Using Policy Intervention to Identify Financial Stress

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The views expressed herein are those of the authors and do not necessarily reflect the view of the Board of Governors or the Federal Reserve System.
(Another) Stress Index

- Financial Conditions Indexes and Financial Stress Indexes have proliferated since 2007
  - Academic
  - Institutional
  - Commercial

- Our index
  - Extension of ideas begun by Roberto Perli and William Nelson in 2004
  - Designed as an aggregate indicator to aid policymakers
  - Stress, not Conditions, Index
This Paper

- The purpose of the paper is two-fold
  - Describe the construction of our index
  - Discuss some of the issues regarding how financial stress indexes are constructed

- Our index
  - High-frequency, dating back to mid-1990’s
  - Policy-oriented stress index

- Stress/Conditions indexes in general
  - Why so many? How are they different?
    - Many different goals/concerns = proliferation of indexes
  - Form should follow function, care is needed
Four Issues of Indexes

1. Financial Stress vs. Financial Conditions
2. Input Data Characteristics
3. Data Combination Strategy
4. History as a Guide
   A. What is “stress”? 
   B. Updating
Variables

- Liquidity Measures
- Risk Spreads
- Investor Uncertainty
Variables (cont.)

Our Variables

- Limited number, standardized, aggregated into a “Level Subindex”
Variables (cont.)

- Our Variables
  - Limited number, standardized, aggregated into a “Level Subindex”

![Graph showing CLN Levels Sub-index, Bloomberg Index, and FRB St. Louis Index from 1994 to 2010. The CLN Levels Sub-index is shown in black with a solid line, the Bloomberg Index in red with a dotted line, and the FRB St. Louis Index in blue with a dotted line. The graph highlights significant spikes in 2004 and 2008.]

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Important Characteristics of the Data

- Most indexes tend to focus on levels
- Our index examines
  - Levels
    - Average of standardized series
  - Volatility
    - Average of sum of squared daily changes over a 4-month rolling window.
    - Inclan and Tiao (1994) show that this is a metric of changes in volatility in backward-looking analysis
  - Comovement
    - Share of total variation of all series explained by a single common factor over a 4-month rolling window.
Volatility and Comovement

Volatility

Comovement
Using the Sub-Index Data

- Combine the three important characteristics of the data based on their behavior during historical stress episodes.

- To determine stress events, we identify US policymaker interventions based on two broad types of concerns:
  - Concerns for a specific US institution
  - Concerns about impairment in the functioning of specific US financial market

- Primarily Fed action, but includes Treasury and FDIC

- Monetary policy actions, even those of non-traditional policy, are not included
Historical Stress Episodes

- **Examples:**
  - FRB action to find a buyer for LTCM
  - Extraordinary actions in funding markets following September, 2001
  - A number of interventions related to the crisis of 2008-2009

- **Caveat:** No gradations of events

- **Windows**
  - Stress episodes are the windows 4 weeks on either side of the event/announce date
  - To allow for capturing both the buildup of stress and the immediate result of the policy intervention
  - Announcement date for programs
Logistic Regression Model

Logistic regression model of the form:

\[ p_t = P(\beta_0 + \beta_LL + \beta_VV + \beta_CC) \]

which is a logit model regressing the three sub-indexes on the stress window indicator.

- All the coefficients are significant in the model
- The data spike in 2008-2009 makes the significance results of the volatility sub-index sensitive to window parameterization in volatility calculation
**Stress Index**

Using the fitted logit regression, we find the stress index.
Stress vs. Conditions

- **Stress Measures**
  - Concerned with fragility and functioning
  - Liquidity changes
  - Looking fundamentally at tail events

- **Conditions Measures**
  - Concerned with overall size/composition of financial costs
    - Household wealth, borrowing costs
    - Business cost of capital, lending standards
    - Condition of monetary policy, exchange rates
  - Evidence of macro predictive power
History

- What looks like a crisis in comparison to 2008?
  - One-sided or two-sided data examination
- Our index removes *some* of the subjectivity in using historical experience
  - Or at least moves it to the debate about window sizes
Updating

- Methodology allows for automatic updating of what is NOT a crisis.
- “Types” of crises, variable relationships
- 2008 specific concerns
  - Crisis follows a broadening of data availability for certain financial products
  - Crisis was preceded by a time during which risk and uncertainty were likely under-priced
Conclusion

- Our stress index
  - A useful tool for policymakers
  - An automatically updated series we can make available by request

- Stress Indexes
  - Different from Conditions indexes
  - Use determines design
  - History and updating methodology are important