

Using Policy Intervention to Identify Financial Stress

Mark Carlson
Kurt Lewis
William Nelson

Division of Monetary Affairs
Federal Reserve Board

August 10, 2012

The Usual Disclaimer...

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

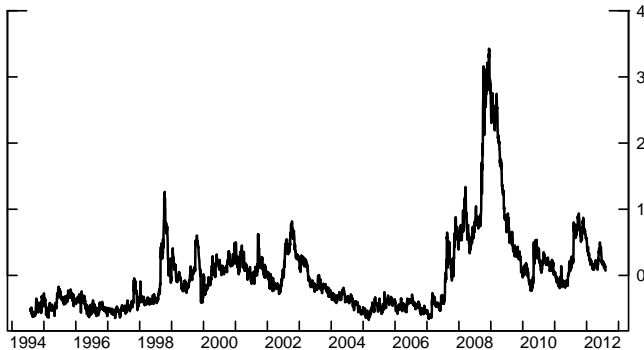
Variables

- ▶ Liquidity Measures
- ▶ Risk Spreads
- ▶ Investor Uncertainty

Variables (cont.)

► Our Variables

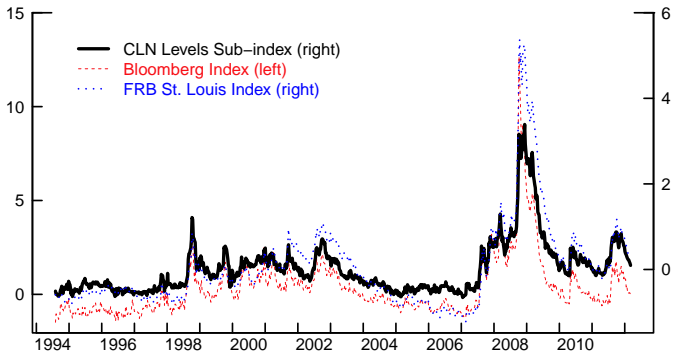
- Limited number, standardized, aggregated into a “Level Subindex”



Variables (cont.)

► Our Variables

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

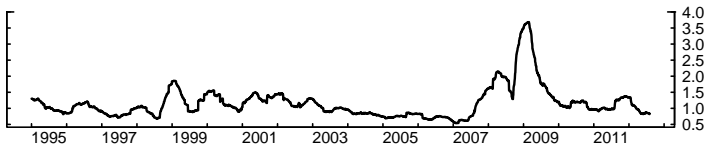


Important Characteristics of the Data

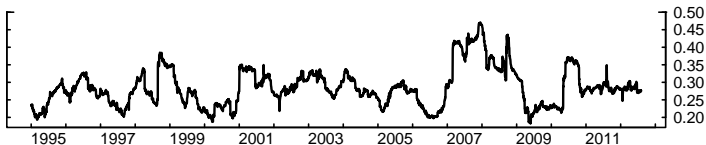
- ▶ Most indexes tend to focus on levels
- ▶ Our index examines
 - ▶ Levels
 - ▶ Average of standardized series
 - ▶ Volatility
 - ▶ Average of sum of squared daily changes over a 4-month rolling window.
 - ▶ Inclan and Tiao (1994) show that this is a metric of changes in volatility in backward-looking 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:

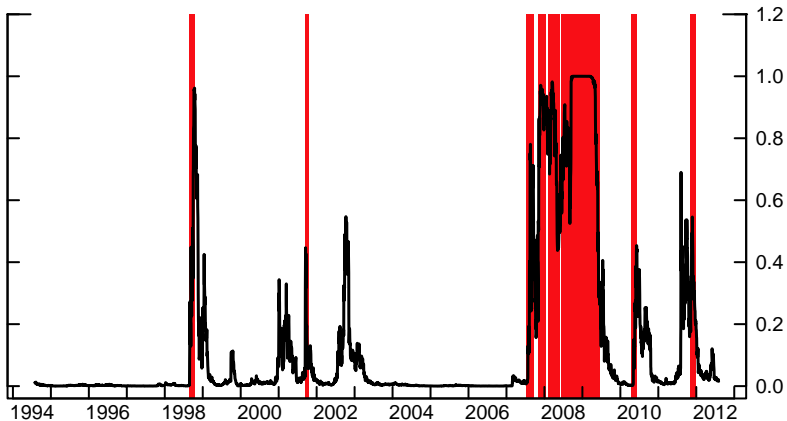
$$p_t = P(\beta_0 + \beta_L L + \beta_V V + \beta_C C)$$

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