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## The interactions between China and US stock markets: New perspectives



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### ABSTRACT

This paper takes a new approach to investigate the interaction between the U.S. and China's stock markets. Since the U.S. and China's stock markets have no overlap in their trading hours, many empirical studies show that the daily returns on these two markets are not correlated. In this paper, we examine the ability of the daily returns on the S&P500 and the DJIA to forecast the direction of the openings of the SSE and SZCI, two benchmark indexes in the China's stock market, and vice versa. We show that the daily returns on the U.S. stock market have had significant ability to forecast Chinese stock market openings since 2006, while the daily returns on the China's stock market have not shown the similar ability to forecast the U.S. stock market openings.

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## 1. Introduction

With the dramatic growth of China's economy in the last few decades, the China stock market has emerged as one of the largest stock markets in the world. As China's economy and the U.S. economy have shown a definite interaction, there is considerable interest to study the interaction between the China and the U.S. stock markets. However, most studies, in particular those investigating the issue

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before the recent global financial crisis, found no or weak co-integration between these two stock markets (see [Huang et al., 2000](#); [Chen et al., 2003](#); [Hsiao et al., 2003](#); [Lin and Wu, 2003](#); [Yang et al., 2003](#); [Zhu et al., 2004](#); [Tian, 2007](#); [Wang and Di Iorio, 2007](#); [Masson et al., 2008](#); [Lin et al., 2009](#); [Luo et al., 2011](#); [Li, 2012](#), among others). It is commonly argued that China stock market is insulated from the rest of the world.

Some more recent studies, however, show that the level of integration between those two markets has been increasing. For example, by using copulas to investigate the relationships between stock market indexes in China (Shanghai Stock Exchange Composite Index) and those in the U.S. (S&P500 index), Japan (Nikkei index), Hong Kong (Hang Sheng Index) and the world (MSCI index), [Johansson \(2010\)](#) evidence suggests that China stock market has experienced an increasing level of integration with several major financial markets during the last decade, especially during the recent global financial crisis. Instead of investigating the relationship between those two stock markets, [Goh et al. \(2013\)](#) find that some US economic variables have significant forecasting ability for the China stock market. Though a close relationship exists between economic activity and stock prices in the US, as indicated by [Schwert \(1990\)](#) and [Roll \(1992\)](#), it is still not clear whether the US stock market would affect the China stock market, because those US economic variables may affect the stock markets in both countries simultaneously. Overall, no significant relationship has been observed between the US and the China stock markets in the literature.

The aim of this paper is to better understand the interactions between the China stock market and the U.S. stock market, which have changed year by year in the past decade and, more importantly, in which ways these two markets have interacted. In this paper we investigate the interaction of the stock price movements in these two markets by examining the forecasting abilities of the stock price movement in one country on the stock price movement in another country. Similar to [Johansson \(2010\)](#), major benchmark stock market indexes are used as proxies for the U.S. and China stock markets. In particular, we use the S&P500, the Dow Jones Industrial Average (DJIA) and the NASDAQ Composite Index (NASDAQ) to represent the U.S. stock market, and the Shanghai Stock Exchange Composite Index (SSEC) and the Shenzhen Stock Component Index (SZCI) to represent the China stock market.<sup>1</sup>

Our approach has two features different from those employed in the literature:

First, while previous studies almost exclusively conduct parametric test and follow correlation/regression type of approaches, a nonparametric test is conducted in this paper to test the ability of the daily returns on the US stock market for forecasting the opening prices in China stock markets and vice versa, by calculating the conditional probabilities of a correct forecast. The forecast model is adapted from [Henriksson and Merton \(1981\)](#) for testing the ability of market timing, or the ability of forecasting when stocks will outperform bonds and when bonds will outperform stocks. My forecast model differs from those of earlier studies in that we assume that the forecaster either forecast that the stock market will open high or low, conditional on the daily return in the other market. According to Henriksson and Merton, the nonparametric test has the advantage that conditional probabilities of a correct forecast are sufficient statistics to measure forecasting ability and yet they do not depend on the distribution of returns on the market or on any particular model for security price valuation.

Second, since no significant correlation between two stock markets has been found by investigating time series of daily returns in the literature, we examine the intraday data and investigate the market microstructure. Namely, first in the literature, we test the ability of daily return in one market to forecast the opening in the other market. In particular, we examine the closing-to-closing daily returns, opening-to-closing overnight returns and closing-to-opening trading-hour returns and test the ability of the daily return in one market as a lead indicator to forecast the opening of the other market. Our basic argument for choosing this approach is as follows: since stock price movement is mainly driven by trading activities, and there is no overlap of trading hours between the US and China stock markets,<sup>2</sup> the daily returns in those two markets are mainly driven by different information sets and hence may

<sup>1</sup> The S&P 500 and DJIA are benchmark indexes for the New York Stock Exchange (NYSE), NASDAQ for the Nasdaq Stock Exchange (NASDAQ), the SSEC and SZCI are the most popularly used benchmark indexes for the Shanghai Security Exchange (SSE) and Shenzhen Security Exchange (SZSE), respectively.

<sup>2</sup> There exists a five and a half hour gap between the major U.S. stock market closing and the China stock market opening, and a five and a half hour gap between the China stock market closing and the major U.S. stock market opening. These gaps

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