Adverse selection costs, trading activity and price discovery in the NYSE: An empirical analysis

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Abstract

This paper studies the role that trading activity plays in the price discovery process of a NYSE-listed stock. We measure the expected information content of each trade by estimating its permanent price impact. It depends on observable trade features and market conditions. We also estimate the time required for quotes to incorporate all the information content of a particular trade. Our results show that price discovery is faster after risky trades and also at the extreme intervals of the session. The quote adjustment to trade-related shocks is progressive and this causes risk persistency and unusual short-term market conditions.
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1. Introduction

A central issue of the financial microstructure literature is the analysis of the information content of trades. From a theoretical viewpoint, the stochastic process of prices should be a function of the trading process. Market participants learn from the sequence of trades, update their beliefs, and this causes prices to move. Since the behavior of the stochastic process of prices is behind most of the questions studied in financial economics, it becomes fundamental to understand this learning mechanism.

As the literature shows, every feature of the trading process which is correlated with the value of the asset, may provide information to market participants. For example, in Easley and O'Hara (1987), the trade size is what provides information, but in Easley and O'Hara (1992) is the timing of trades. From an empirical perspective, there is no clear consensus about what actually drives the relation between trades and prices. For Jones et al. (1994) is the occurrence of transactions per se, and not their size, what contains relevant information for pricing securities. However, Huang and Masulis (1999) and Chan and Fong (2000) conclude that trade size contains no trivial information. Dufour and Engle (2000) report that both the trade duration and the trade size are informative. Finally, Kempf and Korn (1999) report a non-linear relationship between the trade size and the price impact. These conflicting findings suggest that trade size could be an unsatisfactory indicator of the information risk and that traders learn from more complex interactions of several trade features.

A related topic deals with the estimation of the theoretical components of the bid–ask spread. Adverse selection costs (Bagehot, 1971) are usually characterized as the permanent impact that a trade-related shock produces on the equilibrium value of the stock. Current methods are based on structural models with an exogenous trading process characterized either by a buy–sell indicator (e.g., Huang and Stoll, 1997) or by the trade size (e.g., Glosten and Harris, 1988). However, there are serious concerns about the ability of these models to measure adverse selection costs. Recently, Van Ness et al. (2001) examine the relation between adverse selection costs estimators and corporate finance indicators of information asymmetry. They conclude that structural models perform weakly. The results are similar to the ones obtained using the posted spread and therefore bring into question the added benefit of these theoretical measures. Hasbrouck (1991a,b) introduced an alternative reduced-form approach where the permanent impact of a trade can be estimated through the impulse-response function (IRF) of a vector autoregressive (VAR) model for quotes and trades. In the context of an order-driven market, de Jong et al. (1996) study the price impacts of trading using two alternative specifications: the Glosten (1994) model and the VAR model. Once again, in this context the information content of trades is characterized only by the trade size. They show that the estimates of the average adverse selection costs based on the Hasbrouck's model are twice as large of those of the structural model. The reason for the different price effect estimates is that structural models assume that prices disseminate immediately all the information content of a trade. On the contrary, the VAR model accounts for the dynamic impact of trades. We conjecture that if the quote adjustment to trade-related shocks is progressive, informed traders would try to profit from this transitory erroneous