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The cross-sectional determinants of inventory control and the subtle effects of ADRs

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Abstract

This paper addresses the effects of international cross-listings on the domestic market by investigating the properties of market maker inventories on the London Stock Exchange. We find that the unit-root hypothesis can only be rejected for a fraction of dealer inventories, and that mean reversion is generally slow. Inter-stock variations in mean reversion can be explained by liquidity- and risk-related variables, as well as the availability of ADRs on other exchanges. We find that ADRs *do* have an appreciable and significant impact on dealer behaviour and trading costs. The findings have implications for our understanding of the subtleties of linkages between markets.
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1. Introduction

There have been numerous studies concerned with linkages between markets where identical or closely correlated securities are traded, such as exchanges with cross-listed securities or markets for cash and derivative instruments. A very general version of the many questions that researchers are trying to address in this context is: Is there an appreciable impact of the existence of one market on the other, and what

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effects does the availability of another market have on trading behaviour, liquidity and trading costs?

Ideally, questions like these would be examined using data on trading by investors and intermediaries on both exchanges. Unfortunately, researchers seldom get the chance to examine such detailed trading data. Therefore, empirical studies typically look at (intra-day) changes in prices, spreads and volumes, to examine volatility spillover and price discovery effects, for example. Studies on linkages between London and international markets include DeJong et al. (1995), Pagano and Röell (1991), and more recently Werner and Kleidon (1996) (hereafter WK96). Other researchers, notably Chan et al. (1996), have examined NYSE intra-day data on cross-listed securities.

Unfortunately, we do not possess the ideal data either. However, we do have very detailed data on the trading behaviour of one very important subset of market agents on the London Stock Exchange, namely the market makers. In particular, we are able to trace their inventories over time. This is useful since microstructure theory makes certain predictions about the behaviour of dealer inventories, one of these being that they exhibit mean reversion. For example, Garman (1976) models a single dealer trying to follow a zero-inventory drift policy, while in Amihud and Mendelson's (1980) model the market maker has a preferred inventory level to which she tries to revert whenever order flow shocks cause her actual inventory to deviate. Other models with similar implications are Stoll (1978) and, for multiple dealer markets, Ho and Stoll (1983) and Biais (1993). Mean-reversion towards a preferred (or mean) level implies stationarity of the inventory series. Several studies have investigated this prediction empirically; papers include Hasbrouck and Sofianos (1993) and Madhavan and Smidt (1993) for NYSE specialists, and Snell and Tonks (1998) for the London Stock Exchange. [1] These studies find that the unit-root hypothesis cannot be rejected for some of the dealer inventory series. Madhavan and Smidt (1993) as well as Snell and Tonks (1998) resort to intervention analysis to remedy some of their initial methodological problems. But all the authors agree that failure to reject the unit-root hypothesis is mainly due to the low power of unit-root tests, and economic factors which are not easily taken account of with current testing technology, such as time-varying preferred inventory level.

Confirming the results of the above papers for market makers in large stocks on the London Stock Exchange, we show that the unit-root hypothesis cannot be rejected for some dealers, and give a number of reasons why the stationarity property might not be exhibited very clearly in the market from which our data are taken. As in the previous literature, these reasons range from methodological shortcomings to economic forces absent in the formulation of most inventory models.

From the inventory control literature, we can derive a number of predictions of the cross-sectional determinants of the degree to which market makers control their

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[1] Manaster and Mann (1996) test for unit-roots in futures pit market maker inventories and find strong evidence of inventory control in this very different market. Hansch et al. (1998) explore implications of Ho and Stoll's (1983) model using similar data to ours.