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An empirical examination of the lead–lag relationship between spot and futures markets: Evidence from Thailand ☆

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ABSTRACT

This study investigates whether a lead–lag relationship exists between the spot market and the futures market in Thailand during the period 2006 through 2012. In a rational, efficient market, returns on derivative securities and their underlying assets should be perfectly contemporaneously correlated. However, due to market imperfections, one of these two markets may reflect information faster. Using daily data, our results show that there is a price discovery in the Thailand futures market. We find that lagged changes in spot prices lead changes in futures prices. Our results are robust to the use of an alternative equity index. Our results show that the error correction model, which utilizes the traditional linear model, is found to be the best forecasting model. Furthermore, we find that a trading strategy based on this model outperforms the market even after allowing for transaction costs.

1. Introduction

In an efficient financial market information flow is assumed to be frictionless; it follows from this that changes in a spot stock market index and its associated futures price should be instantaneous and simultaneous brought about by the arrival of new information. If a market is efficient, both spot prices and futures prices should react to new information simultaneously, and there should be no lead–lag relationship between one market and the other.

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However, many empirical studies have found that this is not the case. Some researchers believe that both futures markets and options markets may contain more information than the spot market, because traders in these markets are generally large traders and are believed to be better informed. Several papers have found that the futures price leads its underlying index, such as those of Ghosh (1993), Tse (1995), Shyy et al. (1996), So and Tse (2004), and Kang et al. (2006). Other studies have found that the spot index leads its associated futures index, such as those of Streche (2009), Bohl et al. (2009), Cabrera et al. (2009), Chen and Gau (2009) and Yang et al. (2012). While some papers find a bidirectional relationship such as in Pizzi et al. (1998), Gee and Karim (2005), and Jackline and Deo (2011). According to Brooks et al. (2001) market sentiment and arbitrage trading are the major factors linking stock index futures and the underlying spot index.

Some empirical studies find evidence that supports information efficiency in spot and futures market. A study by Kung and Carverhill (2005) on the U.S. Treasury Separate Trading of Registered Interest and Principal Securities (U.S. Treasury STRIPS) with different times to maturity shows that spot and futures prices are cointegrated and that no arbitrage profit can be made after taking liquidity and transaction costs into consideration. Wahab and Lashgari (1993) study the Standard & Poor's 500 (S&P 500) index and the Financial Times spot and futures index, although they find futures prices weakly lead spot prices, the magnitude is too small to generate any arbitrage profit. They conclude that their results are consistent with market efficiency.

Given the mixed empirical findings and the limited research on this issue in emerging markets an interesting and relevant area of study would be a setting with a nascent futures market to examine whether a lead–lag relationship holds and if so in which direction. Therefore, in this study we investigate this issue using data from Thailand's stock and futures markets. Thailand's stock market is small by international standards and its derivatives market is relatively young therefore the question of whether the markets are efficient is important for both participants and regulators of these markets. For investors the finding of a lead–lag relationship may present opportunities for higher returns on their trading strategies. On the other hand, regulators would be interested to know how quickly one market reacts to new information and to what degree the two markets are linked.

Price discovery, according to Schreiber and Schwartz (1986), is the process in which markets attempt to reach equilibrium prices. Therefore, when observing the lead–lag effect, the price or movement of futures should contain useful information for its subsequent spot price. Such effect illustrates how fast futures market reflects new information relative to its spot market. Under the perfectly efficient market hypothesis,[1] where all available information is fully utilized, arbitrage activities will keep futures and spot price movements more synchronous. These two markets should be contemporaneously correlated which is not consistent with the implication of lead–lag effect. In fact, due to market frictions non-synchronous movement between futures and spots markets is observed. The reasons for this lead–lag effect may be due to less restrictive regulation or lower transaction costs in futures markets. Furthermore, greater liquidity in the futures markets and the ability to short sell as well as marking to market are factors that may accelerate the speed of price discovery process in this market. These advantages might move the futures price first and then lead the stock index when arbitrageurs respond to the deviations from the cost of carry relationship. Additionally, the futures price may provide a sentiment indicator for the stock index when investors who are unable or unwilling to utilize futures to integrate the same information into their spot market transaction.

When new information arrives, futures trading can be executed immediately with little cash outlay, as futures are a levered instrument compared to the actual underlying stocks, which would require a greater up-front investment and probably a longer time to implement. It follows, that this transaction preference may explain why a lead–lag relationship from futures to the underlying spot market is observed in many studies.

Generally, it is often believed that futures markets potentially provide a profound process of price discovery. Price discovery performance of futures markets is an important issue that has received a lot of attention in the literature. Price discovery in futures markets is commonly defined as the use of futures prices to determine expectations of cash market prices, and the price discovery performance of futures markets is crucial to the use of these markets. As asset prices appear to exhibit non-stationarity, a number of studies

[1] The term 'market efficiency', presented by Fama (1970), is generally referred to as the informational efficiency of financial markets, which emphasizes the role of information in setting prices. More specifically, the efficient market hypothesis (EMH) defines an efficient market as one in which new information is quickly and correctly reflected in its current security price. Fama (1970) outlines the classic taxonomy of information sets available to market participants and further classifies the EMH into the weak-form, semi-strong-form and strong-form.