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International volatility risk and Chinese stock return predictability



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ABSTRACT

This paper investigates the predictive ability of international volatility risks for the daily Chinese stock market returns. We employ the innovations in implied volatility indexes of seven major international markets as our international volatility risk proxies. We find that international volatility risks are negatively associated with contemporaneous Chinese daily overnight stock returns, while positively forecast next-day Chinese daytime stock returns. The US volatility risk (ΔVIX) is particularly powerful in forecasting Chinese stock returns, and plays a dominant role relative to the other six international volatility measures. ΔVIX 's forecasting power remains strong after controlling for Chinese domestic volatility and is robust in- and out-of-sample. Economically, high ΔVIX forecasts high Chinese domestic market volatility, low trading activity, and low market liquidity, indicating that both ICAPM and liquidity risk help to explain international volatility risks' predictive power for Chinese stock returns.

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1. Introduction

Recent research suggests that information now is evaluated and reflected in a timely manner between markets due to globalization. Specifically, Chinese stock market is showing an increasing level of

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integration with the international financial markets due to its ongoing trade and financial liberalization over the past three decades. For example, [Glick and Hutchison \(2013\)](#) find that Chinese stock market is strongly linked to its East Asian neighbors. [Goh et al. \(2013\)](#) present evidence that US economic variables are leading indicators of Chinese stock market, particularly after China joined in the World Trade Organization (WTO). [Jordan et al. \(2014\)](#) show that stock returns of countries that China net imports from can significantly forecast the aggregate Chinese stock market return. In this paper, we investigate whether international volatility risks are useful in explaining the time variation of Chinese stock market returns.

Understanding the risk–return relationship is critical to many fundamental issues in asset pricing, investment, and corporate finance. [Merton \(1980\)](#) theoretically shows that volatility risk is related to expected stock return. [An et al. \(2014\)](#), [Guo and Qiu \(2014\)](#), [Bali et al. \(2015\)](#), among others, provide empirical evidence on the predictive power of volatility risk for US stock returns. Given China's strengthened link to international financial markets, it is hence possible that the Chinese stock market is exposed to the international volatility risks. Empirically, we find that international volatility risks, particularly the US volatility, can strongly forecast the future Chinese stock market returns beyond Chinese domestic volatility.

This paper also contributes to the asset pricing literature on Chinese stock market, which recently has attracted considerable attention from both practitioners and academics. China now has the second largest stock market in the world, valued at more than eight trillion US dollars (with the Shanghai and Shenzhen exchanges combined), and has more than two thousand public firms listed. Moreover, the Chinese stock market is still young, underdeveloped, speculative, highly volatile, and with many abrupt market fluctuations. Therefore, it is of great interest to understand whether international volatility risk is priced in the emerging Chinese stock market with high volatility, speculation, and poor governance. If international volatility risk contains information for forecasting future Chinese stock returns beyond that contained in the Chinese domestic risk factors, investors should incorporate these international risk measures into their information set to enhance the accuracy of their returns forecast. The enhancement of the return forecasts can be economically large, and will therefore affect the benchmark used for measuring investment performance.

Following [Ang et al. \(2006\)](#), [Bali and Engle \(2010\)](#), [Chang et al. \(2013\)](#) and [An et al. \(2014\)](#), we employ the innovations in daily implied volatility indices of seven major international markets as our proxies for international volatility risks. Specifically, we calculate the daily changes of implied volatility for the US, UK, France, Germany, Euro zone, Japan, and Hongkong markets, and denote them as ΔVIX , $\Delta VFTSE$, $\Delta VCAC$, $\Delta VDAX$, $\Delta VSTOXX$, ΔVXJ , and $\Delta VSHI$, respectively. [Bali and Peng \(2006\)](#), [Guo and Whitelaw \(2006\)](#) and [Guo and Qiu \(2014\)](#) advocate for using implied volatility instead of realized or GARCH related volatility measures to study the relation between the stock market risk and the expected stock return.¹

Since the opening and closing GMT timings for the American and European markets are lagged to the Chinese stock market by six to fifteen hours (see [Table 1](#)), the volatility innovations observed in these markets are overlapped with the Chinese close-to-open overnight stock returns. To avoid this look-ahead bias, we decompose the Chinese close-to-close daily stock returns into close-to-open overnight returns and open-to-close daytime returns. We then focus on forecasting the future Chinese open-to-close daytime returns, for which there is no look-forward bias. [Becker et al. \(1990\)](#) investigate the correlation between the US market return and subsequent daytime returns of East Asian countries. However, little research shows evidence of the relationship between international volatility risks and Chinese daytime returns. To the best of our knowledge, our study is the first paper providing such an empirical result.

Interestingly, we document significant daily return reversals in Chinese stock market: large negative overnight returns from close-to-open and large positive daytime returns from open-to-close. This finding hence indicates on average a lower opening price for the next trading day relative to the closing price at the end of current trading period in Chinese market, which is in sharp contrast to the posi-

¹ We use the daily realized volatility as a proxy for the Chinese domestic volatility risk, calculated as the sum of squared five-minute intraday returns, since there is no option market in China. We obtain similar findings using alternative international volatility risk measures such as the variance risk premium (VRP).

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