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# Effects of electronic trading on the Hang Seng Index futures market

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## Abstract

This investigation of the switch from open-outcry trading to electronic trading on the Hang Seng Index (HSI) futures contract reveals that the bid–ask spread narrows and the futures price plays more of a role in information transmission. Factors, such as anonymity in trading and fast order execution in electronic trading, attract informed traders to the futures market, enhancing the information flow. Our results provide support for the worldwide trend of transforming open-outcry markets into electronic trading platforms.

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## 1. Introduction

Advances in information technology have attracted exchanges to electronic trading systems as an alternative to open-outcry systems. A typical perspective for comparison of the different systems relates to the idea of market quality. The posted bid–ask spread and its modification reflect market frictions and serve as a measure of transaction cost. Overall, a system with a narrower bid–ask spread should be

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preferred. Grossman and Miller (1986) and Miller (1991) suggest that the open-outcry system results in a more liquid market, which makes trading less expensive. Coval and Shumway (2002) show that the sound in trading pits is more than noise; it conveys information. Frino, Harris, McNish, and Tomas (in press) find that locals on the floor contribute significantly to price discovery.

The anonymous nature of an electronic trading system precludes transmission of any information that floor traders might otherwise observe in an open-outcry system. Concerns for adverse selection should produce a wider bid–ask spread. Blennerhassett and Bowman (1998) and Frino, McNish, and Toner (1998), however, provide empirical support that smaller bid–ask spreads are lower in the case of an electronic trading system.

Pirrong (1996) argues that a priori there is no reason to suppose that one system is better than the other, as the sources of liquidity provision are different. Vila and Sandmann (1996) concur with this conclusion. Gilbert and Rijken (2002) find that the determinants of the bid–ask spread are quite different across the two systems. All these results suggest that the effects of electronic trading on the bid–ask spread may vary, depending on the market. Indeed, simulation studies by Domowitz (1990) show that stocks and options, but not futures, display poor properties of liquidity provisions under electronic trading.

As a derivative security, a futures contract is expected to fulfill a price-discovery function. Domowitz (1993) suggests that electronic trading may be better than the open-outcry system with respect to how quickly prices reach a competitive equilibrium. That is, when the market is inactive, floor traders have little to observe, but an open electronic order book continues to inject information into the market, speeding up equilibrium convergence. Electronic trading in futures markets thus enhances the price-discovery function. An electronic trading system strengthens the lead–lag relationship between futures and spot markets, improves the contemporaneous correlation between spot and futures prices, and mitigates the asymmetric response to good or bad news. Volatility spillover or information transmission is also expected to be stronger and more prominent in electronic trading systems.

A contrary result is that concerns about adverse selection in an electronic trading system may discourage trading and impede price convergence during periods of high volatility (when a lot of information is conveyed) because trades are anonymous. Delays in price convergence reduce information transfer from the futures market to the spot market, and diminish the contemporaneous correlation between the two.

Overall, the effects of electronic trading on the price-discovery function of the futures market depend upon trading intensity of the particular market. Beelders and Massey (2002), for instance, find that the index futures market became more informative after introduction of electronic trading on the Johannesburg Stock Exchange, but the gold futures market became less informative.

On June 6, 2000, trading in the Hang Seng Index (HSI) futures contracts switched from floor open outcry to electronic trading. We test the hypothesis that electronic trading reduces trading costs and enhances informational efficiency. Our investigation of the effects of electronic trading on the bid–ask spread and the price-discovery function of the HSI futures market shows that the spread in the futures market narrowed, indicating a decline in trading costs. We use two common-factor models, Gonzalo and Granger (1995) and Hasbrouck (1995), to study the price discovery process and an exponential GARCH (EGARCH) model to describe the volatility spillover process. Futures prices under both processes contribute more information after the advent of electronic trading. The overall results support the decision of the Hong Kong Futures Exchange (HKFE) to close the trading floor and implement electronic trading.

Open interest (which Bessembinder & Seguin, 1993 suggest is a proxy for the amount of uninformed trading) on the futures market declines, as does asymmetry in volatility (a result that Antoniou, Holmes,

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