

**Discussant comments on
High and low frequency correlations in global equity markets**

Robert F Engle and Jose Gonzalo Rangel

Prepared for the BIS CCA Conference on
“Systemic risk, bank behaviour and regulation over the business cycle”

Buenos Aires, 18–19 March 2010

Discussant*: Roberto Rigobon

Affiliation: Massachusetts Institute of Technology

Email: rigobon@mit.edu

* These comments reflect the views of the author and not necessarily those of the BIS or of central banks participating in the meeting.

COMMENTS ON
HIGH AND LOW FREQUENCY CORRELATIONS
IN GLOBAL EQUITY MARKETS

ENGLE AND RANGEL

By

Roberto Rigobon

OBJECTIVE

- Estimate a conditional variance model that allows for changes in the correlation structure.
- Estimate different relationships in the short and long run.
- Evaluate the patterns of comovement in the recent crisis

A VERY NICE POINT

- Difference between conditional and unconditional restrictions for the estimation.
- Explain intuition in the standard OLS framework

$$y_i = \alpha x_i + \varepsilon_i$$

$$E[x_i' \varepsilon_i] = 0$$

- The identifying assumption is the orthogonality condition. That needs to hold unconditionally (full sample) but not in a subsample.

A VERY NICE POINT

- In fact, for a subsample (A)

$$E[x_i' \varepsilon_i] = E[x_i' \varepsilon_i | A] \Pr(A) + E[x_i' \varepsilon_i | \tilde{A}] \Pr(\tilde{A})$$

if

$$E[x_i' \varepsilon_i | A] \neq 0$$

then

$$E[x_i' \varepsilon_i | \tilde{A}] = -E[x_i' \varepsilon_i | A] \frac{\Pr(A)}{\Pr(\tilde{A})}$$

A VERY NICE POINT

- Typically we do not pay attention to this, and run the exact same regression in any subsample. When we do that we are truly assuming:

$$E[\varepsilon_i | x_i] = 0$$

- Which is much stronger than what we need

$$E[x_i' \varepsilon_i] = 0$$

A VERY NICE POINT

- We make the exact same mistake in IV
- This paper uses implications to estimate or differentiate the long and short run.
- Also, the paper uses the exact same trick to differentiate between conditional and unconditional moments.

RESULTS AND LITERATURE

- The results are not surprising at all (and the references are missing).
 - Emerging markets are more sensitive.
 - Known as the curse of non investment grade.
 - Frankel, and even I have papers on this
 - Solving asynchronous trading in exactly an application that looks at contagion.
 - Connolly and Wang (99) have a paper on the exact same issue
 - Correlation changes during crises times
 - Huge literature on contagion
- Nothing here seems terribly surprising.

PARAMETRIZATION

- To estimate the model with changes in the correlation structure they impose a parametrization
 - Is there a validation of these assumptions?
 - From the theoretical point of view this is the wrong model.
 - DSGE models of asset pricing and contagion actually have direct implications on the covariances and variances.
 - The correlation structure is the outcome of each of these different mechanisms, i.e. those models do not produce a linear model of the correlation.
- Validity of the results depend on the parametrization

DEFINITION OF LONG

- Short versus long run (high versus low freq.)
 - What is the long run?
 - When the covariance between idiosyncratic shocks and global shocks is zero? This is a very strange definition of long run.

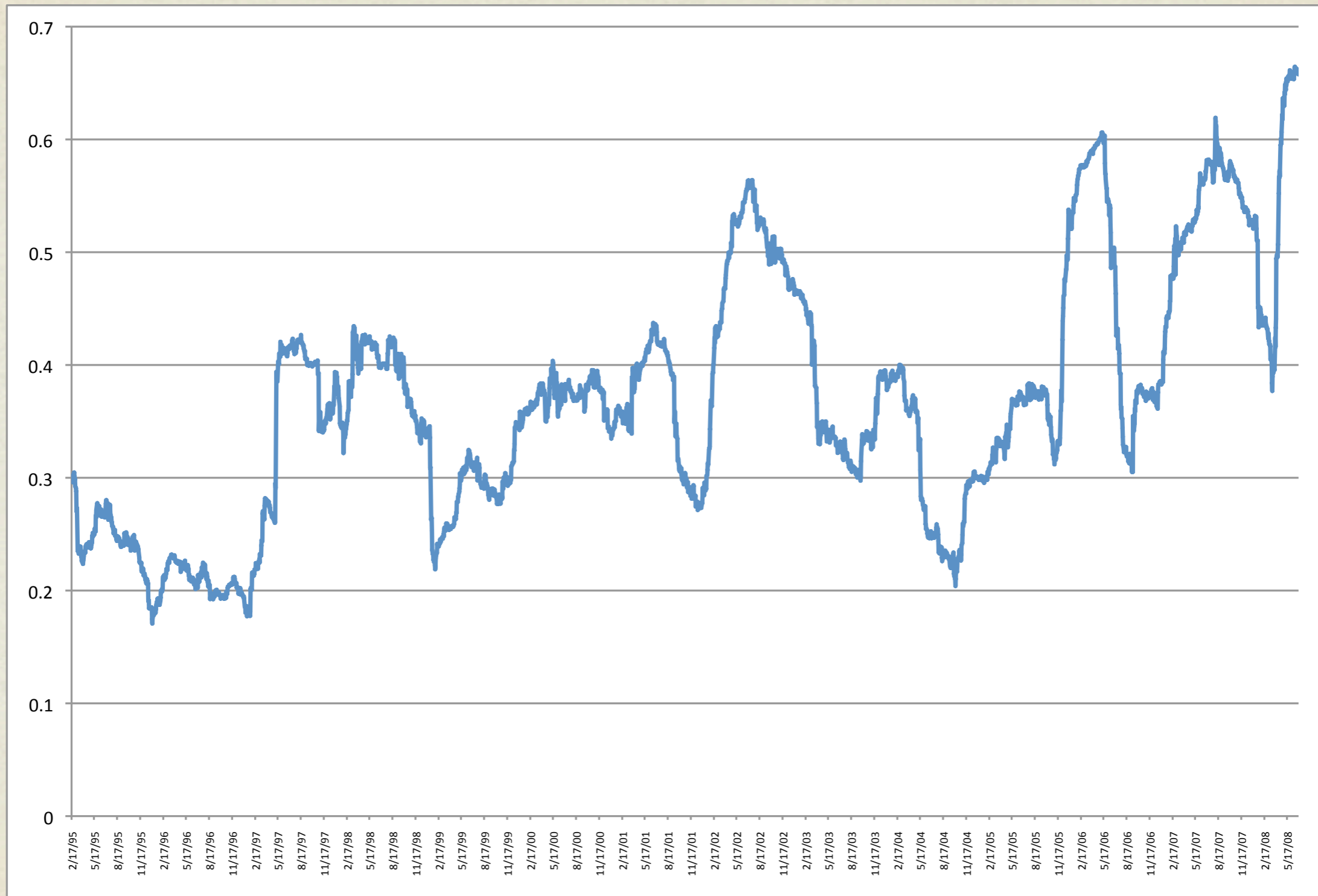
RESULTS

- Measure of contagion
- Correlations increase during crisis
- Emerging markets are more sensitive to these crisis (they are more correlated)

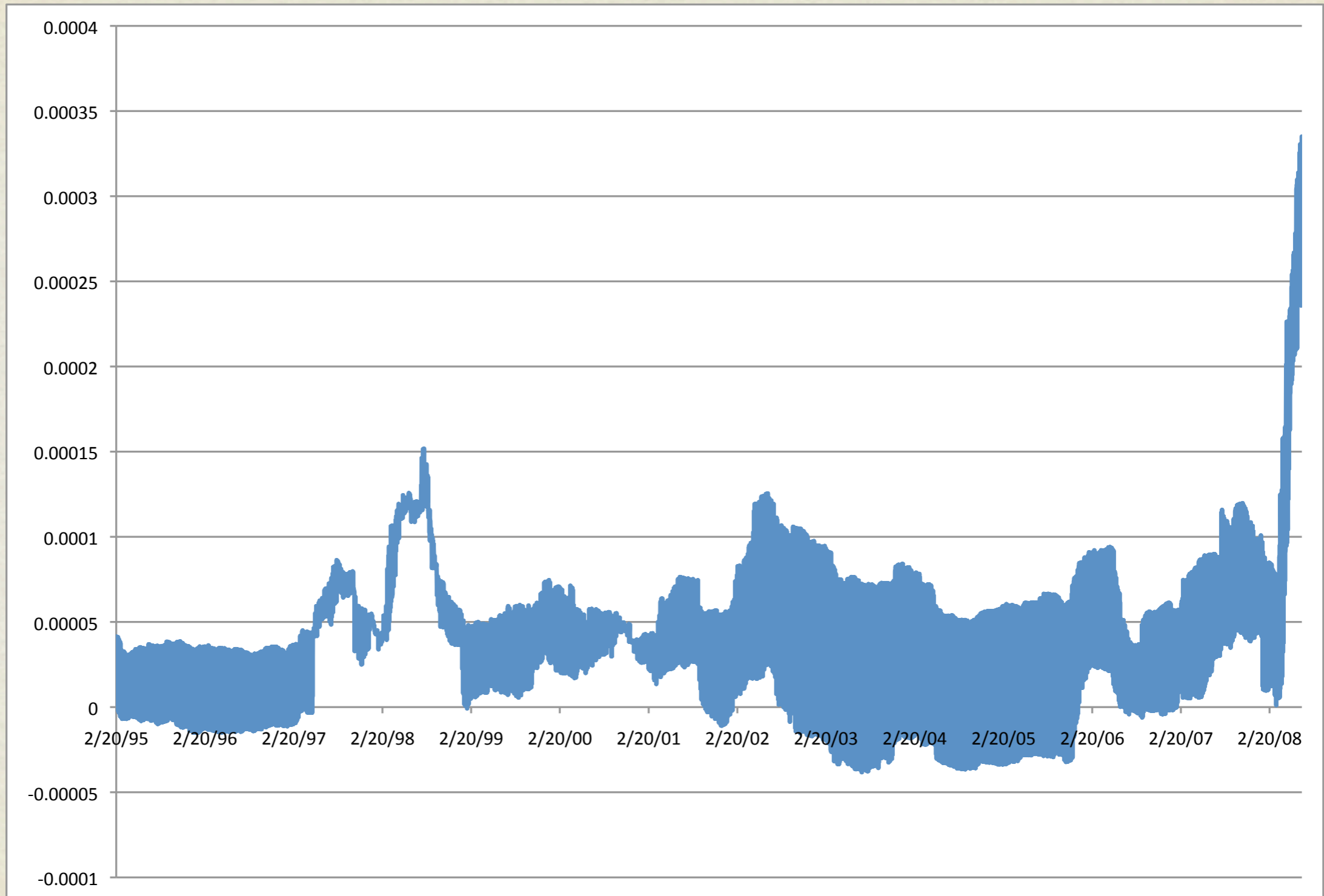
MEASURES OF CONTAGION

- Estimate the level of systemic risk as
 - Non parametric and model free:
 - Variance explained by the first principal component
 - Based on a formal model of financial frictions;
 - Change in the covariance

PRINCIPAL COMPONENTS



CHANGE IN COVARIANCE



SENSITIVITY

- Sensitivity of a country to systemic risk is not necessarily measured by the correlation coefficient.
- In fact, the authors do have a problem explaining several countries because correlations might move in the wrong direction (figures 6 and 7, page 23)
- I measure sensitivity as the explanatory power that the measure of systemic risk has (R-square)
- I measure this in the recent crisis (since jan 2007)

R-SQUARE

