Liquidity and the Threat of Fraudulent Assets

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fraudulent behavior in asset markets

in this paper:

with sufficient costly effort...

...individuals can sell, or borrow against, a “bad” asset

- Examples:
  - clipping of coins in ancient Rome and Medieval Europe
  - counterfeiting of banknotes during 1800-1850
  - identity theft
  - securitizing bad mortgages
  - cherry picking bad collateral to secure credit transactions
what we do

• Asset pricing with lack of recognizability due to the threat of fraud
  many assets differing in vulnerability to fraud

• Step 1: solve for terms of bilateral trades
  assets are used as collateral or means of payment
  different vulnerability to fraud ⇒ different collateralizability

• Step 2: solve for asset prices
  assets with identical cash flows differ in prices
  assets differ in their sensitivity to policy intervention
  open market operations resembling Quantitative Easing
  regulatory measures resembling Dodd-Frank
  assets differ in their sensitivity to shocks
  generate “flight to liquidity”
related literature

• Macro models in which assets have limited re-salability

• Private information and money
  Williamson Wright (1994), Nosal Wallace (2007) among many others

• Asset pricing when moral hazard limits pledgeability
  Holmstrom Tirole (2011) among many others

• Asset pricing with adverse selection
  Rocheteau (2009), Guerrieri Shimer (2011) among many others
the economic environment
a model with monetary frictions

- Two periods, continuum of risk neutral agents, discount $\beta \in (0, 1)$:
  
  measure one of buyers, measure one of sellers
a model with monetary frictions

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- $t = 0$: buyers and sellers trade assets in a competitive market

- $t = 1$: buyers and sellers trade goods in a decentralized market

A buyer is matched with a seller with probability $\sigma$ the buyer likes goods that the seller can produce but lacks of commitment $\Rightarrow$ no unsecured credit $\Rightarrow$ assets become useful as means of payment or collateral

- End of $t = 1$: assets pay off their terminal value
a model with monetary frictions

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  the buyer likes goods that the seller can produce
  but lack of commitment
  $\Rightarrow$ no unsecured credit
  $\Rightarrow$ assets become useful as means of payment or collateral
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assets and the threat of fraud

Assets come in (arbitrary) finitely many types \( s \in S \)

- terminal value normalized to 1
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At $t = 0$ at fixed cost $k(s)$, can create type-$s$ fraudulent assets

- have zero terminal value zero
- are undistinguishable from genuine ones
- can only be used in decentralized trades

High cost $k(s) \implies$ low vulnerability to fraud
Some interpretations

In the paper, we provide explicit models supporting these interpretations:

- Counterfeiting of money or bond

- Creating and cherry picking bad collateral
  
  Mortgage fraud: houses used as collateral in consumer loans
  Assets used as collateral for credit derivative contracts

- Securitization fraud
  
  Bad mortgages bundled inside mortgage-based securities
  Buyers are securitizers, sellers are final investors
mortgage fraud
bilateral trade under the threat of fraud
the bargaining game

For now take asset prices $\phi(s) \geq \beta$ as given

- $t = 0$: buyer chooses a portfolio of assets
  - genuine assets of type $s$ at price $\phi(s)$
  - fraudulent assets of type $s$ at fixed cost $k(s)$

- $t = 1$: buyer matches with seller and makes an offer specifying that
  - the seller produces $q$ units of goods for the buyer
  - the buyer transfers a portfolio $\{d(s)\}$ of assets to the seller

- The seller accepts or rejects. If accepts:
  - the buyer enjoys the utility $u(q)$
  - the seller suffers a production cost equal to $q$
equilibrium concept and refinement

- Perfect Bayesian equilibrium
  sellers’ beliefs about buyer’s portfolio are not pinned down
  ... lots of equilibria, some of them arguably unreasonable

- Refinement: Inn and Wright’s (2011) “reverse order game”
  the buyer post an offer \((q, \{d(s)\})\) at \(t = 0\)
  then the buyer chooses:
    how much genuine and fraudulent assets to bring
    subject to offer \(\{d(s)\}\) being feasible

- Note: there is a proper subgame after any offer \((q, \{d(s)\})\)
  the Nash Equilibrium of the subgame pins down beliefs
equilibrium asset demands and offers

After an equilibrium offer:

- the buyer brings genuine assets with probability one
- the seller accepts the offer with probability one
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Equilibrium asset demands and offers maximize buyer’s utility subject to

- seller’s individual rationality, offer feasibility
- buyer’s no-fraud IC constraint

\[
\left[ \phi(s) - \beta(1 - \sigma) \right] d(s) \leq k(s)
\]

- net cost of offering \(d(s)\) genuine assets
- cost of fraud

- asset specific
- limits resalability
- depends negatively on price
asset prices and liquidity
asset prices at $t = 0$

![Graph showing asset price vs. $k(s)/A(s)$](image)

- $k(s)/A(s) =$ cost of fraud per share of asset
asset prices at $t = 0$

- **Illiquid**
- **Partially liquid**
- **Liquid**

\[ k(s)/A(s) = \text{cost of fraud per share of asset} \]
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asset prices at \( t = 0 \)

\[
\beta \xi + \frac{k(s)}{A(s)} = \text{cost of fraud per share of asset}
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output and liquidity at $t = 1$

output = aggregate liquidity, $L \equiv \sum_{s \in S} \theta(s)A(s)$

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- Liquid assets: $\theta(s) = 1$
  - IC constraint doesn't bind when buyers hold and spend $A(s)$
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- Liquid assets: $\theta(s) = 1$

- Partially liquid assets: $\theta(s) = 1$

- Illiquid assets: $\theta(s) < 1$
  
  IC constraint binds
  
  buyers hold $A(s)$ but find it optimal to spend less
partially liquid assets

- Have the same $\theta(s)$ as liquid assets!
- Yet, they have a lower price

partially liquid asset prices $< \text{marginal social value of their liquidity services}$

Why?
partially liquid assets

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Why?

- Because: pecuniary externality running through the IC constraint

  a high price reduces asset demand in two ways
  through the budget constraint (as usual)
  through the IC constraint, b/c raise incentive to commit fraud
two applications

(more in the paper)
budget balanced open market operations

e.g., selling Treasuries to purchase MBS
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  liquid assets have higher prices
  
  ⇒ one share of liquid asset ...
  
  ... buys more than one share of partially liquid assets
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⇒ $L, q$, interest rates, and welfare go down
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- Using liquid assets to purchase **illiquid** assets
  
  difference in $\theta(s)$ large enough
  
  $L, q, \text{interest rates, and welfare go up}$
a flight to liquidity
concentration of demand towards liquid assets, widening of yield spreads

- Increase in $\sigma$, the probability of trade in the $t = 1$ market
  
  interpretation: collateral is more needed
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a flight to liquidity

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  \hspace{1cm} \text{price increase}

  fraud incentives increase: dominates for partially liquid assets 
  \hspace{1cm} \text{price decrease} 
  \hspace{1cm} \text{so no-fraud IC constraint binds}
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  - liquidity demand increases: dominates for liquid assets, price increase
  - fraud incentives increase: dominates for partially liquid assets, price decrease so no-fraud IC constraint binds

- The set of liquid assets shrinks
  The set of partially liquid and illiquid assets expands
conclusion

- A fraud-based model of liquidity
- An explanation for price and liquidity differences
- Applications
  - open-market operations
  - flight to quality
  - regulatory measures (in the paper)
  - time varying liquidity (in the paper)