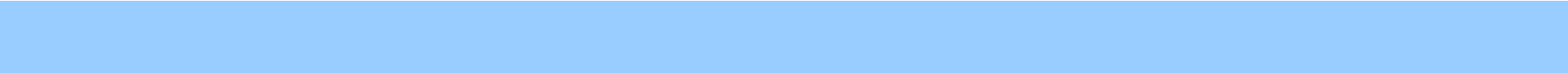


Discussion Of  
**“Intermediary Leverage Cycles and Financial Stability”**  
by Tobias Adrian and Nina Boyarchenko

Paul Glasserman  
Columbia Business School

Day Ahead Conference  
Federal Reserve Bank of Philadelphia  
January 2, 2014



## Overview

- An amazing paper. A *tour de force* model of the “leverage-volatility cycle”
- Some background: Adrian-Shin (2008) find that financial intermediaries increase leverage when volatility is low, pushing prices up; then cycle reverses with leverage and prices dropping and volatility increases
- This paper provides a dynamic equilibrium model that captures further compelling features of this intermediary “leverage-volatility cycle” documented empirically in a series of Adrian et al. papers, including
  - Procyclical leverage
  - Procyclical supply of credit
  - A positive price of risk associated with FI leverage

## Key Features of the Model

- Two agents: households and financial intermediaries
- Two assets: productive capital and FI debt
- Two types of shocks: liquidity shocks and productivity shocks
- Households can hold both types of assets; two roles for FIs:
  - Only FIs can increase the stock of capital through investment
  - FI debt completes the market, allowing households to hedge risks
- Households choose portfolios to maximize utility of consumption paths
- FIs invest to maximize a mean-variance objective subject to a VaR constraint that ties leverage to asset volatility
- Equilibrium heroically found in closed form, and implications deduced through explicit expressions and numerical examples

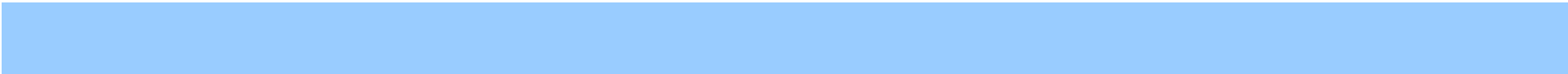
## Uncovering the Price of Risk for FI Leverage

- Equilibrium household consumption yields a pricing kernel with risk prices for the fundamental shocks – liquidity and productivity
- Key step: A “factor rotation” replaces the original shocks with shocks to leverage and output
- This requires two equations
  - Link between productivity and output (standard)
  - Binding VaR constraint ties leverage to asset volatility (special to model)
- Result is a pricing kernel based on shocks to output and leverage – *observable*
- Contrast: With a constant leverage constraint, only a single factor matters, liquidity risk is not priced, liquidity shocks not amplified by FI
  - Stark contrast for regulation
  - Short-cut way to read the paper: compare the two cases



## **A Great Paper Inspires Interesting Questions**

- What type of intermediaries?
- Model of financial distress and systemic risk
- Interpretation of the liquidity shocks



## What Type of Intermediaries?

- What makes these *financial* intermediaries? Couldn't they be entrepreneurs?
- What motivates leverage constraint? How does the unregulated world look?
- Link between leverage and volatility is more immediate for trading than banking
- Adrian-Shin (2008) contrasted procyclical leverage for broker-dealers with constant leverage for commercial banks;
  - A-B argue otherwise, connecting lending conditions to VIX, but empirical results are all for broker-dealers
- The distinction has implications for how “productive” the growth in FI leverage is
  - Alternative narrative: investment banks increasing leverage by re-securitizing a fixed base of real assets that changes slowly (Shin 2009)
- Possible interpretation of A-B: Effects of procyclical leverage arise *even under the most positive interpretation of the role of bank leverage*
  - But are pro-growth implications of FI leverage overstated?

## Financial Distress and Systemic Risk

- The paper measures systemic risk as the probability of FI failure
- Households don't consider this risk and treat the FI debt as default-free
  - Presumably for tractability, but merits some discussion
- At FI failure,
  - FI defaults on debt, despite having positive equity
  - Value of equity goes upWhy these choices?
- Again, more discussion would be welcome

## Liquidity Shocks

- Preference shocks (stochastic time preferences) are crucial to the model
- Paper uses multiple interpretations for the preference shocks
  - Liquidity shocks
  - Time-varying risk aversion
  - Changes in beliefs
  - Preference for early resolution of uncertainty
- Liquidity shock seems to fit best with the rest of the story
  - But optimal consumption remains a fixed fraction of household wealth, regardless of preference shocks
- It would be helpful to more fully develop one interpretation





## Bottom Line

- A must-read paper
  - A fundamental contribution to the macro-finance literature
  - My congratulations to the authors
- 