



# The price adjustment and lead-lag relations between stock returns: microstructure evidence from the Taiwan stock market

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## Abstract

This paper investigates the price adjustment and lead-lag relations between returns on five size-based portfolios in the Taiwan stock market. It finds evidence that the price adjustment of small-stock portfolios is not slower than that of large-stock portfolios. Additionally, limited evidence supports a positive leading role of large-stock portfolio returns over small-stock portfolio returns. These two findings are substantially different from the results of previous research on developed markets.

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## 1. Introduction

Economists have spent many years analyzing security markets in order to understand the short-term movements of security returns. Up to now, there is substantial evidence that short-horizon security returns and their variations are predictable. Conrad and Kaul (1989) demonstrate that time variation in expected return accounts for large proportions, in excess of 25% for small firms, of the variance of both weekly and monthly portfolio returns.

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Fama and French (1988) report that 25–45% of the variations of 3- to 5-year stock returns are predictable from past returns. All the evidence poses a serious challenge to the long-held view that stock prices follow a random walk.

It has been well known that individual stocks exhibit negative autocorrelations in short-horizon returns, e.g., Fama and French (1988) and Jegadeesh (1990). Moreover, empirical studies observe the profitability of contrarian strategies, i.e., selling winners and buying losers. Lo and MacKinlay (1988, 1990) argue the contrarian profits result mainly from the existence of asymmetric cross- (instead of own-) autocorrelation of stock returns. The authors, introducing the lead-lag relations, discover that the lagged returns on U.S. large-stock portfolios are correlated with the current returns on U.S. small-stock portfolios, but the lagged returns on small-stock portfolios are not correlated with the current returns on large-stock portfolios. This type of asymmetric cross-autocorrelations suggests a strong leading role of large-stock returns over small-stock returns that cannot be fully explained by non-synchronous trading.

Yet, not all economists agree on the importance of the lead-lag relations between stock returns. Jegadeesh and Titman (1995) and Hameed (1997) conclude that most cross-autocorrelations are due to stock-price overreaction and a very small fraction can be attributed to lead-lag relations. Boudoukh et al. (1994) summarize that a group of economists, called loyalists, view that large autocorrelations at short horizons are not due to fundamentals. Instead, they arise from the market frictions (e.g., non-synchronous trading, price discreteness or bid-ask spread), institutional structures or microstructure effects.

The purpose of this paper is to study the price adjustment and lead-lag relations between size-based portfolio returns in the Taiwan stock market where the market microstructures are considerably different from mostly developed markets. In sum, this paper observes new microstructure evidence for the Taiwan stock market under mainly a reduced-form specification. The evidence can be regarded as a supplement and extension of previous research.

Market microstructures, according to previous literature, frequently play a key role in explaining the lead-lag relations. Boudoukh et al. (1994), for instance, claim that Lo and MacKinlay (1988, 1990) underestimate the non-synchronous-trading effect that induces the autocorrelations of (particularly small-) stock returns. Their analyses suggest that institutions and factors are the most likely sources of the autocorrelation patterns. Mech (1993) and Badrinath et al. (1995) focus on other market microstructures, such as transaction costs and institutional ownership, to explain the observed cross-autocorrelations.

According to Mech (1993) and Hameed (1997), the difference in stock-price adjustment to information may be one of the primary causes of lead-lag relations. Prices of large firms, usually suffering less from a variety of market frictions such as the non-synchronous trading and transaction-cost problems, respond to (macro) news faster than the prices of small firms and, thus, lead the prices of small firms.

One of other market frictions related to the stock-price adjustment to information is the price limit imposed on stock trading. Chang et al. (1995), studying this issue in the Tokyo stock exchange, suggest that price limits tend to induce autocorrelations of daily returns stronger than those of weekly returns and much stronger than those of monthly returns.

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