Ca' Foscari University

Department of Economics

Master's Degree Programme in Economics and Finance (D.M. 270/2014)

The Effectiveness of EU post-trading transparency regime in harmonizing markets - Case study on the sovereign bond market

Supervisor:
Prof. Loriana Pelizzon

Graduand:
Elisa Yoshitake
871083

Academic year 2018/2019

The Effectiveness of the EU post trading transparency regime in harmonizing markets

Case study on the sovereign bond market

Abstract

The aim of the thesis is to determine whether the post-trading transparency regime put into force by the European Union has proven effective in harmonizing the sovereign bonds markets across the European Market. To this purpose we are going to take into consideration sovereign bonds issued by the Italian Government, and limited to this asset class, check if any harmonizing effect has been achieved. Starting from the description of post trading transparency requirements to be complied with by market participants, as set up by the European Regulation (MiFID II and MiFIR Directive as well as the EC delegated regulations connected), we move into the practical implementation of the post trading transparency requirement within the Italian sovereign bonds secondary markets. Finally, we present market data, in order to empirically verify if European markets have undergone any process of harmonization and to what extent. Through the comparison of the Italian sovereign debt instruments' trading prices before the and after the entry into force of the requirements, we will be able to draw a final conclusion on the effectiveness of the EU post – trading transparency requirements.

Acknowledgements

I wish to express my gratitude to Professor Loriana Pelizzon for her support and assistance during the writing process, which led to the final version of this thesis and for putting me in contact with Ca' Foscari Alumnus Roberto Baldo, who I also thank sincerely for his precious help with the research and collecting data process.
I also want to thank my Family, with a special mention to my Grandmother Rosita and my mother, whose unconditional love and support allowed me to follow my ambitions.
Additionally I want to thank my friends: those who have been knowing me since for many years since our early days in High School, as well as those I had the luck to meet during this Master course, for making this journey all the better and for filling it with unforgettable memories.

Introduction

The aim of this thesis is to determine whether the post-trading transparency regime put into force by the European Union has proven effective. To this purpose we are going to take into consideration only sovereign bonds issued by the Italian and German Government, and limited to this asset class, check if any harmonizing effect has been achieved.

The first chapter of the thesis describes the transparency requirements to be complied with by market participants during the post trading phase. The rules are explained as set up by the European Regulation (MiFID II and MiFIR Directive as well as the delegated regulations connected), we have explained all the most important aspects of the regulatory framework as well as its latest evolution, with the announcing of a MiFID II and MiFIR Refit by the European Commission.

In the second chapter, we will move our focus from the theory to the practical implementation of the post trading transparency requirement within the sovereign bonds secondary markets. A synthetic analysis of the market and their structure will be provided to the extent relevant to our analysis.

In the third chapter, we are going to report and elaborate on market data, in order to empirically verify if liquidity on European markets has increased and to what extent. After recalling the relevant literature, we are going to compare the liquidity of Italian and German instruments though four analysis. We are first taking into account the transaction volumes for both samples and confront them. After this we will check ho the deferrals introduced by the directives have affected the volume distribution and which trading venues were affected the most. We are then going to compute the price

dispersion and its differences between the two sample and between trading venues. Latly we will analyze price differences of Italian and German sovereign debt over the different trading venues and the effect of direct transaction costs.
In the fourth chapter we are going to briefly summarize the main findings of previous chapters, and derive some conclusions.

Contents

Chapter 1

Regulatory framework

In order to regulate the European Financial Markets and achieve the Capital Market Union objective, the European Commission issued The Market and Financial Instruments Directive (MiFID) in 2004. It aimed at harmonising the markets so to enhance transparency and therefore competitiveness. Transparency was to be achieved through several obligations to be complied with by market participants.

Following the 2008 financial crisis, and the subsequent 2012 sovereign debt crisis in Europe, the Directive was amended through the revised Market an Financial Instruments Directive II (MiFID II), which came into force in 2018. European authorities considered it necessary to restore citizens' trust in financial markets, for this reason the reviewed MiFID takes provisions to enhance investors protection and transparency obligations. Moreover, a new Regulation was issued in the same year to prevent market abuse and increase transparency: the Regulation on Markets and Financial Instrument (MiFIR).

The current transparency regime in Europe is organized in four macroareas:

- Product classification and liquidity definition;
- Transaction size thresholds;
- Pre-trade and post-trade reporting requirements;

- Transaction reporting system.

The core of this scheme are the pre and post-trade transparency obligations which provide European markets participants with a live broadcast of trading data, around respectively quotes and executed trades.
The MiFID II directive extended the regulatory requirements to a broader range of financial instruments: other than equity instruments, also bonds, structured finance products, emission allowances and derivatives transactions now need to disclose trading data with the authorities. In addition to this, more trading venues are now regulated with respect to the previous regulations. So that now the compliant markets are:

- Regulated Markets (RM);
- Multilateral Trading Facilities (MTF);
- Organized Trading Facilities (OTF);
- Approved pubblication Arrangements (APA);
- Consolidated Tape Provider (CTP).

1.1 MiFID II transparency requirements

The European Parliament and the Council of the European Union laid the basis of the European transparency scheme in the the Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments (MiFID II).
The disclosure of transactions detail is entrusted to private market participants:

- Approved Publication Arrangements (APAs): "a person, authorised under this (the MiFID II ndr) Directive to provide the service of publishing trade reports on behalf of investment firms [...]";
- Consolidated Tape Providers (CTPs)who collect the trade reports published by APAs;

- Approved Reporting Mechanism (ARM)who takes the responsibility to report transactions' details to the competent authorities and/or to ESMA on behalf of the investment firm.

"The envisaged solution is based on an authorisation of providers working along predefined and supervised parameters which are in competition with each other in order to achieve technically highly sophisticated and innovative solutions, serving the market to the greatest extent possible and ensuring that consistent and accurate market data is made available. By requiring all consolidated tape providers (CTPs) to consolidate data from all APAs and trading venues, it will be assured that competition will take place on the basis of quality of service provided to clients rather than the breadth of data covered."

With regard to non-equity financial instruments, ESMA should ensure that "the establishment of an integrated Union market for those financial instruments will be achieved, when enlisting the trading venues and APAs to be included in the post-trade information to be disseminated by CTPs. It should also ensure the non-discriminatory treatment of APAs and trading venues."

Title V, section 2, 3 and 4 of the Directive describe the conditions to be respected by APAs, CTP and ARMs, setting the organisational requirements to be met.

1.1.1 National Competent Authorities

In order for the market integrity and stability of financial market to be preserved, the EU legislators envisioned a hierarchical supervisory scheme composed of Competent Authorities at both national and European level. In art 67 Member States delegate for these matters competent authorities, which need to be public authorities, and will not be able to delegate, in their turn, their duties, except in the cases cited in art 29(4). All national authorities, ESMA and the European Commission should cooperate and share information useful for the safekeeping of market integrity and financial stability (art 67 (3) and 68).

Effective mechanisms must be set up by Member States for national authorities to report *"potential or actual infringements of the provisions of Regulation (EU) No 600/2014 and national provisions"*. An *"effective"* mechanism should at least include:

- The creation of safe communication channels for the collecting of reports on possible infringements of European and national provisions;
- A protection system for whistle-blowers within the financial sector;
- Protection for the identity of the suspect of the infringements during the investigation process and legal proceedings, unless disclosure is required by the law.

MiFID II Directive also sates that governance rules and operational requirements need to be set for investment firms and firms operating a trading venue. The main aim is to achieve a highest level of investor protection and stability of financial system. For this reason at Art 90, the Commission commits to present to the Parliament and the Council a set of reports, including those on transparency obligations to be carried out before and after the trade (pre and post-trading transparency).

Generally speaking, the criteria that CTP disclosure must meet are:

a) The *availability* and *timeliness* of post trade consolidated information regardless if transactions are carried out on trading venues or not";

b) The *availability* and *timeliness* of full and partial post-trade information, that must be high quality, easily accessible and usable for market participants and available on a reasonable commercial basis.

Should the CTPs fail to provide information that meets the criteria as set out by the law, "the Commission shall accompany its report by a request to ESMA to launch a negotiated procedure for the appointment [...] of a commercial entity operating

a consolidated tape. ESMA shall launch the procedure after receiving the request from the Commission on the conditions specified in the Commission's request and in accordance with Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council (1)."

1.2 MiFIR post-trading requirements

Following the financial turmoil of 2008-2012 in Europe, authorities have deemed a stricter regulation of financial markets necessary. It was clear that the different European Markets needed to undergo a deep harmonization procedure in order to increase resilience and stability. One of the results of this political framework was the Regulation n 600/2014 of the European Parliament and of the Council on Markets and Financial Instrument and amending Regulation (EU) No 648/2012 (MiFIR). Post-trade requirements set by MiFIR build the legal framework of transparency obligations, which is further detailed by the provisions made by the Delegated Regulation 2017/583.

In particular, the transparency regime for non-equity instruments is described by chapters 2 and 3 of the Directive. Art 10 of MiFIR sets that *"Market operators and investment firms operating a trading venue shall make public the price, volume and time of the transactions executed in respect of bonds, structured finance products, emission allowances and derivatives traded on a trading venue. Market operators and investment firms operating a trading venue shall make details of all such transactions public as close to real time as it is technically possible."*

Investment firms who must publish the details of their transactions in bonds [...] shall have access to the arrangements made to comply to art 10 (1) by market operators and firms operating a trading venue (art 10 (2)). It is also stated that for sovereign debt instruments, the competent authorities may allow the publication of several transactions in an aggregated form for an indefinite period of time (art 11(3;d)). Moreover, for this

bond class, authorities can both allow the omission of the publication of the volume of one individual transaction during an extended time period of deferral (art 11(3;b))and when the omission period ends, allow for the volumes to be published in aggregated form.

In compliance to to Art 11(4), ESMA ha provided the Commission with a draft of regulatory technical standards to specify the details of transactions to be made available to the public, the time limits to be applied in such publications, the conditions for authorising market participants and the criteria to be used when deciding a deferring in publication[1].

Art 21(1) and (2) state that investment firms which conclude transactions in bonds on a trading venue shall make public the volume, price and time at which those transactions were concluded, by means of a single APA, one for each individual transaction. The supervisory authorities may, however, authorise the deferral of the publication, the publication of limited details of a transaction, or the details of several transaction to be reported for in aggregated form. Concerning sovereign debt bonds, the authorities can allow the publication of several transaction in aggregated forms for an indefinite period of time and may contextually suspend the post trade obligations, at the same conditions as stated in article 11.

In order to carry out calculations for determining the requirements for the pre and post-trade transparency regimes, competent authorities may require information from the trading venues where the financial instrument is registered, the APAs and CTPs that transmit transactions' data.

As prescribed by Art 21(5), ESMA has also provided the EC with a draft on technical standards regarding the identifiers for the different types of transactions, the application of post trading requirements to the collateral use of financial instruments,

[1]ESMA:Regulatory technical and implementing standards – Annex I

and the party on whom the obligations of publicity lies. Finally, as stated in Art 22(4), ESMA submitted a draft of regulatory technical standards specifying the content and frequency of data request, as well as the format and timeframe to be used by complying parties (trading venues, APAs and CTPs) to respond. The data to be be stored and the period of time necessary for the complying parties to respond consistently to such requests.

All these drafts have later been implemented within the Delegated Regulation 2017/583, that sets the technical standards for market participants to respect in order to comply with the legal obligations set in MiFIR and MiFID II directives.

It is envisioned by the Commission that pre and post trade data are published separately (art 12(1))and on reasonable commercial basis, and guarantee the "non discriminatory" access for the public. In accordance to Art 12(2), ESMA has elaborated technical standards to specify the offering of pre-trade and post-trade transparency data. The reasonable commercial basis is defined by the delegated act of the Commission.

1.2.1 European Commission Delegated Regulation 2017/565

One important addition to the post trading transparency regime is the principle of the "Reasonable commercial basis" to be complied by approved publication arrangements (APAs) and consolidated tape providers (CTPs), and defined by articles 85-89.
The price of market data must be calculated based on the cost of producing those data,including a share of joint costs for other services, including a profit margin defined as "reasonable".[2] Moreover, the service must be offered non-discriminatory to all clients belonging to the same category, meaning at the same conditions and price.[3]
Art 89 finally states the transparency provisions for APAs and CTPs, which must disclose and ensure the availability to the clients of the terms and conditions for the provision of the market data, including the price including the methodology used for

[2] Art 85
[3] Art 86

the pricing. To this purpose Art 89(e) states that service providers must disclose also "the cost accounting methodologies and the specific principles according to which direct and variable joint costs are allocated and fixed joint costs are apportioned".

1.2.2 European Commission Delegated Regulation 2017/572

In accordance with MiFIR art 12(2), ESMA produced a draft of technical standards [4] the European Commission published a delegated act regarding the dis-aggregation level for pre- and post-trade data. For sovereign debt instruments, Art 1 sets the criteria as follows:

- The nature of the asset class,
- The country of issue,
- The currency in which the financial instrument is traded,
- Scheduled daily auctions as opposed to continuous trading

1.3 Commission Delegated Regulation (EU) 2017/583

Commission Delegated Regulation 2017/583 sets the regulatory technical standards on transparency requirements for non-equity instruments to be complied with by firms operating a trading venues and investment firms.
The Article 7 of the Commission Delegated Regulation (EU) 2017/583 sets the post trading transparency obligations for trading venues and investment firms trading outside a trading venue. Regulated Market (RM), Multilateral Trading Facility (MTF), Organised Trading Facility (OTF), Approved Publication Arrangement (APA), Consolidated Tape provider (CTP), must make public the following information with regard to each transaction for all financial instruments.

[4] ESMA: Final Report - Draft Regulatory and Implementing Technical Standards MiFID II/MiFIR (28th September 2015)

1) Trading date and time: date and time when the transaction was executed int the format $\{YYYY-MM-DDThh:mm:ss:dddddZ\}$, where:

   – "YYYY-MM-DD" is the year-month-day format;

   – the letter "T" is always a constant;

   – "hh:mm" are respestively hours and minutes;

   – "ss:dddddd" indicates the second and its fraction of a second;

   – "Z" is the UTC time zone

2) Instrument identification code type: type of code used to identify the instrument, write 'ISIN' when ISIN-code is available, otherwise report 'others'.

3) Instrument identification code: $\{ISIN\}$ code. If the identification code is not an ISIN, the derivative instrument identifier.

4) Price: traded price excluding commissions and accrued interests, should be coherent with what written in the field "quantity" .

   - If expressed in monetary value write $\{DECIMAL-18/13\}$ and add the major currency unit;

   - $\{DECIMAL-11/10\}$ if expressed as percentage or yield;

   - "PNDG" if not available;

   - $\{DECIMAL-18/17\}$ if the price is expressed in basis points.

5) Venue of execution: Identification of the venue the transaction was executed on: $\{MIC\}$ if on trading venues, $\{SINT\}$ if systematic internalizer.

6) Price notation: idicates if the price is expressed in monetary value ('MONE'), percentage ('perc'), yield ('YIEL') or basis points ('BAPO').

7) Price currency: if the price notation is 'MONE', reports the currency in which the price is expressed.

8) Quantity: The number of units of the instrument (/number of derivative contract in the transaction) in the format $\{DECIMAL - 18/17\}$.
It shall be indicated for all financial instruments, except when the competent authorities defer the publication of some or all transaction details (Art 11(1) letters (a) and (b) of the same Regulation).

9) Notional amount: Nominal amount or notional amount in the format $\{DECIMAL - 18/5\}$, the information should be coherent with what reported in the field "Price" . Same exceptions as point 8) apply.

10) Notional currency: currency denominating the notional in the format $\{CURRENCYCODE\_3\}$. Same exceptions as point 8)and 9) apply.

11) Publication date and time: Date and time the transaction was published by a trading venue or APA in the format $\{DATE\_TIME\_FORMAT\}$.

12) Transaction identification code: Alphanumerical code to the financial instrument from APAs and trading venues, unique, consistent and persistent per ISO 10383 segment MIC and per trading day,
reported as $\{ALPHANUMERICAL\_52\}$. If the APA does not use MIC, it should be a 4-character alphanumerical code used to identify the APA per trading day. The transaction codes shall not disclose the counterparties identities.

13) Transaction to be cleared: code that indicates whether the transaction will be cleared. It will br reported 'true' if the transaction will be cleared, 'false' if not.

Moreover the Commission specifies that the investment firms make sure matching trades are reported as one single transaction (art 7 (7)).

1.3.1 Cancelled and amended trades

If a trade, which has already been reported, is cancelled or amended, trading venues, and those operating a trading venue should publish the new trade report and the appropriate flags. The new trade report should contain all the details of the previous

trade, and will be made public together with the cancellation flag ('CANC') if the trade has been cancelled. If the operation has been amended, the trading venue or its operator will publish the same information as in the cancellation case, and will also add a new report containing all the corrected details of the new transaction, together with the amendment flag ('AMND').

1.3.2 Timing of the publication

The EU Regulation states that the post-trade information should be made public as close to real time as possible. Art 11 (4) letter (b) sets the limit at 5 minutes after the execution. Information on a package of transaction should also follow the same rationale, and be published as quickly as possible, indicating each components' details and respective flags.
Deferrals in the publication of all or some transaction details are possible, if authorised by competent authorities as stated in Art 8 "Deferred publication of transaction". Competent authorities can delay the publication of post trade data in one of the following cases:

- The transaction exceeds the minimum size of transaction, so that it is considered *large in scale*.

- The transaction included a financial instrument or a class of instruments which are regarded as illiquid. For all bonds (except ETC and ETN types) the market is considered non liquid if the "average daily number of trades" is below 15 trades per day.

- It the investment firm deals on its own account rather than on a matched principal basis, above the size specific for the instrument (Art 8 (c)), or when executed outside a regulated trading venue.

- The transaction combines more previously stated elements.

The competent authorities can, in addition to the deferral in publication, require the publication of all details except the volume of the transaction, or the publication in

aggregated form (minimum 5 transactions) to be made public the following working day. They can also allow the omission on the publication of the volume for an extended deferred period of four weeks, also the publication of all transactions happened in one week can be deferred of four weeks for non-equity instrument that are not sovereign debt.

However, transaction executed in one calendar week on sovereign debt instrument can be deferred for an indefinite period of time by competent authorities.

When the deferral period ends, authorities will decide whether to apply the already mentioned articles 11(3) (b) and (d) of Regulation N 600/2014:

- - Art 11(3)(b): *"allow the omission of the publication of the volume of an individual transaction during an extended time period of deferral"*;
- - Art 11(3) (d): *" regarding sovereign debt instruments, allow the publication of several transactions in an aggregated form for an indefinite period of time."*.

As a consequence, all details of the transactions are either regularly disclosed, or several transactions executed in the same week are published in aggregated form at the end of the deferral time.

When trades in bonds,structured finance products, derivatives and emission allowances are published as aggregated data, they should include the following information (Art 11 (4) Delegated Regulation 2017/583).

- The weighted average price
- The total volume
- The total number of transaction.
- ISIN code

The publication of calculations referred to bonds except ETCs and ETNs happens on a quarterly basis, on the first day of February, May, August and November.

1.4 Transparency calculation

Market liquidity

Determination of liquidity follows different methods depending on the asset class, for bonds (except ETC and ETNs) the European Commission has decided to use periodic assessment based on quali-quantitative criteria (art 13 (1) (b) (i)).
Tables 2.1 and 2.2 of Annex III of Delegated Regulation 2017/583 set the limit value at an average of 15 daily trades (stage S1 of table 1.2), below which the market is not considered liquid. As shown in Tables 1.1 and 1.2.

Table 1.1: Number of trades

Asset class - Bonds (all except ETCs and ETNs)					
Each individual financial instrument shall be determined not to have a liquid market as per Articles 6 and 8(1)(b) if it does not meet one or all of the following thresholds of the quantitative liquidity criteria on a cumulative basis.					
Average daily notional amount [quantitative liquidity criteria 1]	Average daily number of trades [quantitative liquidity criteria 2]				Percentage of days traded over the period considered [quantitative liquidity criteria 3]
EUR 100 000	S1	S2	S3	S4	80%
	15	10	7	2	

Table 1.2: Issuance size

Asset class-Bonds (all bonds except ETC and ETNs)			
Each individual bond shall be determined not to have a liquid market as per Article 13 (18) if it is characterised by a specific combination of bond type and issuance size as specified in each row of the table			
Bond type		Issuance size	
Sovereign Bond	means a bond issued by a sovereign issuer which is either: (a) the Union (b) a Member State including a government department, an agency or a special purpose vehicle of a Member State; (c) a sovereign entity which is not listed under points (a) and (b).	smaller than (in EUR)	1 000 000 000

Bonds, except ETCs and ETNs, that are admitted to trading for the first time during the first two months or the last one of a quarter are considered to have a liquid market until the application of the calculations of respectively the current or the following calendar quarter (art 13 (19) Delegated regulation 2017/583).

1.4.1 Transaction size

Different methods apply also in order to determine the reference value over which orders are considered "large in size" as per art 3 and the size specific to the instrument as defined in art 5.

- Art 3 of Delegated Regulation 2017/583: *"An order is large in scale compared with normal market size where, at the point of entry of the order or following any amendment to the order, it is equal to or larger than the minimum size of order [...]"*;
- Art 5 of Delegated Regulation 2017/583: *"An actionable indication of interest is above the size specific to the financial instrument where, at the point of entry or following any amendment, it is equal to or larger than the minimum size of an actionable indication of interest[...]"*.

For each bond size (except ETCs and ETNs) it is chosen the greater of the trade size below which lies the percentage of the transactions corresponding to the trade percentile as set in art 17(3) and the threshold floor as defined in Annex III of Delegated Regulation 2017/583.
For transaction executed on sovereign bonds following the exclusion of transaction (Art 13 (10)), so transaction with size equal to or smaller than EUR 100 000, threshold are defined as in Table 1.3:

Table 1.3: Percentiles

SSTI post-trade	LIS post
Trade percentile	Trade percentile
80	90

All the previously mentioned calculation do not apply when the number of transactions is smaller than 1 000, a threshold value of EUR 100 000 for all bonds, except ETCs and ETNs, apply instead.
As stated in art 13 (5) of Delegated Regulation 2017/583, all the data necessary for liquidity and transactions' size calculations are collected daily from trading venues, APAs and CTPs by competent authorities. Moreover, authorities are demanded to establish a collaboration framework between them, in order to avoid dispersion of data (Art 6 DR EU 2017/583).

1.5 Exemption to transparency obligation

1.5.1 Transactions part of ECB policy

Regulation No 600/2014 sets that transparency regulation set in articles 8, 10 and 18 of the same regulation do not apply when regulated markets, market operators and investment firms execute a transaction for which the counter party is a member of the European System Central Bank (ESCB). The operation is not supposed to comply if it is part of monetary, foreign exchange and financial stability policy and when the

member has given prior notice to its counterpart that the operation is exempt.

- Art 8 Regulation 600/2014 "Pre-trade transparency requirements for trading venues in respect of bonds, structured finance products, emission allowances and derivatives";

- Art 10 Regulation 600/2014 "Post-trade transparency requirements for trading venues in respect of bonds, structured finance products, emission allowances and derivatives";

- Art 18 Regulation 600/2014 "Obligation for systematic internalisers to make public firm quotes in respect of bonds, structured finance products, emission allowances and derivatives".

Art 14 of Delegated Regulation 2017/583 enumerates the transaction for which said exemption applies, i.e. which operation can be considered part of the implementation of monetary, foreign exchange and financial stability policy.

- a) The transaction carried out for the purposes of monetary policy shall include operations in accordance with Articles 18 and 20 of the Statute of the European System of Central Banks and of the European Central Bank;

- b) The transaction is a foreign-exchange operation, including operations carried out to hold or manage official foreign reserves of the Member States or the reserve management service provided by a member of the ESCB to Central Banks in other countries to which the exemption has been extended in accordance with article 1(9) of Regulation (EU) No 600/2014;

- c) Any operation pursuing financial stability.

1.5.2 Temporary suspension

Art 9(5) of Regulation 600/2014 delegates to ESMA the responsibility to draft the methods of calculation for liquidity threshold, and consequently the critical value beyond which obligations of transparency may be temporary suspended by the competent

authority. The Delegated Regulation 2017/583 art 16 sets those floor values.

For a class of bonds and other financial instruments, for which there is a liquid market (as previously defined), the authorities may suspend operators' duty to comply with transparency requirements if the volume in the previous 30 calendar days reaches less than the 40% of the average monthly volume of the previous 12 full calendar months. The volume is clearly measured differently, depending on the financial instrument, as shown in Table 1.4.

Table 1.4: Volumes measures per instrument type

Type of instrument	Measure of volume
All bonds (except ETCs and ETNs)	Total nominal value of debt instrument traded
ETCs and ETNs bond types	Number of units traded
Derivatives	Notional amount of traded contracts
Emission allowances and emission allowances derivatives	Tons of carbon dioxide equivalent

If one of the financial instruments listed above does not have a liquid market, the critical value for the total volume is 20%.
In the total volume calculation, all transactions executed on all trading venues within the European Union are taken into consideration and the seasonal effect of financial instruments' class on liquidity must be taken into account as well. These elements need to be double checked every time the authorities decide to apply art 16, as per art 16(4).

1.5.3 Suspended instruments

The complete list of suspended instruments is available on ESMA's website [5] and is periodically updated. To the end of January, these are the suspended Italian and

[5]ESMA website: Double volume cap mechanism

German sovereign bonds suspended from the European trading venues. Currently 541 Italian and 547 German instruments are suspended or re-suspended.

1.6 The European Commission Work Programme 2020: the action plan on the Capital Markets Union

The European Commission published its Work Programme for the 2020 on the end of January 2020, and it also contains the new action plan on the Capital Markets Union. The Commission recalls, besides the importance of achieving and strengthening the banking union and the action plan on Anti-Money Laundering, the necessity to *"better integrating national capital markets and ensuring equal access to investments and funding opportunities for citizens and businesses across the EU, including an initiative to strengthen intra-EU investment protection."*Thus clearly referring to the MiFID II and MiFIR directives and the delegated regulations connected to them, and in particular to the provisions on secondary markets and investor protection.
It derives that a legislative action in further harmonizing EU regulation in that regard will happen within the year 2020.

1.6.1 The German Ministry of finance position paper on MiFID and MiFIR amendments

Following the publication of the Commission Work Programme the German Ministry of finance issued two position papers:

- *"Necessary amendments and revisions to secondary market provisions in MiFID and MiFIR"*[6];
- *"Necessary amendments and revisions to investor protection provisions in MiFID*

[6]German Ministry of Finance website

and PRIIPS"[7].

These two position papers were issued taking into considerations the responses collected by a public consultation on the implementation of MiFID and MiFIR by the Ministry itself. On the topic of secondary markets provisions, the German Ministry reports there is no need, in its opinion, of a review of the secondary market provisions as a whole, but some specific requirements need to be modified to achieve some of the directives objectives, which have been neglected so far. The paper presents some amendments which are considered necessary, dividing them between those needed in the short term and those needed in the medium run. While the paper is a general statement on the whole market regulation, there are some parts about the post trading requirements, non equity instruments, or both.

Among the near term provisions for example, the deferred publication of non equity instrument, the exception for central banks and the double volume cap are among the proposed amendments. National Authorities have the power, under the MiFID directive[8], to defer the publication of non equity trades. This has resulted, in the opinion of the German Finance Ministry, in wide variation in the publishing regime across EU markets. For this reason, provisions should be made in the upcoming MiFIR Refit to harmonize the deferrals.

The MiFIR directive also exempts members of the European Central Bank from the transparency regime (both pre and post-trade) when they act according to their mandate of monetary policy[9], without further defining which actions should be considered to "pursue the monetary policy mandate" and which not. It should moreover be clarified that trading venues do not have to report the transactions with Central Banks.[10]

As for the medium term objectives, the position papers mentions several amendments to the MiFIR directive on reporting requirements. It points out that the reporting regime in MiFIR and the one in the Market Abuse Regulation (MAR)[11] are in some

[7] German Ministry of Finance website

[8] Art 21 (3) and (4)

[9] Art 1 (6)

[10] Art 26(5)

[11] Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on market abuse (market abuse regulation)

cases inconsistent, for example the MiFIR requirements apply to Systematic Internalisers too, while the MAR obligations do not.

Generally speaking, the Finance Ministry calls for an harmonizing intervention between the several different regime currently into force (MiFID,MiFIR,EMIR, MAR, REMIT, SFTR and the Short Selling Regulation) to avoid the overlapping and duplication of norms.

Finally, the position paper mentions the cost of market data, which as we will see in following chapters, is a great component of costs for investors. The Ministry proposes amendments that would avoid an incorrect pricing structure (non compliant to the "reasonable commercial basis" RCB principle)[12].Data providers should receive an incentive to implement innovative services to better meet market demand, and the refit regulation should pursue this objective as well.

[12]Commission delegated Regulation (EU) 2017/565 Art 84

Chapter 2

Implementation of post-trading transparency rules on secondary markets.

2.1 Sovereign debt instruments in Europe.

The issuance of public debt in the European Union is bound to the provisions of the Stability and Growth pact (SGP). According to the pact, Member States may not have deficit exceeding the 3 % of its gross domestic product (GDP), while their outstanding debt may not raise above the 60 % of GDP. The pact has been drafted and implemented as a measure to protect the economic and monetary Union and is supposed to act as a preventive measure, so that European countries won't issue excessive amounts of debt. Although, a dissuasive mechanism does exist too to prevent possible violations from jeopardising the monetary stability of the Euro area. If a member state violets the limits of the SGP, the European Commission has the authority to open an Excessive deficit procedure with regard to the un-abiding country. In 2018 government deficit (measured as the net borrowing of the consolidated general government sector, as a share of GDP) decreased both in the European Union formed by 28 countries and the Euro area (EA-19), the same downward trend has been oberved in the percentage of

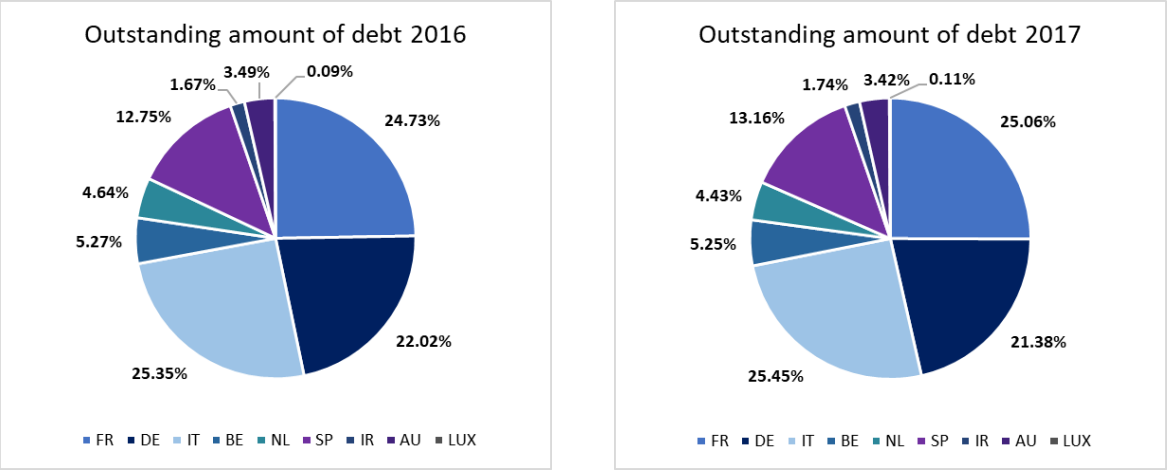
government debt/GDP.[1]

Among European Member States, Italy holds one of the biggest sovereign debt market. As it is shown in Figure 1 and 2, the size of Italian public debt is the biggest if compared to the ones[2] of France, Germany, Netherlands, Belgium, Spain, Austria and Luxembourg.

These countries are, together with Italy, the first 10 countries by GDP per-capita[3] in the EU-area, and for this reason they have been taken into consideration for the comparison.

In the last four years (2016-2019) the Italian share of the considered EU countries' sovereign debt market has consistently being the largest: growing from 25.37% (2016) to 25.98% (2019).

Figure 2.1: Outstanding amount of government debt in 2016-17[3]



[1]Eurostat- Government finance statistics
[2]Data from the European Central Bank Statistical Data Warehouse: National tables Eu area.
[3]IMF Data: WEO: GDP per-capita of EU area countries in national currency
[4]Data from the European Central Bank Statistical Data Warehouse: National tables Eu area.

Figure 2.2: Outstanding amount of government debt in 2018-19

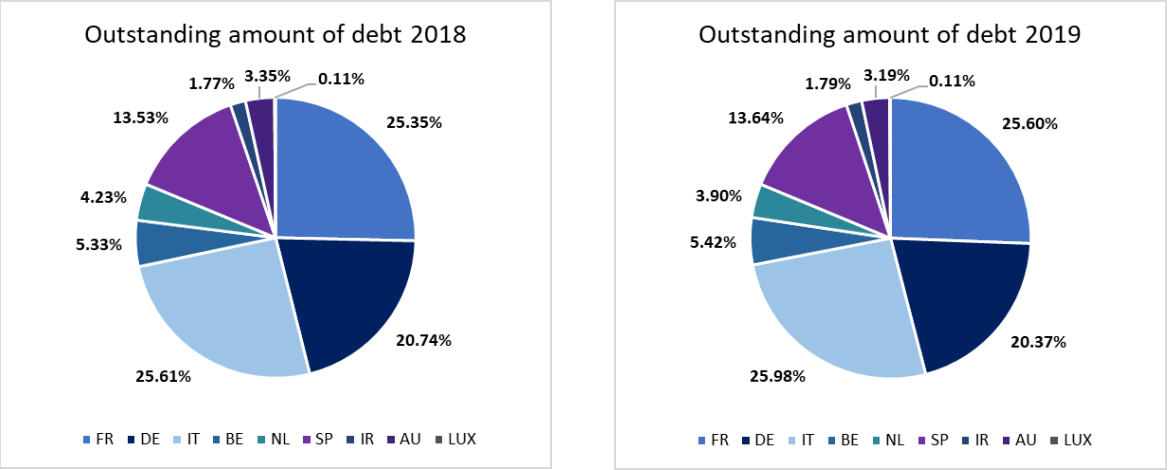
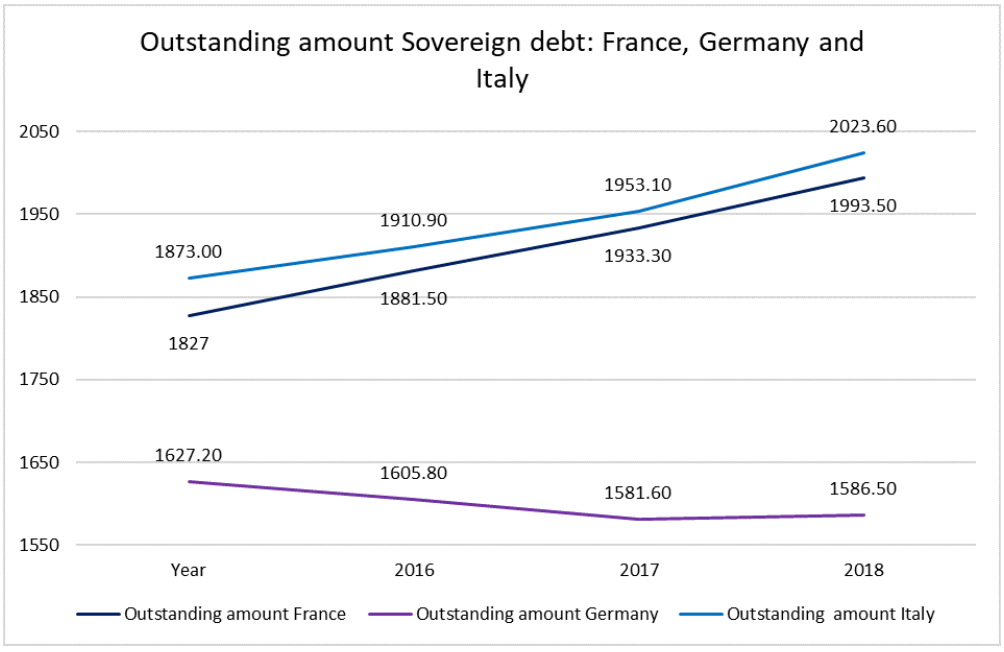


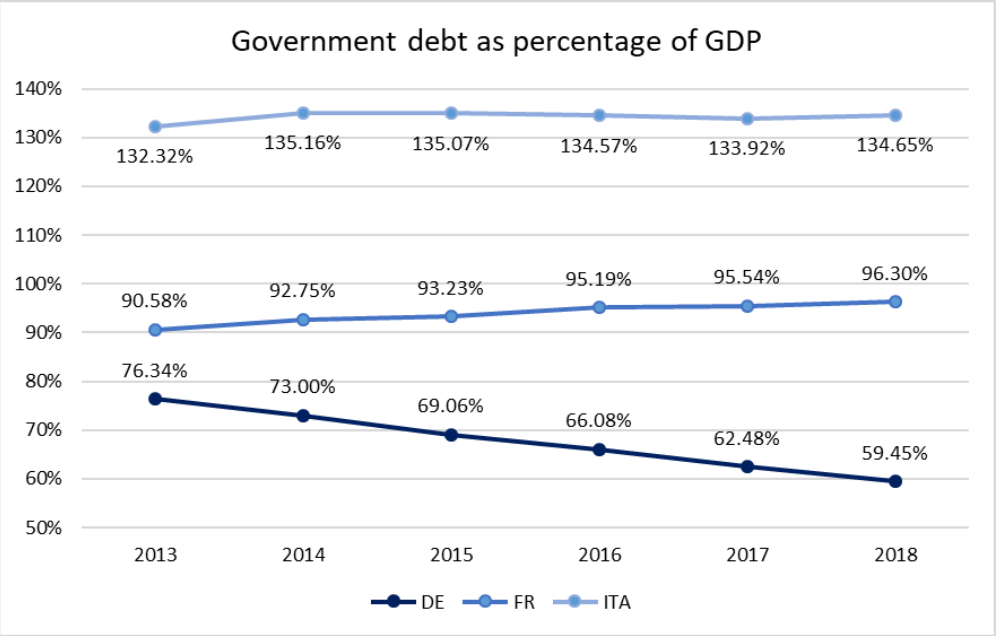
Figure 2.3: Outstanding Amount of debt.[4]



Italian sovereign debt has a net issuance which, when expressed relatively to the Gross Domestic Product, more than doubles the issuance of Germany and exceeds the one of France of 38,35%[5].

We are taking now into consideration the top three issuers of debt: Italy, France and Germany. As shown in figure n.4, the Italian government issuance of debt is massive, compared to the one of the other two countries, with a growth rate ranging from the 2.02% of 2017 and the 3.6% of 2019[6].

Figure 2.4: Sovereign debt as percentage of Gross domestic Product, data in billions of Euros.[7]



[5]The data used for calculation have been taken from the European Central Bank Statistical Data Warehouse: Government debt expressed as percentage of GDP.

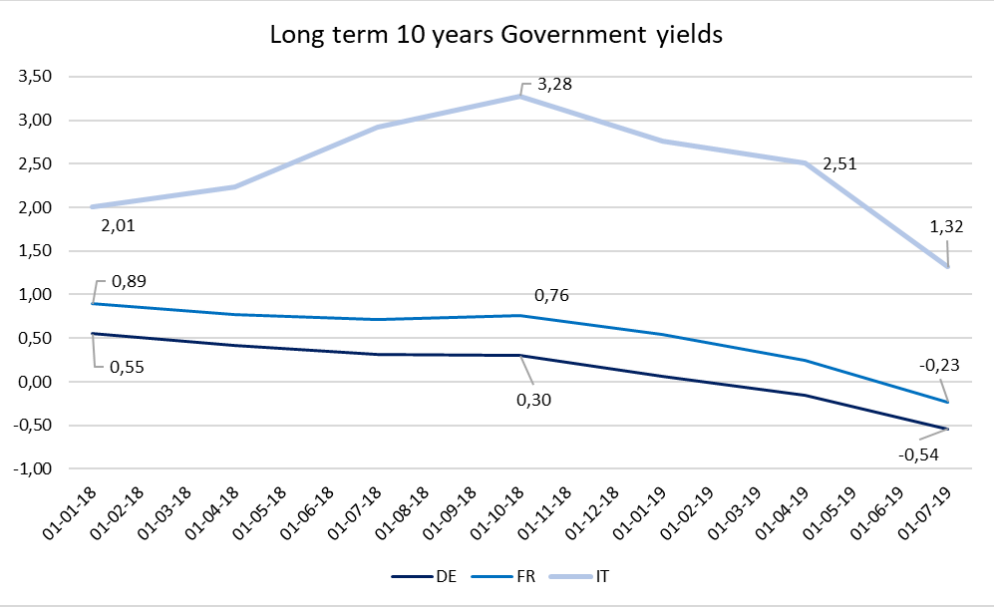
[6]The rates have been calculated using the data in the Report on Government debt securities for Italy from the Statistical Warehouse of the ECB, updated to the 19th of December 2019.

[7]Data from the European Central Bank Statistical Data Warehouse: "Government debt(as a % of GDP)"

As shown in Figure n 5, the yield held by the Italian sovereign bonds is significantly higher than the one of the same instruments issued by the German and French governments. Indeed what one would expect, when taking into account the considerable dimension of the Italian government debt market.
On a short term, the German bonds even earned a scarcity premium between the implied policy rate and the one-year German bonds[8].This trend lasted until the whole 2019.

It is therefore interesting to observe the effect, if any, of the transparency requirements with regard to the Italian and German T-bonds, and check if liquidity improved for these investments.

Figure 2.5: Long term government yields 2018-2019.[9]



[8]ECB Bond Market Contact Group Bond Market Outlook
[9]Data from the European Central Bank Statistical Data Warehouse:

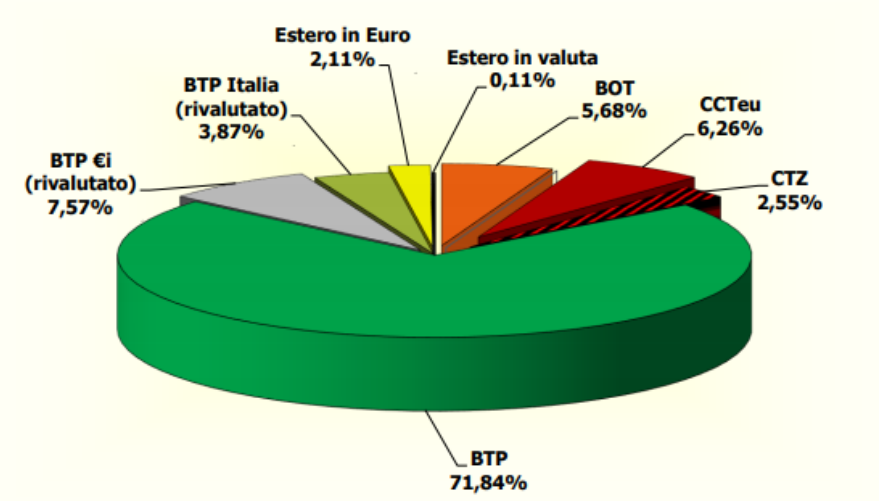
To the purpose of our analysis we take into consideration the Italian and German bonds as they represents the largest bond class in European markets. Both the sovereign debt instruments are first sold by the Ministry of Finance through a marginal auction (uniform-price) with discretionary determination of price.

2.2 Italian bonds composition

Italian sovereign debt is financed through several different types of securities:

- Ordinary Treasury Bonds (BOT);
- Zero Coupon Certificates (CTZ);
- Treasury Credit Certificates (CCT);
- Multi-year Treasury Bonds (BTP);
- EU Inflation indexed Multi-year Treasury Bonds (BTP€i);
- Italian inflation indexed Multi-year Treasury Bonds (BTP Italia).

Figure 2.6: Italian treasury bonds as percentage of in total issue volume 31/12/2019[10]



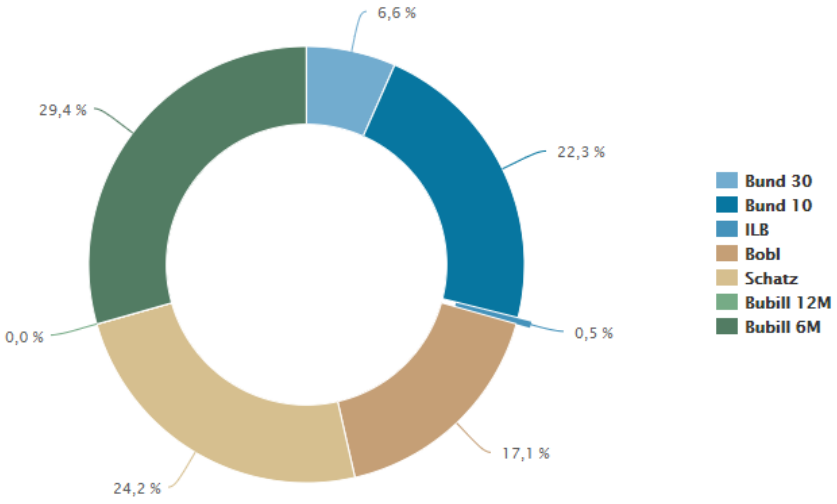
[10]Data from the Treasury department of the Ministry of Finance: Composizione Titoli di Stato

2.3 German bonds composition

As of 2020, the current federal benchmark bonds issued by the German government are the following[11]:

- Bundesschatzanweisung (Federal Treasury note - Schatz);
- Bundesobligation (Federal bond - Bobl);
- 10-jährige Bundesanleihe (10-years Federal bond - Bund10);
- 30-jährige Bundesanleihe (30-year federal bond - Bund30);
- inflationsindexierte Obligation des Bundes (inflation-linked treasury note - iBobl);
- inflationsindexierte Anleihe des Bundes (inflation-linked Federal bond iBund)
- Unverzinsliche Schatzanweisungen (Zero-interest treasury bonds - Bubills)

Figure 2.7: German treasury bonds as percentage of in total issue volume 2020[12]



[11]Data from Bundesrepublik Deutschland [U+2012] Finanzagentur GmbH:Bundeswertpapiere
[12]Data from the Bundesrepublik Deutschland [U+2012] Finanzagentur GmbH: Bundesanleihen ("Bunds")

2.4 Government bonds markets

Italian and German treasury bonds are first auctioned by the Ministry of Finance through predetermined auctions and are then traded on all the types of trading venues envisioned by the MiFID II and MiFIR directives (Regulated Markets, MTF, OTF, Systematic Internalisers, OTC). The regulated markets which we can consider as the domestic one for the Italian bonds is the MOT, which is a segment of Borsa Italiana SpA: For the German securities the Frankfurt Stock Exchange can be regarded as the trading venue of the domestic market, the managing operator is Deutsche Börse Group.

Both this markets trade securities on a daily basis and fall within the definition of regulated trading venues, as stated in MiFID II, MiFIR and following regulations, directives and delegated acts[13], consequently, both the MOT and the Frankfurt Stock Exchange are to be considered compliant to the EU Regulatory framework as seen in Chapter 1.

2.4.1 The MOT market

The Electronic Bond Market (MOT) is a segment of the Italian stock exchange, in it the government bonds of the following European Union countries are traded: Germany, France, Spain, Greece, Austria and Sweden, as well as the Italian sovereign debt instruments. The MOT is the only regulated bond market in Italy and it uses two different settlement measures for the two segments: DomesticMOT and EuroMOT. The first one trades Italian T-bonds using the Monte Titoli settlement as the other securities traded on Borsa Italiana, while the EuroMOT segment trades foreign government bonds and uses Euroclear and Clearstream Banking Luxembourg systems. The market operator for the MOT is Borsa Italiana Spa, which is in turn part of the London Stock Exchange Group since 2007[14].

[13]Deutsche Börse: Regulated Markets (RMs) and Multilateral Trading Facilities (MTFs); Consob List of Italian Regulated Markets

[14]London Stock Exchange Group: London Stock Exchange Group Timeline

2.4.2 The Frankfurt Stock Exchange

The Frankfurt Stock Exchange is the largest of the seven stock exchanges in Germany, with 1.8 million of treadable security. Deutsche Börse AG has the role of market operator of the trading centres "Xetra" (which is the electronic trading platform) and the floor trading, the "Frankfurt Stock Exchange", whereas Börse Frankfurt Zertifikate AG deals the trading in structured products (e.g warrants and certificates). [15] As of the beginning of 2020, there are 186 German treasury bonds and 92 Italian government securities currently listed on the Bond segment of the Frankfurt stock exchange. [16]

2.5 Implementation of MiFID II/MiFIR post trading requirements

In July 2019 ESMA launched a public consultation on a *"MiFID II/MiFIR review report on the development in prices for pre- and post-trade data and on the consolidated tape for equity instruments"*[17] and both Deutsche Boerse and the London Stock Exchange group submitted a response. Considering how the requirements for equity and non-equity instrument to the extent of the post trade transparency do not significantly differ[18], we can take into account some of the responses to this consultation as relevant for our analysis.

2.5.1 The Stock exchanges

The overall effect of the transparency regime is regarded to be satisfactory, so that the Transparency plus set of rules as established by MiFIR ended up delivering a higher lever of transparency of the financial markets of EU.[19] However, Deutsche Boerse points

[15] Börse Frankfurt: Organization of the stock exchange.

[16] Frankfurt Börse, Bonds

[17] ESMA website: MiFID II/MiFIR review report on the development in prices for pre- and post-trade data and on the consolidated tape for equity instruments.

[18] Trading venues are required to disclose the prices, volumes and time of transactions executed in equity and equity-like instruments as well as non equity instruments as close as in real time as the current infrastructures allow.

[19] DBAG Response form, Executive Summary pg 5

out how making post trade data available in a "in a format that can be understood by an average reader" as stated in the latest version of ESMA's Q&As and contextually the impossibility to identify the users who have access to them, may lead to the post trade data to be used for commercial purpose, thus altering the fair competition between market participants.[20] For this reason, Deutsche Börse calls for a clarification from ESMA on the "capability of exchanges to monitor, track and control users accessing exchange data to verify that they do not redistribute the data for commercial purposes against the spirit of the political objective."[21] Moreover, Deutsche Börse calls for the Regulators' intervention in identifying addressable/non-addressable liquidity relatively to the trades which do not concur in the determination of price (non price-forming trades). Leaving this definition to the market participants may in fact have a negative impact on the transparency of EU markets.[22] DBAG considers the current classification standards (MIC, ISINs and ISO formats) to be sufficient, but at the same time supports the use, as long as not mandatory, of the fully protocol agnostic MMT as it "*may provide for proper post-trade classification of securities, such as equities and equity likes, as well as Fixed Income transactions.*"[23]

The London Stock Exchange Group has reported that to the extent of its business the market data have not overall increased[24], although some prices did grow as a consequence of the higher value to the customers[25]. The implementation of MiFID II/MiFIR requirements has successfully delivered the expansion of systematic inte-

[20] "We understand that the scope of the Q&A is limited to the provision of delayed data that is intended for non-commercial use. Furthermore, something aimed at a non-professional and for non-commercial use could still be used for professional use. We need to point out that while providing delayed data for free on our homepage to end users, we consider it important to identify users accessing these data, at least in order to identify those who may be redistributing the data for their own commercial purposes. This is as well a necessity in order to ensure a level playing field between those generating data and those redistributing data for commercial purposes in general." from the Deutsche Börse Group **Response form** to the consultation, Question n°13 (Q13).

[21] Ibidem.

[22] DBAG Response form, Q23

[23] DBAG Response form, Q21

[24] LSEG **Response form** to ESMA consultation, Question n°1 (Q1).

[25] Ibidem.

nalisers and the reclassification of the use of SI's reference data, leveling them with the other MTF licences. The LSE Group reports that the MiFID/MiFIR transparency model as a whole "*is already delivering on its objectives*"[26]. As for retail investors, the LSEG points out how this class of customers may benefit from a regulated Post Trade, End of Day, Tape of Record, [27] when asked about the convenience of having a Consolidated Tape Provider. This consideration is motivated by the resulting accessibility to pan-European trading information for retail investors and the delivery of the Capital Market Union objectives, as well as further motives linked to the lack of equity culture.[28] Like the Deutsche Boerse Group, they too agree on the need for regulation with regard to non price forming trades and the related addressable and non addressable liquidity[29].

2.5.2 The German Banks association

The association of German Banks (BdB), Deutscher Sparkassen und Giroverband (DSGV) and the Association of German Public Banks also replied to ESMA consultation. In their opinion market data prices have not decreased, but costs have indeed increased since the application of MiFID II/MiFIR[30]. There could be several reasons behind this phenomenon, and the the introduction of new data price lists and fees may be one of them. MiFID II caused the creation of new dis-aggregated product thus also causing the introduction of new types of licences, moreover the best execution requirement can result in higer exchange fees for banks, who now need to access more exchanges than before.

However, BdB and the others also noticed that the costs for the creation and distribution of data have not increased themselves, so that the overall impact of MiFID II/MiFIR on market data prices is not easily estimated[31].

With regard to the actual compliance of trading venues, Approved Publication Ar-

[26]LSEG Response form, Question n°9 (Q9)
[27]LSEG Response form, Q16
[28]LSEG Response, Q21
[29]LSEG Response form, Q23
[30]BdB, DSGV and Association of German Public Banks Response, Q1
[31]BdB, DSGV and Association of German Public Banks Response, Q2 and 3

rangements and Systematic Internalisers with the disclosing obligations towards the RCB, its German banks opinion that the quality of the RCB information is not sufficient. Instead of separating the overall costs between those costs generated by trade executions and those generated by the creation of data, the trading venues only report general comments. In the RCB documents submitted by Deutsche Boerse, they say, there is no explanation about how the market data prices are calculated, or how the "reasonable margin" of profit is defined. For the latter, they call for ESMA intervention to issue guidelines on the definition of the "reasonable margin" included in the market data prices.Supervisory guidance is much needed on the RCB information to strengthen the standardisation of the information, specifically BdB and the other representatives suggest the publication of a "product calculation sheet" to explain the pricing process quantitatively per each financial product[32].

German banks do not disregard the transparency plus method completely though, in fact they think it is helpful when based on market data provided as detailed figures. This being considered, they would welcome a different system, not based on data mining costs, and therefore restricting the fees[33]. An alternative approach to reduce the costs of market data would be to appoint just one Consolidated Tape Provider through a periodic public tender. This entity would charge all providers and users of data proportionally to the share of the CTP's costs generated by the interactions with the CTP itself.[34] However, the CTP must not be introduced by regulation, in facts this would lead to several critical problems such as the extent of market data ti would realistically be able to provide (although mandatory contribution to trading venues, APA and SIs might help on that regard) and the ability to provide such data as close to real time as possible.

The US market has been using a CT-arrangement for years now, but the market data fees have been increasing steadily nonetheless[35].

[32]BdB, DSGV and Association of German Public Banks Response, Q5 6 and 7
[33]BdB, DSGV and Association of German Public Banks Response, Q8
[34]BdB, DSGV and Association of German Public Banks Response, Q9
[35]BdB, DSGV and Association of German Public Banks Response, Q21

2.5.3 Association française des marchés financiers - AMAFI

The Association française des marchés financiers - AMAFI is the the international organisation representing participants in financial markets in France and they too answered to the ESMA public consultation. In welcoming the launch of the consultation, they report that market participants believe "MiFID II has not delivered to its objective to lower the prices of market data"[36], highlighting that trading venues are not in complete control of most of the cost generating fees (Euronext, they cite, has no power over fees billed to final users for 74% of its market data.For this reasoon they call for an harmonization and simplification action on fee schedules by ESMA.

In order to better answer ESMA question, AMAFI teamed up with the Comité chargé de services et Systèmes d'Informations destinés aux Opérateurs de Marchés (the committeee for Market Operators on market data information system and services-COSSIOM). According to the data provided by COSSIOM, the number of users of market data in both Deutsche Boerse Group and London Stock Exchange group decreased (respectively by the 18% in one year and 16% over three years), while the revenues from market data increased by the 17% in five years for Deutsche Boerse and by the 14% over the same three years for the London Stock Exchange Group, including Borsa Italiana. This data support the belief that data prices have increased over time after the entry into force of MiFID II and MiFIR.

The reason behind this phenomenon is that each trading venue sells unique market data, linked to its operational activities and trades, which cannot be replaced by a different data set so that banks and investment firms must purchase market data regardless the price level in order to comply with the best execution obligation set by MiFID II. For this reason the market data is not a competitive market.[37]

As for the introduction of new fees, AMAFI has reported that, in its opinion, many trading venues sterted to apply additional fees for the Systematic Internaliser activity. Moreover, the licensing agreement through which market participants subscribe to the market data provision services, are usually complex in content and procedures, long

[36] AMAFI response form introductory comments

[37] AMAFI response form Q1 and 2.

and of difficult interpretation. In most cases those agreement can be changed unilaterally by the service provider with a 90 days notice. AMAFI too, like the Association of German banks, believes that the methodology to calculate market data costs is not fully disclosed by trading venues, some of whom do not report any form of cost calculation and only state the costs are computed through a cost allocation model. AMAFI therefore underlines the need for data cost calculation to follow an harmonized and detailed methodology. [38]

All being considered AMAFI is not in favour of the adoption of approaches different from the current transparency plus for the RCB transparency obligations. However they do call for an intervention on the comparability of the RCB reports, meaning of the trading venues pricing lists and fee schedule, that need to be harmonized across European markets. Moreover AMAFI also thinks the simplification of licensing agreement is vital to lower market data costs, agreement should be valid for a minimum of one year and key definition such as information data, market data etc should be carefully explained and harmonized for all service providers.

Such intervention should come from the industry itself, with the guidance of the supervisory authority (ESMA). Although, AMAFI believes that is such innovation will not be promoted within a reasonable time, ESMA should step in imposing a set of best practices.

[39] Another important topic AMAFI has addressed is the regulation of data vendors. MiFID II provisions, in fact, apply to market data reporting services, but not data vendors, as they are out of the scope of all regulations and directives, although they are a key player in the market of market data. For this reason, AMAFI and its members think that MiFID II obligations should be extended and applied to data vendors as well and to the same extent as they are applied to data reporting services.

A final suggestion to decrease market data is to allow for a different level of disaggregation. Right now the separation allowed by the regulation is between pre- and post trade, whereas they are both needed at the same time by most market partici-

[38] AMAFI response form Q3,4,5 and 6.

[39] AMAFI response form Q7 and 8.

pants. A better division would be between level 1 and 2 data, as a significant number of firms just need the best Bid and Ask for their activity, while some trading venues still impose the level 2 post trade data. Being able to increase flexibility on this regard will result in lowering market price data prices for most companies.[40]

[40] AMAFI response form Q11

Chapter 3

The effect of transparency regulations on trades of Italian and German Government bonds on European Markets

One of the Mifid II/MiFIR objectives is to harmonize European markets, make them more resilient, efficient and liquid. Therefore pursuing the realization of the Capital Market Union. One symptom the objectives have been reached would be the increase of liquidity and better pricing process.Our aim is to understand the effects of the European regulations on the sovereign bonds market, so to assess if their transparency and therefore liquidity increased. For this reason, we decided to check the evolution in traded volumes and pricing accuracy between German and Italian sovereign bonds.

3.1 Existing literature

There are few research papers published so far on the effects of the regulators on the sovereign bonds market, almost none concerns the European markets since the direc-

tives and legislative acts that introduced restrictions and transparency rules on these markets are quite recent in time. However, it does exists a thread in literature about liquidity analysis and treasury bonds trading venues.

Fleming (2003) has found that the spread between the bid and ask prices is a better liquidity measure than the others previously used. Chakravarty and Sarkar (1999) already found out that liquidity is an determinant factor of the realized bid-ask spread in government bond markets and that the realised spread overall decreases when the volume increases. Glostein and Milgrow (1985) have found positive connections between information asymmetries and the widening of bid-ask spreads. Kyle (1985) designs a market model in which cost transactions can be estimated regressing the trading prices over the volume of the trades, therefore calculating the λ coefficient, which takes his name. In Kyle's model information asymmetries cause transaction costs to increase, while a higher level of transparency results in a lower λ.

Pasquariello and Vega (2006) studied the price formation process of US government bonds and found out that a strong *informational effect*[1] indeed exists: unexpected order flows were proven to affect permanently the changes of daily bond yields. Craig Furfine and Eli Remolona in 2002 analysed the and found that in periods of intense trading, the effect of trade flows on price movements was stronger than in non-stess periods. The same phenomenon was earlier documented with respect to the stock market in Dufour and Engle (2000) .

Dunne, Moore and Portes published the article "An Empirical Analysis of Transparency-Related Characteristics of European and US Sovereign Bond Markets" (2006) specifically linked to the extension of MiFID provisions on sovereign bonds as well. In the conclusions of their research paper they advised "great caution" in doing so, as the increase of transparency on such market may have not have beneficial effects[2]. In 2001 Heflin, Subramanyam and Zhang published a paper on the effects of the Fair Disclo-

[1]The effect of both public and private information in a market where imperfect competition and heterogeneous information set are taken into account as frictions

[2]Dunne, Peter and Moore, Michael J.Portes, Richard, 2006. "An Empirical Analysis of Transparency-Related Characteristics of European and US Sovereign Bond Markets," Research Technical Papers 9/RT/06, Central Bank of Ireland.

sure (FD) regulation implemented by the SEC on the stock market and the pre-earning announcement information environment. They found no proof that it would be worse off as a consequence of the new regulations.
Later, in 2003, the same authors studied the early the evidences of the FD regulation on financial markets. They found out their previous conclusions were confirmed by market data, detecting an improved information efficiency of prices prior to earnings announcements and overall no proof that the regulation worsened the infrormation available to investors.
Finally, most recently Pelizzon, Subrahmanyam, Tomio and Uno (2016) studied the effect of ECB interventions on European bond markets. They found out that the long-term refinancing operations of the ECB worsened the sensitivity of market makers' liquidity provision linked to credit risk, which is the main driver of liquidity on sovereign bonds market.
Finally we can say that previous literature have proven that reducing information asymmetries benefits the liquidity of financial markets, which is mostly measured through bid-ask spread, volume and its impact on prices and price differences.
However, the implementation of financial markets regulations is not always beneficial, as in tacking the transparency of the markets it also may at the same time still damage its liquidity.

3.2 Data analysis

To verify what effect the regulations have had on the markets, we have analysed the trades of Italian and German sovereign bonds on European markets between the 03/01/2018 and 21/08/2018. The trading data have been collected from Bloomberg and Thomson Reuters databases: the first having been used to analyse the volumes of trades and deferrals, while the latter have been used in the price dispersion, price differences and Kyle's lambda analyses. The dataset collects 51 German bonds and 61 Italian bonds, their ISINs are listed in Table 3.1:

Table 3.1: German and Italian bonds sample: ISINS

German bonds	DE0001135358	**Italian bonds**	IT0005028003
DE0001102309	DE0001135366	IT0001086567	IT0005030504
DE0001102317	DE0001135374	IT0001174611	IT0005045270
DE0001102325	DE0001135382	IT0001278511	IT0005069395
DE0001102333	DE0001135390	IT0001444378	IT0005083057
DE0001102341	DE0001135408	IT0003256820	IT0005086886
DE0001102390	DE0001135416	IT0003493258	IT0005090318
DE0001102408	DE0001135424	IT0003644769	IT0005094088
DE0001102416	DE0001135432	IT0004009673	IT0005127086
DE0001102424	DE0001135440	IT0004286966	IT0005135840
DE0001102432	DE0001135457	IT0004356843	IT0005142143
DE0001104669	DE0001135465	IT0004361041	IT0005162828
DE0001104677	DE0001135473	IT0004489610	IT0005175598
DE0001104685	DE0001135481	IT0004513641	IT0005177909
DE0001104693	DE0001135499	IT0004532559	IT0005210650
DE0001104701	DE0001141679	IT0004536949	IT0005215246
DE0001104719	DE0001141687	IT0004594930	IT0005216491
DE0001134922	DE0001141695	IT0004634132	IT0005217390
DE0001135044	DE0001141703	IT0004644735	IT0005217929
DE0001135069	DE0001141711	IT0004695075	IT0005240350
DE0001135085	DE0001141729	IT0004759673	IT0005240830
DE0001135143	DE0001141737	IT0004801541	IT0005244782
DE0001135176	DE0001141745	IT0004848831	IT0005246340
DE0001135226	DE0001141752	IT0004889033	IT0005250946
DE0001135275	DE0001141760	IT0004898034	IT0005273013
DE0001135325	DE0001141778	IT0004907843	IT0005274805
		IT0004923998	IT0005277444

		IT0004953417	IT0005282527
		IT0004957574	IT0005285041
		IT0004966401	IT0005321325
		IT0004992308	IT0005323032
		IT0005001547	IT0005325946
		IT0005024234	IT0005327306

3.2.1 Trading venues

The MiFID II directive widened the application of the post-trading requirements to more venues than before. As a consequence, now more markets and market participants are included amonf the regulated market paritcipants.
The trades we have analyzed took place on one either Regulated Markets (RM), Systematic Internalizers (SI), Multilateral Trading Facilities (MTF), Organized Trading Facilities (OTF) (which legal entity was created by MiFID II) or OTC (outside a trading venues).
In particular it is useful to point out the following trading venues and their operational flags, as set by data providers such as Bloomberg, for a better interpretation of the graphs and test results of the following sections:

- Bloomberg Trading Facility Limited's multilateral trading facility (BMTF): Bloombergs' multilateral trading facility (MTF), is one of the MTFs, together with Bondvision Europe MTF (SSOB) and Tradeweb Europe Limited (TREU);
- Kepler Cheuvreux Organized trading Facility (KOTF): the OTF managed by Kepler Cheuvreux; Bondvision UK (BVUK): sovereign bonds market segment of the MTS Market managed by the London Stock Exchange Group (RM);
- "SINT" is the flag for Systematic Internalisers;
- "XXXX" marks a contract signed outside a trading venue, so over the counter;

- "XOFF" signals a trade concluded outside of a trading venue on an instrument admitted to be traded (so OTC trades too) or a trade which took place on a trading venue.

These flags are those used by Bloomberg and Thomson Reuters, so we are going to use them as well in the following analyses.

3.2.2 Deferrals under MiFID II and MiFIR directives

As we have already showed in the First Chapter, one of the main change the directives have introduces is the possibility for the authorities to defer trades on sovereign debt. Art 21(1) and (2) of MiFIR, in fact, The supervisory authorities can authorise the deferral of the publication, the publication of just some of details, or several transaction to be published in aggregated form. Concerning sovereign bonds, the authorities can allow the publication of several transaction in aggregated forms for an undisclosed period of time, and at the same time suspend the post trade obligations.
From the operational point of view there are several flags which indicate a shift in the publication of trades, divided by the reason why the trade was deferred. The main flags, and those useful for our analysis, are.:

- COAF: signals the deferred publication of trades for which incomplete or insufficient information have been disclosed;
- ILQD: marks a trade on an illiquid instrument;
- LRGE: is used for transactions large in size;
- SIZE: signals a trade with a personalized size;
- IDAF: Is the main flag, it indicates the aggregated publication of transactions large in size on Tuesday of the following week.

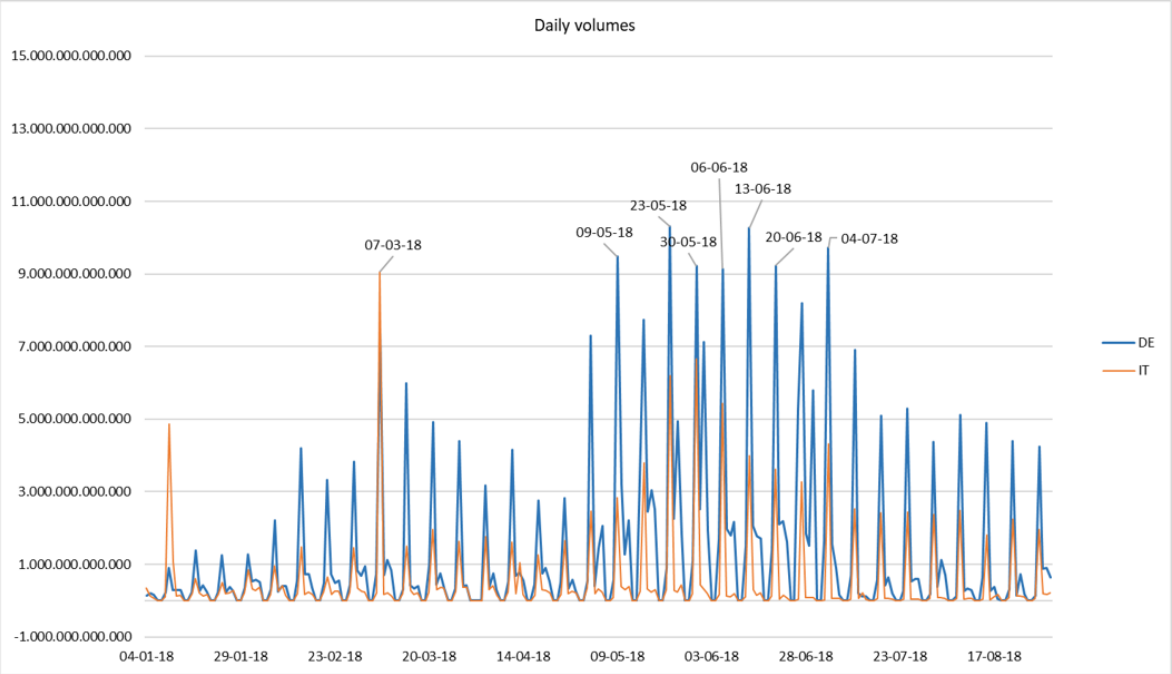
in the following sessions we will analyse the trades[3] on these bonds to detect the effect MiFID II and MiFIR have had on the trading venues.

[3]Orders with blank flags, or cancelled (flag 'CANC') have been excluded from the sample.

3.3 Volumes

The first element analysed is the volume of the trades. We have compared the overall daily volume of the trade on the sovereign bonds.

Figure 3.1: Daily volumes



Even from a very first look it is evident how the German instruments have a bigger trading volume than the Italian ones:

Table 3.2: Italian treasury bonds volumes

Italian treasury bonds		
Average	Max	Min
70 256.400 trillions	904 815 trillions	27.783 billions

Table 3.3: German treasury bonds volumes

German treasury bonds		
Average	Max	Min
181 856 trillions	1030 780 trillions	261.679 millions

Moreover all most of the trades are concentrated in the second half of the sample, with their highest peaks occurring on Wednesdays.
For Italian bonds the average volume for the first half of the year is 413.864 billions, while for second half of the observation period is 579.695 billions.
For German bonds, however, the average of the first half is 729.510 billions and for the second 1.873 trillions.
In the second half of the observation period, there is a volume difference of 1.293 trillions euros.

3.4 Volumes of transactions per day of the week

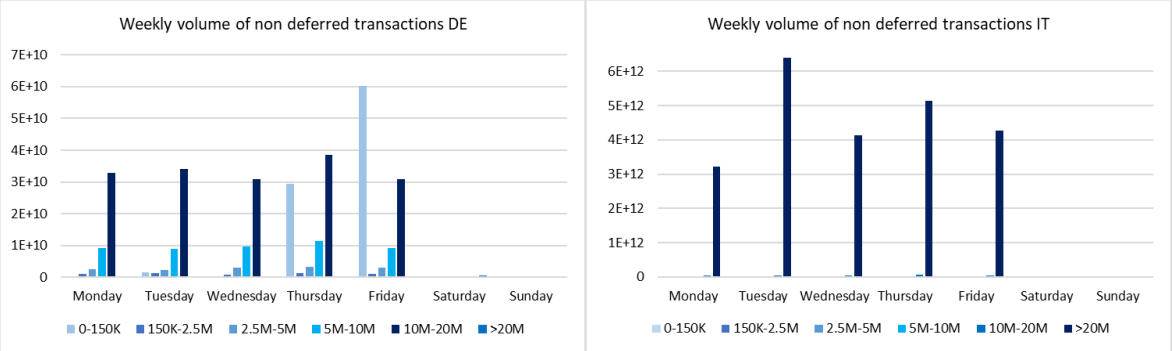
To further investigate the traded volumes, we are going to figure out if there are differences on the orders' distribution depending on their size. Moreover we are going to plot the distribution of transactions on the week days and over the different trading venues.

The transactions have been divided into classes depending on their size:

- Transactions below € 150k;
- Transactions between € 150k and € 2,50 millions:
- Transactions between € 2,5 millions and € 5 millions;
- Transactions between € 5 millions and € 10 millions;
- Transactions between € 10 millions and € 20 millions;
- Transactions above € 20 millions.

We have then computed the volumes of trade per day of the week for all the size classes. The following graph represents the distribution over the week days of those trades which have not been deferred.

Figure 3.2: Weekly non deferred volumes German and Italian bonds

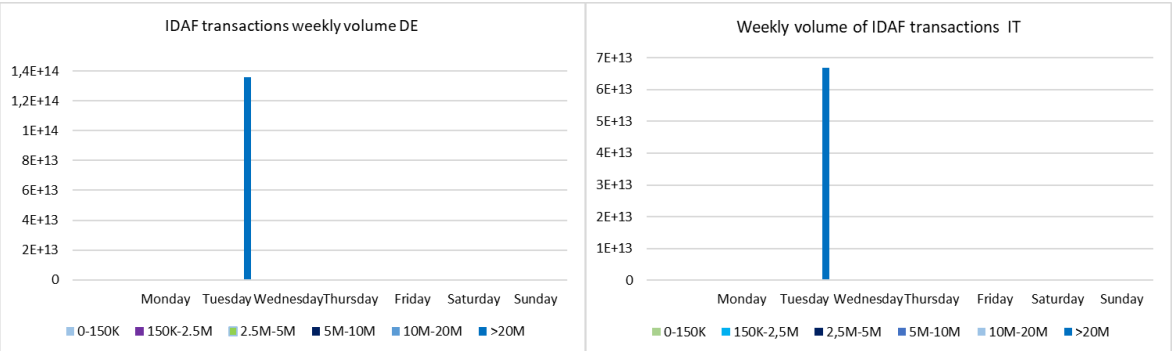


This first analysis shows some interesting differences between the two types of securities, taken away th effect of MiFID II/MiFIR deferrals.

The German instruments are more fragmented in different order sizes, rather than the Italian ones. If it true that most part of the traded volume is formed by orders above 20 millions, smaller sizes account for most part of the Friday trades (almost € 60 billions) and good part of the Thursday volume too (almost € 3 billions). Orders below € 150 000 also make Friday the trading day with the highest traded volume. Italian bonds on the other hands, are almost only traded in large orders. Moreover, the week day with the greatest volume of trading is Tuesday.

Both bond class show little to no trade during the weekend days (just one transaction on German bonds), which is consistent with the consideration that markets are closed.

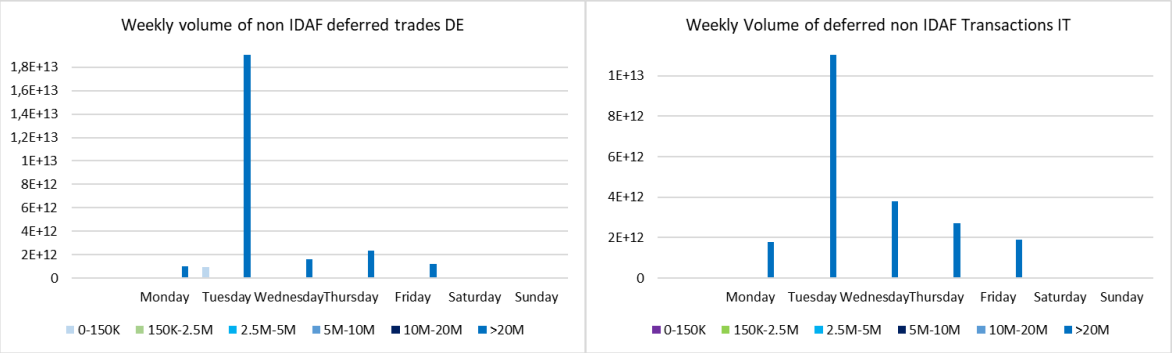
Figure 3.3: Weekly IDAF-deferred volumes German and Italian bonds



As we can see from the graphs, the deferrals have a huge impact on the volumes traded, as in almost all cases they mostly shift transactions of more than 20 millions.

In the German data, IDAF deferral accounts for a total of 136.083 trillions. In the Italian data set, the total volume of shifted big size (> 20 millions) amount to 66.882 trillions.

Figure 3.4: Weekly non IDAF-deferred volumes



Looking at the results of non-IDAF deferred volumes, we can observe in both cases that the mostly deferred trades are orders above 20 million, as it is consistent with most labels (eg 'SIZE'), and they have been deferred mostly to Tuesday.

The German distribution is mostly concentrated on Tuesday, with a volume of 19.096 trillions of euros. In the German sample, we can also see a cluster of small sized delayed orders: on Monday 922.559 billions of transactions < 150 000 euros.

Delayed Italian Treasury bonds are mostly published on Tuesday as well, with a total volume of 11.055 trillions of euros, all through big orders (> 20 millions). Other days deferrals, however, register volumes between 3.812 trillions (Wednesday) and 1.785 trillions (Monday), so that the overall distribution of trades on Italian bonds is not as flat as the German one.

Figure 3.5: Non IDAF-deferred trades per trade venues

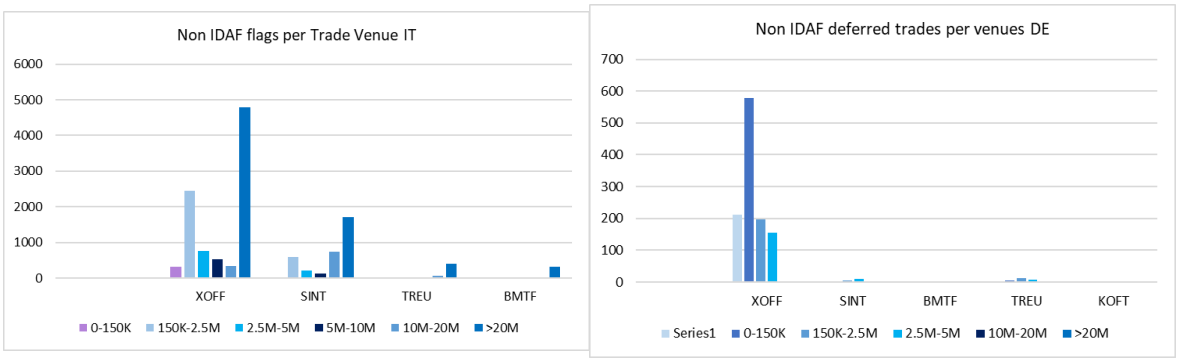
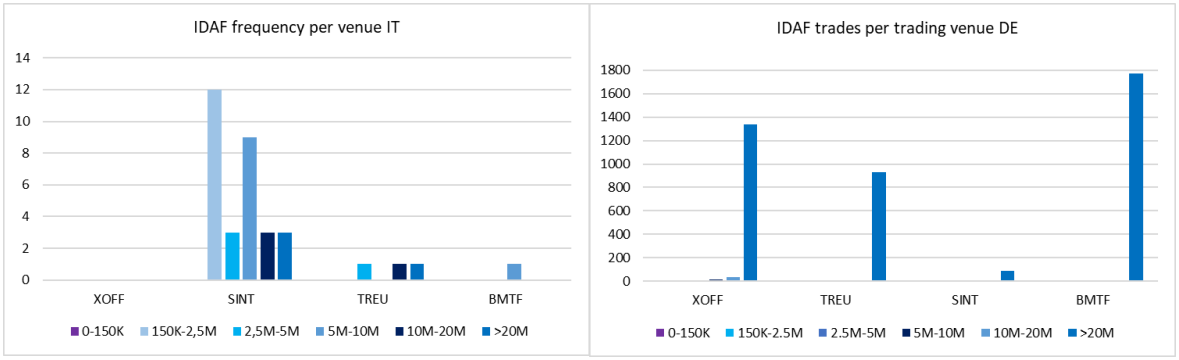


Figure 3.6: IDAF-deferred trades per trade venues



The most affected label are the ones corresponding to the generic negotiation of trades ("XOFF") for specifically deferred instruments (non IDAF). Considered that it incorporates OTC trades as well it is not surprising that it is affected by transactions which are non-liquid or with unconventional size or insufficient information. IDAF deferrals seem to affect significantly more the Systematic Internalisers for the Italian bonds, while for the German ones the BMTF registers the most IDAF deferrals and the Systematic internalisers the least.

To better understand this last result it can be useful to consult the "Data for Systematic Internalysers calculations"[4] issued by ESMA and referring to the period 01/01/2018 - 30/06/2018. It appears from ESMA calculations that Systematic Internalisers have dealt more in German than Italian bonds over the observation period.

[4]ESMA website: DATA FOR THE SYSTEMATIC INTERNALISER CALCULATIONS

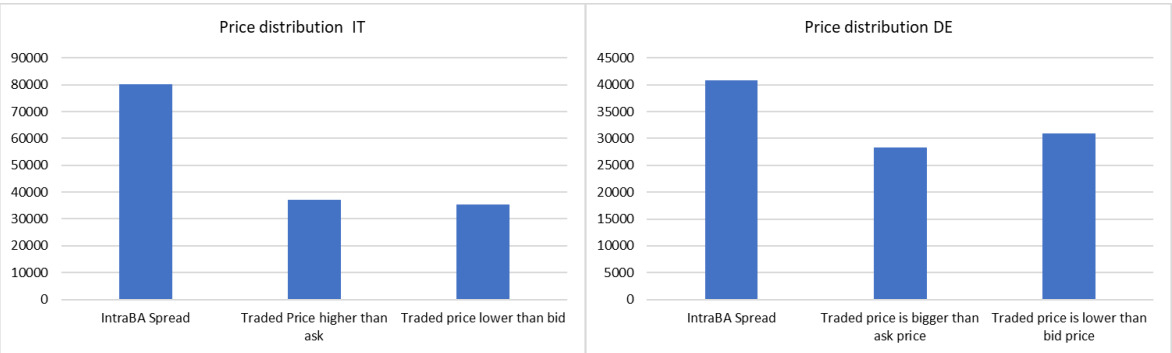
The traded German bonds were, in fact the 5.84% of the total portfolio, while the Italian bonds just the 3.80%.
It can be argued, then, that the most important deferral flag (IDAF) mostly affects the markets on which instruments are traded least, so that on the same market the Italian bonds are deferred more than in any other, while German government debt instruments are very seldom IDAF deferred. In the following sections we will also try to verify if price differences are also more consistent in these same venues.

3.5 Price analysis

We have proved so far that markets volume have been significantly altered in their distribution over time by the directives. To understand if this also implied an increased level of liquidity of the markets, we are now going to check the traded prices of German and Italian bonds and compare them to the Bid-Ask spread of these instruments.

We have computed for each transaction where the price fell in the range of the Bid and Ask prices, then calculated how often in total the price at which instruments were traded have fallen within the Bid-Ask range, above the ask price or below the bid price. To do so, it was necessary to use both the Bloomberg and the Thomson Reuters data.

Figure 3.7: Price distributions of Italian and German bonds



From this rough analysis it is already possible to have a first idea of how well priced the two bond types are. It would seem that the Italian bonds are traded within the range quite more often than the German ones. In facts, Italian bonds fall within the

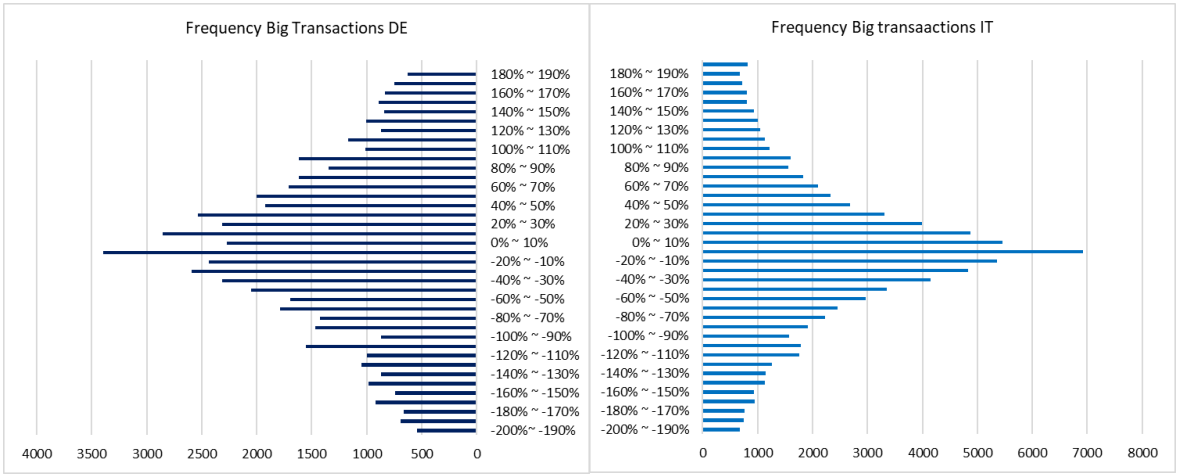
range the 52.44% of the times, while are above the ask price the 24.4% and below the bid the 23.16%. The German ones, on the other hand, fall within the range the 40,8% of the observations, while the 28.3% are above the ask price and the 30.9% below the bid price.

3.5.1 Price dispersion analysis

Going on with our analysis, we have computed the price dispersion with respect to the spread Bid-Ask. For all ranges of difference from the Bid price (negative %) or the Ask price (positive%), we have calculated how often the price has fallen in the 0-100% range. To this purpose, we have again considered size classes to divide the transactions into: this time three main ranges have been considered:

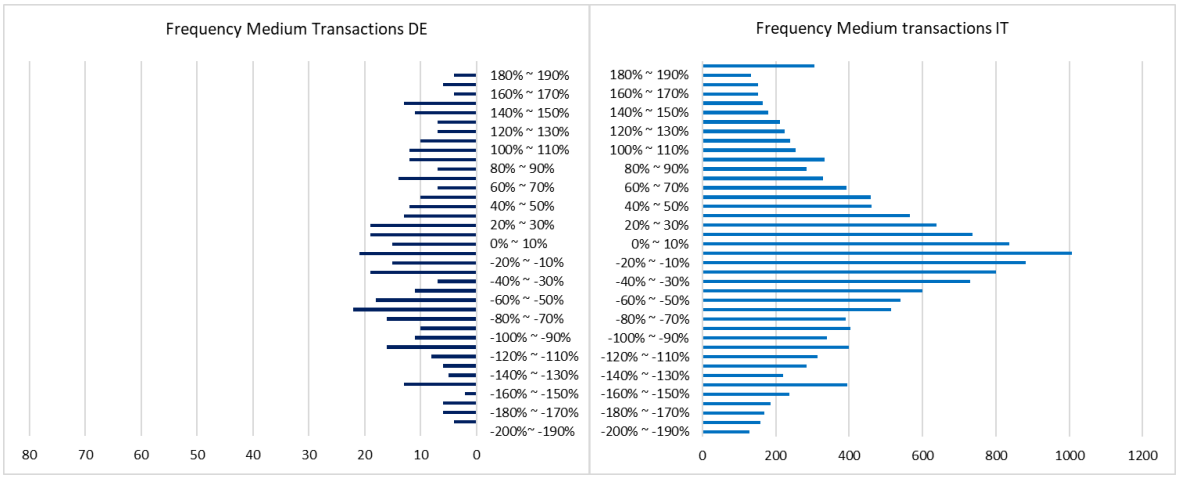
- Transactions below €150k;
- between € 150k and € 20 millions;
- above 20M.

Figure 3.8: frequency of trades between above 20M to fall within the ranges



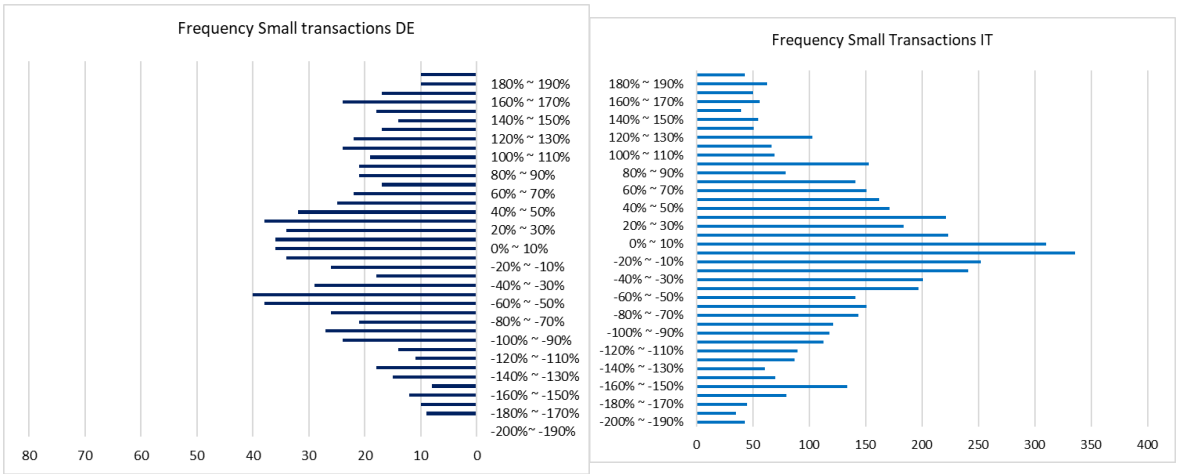
Fort big transactions, Italian prices falls within the Bid-Ask spread the 34.6% of the times, while the Germans fall within the Bid-Ask spread the 35.7% of the times. Thus exposing a slightly better pricing for big size orders.

Figure 3.9: frequency of trades between 150K and 20M to fall within the ranges



For the medium sized transactions, Italian bonds prices fall within the Bid-Ask spread the 31.99% of the times, while the German ones only the 30.62% of the times. So that for this class, the italian bonds are better priced.

Figure 3.10: frequency of trades smaller than 150k to fall within the ranges

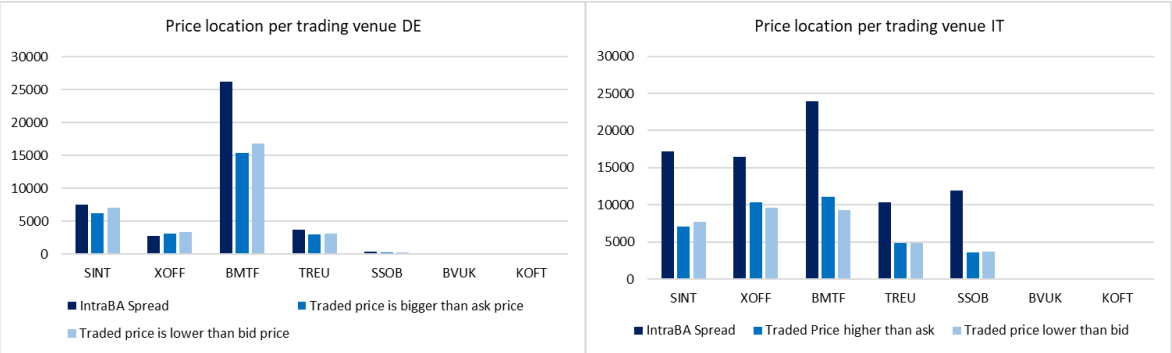


For small transactions, Italian bond prices fall within the Bid-Ask spread the 35.53% of the times, while the German ones fall just the 31.66% of the times.In this case too the Italian bonds are better prices, and the difference of price dispersion is bigger than in the previous cases.

3.5.2 Price distribution per trading venue

Using the same data set we divided the transactions for trading venues, calculating how often do the intra bid-ask spread transactions took places on the different markets. We then repeated the same exercise for prices above the ask price and below the bid. Doing so we obtained the distribution of the price dispersion among different venues.

Figure 3.11: Price distribution per trading venue



The evidences from the German bonds transactions showed that most of the trade happened on the Bloomberg MTF. In this segment of the market 26215 transactions were closed with a price which fell in the bid-ask spread, 16835 were closed below the bid and 15402 above the ask price. On Tradeweb Europe Limited (TREU) and the systematic internalisers the intra spread trades are still the most frequent, but the distance from the above ask and below bid transactions is extremely narrow. On general facilities (XOFF) trades, in facts, the orders executed below the bid prices outnumber (3390) the ones in between the spread (2829) and those above the ask prices (3132). Italian bonds show a better pricing altogether, as in all trading venues the transactions happened in the spread bid-ask are far more frequent than the others on all markets. The venue in which Italian government bonds were traded the most was the Bloomberg MTF, followed by the generic trading facilities and the systematic internalisers. On all trading venues, except for "XOFF" trades, the intra-spread transactions more than double the other cases. We can confront these results with those obtained by the deferred trade analysis. We can see, for example, that the systematic internalisers trade in German bonds more than Italian ones, but pricing-wise the Italian treasury

bonds are more performing.

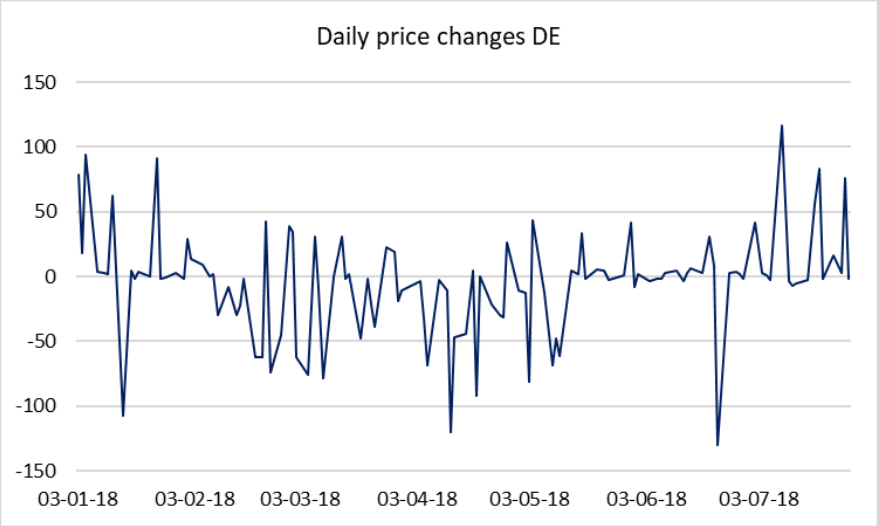
3.6 Price differences analysis

In order to understand what may cause the price dispersion for both Italian and German instruments, we have proceeded to analyse the amounts of price differences over the observation period and their distribution between trading venues.

To do so, we have computed the daily price differences on both bond classes, taking away the Tuesday transactions (29 days). After doing so, we have calculated the sum of all price differences over the observation period, their absolute values and finally plotted per trading venue they were registered on.

3.6.1 German bonds price differences

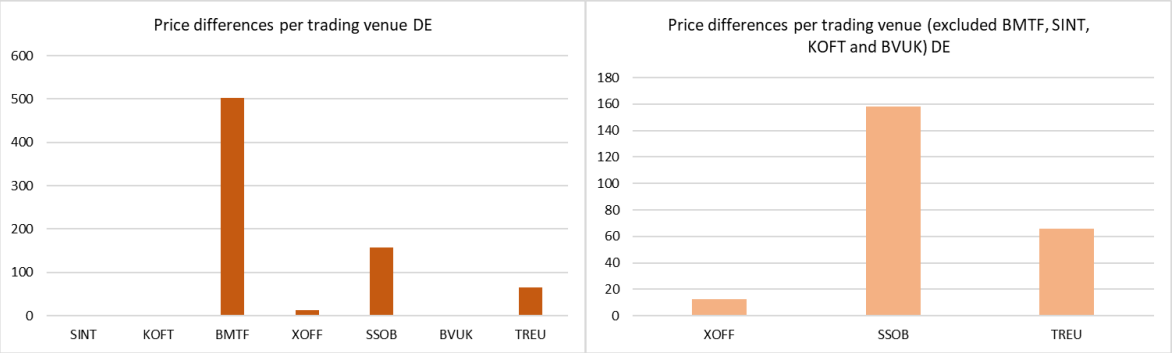
Figure 3.12: Daily price changes for German bonds



It can be pointed out that German bonds undergo heavy price changes, which in three cases overcome the 100 bp (on 15/01 with value -107.69 bps, on 12/04 with -120.3 bps, on 22/06 with -130 and on 9/07 with 116.4), whereas the mean value is -4.53 bps .

We have then divided the transactions based on the trading venue they were executed on, the following plot is the outcome of this analysis.

Figure 3.13: German bonds price differences per trading venue



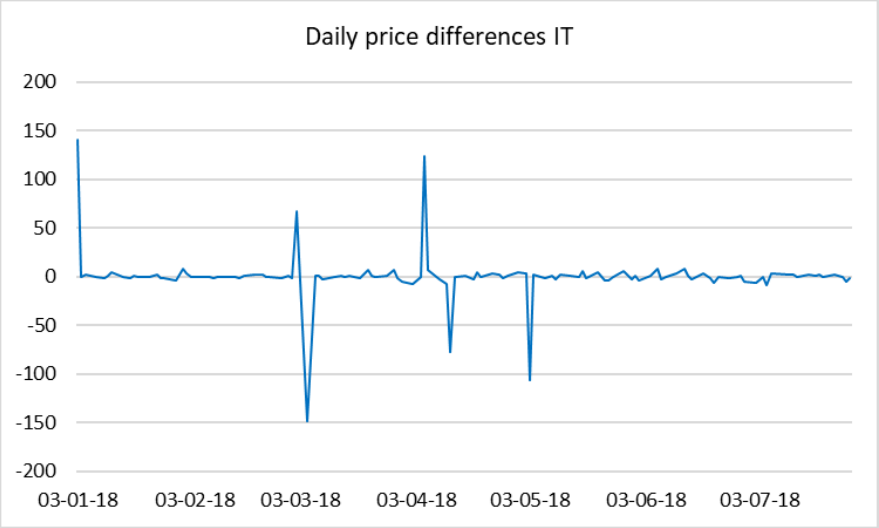
German bonds register the biggest price differences on BMTF, with a consolidated price difference of almost 502.6 bps, followed by the Bondvision Europe MTF that registered a difference of 158 bps, and the Tradeweb Europe Limited (TREU) MTF on which we observed a discrepancy of 65.8 bps .The smallest positive value belongs to the generic flag "XOFF". The results of the German bonds analysis show that the price net differences are concentrated on the MTF, split between the three venues. Summing the net price difference of all MTFs we get a total of 726.4996 bps.
On Systematic internalisers ("SINT") flag, Kepler Cheuvreux Organized trading Facility ("KOFT") and on the market segment Bondvision UK ("BVUK") trades, the price differences were either equal to zero or balanced off over the observation period.
These results are consistent with the distribution on trading venues of IDAF flag deferred trades: German bonds are in fact mostly deferred on the Bloomberg Multilateral Trading Facility BMTF.

3.6.2 Italian bonds price differences

The Italian bonds data have been cleaned of one transaction of exceptional big size[5].

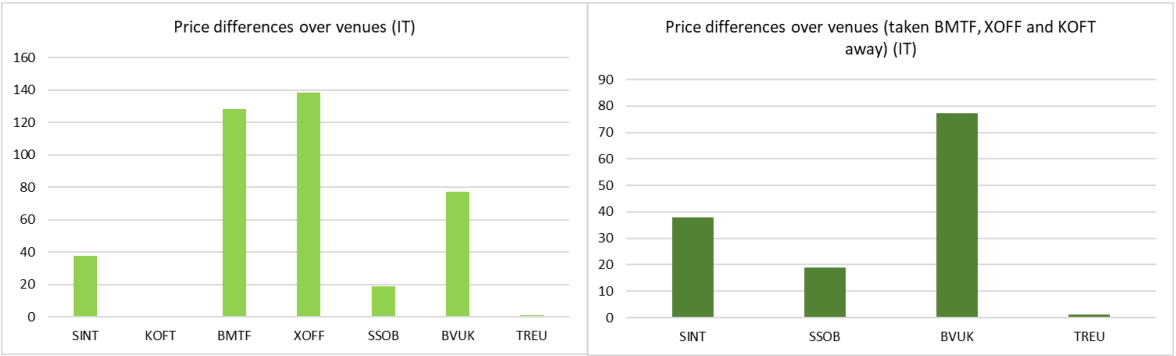
[5]19-01-2018

Figure 3.14: Daily price changes for Italian bonds



As opposed to the German bonds, the Italian price difference plot is much flatter, with occasional peaks on the 03/01 (140.83), 05/03 (148), 05/04 (123) and 03/05 (105). The mean value is 0.1377 bps, far lower than the German sample's average, despite these four values in the time series.

Figure 3.15: Italian bonds price differences per trading venue



For the Italian instruments, the biggest part of price differences happen on the general flag "XOFF" with a value of 138.48 bps. The XOFF flqg incorporates trades on instruments admitted on trading venues (like treasury bonds, in this case) regardless if executed on trading venues or outside, thus incorporating OTC trades too, in this case it may generate some confusion as some of the price dispersion is a spillover of OTF trades.

The Bloomberg MTF follows as second venue, registering a price difference of 128, followed in turn by the Bondvision UK ("BVUK") with 77 bp, Systematic Internalisers with 37.7 bps and Bondvision Europe MTF ("SSOB") with a net price difference of 18.93 bp. Whereas the smallest discrepancies are registered on the Tradeweb Europe Limited MTF (TREU): 1.225 .

On the Kepler Cheuvreux OTF trades, the price differences balanced out or were equal to zero.

In this case too, the results are consistent with the deferral analysis: Italian bonds were, in fact, deferred under the non-IDAF flags mostly with the "XOFF" label, while the price dispersion on Systematic Internalisers trades is not prominent.

3.7 Market impact: transaction costs

So far the results produced by the analyses of the volume and price dispersion have highlighted significant differences between the two treasury bond samples. German bonds result so far traded in higher volumes, deferred mostly on the MTFs under the generic IDAF flag. Price-wise, the German sample has shown more dispersion, price differences are registered mostly on MTFs' trades.

Italian bonds, on the other hand, are characterized by a lower transaction volume, and IDAF deferrals mostly on Systematic internalisers trades. Their pricing, however, is better than the Germans' with price differences registered mostly under the Systematic Internaliser flag.

Now, to better understand what determines the price asymmetries between the two samples and within them, we will try to test for the effect of transaction costs. Part of transaction costs is implicit and hard to directly verify post trade, and the spread and price dispersion are indicative of such costs too, however there are explicit costs too that are detectable post-trade, using transaction volumes and prices.

Following this thread, we will begin to investigate on the effect on Italian and German sovereign bonds prices of detectable transaction costs, so taxes, fees and commissions.

3.7.1 Kyle's lambda regression

Another aspect we have analysed is the role of transaction costs on the price dispersion we have found in the previous sections. To this purpose we have tried to measure the market impact by computing the Kyle's lambda as defined in Kyle (1985)[6], so that, applied to our market it would become:

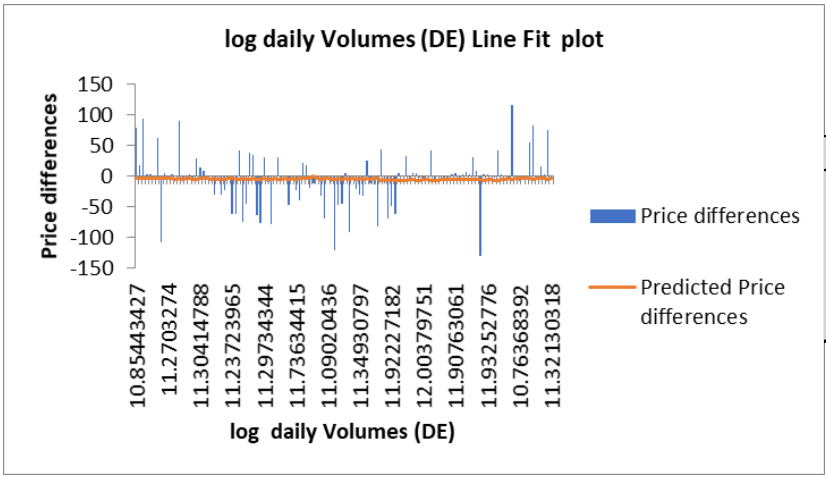
$$P_t = \mu + \lambda_t V_t + \varepsilon_t$$

In Kyle's model, the λ is the slope of the regression for which an insider (or in this case, perfectly informed) trader's strategy and the market auctioneer's pricing are in equilibrium. It is the value such that the trader's order size matches the market price set by the market maker, so implicitly it measures the transaction costs.

3.7.2 Daily values

First we have regressed the daily price differences over the logarithmic transformation of the daily volumes of transactions. Thus obtaining the following results.

Figure 3.16: Regression statistics daily values, German bonds



Regression Statistics	
Multiple R	0.027736293
R Square	0.000769302
Adjusted R Square	-0.007844756
Standard Error	40.64034024
Observations	118

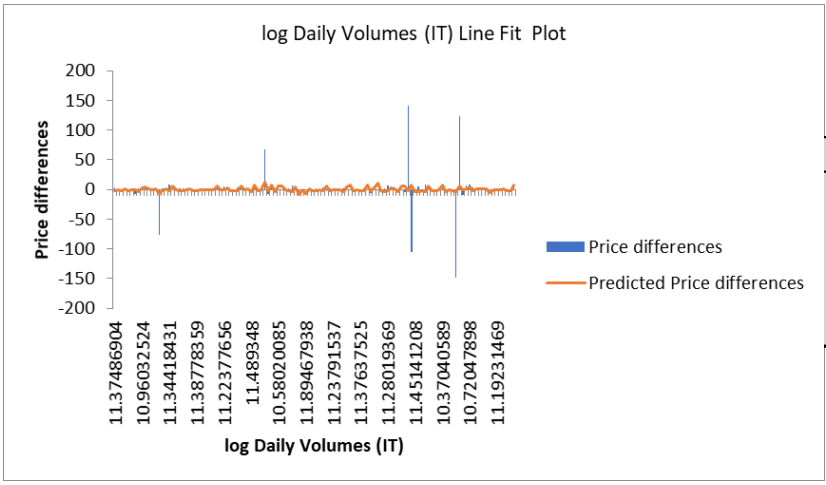
As we can see the German bonds prices are little to no influenced by the volumes of the daily transaction, so that only the 0.77% can somehow be predicted by the vari-

[6] Albert Kyle "Continuous auctions and insider trading" in *Econometrica* (1985)

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	26.77444814	104.8233907	0.255424	0.798847697	-180.8414852	234.3903814	-180.8414852	234.3903814
log daily Volumes	-2.722133347	9.108877516	-0.29884	0.76559379	-20.76341301	15.31914631	-20.76341301	15.31914631

able volumes. Kyle's lambda is negative (-2.722) so that transaction costs negatively influence the 0.77 of the price formation process. We can therefore state that direct transaction costs don't make the instrument any less liquid and cannot be accounted for price dispersion.

Figure 3.17: Regression statistics daily values, Italian bonds



Regression Statistics	
Multiple R	0.143129337
R Square	0.020486007
Adjusted R Square	0.012041921
Standard Error	25.94407543
Observations	118

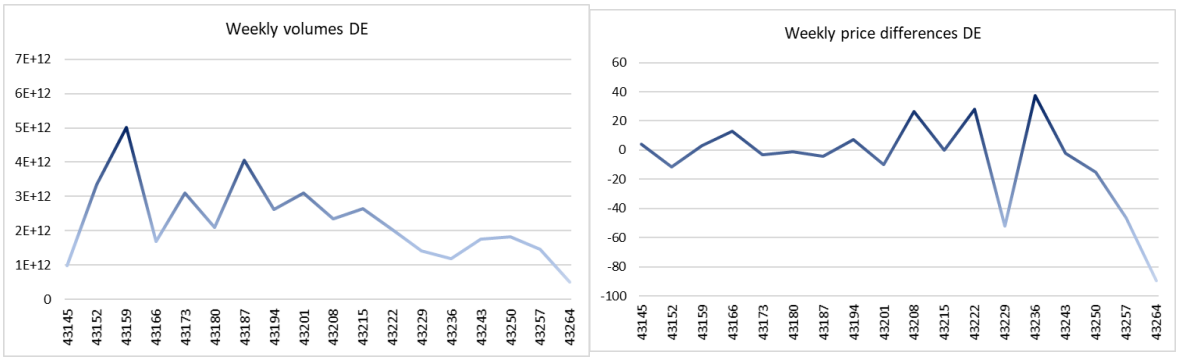
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	113.1015329	72.56415116	1.558641989	0.121805295	-30.62091177	256.8239775	-30.62091177	256.8239775
log Daily Volumes	-10.1466264	6.514323746	-1.55758707	0.122055326	-23.04906544	2.755812564	-23.04906544	2.755812564

Italian government bonds, on the other hand, reported more dependence between the prices and volumes, the first being predicted by the 2% by the latter. However the p-value (0.122) of the regression suggest a low level of significance.
We can conclude that in this case too direct transaction costs arfe not responsible for price dispersion.

3.7.3 Weekly values

We have then repeated the regression using weekly values, to verify if the frequency of the data had some influence on the results. We have first adjusted the dataset and computed the weekly volumes and prices.

Figure 3.18: German bonds weekly volumes and prices

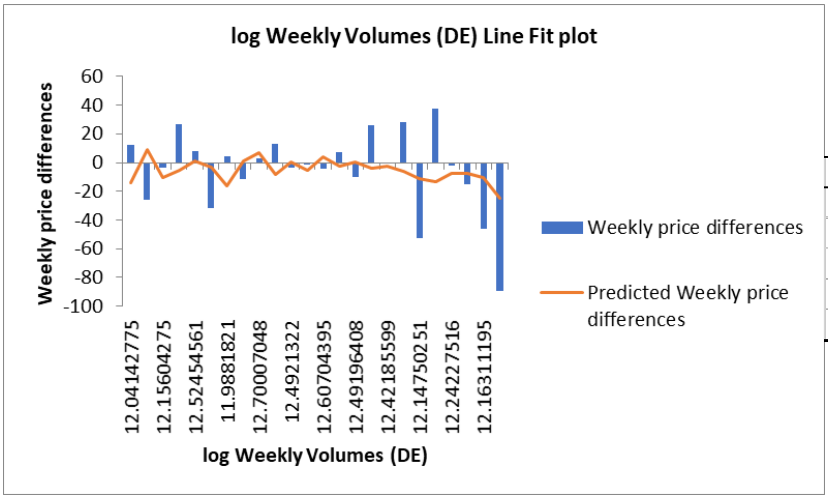


We can see that the weekly volumes still show an increasing in trading activity in the second half of the observation period, as previously noted observing the daily values in Section 3.3. Weekly values range from a minimum of 506.229 billions and a maximum of 5.93 trillions, with average value of 2.399 trillions.

German bonds Weekly price differences range from -89.48 and 37.54 bps, with average value of -5.42 bps.

Using these data, we regressed the prices over the volumes using the new data.

Figure 3.19: Regression statistics weekly values, German bonds

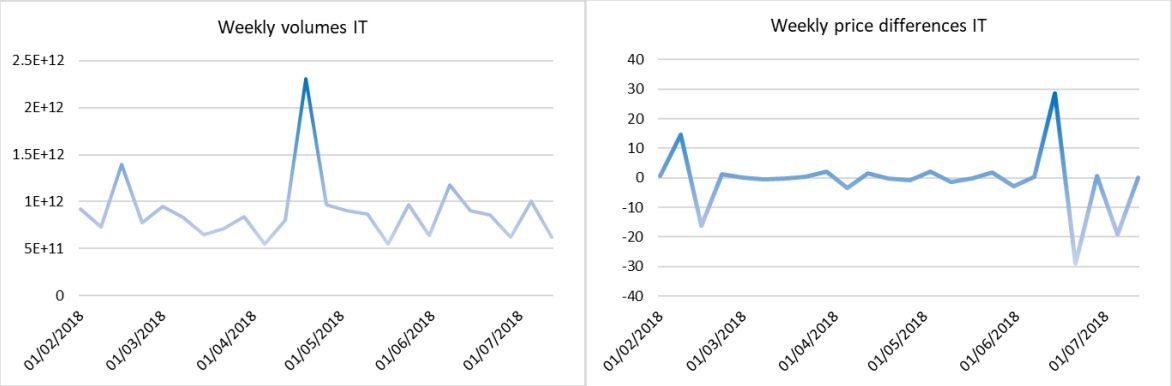


Regression Statistics	
Multiple R	0.271339899
R Square	0.073625341
Adjusted R Square	0.031517402
Standard Error	27.85768023
Observations	24

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-398.6943295	297.47092	-1.34028002	0.193832828	-1015.611259	218.2225999	-1015.611259	218.2225999
log Weekly Volumes	31.92135335	24.14068724	1.322305079	0.199650007	-18.14336775	81.98607446	-18.14336775	81.98607446

Again, the German bonds show little to no predictive power of volumes, with an R square of 0.0073. The p-value of the regression is 0.1996, so that regression is insignificant. Direct transaction costs, therefore, seem to have almost no impact on the formation of price.

Figure 3.20: Italian bonds weekly volumes and prices



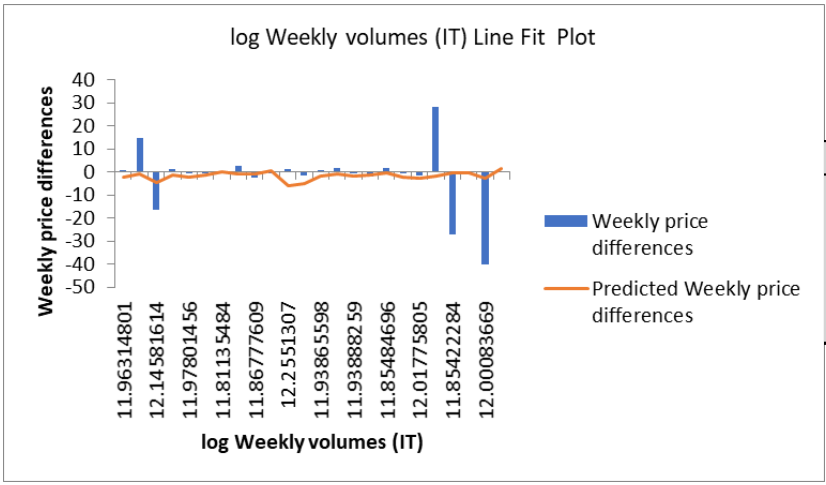
In the Italian sample too, the weekly volumes show an increasing in trading activity in the second half of the observation period, even with a considerable scale difference with respect to the German bonds, as already observed in Section 3.3. Weekly values

range from a minimum of 548.841 billions and a maximum of 2.307 trillions, with average value of 898.392 billions .

Weekly price differences range from -40.03 and 28.256 bps, with average value of -1.68 bps .

With this new data set, we have run the regression again.

Figure 3.21: Regression statistics weekly values, Italian bonds



Regression Statistics	
Multiple R	0.13823971
R Square	0.01911022
Adjusted R Square	-0.0254757
Standard Error	12.6482329
Observations	24

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	160.3009517	247.4401095	0.64783738	0.523794136	-352.858427	673.4603308	-352.8584273	673.4603308
log Weekly volumes	-13.57584215	20.73637038	-0.6546875	0.519455712	-56.5804422	29.42875791	-56.58044222	29.42875791

Italian bonds, on the other hand show a higher R square (0.019) with a low level of significance with a p-value of 0.519. In this case too we can argue that transaction costs have little to no role in the price dispersion for Italian bonds.

3.8 Overall results

Our analysis on transaction costs delivered the clear result that direct transaction costs are not a relevant factor in treasury bonds transactions, as far as our sample is concerned.

Summarizing the evidence we have as of this point, we can say that we have detected pricing asymmetries on both Italian and German bonds, with stronger evidence in

the latter. This results are combined with a higher transactions volumes and deferrals and price differences on MTFs transactions. Italian Bonds, on the other hand, combine lower volumes with a weaker price dispersion and trades deferred mostly on Systematic Internalisers trades. The test we have conducted showed little to no contribution of direct transaction costs to the pricing process for both the samples.

Nevertheless, representatives of the industry such as those who answered the ESMA consultation on on the development in prices for pre- and post-trade data and on the consolidated tape for equity instruments have already pointed out how the market data prices have been developing uncontrolled since the entry into force of MiFID and MiFIR transparency requirement. Moreover, the appropriate regulation of data vendors has been specifically requested by the German Finance Ministry and by the European Banking Federation, which publicly endorsed this point of the position paper[7]

[7]EBF:German Position Paper on MiFID Review: EBF Comments (2020)

Chapter 4

Conclusions

This thesis has investigated the effect on sovereign debt instruments of the post trading transparency requirements imposed by the MiFID II and MiFIR directives of the European Commission and the Delegated regulation connected to them.
In the first Chapter we have explained in detail the obligations set in MiFID II, MiFIR, which were initially to enter into force in January 2017[1] and the European Commission Delegated Regulation n 565, 572 and 583 all of those entered into force in 2017.
This initial part explains the reporting obligation introduced on the European Market to be complied with ex post (post-trading transparency) and its main features: terms of the publication (the Reasonable Commercial Basis principle), best execution principle, time of the publication, size and deferrals, exemptions and suspension of financial instruments from trading. The First chapter is closed by the last development of the regulatory framework, with the publication of the Commission Work Programme for the 2020, in which both a MiFID II and MiFIR Refit are announced, and the reaction of the German Ministry of Finance which published two position papers on the matter. From this very first part it already possible to point out the importance of data providers in the market structure imposed by MiFID and MiFIR. In facts, a reform of the legal obligations data vendors have to comply to is one of the objectives proposed by the German Federal State.

[1] Then delayed to January 2018

The second chapter deals with the implementation of the post trading transparency on the secondary markets. It starts with a detailed description of the European treasury bonds secondary markets, with a focus on the two classes which will form our sample for the empirical analysis, carried on in chapter 3: Italian and German sovereign bonds.

After a synthetic description of Italian and German Bonds composition and of the MOT and Frankfurt stock exchange , we focus on the implementation of the MiFID II/MiFIR requirements on European Markets. We did so basing our description on the opinion of the Managing authorities of the markets: The Deutsche Boerse Group and the London Stock Exchange Group as well as their counter-parties, the representatives of banks and professional investors form other Member States: the Association of the German Banks and the Trade Association representing participants in financial markets in France.

After having confronted all these different opinions and the data they presented to support them, we could conclude that the market structure imposed by the directives has proven efficient and more transparent, thus achieving most of their objectives. However, it has not achieved the goal of harmonizing the prices of market data over Europe. For this reason relevant members of the industry call for the implementation of best practices and, eventually, the intervention of ESMA to regulate the activity of data vendors.

Chapter n°3 starts with a brief recollection of the existing literature on the topic of sovereign bonds, market liquidity and the effect of regulatory intervention on financial markets. In the following section, we have presented a sample of 51 German and 61 Italian sovereign bonds. The data set, provided by Bloomberg and Thomson Reuters, is composed of daily transactions between 03/01 and 21/08 of 2018 on the selected bonds. We then proceeded explaining the trading venues on which the orders were placed and the different flag present in the samples.

We have then analysed the volume of the transactions per emitting Government (German and Italian). Italian bonds resulted to have a considerable lower volume, with a difference of volume of 1.293 trillions euros in the second half of the observation

period, which was also the one characterised by a more intensive trading. Then again we calculated the volume per day of the week, this time dividing the transactions in six classes based on the order size, and taking into consideration the trades without any deferral flag, meaning those trades published the same day the order was placed on the market.

In this case the German sample appeared to be traded in all size bands,and mostly on Friday, whereas the Italian one was composed predominantly of big transactions, with the highest volume registered on Tuesday.

At this point we wanted to confront the "normal" trades with the deferred ones. After briefly recalling the deferral regime and the corresponding flags, we have computed the weekly volume of the deferred trades both under the generic flag (IDAF) and more the specific ones (non IDAF). For the non IDAF flag, both samples mostly showed deferred clusters of big transactions ($>$ 20 millions) with the only exception for a small cluster of several small sized orders deferred in the German sample. Non IDAF transactions too are mostly published on Tuesday, although in the Italian sample other weekday deferrals are not irrelevant either, for example the € 3.812 trillions of transactions above 20 millions published on Wednesdays.

We have then checked the distribution among trading venues of deferred trades: specific (non IDAF) deferrals happen on trading venues and OTC (XOFF) trades. For IDAF deferrals, on the other hand, German bonds are mostly deferred either on MTFs, whereas Italians are mostly deferred on Systematic Internalisers transactions.

The following part of the third chapter focuses on the price analysis: we have computed how often the traded price falls within the Bid-Ask spread in the whole samples and per size bands. We have found out that Italian bonds are more efficiently priced than German ones, and the result stands also dividing the transaction into three size classes. Indeed, Italian bonds are priced coherently with the spread 52.44% of the time and German bonds the 40%.

We have then computed how often the price is within the range or above/below the bid/ask on the different trading venues. In the German sample, bonds are priced worse on systematic internalisers, whereas the Italian ones are efficiently traded on all venues

except for the "XOFF" label, which includes also OTC contracts.

From this first half of analysis we can conclude that Italian bonds are better priced although less frequently traded, that they are mostly deferred on Systematic internalisers trades. German bonds, on the other hand, are more traded, less efficiently priced, especially on multilateral trading facilities, which are the same venues on which they are mostly deferred.

In the second part of the chapter we have tried to understand what may cause the price dispersion, which affects the most liquid sample (German bonds) more than the other (Italian bonds) and checked for the distribution among trading venues of price differences and the role of transaction costs.

The price difference analysis of the German bonds retrieved consistent results with the deferral analysis, in fact the biggest price difference was registered on the Bloomberg MTF, followed by the other MTFs in the sample. The Italian sample, on the other hand registered the biggest price difference on Systematic internalisers, followed by the "XOFF" flag (which includes OTC trades), and the Bloomberg MTF. For Italian bonds too, the results are coherent with the deferral analysis that showed that the most IDAF deferral in the Italian sample happens on systematic internalisers trades.

Finally the direct component of transaction costs has been checked computing the Kyle's lambda on both sample using both daily and weekly data: In all cases it proved almost irrelevant: the transactions volume, in fact, showed little to no predictive power on the prices.

These results, in addition to the role of MTFs for German bonds and the "XOFF" label for the Italian sample, as well as MTFs, may suggest that other types of transaction costs prevent the efficient pricing of the treasury bonds in the sample and of the German ones in particular.

This, connected with the evidence showed by the German Bank Association, the German Ministry of Finance and the Association of market participants in France, can imply that the market data prices charged to investors can alter the pricing method and therefore the orders placed on particular instruments (German treasury bonds, but also Italian ones) in selected venues (MTFs).

Bibliography

Afme and KPMG (2017): MiFID II/MiFIR post-trade reporting requirements-Understanding bank and investor obligations.

Baker, H. K., and G. Filbeck (2015): Investment Risk Management. Oxford University Press

Borsa Italiana SpA website: Il MOT, La Struttura e Le Caratteristiche Del Mercato.

Börse Frankfurt website: Aktien, Kurse, Charts Und Nachrichten.

Brockman, P., D. Y. Chung, and C. Pérignon (2009): Commonality in Liquidity: A Global Perspective. The Journal of Financial and Quantitative Analysis 44:851–82.

Chakravarty, S., and A. Sarkar (1999): Liquidity in U.S. Fixed Income Markets: A Comparison of the Bid-Ask Spread in Corporate, Government and Municipal Bond Markets. SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Cheung, Y. C., B. Rindi, and F. De Jong (2004): Trading European Sovereign Bonds: The Microstructure of the Mts Trading Platforms. SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Chiyachantana, C. N., P. K. Jain, C. Jiang, and R. A. Wood (2004): International

Evidence on Institutional Trading Behavior and Price Impact. The Journal of Finance 59:869–98.

Chordia, T., R. Roll, and A. Subrahmanyam (2000): Commonality in Liquidity. Journal of Financial Economics 56:3–28.

Chordia, T., A. Subrahmanyam, and R. Roll (2000): Market Liquidity and Trading Activity. SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Commission Delegated Regulation (EU) 2017/572 of 2 June 2016 supplementing Regulation (EU) No 600/2014 of the European Parliament and of the Council with regard to regulatory technical standards on the specification of the offering of pre-and post-trade data and the level of disaggregation of data (Text with EEA relevance.)

Commission Delegated Regulation (EU) 2017/583 of 14 July 2016 supplementing Regulation (EU) No 600/2014 of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards on transparency requirements for trading venues and investment firms in respect of bonds, structured finance products, emission allowances and derivatives (Text with EEA relevance.)

Commission Delegated Regulation (EU) 2017/565 of 25 April 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council as regards organisational requirements and operating conditions for investment firms and defined terms for the purposes of that Directive (Text with EEA relevance.)

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Commission Work Programme 2020, A Union that strives for more. Brussels, 29.1.2020 COM(2020) 37 final

De Renzis, Guagliano, Loiacono (2018): ESMA working paper n 1 2018 - Liquidity in fixed income maerkets - Risk Indicators in EU evidence.

Deutsche Börse Group website;: Procedure for the Legal Implementation of MiFID II/MiFIR.

Deutsche Börse Group website: Transparency.

Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU Text with EEA relevance

Dufour, A., R. Engle (2002): Time and the Price Impact of a Trade, THe Journal of Finance, Vol.55, N.6.

Dunne, P., M. J. Moore, and R. Porter (2006): An Empirical Analysis of Transparency-Related Characteristics of European and US Sovereign Bond Markets. Research Technical PapersCentral Bank of Ireland.

Euronext website: Market Data Products

European Banking Federation (2020): German Position Paper on MiFID Review: EBF Comments.

European Central Bank's Statistical Data Warehouse: National Tables: Euro Area - National Tables - Debt Securities Issuance and Service by EU Governments - Macroeconomic and Sectoral Statistics - Reports

European Securities and Markets Authority (ESMA): Regulatory technical and implementing standards, MiFID II and MiFIR – Annex I

European Securities and Markets Authority (ESMA) website: Double Volume Cap Mechanism.

European Securities and Markets Authority (ESMA) website: Data for the Systematic Internaliser Calculations.

European Securities and Markets Authority (ESMA) website: MiFID II/MiFIR Review Report on the Development in Prices for Pre- and Post-Trade Data and on the Consolidated Tape for Equity instruments.

European Securities and Markets Authority (ESMA) website: MiFID II/MiFIR consultation on the Development in Prices for Pre- and Post-Trade Data and on the Consolidated Tape for Equity instruments: Response forms from: Londom Stock Exchange Group, Deutsche Bank Group, Association française des marches financiers, The association of German Banks (BdB), Deutscher Sparkassen und Giroverband(DSGV) and the Association of German Public Banks, European Banking Federation (EBF).

Federal Reserve Economic Data (FRED) St. Louis Fed.

Fleming,M.J. (2003):Measuring Treasury Market Liquidity, Economic Policy Review, Vol.9, No.3.

Fleming, M.J., and E. M. Remolona (1999): Price Formation and Liquidity in the U.S. Treasury Market: The Response to Public Information. The Journal of Finance 54:1901–15.

Furfine,C., E. Ramona (2002): What's behind the liquidity spread? On-the-run and off-the-run US Treasuries in autumn 1998, " BIS Quarterly Review, Bank for International Settlements, June.

Glosten, L.R., and P.R. Milgrom. (1985): Bid, Ask and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders. Journal of Financial Economics, 14:71–100.

GmbH, B.D.F. Deutsche Finanzagentur - Wissen und Verstehen.

GmbH, B.D.F. Deutsche Finanzagentur - Private Anleger.

Heflin, F., K.R.Subramanyam, and Y.Zhang (2001):Stock Return Volatility Before and after Regulation FD, SSRN Electronic Journal.

Heflin, F., K.R.Subramanyam, and Y.Zhang (2003): Regulation FD and the Financial Information Environment. Rochester, NY: Social Science Research Network.

International Monetary Fund: Report for Selected Countries and Subjects (2019 data set).

iotafinance.com. website: Market Identifier Codes (MIC, ISO 10383).

JFD Group Ltd: Post-Trade Transparency Reports.

Kyle, A.S (1985): Continuous Auctions and Insider Trading, Econometrica, Vol.53, No.6, pp. 1315-1336.

London Stock Exchange Group: The MOT market .

Manek, V. (2018): Your 10-Minute Guide to MiFID II Costs and Charges. OpenGamma.com

Ministero dell'Economia e delle Finanze, Dipartimento Del Tesoro Website: Emis-

sioni Titoli Di Stato Interni.

Norddeutsche Landesbank Girozentrale NORD/LB (2015): Issuer Guide Government Bonds Eurozone (EU19)

Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012 Text with EEA relevance

Pasquariello P., C. Vega (2006): Informed and Strategic Order Flow in the Bond Market, Review of Financial Studies, vol.20, n.6.

Refinitiv website: MiFID – Pre- and Post-Trade Transparency.

Pelizzon, L., M.G. Subrahmanyam, D.Tomio, and J.Uno. (2016): Sovereign Credit Risk, Liquidity, and European Central Bank Intervention: Deus Ex Machina? Journal of Financial Economics, 122:86–115.

Sachee, Z. (2015): MiFID II pre- and post-trade transparency - Impact on bonds markets. ECB Bond Market Contact Group

Surowiecki, M. (2018) "MiFID II Transparency rules" FIMCO

Vegas,G. (2017): The fixed income colloquium, introductory remarks. Consob

Venkataraman, K., R.Thompson, and V.Eleswarapu (2001): The Impact of Regulation Fair Disclosure: Trading Costs and Information Asymmetry. Rochester, NY: Social Science Research Network.