Portfolio Dynamics and the Supply of Safe Securities

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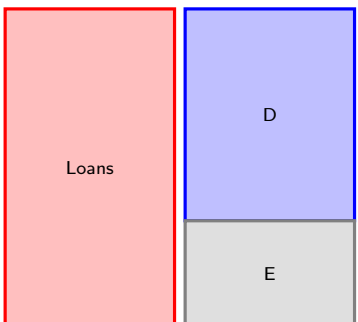
Safety Transformation in the Leveraged Loan Market

- Securitization of leveraged loans via collateralize loan obligations (CLOs)
  - 65% are AAA-rated, safe securities
- Well-known facts:
  - CLOs' collateral are dynamic loan portfolios
  - CLOs and Loan Funds (mutual & hedge funds) always coexist
- Open questions:
  - What is the benefit of dynamic portfolios in safety transformation?
  - Why don't loan funds create safe securities?
  - How does trading affect the quantities of loans & securities?
- This paper: the way CLOs create safe securities drives many empirical patterns.

Dynamic Portfolio and Safe Debt Capacity

- Mechanism: CLOs create *larger* safe tranches via *dynamic collateral management*.



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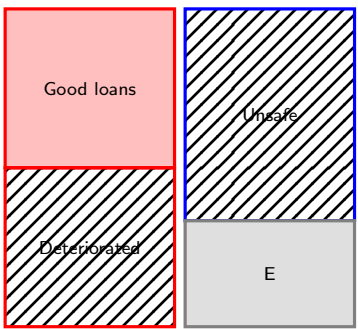

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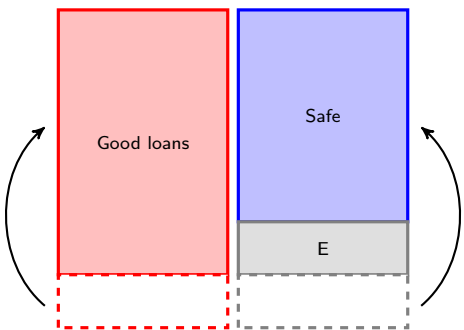

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- ◇ Trading: replace bad loans with good loans
  - ⋆ Portfolio's cash flow uncertainty ↓

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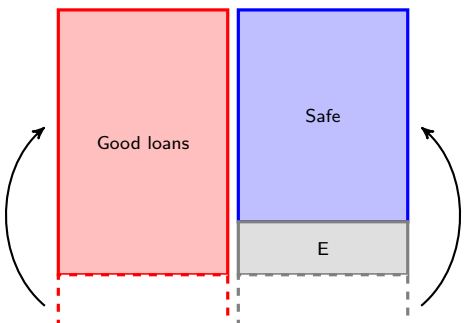

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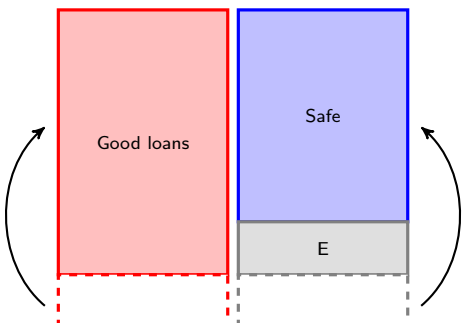

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- ◇ Ex ante: commitment ⇒ a bigger safe tranche
- ◇ Equity holders enjoy a lower cost of capital

Model Overview

Exogenous assumptions:

- Investors enjoy non-pecuniary benefit from safe debt
- Loan quality reveals after security issuance
- Dynamic collateral management is viable, at a fixed cost

Endogenous outcomes in equilibrium:

- CLOs and loan funds emerge from ex-ante identical institutions
- Price pressure from CLOs' distorts secondary loan prices
- Both lending and safe securities increase relative to static benchmark
- Total surplus is greater when price distortion is larger

Stylized Facts

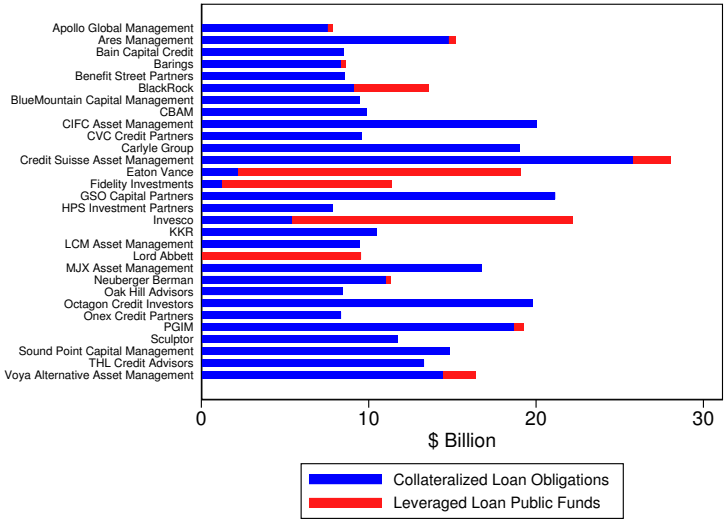
Model

Results

Conclusion

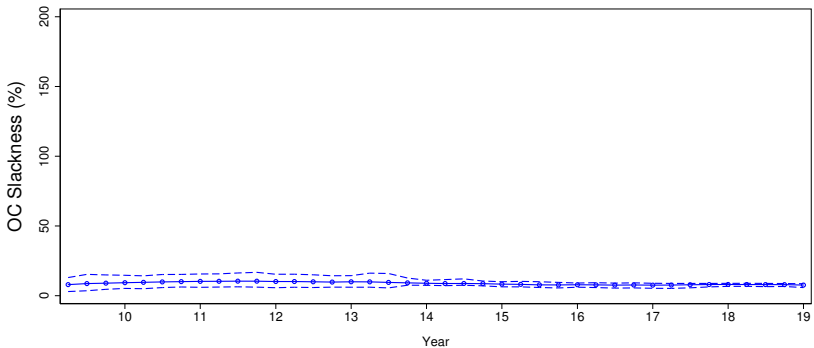
Fact 1: Coexistence of CLOs and Loan Funds

Top 30 leveraged loan asset managers by AUM:



Fact 2: CLOs Face Binding Collateral Constraints

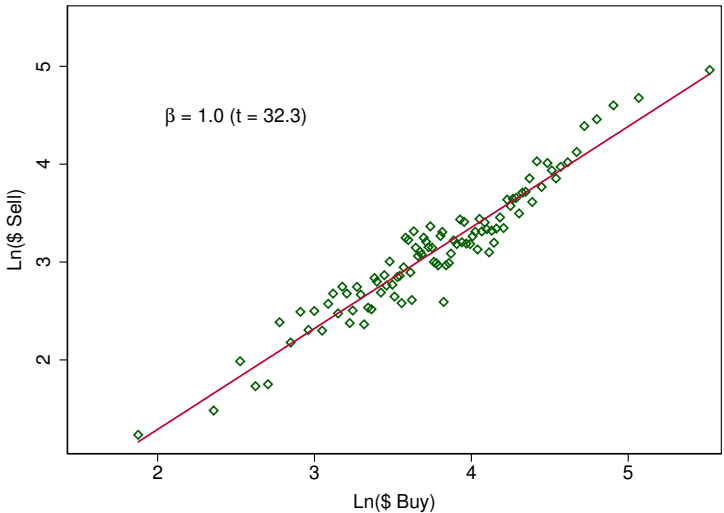
Dispersion in the slackness of senior tranche Over-Collateralization constraint:



Persistently binding collateral constraints: CLOs fully use safe debt capacity.

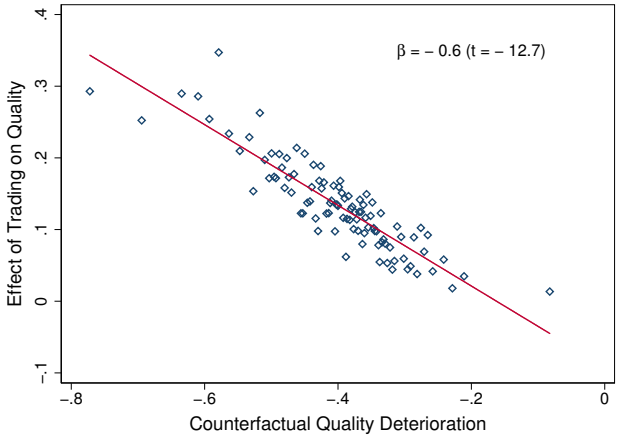
Fact 3: Binding Constraints Force CLOs to Replace Loans

CLOs' secondary market trades around the onset of COVID-19:



Fact 4: Portfolio Rebalancing Improves Collateral Quality

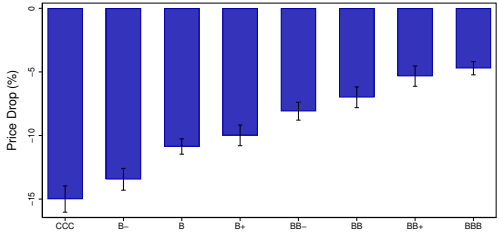
The effect of loan trades on portfolio quality:



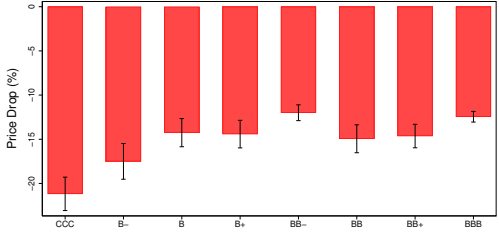
- Trading offsets 60% of quality deterioration.

Fact 5: Price Pressure from CLOs

(a) Leveraged Loans



(b) High-Yield Bonds



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Investors and Financial Institutions

- Investor utility: $U = C_0 + \mathbb{E}_0[C_1 + C_2] + \gamma D$
  - D: safe debt, which pays face value with certainty
  - γ: non-pecuniary benefit from holding safe debt (e.g., regulatory advantage)
- A continuum of identical institutions: $\mathcal{I} = [0, 1]$
  - Can make loans to generate a risky payoff
  - Need external financing
    - Flexible capital structure: can issue any equity and debt securities
- Investors take security issuance prices as given
  - Issuing safe debt lowers funding costs because $\gamma > 0$

Timeline and Technology

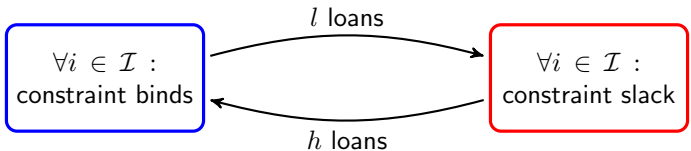
- At $t = 0$, institution i makes balance sheet choices
  - Lending: makes x_i loans at a convex cost of effort $c(x_i) - x_i$
  - Financing: issue $d_i \geq 0$ of safe debt and external equity shares
- At $t = 2$, a macro state $s \in \{g, b\}$ realizes
- Two loan quality types $j \in \{h, l\}$: low-quality loans have riskier payoff:
  - In g state, both types pay $R > 1$
  - In b state, h loans pay 1, whereas l loans pay 0
- Key concern: loan quality is unknown until $t = 1$
  - A fraction α_i of portfolio reveals type l, iid drawn from $(0, \bar{\alpha})$

Dynamic Collateral Management

- At $t = 0$, institution i can make its portfolio static until $t = 2$
  - Fraction of low-quality loans, α_i, is uncertain
  - Capacity of safe debt: $d_i \leq (1 - \bar{\alpha})x_i$
- Use a dynamic portfolio?
  - If allow trading loans at $t = 1$, leverage gives incentives of risk shifting
- Dynamic collateral management: fixed cost $\xi > 0$
  - Credibly promise to replace low-quality loans at $t = 1$, which increases the portfolio's worst-case payoff
  - This commitment raises debt capacity, by $\bar{\alpha}\frac{q_l}{q_h} \cdot x_i$

Secondary Market Portfolio Rebalacing

When loan quality reveals at $t = 1$: loan trades among institutions



- Replacing low-quality loans generates price pressure: q_l decreases relative to q_h
- Endogenous loan prices q_l, q_h affect ex-ante debt capacity

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Proposition 1

There is a unique equilibrium, and CLOs and loan funds coexist:

- $\lambda \in (0,1)$ *of institutions operate as CLOs,* $1-\lambda$ *operate as loan funds.*
- *At* $t=0$*, CLOs fully use capacity of safe debt, and loan funds issue zero safe debt.*
- *At* $t=1$*, CLOs sell* l *loans and buy* h *loans, and loan funds buy* l *loans and sell* h *loans.*
- *Distortion in loan prices:* $\frac{q_l}{q_h} <$ *the ratio of fundamentals.*

How does *dynamic collateral management* drive the equilibrium?

- CLOs issue larger safe tranches at a premium and enjoy lower funding costs.
- Price pressure makes replacing l loans costly, and providing liquidity to CLOs profitable.
- Loan prices adjust: institutions indifferent between operating CLOs and loan funds.

Total Lending and the Supply of Safe Securities

Proposition 2

The market supply of safe debt exceeds the static benchmark due to two channels

- *Dynamic portfolios increase the quantities of lending.*
- *Risk sharing across institutions raises total debt capacity*

These two channels are complementary:

- Risk sharing improves lending payoffs by capturing more safety premium.
- Increased lending generates more loans to share across institutions.

Price Distortion and Total Surplus

Proposition 3

In equilibrium, the market's total surplus is greater when loan prices deviate more from fundamental values.

Unlike many markets, distorted prices are not a "problem":

- Loan funds optimally provide imperfect liquidity, thereby sharing some of the safety premium with CLOs.
- Equilibrium prices make institutions indifferent: total surplus is greater when liquidity provision is better compensated.

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Takeaways

- Dynamic collateral management creates larger safe tranches.
  - Tradeoff: cheaper funding v.s. replacing deteriorated assets.
- The resulting price pressure drives the market equilibrium.
  - CLOs and loan funds coexist and trade as counterparties.
  - Trading can raise total lending and safe debt supply.
- The idea goes beyond the leveraged loan market.
  - Commercial real estate loans, crypto-backed lending platforms, etc.