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The impact of transaction costs on price discovery: Evidence from cross-listed stock index futures contracts

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Abstract

Fleming et al. [J. Futures Markets 16 (1996) 353] hypothesise that 'price discovery will tend to occur first in the lowest-cost market, as information-based trades are executed where they produce the highest net profit'. This paper exploits the institutional differences between Nikkei 225 Stock Index futures trading on the Osaka Securities Exchange (OSE) and Singapore International Monetary Exchange (SIMEX) to provide new evidence on the 'transaction cost hypothesis'. The institutional differences between the two markets result in higher brokerage commissions and margins on the OSE relative to SIMEX. The analysis reported in this paper finds that both SIMEX and OSE Nikkei futures returns lead Nikkei 225 Index returns. However, a direct comparison of the rates of price discovery between the two futures contracts demonstrates that SIMEX futures returns strongly lead OSE futures returns. This evidence is consistent with the transaction cost hypothesis, and corroborates findings of earlier studies.

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Keywords: Securities market microstructure; Transaction costs; Price discovery; SIMEX; Osaka Securities Exchange

1. Introduction

A large volume of research has found that a temporal or lead–lag relation exists between returns on stock index futures contracts and their underlying equity

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indices.[1] Fleming et al. (1996) propose that this relation arises due to differences in the cost of trading between markets. They argue that the activities of informed traders are concentrated in the lowest cost market which yields the highest net profit on their information. Consequently, new private information is first traded on (and impounded) in the lowest cost market followed by related markets in ascending order of costs. This implies that price discovery occurs more rapidly in lower cost markets. While prior research has provided tests of the transaction cost hypothesis by examining the lead–lag relation between derivative markets and their underlying assets, a further test can be conducted by examining temporal relations between similar futures contracts.[2] As implied by Kim et al. (1999), such an examination provides a more internally valid test of the impact of transaction costs as the securities tested are more homogenous. This paper employs both sets of tests and examines the cross-listed Nikkei 225 futures contract.[3]

The Nikkei 225 futures contract listed on the Nikkei Stock Average (also called the Nikkei 225 index) provides a natural experiment to test the transaction cost hypothesis because it is traded simultaneously in three markets around the world: the Singapore International Monetary Exchange (SIMEX), Osaka Securities Exchange (OSE) and Chicago Mercantile Exchange (CME). Of particular importance to this paper, at least two markets exhibit significantly different transaction costs arising from institutional differences. First, the brokerage markets in Japan and Singapore are regulated differently yielding significantly different brokerage charges. Second, margin levels also differ significantly between the exchanges.

Prior research examining temporal return relations for Nikkei 225 futures is relatively scarce. Papers such as Tse (1999) and Iihara et al. (1996) demonstrate that OSE futures lead the underlying index using a sample of data prior to 1992. In contrast, Swinnerton et al. (1995) also examine OSE Nikkei futures and the underlying stocks in the Nikkei 225 index and find that the futures play little, if any, price discovery role for a sample of tick data drawn from 1990. Lim (1992) examines the lead–lag relation between SIMEX Nikkei 225 futures and the underlying index using data sampled between 1988 and 1989 and finds that neither the futures nor the index lead or lag each other. Consequently, there are a number of discrepancies in the results of prior literature. Furthermore, the sample periods examined in previous research are close to contract inceptions and may be influenced by market maturation effects.[4]

[1] Previous research on this issue includes Zechauser and Niederhoffer (1983), Herbst et al. (1987), Finnerty and Park (1987), Kawaller et al. (1987), Laatsch and Schwarz (1988), Harris (1989), Kawaller et al. (1990), Stoll and Whaley (1990), Chan et al. (1991), Kutner and Sweeney (1991), Schwarz and Laatsch (1991), Chan (1992), Shyy et al. (1996), Pizzi et al. (1998), Frino and West (1999) and Frino et al. (2000).

[2] Fleming et al. (1996) test the theory by examining the lead–lag relation between pairs of securities including the S&P 500 index futures contract, S&P 100 index options and S&P 500 stock index.

[3] We use the term "cross-listed" loosely here. A strict definition of cross-listed implies that the same security is traded on two different exchanges (e.g. a share of IBM stock is cross-listed on a number of exchanges, but everywhere a share of IBM represents a share of the ownership of IBM). Here, while the underlying instrument is the same (Nikkei 225) the contracts are different (in specification) and are not fungible from one exchange to the next.

[4] Stoll and Whaley (1990) discuss the relation between market maturation and the rate of price discovery in futures markets.