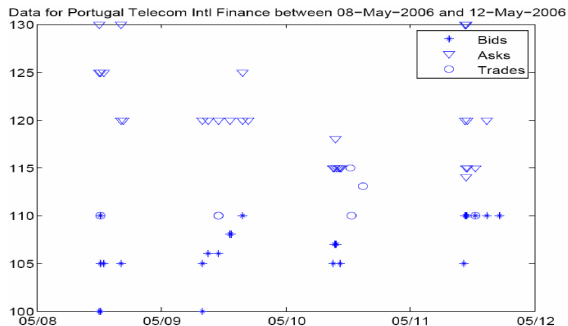


Figure 1: Bid quotes, ask quotes and trade prices expressed in basis point during 5 trading days (May 8, 9, 10, 11 and 12, 2006) for the 5-year CDS contract on Portugal Telecom Intl Finance

► **Source:** Fulop and Lescouret (2009)

## OTC vs Organized Trading 3/3

- ▶ **Two main effects of switching from OTC to organized trading for an asset:**
  1. Transparency (pre-trade/post-trade) will increase
  2. Trading technology changes
  
- ▶ **Is this good for end-users? liquidity? Volatility? Risk?**

## Difficulties

- ▶ **Increased market transparency and electronic trading are conceptually two distinct dimensions of market design.**
  1. Market transparency, especially post-trade, can be achieved without electronic trading (at least in the form observed in equities markets).
- ▶ **Some securities may trade in OTC markets precisely because investors rarely wish to trade them so that cost of arranging trades in more centralized markets is high....**
  1. Lack of empirical studies on the effects of making the market for OTC products more transparent or changing the trading technology for these products.
  2. Pilot experiments would be welcome
- ▶ **We can gain insights for changes in market design for other type of securities.**

- ▶ Background
- ▶ **Market Transparency**

## Lessons from the U.S. corporate bond market 1/2

### ▶ **Why is the U.S. bond market interesting?**

1. Trading is OTC: quotes are posted by dealers/trades take place on the phone through brokers;
2. Many issues trade very infrequently, have close substitutes and locating counterparties is difficult.
3. The market was opaque (no pre trade transparency/no post trade transparency) until 2002: high search costs for end-users (institutions/retail investors)

▶ ⇒ **Market structure** quite similar to that of OTC derivatives.

## Lessons from the U.S. corporate bond market 2/2

### ► **Changes in the post trade transparency of this market in 2002:**

1. In 2002, under regulatory pressure, dealers started disseminated post trade information (with a relatively long delay after the trade) through a trade reporting system known as TRACE.
2. Several empirical studies look at the effect of this change in market structure on trading costs in U.S bond markets.
  - Edward, Harris and Piwowar (2005)
  - Goldstein, Hotchkiss and Sirri (2005)
  - Bessembinder, Maxwell and Venkataraman (2005)
3. **They all reach the same conclusion: post trade transparency has reduced trading costs in U.S. corporate bonds.**



## Example

- ▶ **The Goldstein, Hotchkiss and Sirri (2005)'s experiment**
- ▶ **Two groups of bonds:**
  1. **Treated group:** 90 BBB rated bonds for which post trade transparency was introduced
  2. **Control group:** 90 BBB rated bonds matched with those in the treated groups for which post trade transparency was not introduced (at the time of the experiment).
- ▶ **Main finding:** trading costs decrease for treated bonds relative to control bonds.

## Example

Trade Size	$\leq 10$	$\leq 20$	$\leq 50$	$\leq 100$	$\leq 250$	$\leq 1000$	$> 1000$
$\Delta\text{Cost T}$	-0.26	-0.59	-0.60	-0.81	-0.59	-0.30	-0.18
$\Delta\text{Cost C}$	-0.69	-0.53	-0.25	-0.26	-0.21	-0.26	-0.12
$(\text{T}) - (\text{C})$	0.43	-0.06	-0.35	-0.55	-0.38	-0.04	-0.05

- ▶ "T" = Treated Bonds - "C" = Control bonds
- ▶  **$\Delta\text{Cost}$ : Dollar difference in a measure of trading cost per \$100 of face value after and before treated bonds start trading in the transparent setting (pre-TRACE period: 7/8/02–4/4/04-Post trade period: 4/21/03-2/27/04).**
- ▶ **Example:** The cost of trading 100 treated bonds with a \$1,000 face value is reduced by  $0.55 \times 10 \times 100 = \$550$  relative to control bonds.
- ▶ **Source:** Goldstein, Hotchkiss and Sirri (2005), Table 7

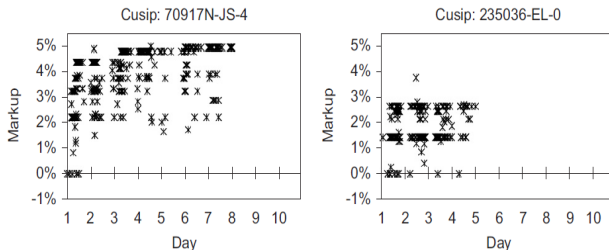
## A possible explanation for these findings

- ▶ Several studies of U.S. corporate or muni bond market point to non competitive behaviors in this market (e.g., Goldstein, Hotchkiss and Sirri (2005) or Green, Hollifield and Schüroff (2011))
- ▶ **Post-trade transparency** helps investors to better figure out current prices for a bond and reduces dealers' bargaining power.

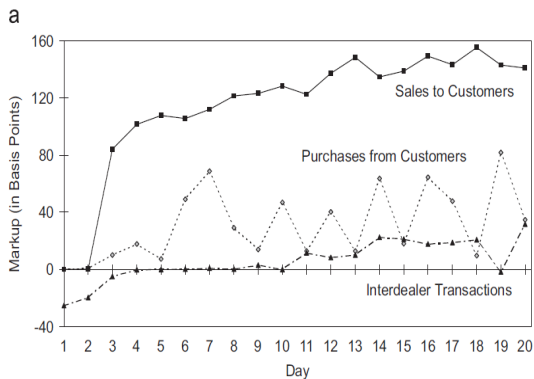
## Evidence of market power for intermediaries in OTC markets

- ▶ *Price dispersion*: trades of the same size execute at widely different prices on the same day (Green Hollifield, and Schürhoff (2007)-for the Munis bond market)
- ▶ *Low sensitivity of prices to changes in fundamentals* (e.g., changes in interest rates)-(Green, Li and Schürhoff (2011)-for the Munis bond market) .
  1. Intermediaries in the muni bond market opportunistically time their response to changes in fundamentals
    - 1.1 Dealers' sell price is, more sensitive to "good news" than "bad news": when dealers sell, they reflect quickly good news into their prices but slowly bad news.
    - 1.2 Dealers' bid price is more sensitive to "bad news" than "good news": when dealers buy, they reflect quickly bad news into their prices but slowly good news.

## Price dispersion



- ▶ **Days:** nber of days after the issue of the bond.
- ▶ **Markup:** difference between the price at which bond is sold to clients and the issuing price.
- ▶ **Source:** Green Hollifield, and Schürhoff (2007)-Figure 1



**b**

► **Source:** Green Hollifield, and Schürhoff (2007)-Figure 2

*"All these findings suggest intermediaries benefit from the lack of transparency and decentralization, and the search costs thus imposed on investors, in this important OTC market" (Green, Li and Schürhoff (2011), page 35)*

## Pre-Trade Transparency

- ▶ Studies on transparency in the U.S. bond market are really about post-trade transparency: dissemination of trade and price information after transactions.
- ▶ **Studies regarding pre-trade transparency in cash markets have obtained mixed results:**
  1. Madhavan, Porter and Weaver (2005): switch of the Toronto stock exchange to pre-trade transparency is associated with a decline in liquidity.
  2. Boehmer, Saar and Yu (2005): switch of the NYSE to pre-trade transparency is associated with an increase in liquidity.



## Why mixed results?

- ▶ **Benefit of pre-trade transparency:**
  1. Smaller search costs
  2. Increased competition among liquidity providers.
- ▶ **Costs of pre-transparency: risks increased for those supplying liquidity**
  1. Greater “risk of being picked off”: This risk may be especially large when trading is infrequent  $\implies$  Cost of managing limit orders increase (e.g., monitoring, cancellations and resubmissions)
  2. Increased risk of front running for traders displaying their interest in the LOB.

- ▶ Background
- ▶ Market Transparency
- ▶ **Electronic Trading**

## Electronic trading for inactive securities

- ▶ Are electronic platforms (limit order books) adapted for securities that trade very infrequently?
- ▶ **Liquidity provision in limit order markets hinges on the willingness of some traders to post limit orders. But in inactive securities:**
  1. These orders will have a low likelihood of relatively quick execution
  2. Will be quite exposed to the risk of being picked off unless they are closely monitored by limit order submitters.
  3.  $\implies$  Lack of liquidity for infrequently traded securities unless some traders have some obligations to post two-way quotes
- ▶ **How do traders choose between decentralized trading and electronic trading when they can?**

## A case study: The treasury market in the U.S. 1/3

- ▶ **“On the run treasuries:”**
  1. **Bonds issued less than one month ago by the U.S. treasury: very actively traded.**
- ▶ **“Off the run treasuries:”**
  1. **Bonds issued more than one month ago by the U.S. treasury: much less actively traded.**
- ▶ **When a security switches from being on the run to being off the run, its trading volume falls. (Barclay et al. (2005))**
  1. Number of inter-dealer trades for on the run security: about 1 every 20 seconds
  2. Number of inter-dealer trades for off the run security: about 20 per day or even less

## On the run/Off the run bonds trading activity

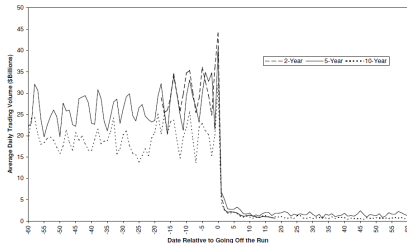


Figure 1. Trading volume for on- and off-the-run Treasury securities. Average trading volume is calculated for 2-year, 5-year, and 10-year U.S. Treasury notes that go off the run between January 2001 and November 2002.

- ▶ **Source:** Barclay, Hendershott and Kotz (2006), Figure 1.  
Sample: Inter-dealer trades in 2-year, 5-year and 10-year U.S treasury notes from Jan. 2001 to Nov. 2002.

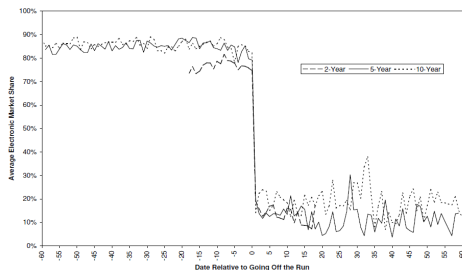
## A case study: The treasury market in the U.S. 2/3

- ▶ **Two trading systems for inter-dealer trades in U.S. treasuries :**
  1. *Electronic limit order books*: Broker-Tec and E.Speed
  2. *Voice brokers* who take and execute orders from the dealers over the phone
  
- ▶ **What are the benefits of human intermediation that are difficult to replicate in centralized electronic platforms?**
  1. Knowledge of undisplayed pool of liquidity: voice brokers can match natural counterparties that otherwise would have difficulty finding each other  $\implies$  Especially valuable when trading volume and the matching rate for a security is low.
  2. Repeated relationships + reputation effects mitigate informational asymmetries for information sensitive securities.

## A case study: the treasury market in the U.S. 3/3

- ▶ **Implication:** when treasuries go off the run, the incentives of traders to use voice brokers should dramatically increase.
- ▶ This is indeed what happens (Barclay et al.(2005))
- ▶ **When a treasury goes off the run,**
  1. The market share of electronic brokers falls dramatically.
  2. The market share of electronic brokers is inversely related to proxies for the exposure to the risk of being picked off for limit orders: volatility, time between trades and the embedded option value of limit orders (Barclay et al.(2005), Table II).
  3. The market share of electronic brokers is lower for large trades.
- ▶ **Hence, traders have a preference for using voice brokers for inactively traded securities!**

## Electronic broker's market share for on and off the run securities



**Figure 2. Electronic brokers' market share for on- and off-the-run Treasury securities.**  
The electronic brokers' daily market shares are calculated for 2-year, 5-year, and 10-year U.S. Treasury notes that go off the run between January 2001 and November 2002.

- ▶ **Source:** Barclay, Hendershott and Kotz (2006), Figure 2.  
Sample: Inter-dealer trades in 2-year, 5-year and 10-year U.S. treasury notes from Jan. 2001 to Nov. 2002.



# Electronic broker's market share for on and off the run securities: Determinants

**Table II**  
**Electronic Brokers' Market Share Regressions**

The market share of electronic interdealer brokers (in percent) is calculated each day for 2-year, 5-year, and 10-year U.S. Treasury notes from January 2001 through November 2002 for the days prior and subsequent to the going-off-the-run event (20 days before and after for 2-year notes and 60 days before and after for 5-year and 10-year notes). These daily percentage market shares are regressed on the bond price volatility (*volatility*), the logarithm of the average trade size (*logtrade size*), the square root of the average time between trades (*sqrt(time)*), the cost of placing a limit order (*option value*), and dummy variables indicating securities with a 5-year maturity (*5-year*), securities with a 10-year maturity (*10-year*), macroeconomic announcement days (*macro*), and securities that are on the run (*on-run*). The standard errors of the coefficients (in parentheses) control for heteroskedasticity and contemporaneous correlation within days. An asterisk (\*) represents statistically significant coefficients at the 0.01 level.

Regression Number	(1)	(2)	(3)
Intercept	220.38* (28.10)	235.28* (29.08)	233.53* (28.48)
5-year	-0.77 (0.93)	-4.03* (1.22)	-3.29 (1.23)
10-year	4.07* (1.17)	-0.67 (1.52)	1.02 (1.60)
Macro	0.19 (0.60)	-0.23 (0.55)	0.01 (0.56)
log(trade size)	-11.28* (1.59)	-11.61* (1.60)	-11.52* (1.56)
Option value	-5.29* (0.59)		-2.61* (0.63)
Volatility		-7.32* (2.16)	-3.27 (2.01)
sqrt(time)		-163.32* (23.39)	-119.72* (26.80)
On-run	45.58* (2.24)	42.84* (2.89)	40.94* (2.71)
Observations	1,986	1,986	1,986
R <sup>2</sup>	0.888	0.892	0.894

► **Source:** Barclay, Hendershott and Kotz (2006), Table II.

## Conclusions 1/2

- ▶ **The transition from OTC trading to electronic trading for standardized OTC products is a big step:**
  1. Improvement in post trade transparency is likely to have benefits.
  2. Less clear for electronic trading and pre-trade-transparency given the low level of activity in some of these securities.
  3. There are very few empirical studies of this type of switches  $\implies$  Trade-offs are not well-informed.

## Conclusions 2/2

▶ **Two suggestions:**

1. **Attention should be paid to the design of the trading platforms for relatively inactive derivatives.**

- 1.1 For instance one may solve the competition/order exposure tension with trading systems in which multiple dealers respond simultaneously to a quote request
- 1.2 Important to let the industry experiments with various format for the trading platforms.

2. **“Pilot experiments”** would help to assess the effects of the proposed changes on measures of market quality and would also help the industry to prepare to the new environment.

## References

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