NORTH-HOLLAND

Global Finance Journal 12 (2001) 1–33

Global Finance
Journal

Equity market linkages in the Asia Pacific region A comparison of the orthogonalised and generalised VAR approaches

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Received 20 January 2000; received in revised form 8 May 2000; accepted 21 September 2000

Abstract

This study provides an empirical analysis of the linkages between markets, and the efficiency with which innovations between markets are transmitted in the Asia Pacific region, using two competing methodologies. Specifically, this study compares the generalised approach to forecast error variance decomposition and impulse response analysis to the more traditional orthogonalised approach. The findings of this study confirm earlier studies that show the Asia Pacific region to be characterised by informationally efficient equity markets, with a number of these markets showing strong linkages. More significantly, the generalised vector autoregression (VAR) approach is shown to give more realistic results, particularly for those markets with the closest geographical and economic links.
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JEL classification: G15

Keywords: Market linkages; Orthogonalised VAR; Generalised VAR

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1044-0283/01/$ – see front matter © 2001 Elsevier Science Inc. All rights reserved.
PII: S1044-0283(01)00025-4

1. Introduction

Recently, investment in the Asia Pacific region has gained increasing attention. While early literature found evidence of considerable benefits from diversification outside domestic markets, the floating of exchange rates, the gradual removal of trade barriers, and technological advancement have all contributed to increasingly integrated markets. An implication of greater integration amongst world equity markets is stronger comovement between markets, an important concern for investors given that international diversification works best when there is little comovement between markets. The worldwide impact of the stock market crash in October 1987 highlighted how integrated markets have become. The more recent financial crisis centered in Asia (the 'Asian Crisis') confirmed this phenomenon.

This study employs two competing methodologies to examine the comovements between 10 Asia Pacific equity markets. In relation to these equity markets, essentially two questions are addressed. To what extent are markets in the Asia Pacific region linked? What are the key linkages between these markets? How efficiently are innovations in one market transmitted to the other markets in the region? The methodologies used are the generalised approach to forecast error variance decomposition and impulse response analysis and the more traditional orthogonalised approach. The major difference between these approaches is that the orthogonalised approach is dependent on the ordering of the variables in the vector autoregression (VAR) while the generalised approach is not.

Several earlier studies have used the VAR methodology to consider these questions, including Janakiramanan and Lamba (1998) who also studied Pacific Basin markets. Although the results of this study are generally consistent with earlier studies that have used the orthogonalised approach to forecast error variance decomposition and impulse response analysis, the generalised approach used in this study clarifies the nature of a number of the relationships.

2. Literature review

Grubel (1968) was the first to point out that the unique characteristics operating in countries around the world meant that investment in assets denominated outside the domestic market was likely to provide an attractive source of risk reduction opportunities. At that time markets were relatively isolated with international trade less prevalent than it is today. Greater restrictions operated on foreign currency movements and global communication systems were less advanced. Given these points and the unique monetary and fiscal policies that operated in different countries, it was likely that comovement between foreign assets would be lower than between domestic assets. The early empirical evidence including Agmon (1972), Grubel and Fadner (1971), Lessard (1973, 1974, 1976), Levy and Sarnat (1970), and Solnik (1974) was consistent with Grubel's (1968) conjecture.

Granger and Morgenstern (1970) did note that in the case of a financial crisis, those linkages between markets that did exist were likely to be much stronger. In fact, Hilliard (1979) confirmed this in his study of markets during the 1973–1974 OPEC crisis. Hilliard

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