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Intra-national and international spillovers between the real economy and the stock market: The case of China

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ABSTRACT

This paper investigates the existence of mean and volatility spillover effects between the Chinese industrial sector and the domestic stock market (intra-national spillovers) as well as between China's industrial sector and the US stock market (international spillovers). The main result is that real economic activity in China can be influenced by domestic and foreign financial markets. Intra-national spillovers are transferred through the balance sheet channel, while international spillovers are transferred through an indirect channel, linking the domestic industry with the foreign stock market via the domestic stock market. Moreover, it is shown that the dependence of the domestic industrial sector increases during periods of financial instability. In such a case, policy steps are needed to protect the real economy from the unstable financial system.

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1. Introduction

There is no doubt that the subprime crisis, which first broke out in the US in 2007, was an important turning point in the recent financial history. This is not only because the US crisis progressed very quickly into a global financial crisis, but also because this crisis changed the way, the magnitude and the speed of financial contagion among international markets. From very early on, [Ackermann \(2008\)](#) stresses the global influence of the US subprime crisis, while [Eichengreen, Mody, Neljokovic, and Sarno \(2012\)](#) provide evidence that the US crisis has affected the global financial system. [Dooley and Hutchison \(2009\)](#); [Longstaff \(2010\)](#) and [Wang and Moore \(2012\)](#) find that cross-market linkages increased after the crisis. These studies imply that financial contagion increased during (and after) the US subprime crisis.¹ Focusing on stock markets interdependence, there is also evidence that correlation among international stock markets increased during the US crisis (see, inter alia, [Cheung, Fung, & Tsai, 2010](#); [Min & Hwang, 2012](#); [Samarakoon, 2011](#); [Zhang, Li, & Yu, 2013](#)).

Apparently, the global financial crisis of 2007–2008 could not leave world real economic activity unaffected. Economic slowdown first appeared in the US and soon was followed by recession in developed and developing countries of the world. This consequence reveals that a significant relationship between the financial market and real economic activity may exist. The recent global financial crisis and the subsequent slowdown of the global economy have even more stressed the

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¹ [Dooley and Hutchison \(2009\)](#) and [Wang and Moore \(2012\)](#) examine the credit default swaps (cds) market, while [Longstaff \(2010\)](#) examines the asset-backed collateralized debt obligations (cdo) market.

importance of examining the aforementioned relationship. Even before the crisis, the interdependence between financial markets and the real economic sector was a central research question for academics and policy makers. However, most of the empirical studies have focused on the examination of this relationship in developed countries (see among others, Barro, 1990; Fama, 1990; Giannellis, Kanas, & Papadopoulos, 2010; Kanas & Ioannidis, 2010; Nasseh & Strauss, 2000; Schwert, 1990). Indeed, only a limited number of studies have examined this relationship for the case of emerging countries (see among others, Mauro, 2003).

For example, for the case of China, one of the fastest growing emerging economies with a rapidly growing stock market, the influence of stock market developments on real economic activity has been investigated only by Liu and Sinclair (2008); Wang and Ajit (2013). The former study tests the existence of causality patterns within a Vector Error Correction model (VECM) and finds evidence of causality from the stock market to economic growth, indicating that the stock market acts as a leading indicator of future economic growth. In contrast, Wang and Ajit (2013) find a negative relationship between stock market developments and real economic growth, thereby implying that stock market development does not contribute to economic growth in China.

Next, bearing in mind the rapid growth of the Chinese stock market in the recent years and the accompanied high stock returns volatility, one sensible inquiry is whether volatility from the stock market is transmitted to the real economic sector or/and vice-versa. Girardin and Joyeux (2013) examine the existence of volatility transmission from the real economy to the stock market in China. They find no evidence of mean and volatility spillovers from industrial output growth to stock returns. Instead, they find that stock market volatility is influenced by nominal macroeconomic fundamentals, such as the inflation rate. However, volatility spillovers in the opposite direction (i.e. from stock market to real economic sector) have not been investigated at all for the case of China. Moreover, the investigation of the influence of the international financial system on the Chinese real economic sector is also missing from the literature.

To fill this gap in the literature, the present paper investigates the dynamic interdependence between the stock market and the industrial sector in China. By employing the bivariate specification form of the BEKK-Generalized Autoregressive Conditional Heteroskedasticity (VAR BEKK-GARCH) model, we test the existence of mean and volatility spillovers between the two sectors of the Chinese economy. Besides our interest on spillovers within the country (intra-national spillovers), this paper also tests the existence of mean and volatility spillover effects between China's output sector and the foreign stock market (international spillovers).² An indirect channel through which shocks can be transmitted from the foreign stock market to the domestic real economic sector is the possible interdependence between China's stock market and foreign stock markets. In other words, the indirect channel implies that foreign stock market volatility may be transmitted to the domestic output sector via its influence on the domestic stock market. Hence, the presence of mean and volatility spillover effects between the Chinese and US stock markets is tested as well.

This paper contributes to the literature by extending the research of the relationship between the stock market and the real economic sector in China. First, to the best of our knowledge of the literature, this is the first time that volatility spillover effects from the stock market to real economic sector within China are investigated.³ The answer to this research question provides policy makers with valuable information. For example, the evidence of volatility transmission from the stock market to the output sector implies that policy makers should take steps protecting the economy from unwanted volatility in periods of financial distress. Second, this paper is shown to be the first in the literature which investigates the influence of a foreign stock market over China's output sector.⁴ Similarly, significant policy implications arise from the above investigation. Given the ongoing financial openness and the gradual abolishment of capital controls in China, domestic output sector is expected to be negatively influenced if foreign financial disturbances can be transmitted to the domestic economy. In this case, policy steps are required protecting the domestic economy from external negative shocks.

The structure of the remainder of the paper is as follows. The next section presents the dataset and results from preliminary statistics. The econometric methodology is described in Section 3, while the main empirical findings are shown in Section 4. The results and policy related issues are discussed in Section 5. A final section concludes.

2. Data and preliminary statistics

The dataset was retrieved from the International Financial Statistics of the International Monetary Fund database. It consists of monthly observations of Chinese and US share price and consumer price indices, as well as Chinese industrial production index over the period from 1994:01 to 2012:05. Consumer price indices (p) and the Chinese industrial production index (ip) are presented in percentage and correspond to the inflation rate and the industrial production growth, respectively.⁵ Although both share price indices (r) were available as an index, these series have been transformed into

² Reflecting the international status and influence of the US financial sector, the foreign stock market is represented by the US stock market.

³ As already mentioned, Girardin and Joyeux (2013) examine volatility spillovers only in the opposite direction.

⁴ Other studies have tested the interdependence between China's stock market and foreign stock markets, but not the relationship between China's output sector and foreign stock markets (see among others, Burdekin & Siklos, 2012; Jayasuriya, 2011; Li, 2007; Wang & Wang, 2010; Zhou, Zhang & Zhang, 2012; Ye, 2014).

⁵ Consumer price indices and the industrial production index were collected as a percentage because these series were not available in levels for China. Although this limitation does not exist for US data, we also collected the US consumer price index as a percentage to ensure data compatibility.

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