

Specialists' Incentives on Government Bond Markets

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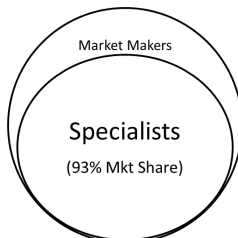
Rationale

- European Government Bonds (EGBs) are standard financial instruments, traded in highly transparent markets.
- A good functioning of secondary market is essential for the primary market.
- Most of the EGBs' secondary markets operate under the *specialist* system (a group of selected market makers).

In this paper we investigate some peculiar features of this market that affect specialists' quoting decisions.

The Italian wholesale government bond market

- MTS Italy is the Italian wholesale government bond market and it is a quote-driven electronic order book market. Participants are divided in market makers and market takers.
- Among market makers, a group of selected dealers act as **specialists** of the Italian public debt, facing, other than quoting obligations on MTS, other duties in terms of advisory of public debt management and activity in the primary and repo markets.
- *Specialists* benefit from some **monetary** and **non-monetary** rewards (defined by the *MEF*).



The Italian wholesale government bond market

- MEF continuously **monitors** their activities, defining every year a large set of monitoring criteria on:
 - primary market (auctions)
 - secondary market (liquidity providing)
 - advisory
- At the end of each year, based on the overall evaluation, the Italian Treasury calculates and **publicly ranks** the first five specialists.

Research question n. 1

Do monitoring rules and public ranking system affect the liquidity conditions and the market quality?

Related literature

Market microstructure models

- The microstructure of Financial Markets. De Jong and Rindi (2009). Three reasons for the existence of a bid-ask spread and other implicit transaction costs: 1. order processing costs, 2. inventory control, 3. asymmetric information.
- Market liquidity - theory and empirical evidence. Vayanos and Wang (2012)

Effect of regulatory changes in market making activity

- Price and quantity quotes in the equity markets: a study of dealer quotation behavior. McNish et al. (1998), Chung and Zhao (2006).
- Dealers and changing obligations: the case of minimum tick size. Goldstein and Kavajecz (2000), Chung and Chuwonganant (2004), Ahn et al. (2007), Buti et al. (2013), Lepone and Wong (2017).
- Regulation and market liquidity. Trebbi and Xiao (2016)
- Lot Size Constraints and Market Quality: evidence from the Borsa Italiana. Gozluklu et al. (2015)

Related literature

Liquidity condition in MTS market and on Italian Government Bonds

- Trading European sovereign bonds: the microstructure of MTS trading platforms. Rindi et al. (2005)
- Measuring and analyzing the liquidity of the Italian Treasury security wholesale secondary market. Coluzzi, Ginebri and Turco (2008).
- Sovereign credit risk, liquidity and ECB intervention. Pelizzon et al. (2013)
- The microstructure of Italian Sovereign bond market during the Euro-zone crisis (2013)
- Limits to arbitrage in sovereign bonds. Pelizzon et al. (2014)
- Informed trading in parallel bond markets. Paiardini (2015)
- How has sovereign bond market liquidity changed. Schneider et al. (2016)

The Italian wholesale government bond market

The Italian case is the most suitable framework to analyze how ranking system affects market quality:

- quoting obligations on a **single eligible** trading platform (MTS Italy)
- annually, through a clear assessment, the first five positions of the ranking are **published**
- the **2015-2016 changes** are suitable for this analysis since these affect only a restrict group of BTPs with two clear discontinuities in the regulatory setup: temporal and unit.

MTS Italy and quoting monitoring criteria

Focusing on the criteria on the **secondary market**, the Italian Treasury defines four indicators:

- the **quotation quality index (QQI)** measures the contribution of each specialist on the tightness of the market;
- the **traded volumes (TV)** measures the market share of each specialist;
- the **number of bonds traded as filler (NBTF)** measures the ability of each specialist to trade the highest possible number of bonds;
- the **large in size contract (LSC)** measures the contribution of each specialist to provide size to contracts.

Empirical application

- We employ the changes between 2015 and 2016 in order to verify whether and how market microstructure is affected by the monitoring system and ranking rules.
- These changes were mainly designed to incentive market makers to provide **higher liquidity** in the group of **BTPs with residual maturity greater than 10 years**:
 - **the minimum size** required for the evaluation of QQI on BTPs with maturity longer than 10 years **was modified from 5mm to 2mm**,
 - in order to offset the potential negative impact on the depth of the quoting book, MEF has increased the weight for this group of BTPs in calculating NBTF, LSC and TV indexes.

Empirical application

- **Database:** quoting book of long end government bonds curve on MTS platforms. The database contains all the "snapshots" between 8.30am and 5.30pm at a five-minute frequency.
- **Units:** bonds that in line with the regulatory switch were closed to the threshold of 10 years as residual maturity.
 - **Treatment group:** seven bonds with residual maturity between ten to fifteen years
 - **Control group:** seven bonds with residual maturity between seven to ten years
- **Period:** from **1st September 2015** to **29th April 2016**. Monthly averages.

Empirical application

- The model is estimated on **three different outcome variables** in order to verify different dimensions in the quoting response of market makers³. In particular:
 - ① **Best Bid-Ask Spread** in percentage on the mid quote (BA_{it}): normalizing the absolute bid-ask spread with respect mid price allows to compare bid-ask spreads of different BTPs.
 - ② **Total quoted quantity** (Q_{it}): the average between the total depth quoted on the ask and on the buy sides.
 - ③ **Price impact of 20mm** (PI_{it}): the difference between the mid price and the realizable execution price of a deal of 20mm (both on the bid and ask sides).

³These outcome variables are selected among the most informative liquidity measures on the quoting activity of market makers (Coluzzi et al. 2008).

Empirical application

- The following model, based on **diff-in-diff approach**, is estimated:

$$Y_{it} = \alpha_0 + \beta change_{it} + \gamma X'_{it} + d_t + a_i + \epsilon_{it} \quad (1)$$

- change*: dummy variable equal 1 when observation is about a bond of the treatment group in the 2016 year (treatment period),
- X'_{it} : covariates (bond volatility, specialness, auction)
- d_t : time fixed effects
- a_i : bond fixed effects.

The **coefficient β** represents the effect of the regulatory variation on the outcome variable.

Empirical application

	<i>BA</i>	<i>Q</i>	<i>PI</i>
β	-0.015	0.785	-3.982
<i>Robust SE</i>	0.003	1.715	0.694
<i>p-value</i>	0.001	0.654	0.001
<i>Covariates</i>	yes	yes	yes
<i>Obs</i>	120	120	120
R^2	0.697	0.841	0.692

Table : Panel estimates. The table shows the estimates of β coefficient of OLS panel regressions defined in model n. 1 with bond and time fixed effects with each observation defining a bond-month. The causal effect of the change in monitoring rules between 2015 and 2016 is estimated on four different liquidity measures of the quoting book: best bid-ask spread (BA), average bid and ask depths (Q) and price impact of a deal of 20mm (PI). Under each coefficient, robust standard errors (clustering at the level of individual bonds) and p-value are presented.

Empirical application

- The **estimates confirm** the impact of monitoring rules on two liquidity measures (*BA* and *PI*).
- **Robustness checks:**
 - Selection bias time invariant
 - No slow-acting effect
 - No seasonal effect
 - No impact on market makers non-specialists
- We find a **significant** and **negative impact** on the **bid-ask spread** and on **Price Impact**, but **no significant effect** is found on the **whole quoted quantities**. Is it a counterintuitive result?
- **Bid ask spread** and **depths** are used as **substitutes** by market makers (Kavajecz 1998, 1999)

Public ranking system and microstructure models

Hypothesis

The specialists quote strategically in order to consider the positive component (direct privileges and higher reputation) in reaching high positions in the final ranking

- **Explicit and direct privileges** that the Italian Treasury lists in its decrees (Specialist's Decree)
 - ① reserved reopenings of government bond auctions
 - ② to be selected as lead managers in syndicated issuances, as dealers for bilateral buyback operations or counterpart in derivative transactions.
- **Reputation return**

Public ranking system and microstructure models

- Standard model: specialist's expected return is $E_{ij}[\pi(b_{ij}, \beta_{ij}, a_{ij}, \alpha_{ij})]$, where for a given bond i
 - b_{ij} and a_{ij} are the specialist's bid and ask prices
 - β_{ij} and α_{ij} are the specialist's bid and ask quantities
- $h_{ij}(\gamma_j, b_{ij}, \beta_{ij}, a_{ij}, \alpha_{ij})$ is the function that describes the expected return to offer liquidity on a specific asset reaching a top position in the final ranking. It is an additive economic component of the profit maximization problem, where
 - $b_{ij}, \beta_{ij}, a_{ij}, \alpha_{ij}$, directly affect the individual ranking score
 - γ_j represents the individual ability to transform the final position in the public ranking in economic revenues
- The final expected return becomes $E_{ij}[\pi_{ij}(\cdot) + h_{ij}(\cdot)]$.
- The idea is that **market makers are heterogeneously exposed** to potential benefits of the ranking system.

Public ranking system and microstructure models

- Assuming the perspective of a single market maker, the table summarizes how quoting choices (quantities and prices) affect her ranking score:

Variable	Variation	QQI	TV	NBTF	LSC
Q_b or Q_a	↓	=	–	=	–
<i>Bid Ask Spread</i>	↓	+	+	+	+
<i>Total</i>		+	+/-	+	+/-

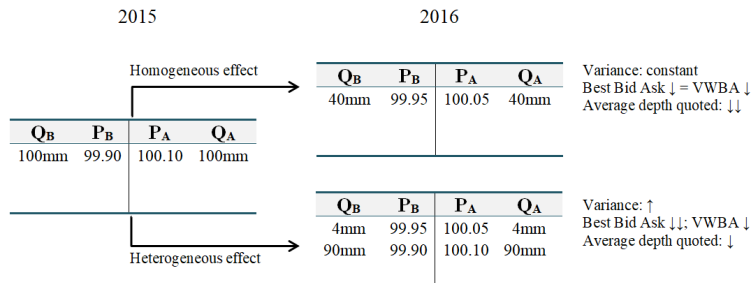
- Assuming a higher perspective level (market level), the effect of rules' change should be:

Variable	Traditional models	+ ranking benefits
<i>Total quoted size</i>	↓	= / ↓
<i>Best Bid Ask Spread</i>	= / ↓	↓

Signs of heterogeneous impact

Research question n. 2

Are specialists heterogeneously affected by the public ranking system?



Signs of heterogeneous impact

- In order to address this question we introduce three liquidity measures:
 - 1 **Variance of quoted prices weighting for correspondent sizes in the book** (VAR_{it}), in order to verify whether a greater prices' dispersion occurred.
 - 2 **Volume-weighted bid-ask spread** in percentage on the mid quote ($VWBA_{it}$): to get a measure that combines the tightness and depth of the order book.
 - 3 **Average quoted quantity per specialist on the two top positions of the order book** ($A2B_{it}$), in order to measure the average size defined by the more competitive specialists.

Signs of heterogeneous impact

- We **estimate the previous econometric model** employing these measures as outcome variables.
- The **expectations** are that **a greater variability in the prices** occurred lead by an higher competition of few specialists, that reduce their size and tight their spread, in the top levels of book. The result is that the **depth at the top apparently rarefies, actually it is new quoted volume in higher competitive prices that are unable to be quoted with old rules.**

Signs of heterogeneous impact

	VAR	VWBA	A2B
β	0.006	-0.012	-0.830
<i>Robust se</i>	0.003	0.003	0.151
<i>p-value</i>	0.057	0.002	0.001
<i>Covariates</i>	yes	yes	yes
<i>Obs</i>	120	120	120
<i>R</i> ²	0.324	0.675	0.739

Table : Panel estimates on outcome variables: VAR, VWBA, A2B. The table shows the estimates of β coefficient of OLS panel regressions defined in model n. 1 with bond and time fixed effects with each observation defining a bond-month. The causal effect of the change in monitoring rules between 2015 and 2016 is estimated on three different liquidity measures of the quoting book: variance of prices (VAR), volume-weighted bid-ask spread (VWBA), average size of proposals in the best two prices (A2B). Under each coefficient, robust standard errors (clustering at the level of individual bonds) and p-value are presented.

Robustness checks

- Selection bias is time-invariant in the pre-treatment period.
- Regulatory variation immediately affects market makers' quoting choices without any slow-acting effect.
- No relevant seasonal effect exists between the two groups of BTPs during the months (September-April) of the analysis.
- No confounding effect of market makers that are not specialists.
- No relevant differences exist between the bid and ask sides.
- Bai and Perron test (1998, 2003) confirms the structural break on the liquidity measures occurred on the first trading day of 2016

Concluding remarks

- Monitoring rules and ranking system play a crucial role in affecting market makers' quoting behavior.
- Market makers are heterogeneously exposed to implicit incentives coming from public ranking (few specialists reduced their quoted sizes in order to compete to tight the best bid ask spread, the others do not modified their quoting behavior).
- Implications for the market design of European government bonds markets (which benefits from a common **European Ranking?**).
- A lower uncertainty about potential privileges and benefits of reaching the top positions in the final ranking may lead to a more homogeneous response among specialists to a change in monitoring rules (**more homogeneous** $E_{ij}[\pi_{ij}(\cdot) + h_{ij}(\cdot)]$).