Discussion

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Toni Gravelle, Maral Kichian, and James Morley have written a very interesting paper that seeks to improve our understanding of asset-market linkages and dynamics during financial crises. The authors contribute to the burgeoning literature on contagion by developing a bivariate regime-switching model to detect whether the relationship between two asset markets changes during a crisis. This model is applied to weekly data from seven developed foreign exchange markets and four Latin American bond markets. Gravelle, Kichian, and Morley observe some evidence of contagion between developed currency markets, but none between emerging bond markets. From a public policy perspective, these findings suggest that shocks between Latin American bond markets are transmitted through long-term linkages, and short-run policies would likely not mitigate their adverse effects.

The econometric framework outlined in the paper has many attractive features. It allows normal and crisis regimes to be determined endogenously rather than being assigned exogenously, as is common in the literature. In addition, the regime-switching model is flexible enough to allow common and idiosyncratic shocks to the two asset markets to be in separate volatility regimes in any period. The model also performs well insofar as it is able to accurately identify from the data past turbulent periods, such as the Mexican peso crisis of 1994, the Asian crisis of 1997, and the Russian/Long-Term Capital Management crisis of 1998.

I have a few comments about this paper. The first concerns the authors' tests for the presence of shift contagion. They define shift contagion as occurring "when the propagation of shocks during crisis periods increases systematically from that observed during normal times" (see p. 85). This definition is similar to the one offered by Forbes and Rigobon (2000), who

describe shift contagion as "a significant increase in cross-market linkages after a shock to one country or region." Underlying both definitions is the notion that linkages between markets must have increased for contagion to have occurred. How can we test whether cross-market linkages have changed?

Consider the following simple model based on Forbes and Rigobon (2000). Let two asset returns, x_t and y_t, be described as follows:

$$y_t = \beta\, x_t + \gamma\, z_t + \varepsilon_t,$$

$$x_t = \alpha\, y_t + z_t + \eta_t,$$

$$E(\eta_t' \varepsilon_t) = 0, E(z_t' \varepsilon_t) = 0, E(z_t' \eta_t) = 0,$$

$$E(\eta_t' \eta_t) = \sigma^2_{\eta_t}, E(\varepsilon_t' \varepsilon_t) = \sigma^2_{\varepsilon_t}, E(z_t' z_t) = \sigma^2_{z_t},$$

where z_t is a common shock, and ε_t and η_t are idiosyncratic and independent shocks. According to this model, shocks are transmitted from the market x_t to the market y_t through the parameter β, and from y_t to x_t through the parameter α. The common shock has different effects on the two markets (with the coefficient on z_t in market x_t normalized to one), and is independent of the idiosyncratic shocks.

Solving for the reduced-form equations, we have:

$$y_t = \frac{1}{1-\alpha\beta}[(\gamma+\beta)z_t + \beta\eta_t + \varepsilon_t],$$

$$x_t = \frac{1}{1-\alpha\beta}[(1+\alpha\gamma)z_t + \eta_t + \alpha\varepsilon_t].$$

The existence of shift contagion could be ascertained by testing whether α and β are different between crises and normal periods. It is possible to view the framework presented by Gravelle, Kichian, and Morley as one in which $\alpha = 0$ and $\beta = 0$ in all states of the world, yielding the following:

$$y_t = \gamma\, z_t + \varepsilon_t,$$

$$x_t = z_t + \eta_t.$$

Consequently, the paper effectively tests whether there is a change in the magnitude by which the common shock (through γ) influences asset returns during crises compared with normal periods. In this model, however, changes in exogenous common shocks do not affect cross-market linkages

and therefore do not generate contagion. For example, suppose that two countries are exporters of a commodity whose world price decreases sharply. Then, asset prices in the two countries may both decrease simultaneously, and correlations between the markets may increase. However, the propagation mechanism of shocks *between* the two markets would not have changed, and so the exogenous commodity price shock would not generate shift contagion.

It seems to me that to properly test for the existence of shift contagion using the authors' framework, it would be necessary to separate the effects of other market shocks from those of common shocks in the equations describing asset returns. This would admittedly be a difficult econometric problem to solve, and would likely require making a number of simplifying assumptions.

My second comment concerns the econometric methodology in the paper. To better assess the specification of the econometric model, I think that it would be helpful if the authors reported the results of residual diagnostic tests. In particular, it would be interesting to see how well the model captures the ARCH (autoregressive conditional heteroscedasticity) effects in asset returns documented in the paper.

Based on their analysis, Gravelle, Kichian, and Morley conclude that shift contagion does occur between developed currency markets. While this finding may be accurate from a statistical perspective, it would be interesting to determine whether the contagion is economically significant. How strong is the contagion? I feel that the paper would benefit from the inclusion of these additional data.

Finally, I have a few suggestions for extensions to the paper. The authors find no evidence of contagion between emerging bond markets using their model, but does this observation also hold for other emerging financial markets? It would be especially interesting to study emerging currency markets in light of the financial crises that the world has witnessed in the past decade.

In designing their regime-switching model, the authors use unconditional probabilities to model the transitions between high- and low-volatility regimes. In adopting this somewhat restrictive structure, the authors are unable to capture persistence in the data from the likelihood of an asset remaining in the same volatility regime from one period to the next. Tackling the estimation of the more general model with conditional probabilities would undoubtedly be a challenge, but the resulting framework should enable us to gain deeper insights into the nature of asset-market dynamics during financial crises.

Reference

Forbes, K. and R. Rigobon. 2000. “Contagion in Latin America: Definitions, Measurement, and Policy Implications.” National Bureau of Economic Research Working Paper No. 7885.