Discussion of “Which Financial Frictions?”
by T. Adrian, P. Colla and H. Shin

Guido Lorenzoni

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Heterogeneity

• Models with financial frictions distinguish “special” agents from other investors
• E.g. Kiyotaki-Moore “farmers” and “gatherers”

• **Special agents**: can extract more utils from some asset, so they are that asset’s natural buyers

• Crucial observation: the balance sheet of these agents matters
• In applications to banking, the special agents are the banks
• What is the source of this heterogeneity?
  • Differences in technology (Kiyotaki-Moore)
  • Differences in beliefs (Geanakoplos)
  • Differences in risk-aversion (Garleanu-Pedersen, this paper)
Leverage

Initial balance sheet

\[ n = (p + d) k - (1 + r) b \]

Balance sheet after investment decision

\[ pk' = n + b' \]

If shock to asset price

\[ \Delta n = \Delta p \cdot k \]
Leverage

\[ L = \frac{b'}{pa'} \]

In standard balance sheet models \( L \) does not move much

\[ \Delta [pk] \approx \frac{1}{1 - L} \cdot \Delta n \]

ACS: for banking sector is mostly

\[ \Delta [pk] \approx \Delta \left[ \frac{1}{1 - L} \right] \cdot n \]
• Maybe we should look at elasticities rather than level changes

\[
\frac{\Delta [pk]}{pk} \approx \Delta \left[ \frac{1}{1-L} \right] \cdot n + \frac{1}{1-L} \cdot \frac{\Delta n}{n}
\]

• Marginal leverage versus average leverage

• What really matters for transmission mechanism is how a dollar of capital that frees up can be reinvested
• Example household: average leverage is countercyclical because $b$ and $k$ do not move much while $p$ moves

• However, does it mean that a household could buy, say, a car with the same downpayment when house prices go down?

• For a pure security firm, marginal leverage $=\text{average leverage} = \text{margin}$
Value at risk

Model idea: relation between risk, leverage, and risk premia

Risk goes up $\rightarrow$ VaR banks delever $\rightarrow$
$\rightarrow$ Risk averse investors have to step in $\rightarrow$ Risk premia go up

Relatively inelastic supply of risky asset (demand of funds by risky borrowers)

Here: explore feedback from leverage to risk
(Brunnermeier-Pedersen)
Risk feedback

- Tree in unit supply with dividends $d_t$ i.i.d.
- $d_t$ continuous density on $[0, \infty)$
- Bonds in zero net supply
- Infinitely lived risk averse agents with log utility
- OLG of risk neutral agents born with $d_t$

$$p_t k_t^N = d_t + b_t$$

- Collateral constraint

$$(1 + r_t) b_t \leq \lambda p_t k_t^N$$
VaR

- How is $\lambda$ determined?

$$\Pr [p_{t+1} \leq \lambda p_t] = \alpha$$

- Extreme case $\alpha = 0$
- Liabilities of risk neutral agent must be perfectly safe

Market clearing

$$k_t^N + k_t^A = 1$$
Two equilibria

Good equilibrium

• no price risk

\[ p_t = \frac{\beta}{1 - \beta} E [d_{t+1}] \]

\[ 1 + r_t = \frac{1}{\beta} \]

• \( \lambda = 1 \) so risk neutral agents hold all risk

• risk averse agents only hold bonds, \( k_t^A = 0 \)
Two equilibria (continued)

Bad equilibrium

- price risk

\[ p_t = \frac{\beta}{1 - \beta} d_t \]

- \( \lambda = 0 \) risk neutral agent cannot lever at all, they only buy a fixed fraction of trees with their endowment
- risk averse agents only hold risky trees, \( k_t^A > 0 \) constant