Semi-transparency, dealership market, and foreign exchange market quality

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ABSTRACT

This paper examines the effects of a semi-transparency event, the introduction of the electronic trading system (EBS), on the market quality of a typical dealership market – the FX market. We find that increasing transparency leads to smaller quote disagreement among dealers and higher trading volume, but the beneficial effects are bigger for uninformed dealers than informed dealers. We also find that information efficiency improves overall in the semi-transparent system; however, informed dealers are found to quote less aggressively in the more transparent market. We conclude that semi-transparency raises market quality in general, but that it is the uninformed dealers who benefit more from this increased quality.

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1. Introduction

Transparency is a fundamental issue in the design and regulation of financial markets. Since the information structure and liquidity providing mechanism are different in the centralized order driven auction market and the decentralized quote driven dealership market, the impact of changing transparency on market quality should be different in different market structures as well. For the dealership market, the theoretical model of Duffie, Garleanu, and Pedersen (2005) suggests that increasing market transparency should lead to higher market liquidity if there are multiple market makers. Recognizing that some of these dealers have private information, Golosov, Lorenzoni, and Tsyvinski (2008) find that uninformed dealers can learn the state of the world from informed dealers through transactions with them, but this comes at a cost (or rent for informed dealers), which can be reduced by increasing transparency. In general, these studies suggest that greater transparency should lead to improved market quality, but it benefits uninformed dealers at the expense of informed dealers.

Furthermore, depending on how much information is revealed, the degree of transparency can be quite different. Intuitively, in a completely transparent market, informed dealers would hesitate to trade to avoid the loss of their information advantage. Conversely, in a totally opaque market, uninformed dealers will be taken advantage of, and are thus unwilling to trade. Hence, there is a trade-off

between transparency and market quality, and an optimal quality should occur at some semi-transparency level. This view has been supported by theoretical papers such as Madhavan (1995), Pagano and Roell (1996), Lyons (1996) and Dumitrescu (2008).

Empirical examinations of changing transparency on market quality are not lacking. Some of the existing research, however, focuses on the centralized market. For example, Boehmer, Saar, and Yu (2005) examine the effect of increasing pre-trade transparency in limit order book by introduction of the OpenBook service on the New York Stock Exchange (NYSE). Madhavan, Porter, and Weaver (2005) study greater pre-trade transparency by publicly disseminating its limit order book in Toronto Stock Exchange increases in 1990. Other related research does focus on the dealership market, but examines full transparency events (i.e. revealing both quote and order book pre-trade or both transaction price and quantity post-trade). Chung and Chuwonganant (2009), for instance, examine the impact of revealing limit order book brought by SuperMontage on NASDAQ. Bessembinder, Maxwell, and Venkataraman (2006) examine the initiation of the Trade Reporting and Compliance Engine (TRACE) reporting system, which reveals full post-trade transaction information, on the corporate bonds market. Finally, these studies do not examine the effect on different dealers separately.

The existing empirical examinations of semi-transparency are limited to a few experimental studies which are not equivalent to real market data. Moreover, different studies draw conflicting conclusions. Bloomfield and O'Hara (1999) use experimental results to conclude that semi-transparency (quote disclosure only) has little effect on

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price efficiency while only full-transparency (both quote and order disclosure) leads to better market quality. In contrast, Flood, Koedimk, and Mahieu (1999) report that a semi-transparent market leads to narrower spreads, higher volume, and slower price discovery.

Thus, no research to date has empirically tested the theoretical conclusions introduced above with regard to the impact of semi-transparency on a dealership market.[1] The experimental research also draws mixed conclusions. This paper adds to the literature by studying a semi-transparency event in a dealership market and specifically focusing on its impact on different types of dealers in terms of multiple aspects of market quality.

Through the mid-1990s, the foreign exchange interdealer market primarily relied on a bilateral phone-based trading platform, in which access to market information was very limited. Two main electronic systems, Reuters system and EBS, were introduced to the market in 04/1992 and 09/1993, respectively. The electronic systems reveal the best live bids and offers available in the market before trade and publish the transaction price after trade, which greatly increases market transparency. However, the systems do not reveal the limit order book before trade and transaction quantity after trade.[2] In this sense, the FX market only has pre-trade and post-trade semi-transparency. The impact of pre-trade and post-trade semi-transparency on market quality can therefore be determined by comparing the market qualities before and after the use of these electronic systems.

To examine the impact, we obtain the data of tick-by-tick spot quotes[3] for the Deutsche Mark–U.S. Dollar exchange rates around the introduction of the electronic systems. Among the two electronic systems, the EBS is the primary liquidity source for EUR/USD (DEM/USD before 1999).[4] Ding and Hiltrop (2010) also confirm that the introduction of the EBS generated much more significant impact on bid-ask spreads for DEM/USD than that of Reuters system. Accordingly, this paper only focuses on the EBS to test our hypotheses.

There are multiple aspects of market quality. We follow Kaul and Sapp (2009) as well as experimental hypothesis proposed by Bloomfield and O'Hara (1999) and Flood et al. (1999) to focus on volatility, volume, and price efficiency to show the impact of the semi-transparency event. We find that the semi-transparency leads to lower volatility and higher trading volume, and small dealers receive more beneficial effects than big dealers. We also find that the semi-transparency increases information efficiency. However, informed dealers are found to quote less aggressively in the more transparent market. Overall, the semi-transparency raises market quality, although uninformed dealers benefit more than informed dealers from this increased quality.

These empirical findings support theoretical conclusions that semi-transparency improves market quality by Lyons (1996) and Dumitrescu (2008), and also are consistent with experimental results obtained in Flood et al. (1999). These results also support the claim that greater transparency benefits uninformed dealers at the expense of informed dealers in the decentralized market, as suggested by Duffie et al. (2005) and Golosov et al. (2008).

The rest of the paper is organized as follows: Section 2 surveys the literature and proposes general hypotheses to test; Section 3 introduces the data; market volatility, volume, and information efficiency

are tested in Sections 4, 5, 6, respectively; Section 7 tests price discovery efficiency; Section 8 concludes.

2. Literature review and hypothesis development

Market transparency has multiple dimensions. The timing of information disclosure differentiates pre-trade and post-trade transparency. The content of information revealed differentiates quote, order, trade, execution quality, and identity transparency. Furthermore, the impacts of changing transparency might be different for centralized auction market and decentralized dealership market. Accordingly, our literature survey follows these dimensions.

We survey theoretical papers first. Models based on auction market give mixed implications. Madhavan (1996) shows that greater transparency in order flow lowers price volatility and improves market quality in a sufficiently large market. Pagano and Roell (1996) also show that greater transparency in order flow results in lower trading costs for uninformed traders, although not for all trade sizes. In contrast, Baruch (2005) shows that greater transparency might not be good for everyone. He finds that traders who demand liquidity are better off when limit order book is open while liquidity suppliers are better off when the book is closed. Similarly, Dumitrescu (2008) suggests that an intermediate level of transparency can improve market performance.

For the dealership market, general theoretical studies of information and market quality suggest that the market benefits from increasing transparency but the benefit varies for different dealers. Specifically, Duffie et al. (2005) find that market liquidity is higher if investors can more easily find other investors and have easier access to the dealers if there are multiple market makers. Considering that a lot of information is private and only available to certain dealers in such a market, Golosov et al. (2008) argue that uninformed agents can learn all the useful information in the long run through transactions with informed dealers and dealers with private information receive rents. Thus, increasing transparency can reduce the cost that uninformed dealers have to pay to learn the state of the world.

Theoretical studies specifically focusing on the transparency and market quality of the dealership market find, fairly consistently, that semi-transparency improves market quality. Biais (1993) predicts that pre-trade transparency increases both market efficiency and liquidity. However, Madhavan (1995) documents the existence of equilibrium where dealers choose not to disclose trades, because they profit from the associated reduction in price competition. These dealers will also post narrower spreads at the initiation of trading in order to attract informative order flow. Similarly, Lyons (1996) suggests that disclosure of order flow will make informed dealers lose their information advantage, thus these dealers would hesitate to trade, which impedes market liquidity. He suggests semi-transparency as an optimal level for market liquidity. Naik, Nueberger, and Viswanathan (1999) provide another trade-off between transparency and market liquidity. They show that greater transparency can reduce inventory holding costs (quantity risk), but increase price revision risk. The nondisclosure of the first-stage trade details allows the market maker who receives the order first to profit from the information that is learned.

Existing empirical research on the auction market are as inconclusive as the theoretical predictions. Boehmer et al. (2005) examine the effect of increasing pre-trade transparency by the introduction of OpenBook service on the New York Stock Exchange (NYSE). The OpenBook service reveals limit order book in the market and hence increases pre-trade order transparency. They show that greater pre-trade transparency led to higher liquidity and greater informational efficiency of price. Zhao and Chung (2007) examine the effect of public disclosure of execution quality on the spread and depth of NYSE, AMEX, and NASDAQ stocks and show that greater post-trade transparency led to higher liquidity. Theissen (2003) finds that increasing

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[1] Most recently, Ding and Hiltrop (2010) examine a semi-transparency event on a dealership market. However, they only focus on spread, and several important theoretical hypothesis proposed in the literature, especially the ones related to price discovery, are not examined by the paper.

[2] EBS started providing post-trade information in 2007 after it acquired Traiana, which was a platform displaying post trade information. It did not have such a transparency when it was launched in 1993.

[3] The data are indicative quotes from Reuters FXFX. The issues of using such data in the test will be addressed in Section 3.

[4] The qualitative and statistical evidence can be found from: http://en.wikipedia.org/wiki/Electronic_Broking_Services and survey report http://www.e-forex.net/Files/surveyreportsPDFs/Celent%20FX%20report.pdf.