Article

Fragmentation vs. consolidation in Spanish Stock Exchange. A note

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A R T I C L E   I N F O

A B S T R A C T

After the implementation of MiFID (I and II), competition is a reality in all the European Cash Markets. A natural consequence of competition is that order flow is fragmented in different type of venues. This paper focuses on the consequences of fragmentation on the local market liquidity of the Spanish Stock Exchange (hereafter SSE). Our main result shows that, for our sample, fragmentation is relevant determining the cost of liquidity. Following the analysis of Degryse et al. (2014), the linear component of fragmentation has a positive and significant effect on liquidity (reduces spreads and increases Kyle's Lambda) and the quadratic term has a negative and significant effect on liquidity (increases spreads and reduces Kyle's Lambda). So, fragmentation is good for liquidity but beyond a given level of fragmentation, increasing it is worse for the liquidity of the regulated market.

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1. Introduction

Financial Market Fragmentation is one of the important issues during the last decade. Financial markets have evolved from a natural monopolistic position in Europe to a competitive environment where fragmentation is a key ingredient. Competition is one of the main tasks of Markets in Financial Instruments Directive (MiFID). MiFID defines three different alternative trading venues. First, the Regulated Markets are the traditional cash markets where transactions are done through matching buy and sell orders in a Limit Order Book with a diversity of traders. Second, the Multi Trading Facilities (MTF) that provide liquidity in the same way than regulated markets but with lower transparency requirements.[2] MTF can offer lit or dark liquidity.[3] Last, the Sistematic Internalizers (SI) that are investment firms who could match "buy" and "sell" orders from clients in-house. Instead of sending orders to a RM or a MTF, SIs can match orders on its own book.

The expected positive effects of increasing the level of competition should be the reduction of trading fees and an increase of liquidity through the reduction of execution cost. The negative one could be the fragmentation of supply and demand and its consecuences in volatility and execution cost. As result of fragmentation, it is not clear the final effect of competition on different liquidity measures. Competition is possible if competitors can improve the execution conditions. These execution conditions includes an improvement of the liquidity conditions, the quality of the trading technology (e.g. the speed of execution), the number of securities traded or make and take fees and clearing and settlement costs among others.

Looking at European Markets and as a consequence of MiFID, fragmentation is a reality. Additionally, Table 1 summarizes the distribution of the turnover in Europe from July 6th to 10th of 2015. The Total column shows the percentage distribution only among Lit markets. BATS Chi-X transacts 24.25% of the lit markets total volume. If we look at the other columns we see the same concept but only considering stocks included in each index. Table 1 main conclusion is that BATS Chi-X is capturing around 30% of the total lit turnover. The rest till 100% is dark.

Focusing on empirical papers, on one side Bennett and Wei (2006) show that the assets that move from less consolidated market like NASDAQ to a more consolidated ones like NYSE reduce the execution cost. On the other, the greatest part of the papers found positive results on the effect of fragmentation on liquidity but we should highlight that this effect does not hold for the whole sample. Among others, Chlistalla and Lutat (2011) observe an increases in liquidity of the most actively traded stocks in the

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[2] MiFID II equalizes the ex-ante and post-trading transparency level of RM and MTF.

[3] MTF that offer dark liquidity are named Dark Pools.

Table 1
Market fragmentation in lit markets. This table shows the distribution of turnover of the constituents of four selected European Indices from July 6th to 10th of 2015. We only include market turnover in lit markets.

% Turnover	CAC40	FTSE 100	DAX	IBEX
Paris (Euronext)	66.23	–	–	–
London SE	–	55.96	–	–
Deutsche Börse	–	–	55.45	–
Madrid (SSE)	–	–	–	66.75
BATS Chi-X	26.25	27.06	31.83	27.99
Turquoise	5.34	15.55	11.51	5.26

Source: Fidessa.

sample when these asset are trading in Chi-X and in Euronext-Paris. But this positive result does not hold for the less traded stocks. Another example is Fioravanti and Gentile (2011). With the assets of Stoxx Europe 50 Index, they find that the trading in the RM and the MTFs increases liquidity (narrowing quoted spreads and increasing quoted depth at the best prices) but the increase in fragmentation reduces informational efficiency. Gresse (2012) examines fragmentation of European markets analyzing the stocks included in the FTSE-100, CAC-40, and SBF-120 (the non-CAC-40 components of the index) before and after the implementation of the MiFID. The author finds that visible fragmentation narrows spreads and increases depth or does not affect it.

Last, the research closely related to ours is Degryse et al. (2014). They use a sample of Dutch stocks during 4 years (January 2006 to the end of 2009). Therefore, the sample includes a period with fragmentation and a period without it. Degryse et al. (2014) construct daily averages with information that covers the whole limit order book of the stocks during the sample period using intraday data. They measure liquidity with three alternative measures. First, they calculate quoted spreads and quoted depth at the best prices. Secondly, they use "Depth(X)". This liquidity measure aggregates the effective volume posted at 10, 20, 30, 40, and 50 basis points around the mid point. Also, they distinguish between visible and dark trading calculating fragmentation level in both scenarios. The authors use one minus Herfindahl–Hirschman Index (1-HHI) to measure fragmentation.

They observe that the effect of fragmentation on liquidity shows an inverted U-shape. Their results imply that fragmentation improves liquidity but beyond a specific level of fragmentation it becomes worse. Moreover, the authors find that visible fragmentation decrease "local liquidity" (liquidity at traditional stock exchanges). Therefore, investors that can only access to national market are worse off in a fragmented market environment.

Our results follows the previous ones, we find that fragmentation plays a similar role in SSE as the ones it plays in other stock exchanges. Fragmentation is relevant determining the cost of liquidity. Linear component of fragmentation has a positive and significant effect on liquidity (reduces spreads and increases Kyle's Lambda) and the quadratic term has negative and significant effect on liquidity (increases spreads and reduces Kyle's Lambda). So, fragmentation is good for liquidity till some point. Beyond this level of fragmentation, increasing the fragmentation level is worse for the liquidity of the regulated market. For SSE, the maximum improvement of QSp is when the level of fragmentation is 21.5%. This represents a decrease of 2.42 basis points. Regarding DWQSp the fragmentation level of the maximum decrease is at 19% with 5.86 basis points. Last, the highest improvement of lambda is at 25.5% with a 11.20% higher level of lambda. These results are robust to controlling for market-wide liquidity effects (Chordia et al., 2000).

2. The market and the dataset

Our dataset contains 21 Spanish stocks listed on SSE. These stocks are the most important constituents of the Spanish Index,

the IBEX-35© and belong to the Index during our sample period. These stocks can be traded in alternative venues. The SSE handles the most important part of trading activity. Trading is continuous from 9:00 am to 5:30 pm GMT + 1, with call auctions at the opening (8:30–9:00 am) and closing (5:30–5:35 pm).

Our database covers 5 years (from January 2010 to February 2015) of volume daily data of alternative trading venues. The first group is the RMs. We include SSE, Euronext, Xetra International Market and NASDAQ OMX. Those markets are organized through Limit Order Books where the whole market participants post limit orders providing liquidity. Although, we can observe a diversity of RMs, the associated effective volume of Euronext, Xetra International Market and NASDAQ OMX is negligible for our data set.[4] The second group are the lit Multi Trading Facilities (MTF) that provide liquidity in the same way (e.g. through LOBs). Chi-X, Bats Europe, and Turquoise are the members of this group. This group is the main responsible of the fragmentation in our sample. The third group contains MTFs with completely hidden liquidity (e.g. dark pools), Systematic Internalizers and the Over The Counter market.[5] Unfortunately, our dataset does not include volume of such competitors.

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2.1. Liquidity variables

1. Quoted Spread (QSp) is the average of the intraday quoted spreads. Intraday quoted spreads are calculated in the standard way each time there is a change in one of the five best Ask or Bid prices. Qsp is measured in basis points.
2. Depth Weighted Quoted Spread (DWQSp) is the average of the intraday depth weighted quoted spreads. Intraday depth weighted quoted spreads is calculated as:

$$\text{DWQSp} = \frac{\left(\left(\sum D_{Ask} * P_{Ask} / \sum D_{ASp}\right) - \left(\sum D_{Bid} * P_{Bid} / \sum D_{Bid}\right)\right)}{mid - point}$$

The SSE calculates DWQSp each time there is a change in one of the five best Ask or Bid prices. DWQSp is measured in basis points.
3. Lambda(λ) is the result of calculating the amount of money needed to move the mid-price 100 basis points on both sides of the LOB. The market calculates the effective volume needed to sweep all the volume of the five best positions at the Bid (Ask). At the same time, the market calculates the movement of the prices in basis points. Next, the market does an average of the

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[4] At the end of 2014, there is no volume associated with other RMs although traders can transact.
[5] Davies (2008) provides a good description of these trading venues.
[6] The minimum amount of volume traded by SSE is 70% during the sample.