

Volatility dependence and contagion in emerging equity markets

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Abstract

In this paper, we use weekly stock market data for a group of Latin American countries to analyze the behavior of volatility through time. We are particularly interested in understanding whether periods of high volatility are correlated across countries. The analysis uses both on univariate and bivariate switching volatility models. Our results do not rely on the correlation coefficients, but on the co-dependence of volatility regimes. The results indicate that high-volatility episodes are, in general, short-lived, lasting from 2 to 12 weeks. We find strong evidence of volatility co-movements across countries, especially among the Mercosur countries. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

In the aftermath of the East Asian and Russian crises of the 1990s, a number of authors have argued that capital mobility has gone too far, creating a highly unstable international financial system. Some analysts have even argued that the emerging countries should implement policies aimed at slowing down capital flows. Specific proposals have included imposing a Tobin tax on foreign exchange transactions, and introducing controls on capital inflows (see Edwards, 1999).

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In this paper, we use data from a group of Latin American and Asian countries to investigate two issues that have been at the center of recent debates on the international financial system. First, we analyze whether the degree of financial instability has indeed increased during the last several years. We do this by analyzing weekly behavior of stock market returns. Second, we investigate whether periods of increased stock market volatility coincide across countries. Understanding these issues has a number of important policy implications. Indeed, supporters of the imposition of capital controls have largely based their views on the notion that periods of financial instability are transmitted across countries.

We address these issues by using both univariate, as well as multivariate techniques. We first follow a variant of Hamilton and Susmel's (1994) SWARCH methodology, to identify breakpoints in an ARCH model of the conditional variance of stock market returns. A particular attractive feature of this approach is that it allows us to date periods of unusually high volatility. We find that, although the degree of volatility does change through time, it has not experienced, in any of our countries, a secular increase. Our results indicate that in most (but not all) countries, the "unusually high volatility states" are short-lived. We also find that these periods of "high volatility" tend to roughly coincide across some countries.

Our analysis departs from other work in the area in that we also use a multivariate extension of the SWARCH model to explore whether there are co-movements in stock market volatility across countries. This type of analysis is particularly important in current debates on financial "contagion" across countries. Indeed, the existence of statistically significant co-movements in volatility can be interpreted as providing some evidence regarding the presence of contagion. In particular, a simultaneous increase in the (conditional) variance of stock returns would have important implications for the interpretation of traditional models of contagion, based on detecting break-points in simple returns correlations across countries—see Forbes and Rigobon (1999).

Since multivariate SWARCH models are highly intensive in computing time, in this paper we restrict its application to pairs of countries. The bivariate SWARCH model allows for dependence not only through the correlation coefficient, but also through the Markov matrix, which determines the different volatility states. We find evidence for state-dependent correlations, where the high volatility states tend to be related to international crises. During high volatility periods due to international crisis, correlations among Latin American emerging stock markets increase between two to four times. We find strong evidence of volatility dependence among all Latin American markets. We also find that Hong Kong, which we take as an emblematic representative of the Asian financial crisis of 1997, does not show a nonlinear state dependence with most of the Latin American nations.¹

¹ In a companion paper, we use data for all five countries to analyze "volatility comovements" in domestic interest rates. See Edwards and Susmel (2000).

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