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#### Adverse Selection Dynamics in Privately-Produced Safe Debt Markets

Nathan Foley-Fisher\* Gary Gorton\*\* Stéphane Verani\*

\*Federal Reserve Board \*\*Yale SOM and NBER

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What happens when info-insensitive debt turns sensitive?

- Private sector produces substitutes for safe debt
  - It is information-insensitive
  - No agent finds it profitable to produce private information
- If bad public news shifts investor incentives
  - Some investors become informed (others cannot)
  - (Fear of) adverse selection arises

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## When COVID hit, the bid-ask spreads and price dispersion of AAA-rated CLO debt sharply increased



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#### Summary of adverse selection dynamics

- Using the pandemic as a natural experiment
- CLO debt and loan prices begin to reflect private information
- Warnings issued to clients of informed investors trading CLOs
- Intermediated trade cost increased heterogeneously for CLO
- · Lemons premium accounts for 12pp increase in bid-ask spread
- Industry response: Reduce information asymmetry

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#### Collateralized loan obligations



<sup>2</sup>Asset manager typically contributes a portion of equity. P&I – Principal and interest. C/e – Credit enhancement (based on subordination). NR – Not rated. Source: Fitch Ratings.

- Off-balance sheet bank loans securitization vehicles
- Hold roughly 60% of \$1.1 trillion leveraged loans outstanding
- Features: tranching, loan trading, OC tests, issuer equity
- Role of trustee reports: information

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#### Data sources

- Bloomberg Backoffice: CLO tranch identifiers (CUSIP)
- FINRA TRACE: individual transactions
- Moody's, S&P, Fitch: credit ratings and watches
- Moody's Analytics: CLO loan portfolios
  - Based on trustee reports

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#### CLO loan portfolios

	Pre-pandemic, 1,627 CLOs		Pandemic, 1,599 CLOs			
Characteristic	Mean	Median	SD	Mean	Median	SD
AAA tranche attachment point (%)	36.9	35.7	5.5	36.7	35.6	5.9
Loans per CLO	369.6	344	233	390.3	349	285
CLO market value (loans, \$mn)	421.4	408.9	175.7	367.7	353.7	157.7
Mean loan value (\$mn)	1.5	1.3	0.9	1.3	1.2	0.8
Median loan value (\$mn)	1.2	1	0.9	1	0.9	0.7
Mean loan maturity (yrs)	4.5	4.8	0.9	4.5	4.8	0.9
Median loan maturity (yrs)	4.7	5	0.9	4.7	4.9	0.9
Principal value in bonds (%)	2.7	0	8.6	3.4	0	11.4
Vulnerable loans (market value, %)	18.4	18.1	9.6	16.4	16.2	9

Note: Prepandemic/pandemic trustee reports before February 15/after April 1, 2020.

 Vulnerable industries: Automotive, Consumer goods: Durable, Energy: Oil & Gas, Hotel, Gaming & Leisure, Retail, Transportation: Cargo, and Transportation: Consumer

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### Potential sources of adverse selection

- $1. \ \ {\rm Structure \ of \ individual \ CLOs}$ 
  - Attachment points, risk retention, reinvestment period
- 2. Contents of CLO loan portfolios
  - Sectoral diversification
- 3. Performance of CLO loan portfolios
  - Credit analysis, loan correlations

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#### Who are the informed traders?

"JPMorgan Chase & Co. is warning clients...it has received increased interest from originators and sponsors of securitizations, as well as managers of collateralized loan obligations, in buying securities from their own deals. Such purchases 'may constitute inside information' " (Bloomberg, May 20, 2020)

- Informed traders have private information
  - check trustee reports continuously
  - are not limited by information in trustee reports
  - obtained through significant technology investment

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#### What about the uninformed traders?

- Markit and Reuters provide loan price estimates
  - Observe the trustee reports
  - Do not have credit analyst teams
  - Proxy for uninformed prices and disagreement
- No price discovery in illiquid loan markets
- Dealers are also uninformed

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#### The arrival of adverse selection

- Trading costs (Glosten & Milgrom, 1985)
- Imputed roundtrip cost (IRC):
  - Match trades occurring within one day
  - Dealer sell price Dealer buy price
- Uninformed dealers almost always match clients in advance
- No commitment to trade; dealers may be left holding tranche
- IRC compensates for risk of trading with informed clients





- Non-linear negative relationship between prices and IRC
- CLOs' vulnerability to the pandemic is heterogeneous
- Pandemic is an exogenous shifter of CLO tranche prices
- $\Rightarrow$  Low-price debt IRC distribution disproportionately increases

Bottom of the IRC distribution increases by relatively more than the top of the IRC distribution during the pandemic for *low-price AAA CLOs* 

	Pre-pandemic		P	Pandemic		
	Low price	High price	Low price	ce High price		
75 <sup>th</sup> percentile	5.0	4.4	53.5	25.5		
25 <sup>th</sup> percentile	1.0	1.3	3.6	2.1		

• Low-priced AAA CLOs trade below the weekly median price

• Triple difference effect suggests adverse selection in the market

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#### Identification of the arrival of adverse selection



#### • Potential confounders:

- Fixed and/or time-varying dealer funding cost heterogeneity
- Fixed tranche/CLO heterogeneity

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Implementation of the adverse selection test with a quantile regression with fixed effects

 $Q_{\text{IRC}_{it}}(\tau | \text{Covid}_t, \text{Trading price}_{it}) = \alpha^i + \beta_1(\tau) \text{Covid}_t$  $+ \beta_2(\tau) \text{Low price}_{it}$  $+ \beta_3(\tau) \text{Covid}_t \times \text{Low price}_{it}$  $+ \sum_{j=1}^{K} \beta_4^j(\tau) \text{Dealer ID}_{ijt}$  $+ \beta_j(\tau) \text{Covid}_t \times \text{Dealer ID}_{ijt}$ 

 $+ \beta_5(\tau) \mathsf{Covid}_t \times \mathsf{Dealer } \mathsf{ID}_{ijt}$ 

- Quantile  $\tau \in \{0.25, 0.5, 0.75\}$
- Low price<sub>it</sub>: weekly binary low price indicator
- $\alpha^i$  is tranche fixed effect unrelated to the quantile function
- Covid<sub>t</sub> × Dealer ID<sub>ijt</sub>: Dealer funding heterogeneity

# Lemons premium accounts for about half, or 12pp, of the increase in bid-ask spread for low-price AAA CLO tranches

	(1) AAA	(2) AAA	(3) E tranche	(4) E tranche
[0.25]LowPrice <sub>it</sub>	0.57	0.39	1.74	2.25
	(1.25)	(0.85)	(1.71)	(1.55)
[0.25]Covid <sub>t</sub> ×LowPrice <sub>it</sub>	0.03	0.63	-2.01	-3.96
	(1.49)	(1.21)	(3.67)	(3.69)
[0.75]LowPrice <sub>it</sub>	1.59	1.56	3.08	2.67
	(1.19)	(0.97)	(2.15)	(1.85)
[0.75]Covid <sub>t</sub> ×LowPrice <sub>it</sub>	12.2***	12.64***	5.5	4.53
	(2.25)	(2.01)	(5.47)	(4.8)
CUSIP fixed effects Dealer funding controls:	Y	Y	Y	Y
Dealer ID <sub>iit</sub>	Y	Y	Y	Y
$Covid_t \times Dealer ID_i jt$	Ν	Υ	Ν	Y
Observations	2,666	2,666	1,903	1,903

 $H_0: [0.25]$ Covid<sub>t</sub>×LowPrice<sub>it</sub> = [0.75]Covid<sub>t</sub>×LowPrice<sub>it</sub> F test 29.44\*\*\* 42.22\*\*\* 2.2 6.35\*\*



#### AAA-tranche IRCs were different by industry vulnerability



#### Quantile regression test for information sensitivity

- Highly-rated CLO tranches are designed to be uncorrelated with vulnerable underlying collateral price volatility
- Is the entire distribution of CLO prices now correlated?
- Or, are investors distinguishing among CLOs?
- Specification:

 $\begin{aligned} Q_{\mathsf{Trading price}_{it}}(\tau | \mathsf{Covid}_t, \mathsf{Volatility}_t) &= \alpha^i + \beta_1(\tau) \mathsf{Covid}_t \\ &+ \beta_2(\tau) \mathsf{Volatility}_t \\ &+ \beta_3(\tau) \mathsf{Covid}_t \times \mathsf{Volatility}_t , \end{aligned}$ 

where quantile  $\tau \in \{0.25, 0.5, 0.75\}$  and  $\alpha^i$  is CUSIP fixed effect.



Mar 20

Jul 20

Sep 20

May 20

Jan 20

• Shorten reinvestment period

Nov 19

Sep 19

Jul 19

Increase affiliated equity stake



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#### Conclusion

- Test for the arrival of adverse selection in AAA CLO market
  - Normal times: No incentive to produce information
  - Bad times: Only some agents *can* produce information
- · Lemons premium accounts for half of the increase in illiquidity
- Difficult to reconcile body of evidence with other stories