Shadow Banking

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Shadow banking and liquidity transformation

1. Three perspectives on shadow banking
   i. Regulatory arbitrage
   ii. Neglected risks
   iii. Liquidity transformation

2. Liquidity transformation
   - Creating money-like securities from risky illiquid assets (ABCP, Repo)
   - Fragile liquidity, evaporates quickly

3. Welfare tradeoff (pecuniary externalities)
   - Good times better, bad times worse
   - Rationale for regulation
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Demand for money-like claims has grown

1. Cash pools have limited access to M2 ⇒ invest in “shadow money” (Pozsar 2014)
Shadow banking responds to demand for money-like claims

1. Sunderam (2013)
   - ABCP issuance correlated with premium for money-like TBills
   - Can explain half of pre-crisis ABCP issuance

2. Nagel (2014)
   - GC Repo-TBill spread correlated with opportunity cost of money
Shadow money is uncertainty-sensitive

1. Normal-times liquidity that evaporates when uncertainty rises (Kacperczyk and Schnabl 2013)
   - Economizes on collateral when it is more scarce
   - Tradeoff: fragility versus quantity of liquidity
How to regulate the shadows?

1. Command and control: capital requirements, liquidity coverage
   - May backfire due to regulatory arbitrage
   - Harris, Opp, and Opp (2014)
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   - Acharya, Pedersen, Philippon and Richardson (2010)
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3. Price-based approach: Pigouvian taxation, mandatory insurance
   - Perotti and Suarez (2009); Acharya, Pedersen, Philippon and Richardson (2009)
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4. Public liquidity provision: Fed’s reverse repo, floating-rate Treasurys
   - Preserves liquidity supply
   - Emerging consensus: Greenwood, Hanson and Stein (2014); Gorton and Ordonez (2013); Cochrane (2014)
   - Apply Moreira and Savov (2014) to explore how this could work
Crowding out private liquidity transformation

   - Government debt negatively related to ST debt in financial sector
Moreira and Savov (2014) in a nutshell

1. Households demand liquid securities to self-insure against shocks
   - Liquidity $\Leftrightarrow$ low information sensitivity
Moreira and Savov (2014) in a nutshell

1. Households demand liquid securities to self-insure against shocks
   - Liquidity ⇔ low information sensitivity

2. Intermediaries invest in (safe/risky) real capital and finance with
   - Money $m_t$ safe ⇒ liquid
   - Shadow money $s_t$ safe except in a crash ⇒ liquid except in a crash
   - Equity residual ⇒ illiquid
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3. Collateral constrains liquidity provision, quantity vs. fragility tradeoff

\[
\text{Money} \times 1 + \text{Shadow money} \times \left(1 - \text{Crash loss}\right) \leq \text{Bank assets crash value}
\]

\[
m_t + s_t \left(1 - \bar{\kappa}\right) \leq 1 - \kappa_{A,t}
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4. Uncertainty drives demand for crash-proof vs. crash-fragile liquidity
Moreira and Savov (2014) equilibrium

- Collateral supply $1 - \kappa_{A,t}$ limits overall liquidity provision
- Optimal mix pinned down by uncertainty $\lambda_t$
Balance sheets

Capital

Intermediaries

Households

Risky

Assets

Liabilities

Assets

Liabilities

-safe

Crash risk

$\kappa_{A,t}$

Collateral

$1 - \kappa_{A,t}$

Equity

$e_t$

Shadow money

$s_t$

Money

$m_t$

Wealth

$m_t + s_t + e_t$

Liquidity

$m_t + s_t$

Crash-proof

$m_t$

$\kappa$
Balance sheets with “tax-backed” public money

<table>
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Government

- Taxes
- Public money $g_t$

Households

- Public money $g_t$
- Taxes

\[ \text{Crash risk } \kappa_{A,t} \]
\[ \text{Collateral } 1 - \kappa_{A,t} \]
\[ \text{Money } m_t \]
\[ \text{Equity } e_t \]
\[ \text{Shadow money } s_t \]
\[ \text{Wealth } m_t + s_t + e_t \]
\[ \text{Liquidity } m_t + s_t \]
\[ \text{Crash-proof } m_t \]
Equilibrium with “tax-backed” public money

- **Spreads**
  \[ \mu_{e,t} - \mu_{m,t} \propto e^{-\tau\lambda_t} e^{-\eta(g_t+m_t+s_t)} + (1 - e^{-\tau\lambda_t}) e^{-\eta(g_t+m_t)} \]
  \[ \mu_{s,t} - \mu_{m,t} \propto (1 - e^{-\tau\lambda_t}) e^{-\eta(g_t+m_t)} \]

- **Collateral constraint**
  \[ m_t + s_t (1 - \kappa) \leq 1 - \kappa_{A,t} \]

- **Public money lowers discount rates**
  - Does NOT directly affect incentive to produce shadow money

- **Indirect effect through collateral values**
  - Raises collateral values if expected to remain in place in bad times, e.g. deposit insurance, TBills, floating-rate Treasurys
  - Lowers them if it disappears, e.g. stigma, fiscal/political constraints
“Tax-backed” public money

\[ g_t = 0 \quad \text{or} \quad g_t = 0.5 \]

**Liquidity services**

**Risky asset price**

**Safe asset price**

**Collateral** $1 - \kappa_{A,t}$

**Private money** $m_t$

**Shadow money** $s_t$

Value-weighted capital mix 75% risky.

- Permanent fiscal expansion $\Rightarrow$ stable liquidity supply $\Rightarrow$ greater collateral values $\Rightarrow$ crowds private money in, shadow money out.
“Tax-backed” public money in good times only

\[ g_t = 0 \quad \text{vs} \quad g_t = 1_{\lambda_t \leq 0.25} \]

- Liquidity crunch in crisis $\Rightarrow$ collateral values lower ex ante
  - Collateral runs (margin spirals) depress liquidity below level with no public money
  - Crowds private money out, shadow money in
“Asset-backed” public money

- Taxation power + commitment
  - Government not subject to collateral constraint unlike private sector
  - Allows for greater liquidity provision
  - Distortions due to taxes, redistribution
  - E.g. deposit insurance

- Fed lacks taxation power
  - Monetary policy via open market operations
  - Uses assets to back liabilities
  - E.g. Fed’s reverse repo

- Two types of liquidity policy
  - Fiscal = tax-backed
  - Monetary = asset-backed
  - Trade off: cost of taxation versus effectiveness
Balance sheets, “asset-backed” public money

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Balance sheets, “asset-backed” public money

Capital

Risk

Safe

Intermediaries + government

Assets

Liabilities

Crash risk

$\kappa_{A,t}$

Collateral

$1 - \kappa_{A,t}$

Equity

$e_t$

Shadow money

$s_t$

Money

$m_t$

Public money

$g_t$

Households

Assets

Liabilities

Wealth

$m_t + s_t + e_t$

Liquidity

$m_t + s_t$

Crash-proof

$m_t$

Public money

$g_t$
Equilibrium with “asset-backed” public money

- Collateral constraint

\[ m_t + s_t (1 - \bar{\kappa}) \leq 1 - \kappa_{A,t} \]

- If Fed buys safe asset, private sector collateral \( 1 - \kappa_{A,t} \) falls
  - The financial sector shifts to shadow money
  - Intuition: public money crowds out closest substitute, private money
  - Even total collateral (Fed + banks) can fall if safe asset has flight to quality (negative beta, e.g. Treasurys).

- If Fed buys risky asset, private sector collateral \( 1 - \kappa_{A,t} \) rises
  - Requires taxes to back potential losses
  - The financial sector shifts to money
  - Taxes as additional “collateral”, (Fed ultimate “shadow bank”)

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“Asset-backed” public money

- Public money backed by safe asset ⇒ Less collateral in private hands ⇒ Shift to shadow money
- Excess collateral at Fed wasted ⇒ Less overall collateral, liquidity

Value-weighted capital mix 75% risky. Public money backed by stock of safe asset.
Takeaways

1. Emerging consensus for public money to crowd out shadow banking. But...
   - Public money substitute for fully safe securities, e.g. bank deposits
   - Can lead financial sector to substitute toward shadow banking
   - Especially true if public money backed with safe assets

2. Tax-backed public money, e.g. floating-rate debt expands liquidity supply
   - Directly by increasing collateral supply
   - Multiplier effect by increasing collateral values
   - Requires counter-cyclical taxation or deficits

3. A possible combination: risky-asset backed reverse repo
   - Trades off cost of taxation and effectiveness