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Pre- and post-1987 crash frequency domain analysis among Pacific Rim equity markets

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Abstract

This paper uses the method of cross spectral analysis to examine pre- and post-1987 crash comovements among several Pacific Rim markets. The results support increased post-crash comovements among the markets. Each of the pairwise median coherences was greater in the post-crash period. The same is true for the post-crash mean coherences, with one exception. The nonparametric Wilcoxon Z statistics indicate that the pre- and post-crash coherences were drawn from different populations in seven of the eight pairwise market comparisons. Phase lead results indicate that the post-crash phase leads in four of the eight pairwise comparisons were smaller than in the pre-crash period, while post-crash phase leads did not fall in any of the market comparisons. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

Increased world trade has intensified the interest in the integration of world equity markets. Along with increased trade, increases in communications and capital flows have contributed to the globalization of business activity. It has long been a tenet of investment that international diversification can reduce risk in portfolios. Increasing equity market integration tends to reduce this diversification,

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reducing the benefit of reduced risk. The question is, 'Are equity market movements around the world disparate enough to provide the diversification benefit?' Even though trade, communications, and capital flows have tended to make the world 'smaller', to what extent is international equity diversification a benefit to investors?

There are now many articles, using differing methods, which examine the comovement of equity markets around the world. One of the most used methods is the ARCH/GARCH family of models, which test for volatility spillovers. Darbor and Deb (1997) used bivariate GARCH models (December 1989 through December 1992) to conclude that each bivariate pair (Japan/Canada, UK/Canada, US/Canada, UK/Japan, US/Japan, UK/US) of markets showed evidence of 'transitory correlation'. Only the US/Japan pair indicated a lack of 'permanent correlation'. Employing the trivariate EGARCH model, Koutmos and Booth (1995) found price spillovers from New York to Tokyo and London, and from Tokyo to London. Susmel and Engle (1994) used a bivariate ARCH model with hourly data and found volatility spillovers last, 'only an hour or so'. Theodossiou and Lee (1993) employed the multivariate GARCH-M model to find volatility spillovers among a subset of five markets (US, UK, Canada, Germany, and Japan) from January 1980 to December 1991. Hamao et al. (1990) used a trivariate GARCH model with daily data (April 1985 to March 1988) to test for volatility spillovers from New York, London, and Tokyo. They presented evidence of volatility linkages. Booth et al. (1997) employed a trivariate VAR to investigate volatility spillovers in US, UK, and Japanese equity index futures markets. These results indicated that volatility in the US and UK markets is a reaction to shocks from the other markets, supporting the argument that these markets are becoming more interdependent. The Japanese stock index futures markets appear somewhat more isolated.

Other methods, which focus on price spillovers, have been used as well to study market linkages. Koch and Koch (1991) estimated an eight market (Japan, Australia, Hong Kong, Singapore, Switzerland, West Germany, UK, and the US) simultaneous equations model for three separate years: 1972, 1980, and 1987. They found evidence of, 'several clusters of markets that display substantive interaction on the same day'. Brocato (1994) estimated six market (US, UK, Canada, Germany, Hong Kong, and Japan) VARs: one for the early 1980s and another for the latter years of the 1980s. His variance decompositions yielded many linkages among these markets, with the US role diminishing post-March 1984. Eun and Shim (1989) estimated a nine market (US, UK, Canada, France, Germany, Switzerland, Hong Kong, Japan, and Australia) VAR and concluded that a substantial amount of 'interdependence' existed among these markets: 1980–1985.

A further issue is the temporal nature of diversification. Do benefits from diversification accrue to international investors in the short term or is diversification a long run concept? Taylor and Tonks (1989) employed cointegration analysis to conclude that low correlation among equity markets occurs in the 'short term'. Meric and Meric (1989) compared correlation matrices of international equity markets to test for intertemporal stability. Tests were performed which compared the pairwise correlation matrices of nine adjacent 1.5-year subperiods for 17 countries. The tests were also conducted for four adjacent 3-year and two adjacent

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