Discussion of BCS Paper on SBC

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Overview

- Develop complete model of financial boom/bust cycle
- Requires non-linear computational approach
  - Asymmetries present with financial crises
  - "Shock-elasticities" vary with credit conditions
    - With linear approx: shock elasticities depend on credit conditions within a local region of the steady state

Overview (con't)

- Burgeoning literature on non-linear comp. of financial crises model:
  - Mendoza, Bianchi, Brunnermeier/Sannikov, He/Krishnamurthy
- Bottom line: Important research agenda
- Key issues involving mapping to real world
  - Main limitation of non-linear methods: restricted state space
  - How well can models capture what really happened

Model Basics

- Two states: tfp z_t and capital k_t
- k_t allocated between firms and storage
- Households lend capital to firms via banks
- Inter-bank market reallocates capital from inefficient to efficient banks
- Crisis: Inter-bank market collapses if return to capital $R_t < \overline{R}$
  - Only efficient banks lend capital to firms
  - Inefficient banks use storage technology $\rightarrow$ output collapse

Inter-bank Market

$\rho \equiv$ inter-bank rate; $\phi \equiv$ leverage; $p \in [0, 1] \equiv$ bank efficiency

- bank profits (per unit of assets)

$$\max\{pR_t + (pR_t - \rho_t)\phi_t,\ \rho_t\}$$

- moral hazard:
  - borrowing bank can renege on debt
  - can divert $1 + \theta\phi_t$ to a storage technology earning $\gamma \leq 1$

- private information: p unknown to lender

Inter-bank Market (con't)

- Only way to align incentives:
  - make lending in IB market more attractive than borrowing and re-neging:

$$\rho_t \geq \gamma(1 + \theta\phi_t)$$

- Key implication: leverage ratio ϕ_t INCREASING in interbank rate

$$\phi_t = \frac{\rho_t - \gamma}{\gamma\theta}$$

  - Crucial for why low value of R_t leads to market collapse

- Key to result: Private information about bank's franchise value $pR_t + (pR_t - \rho_t)\phi_t$.

Inter-bank Market (con't)

- Without private information about franchise value:

$$pR_t + (pR_t - \rho_t)\phi_t \geq \gamma(1 + \theta\phi_t)$$

$\Rightarrow$ Leverage ratio DECREASING in inter-bank rate

$$\phi_t = \frac{pR_t - \gamma}{\theta - (pR_t - \rho_t)}$$

- Empirical question as to which approach is appropriate
  - Inter-bank rates do vary by bank (suggesting franchise value matters).
  - Alfonso/Kovner (2010): No clear link between volume and rate in IB market

Crisis (Inter-bank Market Breakdown)

- drop in $R_t \Rightarrow$ banks at margin shift from borrowing to lending
  - $\Rightarrow$ interbank rate ρ_t declines as relative supply of interbank funds rises
  - $\Rightarrow$ decline in ρ_t reduces leverage (which reduces demand)
- Below threshhold $\overline{\rho}$ the market collapses
  - Loan demand falls with ρ_t due to leverage effect
  - $\Rightarrow$ decline in ρ_t cannot eliminate excees supply
- $\overline{\rho}$ implies threshhold for $\overline{R}$ for R_t

Mechanics of Crisis Probability

- After solving out for n_t and imposing parameter values $\Rightarrow$ no crisis region

$$R_t = \alpha z_t^2 k_t^{-1/3} + 1 - \delta \geq \overline{R}$$

- Crisis probability π_t: effective probability innovation in $z_t \Rightarrow R_t \leq \overline{R}$
  - Key point: π_t is increasing in k_t

- To move into crisis region (starting at SS)
  - * z_t has to drop $6 - 7$ % (holding k constant)
    * k_t has to increase $35 - 40$ % (holding z constant).

Some Implications

1. Endogenous vulnerability (due to high k_t) takes a long time (decades) to build up.

   (a) One percent in k_t leads to small reduction in R_t ($\sim$ 4 to 5 basis points)

   (b) Big percentage increases in k_t can occur slowly over time.

2. Feeding U.S. data into model: Minimal endogenous vulnerability before recent crisis.

   (a) Pattern of TFP shocks $\Rightarrow$ k_t and z_t near steady state in 2007.

   (b) Crisis due to large negative TFP shocks.(not utilization adjusted).

Figure 8: Typical path (I)

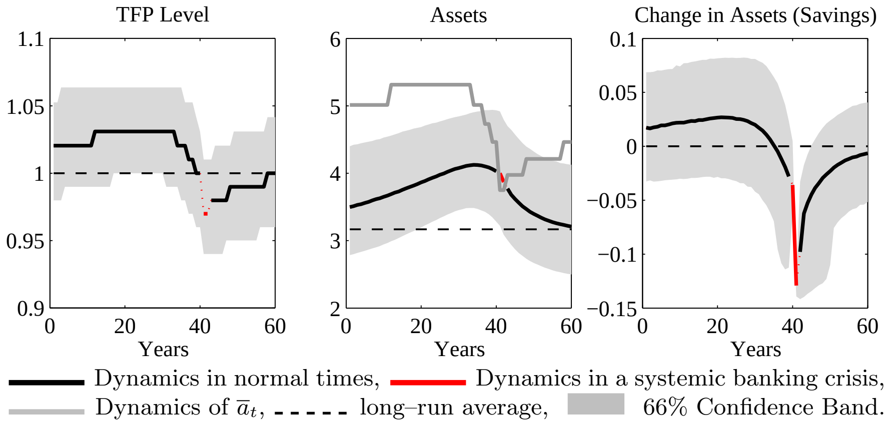
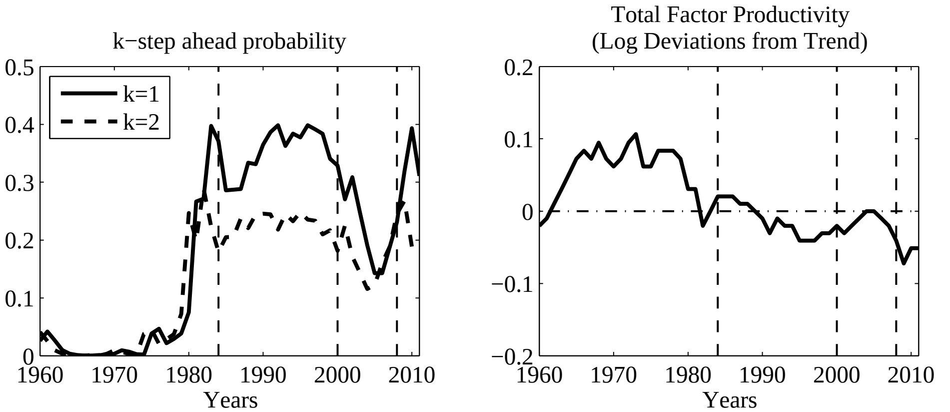
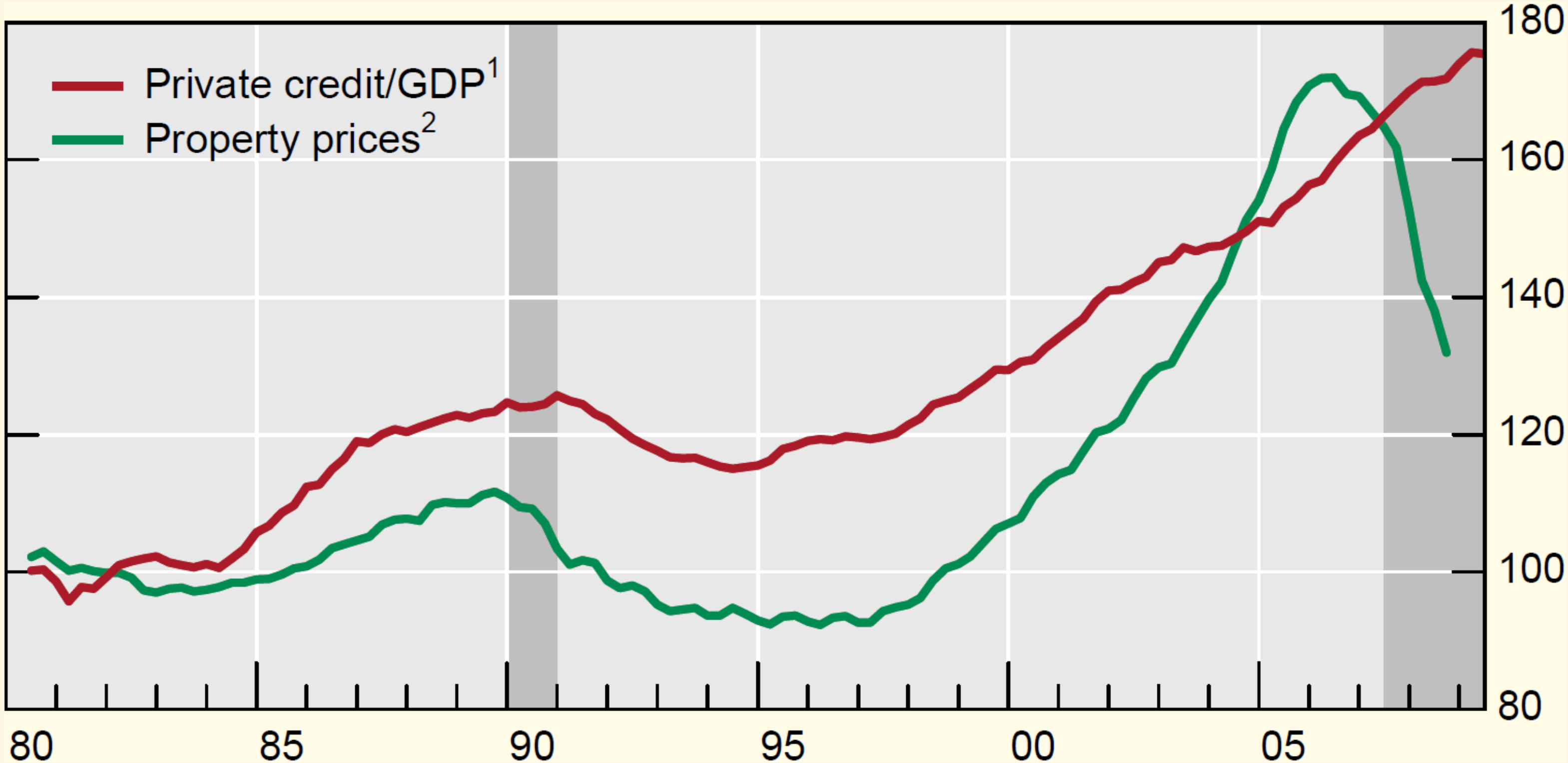


Figure 19: k–step ahead Probabilities of a Financial Crisis (k=1,2)



Note: The vertical thin dashed lines correspond to the 1984 Savings & Loans, the 2000 dotcom and 2008 crises.

Private credit/GDP ratio and property prices
United States



Vertical shaded areas indicate the starting years of system-wide banking crises.

[1] In per cent. [2] Aggregated index including residential and commercial property prices; 1985 = 100.

Source: National data.

Mechanics of Recent Boom/Bust Episode

- Conventional "financial accelerator" mechanism accounts for bust
  - Asset price contractions hit leveraged borrowers in key sectors (banks, households)
  - Weakened balance sheets tighten credit constraints, and so on.
- Other "nonlinear" approaches incorporate financial accelerator mechanism
  - Mendoza, Bianchi, Brunneremeir/Sanikov, He/Krishmmurthy
  - Explain bust but lack good explanation for build-up in vulnerability
- Possible sources of rapid asset price/credit booms
  - Deregulation/ Relaxed Lending Standards (while keeping "Too-Big-Too-Fail")
  - Bubbles/News Shocks (see Bernanke/Gertler 1999 and Christiano et. al 2010 for early attempts.)

Summary

- Interesting contribution to important literature

- More work on mapping from model to data would be useful