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# Hedging with foreign currency denominated stock index futures: evidence from the MSCI Taiwan index futures market

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## Abstract

To hedge with foreign currency denominated stock index futures, the interdependence of equity, futures, and foreign exchange markets is important in formulating hedging strategies. This also results in divergent optimal hedging strategies for international and domestic investors. We derive and compare optimal hedging strategies for the two types of investors. Evidence from the MSCI Taiwan index futures traded on the SGX shows that both types of investors gain from hedging with the futures contract, while international investors tend to benefit more than domestic investors. This result is robust to various commonly used hedging techniques and sample periods. Moreover, both in-sample and out-of-sample results indicate that a GARCH error-correction model persistently outperforms other hedging techniques.
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## 1. Introduction

Emerging stock markets especially in some Far East economies have been experiencing fast-paced real and monetary growth, and continue to attract attention of investors in developed countries who look for opportunities to enhance portfolio performance. However, such markets are noticeably volatile and unpredictable, exposing investors to substantial equity price risk in addition to exchange rate risk. Moreover, an active stock index futures market may not exist in most emerging economies, making foreign equity price risk management more difficult. Recently, a class of innovative derivative instruments have been created to facilitate foreign equity price risk management especially for international investors. An example is the US dollar denominated Morgan Stanley Capital International (MSCI) Taiwan index futures traded on the Derivatives Trading Division of SGX (the Singapore Exchange).[1] Since its inception, the index futures has been quite successful, and is one of the most actively traded contracts on the SGX.

The unique feature of the MSCI Taiwan index futures is that it is denominated in foreign currency (US dollars), and supposed to hedge equity price risk in Taiwan. This makes risk management strategy of hedging with foreign currency denominated stock index futures different from the conventional approach studied in the finance literature (e.g. Figlewski, 1984; Junkus and Lee, 1985; Park and Switzer, 1995),[2] because the interdependence of equity returns, futures returns, and exchange rate fluctuations becomes an important factor affecting investors' hedging decisions. More importantly, the interdependence may affect differently the hedging strategies of international and domestic investors.

The objective of this article is to evaluate the usefulness of the US dollar denominated MSCI Taiwan index futures for managing equity portfolio risks from the perspectives of both international and domestic investors. Based on the above observations, we derive and compare optimal hedging strategies for both types of investors, and assess in-sample and out-of-sample hedging effectiveness of various hedging techniques, including a GARCH error-correction model, the ordinary least squares (OLS) hedge, the OLS hedge with co-integration (OLS-CI), and a naive hedge.

We find that both international and domestic investors gain from hedging with the MSCI Taiwan index futures, while international investors appear to benefit more

[1] There are other stock index futures markets that share the similar feature to the MSCI Taiwan index futures. For example, the US dollar denominated Nikkei 225 stock average futures traded on the CME, the US dollar denominated Nikkei 225 and Nikkei 300 stock index futures traded on the SGX, and the US dollar denominated Taiwan index futures traded on the HKFE, etc.

[2] An alternative risk management strategy for an international investor is international diversification, or a currency hedge in addition to diversification. However, a portfolio manager who manages risk via international diversification has to buy or liquidate his positions, which is more costly compared to a strategy of hedging with forward or futures contacts.

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