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Competition between exchanges: A research agenda

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ABSTRACT

This paper describes open research questions related to the competition and market structure of financial exchanges and argues that only a combination of industrial organization and finance can satisfactorily attack these questions. Two examples are discussed to illustrate how the combination of these two approaches can significantly enrich the analysis: the "network externality puzzle", which refers to the question of why trading for the same security is often split across trading venues, and the impact of the multi-sided character of financial exchanges on pricing and profitability.

1. Introduction

The financial exchange industry has undergone profound changes in the past 20 years. On the technological front, advances in telecommunications and computer power have changed the economics of the business entirely by offering new ways to make markets, greater speed of dissemination of financial information, greater access to exchanges from anywhere in the world, new interfaces allowing traders to route their orders where most profitable and algorithmic trading. On the governance front, most exchanges have moved from a member-owned structure, where users of the exchange were also its shareholders, to a for-profit structure. Many have eventually sought to issue shares publicly. Finally, the industry has experienced an unprecedented wave of entry of new platforms and, at the same time, an unprecedented wave of mergers.[1]

As the industry is in flux and it is unclear whether the current organization is permanent or transitional, policy-makers must take a stance on merger applications and new regulations to improve the performance of financial markets. For many of these decisions, they combine institutional and industry knowledge with the "standard industrial organization toolkit" of industry analysis.

In this paper, we argue that this toolkit is not sufficient to answer questions such as, for example, the likely or even optimal market structure for the financial exchange industry. There are important gaps in our understanding. Financial exchanges are special because their microstructure is part of their business models. Financial markets are special because of the heterogeneity of trading motives and because of the way in which these markets create value. No "off-the-shelf" IO model integrates these aspects in a way that is useful for policy. The finance literature is of no greater help because it tends to narrowly focus on the trading decision, at the cost of abstracting from the economic implications of the other events surrounding this transaction, and because it has largely taken market structure as fixed and exogenous.

We illustrate these points by focusing on the way exchanges compete for trading. Specifically, we first argue that the combination of finance microstructure and industrial organization can significantly enrich the debate on the "network externality puzzle" (Madhavan, 2000), i.e. why trading in one security does not aggregate in one place. We then discuss how viewing exchanges as multi-sided markets can generate new insights on their price structure. On both topics we suggest questions for further research.

This paper is organized as follows. Section 2 provides a brief overview of the workings of the exchange industry. Section 3 summarizes the lessons from research in finance on the competition between exchanges. Section 4 revisits the "network externality puzzle." Section 5 discusses the

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[1] Just to name a few recent mergers or acquisitions: the InterContinental Exchange and the International Petroleum Exchange (2001); Euronext and LIFFE (2002); NYSE and Archipelago (2006), Euronext (2007) and NYMEX (2008); the London Stock Exchange and Borsa Italiana (2007); Eurex and ISE (2007); CME and CBOT (2007), and NYMEX (2008); Toronto and Montreal Stock Exchanges (2008); NASDAQ and the Philadelphia Stock Exchange and OMX (2008).

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competition implications of exchanges' multi-sidedness. Section 6 concludes.

2. Financial markets: the basics

In this section, we provide a brief overview of how exchanges and market platforms work for the reader who is not familiar with this industry.

To start with, it is useful to recall that the ultimate goal of financial markets is to help individuals, firms and governments manage their inter-temporal inflows and outflows of cash and assets. They do so by aggregating information (so that economic agents can properly optimize) and reducing transaction costs.

2.1. Securities and trading motives

Because financial circumstances are almost as diverse as individuals, there is a very large set of potential financial transactions. For the purpose of this paper, we will focus on two classes of securities: stocks and derivatives. Stocks are issued by firms in exchange for capital. They represent ownership shares in the company. Their value depends on the profitability and ultimate health of this company. Derivatives are financial instruments whose value depends on the value of other more basic instruments or products. For example, a call option on a stock is a contract that gives the holder the right to buy that stock at a given price, within a given time frame. A future on a stock is a promise to buy or sell that stock at a given price and at a given time.

Each security has its "natural" traders: those economic agents whose financial needs it addresses. Thus, for example, derivatives will attract investors who need to hedge a position in the underlying instrument or product. But trading in any security will also attract traders seeking profit opportunities, independently of their intrinsic interest for this security. Speculators trade on the basis of their forecasts about the future movements of prices: they take positions hoping that prices will move in a direction favorable to them. Arbitrageurs are traders who speculate on the price comovements between similar securities.

2.2. Exchanges and other trading venues

Stock exchanges were created in the 18th century to facilitate trading in securities by centralizing transactions and setting rules for how traders reach an agreement (derivatives exchanges emerged in the 1970s). Centralization pools liquidity and makes it easier to find a counterparty.

Each exchange has its own rules covering which securities can be traded, who can participate, and what mechanism is used to match supply and demand and determine the transaction price. There are two broad categories of trading mechanisms: quote driven and order driven. Quote-driven markets are markets where market-makers compete by posting prices at which they commit to buy and sell a given security. Buy and sell orders never interact with one another in a quote-driven market. Instead, buyers and sellers trade with the market-maker who makes a profit from the difference between the bid price and the ask price. This compensates market-makers for the risk they take by holding inventories of the traded security. Market-makers revise their quotes periodically in order to reflect market conditions, the state of their inventory, and competition with other market-makers. Order-driven markets are mechanisms where buy and sell orders interact directly. The price adjusts to changes in the ratio of buy and sell orders. Most electronic markets fall into this category. Typically, traders can place conditions on the execution of their orders. A market order is an unconditional order to execute at the best current available price. A limit order is an order to execute a transaction if the price reaches at least a certain level (for a sell order) or is below a certain level (for a buy order). If these conditions are not satisfied, the order is kept in a so-called "limit order book" until they are met or the trader cancels the order.

Stock exchanges have traditionally had three sources of revenues: transaction fees, trading data sales and the listing fees charged to the companies whose stocks are traded on the exchange.[2] Because derivatives exchanges design the securities for which they organize markets, instead of organizing a market for existing securities, they do not get any listing fees. There is much heterogeneity however across exchanges as to the relative importance of these sources of revenues. For example, some exchanges focus on trading services and even organize markets for stocks that they do not list. The transaction fee component of their revenues tends to be bigger and the listing fee component smaller. Others only organize markets for listed companies and are able to extract higher listing fees.

In addition, exchanges have recently tapped new sources of revenues. First, some exchanges have vertically integrated into post-trading (see Section 2.3. below). Second, with the emergence of electronic trading, the provision of technology services such as electronic trading platforms has become a source of revenues for some exchanges.

At the end of the 1990s, electronic platforms, initially targeted at institutional investors, emerged as an alternative to traditional exchanges to trade stocks. These platforms, which became known under the name of ECNs (electronic communication networks) concentrated on trading services and did not have the listing and regulatory functions of exchanges. As early as 1996, regulation in the US sought to integrate these ECNs into the rest of the trading infrastructure. In particular, ECNs in the US can choose to be regulated as broker-dealers or as an exchange (many have chosen this second option). In Europe, the entry of ECNs in trading services was greatly deregulated with the implementation of the Markets in Financial Instruments Directive (MiFID) in 2007.

2.3. Post-trading: clearing and settlement

Once a trade has been executed on an exchange, the clearance and settlement process begins. The details of the trade are sent to a clearing house. Clearing houses register and aggregate trades to establish who owes what to whom. Netting–the process by which net positions of market participants are derived by summing up all their buy and sell orders–reduces settlement values and transaction costs dramatically. Clearing houses also offer other services, such as acting as central counterparty (the buyer to every seller and the seller to every buyer). By this process, a clearing house replaces the original bilateral contract by two bilateral contracts and guarantees the trade.

Derivatives are special among securities because no money is exchanged at the time of transacting. Delivery and payment take place at maturity. Because economic conditions may have changed between the time of the transaction and the maturity, ex-ante beneficial trades are usually no longer ex-post beneficial for one of the parties. To remove the resulting incentives to default, clearing houses require that derivatives traders deposit margins as collateral. These margins are updated daily in a way that eliminates traders' incentives to default.

The final step in the transaction is its settlement. Settlement is the process by which the legal ownership in the traded asset is transferred. It is carried out by a depositary. The depositary acts as a "securities bank" that holds physical securities in custody and holds accounts of their ownership.

As suggested above, some exchanges are vertically integrated into most, if not all, post-trading activities. Diversity rules again, however. Any configuration between the full "silo model" where an exchange is

[2] In the traditional model, exchanges only organize markets for companies that apply for listing and satisfy the criteria for listing.