Motivation

• The global financial crisis highlighted the importance of financial factors for the real economy

• Long tradition linking risk appetite to business fluctuations
  — Keynes “animal spirits”, Minsky “financial instability hypothesis”, etc
  — How do risk appetite, credit and monetary policy interact?

➢ Implications for policy: Use monetary policy to “lean”? Macropru?
Our paper

• We characterize the time series of the credit-to-GDP gap and “risk appetite,” 1975 to 2014

• We estimate VAR models of the macroeconomy and monetary policy
  — Augmented with our risk appetite measure and the credit-to-GDP gap
  — Threshold VAR allows for nonlinear dynamics

• We characterize the response to
  — Risk appetite shock
  — Monetary policy shock

• We split the sample into periods when the credit-to-GDP gap is high or low to test for nonlinearities
Key empirical results

• Our risk appetite measure
  — Is an indicator of financial conditions and is expansionary
  — But can lead to a higher credit-to-GDP gap and recession

• Dynamics are nonlinear depending on credit-to-GDP gap. When gap is high:
  — ALLM shocks lead to recessions
  — Monetary policy is ineffective

• Monetary policy
  — Is not effective and does not cool risk appetite when the credit gap is high
  — Using Hanson-Stein (2015) framework, less transmission to far future yields when the credit gap is high
VAR specification

• U.S. macro data 1975:Q1 to 2014:Q4

• Log real GDP, GDP deflator, unemployment rate, Federal Funds rate

• Risk appetite variable ("ALLM") – asset valuations and lending standards in 4 sectors (HH, business credit, CRE, and equity market)

• Candidate vulnerability measures
  — Credit-to-GDP gap (focus here today)
  — Household vs. business credit; bank vs. nonbank
  — ALLM

• We define a measure to be a vulnerability if an impulse to the measure leads to an economic contraction
VAR dynamics

• Shocks are identified using the Cholesky decomposition with shocks ordered as in the monetary policy literature
  — Monetary policy reacts to all shocks in a period
  — The vulnerability measure reacts to all shocks within a quarter save monetary policy
  — The unemployment rate, the GDP deflator, and real GDP react to shocks to the vulnerability measure and monetary policy with a one-quarter lag

• Estimate the VAR following Giannone, Lenza, and Primiceri (2015)
  — Bayesian technique specifies a prior that each variable follows a random walk, possibly with a drift; this reduces estimation uncertainty and leads to more stable inference.
Threshold VAR

- Nonlinear estimations – high vulnerability qualitatively different because the system might be susceptible to self-fulfilling negative dynamics
- Effectively estimate system on disjoint sets depending on whether the candidate vulnerability is above/below its mean
- We don’t model transitions from one state to another

\[
y_t = c^j + A(L)^j y_{t-1} + u^j_t \begin{cases} j = \text{high, if } \widehat{CY}_t > 0. \\ j = \text{low, if } \widehat{CY}_t \leq 0. \end{cases}
\]
Credit-to-GDP and trend

Private nonfinancial credit-to-GDP gap

Quarterly
Credit-to-GDP
Trend

Q1

Ratio

0.8 1.0 1.2 1.4 1.6 1.8

Note: Trend calculated using an HP filter with lambda = 400,000.
Source: Financial Accounts of the United States, and staff calculations
Credit-to-GDP gap (CY)

Note: Trend calculated using an HP filter with lambda = 600,000.
Source: Financial Accounts of the United States, and authors' calculations.
Risk appetite
Components of risk appetite

Note: The figure presents the component series of the risk appetite index. In computation of the index, these four components are respectively weighted by 2/10, 3/10, 2/10, and 3/10. Source: Authors’ calculations.
Shock to risk appetite is expansionary...
...even with the credit/GDP gap...
...but nonlinear effects: when CY is high, leads to a recession
Monetary policy shock works as expected in a linear system...
...but is ineffective when CY is high...
...and when CY is growing
Attenuation by horizon (Hanson-Stein, 1975-2014)
Conclusions

• Key findings:
  — Credit-to-GDP gap matters for economic dynamics
  — When credit gap is low, increases in risk appetite lead to sustained increases in output; but when it is high, such increases lead (with a lag) to contractions
  — Monetary policy transmission is blunted when the credit gap is high, consistent with evidence of less transmission to distant forward rates

• Implications:
  — Policymakers have an added incentive to prevent the credit gap becoming excessive; relative merits of using macropru vs monetary policy?
  — What leads to high credit-gap states; role of demand or supply? Do it matter for the vulnerabilities we document?