

# Who Benefits From Debt Covenant Violations

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- Background
  - Covenant violation triggers “technical default”. Creditors have more influence on firm’s operation.
  - Natural Regression Discontinuity Design (RD) to solve endogeneity issue.
  - Existing researches find negative results on investment and employment.
- This study:
  - State-of-the-art RD method.
  - Market responses to measure benefits.
- Preview of findings
  - Decrease investment by 5%.
  - Increase yield spread by 7.3%.
  - Decrease market evaluation by 10%.

- For covenant type  $j$  of firm  $i$  at quarter  $t$ , define violation as:

$$v_{ijt} = \begin{cases} 0 & z_{ijt} < z_{ij0} \\ 1 & z_{ijt} \geq z_{ij0} \end{cases}$$

- Define log distance to violation as:

$$d_{ijt} = \log \left( \frac{z_{ijt}}{z_{ij0}} \right)$$

- $d_{ijt} > 0 \Leftrightarrow v_{ijt} = 1$
- Comparison with the 10-Q method (Nini, Smith, and Sufi, 2012).

- Estimator

$$\tau_{SRD} = \lim_{d \uparrow 0} \mathbb{E}[Y_{it}(0) | d_{ijt-1} = d] - \lim_{d \downarrow 0} \mathbb{E}[Y_{it}(1) | d_{ijt-1} = d]$$

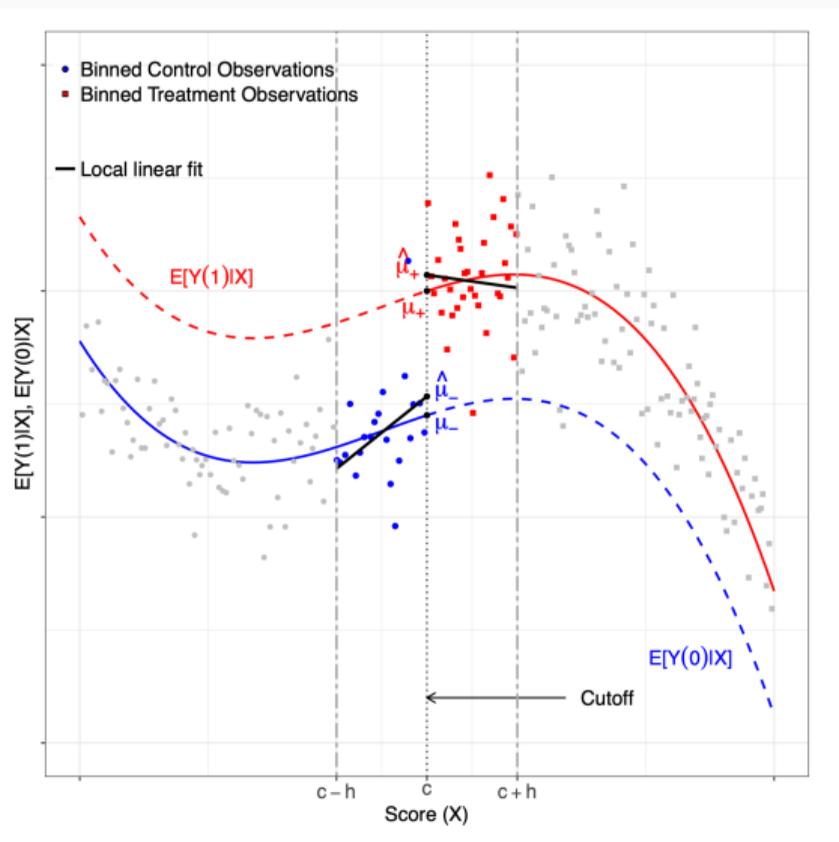
- Chava and Roberts (2008)

$$\mathbb{E}[Y_{it} | v_{ijt-1} = 0] - \mathbb{E}[Y_{it} | v_{ijt-1} = 1] = \alpha_0 + \beta_0 v_{ijt-1}$$

- Cattaneo, Idrobo, and Titiunik (2019)

$$\mu_{+(-)} = \mathbb{E}[Y_{it}(1(0)) | d_{ijt-1} = d]$$

$$\hat{\mu}_{+(-)} : \hat{Y}_{it} = \hat{\mu}_{+(-)} + \hat{\mu}_{+(-),1} d_{ijt-1}$$



- No need for covariates
  - If covariates do not change non-linearly around the cutoff, there should be no effect.
  - If they do, there will be bias.
- No need for fixed effects (Lee and Lemieux, 2010).
  - The error term should not inherit the non-linearity around cutoff.
- Include lagged dependent variable to exploit panel feature. This reduce variance (Cattaneo, Idrobo, and Titiunik, 2019).

- Loan covenants: DealScan
- Financial Measures: Compustat & CRSP
- Synthetic T-bill price

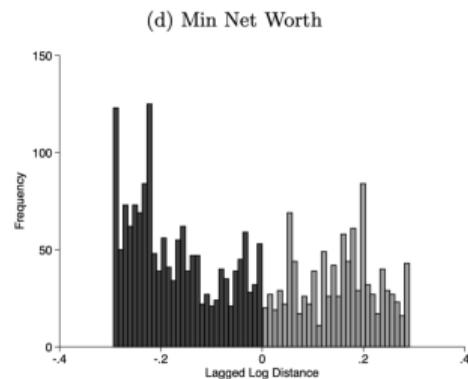
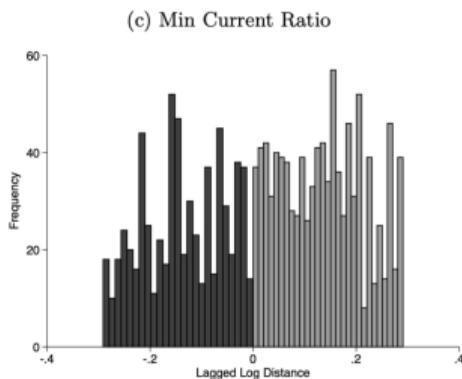
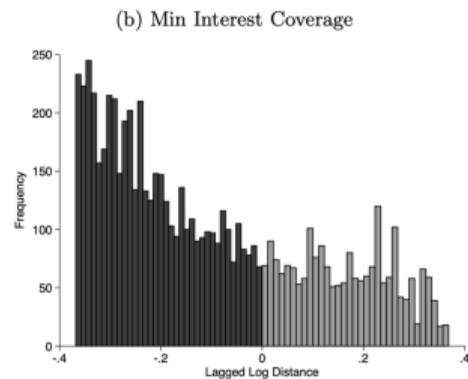
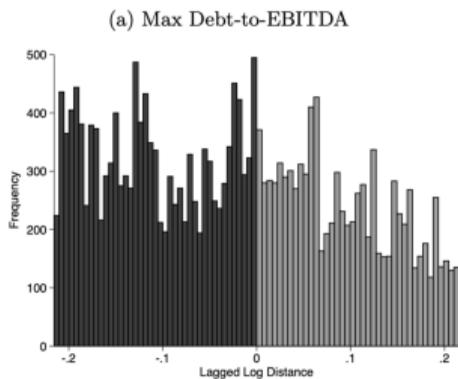
$$P_{it}^f [k] = \sum_{s=1}^S C^k (s) D (t_s)$$

- Discount rate from Gürkaynak, Sack, and Wright (2007).
- Credit spread:  $S_{it} [k] = y_{it} [k] - y_t^f [k]$

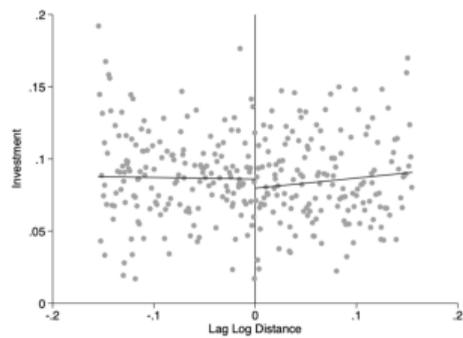
# Summary Statistics

	Compustat		Max Debt-to-EBITDA		Min Interest Coverage		Min Current Ratio		Min Net Worth	
	Mean/Median	SE	Mean/Median	SE	Mean/Median	SE	Mean/Median	SE	Mean/Median	SE
Current Ratio	2.36 [1.75]	(1.96)	1.90 [1.63]	(1.25)	1.80 [1.58]	(1.13)	2.11 [1.76]	(1.55)	2.02 [1.76]	(1.28)
Net Worth	331.61 [55.63]	(661.45)	954.93 [408.85]	(1389.58)	1141.93 [579.39]	(1477.38)	396.62 [106.56]	(898.05)	651.00 [283.69]	(1021.29)
Tangible Net Worth	294.22 [40.24]	(634.58)	456.50 [134.00]	(1134.08)	561.24 [218.96]	(1219.83)	582.37 [144.90]	(1179.39)	494.63 [185.00]	(910.61)
Log Asset	4.93 [4.91]	(2.24)	6.95 [6.97]	(1.50)	7.30 [7.36]	(1.41)	5.54 [5.52]	(1.65)	6.42 [6.48]	(1.53)
Market-to-Book	1.79 [1.24]	(1.51)	1.48 [1.17]	(1.13)	1.38 [1.12]	(0.97)	1.42 [1.08]	(1.18)	1.30 [1.06]	(0.90)
Investment to Capital	0.14 [0.10]	(0.14)	0.13 [0.10]	(0.12)	0.12 [0.09]	(0.11)	0.16 [0.12]	(0.14)	0.14 [0.10]	(0.12)
Cash Flow	0.10 [0.39]	(2.29)	1.13 [0.72]	(1.33)	0.98 [0.63]	(1.34)	0.67 [0.44]	(1.31)	0.95 [0.67]	(1.42)
Leverage	0.23 [0.19]	(0.22)	0.34 [0.31]	(0.24)	0.39 [0.36]	(0.23)	0.30 [0.28]	(0.22)	0.29 [0.28]	(0.18)
From	1989q1		1992q4		1989q1		1990q1		1990q2	
To	2020q4		2020q4		2020q4		2020q4		2020q4	
Firm-Quarter Obs	966,656		81,979		56,258		18,868		32,028	
Firms	30,474		3,099		2,191		1,100		1,567	

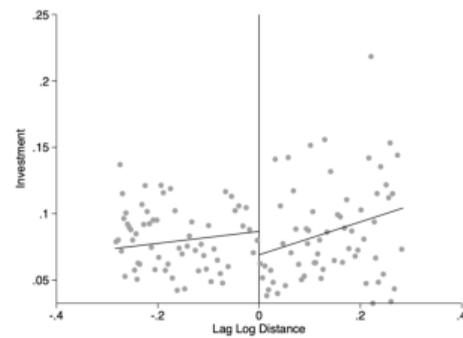
# Bunching



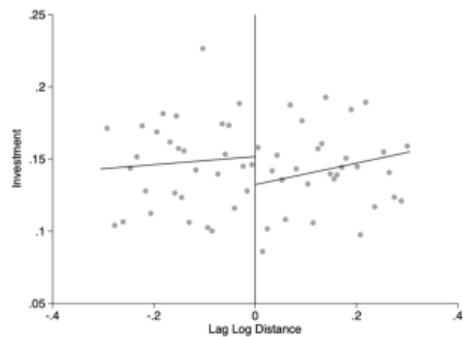
(a) Max Debt-to-EBITDA



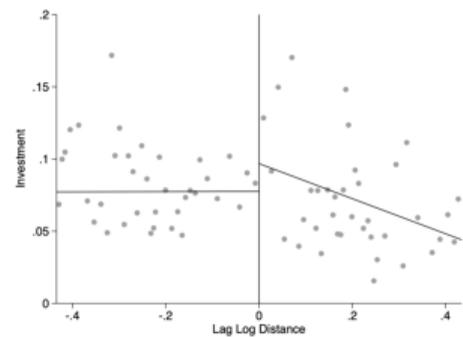
(b) Min Interest Coverage



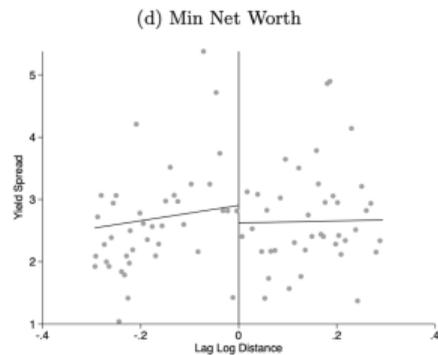
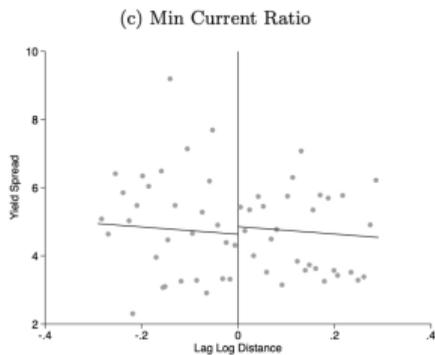
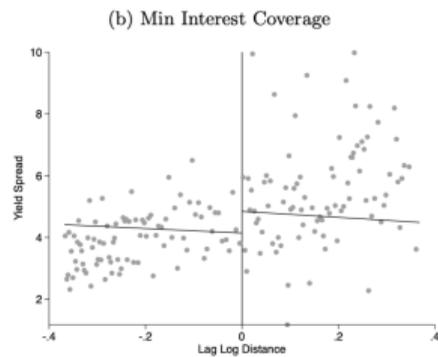
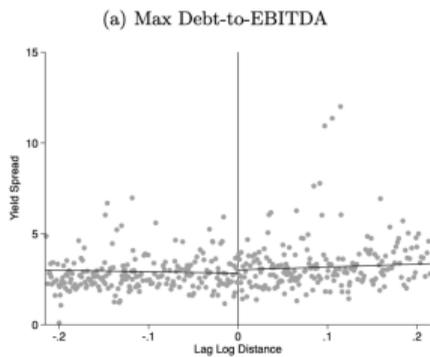
(c) Min Current Ratio



(d) Min Net Worth

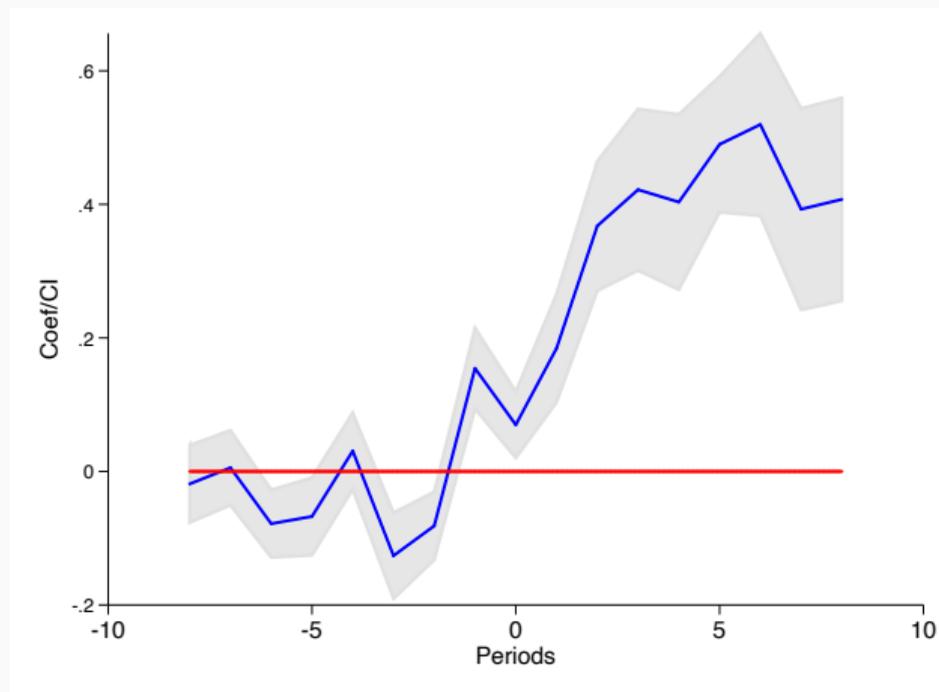


# Yield Spread



**Table 1: Yield Spread**

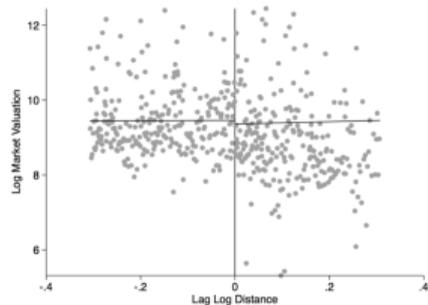
Covenant Type	Max Debt-to-EBITDA		Min Interest Coverage		Min Current Ratio		Min Net Worth	
	One Side	Two Side	One Side	Two Side	One Side	Two Side	One Side	Two Side
Lagged Violation	0.184*** (0.041)	0.097** (0.039)	0.703*** (0.171)	0.494*** (0.159)	0.224 (0.334)	0.237 (0.314)	-0.281** (0.136)	-0.132 (0.118)
Effective Obs Left	12,346	33,098	4,533	10,867	599	584	1,455	3,595
Effective Obs Right	8,639	7,640	1,893	1,892	920	1,155	932	786
Total Observations	71,078	71,078	49,946	49,946	3,759	3,759	7,676	7,676



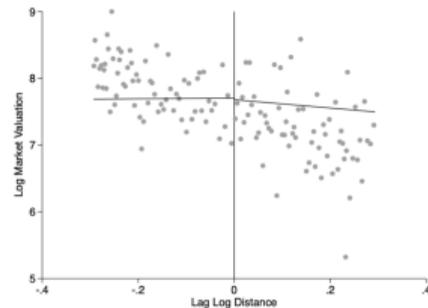
**Figure 1:** Yield Spread - Max Debt-to-EBITDA

# Market Valuation

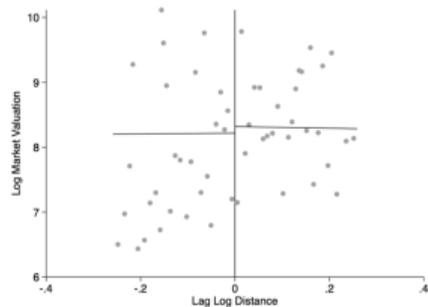
(a) Max Debt-to-EBITDA



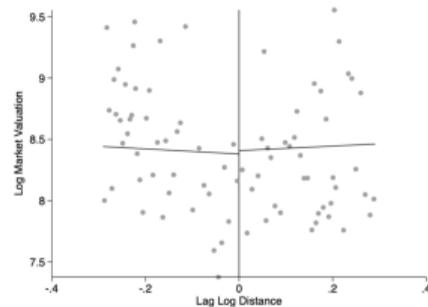
(b) Min Interest Coverage



(c) Min Current Ratio



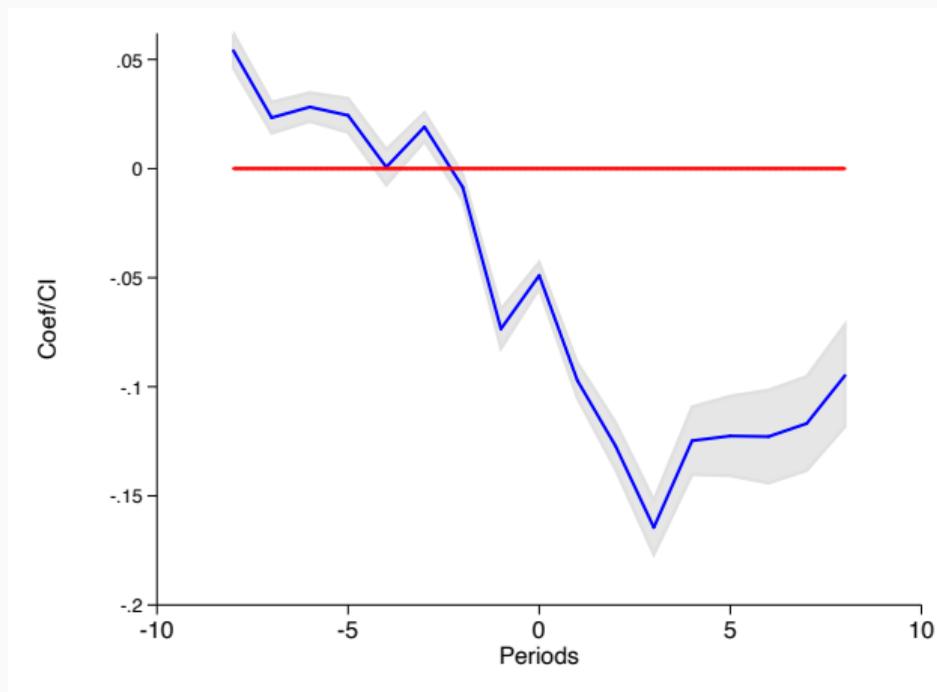
(d) Min Net Worth



**Table 2: Market Valuation**

Covenant Type	Max Debt-to-EBITDA		Min Interest Coverage		Min Current Ratio		Min Net Worth	
	One Side	Two Side	One Side	Two Side	One Side	Two Side	One Side	Two Side
Lagged Violation	-0.097*** (0.004)	-0.102*** (0.004)	-0.024 (0.024)	-0.011 (0.021)	0.101** (0.042)	0.121*** (0.045)	0.027 (0.021)	0.021 (0.023)
Effective Obs Left	17,162	29,302	2,962	26,538	519	393	1,373	2,133
Effective Obs Right	9,444	6,432	1,558	1,133	776	1,031	932	768
Total Observations	66,345	66,345	47,497	47,497	3,400	3,400	7,571	7,571

# Local Projections



**Figure 2:** Market Valuation - Max Debt-to-EBITDA

## References

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-  Lee, David S and Thomas Lemieux (June 2010). “Regression Discontinuity Designs Who Benefits From Debt Covenant Violations