Collateral Requirements and Asset Prices

Johannes Brumm, Michael Grill, Felix Kubler, Karl Schmedders

Discussion by: Ctirad Slavík

May 30, 2011

Introduction

- The big question addressed in this paper:

  Can collateral (credit) constraints amplify business cycle and asset price fluctuations?

- Answer: YES.

Outline

- Model.
- Main results.
- Related literature and open questions.

Model

Physical environment and agents:

- Pure exchange, ∞ horizon economy.
- Cash-flow identical Lucas trees.
- Epstein-Zin agents heterogeneous in preferences, endowment streams and initial asset holdings.

Asset markets:

- Shares in Lucas trees (cannot go short).
- 'Riskless' bonds:
  - heterogeneous in collateral requirements (endogenous),
  - heterogeneous in default probability (endogenous),
  - default cost λ,
  - no punishment for default.

Equilibrium Comparison

- Benchmark: single bond w/o default.
- Endo collateral requirements: WLOG consider $S - 1$ bonds.
- Exo capital-to-value (margin) ratios $\Rightarrow$ (different) endogenous collateral requirements.

Quantitative Analysis

- 2 (types of) agents:
    - 10% of less risk-averse agents,
    - 90% of more risk-averse agents.
    - Why these numbers? What are they calibrated to match?
- 8% of per period endowment divided through dividends.
- I.i.d. disaster states à la Barro and Jin (2009).

Single Tree Model Results

- Fairly large asset return volatility even in the standard incomplete markets model, coming from disasters?
- Added asset return volatility with collateral constraints.
- Single vs. multiple bonds and costly default seem to play minor role.
- (State dependent) margin regulation decreases volatility significantly.

Two Equal Cash Flow Tree Results

- 2 trees of equal size, 4%.
- Tree 1 can ($\sim$ housing), tree 2 cannot ($\sim$ stocks) be used as collateral, proceed w/o default.
- Quantitatively significant *collateral premium*.
- Overall lower return volatility, in particular for tree 1.
- Margin regulation of tree 2 affects return volatility of both trees, decreases for tree 1.

Discussion

- Persistent income processes?
- Data comparison? S&P500 versus housing versus aggregate stock market?
- Interesting and possibly policy relevant.
  - BGKS ask: How to decrease volatility?
  - Q1: Why is that good? Welfare comparison?
  - Q2: Other policy options? Provide more collateral?
- What if the amount of collateral was not fixed (endowment vs. production economies)?

Production Economies and the Question

- Kiyotaki, Moore (1997): credit constraints *theoretically* amplify business cycle and asset price fluctuations.
- Kocherlakota (2000), Gomes, Yaron and Zhang (2003), Arias (2003), Cordoba and Ripoll (2004): *quantitatively* TFP shocks won't work.
- What does 'work'?
  - Liu, Wang, Zha (2011): collateral asset demand shocks.
  - Nezafat, Slavik (2010): financial shocks, collateralizability shocks; works for asset prices and investment, not for output.
  - Gourio (2010) and Gourio (2011): disasters.

But this is not your ballpark!

Pure Exchange Economies

- Your model is a pure exchange economy (no production).
- You cannot really analyze *business cycle* fluctuations.
- Question: would your results carry over?
- Mechanisms that 'work' in pure exchange, but not in production economies.
  - Habit persistence (Campbell and Cochrane, 1999, vs. Lettau and Uhlig, 2000)
  - Long run risk (Bansal and Yaron, 2004, vs. Croce, 2009).

Disasters?

Gourio (2011): financial frictions (limited enforcement and default) propagate changes in disaster risk probability, but:

- Disasters very severe: TFP and stock of K$\downarrow$ by 50% (similar to BGKS).
- Need disasters to *happen* to get asset price volatility.

Questions:

- What happens in your model in sample paths w/o disasters?
- What happens in your model w/o disasters?
- How would your results change with production?
  Gourio's results suggest you should get some action as well.

Summary

- Nice paper addressing an important question and offering interesting answers.
- Most important conclusions:
  - Large asset return volatility arising from financial frictions and disasters.
  - Margin policies can decrease volatility.
- Suggestions:
  - Tighter link to the data.
  - More explicit policy analysis.
  - Add production?

Literature

Arias, A. F., 2003. Quantitative Implications of the Credit Constraints in the Kiyotaki-Moore (1997) Setup, Working Paper, CEDE, Universidad de los Andes.

Bansal, R. and A. Yaron, 2004. Risks for the Long Run: A Potential Resolution of Asset Pricing Puzzles, *The Journal of Finance* 59, 1481-1509.

Barro, R. and T. Jin, 2009. On the Size Distribution of Macroeconomic Disasters, mimeo.

Campbell, J. Y. and J. H. Cochrane, 1999. By Force of Habit: A Consumption-Based Explanation of Aggregate Stock Market Behavior, *Journal of Political Economy* 107, 205-251.

Cordoba, J. C. and M. Ripoll, 2004. Credit Cycles Redux, *International Economic Review* 45, 1011-1045.

Croce, M. M., 2009. Long-Run Productivity Risk: A New Hope for Production-Based Asset Pricing?, mimeo.

Gomes, J. F., Yaron, A. and L. Zhang, 2003. Asset Prices and Business Cycles with Costly External Finance, *Review of Economic Dynamics* 6, 767 - 788.

Gourio, F., 2011. Credit risk and disaster risk, mimeo.

Gourio, F., 2010. Disaster risk and business cycles, mimeo.

Kiyotaki, N. and J. Moore, 1997. Credit Cycles, *Journal of Political Economy* 105, 211-248.

Kocherlakota, N. R., 2000. Creating Business Cycles Through Credit Constraints, *Federal Reserve Bank of Minneapolis Quarterly Review* 24, 2-10.

Lettau M. and H. Uhlig, 2000. Can Habit Formation Be Reconciled with Business Cycle Facts?, *Review of Economic Dynamics* 3, 79-99.

Nezafat, P. and C. Slavik, 2010. Asset Prices and Business Cycles with Financial Frictions, mimeo.

Default Cost Specification

- Let $f_j(s^t)$ be the payout (1 if no default).
- With default, $f_j(s^t) < 1$ is the collateral value and default costs (borne by the lender) and net payout are:

$$
\begin{aligned}
l_j(s^t) &= \lambda \left[1 - f_j(s^t)\right] \\
r_j(s^t) &= \max\{0, f_j(s^t) - l_j(s^t)\}
\end{aligned}
$$

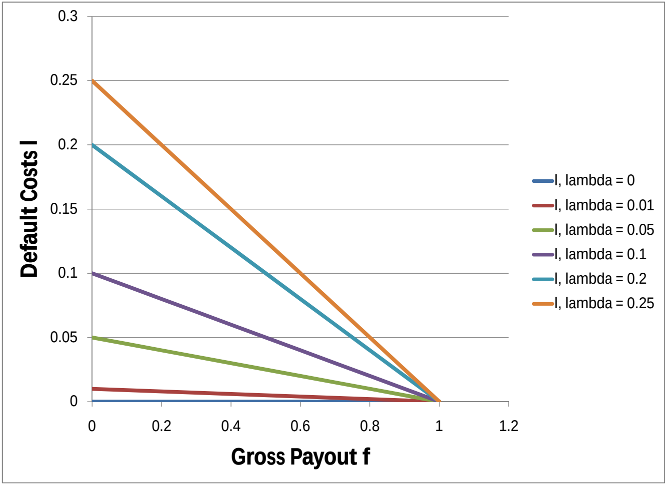
- BGKS say: Convenient because continuous.

Default Cost Specification

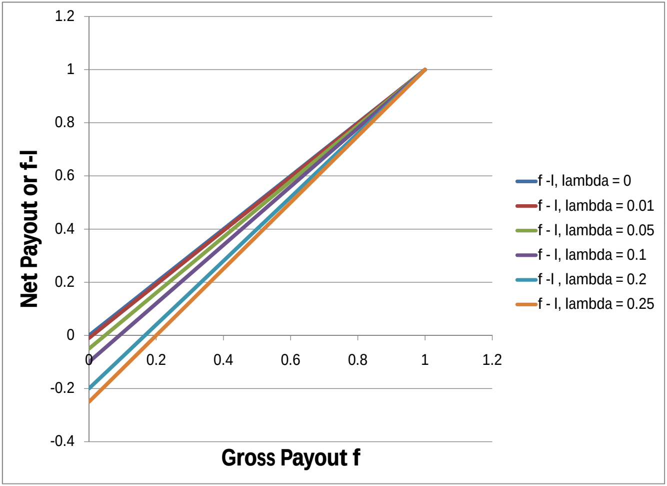
Questions:

- Why default costs decreasing in $f_j(s^t)$?
- Who bears the costs when $f_j(s^t) - l_j(s^t) < 0$?
- Why default costs borne by the lender?
- What are the costs supposed to represent/measure?
- Interestingly: don't seem to matter quantitatively.

Default costs decreasing in $f_j(s^t)$:



Who bears the costs when $f_j(s^t) - l_j(s^t) < 0$:



The ‘true’, paid default costs: