“Near-Coincident” Indicators of Systemic Risk

by Laura Kodres et al.

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What is value of nearly coincident indicators?

- 5 minute warning on Tsunami
- Roots of a financial crisis may go back years...crisis may be inevitable, just the timing is in question
- Nearly coincident indictors may give some early warning...days, weeks, maybe even months
Develops a measure of systemic stress
- Large fraction of FI with sharp stock price falls

Investigates whether nearly coincident indictors—1 to 52 weeks—helps predict “events”

Considers systemically important FI in U.S. and Euro Area

Long tradition of predicting crises
- Innovation here is higher frequency, using market asset prices as events, and using various indicators available at reasonably high frequency
Could effective Macro Prudential Policies Limit value of coincident indicators?

- Assume macro-prudential policies in place and effective...set of circuit breakers that would stop full blow financial crisis
- Bank stocks wouldn’t noise dive even when “near coincident” indicators reach threshold levels
- Result is that “near coincident indictors” don’t predict stress, since stress is avoided

Version of Lucas Critique
Some issues

- In Sample Predictions...biggest (admitted) problem
  - Most work on forecasting financial asset prices based on out-of-sample
  - See Cheung-Chinn-Pasquel (2005; for exchange rates): use MSE, Direction of Change and Consistency Criteria— all with statistical properties versus alternative (RW) model
  - Adrian-Brunnermeier (2010) use CoVar to do (casual) out-of-sample prediction of financial crisis
  - Problem with “one event” sample

- False Positives
  - Analysis of false predictions is important
  - If too many false positives— “some signal, but lots of noise also”--then policymakers ignore
  - Glick-Hutchison: Twin Crisis predictions found false positives give different picture of value of leading indicators
  - Problem with “one event” data sample
Some Issues (continued)

- **Non-linearities**
  - A number of researchers find “two states” of world: one for tranquil periods, one for turbulent periods (e.g. Aizenman-Jinjarik-Hutchison on link of debt levels to CDS spreads)
  - Implies estimates of “leading indictors” with tranquil sample may not be helpful to predict high stress periods
    - Solution: need repeated crises? Basic problem.

- **Financial data**
  - Basic problem is that everything is caused by same driving factors
  - Usefully high frequency, but nothing is “predetermined”...why results are mixed?
Size of institutions

- A simple fraction of financial institutions with major declines in stock prices may miss importance of institution size and inter-connectedness...even though all may be systemically important

- S&L crisis: failure of 1,043 out of the 3,234 (and stock collapses in virtually all S&Ls...not 25% but 99%) in U.S. 1986 to 1995...but not entire financial system failure

- How to choose Systemically important?

- Collapse of LTCM & Lehman did create risk of contagion/systemic failure
### Test 1: Some specific comments

- Lag length tests?
- Seasonality at 52 weeks...explain yield curve measure?
- (Granger p-value score + lag length score)/2 = total score; summary measure of importance of prediction: but ad hoc (apples and oranges)? statistical measure?

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**Table 3. Test 1—Granger Causality of Systemic Risk Measures to the Event Indicator for the U.S. Sample**

<table>
<thead>
<tr>
<th>p-Values for Granger Causality Tests with Various Lags 1/</th>
<th>Scores 2/</th>
<th>p-Values for t-Test at Each Lag 3/</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit Suisse Fear Barometer</td>
<td>0.122</td>
<td>00.000</td>
<td>00.000</td>
</tr>
<tr>
<td>Time-varying CoVaR</td>
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<td>00.000</td>
<td>00.000</td>
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<tr>
<td>Rolling CoVaR</td>
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<td>00.021</td>
<td>00.243</td>
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<td>DD banks</td>
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<td>00.750</td>
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<tr>
<td>Systemic Liquidity Risk Index</td>
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</tr>
<tr>
<td>Diebold-Yilmaz</td>
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<td>00.049</td>
<td>00.002</td>
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<tr>
<td>JP0D</td>
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<tr>
<td>Systemic CCA</td>
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<td>00.116</td>
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<tr>
<td>Libor-OIS spread</td>
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<td>00.000</td>
<td>00.000</td>
</tr>
<tr>
<td>VIX</td>
<td>0.000</td>
<td>00.000</td>
<td>00.000</td>
</tr>
</tbody>
</table>

Note: Black boldface values are significant at 1 percent level. Red boldface values are those with no two-way causality and significant at the 1 percent level.

1/ Granger Causality (GC) tests with lag-lengths specified in each column.
2/ Equal to the number of lags if the p-value is less than 0.01 and no two way causality, 0 otherwise.
3/ Based on ordinary least squares regression that regresses the Systemic Financial Stress (SFS) indicator on various lags of itself and the risk indicators; the p-values are for the t-tests for each of the lags in the same regression. The lag-length score is the weighted average of the p-values if the p-value is less than or equal to 0.01.
Test 2: Logit models (specific comments)

- Standard approach to predicting crises
  - Usually (0, 1) for banking crisis, currency crisis, sudden stop, twin crisis

- Drops information by taking continuous variable into (0, 1) crisis dummy
  - Appropriate if “qualitative” variable– e.g. systemic banking crisis
  - But here we have a continuous “event” variable

- Similar aggregation of scores may be problematic
Test 3: Quandt-Andrew Breakpoint (specific comments)

- The Quandt-Andrews Breakpoint Test tests for one or more unknown structural breakpoints in the sample for a specified equation. A single Chow Breakpoint Test is performed at every observation between two dates, or observations. The test statistics from those Chow tests are then summarized into one test statistic for a test against the null hypothesis of no breakpoints between the two dates.

- Uses entire sample...so again an in-sample test for breakpoints, not very useful for forecasting equations ex ante.
Overall

- Important, useful, topical
- In early stages of development
- Biggest theoretical problem: successful stabilization (macro-prudential) decouples indicators from “events”...but linkages is there
  - Problem of measuring counterfactual
- Biggest technical problem: only one event during sample...largely precludes standard out-of-sample forecast tests
- Policy works with “what is” not “what we would like to have” and exercises like this are essential to good policy
- Looking forward to future work in the area!