



## Do US macroeconomic conditions affect Asian stock markets?

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### ABSTRACT

The aim of this paper is to examine the impact of US macroeconomic conditions—namely, exchange rate and short-term interest rate—on the stock markets of seven Asian countries (China, India, the Philippines, Malaysia, Singapore, Thailand, and South Korea). We use daily data for the period 2000–2010. We divide the sample into a pre-crisis period (pre-August 2007) and a crisis period (post-August 2007). We find that, in the short-run, the interest rate has a statistically insignificant effect on returns for all countries, except for the Philippines in the crisis period. On the other hand, except for China, regardless of the crisis, depreciation has a statistically significant and negative effect on returns. When the long-run relationship among the variables is considered, for five of the seven countries (India, Malaysia, the Philippines, Singapore, and Thailand), while there is cointegration in the pre-crisis period, in the crisis period there is no such relationship, implying that the financial crisis has actually weakened the link between stock prices and economic fundamentals.

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### 1. Introduction

The link between macroeconomic variables and return on investments was first established by Ross (1976), as being inherent in his proposed arbitrage pricing theory. Ross (1976) argued that a range of variables are possible determinants of returns. A limitation of his study was that the specific variables that determined returns were not identified. This research gap was addressed, however, by Roll and Ross (1980). They identified four main factors—namely, unanticipated changes in inflation, risk premiums, the term structure of interest rates, and industrial production—as determinants of returns. Subsequently, a large number of studies have empirically examined the relationship between key macroeconomic variables and stock returns; among influential studies, see Chen, Roll, and Ross (1986) and Fama (1981).

The aim of this paper is to examine the impact of US macroeconomic conditions, proxied by exchange rate (US vis-à-vis local currency) and short-term US interest rate, on stock returns of seven Asian countries (India, China, the Philippines, Malaysia, Thailand, Singapore, and South Korea). The proposed work is different from the literature in two distinct ways. First, we examine whether the impact of the two macro variables for the US had different effects on returns in those Asian countries in the pre-2007 financial crisis period compared to the post-2007 crisis period. A feature of the traditional and voluminous literature alluded to earlier is that it considers only the effect of domestic macroeconomic conditions on stock market returns. There are very few studies that consider the impact of foreign macroeconomic factors on the performance of stock markets. The exceptions are Christie-David, Chaudhry, and Khan (2002) and Becker, Finnerty, and Kopecky (1995), who examine the reaction of the US and foreign bond futures prices from US macroeconomic news announcements; Nikkinen and

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Sahlstrom (2004), who examine both domestic and worldwide (proxied by the US) macroeconomic news in stock valuations on European stock markets; Nasseh and Strauss (2000), who use a variance decomposition analysis and report that German short-term interest rates impacted stock prices in European countries; and Arora and Cerisola (2001), who examine the impact of the US monetary policy on country risk, proxied by the sovereign spreads, of emerging markets. They find that the level of the US interest rate has positive effects on sovereign risk.

Furthermore, some studies suggest that Asian markets are integrated with the US market. Chou, Ng, and Pi (1994) found that the stock price indices of the US and those of the G5 countries were co-integrated and that this relationship became stronger over time, or with the increasing liberalisation and globalisation of capital markets. Similarly, Cheng and Glascock (2006) show that stock market integration between the US and three Asian countries—China, Hong Kong and Taiwan—increased after the 1997 Asian financial crisis.<sup>1</sup> Integration of Asian markets with the US suggests that the US macroeconomic factors may be contributing to movements in Asian stock markets, or vice versa.

In addition, a sound argument in favour of modelling the influence of the US macroeconomic condition is provided by Nikkinen and Sahlstrom (2004: pp. 201–202), who contend that firms operating in several markets are not only concerned about what is happening in one particular market, they are also interested in the economic conditions in the largest market because they have implications on their profitability and decision making. It is also convenient to examine the effects of the macroeconomic conditions in the US, as it is also an important trading partner of the Asian countries.

Second, the short sample period which is due to the fact that the financial crisis is only a few years old, means that unlike the extant literature we cannot use monthly data; rather, to have a reasonable sample period for estimation, we need to use daily data, which we do. Our approach of using daily data provides us an opportunity to examine the impact of US macro variables in the pre-crisis and crisis periods. One disadvantage, however, is that the use of daily data precludes us from using a wide range of macro variables as proposed by, for instance, Roll and Ross (1980). This caveat is a result of the fact that daily data on unemployment, industrial production, and inflation do not exist. At the same time, it is also true that either due to econometric estimation constraints or data constraints we will never be able to capture all the determinants of returns. Nonetheless, we believe that these macroeconomic conditions are indirectly captured in the exchange rate and interest rate variables that we use. For instance, a stable and competitive exchange rate and interest rate tend to coincide with strong macroeconomic conditions in a country, including high growth of economic activity. As a result, we believe that our work, while by no means perfect from the point of view of model specification, sufficiently captures the domestic macroeconomic conditions.

We organise the balance of the paper as follows. In Section 2, we discuss the empirical model and the theoretical framework that motivates the empirical framework. In Section 3, we discuss the data and the findings. In the final section, we provide concluding remarks.

## 2. Empirical model and theory

In this section, we discuss our proposed model and the theoretical framework that motivates the empirical analysis. As mentioned earlier, our focus in this paper is on the potential role of the US macro variables—namely, the exchange rate (US vis-à-vis China, India, Malaysia, Thailand, the Philippines, Singapore, and South Korea) and the US short-term interest rate—on returns from seven Asian markets. Our choice of these seven countries is motivated by two things: first, the stock markets of these seven countries are relatively well developed compared to some Asian countries (Pakistan and Sri Lanka) that we do not consider. Second, consistent daily time series data were available for our choice of countries. Based on this, the functional form of the relationship between returns and the US macro variables takes the following form:

$$R = f(ER, IR) \quad (1)$$

This functional form has the following regression specification:

$$R_t = \alpha_0 + \alpha_1 RER_t + \alpha_2 RIR_t + \mu_t \quad (2)$$

where  $R$  is the returns computed as  $\log(P_t/P_{t-1})$ ,  $P_t$  is the stock price in period  $t$ ;  $RER$  is the return on the bilateral exchange rate—domestic currency per US dollar, calculated as  $\log(ER_t/ER_{t-1})$ , such that an increase in the exchange rate represents a depreciation of the domestic currency; and  $RIR$  is the return on the short-term US interest rate proxied by the 3-month Treasury Bill rate, calculated as  $\log(IR_t/IR_{t-1})$ . Data is daily for the period 5 January 2000–25 January 2010. While using daily data allows for a sufficient number of observations, it also means that we cannot use some of the other variables that are determinants of returns. However, because the model incorporates the US short-term real interest rate and the bilateral exchange rate, the macroeconomic conditions are taken care of, at least indirectly.

<sup>1</sup> Chan et al. (1992), on the other hand, show that stock markets in Hong Kong, Japan, Singapore, South Korea, and the US were not integrated, using weekly data from February 1983 to May 1987. This finding is consistent with Chou et al. (1994). Furthermore, Nishimura and Men (2010) use relatively more recent data for the period 5 January 2004–31 December 2007, and find that China's stock market has a significant influence on the G5 stock markets, but not vice versa. They attribute this to stronger economic development and strict capital regulations in China.

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