The Macroeconomics of Shadow Banking

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2015 Financial Markets Conference
Federal Reserve Bank of Atlanta
March 31, 2015
Shadow banking, what is it good for?

Three views:

1. Regulatory arbitrage
   - avoid capital requirements, exploit implicit guarantees

2. Neglected risks
   - package risky investments as safe, pass on to unsuspecting investors

3. Liquidity transformation
   - create money-like liquid instruments from a broader set of assets

Moreira and Savov (2014)
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All reform proposals take an implicit stance

Moreira and Savov (2014)
The liquidity transformation view of shadow banking

1. Shadow banking turns risky assets into liquid liabilities
   ⇒ expands credit to the economy and liquidity provision to households/institutions

2. Bigger booms, deeper busts
   ⇒ tradeoff between growth and stability

Moreira and Savov (2014)
1. Demand for liquid securities has doubled, continues to grow
   - supply of fully safe (i.e. government-backed) assets has not kept up
   - shadow banking has been meeting this demand
Shadow money ≠ money

Prime vs Government Money Market Funds
(From Acharya and Mora, 2015)

1. Money-like liquidity of shadow banking securities evaporates quickly
   - uncertainty about underlying assets drives up spreads
   - flight to safety from “shadow money” into “money”

⇒ Tradeoff between quantity and fragility of liquidity supply

Moreira and Savov (2014)
Our framework

1. Households demand liquid securities to self-insure against shocks
   - liquidity \iff low information sensitivity (e.g. stable NAV)

2. Intermediaries invest in real capital and finance with
   - money safe \Rightarrow liquid (e.g. insured deposits)
   - equity residual \Rightarrow illiquid
   - shadow money safe except in a crash \Rightarrow liquid except in a crash
     (e.g. ABCP)

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3. Collateral constrains liquidity provision:

   \[ \text{Money} \times 1 + \text{Shadow money} \times (1 - \text{Crash loss}) \leq \text{Value of assets in case of crash} \]

   - quantity vs. fragility tradeoff

4. Uncertainty drives demand for crash-proof vs. crash-fragile liquidity
The liquidity/macro cycle

- High uncertainty
  - Low collateral/high productivity
    - Shadow banking boom
  - High collateral/low productivity
    - Collateral mining

- Low uncertainty
  - Slow recovery
  - De-leveraging

Moreira and Savov (2014)
Uncertainty

1. True probability of a crash $\tilde{\lambda} \in \{ \lambda^L, \lambda^H \}$ not observed
   - agents learn from crashes and other news

2. Bayesian learning $\Rightarrow$ time-varying uncertainty $\lambda_t$
   - low after a long quiet period (Great Moderation)
   - high after a crash (Reinhart-Rogoff)
   - jumps most from moderately low levels (“Minsky moment”)

Moreira and Savov (2014)
Intermediaries and liquidity provision

1. Households demand liquid securities
   - a liquid security is backed by enough assets to avoid adverse selection

2. Real assets risky ⇒ illiquid ⇒ need intermediation
   - liquidity supply constrained by crash value of assets (i.e. collateral)

\[
\left( \text{Liquid securities} \right) \times \text{Collateralization} \leq \left( \frac{\text{Crash value of total assets}}{} \right)
\]

3. Collateral reflects cash flow risk and endogenous price risk
   - even a cash-flow safe asset is risky in equilibrium

\[
\left( \frac{\text{Crash value of asset } i}{\text{Cash flow risk of } i} \right) = 1 - \left( \frac{\text{Price risk of } i}{\text{Price risk of } i} \right)
\]

Moreira and Savov (2014)
1. Intermediaries buy assets \( a \) (risky) and \( b \) (safe) and invest to maximize profits.

2. Asset prices embed tradeoff between productivity and collateral value.

\[
\text{Price of asset } i = \frac{\text{net cash flow of asset } i}{\left(\text{aggregate discount rate} - \theta_t \text{ collateral value of } i\right)} - \text{growth rate of } i
\]

- \( \theta_t \) = collateral premium, varies with asset mix and uncertainty.
- aggregate discount rate decreasing in liquidity provision.

Moreira and Savov (2014)
Balance sheet view

Real assets

Intermediaries

Assets

Liabilities

Crash exposure

Equity $e_t$

Shadow money $s_t$

Collateral

Money $m_t$

Households

Wealth $m_t + s_t + e_t$

Liquidity $m_t + s_t$

Crash-proof $m_t$

Moreira and Savov (2014)
RESULTS
Liquidity provision

1. Shadow banking booms in low uncertainty-low collateral states
   - crowds out money creation in booms
   - disappears when uncertainty rises from a low level (e.g. August 07)

Moreira and Savov (2014)
1. Higher uncertainty increases collateral premium, lowers risky asset price and may raise safe asset price
   - fragility buildup when uncertainty is low (invest only in risky assets)
   - collateral mining when uncertainty is high (invest only in safe assets)
1. Liquidity and growth are uncertainty-sensitive when liquidity transformation is high (collateral is low)

2. High growth requires liquidity transformation (low uncertainty, productive capital mix)
   - real economy boom coincides with shadow banking boom
Collateral runs (margin spirals)

1. Haircuts rise as prices fall ⇒ prices fall more, etc.
2. A product of shadow banking

(Circle markers: economy without shadow banking)
POLICY INTERVENTIONS
QE1 - Large-Scale Asset Purchases

1. Interpret safe asset $b$ as long-term government bond
2. Fed buys $a$ (risky) and sells $b$ (safe) asset

Announcement effect
(% price change)

Policy effect on collateral supply
(% change in asset crash value)

3. LSAP increases the supply of collateral $\Rightarrow$ liquidity provision rises $\Rightarrow$ discount rates fall, especially for risky/productive assets

Moreira and Savov (2014)
Operation Twist

   - long-term safe bond acts as crash hedge due to flight to quality
   - short-term safe bond safe but not a hedge

   **Announcement effect**
   (% price change)

   **Policy effect on collateral supply**
   (% change in aggregate collateral and $b$ collateral value)

   ![Graph showing announcement and policy effects](image)

2. OT reduces the supply of collateral $\Rightarrow$ liquidity provision falls
   $\Rightarrow$ discount rates rise, especially for risky/productive assets

*Moreira and Savov (2014)*
Liquidity requirements

1. Limit liquidity mismatch: \( m_t + s_t \leq \bar{l} \)

![Graph showing Asset a haircut and Asset a price](image)

- **baseline**
- **policy (\( \bar{l} = 0.9 \))**

3. Mitigate collateral runs, enhance financial stability

4. *But* higher discount rates, lower prices in booms

*Moreira and Savov (2014)*
Monetary policy normalization

1. Pre-crisis view: short-term rate captures monetary policy stance

2. Our framework:

\[
Tbill \ rate = \left( \frac{\text{aggregate discount rate}}{\text{collateral value of Tbill}} \right) - \theta_t
\]

⇒ Tbill rate can be low if collateral premium \( \theta_t \) is high and policy tight

3. Reverse repo facility
   - “... should help to establish a floor on the level of overnight rates.” (Dudley, 2013)
   - accommodative, even though pushes the safe rate up
   - releases collateral to financial system (\( \theta_t \downarrow \))
Takeaways

1. Liquidity transformation and the macro cycle
   - tradeoff between quantity and fragility of liquidity provision

2. Shadow banking expands liquidity supply in booms
   - lower discount rates, more investment, more growth
   - increases economic and financial fragility

3. Framework has implications for
   - monetary policy, financial stability regulation

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Is it better to have been liquid and lost than never to have been liquid at all?

Moreira and Savov (2014)