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# Did the rise of CLOs lead to riskier lending?

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The views of the authors and not necessarily the views of the Federal Reserve Bank of New York or the Federal Reserve System

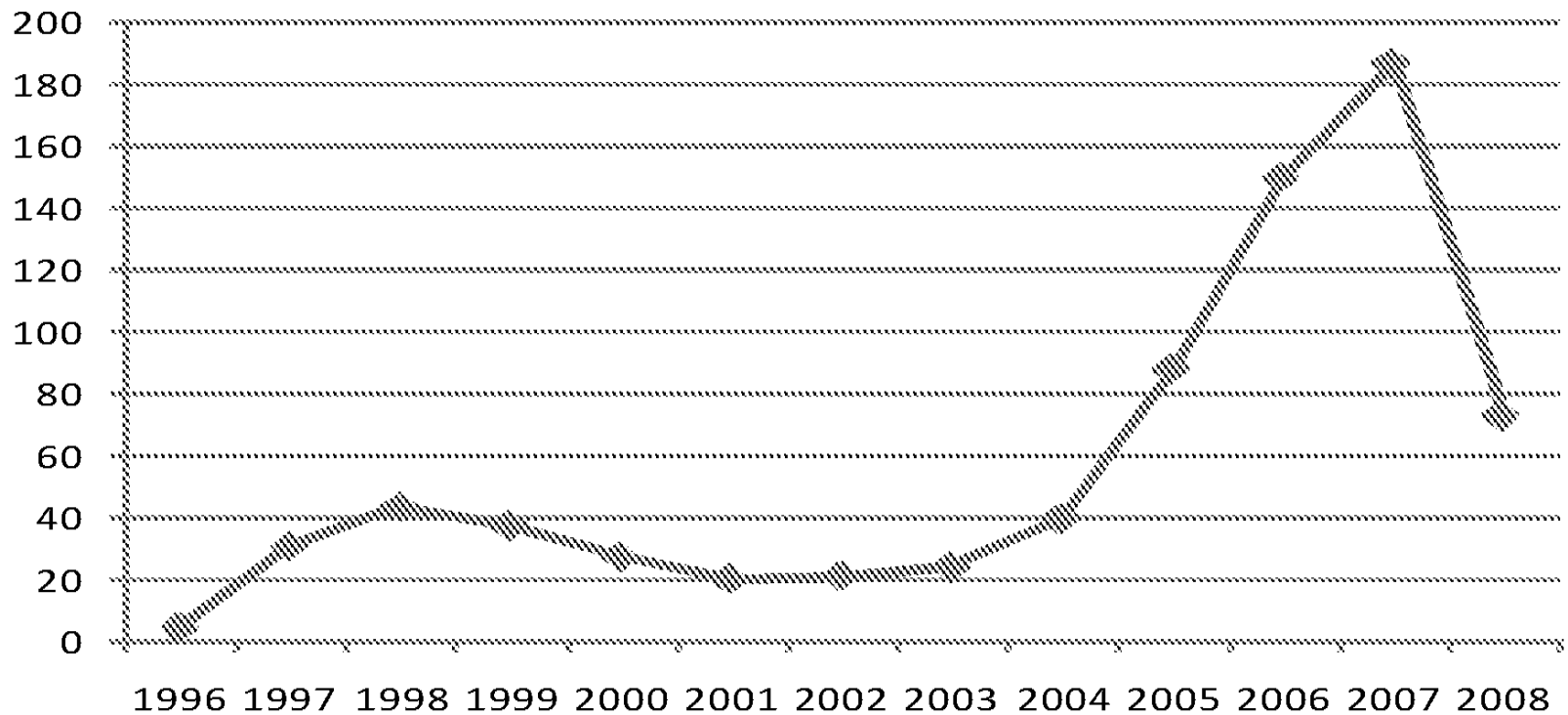
## Motivation

- Securitization adversely affected the screening incentives of mortgage lenders, contributing to a large increase in mortgage delinquencies.
  - Dell'Ariccia et al. (2008), Mian and Sufi (2008), Puranandam (2008) and Keys et al. (2008).
- Studies of corporate loans find no evidence that securitization led to poor quality loans.
  - Benmelech, Dlugosz, and Ivashina (2009), Shivdasani and Wang (2010), Wang and Xia (2010) finds mixed effects.
- Difference in these studies puzzling
- Mortgages are different from corporate loans, but securitization has similar effects on banks' screening and monitoring incentives in both markets

## Motivation (cont.)

- Further, as with mortgages there was a rapid growth of loan securitization in the years leading up to the crisis.

Figure 1: Volume of CLOs originated by year (billions U.S. dollars)



## Our objectives

- Investigate whether corporate loans that are sold to CLOs perform differently from non-securitized loans.
- Investigate whether banks' loan pricing policies reflect the expected performance of loans they sell to CLOs.
- Attempt to explain whether the difference in performance of these loans was due to a difference in
  - Ex ante screening
  - Ex post monitoring

## Differences to existing studies

- Our measure of performance is loan specific
  - Existing studies rely on borrower measures of performance.
- We compare loans that are sold to CLOs with loans that the same bank originates but does not sell to CLOs
  - Shivdasani and Wang (2010) and Wang and Xia (2010) focus on leverage loans of banks that are heavily involved in securitization
  - Benmelech, Dlugosz, and Ivashina (2009) also focus on loans sold to CLOs, but in contrast to them:
- We focus on years of rapid growth of CLOs (2004-2008)
- We consider only credits sold to CLOs at origination
- We have a 3x larger sample of CLO credits
- We focus on within-bank effects

## Sample: CLO credits vs non-CLO credits

	CLO credits	Non-CLO credits	Difference	T stat
NONACCRUAL YEAR 3	0.108	0.049	0.059	6.30***
AMOUNT	12.382	11.620	0.766	20.11***
MATURITY	6.021	4.237	1.788	37.26***
SPREAD	287.0	164.2	122.8	21.71***
SECURED	0.764	0.295	0.481	25.69***
DIVIDEND REST	0.449	0.327	0.146	6.84***
BBB	0.010	0.065	-0.055	14.02***
BB	0.101	0.043	0.057	6.34***
B	0.103	0.022	0.079	8.85***

## Sample (Continued)

	CLO credits	Non-CLO credits	Difference	T stat
BK CREDIT EXP	0.544	0.912	-0.364	24.48***
BK CREDIT SH	0.091	0.263	-0.172	32.49***
MEDIAN CLO SH	0.021			
CLO SH	0.241			
MED PARTICIPANTSH	0.029	0.153	-0.124	65.76***
Observations	1176	7828		

# Performance of loans sold to CLOs: Methodology

$$PERFORMANCE_{c,f,b,t+k} = c + \alpha \cdot CLO_{c,f,b} + \sum_{i=1}^I \beta_i X_{i,c,t} + \sum_{j=1}^J \gamma_j Y_{j,f,t} + \epsilon_{f,t}$$



# Performance of loans sold to CLOs: Results

	Year 1	Year 2	Year 3
<b>CLO</b>	<b>0.015**</b>	<b>0.030***</b>	<b>0.035***</b>
<b>LOAN CONTROLS</b>	<b>in</b>	<b>in</b>	<b>In</b>
<b>FIRM CONTROLS</b>	<b>in</b>	<b>in</b>	<b>in</b>
<b>YEAR DUMMIES</b>	<b>in</b>	<b>in</b>	<b>in</b>
<b>BANK FIXED EFFECTS</b>	<b>in</b>	<b>in</b>	<b>in</b>
<b>R squared</b>	<b>0.25</b>	<b>0.26</b>	<b>0.24</b>
<b>Observations</b>	<b>8966</b>	<b>8966</b>	<b>8966</b>

# Performance of loans sold to CLOs: Matching

	Year 1	Year 2	Year 3
<b>CLO</b>	<b>0.012</b>	<b>0.038**</b>	<b>0.038**</b>
<b>R squared</b>	<b>0.29</b>	<b>0.32</b>	<b>0.30</b>
<b>Observations</b>	<b>596</b>	<b>596</b>	<b>596</b>

# Performance of loans sold to CLOs: Robustness tests

	Year 3	Year 3	Year 3	Year 3	Year 3
<b>CLO</b>	<b>0.035***</b>	<b>0.040***</b>	<b>0.039***</b>	<b>0.040***</b>	<b>0.086***</b>
<b>BK CREDIT SH</b>		<b>0.057***</b>		<b>0.057***</b>	<b>0.049**</b>
<b>BK BORROWER SH</b>			<b>0.059***</b>		
<b>MED CLO SH</b>				<b>-0.017</b>	
<b>CLO SH</b>					<b>-0.173***</b>
<b>R squared</b>	<b>0.24</b>	<b>0.24</b>	<b>0.24</b>	<b>0.24</b>	<b>0.24</b>

# Performance of loans sold to CLOs: Conclusion 1

Everything else equal, loans sold to CLOs at the time of their origination are more likely to default or become nonaccrual in the three years after origination

## Spreads on loans sold to CLOs: Methodology

$$CSPREAD_{c,f,b,t} = c + \alpha \cdot CLO_{c,f,b} + \sum_{i=1}^I \beta_i X_{i,c,t} + \sum_{j=1}^J \gamma_j Y_{j,f,t} + \epsilon_{f,t}$$

## Spreads on loans sold to CLOs: Results

	(1)	(2)	(3)	(4)	(5)
<b>CLO</b>	<b>57.411***</b>	<b>54.532***</b>	<b>54.677***</b>	<b>53.858***</b>	<b>54.055***</b>
<b>BK CREDIT SH</b>		<b>-39.374**</b>		<b>-39.358**</b>	<b>-39.261**</b>
<b>BK BORROWER SH</b>			<b>-69.603**</b>		
<b>MED CLO SH</b>				<b>23.442</b>	
<b>CLO SH</b>					<b>1.834</b>
<b>R squared</b>	<b>0.61</b>	<b>0.61</b>	<b>0.61</b>	<b>0.61</b>	<b>0.61</b>
<b>Observations</b>	<b>4041</b>	<b>4041</b>	<b>4041</b>	<b>4041</b>	<b>4041</b>

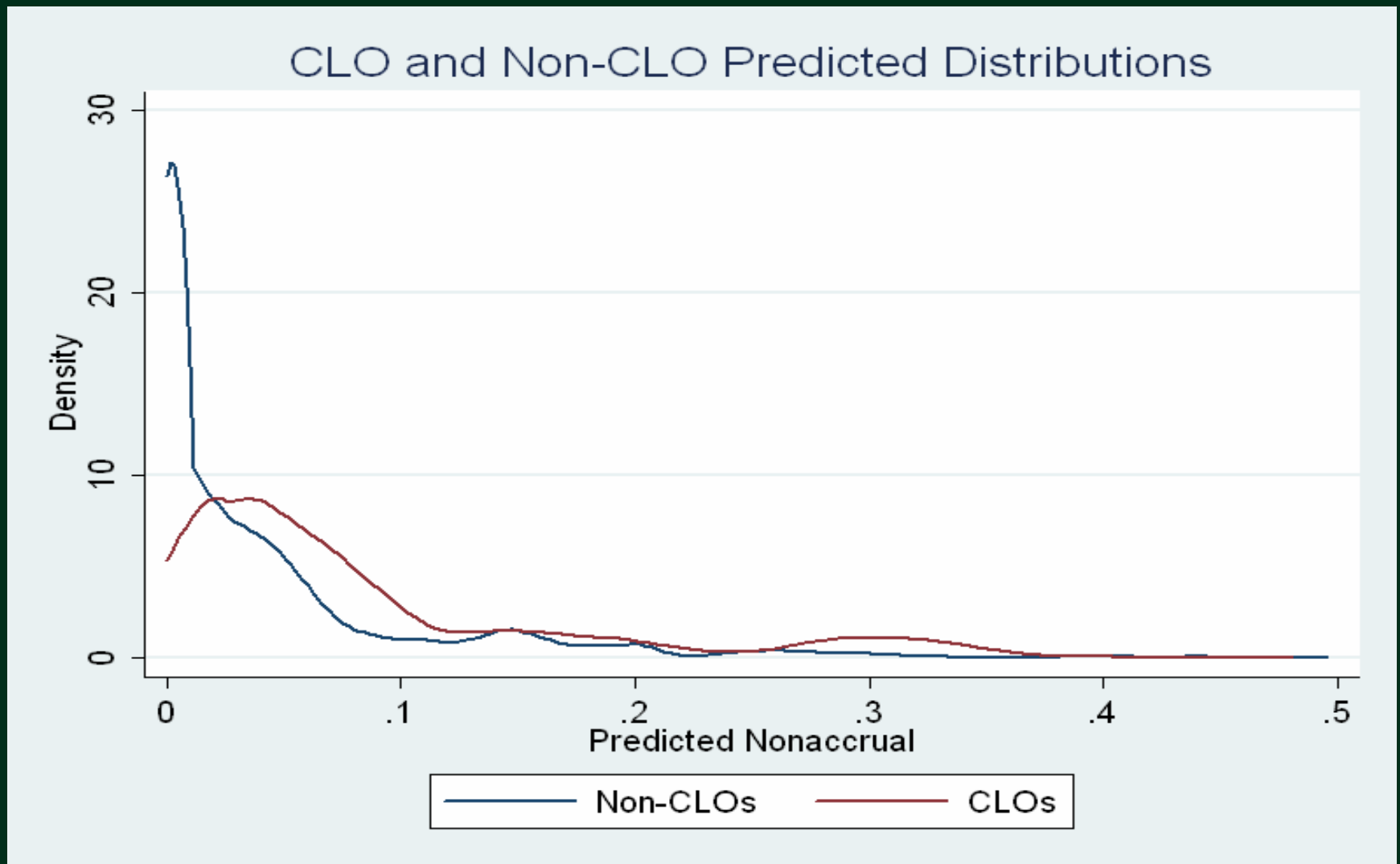
# What drives CLO credits' interest rate premium?

Use a two-step test:

First step: Estimate the probability of default

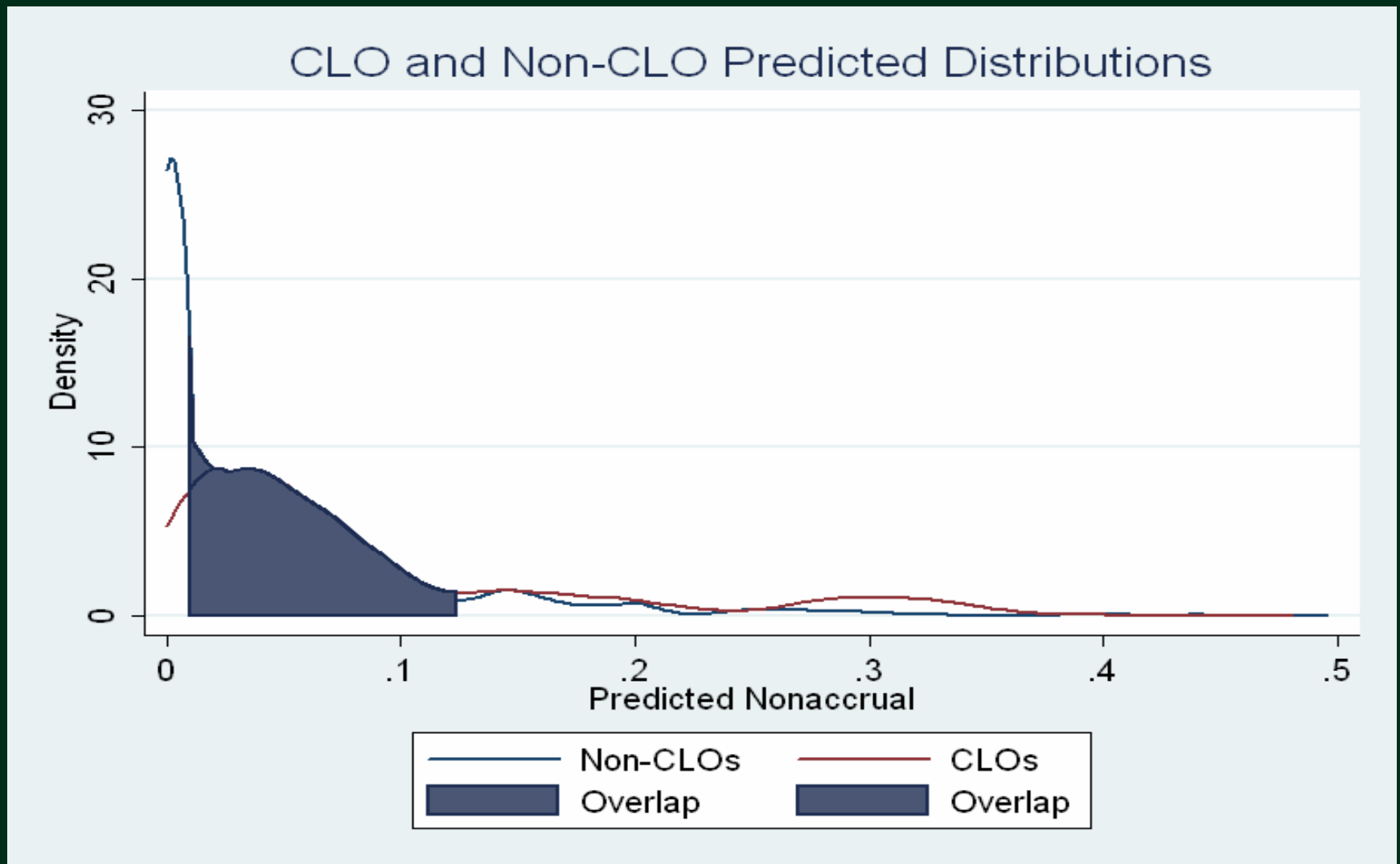
Second step: Investigate how spreads for clo credits and non-clo credits vary with the predicted probability of default

# Distribution of predicted nonaccrual

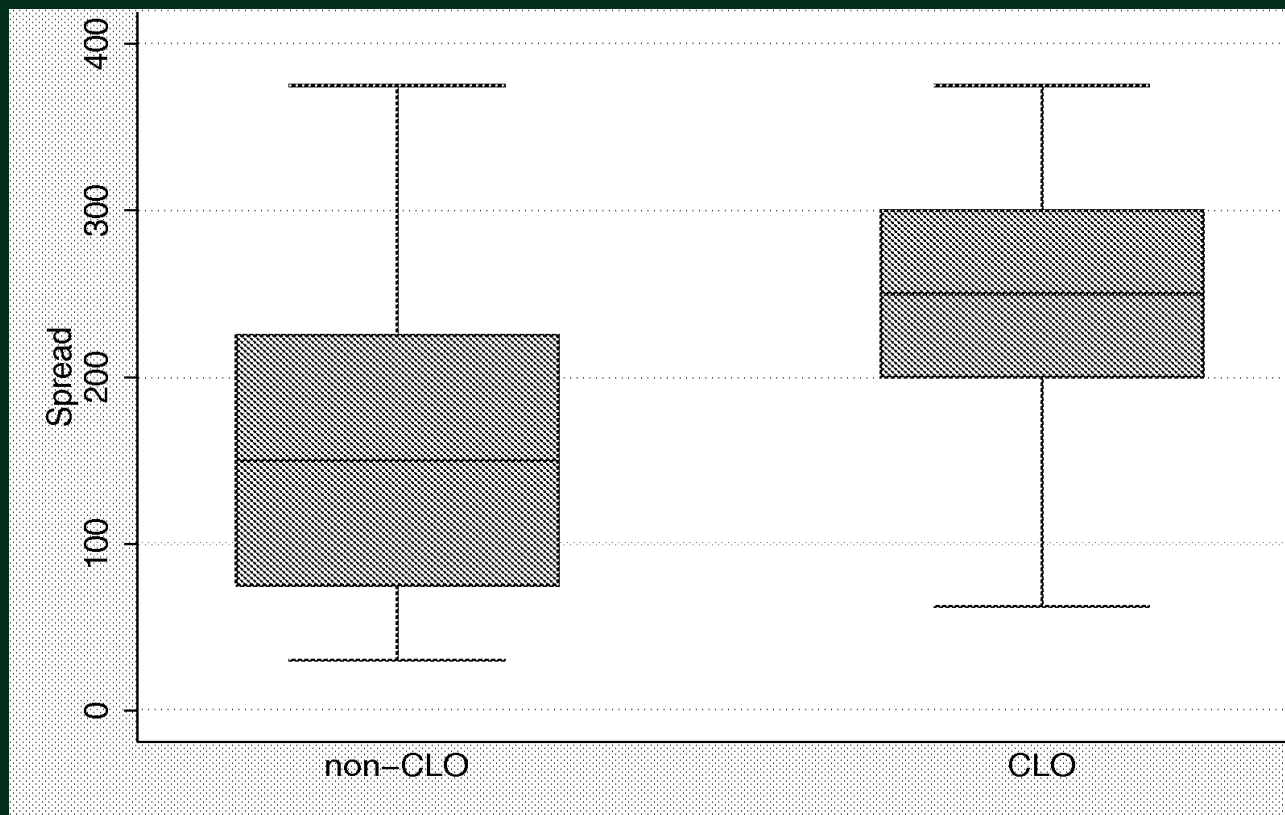




# Distribution of predicted nonaccrual



# Spreads on loans sold to CLOs and credit risk



Volatilities	Non-CLO credits	CLO credits
PDEFAULT	2.5	2.7
SPREAD	96.5	71.3

## Spreads on loans sold to CLOs: Conclusion 2

- Banks anticipated the worse performance of CLO loans and charged higher interest rates on the these loans.
- However, the loan interest rates they charge CLO credits are less driven by risk than their nonsecuritized loans.

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# Why did CLO loans perform worse than non-CLO loans?

- Lower incentives to screen loans ex ante?
- Lower incentives to monitor loans ex post?

# Did banks use different standards to underwrite CLO credits?

- Yes
- We classify loans banks sold to CLOs as follows
  - Borrowers banks lent in the past and also sold their loans to CLOs
  - Borrowers banks lent in the past but did not sell their loans to CLOs
  - New borrowers
- Loans of new borrowers as well as loans of recurring borrowers that banks sell to CLOs for the first time perform worse than CLO loans of recurring borrowers with a CLO history

# Did banks have less incentive to monitor CLO loans?

- Yes
- Banks retained less “skin in the game” when they sold loans to CLOs
  - Kept a lower exposure to loans they sold to CLOs
  - Kept a lower exposure to the borrowers of loans they sold to CLOS
- Further, no evidence that syndicate participants fill in banks’ monitoring slack
  - Syndicate participants retained lower exposure to loans banks sold to CLOs
  - Syndicates of CLO loans were less concentrated
  - Median CLO loan share positively related to the bank’s loan share

# Does bank monitoring matter?

- Probably
- Compared to “similar” loans sold to CLOs at the time of credit origination, loans bought by CLOs at a latter date in the secondary market:
  - Perform better if the bank does not change its exposure to the credit when the CLO acquires the loan
  - Have similar performance if the bank lowers its exposure to the loan at the time the CLO makes the acquisition

## Final remarks

- Loans sold to CLOs at the time of their origination are more likely to default or become nonaccrual.
- Banks accounted for this difference and charged higher interest rates on the these loans.
- However, the loan interest rates they charge CLO credits are less driven by risk than their nonsecuritized loans.
- Difference in performance happened because
  - Banks use different standards to underwrite CLO loans --- worst performance came from loans they extended to new borrowers
  - Banks also had less incentives to monitor CLO loans because they retained less “skin in the game”