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The impact of internalisation on the quality of displayed liquidity

Economic Impact Assessment EIA10

Foresight, Government Office for Science

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The impact of internalisation on the quality of displayed liquidity¹

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30 January 2012

This review has been commissioned as part of the UK Government's Foresight Project, The Future of Computer Trading in Financial Markets. The views expressed do not represent the policy of any Government or organisation.

¹ The authors would like to thank Michael Brennan and three anonymous referees for useful comments.

1. Objective

This report discusses the impact of internalisation on liquidity provision in the US and EU equity markets. We start with an introduction to internalisation and its role in modern capital markets. We present the internalisation practice from the perspectives of the internaliser, the retail and institutional investors as well as the liquidity provider in displayed trading centres. Academic work on internalisation is surveyed before we evaluate the costs and benefits of internalisation for each of the trading participants mentioned above. Four potential regulatory measures on internalisation are then presented, namely the “trade-at” rule, sub-penny pricing for retail liquidity providers, minimum size requirement and dark pool quote threshold. Specifically, we evaluate how each of the four proposed measures may affect internalisation practices, retail and institutional investors, and the overall market quality. With the exception of the dark pool quote threshold, the proposed measures are intended to restrain internalisation, as there is general agreement that opaque execution and unfair competition will harm market quality. Finally, we evaluate the costs, risks and benefits for each of the four proposed measures, and provide a guideline for the future of regulatory developments.

2. Background

Internalisation is a practice associated with the order-routing decisions of brokers (Figure 1). Orders may be executed in-house against a trading firm’s inventory, or a broker-dealer firm may route orders from its brokerage section to its market-making section, internalising trades. Internalisers match or provide price improvement compared to the National Best Bid and Offer (NBBO)² that a customer would receive if their orders were sent directly to an exchange. If an internaliser is unwilling to match or improve the NBBO for a particular order, it will route the order to other trading centres. In doing so, it will generally prefer trading centres that do not charge an access fee, such as “dark pools”³, electronic communication networks⁴, multilateral trading facilities⁵ and other internalisers. If the order is not filled within a short time, it is routed directly to displayed liquidity centres, where it competes with other orders for liquidity, and obtains execution on the risk-less principal basis. In traditional internalisation, dealers fill customer orders from their own inventory, thus earning the spread. If the dealer limits his/her internalized flow to orders from uninformed investors, he/she may earn excess rents due to

² *Best bid price* is the highest buying price, while *best offer price* is the lowest selling price.

³ The term “dark pools” refers to non-exchange Alternative Trading Systems that do not display bids or offers in the public quote stream.

⁴ The Electronic Communication Network (ECN) is an electronic system that attempts to eliminate the role of a third party in the execution of orders entered by an exchange market maker or an over-the-counter market maker, and permits such orders to be entirely or partly executed.

⁵ The Multilateral Trading Facility (MTF) is a trading system that facilitates the exchange of financial instruments between multiple parties. Multilateral trading facilities allows eligible contract participants to gather and transfer a variety of securities, especially instruments that may not have an official market. These facilities are often electronic systems controlled by approved market operators or larger investment banks. Traders will usually submit orders electronically, where a matching software engine is used to pair buyers with sellers. MTF is a European equivalent of an ECN.

smaller adverse selection costs. In an internalisation dark pool, dealers send customer orders to a dark pool they have established. The dealers then sell access to that dark pool to traders who can earn excess rents by interacting with uninformed orders. In this case the dealer earns the smaller access fee, but faces no risk from inventory exposure. Internalized order flow creates market fragmentation, as the order matching is isolated from interaction with the displayed liquidity centres. Internalisers reap the benefit of price discovery from displayed liquidity centres, but deprive exchange market makers of liquidity provision as they keep the order flow in private markets.

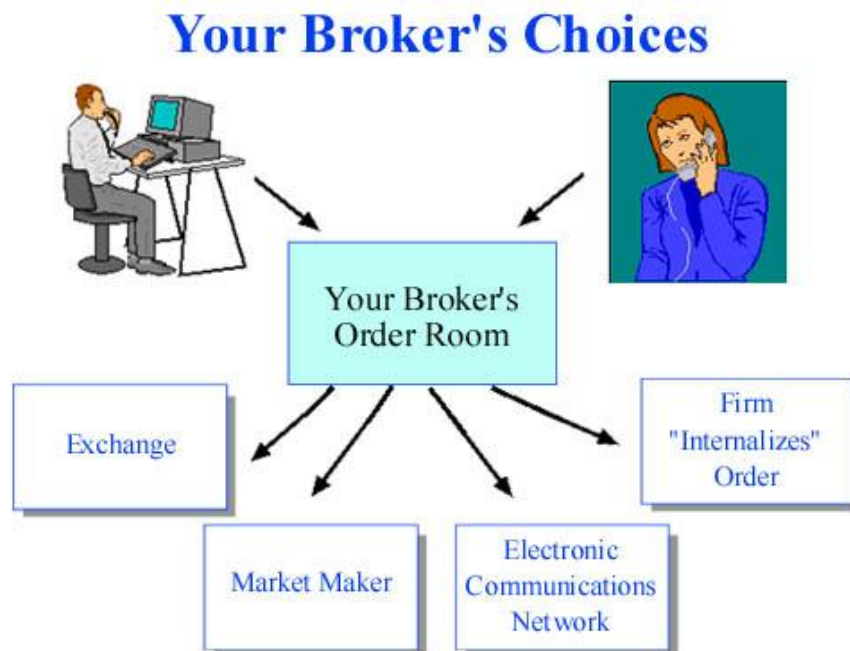


Figure 1. Broker's choices when executing a client's order

Source: SEC webpage

Automatic and electronic internalisation was pioneered in the late 90's by a group of investment firms within the Primex Auction System – an electronic execution system. It was conceived as a way to compete for order flow with the New York Stock Exchange specialist firms that dominated trading activity. Order routing algorithms systematically searched for liquidity in undisplayed venues among an exclusive group of wholesalers before the order was routed to market makers in displayed centres. The Primex Auction System provided an automated, electronic forum for showing the orders for a brief moment to a broad-based crowd of participants who competed for the orders at prices equal to or better than the best quotes publicly displayed (Primex Trading N.A. Llc., 2001). Orders that appeared in the system may receive price and size improvement above the public best bid and offer. Participants in the system's electronic crowd benefit by being able to quickly and efficiently interact with a continuous stream of orders – without disclosing their interest to the public market.

Even though Primex Auction System was abandoned in the mid 2000's, automatic and electronic execution internalisers provision has continued to be an important part of the equity markets. Internalisation is now a part of undisplayed liquidity centres, or "dark pools", that execute a large portion of orders. Internalisation platforms in the US equity markets are regulated as Alternative Trading Systems (ATS). ATSs are Security and Exchange

Commission approved non-exchange trading venues specifically designed to match buyers and sellers, instead of trading large blocks of shares on the normal exchange (US Securities and Exchange Commission, 1998). ATSs differ from exchanges as there is no pre-trade transparency; participants do not have to show quotes at which they are willing to trade, though the executions are based at prices quoted in displayed venues. The trading volume in US equity markets is split between 13 public exchanges, more than 30 dark pools, and over 200 internalizing broker-dealers (Shapiro, 2011). Undisplayed trading venues account for approximately 33% of the trading volume where 87.3% of dark pool volume can be attributed to internalisation and hybrid pools (Rosenblatt Securities Inc., 2010). EU regulation, on the other hand, mandates a special class of market participants named Systematic Internalisers (SI) in accordance with the Markets in Financial Instruments Directive (MiFID). Only a handful of firms are registered as SI in the EU, since there are strict obligations placed upon internalisers in terms of quotation requirements, size limits, and price improvement. Specifically, SIs have to provide firm quotes for orders in the regulated market that are classified as “liquid” under MiFID when dealing in sizes up to standard market size. Further, they are allowed to provide price improvement only to quotes exceeding certain size, therefore depriving retail investors of any price improvement. Future changes in EU regulation might include more objective criteria for determining when a firm is an SI, and encourage more firms to opt-in as SI. SI account for 3.26% of trading volume (Fidessa, 2011).

There have been extensive theoretical and empirical studies of internalisation’s impact on market quality which show that at best internalisation is benign⁶ and at worst it will reduce market quality⁷. Internalisation has traditionally been considered as part of a broader category of order routing (or non-routing) called preferencing. A broker can decide to either execute a customer’s order from the broker’s inventory or send it to a pre-designated market maker for execution against that market maker’s inventory. Chordia and Subrahmanyam (1995) and Easley, Keifer, and O’Hara (1996) develop theoretical models that show that dealers have an incentive to internalise orders from uninformed investor. This discrimination in order routing leads to wider spreads in the public market as market maker seek to compensate for the increased percentage of informed traders in the non-internalised order flow. Chakravarty and Sarkar (2002) develop a model that shows internalisation damages market quality by reducing market depth and price informativeness. Empirical studies of internalisation have shown that its impact on market quality has been at best benign or at worst harmful to market quality. We will focus on a recent study by Weaver (2011) that analyzed internalisation in modern market environment.

Weaver (2011) examines the dramatic increase in internalisation on market quality using data of October 2010. He finds that internalisation is directly related to spread width (quoted, effective, and realized). Specifically, he finds that internalisation is associated with wider percentage spreads, and quoted, effective, and realized spreads. The spread is \$0.0128 wider than a similar stock with no Trade Report Facility⁸. He shows that this results in investors

⁶ Battalio, Greene, and Jennings (1997); Hansch, Naik, and Viswanathan (1999); and Kam, Panchapagesan, and Weaver (2003)

⁷ Battalio, Greene, and Jennings (1998); Chung, Chuwonganant, and McCormick (2004); Grammig and Theissen (2005); Chung, Chuwonganant, and McCormick (2006); Larrymore and Murphy (2009); Weaver (2011)

⁸ The FINRA/NASDAQ Trade Reporting Facility TM (TRF TM) is an automated trade reporting and reconciliation service operated on the ACT technology platform. The TRF electronically facilitates the post-execution steps of price and volume reporting and, comparison and clearing of trades for NASDAQ-listed securities, as well as for

paying \$3,890,624 more per stock per year due to internalisation. Further, as the percentage of internalisation increases, average trades will have an increasing impact on prices. Finally, for all market segments, higher levels of internalisation are associated with higher levels of return volatility. He concludes that increased internalisation is associated with a degradation of market quality for all market segments in the US.

In October of 1998, the Toronto Stock Exchange (TSX) enacted a price improvement rule that requires brokers to either improve on the best quoted prices at the exchange or route the order to the exchange for execution against customer limit orders. The rule applies to any order of 5,000 shares or less. The rule effectively banned internalisations of limit orders without price improvement. Larrimore and Murphy (2009) examine the impact of this rule on TSX market quality. They find a statistically significant improvement in market quality following the rule change. In particular, they find that time-weighted quoted currency and percentage spreads have declined. Volume-weighted effective spreads declined by a statistically significant amount while quoted depth increased significantly. Given that depth absorbs liquidity shocks they also find that return volatility declines.

3. Risk assessment

Liquidity providers in displayed centres post price quote with a bid-ask spread to protect themselves against informed investors who know better which side to trade. Internalisers execute and profit from uninformed orders at prices quoted by these liquidity providers. The internalisers become an exclusive counterparty to their own customers, and obtain the right, but not the obligation, to execute their orders. They can basically “cherry-pick” the best trades for themselves and send the toxic trades (i.e. from informed investors) to the displayed liquidity centres. Empirical studies have shown that such practice has forced the market makers to widen the bid-ask spread and discourage them from providing liquidity, thus making all investors worse off in the long run.

As the internalisers’ motive is to make a profit while the investors’ motive is to obtain the best price, internalisers have a direct conflict of interest when executing the clients’ orders. The May 6th, 2010 Flash Crash provides clear evidence of this conflict. During the sharp price decline, the market witnessed a severe reduction in internalisation. Internalisers decided to retain buy orders in-house, but routed sell orders to exchanges hence placing further pressure on the liquidity that remained in these venues. Many retail stop orders or market orders were converted to limit orders by internalisers prior to routing them to exchanges for execution. When these orders were not filled in the falling market, internalisers submitted new limit orders at even lower prices and reached unrealistically low price level which was a poor execution for their clients, and eventually resulted in “busted” trades (US Securities and Exchange Commission, 2010).

Under normal circumstances, internationalisation makes economic sense for both the broker and the clients – the broker avoids the exchange and clearing fees associated with trading in a Public Limit Order Book (PLOB), and the clients satisfy their orders without signalling their intentions publicly or incurring any market price impact. Internalisers often, though not always, provide price improvement to their clients and the trades get executed inside the spread. The

transactions in NYSE- and other US regional exchange-listed securities that occur off the floor. The TRF handles transactions negotiated broker-to-broker.

more a broker internalises orders, the more competitive its commission rates for his/her clients become. With these benefits in mind, it is difficult to see the logic for curtailing internalisation. Why force a broker to buy services from an exchange or multilateral trading facility when these such services are not needed, which is the case if the broker has two clients who are willing to trade with each another within the NBBO. If the level of post-trade transparency is adequate, it is not clear who benefits from restricting internalisation other than the exchange and the clearing house.

From the discussion above, it is clear that there are advantages and disadvantages for internalisation and there might be an optimal level even if it is difficult to pinpoint what this level might be. Recent studies have shown that when the internalisation level approaches 40% of a stock's volume, price discovery is impaired (D'Antona Jr., 2010). Internalised trades that are executed at the NBBO take order flows away from the displayed centres without providing price improvement. This is unfair competition when market makers at displayed centres are required to post quotes without the guarantee of receiving the orders. Further, for many stocks, the market makers' bid-ask spread is one cent which is one price tick. Yet regulation mandates that market makers cannot provide price improvement that is less than one price tick. In contrast, internalisers do not face such restrictions as they often trade at NBBO or provide an insignificant amount of price improvement.

US "trade-through" rule protects investors against their orders being executed at inferior prices. The Order Protection Rule (Rule 611) of the Regulation National Market System (NSM) aims to ensure that both institutional and retail investors get the best possible price by comparing quotes from multiple exchanges. A trade must be routed to the exchange with the best price quote, and not be "traded-through" at its current exchange. The update of best bid and offer information heavily relies on the Consolidated Quotation System (CQS) to collect and disseminate information in a timely fashion. Yet, it has been shown that CQS often lags behind a fast paced market (Nanex Llc., 2011). Any market participant with servers co-located next to the exchanges ticker plant and access to direct data feeds can easily detect the mismatch between the CQS and the market orders. In fact, traders with superior computing technology could trade in the dark pool or internalisation platform at the NBBO obtained from CQS, while at the same time do a reverse trade in the lit markets bypassing the Order Protection Rule with the use of an Intermarket Sweep Order (ISO)⁹. The client's order is executed at the NBBO that does not reflect the current market activity while the internaliser makes a risk free profit by knowing the true market order flows. Figure 2 presents a 1 millisecond interval chart of Yahoo (YHOO) prices on September 15, 2011, beginning at 12:48:54.600 showing only NASDAQ trades (black circles) and the NASDAQ bid-ask spread (gray vertical bars). The figure clearly shows that the CQS was unable to keep pace with the market activity as the trades (black circles), most of the time, occur before the best bid and offer quotes (grey bars) could have produced them.

⁹ Intermarket sweep orders (ISO's) are limit orders that require they be executed in one specific market centre even if another market centre is publishing a better quote, disobeying the Order Protection Rule.

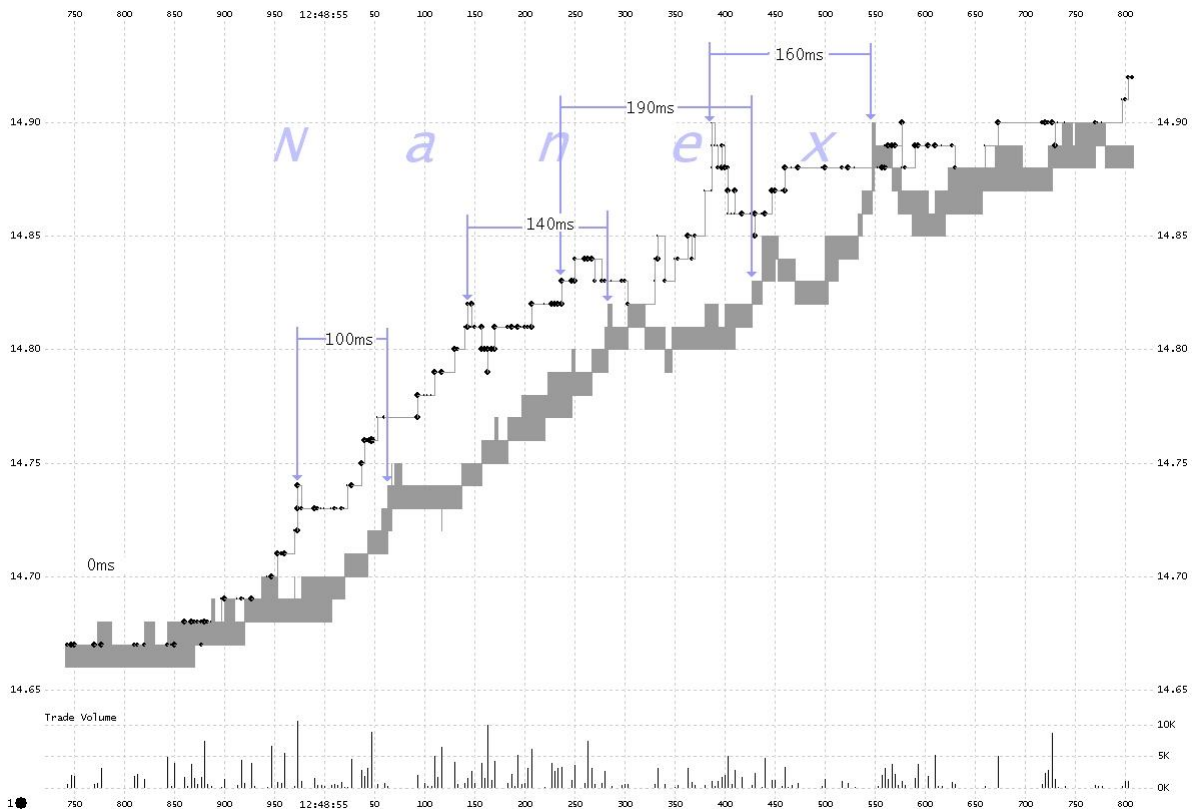


Figure 2. Consolidated Quotation System lag.

Source: Nanex Llc. webpage

4. Options

Publicly disseminated prices and quotes serve a vital purpose for capital markets and they should be protected. However, undisplayed pools of liquidity or dark pools are also beneficial to the market place and serve numerous legitimate functions, including: improving fill prices relative to displayed quotations, reducing market impact, lowering transaction and clearing fees, reducing information leakage and fostering innovation (Buti, Rindi, Werner, 2010; Buti, Rindi, Werner, 2010; Degryse, Van Achter and Wuyts, 2008; Gresse, 2006; Ye, 2010).

Therefore it is important to strike the right balance in protecting the important role that public markets play in fostering price discovery, while recognizing the purpose of undisplayed liquidity centres. In this section we discuss several measures that have been proposed to increase transparency of internalisation process and reflect greater quality of execution. Namely, we will discuss:

- “trade-at” rule,
- sub-penny pricing for retail liquidity providers,
- minimum size requirement,
- dark pool quote threshold.

Most of the proposed measures have originated from discussion of the US equity market and are intended to tackle structural issues there – the exception being minimum size requirement.

Nevertheless, we feel that discussing the mentioned measures might give insight into the development of EU equity markets and allow consideration of potential pitfalls for upcoming regulation changes.

4.1. “Trade-at” rule

At present, internalisers can execute trades if they can match the NBBO, or provide some insignificant amount of price improvement. Regulators are increasingly concerned that a large amount of order flow is diverted away from the displayed markets and end up in dark pools (US Securities and Exchange Commission, 2010). The US regulators now propose “trade-at” rule to prevent any trading centre from matching the NBBO unless it is displaying the NBBO at the time when the order is received. Otherwise, the trading centre must provide significant price improvement (e.g. minimum allowable quoting increment), or route Intermarket Sweep Orders to the full displayed size of NBBO quotation and then execute the balance of orders at the NBBO price. This new rule effectively gives priority to those market participants who are prepared to disclose their limit order.

4.2. Sub-penny pricing for retail liquidity providers

Currently, internalisers are allowed to execute trades in sub-penny increments, but exchanges are prohibited to accept orders in increments less than one cent due to the Sub-Penny Rule (Rule 610) of Regulation NMS. There has been a debate over this regulation as the spreads have nowadays narrowed to a penny for many stocks. While market makers in displayed liquidity centres keep the spread to one cent, i.e. the smallest price tick, the internalisers could bypass their service by trading at the same spreads or providing some insignificant amount of sub-penny improvements. Therefore, the new sub-penny pricing rule can be regarded as a compliment to the “trade-at” rule. Stock exchanges have asked the US Securities and Exchange Commission for approval to allow a special group of “retail liquidity providers” to quote between a stock’s NBBO in increments of less than a cent, specifically one-tenths of a cent (\$0.001) (Traders Magazine, 2010). The quotes would be hidden from the view of the wider market and only accessible by providers of retail order flow. This rule is also welcomed by the market participants also as it has been widely agreed that a full penny price improvement is too high for some stocks.

4.3. Minimum size requirement

Internalisers are keen to privatize retail order flows that are small in size and typically initiated by less sophisticated and uninformed investors. Market makers and dealer-brokers like this type of order as they are often at a disadvantage if order come from sophisticated and informed investors who know better which side to trade. The internalisation problem has become so severe that several deep discount brokers¹⁰ send almost all of their client orders to internalisers. This means that market makers in displayed venues are deprived of retail order flows and are forced to take only orders initiated by informed investors. Therefore, it has been proposed that a minimum be set on the size of the order that an internaliser can execute, effectively forcing brokers to send the retail order flows to market makers in displayed venues.

4.4. Dark pool quote threshold

US regulation requires Alternative Trading Systems (ATS) to disclose “prices and sizes of the orders at the highest buy price and the lowest sell price” for any stock that are “displayed to

¹⁰ For instance, TD Ameritrade, US retail brokerage house routes close to 90% of orders to two wholesalers, Citadel and Citigroup.

more than one person” in the ATS, if in at least four of the preceding six months the ATS had an average daily trading volume of 5% or more of the aggregate average daily share volume for such stock. Once the threshold is reached the ATS is required to match the quote size or the order book depth of the displayed market. The SEC has proposed to lower the threshold to 0.25%. The proposal also provides an exception from the ATS quotes that are for \$200,000 or more that are communicated only to contra-side trading interest of equally large size.

5. Costs, risks and benefits

In this section we discuss potential impact of the proposed measures on the market participants and trading centres. We provide a brief review of each of the measures, which is followed by a discussion of the costs, risks and benefits of the measures. It should be stressed that three of the proposed measures are aimed to retain undisplayed execution and direct it to lit trading venues. Hence, there should be no surprise that internalisers are supposed to be adversely affected by the measures: by decrease in their profit margins, natural restriction on their potential client base, greater competition with liquidity providers in displayed trading venues, and greater competition with the exchanges.

5.1. “Trade-at” rule

The “trade-at” rule would require internaliser to provide significant price improvement to his clients in case of execution. This “trade-at” rule will strengthen the integrity of NBBO and discourage undisplayed execution of orders at market makers’ best public quotes in the displayed centres. Greater order flows reaching the public markets would strengthen the incentives for others to post displayed limit orders – leading to tighter public spreads and benefiting all market participants. Retail and institutional investors should benefit from the new rule as internalisers would have to provide competitive pricing. It is clear that internalisers would be at a disadvantage as they are a part of the undisplayed liquidity centres, they cannot, by definition, display the best bid and offer when the client’s order is received. Therefore, they will be required to transact well inside the spread if they intend to keep the clients order “in-house”. However, it is possible that internalisers transfer the excess cost of significant price improvement back to institutional and retail investors in the form of higher trading fees. In addition, liquidity provided by off-exchange market makers could be drastically decreased as costs of the “trade-at” rule would outweigh their liquidity provision ability in most cases. Finally, as internalisers usually handle sensitive order flow, routing of Intermarket Sweep Orders to the fill displayed size of NBBO quotations may signal to other market participants that there may be additional order flow in the sending trading venue.

5.2. Sub-penny pricing for retail liquidity providers

Sub-penny pricing for liquidity providers is intended to allow certain market participants to post public quotes in increments of less than a cent. The sub-penny pricing should benefit retail clients with better pricing from displayed liquidity centres previously possible only through internalisation. Such a development should increase transparency and efficiency of price discovery as more orders would be routed to the displayed markets. Further, it would increase competition between internalisers and exchange market makers. However, as it is currently worded, it is unclear who would be allowed to act as a “retail liquidity provider”, and potentially may lead to a tiered market within the exchanges. In addition, if exchanges have the sole responsibility for choosing such “retail liquidity providers”, they would have a strong incentive to grant the service to the highest bidder, which may not be in the best interest of the retail investors. A more sensible proposal may be to allow all market participants to quote in sub-pennies, thereby encouraging competition among all liquidity providers.

5.3. Minimum size requirement

The minimum size requirement sets a lower limit on the size of the order an internaliser can execute. The minimum size requirement will help to channel retail orders to displayed centres and keep these centres liquid and afloat. In this case, retail investors would see their transaction cost increases, as they would now have to pay for access and clearing fees associated with trading in displayed liquidity centres. However, in the long term, it is hoped that this rule will lead to tighter spreads and superior market quality. Institutional investors would be unaffected by this rule, as they can continue to trade large blocks of shares with internalisers. However, one may argue that if internalisers do not have enough liquidity, as they have been prohibited from trading with retail investors, they may now lack the capacity to fill the large orders from institutional investors. If only a small fraction of a large order is filled by internalisers, the institutional investors risk exposing their trade intention in which case they might switch to using order execution algorithms that slice the large blocks of orders into smaller orders and search for liquidity in displayed and undisplayed liquidity centres. If this is the case, it negates the original purpose of a dark pool for institutional investors to efficiently trade large blocks of shares. In the longer term, some undisplayed liquidity centres would cease to function or will be forced to convert to another type of trading venue.

5.4. Dark pool quote threshold

The dark pool threshold sets the maximum amount of trading volume that could be kept in undisplayed trading venues or dark pools away from the public market. However, if the proposal applies to dark pools with more than one liquidity providers, internalisation dark pools would be unaffected if the incoming orders are exposed to only one counterparty. A negative side effect of the current proposal is that once the dark pool quote threshold is breached for a particular stock, institutional investors with a large block trading demand for that stock could no longer take shelter inside the dark pool as the dark pool operator must now disclose the quote details including the dark pool's decision to stop trading on that stock. Hence, the threshold rule might inadvertently discourage institutional shareholding and make equity financing of corporations more difficult.

6. The future

There is a general consensus that regulators should increase their efforts in tackling the opaque practices of internalisation which has been diverting order flows from public to private markets, and so denying all market participants fair access to information. When internalisation combines with information arbitrage, it quickly leads to expensive and less efficient markets. Further, recent financial crises have showed that lack of transparency has the potential to damage the integrity of the entire global market system. Both regulators and industry participants are concerned that the current situation is unviable, and have started a discussion on potential changes in capital market regulations to restrain internalisation. Potential regulatory measures have been discussed in detail in this report. In addition, there are also concerns that recent proposals may make matters worse. Further, we expect that the upcoming change in EU capital market regulation, in the form of MiFID II, will provide more objective criteria for a trading firm to be classified as a Systematic Internaliser. At the moment, only a handful of firms operate as Systematic Internalisers in the EU, while other hybridized internalisation trading platforms bypass the strict quotation requirement and call themselves as "broker crossing networks". The current version of MiFID II indicates that the new trading venue category, named Organised Trading Facility (OTF), might fill the gap in the current regulation. An OTF will be defined as *"...Any system or facility which is not a Regulated Market or Multilateral Trading Facility, operated by an investment firm or a market operator in which multiple third party buying and selling interests in financial instruments are able to interact in*

the system in a way that results in a contract.”. As the current version proposes, Systematic Internaliser will be unable to operate as Organised Trading Facility.

At the time of writing (January 2012), the capital markets are witnessing a growing trend in algorithmic and electronic trading, and it appears safe to conclude that this trend will continue to grow in the near future and might result in a tiered market environment for trading. On the one hand, we have retail and institutional investors who feel that their orders are being preyed upon by traders at exchanges with superior technology and faster access to data. These investors prefer to trade in undisplayed venues where they could take shelter and avoid being out-run by faster traders. On the other hand, market ecosystem means high frequency traders will take over the role of modern market makers, utilizing superior technology and sophisticated trading algorithms to manage their books as well as making profit for themselves. Internalisation is considered as a safe haven where investors can access hidden liquidity, and execute trades without information leakage and price impact. Yet, as we have demonstrated in this report, a high level of internalisation and the lack of transparency in capital market trading will lead to the deterioration of market quality. If the market participants continue to gravitate towards undisplayed liquidity venues, we will see more proposals to restrain internalisation practices. Elimination of internalisation on the other hand would also result in higher transaction costs for end users and less efficient markets. Instead of focusing solely on more new regulations we believe it is important to understand the reasons for investors’ unwillingness to trade at displayed liquidity centres, as well as the brokers drive to internalise trades.

7. Summary and recommendation

This report discusses the impact of internalisation on quality of market structure. An introduction to internalisation has been presented in the context of modern market environment. Theoretical and empirical studies of internalization’s impact on market quality have also been discussed. Further, we have assessed the risks associated with internalisation within the current market structure and demonstrated that excessive internalisation harms overall market quality. We have presented four regulatory measures that have been discussed in the context of internalisation: “trade-at” rule, sub-penny pricing for liquidity providers, minimum size requirement and dark pool threshold. The “trade-at” rule is intended to discourage undisplayed execution of orders at public quotes by requiring the operator in a dark pool to provide economically significant price improvement. Sub-penny pricing for liquidity providers aims to allow a privileged group of traders within exchanges to post quotes in increments of less than a fraction of a cent. The minimum size requirement mandates that internalisers would be allowed to match orders exceeding certain size requirement. Finally, the dark pool quote threshold sets the maximum amount of trading volume that is allowed to be kept in undisplayed trading venues. This rule would not affect internalisation platforms with only one executing counterparty. We have discussed costs, risks and benefits of each of the proposed measures and assessed their potential impact on market participants. While each measure has its merit in improving the current market structure, we feel that it would be beneficial to consider combining certain proposed measures. In particular, a viable option may be to combine the “trade-at” rule and minimum size requirement – retail investors would receive price improvement for undisplayed execution, while the internaliser would be unburdened by such a restriction when executing a large block of shares for an institutional investor.

References

- Battalio, R., J. Greene, and R. Jennings, (1997), *Do Competing Specialists and Preferencing Dealers Affect Market Quality?*, Review of Financial Studies 10, 969-994.
- Battalio, R., J. Green, and R. Jennings, (1998), *Order flow distribution, bid-ask spreads, and liquidity costs: Merrill Lynch's decision to cease routinely routing orders to regional stock exchanges*, Journal of Financial Intermediation 7, 338-58.
- Buti, S., Rindi, B., and Werner, I.M., (2010), *Diving into Dark Pools*, Working Paper, The Ohio State University
- Buti, S., Rindi, B., and Werner, I., M., (2010), *Dynamic Dark Pool Trading Strategies in Limit Order Markets*, Working Paper
- Chakravarty, S. and Sarkar, A., (2002). *A model of broker's trading, with applications to order flow internalization*, Review of Financial Economics, 11(1), 19-36
- Chordia, T., and Subrahmanyam, A., (1995), *Market Making, the tick size, and payment-for-order flow: Theory and Evidence*, Journal of Business 68, 543-575
- Chung, K., C. Chuwonganant, and D. T. McCormick, (2004), *Order preferencing and market quality on NASDAQ before and after decimalization*, Journal of Financial Economics 71, 581-612.
- Chung, K.H., Chuwonganant, C., McCormick, D.T., (2006), *Does internalization diminish the impact of quote aggressiveness on dealer market share?*, Journal of Financial Intermediation 15, 108-131.
- D'Antona Jr., J., (2010), *Nasdaq Frets Over Internalization*, Traders Magazine Online News [online] Available at: <<http://www.tradersmagazine.com/news/nasdaq-internalization-dark-pools-level-direct-edge-sec-105265-1.html>> [Accessed on 1 November 2011]
- Degryse, H., Van Achter, M., and Wuyts, G., (2008), *Shedding Light on Dark Liquidity Pools*, TILEC Discussion Paper No. 2008-039
- Easley, D., Kiefer, N., M., O'Hara, M., (1996), *Cream-Skimming or Profit-Sharing? The Curious Role of Purchased Order Flow*, Journal of Finance, American Finance Association, 51(3), 811-33,
- Gramming, J. and Theissen, E., (2005), *Is Best Really Better? Internalization in Xetra Best*, Working Paper
- Gresse, C., (2006), *The Effect of Crossing-Network Trading on Dealer Market's Bid-Ask Spreads*, European Financial Management 12, 143-160
- Hansch, O., N. Y. Naik, and S. Viswanathan, (1999), *Preferencing, internalization, best execution, and dealer profits*, Journal of Finance 54, 1799-1828.
- Larrymopre, N.L. and A. Murphy, (2009), *Internalization and Market Quality: An Empirical Investigation*, Journal of Financial Research, 32, 337-363

- Kam, T., V., Panchapagesan, V., Weaver, D.G., (2003), *Competition among markets: The repeal of Rule 390*, Journal of Banking and Finance, 27(9), 1711-1736
- Nanex Llc., (2011), *HFT Breaks Speed-of-Light Barrier, Sets Trading Speed World Record*, [online] Available at <<http://www.nanex.net/Research/fantaseconds/fantaseconds.html>> [Accessed 1 November 2011]
- Primex Trading N.A. Llc., (2001), *Primex Auction System*, Primex Holdings LLC.
- Rosenblatt Securities Inc., (2010), *Let There Be Light*
- Schapiro, L. M., (2010), *Strengthening Our Equity Market Structure*, US Securities and Exchange Commission Economic Club of New York, New York
- (2004), *The Markets in Financial Instruments Directive (MiFID)*
- Fidessa, (2011), *Fragulator*, [online] Available at: <<http://data.fidessa.com/stockffi2>> [Accessed 26 October 2011]
- Traders Magazine, (2010), *NYSE Tries Again for Sub-Penny Pricing*, Traders Magazine Online News, [online] Available at: <<http://www.tradersmagazine.com/sta-conference/news/sub-penny-pricing-109500-1.html>> [Accessed 1 November 2011]
- US Securities and Exchange Commission, (2010), *Concept Release on Equity Market Structure*
- US Securities and Exchange Commission, (2010), *Findings Regarding the Market Events of May 6, 2010*
- US Securities and Exchange Commission, (1998), *Regulation of Exchanges and Alternative Trading Systems*
- Weaver, D., (2011), *Internalization and Market Quality in a Fragmented Market Structure*, Working Paper
- Ye, N., (2010), *Execution and Market Share of Crossing Networks*, Working Paper, University of Illinois

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URN: 12/1071