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Time-varying bid–ask components of Nikkei 225 index futures on SIMEX

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Abstract

This paper investigates the time-varying behavior of the bid–ask spread components of Nikkei 225 index futures contract on the Singapore International Monetary Exchange (SIMEX). Using the Huang and Stoll [Journal of Financial Economics 41 (1996) 313] trade indicator model, intraday transaction data is analyzed for the period 1993 to 1996. The empirical results support the presence of a large inventory holding cost (63.39%) and a smaller adverse information cost (3.70%). Time-varying analyses show an L-shaped pattern of the adverse information costs and reversed U-shaped pattern of the inventory holding costs during a day. Moreover, for the last 15 min when only the SIMEX is open (Tokyo Stock Exchange (TSE)-nontrading period), there is a relatively large portion of adverse information cost (7.79%). © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

Liquidity is one of the most important characteristics for an organized financial market. To maintain liquidity, many organized exchanges use market makers who stand ready to buy or sell whenever the public wishes to sell or buy. The bid–ask spread is not only a major source of revenue for market makers, but also the most important quantity that market makers control in their interactions with other market participants. Consequently, the bid–ask spread has long been of interest to academic researchers as well as traders and

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regulators, and it has been the biggest area of market microstructure studies. Since Demsetz (1968), many theories of the bid–ask spread have been developed. Market microstructure theory attributes the bid–ask spread to three primary cost components: order processing, inventory holding and adverse information costs. Order processing costs consist of the basic setup and operating costs of trading and bookkeeping. Inventory holding cost is related to the opportunity and carrying cost of undesired inventory, which is subject to price risk. Adverse information cost arises because some investors are better informed about a security's value than market makers. Since market makers cannot distinguish the informed investor from the uninformed investor, they are forced to enlarge the spread to protect themselves from possible losses arising from transactions with informed traders.

Up to now, two classes of statistical models have been developed to decompose the components of bid–ask spread. One is the covariance-spread model. The seminal paper by Roll (1984) makes an inference about the bid–ask spread, which is modeled according to the serial covariance properties of observed transaction prices. Other covariance-spread models include Choi et al. (1988), Stoll (1989), and George et al. (1991). Another class is the trade indicator model, which was originally developed by Glosten and Harris (1988). This category includes Madhavan et al. (1997). Recently, Huang and Stoll (1997) developed a model, which generalizes previous bid–ask spread models.

Glosten and Harris (1988) estimate Glosten's (1987) decomposition of the bid–ask spread using transaction data for 250 NYSE stocks and conclude that the permanent adverse information cost is present in the data. Using the NMS securities on the NASDAQ, Stoll (1989) finds that the quoted spread contains a large amount of, and statistically significant, adverse information (43%) and order processing costs (47%), while the inventory holding cost is small (10%).

Using daily and weekly data for NYSE, AMEX and NASDAQ stocks, George et al. (1991) find that the adverse information cost accounts for a much smaller proportion (8 to 13%) of the quoted spread than the proportion (over 40%) previously reported. Furthermore, order processing costs are the predominant component of the quoted spreads.

Madhavan et al. (1997) use 274 NYSE common stocks from the 1990 ISSM files. They find that the average of adverse information cost decreases monotonically during a day until the final period where it increases slightly. Huang and Stoll (1997) use 19 of the 20 stocks in the Major Market Index from the 1992 ISSM files. They find that the adverse information cost is 9.59% of the traded spread, the inventory holding cost 28.65%, and the order processing cost 61.76%. They also find that the adverse information cost varies from 1.44% to 21.99% and the inventory holding cost from 9.19% to 73.71%, depending on the sequence of trade sizes.

The differences of these estimates come from two sources: different specifications for the behavior of the bid–ask spread and different data. Nevertheless, the overall conclusion is that there exists a sizable amount of adverse information cost for individual stocks, and that it declines as time passes. All of the above studies have focused on the bid–ask spread behavior of individual stocks. If other financial instruments were selected for analysis, different conclusions would be obtained.

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