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Int. Fin. Markets, Inst. and Money 14 (2004) 281–294

Journal of  
INTERNATIONAL  
FINANCIAL  
MARKETS,  
INSTITUTIONS  
& MONEY

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# Do birds of the same feather flock together? The case of the Chinese states equity markets

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Accepted 26 August 2003

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## Abstract

We examine the equity market price interdependence between China, Hong Kong, Singapore, and Taiwan based on the [Journal of Econometrics 66 (1995) 225] causality test which we bootstrap with leveraged adjustments. A new information criterion is used to choose the optimal lag order. We cover the period January 1, 1993–September 10, 2001 taking into account the Asian financial crisis in 1997. We find that before the Asian crisis, the only interaction among the Chinese markets was between Singapore and the markets of Taiwan and Hong Kong with the causality running from the former to the latter. However, after the Asian crisis, the Chinese equity markets became more interdependent among themselves although Hong Kong remained non-influential.

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*JEL classification:* G15; G11; C32

*Keywords:* Equity market integration; Leveraged bootstrap; Chinese equity markets

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## 1. Introduction

The issue of financial market integration is one whose importance is well-recognised, both from the theoretical and practical point of view. Theoretically, financial integration is a crucial input into international portfolio diversification theory and Mundell-Fleming open economy models. Practically, the international diversification benefits available to investors depend on the linkages between markets. Knowledge of the integration between markets is

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also useful to financial market regulators in terms of the understanding of contagion risks or spill-over effects.

Unfortunately, there is still no conclusive evidence as to the extent of integration between markets. There is a considerable body of literature which has developed but their results vary depending on the theoretical framework, methodology, data and time period covered. Some studies have found that equity markets are integrated (see, for instance, Agmon, 1972; Wheatley, 1988; Hamao et al., 1990; Espitia and Santamaria, 1994, among others) while others reported that equity markets are segmented (see, for instance, Grubel, 1968; Makridakis and Wheelwright, 1974; Adler and Dumas, 1983; Smith et al., 1995).

There is also no clear agreement in the literature as to which markets are significantly linked although the results seem to point to the existence of a linkage between certain groups of equity markets based on some unifying or common factor, such as close regional, economic, and geographical relationships. To et al. (1994) found the following clusters: Japan and Asian emerging markets, and the UK and African emerging markets. Hillard (1979) discovered a close association among intra-continental markets during the oil crisis of 1973 while Jorion (1989) reported a high degree of linkage among European continental markets. An Anglo-Saxon cluster was also reported by Jorion (1989). Thus, there is scope for further research on equity markets interaction and there is a need to examine whether other possible market clusters can be identified.

We therefore re-examine the issue of international financial market interdependence once again. Our study differs from previous studies in two respects. Firstly, we focus on the equity markets of the dragons during the periods before and after the Asian financial crises. The Chinese equity markets represent a very important and logical group of markets to study. First, they share a common factor—that is, the Chinese culture. Previous studies on equity market linkages have found significant relationships among markets with common cultural links. For example, Jorion (1989), as stated earlier, found an Anglo-Saxon cluster. Secondly, these markets have a high degree of economic integration. China, with its abundant labour, serves as the production base while the little dragons—Hong Kong, Taiwan and Singapore, provide the capital and technology (Wu, 2000). There is a very significant level of trade between them. It has been found that countries with close economic ties tend to have more integrated or interdependent equity markets, such as for instance in the case of the US and Canada (Jorion and Schwartz, 1986), and Malaysia and Singapore (Cheung and Ho, 1991). Thus, there is a strong reason to suspect that these markets are integrated and that there is a Chinese equity markets cluster. Thirdly, these Chinese markets are also an economic powerhouse. They represent countries with very high economic growth rates and huge accumulated foreign exchange reserves (World Development Indicators, 2001; Emerging Stock Markets Factbook, 2000).

As far as we know, none of the previous studies has focused exactly on this set of equity markets. There have been a few studies on equity market interaction among the Chinese states but these have included only China, Hong Kong, and Taiwan—the so-called Greater China, and thus, one dragon, Singapore, has been excluded (see, for instance, Huang et al., 2000; Lo and Chan, 2000; Chan et al., 1999). These studies also had only examined the period before and up to the Asian crisis.

Secondly, our study also differs from those of others in terms of the use of an econometric methodology that overcomes problems when the data are characterised by non-normalities

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