Università
Ca'Foscari
Venezia

Discussion

"A MEM-based Analysis of Volatility Spillovers in East Asian Financial Markets"

by Robert F. Engle, Giampiero M. Gallo and Margherita Velucchi

Carlo Giannini Conference
Rome, January 19-20, 2010

Summary

Authors specify a **vector Multiplicative Error Model** where volatilities are modeled directly

Volatilities are approximated by the **daily ranges**

Spillovers are represented by a significant links across markets and the behaviour in the crisis is accommodated by allowing for a different dynamic behaviour during a specific period (dummy variable)

The proposed MEM-based approach allows Authors to investigate the mechanisms of volatility spillovers from one market to another by enlarging the list of predetermined variables for the expected volatility and including volatility proxies of other markets

Authors also propose dynamic forecast profiles and nonlinear impulse response functions

Authors analyze the interdependence and dynamic transmission mechanisms of volatility across East Asian markets during 1990-2006 with a focus on the **Asian crisis period** (1997-1998) (eight markets in a simultaneous structure)

Results

Build-up in the volatility transmission in the case of the major episode of the Asian crisis

No effects in the case of the terrorist attacks of September 11

Full interdependence confirmed by the analysis of the responses to shocks, with Hong Kong having a major role as a net creator of volatility

Model choice

Authors specify a **Gamma distribution** for error terms, but no details is given on the multivariate structure: multivariate Gamma distribution or the univariate Gamma are related by some copula?

Is it possible to consider other types of distribution with positive support? Log-normal or Weibull?

The model allows the description of volatilities and to relate them by introducing cross terms, but nothing is said about covariances, differently from multivariate GARCH. Are they implicitly defined or they can be added as additional equations, if a good proxy is available?

Regarding the multivariate dimension, Authors work with 8 series. Is this a small or big dimension for a vector MEM?

Volatility proxy choice

Authors consider the **daily range**. Other proxy are available like realized volatility or absolute returns

An evaluation of the robustness of the results with respect to the proxy choice could be interesting.

Crisis period definition

Authors do not discuss the definition of the crisis periods: it is **fixed a priori** July 2, 1997 – Dec 31, 1998

Some other windows can be considered:

- the largest window considered by Forbes and Rigobon (2002, JF) for the same crisis is June 1, 1997 – March 1, 1998.
- Billio and Caporin (forthcoming CSDA) according to a sequential testing procedure select the period July 23, 1997 – Dec 10, 1997

Moreover, Billio and Pelizzon (2003, JEB) analyse the sensitivity of contagion tests to the window choice and show how this choice can be really relevant

Authors analyse only **two crises**: the Asian Flu and September 11, thus implicitly assume that there are no others crises in the sample (July 14, 1995 – Oct 3, 2006). Have this been tested?
Contagion literature usually recognises at least 4 other crises: the 1998 ‘‘Russian Cold,’’ the 1999 Brazilian devaluation, the 2000 Internet bubble burst, and the July 2001 default crisis in Argentina

Estimation

In the paper there are few details concerning the estimation procedure. Authors define a simultaneous system, but the estimation seems to be performed equation by equation and in two steps (parameters ϕ_i have been estimated on the standardized residuals by a method of moments approach)

A multivariate estimation procedure is possible according to Cipollini, Engle and Gallo (2006) and, as they demonstrate, the loss of efficiency can be considerable and the selection procedure can be affected by a single equation estimation

Authors present autocorrelation tests but nothing is said about a possible correlation among error terms and its relevance

In table 4 no-spillovers tests are presented and for all markets rejected. Anyhow, looking at the increase in the loglikelihoods (table 4) and the number of additional parameters estimated in the selected model, in some cases it seems that the additional parameters are not overall significant (see KO and TA).

KO – MEM(1,1)	
Base	Selected
-3696.633	-3694.599

Forecasts and non linear impulse response functions

Conditional on the information available at time *t*, Authors forecast the volatility several step ahead, by substituting the conditional expectations. In doing that, dummy variables remain fixed at time *t*, but the parameters have been estimated for different lagged effects.

$$\boldsymbol{\mu}_{t+1} = \boldsymbol{\omega}^* + \boldsymbol{\delta} DC_t + \boldsymbol{\lambda} PC_t + \mathbf{B}\boldsymbol{\mu}_t + \mathbf{A}^* \mathbf{hl}_t + \boldsymbol{\Gamma} \mathbf{hl}_t DC_t + \boldsymbol{A}_2 \mathbf{hl}_{t-1}$$

$$\begin{aligned} \boldsymbol{\mu}_{t+2} &= \boldsymbol{\omega}^* + \boldsymbol{\delta} DC_t + \boldsymbol{\lambda} PC_t + \mathbf{B}\boldsymbol{\mu}_{t+1} + \mathbf{A}^* \boldsymbol{\mu}_{t+1} + \boldsymbol{\Gamma} \boldsymbol{\mu}_{t+1} DC_t + \boldsymbol{A}_2 \mathbf{hl}_t \\ &= \boldsymbol{\omega}^* + \boldsymbol{\delta} DC_t + \boldsymbol{\lambda} PC_t + \left(\mathbf{B} + \mathbf{A}^* + \boldsymbol{\Gamma} DC_t\right) \boldsymbol{\mu}_{t+1} + \boldsymbol{A}_2 \mathbf{hl}_t \end{aligned}$$

It would be eventually helpful to consider <u>different models for different forecast horizons</u>, avoiding to replace the conditional expectations and to be sure to use the correct effects.

To be able to judge the non linear impulse response, **confidence intervals** would be helpful. If an asymptotic approximation is not available, a bootstrap approach can be taken into account

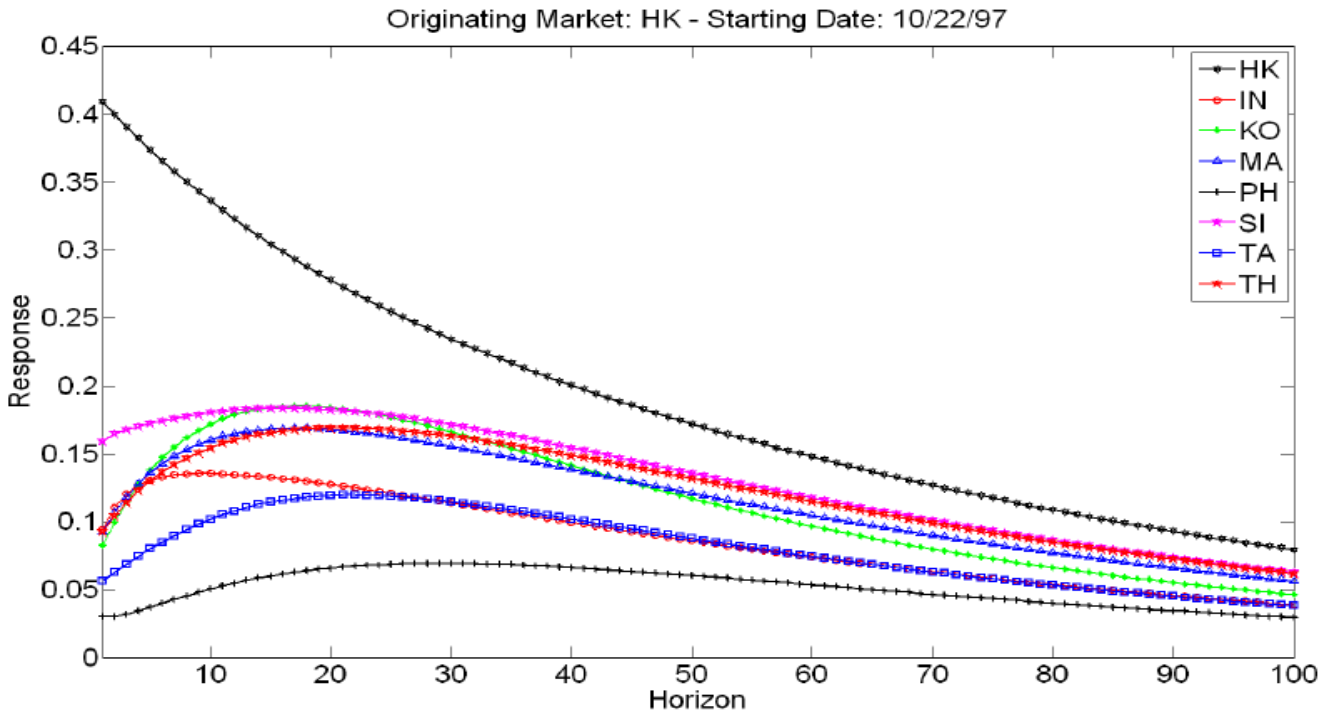

Figure 5: MEM Impulse Response Functions. Each line shows markets relative response to the shock originating in Hong Kong (Oct., 22, 1997).

Finally

A comparison with a GARCH model would be interesting.

A suggestion can be a VARMA-GARCH model (Ling-McAleer 2003, ET) with the same dummy variables, a complete set of ARCH effects (also cross effects), and diagonal GARCH effects to allow the equation by equation estimation

An evaluation of the dynamics of the last financial crisis would be certainly appealing