Contemplating Electronic Mediation: What Makes CBOT Face-to-Face Trading Work?

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ABSTRACT
Designing a computer-mediated communication system to replace a face-to-face (f-2-f) process is a complex undertaking. It is necessary to determine which of the behaviors are critical to the operation of the process and which are inefficiencies to eliminate. This requires that behaviors be understood in terms of their *intent or function* within the goal structure of the process. We explore this issue for a face-to-face futures market whose management is contemplating an electronic version of the market. Our examination of the intent of traders' behavior raises two important issues that will need to be addressed in any electronic re-design. First, can the social fabric that enables collaboration to occur under conditions of competition and cooperation be supported in an electronic medium? Second, will the removal of inefficiencies inherent in the f-2-f process by a new electronic system destroy the very basis for the operation of the market?

Keywords
Adversarial collaboration, accountability, behavioral intent, CBOT, commons problem, cooperation, and social cues.

INTRODUCTION
Much has been written about difficulties of designing an electronically mediated version of an existing, unmediated face-to-face process [3,4]. It is generally agreed that the design task is not to necessarily replicate the functionality afforded by the face-to-face situation, but to support the purpose or intent served by the functionality [3]. Understanding the intentions behind the behaviors enables the designer to uncover the factors that are critical to the functioning of the process under study.

Additional complexity for collaborative applications arises from the presence of multiple stakeholders who may have partially competing goals. A generally acceptable solution must be based on understanding the roles played by each stakeholder and the contribution of individuals' goals to the overall goal structure of the task. Solutions acceptable to all stakeholders are difficult to design, in part, because the costs and benefits of a solution may not be evenly distributed among the stakeholders [4]. Also, this allocation may be changed by electronic re-design [4].

THE CHICAGO BOARD OF TRADE
We examine these issues as part of an investigation into the requirements for an electronic market to replace current f-2-f trading at the Chicago Board of Trade (CBOT). CBOT[1] is an open-outcry market where financial products called futures contracts are traded by participants who are physically co-present. Management of the CBOT Corporation is concerned that the physical nature of the f-2-f market will limit its growth and hence its long-term viability. Availability of space limits the number of products that can be traded on the exchange because space must be allocated to accommodate all those interested in trading each product. Physical co-presence of traders limits activity to individuals who are in the physical vicinity of the CBOT exchange. CBOT management is considering an electronic version of the market as a way of eliminating limits on the number of products and potential participants and thus the number of trades that might take place.

A Shared Commons Problem
We examine the implications of such a step through an analysis of the behavior of the CBOT traders. Our discussion is based on a two-day visit to the CBOT that included interviews with various participants and observations of trading behavior. We interviewed eight traders who trade exclusively in f-2-f mode, two traders who also participate in electronic markets, representatives of one firm that employs traders and a commentator who writes a newsletter for investors.

We can view f-2-f trading that occurs at CBOT as a variant of adversarial collaboration [2]. The traders have individual goals of capturing the profitable trades available in the market. This puts them in conflict with other traders who are trying to do the same. However, there must be a certain baseline of liquidity, that is, the ability of buyers to find sellers and for sellers to find buyers, in order to keep the market thriving. Thus, while traders are adversaries in that they are competing with each other for profitable trades, they must be collaborators in the broader goal of making

[1] For general background on futures markets and the CBOT in particular, see http://www.cbot.com.

the market liquid. These dynamics make trading in the CBOT market an instance of the shared commons problem [5]. That is, this is a case where if individuals narrowly focus on their own self-interest (i.e., only making profitable trades), the shared entity that enables their personal benefit (i.e., the liquid market) will be destroyed. Thus, individuals must balance their personal self-interest with that of the larger group and cooperate with their adversaries.

The Dynamics of Face-to-Face Trading

We identified several factors that create a social situation in which traders contribute to the common good even when their short-term personal interests are not served.

According to our informants, 75% of the trades are either marginally profitable or unprofitable. We learned through our interviews that traders exert peer pressure in an attempt to cajole other traders to participate in trades that, while not resulting in their personal profit, add to the liquidity of the market. The consensus opinion among our informants is that the opportunity to profit comes with a responsibility to keep the market going for others even at a cost to oneself.

Two factors are necessary for promoting cooperation through peer pressure to operate. First, the social situation must be such that people have the opportunity to apply pressure to impact the behavior of others. Second, a mechanism must exist to enforce the desired response.

Several aspects of the f-2-f situation contribute to enabling peer pressure to be exerted. First, because the traders are part of a stable group with opportunities for future and repeated interaction, there are consequences to one's behavior. Second, slow times in the trading day offer many opportunities for informal social interaction that promote the strengthening of bonds. In addition to purely social interaction, traders use these as opportunities to develop a network of trusted informants on issues related to their trading behavior. Third, many of the traders have relationships that predate their trading interactions. Many traders have been introduced to their career through friends or relatives because this is a family-oriented profession that depends on apprenticeship rather than formal training. These factors result in social dynamics that increase the chances that peer pressure will exist and be applied.

While many of these factors have also been identified as increasing the likelihood that people will cooperate [1], the exertion of peer pressure would not be as effective without the operation of a second, more tangible way of attaching consequences to traders' behavior. This factor is the ability to allocate trades strategically. In a typical trade situation, a trader has a quantity of contracts to sell at a specified price. The trading situation gives him access to other traders who wish to purchase some or all of these contracts at the offered price. Since the seller selects which of the many potential buyers to trade with, he has the power to attach consequences to the aspiring buyer's behavior. Specifically, traders told us that they allocate trades in reciprocity to the other's previous behavior and as rewards or punishments for contributing or not contributing to market liquidity. Strategic allocation of trades is possible in an open outcry system because exact dating of trades not possible.

What Will Be the Impact of Electronic Trading?

In moving to an electronic system where requests to buy and sell are time-stamped, the opportunity to make trades strategically is eliminated. Trades are being allocated according to some rule based on a trader's position in the time-ordered queue of those desiring trades. The critical question this raises is whether eliminating the power to reward and punish behavior will eliminate the ability to create liquidity in the electronic market. In the f-2-f situation, the intent of the human allocation of trades is believed to be crucial to the functioning of the f-2-f process. CBOT is currently experimenting with after-hours electronic trading. For the past year, electronic trades have been 10% of f-2-f trades. Further analysis is required to determine why this is so low.

With peer pressure being eliminated as a means to facilitate cooperation, what social conditions must be supported and what form of technology facilitated social regulation will emerge? In studies of other bilateral online exchanges, Kollock has pointed to the importance of a persistent identity and accountability [6]. Can the social cues that are introduced be made sufficiently powerful to enable social controls to support contributions by participants to the common good and thus continue a high degree of liquidity? Alternatively, perhaps some other means may be introduced to support market liquidity that will make this change unimportant. In this case, traders will need to accommodate to the new order.

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