



Contagion in the stock markets: The Asian financial crisis revisited

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ABSTRACT

This paper presents empirical evidence of herding contagion in the stock markets during the 1997 Asian financial crisis, above and beyond macroeconomic fundamental driven co-movements. We analyze the cross-country time-varying correlation coefficients among the stock prices for the countries of Thailand, Malaysia, Indonesia, Korea, and the Philippines, between crisis and tranquil periods. Macromodels are constructed and implemented to capture the pure contagion effects on the markets. After controlling for the economic fundamentals for the five countries, the paper finds strong evidence of herding contagion.

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1. Introduction

The 1997 Asian crisis has rekindled the debate over currency contagion. When the Thai Government abandoned the dollar exchange rate peg (July 2, 1997), the looming financial crisis quickly spread through much of East Asia. How this crisis spread so rapidly from the first victim to the rest has baffled the policy makers and has attracted the attention of a growing number of economists and professionals, all searching for answers.

According to Calvo and Reinhart (1996), herding contagion is rooted in factors that are independent of economic fundamentals. Such contagion is more likely to occur when common shocks or all channels of interdependence are not present or controlled. In other words, a herding framework assumes that individual investors simply follow other investors where market sentiment is the main dynamic force. As Radelet and Sachs (1998) argue, to a foreign creditor the basic economic characteristics of the Southeast Asian countries prior to the crisis were indistinguishable from one another. To them, if Thailand was in trouble, any other country in the region could be next. Therefore, the creditors' mood was to get out of the region as soon as possible, something that potentially could lead to herding behavior in the financial market.

The objective of this paper is to investigate the existence of herding contagion in the stock markets during the financial crisis of 1997. The paper tests for the contagion by analyzing the cross-country time-varying correlations among the stochastic components of the stock prices for the countries of Thailand, Malaysia, Indonesia, Korea, and the Philippines between crisis and tranquil period. The paper recognizes the role of market sentiment and argues that sentiments are very important in capturing herding contagion. The paper uses time-varying correlation coefficients of stocks after controlling the

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macroeconomic fundamentals to capture contagion effect. This issue is certainly very important. If the correlations of residuals are significantly higher than the historical correlations, then we have reason to believe that market sentiments have shifted and the policy makers should move quickly to calm the market.

In line with Baig and Goldfajn (1999) and Forbes and Rigobon (2002), we define contagion as a significant increase in cross-market linkages after an initial shock to one country or a group of countries. Within this framework, test for contagion boils down to verifying if the cross-market co-movements increase significantly after a shock. The argument is: If correlations increase significantly in the crisis period compared to the tranquil period, one may conclude in favor of herding contagion. This happens because international financial markets tend to move more closely together during a period of turbulence. Due to its simplicity, the approach has become a relatively standard tool in the literature on contagion.¹ The basic question is: Was there any evidence of contagion in the Asian stock markets during the 1997 financial crisis? The answer to this ought to be an empirical one. Defining contagion as a substantial increase in the cross-market linkages following a shock² to an individual country (or group of countries), we want to test if such a rise in the stock markets for the economies of Indonesia, Korea, Malaysia, the Philippines, and Thailand did take place after the shock.³

Following the US stock market crash of 1987, the methodology of using a rise in cross-country correlation has become fairly standard in measuring contagion. King and Wadhvani (1990) applied this methodology to the US, the UK, and the Japanese data and found evidence of a significant rise in correlations after the crash. Bertero and Mayer (1990), Hamao, Masulis, and Ng (1990), Karolyi and Stulz (1996), Lee and Kim (1993) also had similar results. Calvo and Reinhart (1996) found evidence of a rise in correlation between weekly returns on equities and Brady bonds for Asian and Latin American emerging markets after the Mexican crisis. Baig and Goldfajn (1999) and Khan, Faridul and Faridul (2005) also found evidence of increased cross-market correlations. On the other hand, Forbes and Rigobon (2002) argued for caution in interpreting the increase in correlations as evidence of contagion since the return correlations can be the product of statistical artifact, particularly when the stock market is more volatile. Using a corrected conditional heteroskedasticity method, they showed that once the bias is adjusted, the evidence of contagion disappears in the Asian crisis of 1997, the Mexican crisis of 1994, and the U.S. stock Market crash of 1987. Recently, Bartram and Wang (2005) and Corsetti, Pericoli, and Sbracia (2005) have questioned the results of Forbes and Rigobon (2002) arguing that the empirical findings rely on particular assumptions about the stochastic process of stock returns. The later authors show that the adjustment produces serious biases in test in favoring the null hypothesis of “no contagion.” Masson (1998) and Pindyck and Rotemberg (1990) used the concept of pure contagion. They argued that co-movements of macrovariables among countries cannot be explained by economic fundamentals alone because market sentiments do have a role.

The contemporary research in the area of contagion uses very high frequency data (daily, weekly, etc.). This limits the ability of a researcher to control for macroeconomic fundamentals and global shocks, which are reported in a different (lower) frequency. Given our interest in herding contagion it is necessary to control for macro-fundamentals and global shocks. Dornbusch et al. (2000) suggested measuring contagion as co-movement that cannot be explained on the basis of fundamentals or global shocks. Calvo and Reinhart (1996) and Chuhan, Classens, and Mamingi (1998) found the evidence to suggest that global shocks are important to adjusting markets. Bencivenga and Smith (1992) and Boyed, Levin, and Smith (2001) found evidence to link macroeconomic environment to financial markets. Thus, in order to capture the herding contagion, we need to control for macroeconomic fundamentals and global shocks, which surely affect the financial markets.

This paper is related to Baig and Goldfajn (1999), with important differences in terms of both approach and methodology. Baig investigated whether or not the cross-country correlations between the macrovariables, e.g., currencies, stock returns, interest rates, and sovereign spreads among emerging markets, increased during the Asian crisis. Our paper examines whether or not the time-varying cross-country correlation among stock returns of the countries involved increased during the Asian crisis, after controlling for fundamental driven factors. The residual filters out the affects of other relevant macroeconomic fundamentals and global shocks. Thus, the correlations obtained from the residuals are expected to better represent market sentiments or herding behavior. We study the correlation dynamics using time-varying approach. Time-varying correlations can capture the market sentiments in a more structured way. A time-varying parameter model can reflect the changing market dynamics more accurately than the constant parameter model. If behavior of the investors is significantly different during the crisis period, as compared to the tranquil period, structural breaks in the correlation dynamics are expected. We investigate the structural breaks in the conditional covariances among stock prices, after controlling for fundamental driven co-movements. Thus, the paper makes an original contribution in understanding the Asian financial crisis and adds to the existing literature.

The paper is organized as follows. Section 2 describes methodology and data. Empirical results are reported in Section 3. Section 4 concludes the paper.

¹ Baig and Goldfajn (1999), Calvo and Reinhart (1996), King and Wadhvani (1990), and Lee and Kim (1993).

² Dornbusch, Park and Claessens (2000) and Forbes and Rigobon (1999) also defined contagion in similar fashion.

³ For Tranquil period, we sampled from January 1994 to December 1996. For the crisis period, our sample is from January 1997 to December 1998. As for the East Asian crisis, Baig and Goldfajn (1999) define the crisis period as July 2, 1997 to May 18, 1998. Thai baht collapsed on July 2, 1997. Park and Song (2000) and Khalid and Kawai (2003) also define the period of the East Asian crisis very similarly with Baig and Goldfajn (1999). Ito and Hashimoto (2002) defined pre-crisis (January 1994–June 1997), and post-crisis period (July 1997–July 1999). Thus, our samples for tranquil and crisis periods are consistent with the existing literature. Also, as the markets calmed down gradually from the end of 1998, contagion should not persist thereafter.

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