Market Value of U.S. Universities

Benjamin Bennett Jaewon Choi Chanik Jo Yoshio Nozawa

Texas Christian University

Seoul National University

Chinese University of Hong Kong

University of Toronto

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Universities Do NOT Maximize Profits

- .. But they generate cash flow from operations, donations, and grants.
- This cash flow can be used to i) absorb negative shocks, ii) invest in a better campus, iii) support future research.



(a) Investment: High



(b) Investment: Low

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Bok (2003): "*reasonable financial stability is the ultimate guarantee against irresponsible entrepreneurial behavior*" .

Research Question

Central Question

Can we create a forward-looking measure of U.S. private universities' future cash flows?

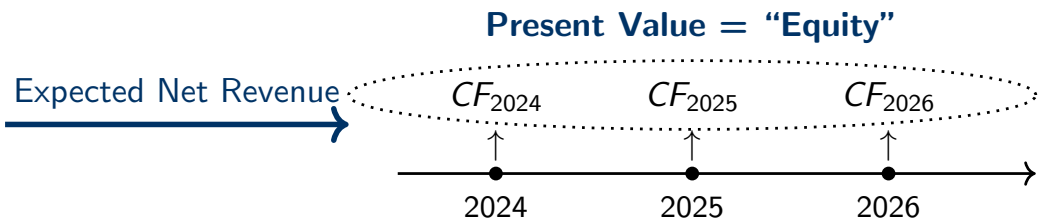
Income Statement

Revenue: \$678M

Expenses:

\$609M

Available: \$69M



- Cash flows fluctuate in the future.
- As of 2023, what is their expected present value?
- How would a new public policy change these cash flows?

Our Approach: Reverse-Engineering Black-Scholes

Key insight: While universities don't issue stocks, they issue **publicly traded bonds**

- Bond prices reflect investors' expectations of default risk
- We can reverse-engineer equity values from observed bond prices

Standard Approach (Corporate)

- Observe stock prices and volatility
  $\Rightarrow$ Back out credit spreads (e.g., Jones, Mason, & Rosenfeld, 1984)

Our Approach (Universities)

- Observe bond credit spreads and volatility
  $\Rightarrow$ Back out "stock prices"

Analogy

- Defaultable bond $\approx$ Put option
- Strike price = Face value of debt
- Equity $\approx$ Call option
- Underlying = Asset value

Universities vs. Corporations

	Universities	**Corporations**
Legal form	501(c)(3) non-profit	C-Corporation
Objective	Research and education	Maximize shareholder value
Governance	Board of Trustees + faculty senate	Board of Directors
Debt	Tax-exempt municipal bonds	Corporate bonds
Revenue	Tuition + grants + donations	Commercial operations
Equity	No residual claims issued	Issue stocks

What Our Measure Captures

Bond investors price bonds *given* these differences.
$\Rightarrow$ Market value of universities "as-is".

Literature Review

Finance & Universities

- Endowment management and university governance (Gilbert & Hrdlicka, 2015; Dimmock et al., 2024, Célérier, Vallée, and Vasilenko, 2026)
- Student credit markets and tuition (Lucca et al., 2018)
- University debt usage (Binfaré & Zimmerschied, 2025)

Nonprofits in Finance

- Earnings management in nonprofits (Leone, 2005; Eldenburg et al., 2011)
- Capital allocation (Adelino et al., 2015)
- Rationale for nonprofit form (Glaeser, 2001; Lakdawalla, 2006)

Structural Models of Debt

- Merton (1974) framework
- Credit spread puzzle (Huang & Huang, 2012; Chen et al., 2009; Bao, 2009)
- Stochastic volatility (Du et al., 2019; McQuade, 2018)
- OTC frictions (He & Xiong, 2014; Chen et al., 2018)
- Myth of credit spread puzzle (Feldhütter & Schaefer, 2018; Bai et al., 2020)

Our Contribution

First to estimate market value of nonprofit organizations using structural credit risk models

Structural Model: Asset Dynamics

Stochastic volatility model (Du, Elkamhi, & Ericsson, 2019)

Asset value X and variance V under physical measure:

$$\frac{dX_{i,t}}{X_{i,t}} = (\mu^P_{i,t} - q_i)dt + \sqrt{V_{i,t}}(\rho\, dW_{2,i,t} + \sqrt{1-\rho^2}\, dW_{1,i,t})$$

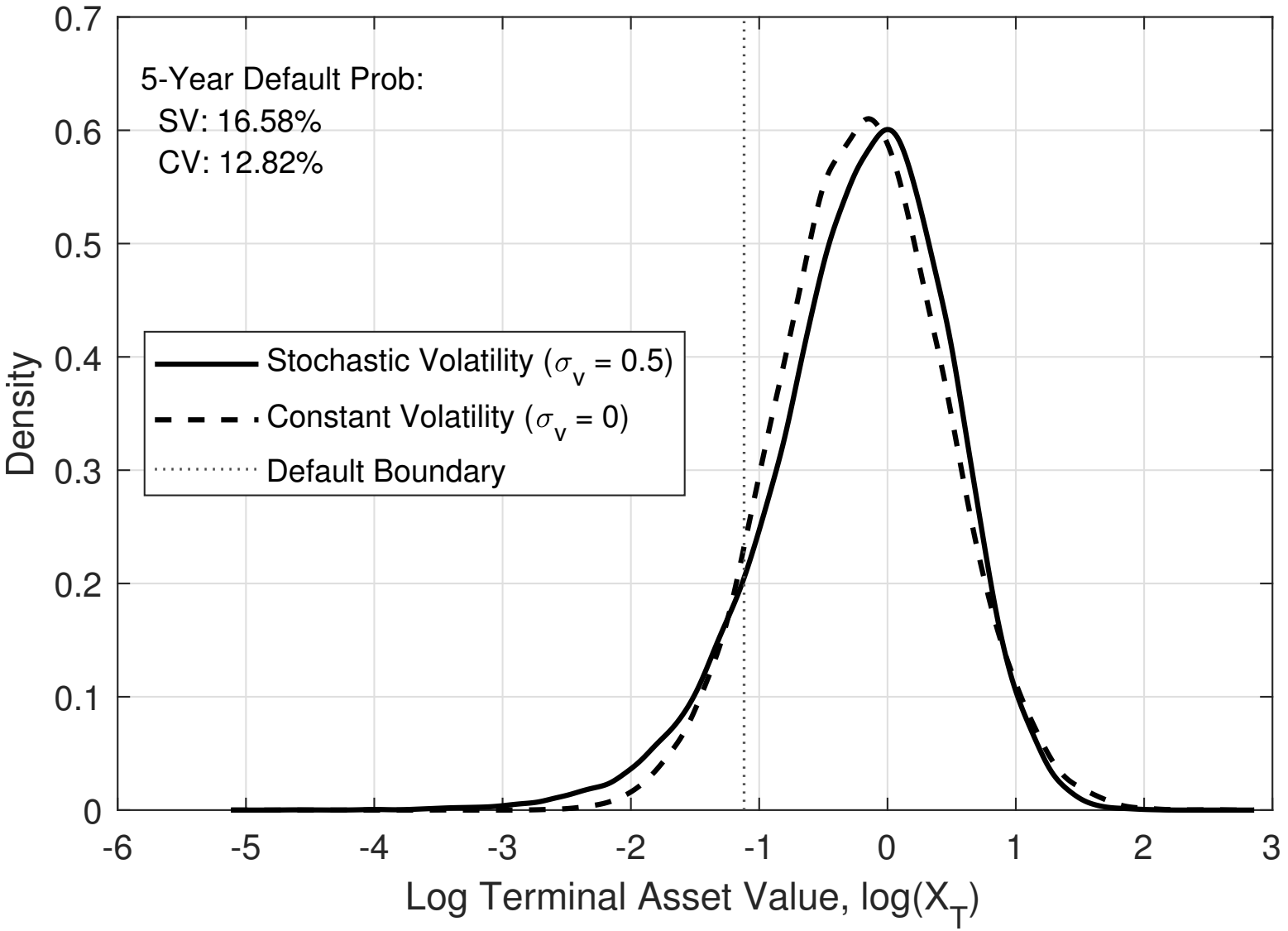
$$dV_{i,t} = \kappa(\theta - V_{i,t})dt + \sigma\sqrt{V_{i,t}}\, dW_{2,i,t}$$

- $\mu^P_{i,t}$: expected return; q_i: payout rate; ρ: corr. between asset and variance shocks
- κ, θ, σ: mean reversion speed, long-run variance, vol-of-vol

Risk-neutral dynamics: Replace $\mu^P \to r$, $\kappa \to \kappa^* = \kappa + \sigma\lambda_V$, $\theta \to \theta^* = \frac{\kappa}{\kappa^*}\theta$

Key risk prices: λ_V (variance risk), λ_D (asset risk)

Distribution of Asset Value



Bond Pricing

Default: Asset $X_{i,t}$ hits boundary $X_D \cdot F_i$ (face value of debt)
Coupon bond value:

$$B_{i,t} = \underbrace{\frac{c}{2}\sum_{k=1}^{K} e^{-r(t_k - t)} Q(t^* > t_k)}_{\text{PV of coupons}} + \underbrace{(1 - LGD)\sum_{k=1}^{K} e^{-r(t_k - t)} Q(t^* > t_{k-1})\, q(t^* = t_k)}_{\text{Recovery upon default}}$$

$$+ \underbrace{e^{-r\tau} Q(t^* > T)}_{\text{Principal if no default}}$$

- $Q(\cdot)$: risk-neutral survival probability; $q(\cdot)$: conditional default probability
- LGD: loss given default
- Credit spread $s_{i,t}$: difference between model yield and risk-free yield

Bond Volatility and Identification

Bond instantaneous volatility:

$$\sigma^B_{i,t} = \sqrt{\left(\frac{X_{i,t}}{B_{i,t}}\frac{\partial B_{i,t}}{\partial X_{i,t}}\right)^2 + \left(\frac{\sigma}{B_{i,t}}\frac{\partial B_{i,t}}{\partial V_{i,t}}\right)^2 + 2\rho\sigma\frac{X_{i,t}}{B^2_{i,t}}\frac{\partial B_{i,t}}{\partial X_{i,t}}\frac{\partial B_{i,t}}{\partial V_{i,t}} \cdot V_{i,t}}$$

Identification: Two equations, two unknowns $(X_{i,t}, V_{i,t})$

$$s_{i,t} = s(X_{i,t}, V_{i,t}; \cdot), \qquad \sigma^B_{i,t} = \sigma^B(X_{i,t}, V_{i,t}; \cdot)$$

- Observe: credit spreads and bond volatility for each issuer-month
- Solve numerically via Monte Carlo simulation (10,000 paths)

Computing Equity Value

Given $X_{i,t}$ and $V_{i,t}$, compute **equity value**:

$$S_{i,t} = X_{i,t} - F_{i,t}\left(PVB_{i,t} + DWL_{i,t}\right)$$

where:

$$PVB_{i,t} = (1 - LGD)\sum_{k} e^{-r(t_k - t)}\, Q(t^* > t_{k-1})\, q(t^* = t_k) + e^{-r\tau}\, Q(t^* > T)$$

$$DWL_{i,t} = LGD\sum_{k} e^{-r(t_k - t)}\, Q(t^* > t_{k-1})\, q(t^* = t_k)$$

- PVB: Present value of principal payment to bondholders
- DWL: Dead-weight loss from bankruptcy costs
- Equity = Asset value − Value going to debt holders − Bankruptcy costs

Model Parameters

Global parameters (fixed across rating groups)

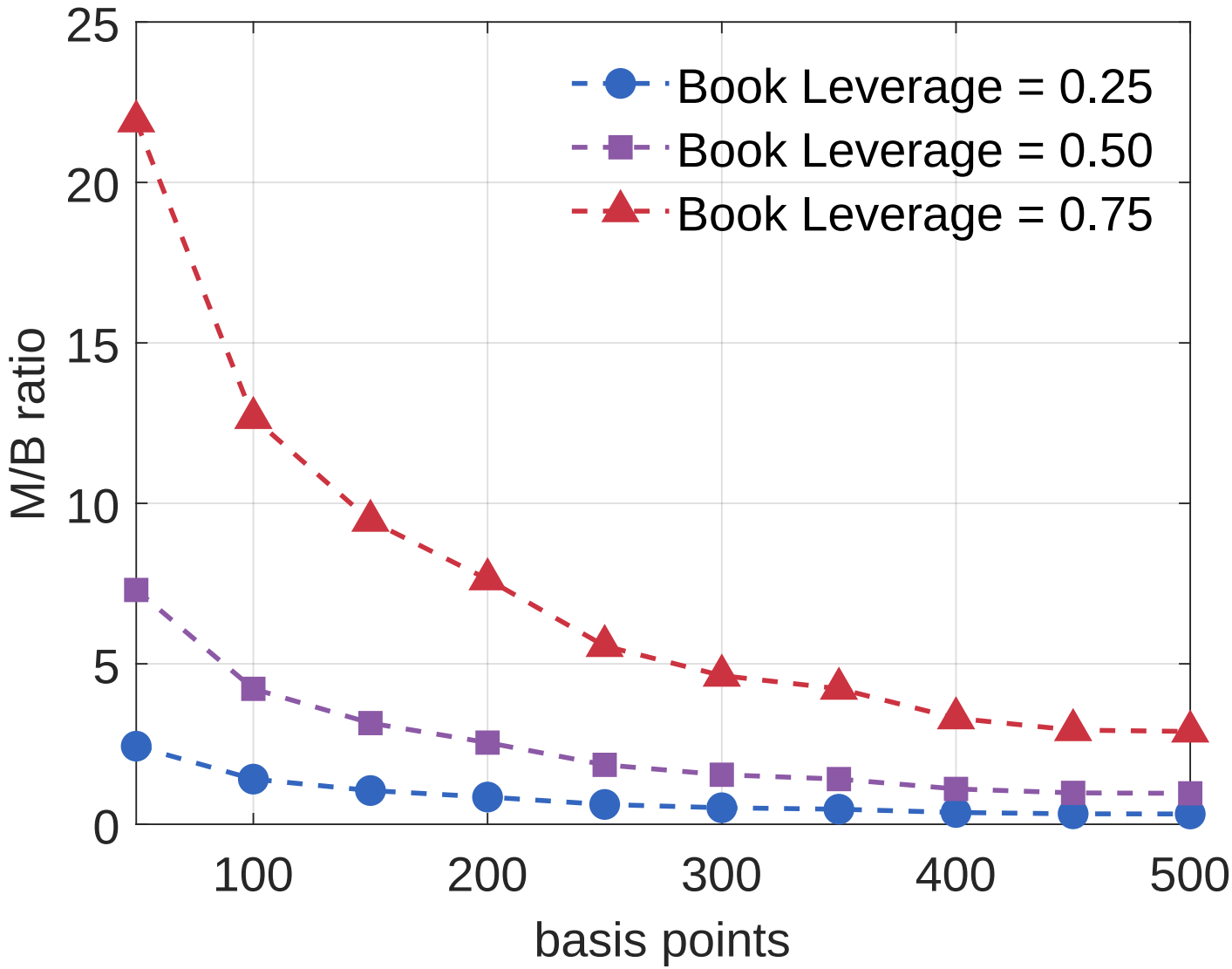
Parameter	Interpretation	Value	Source
ρ	Corr. (asset, variance)	-0.15	Du et al. (2019)
θ	Long-run mean of variance	0.084	Du et al. (2019)
κ	Speed of mean-reversion	4.00	Du et al. (2019)
σ	Vol-of-vol	0.30	Du et al. (2019)
LGD	Loss given default	0.55	Du et al. (2019)
SR	Target asset Sharpe ratio	0.22	Pins down λ_D given λ_V

Rating-specific parameters (re-estimated on ICE corporate bonds)

Rating	X_D	λ_V	λ_D
AAA	0.500	-8.90	-0.583
AA	0.580	-7.50	-0.371
A	0.705	-5.90	-0.128
BBB	0.605	-6.40	-0.204
HY	0.875	-1.40	$+0.555$

X_D matched to Moody's 1920–2020 default rates; λ_V minimizes spread pricing errors; λ_D implied by $SR = 0.22$.

Model Mechanism: Credit Spread vs. Equity M/B



Equity M/B is decreasing in credit spreads; conditional on spread, higher leverage $\Rightarrow$ higher M/B.

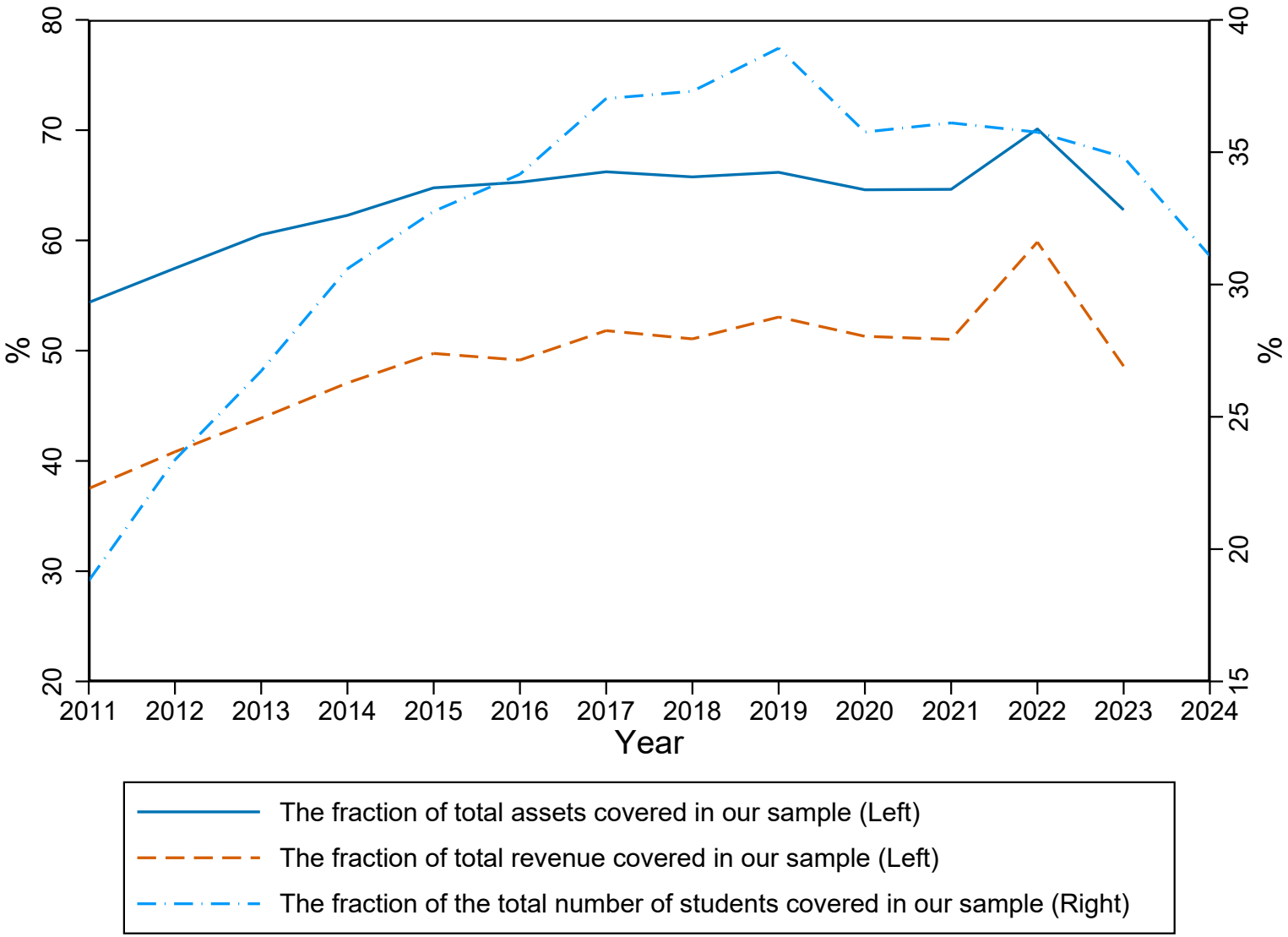
Data Sources

1. **IRS Form 990** (National Center for Charitable Statistics)
   - Financial statements of nonprofit organizations
   - FY 2010–2024; select entities filing Schedule E ("Schools")
2. **IPEDS** (National Center for Education Statistics)
   - Enrollment, student aid, student characteristics
3. **MSRB** (via WRDS)
   - Municipal bond transaction prices and volumes
   - Monthly panel: daily mid prices $\rightarrow$ month-end observations
4. **Mergent Municipal Bond Securities Data**
   - Bond characteristics: issue dates, maturities, call/put provisions
   - Yield-to-worst: min(maturity, first call, mandatory put)
   - Tax adjustment following Schwert (2017):

$$y_{j,t} = \frac{y^*_{j,t}}{(1 - \zeta_{t,\text{Federal}})(1 - \zeta_{j,t,\text{State}})}$$

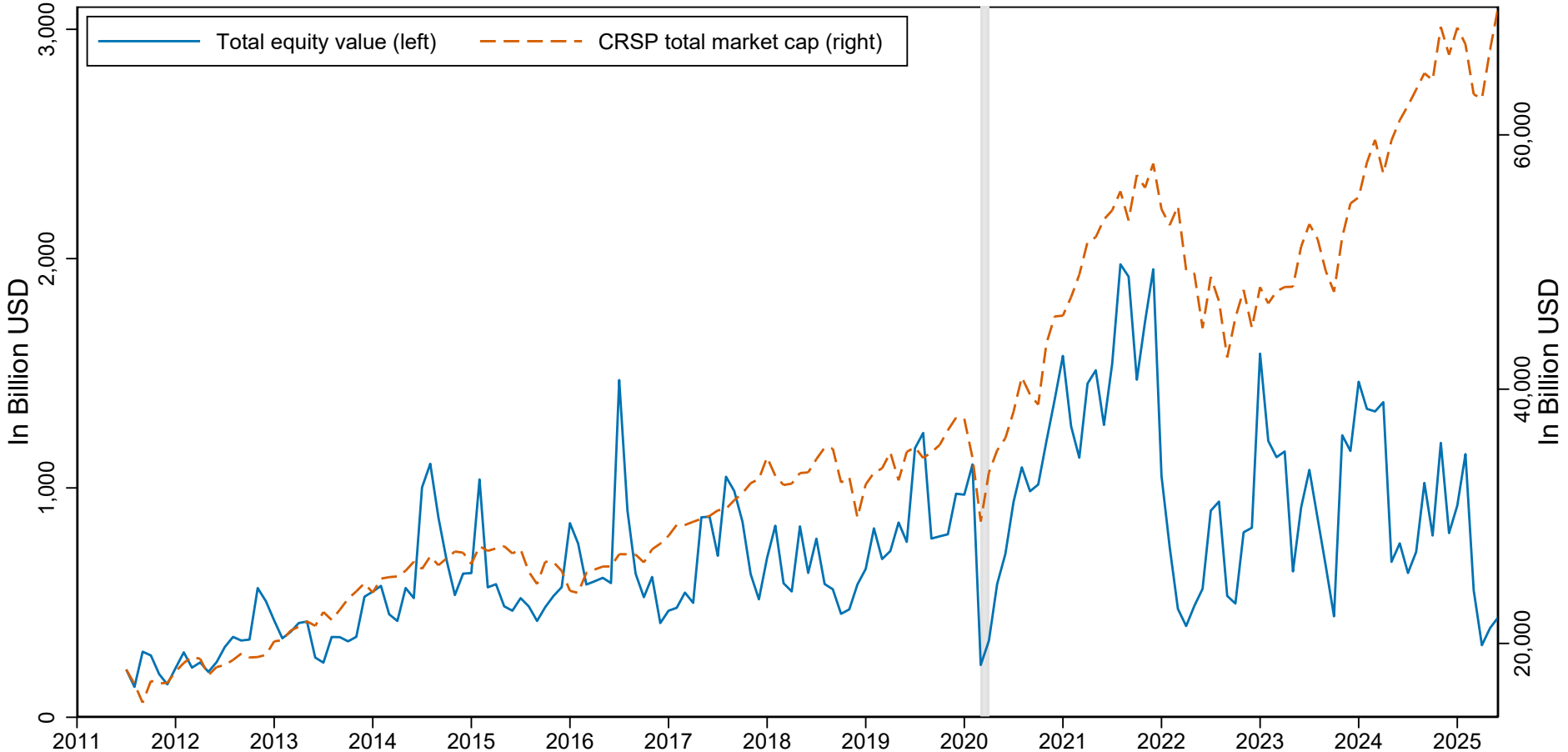
Monthly panel: 282 Institutions, July 2011 - June 2025.

Data Coverage



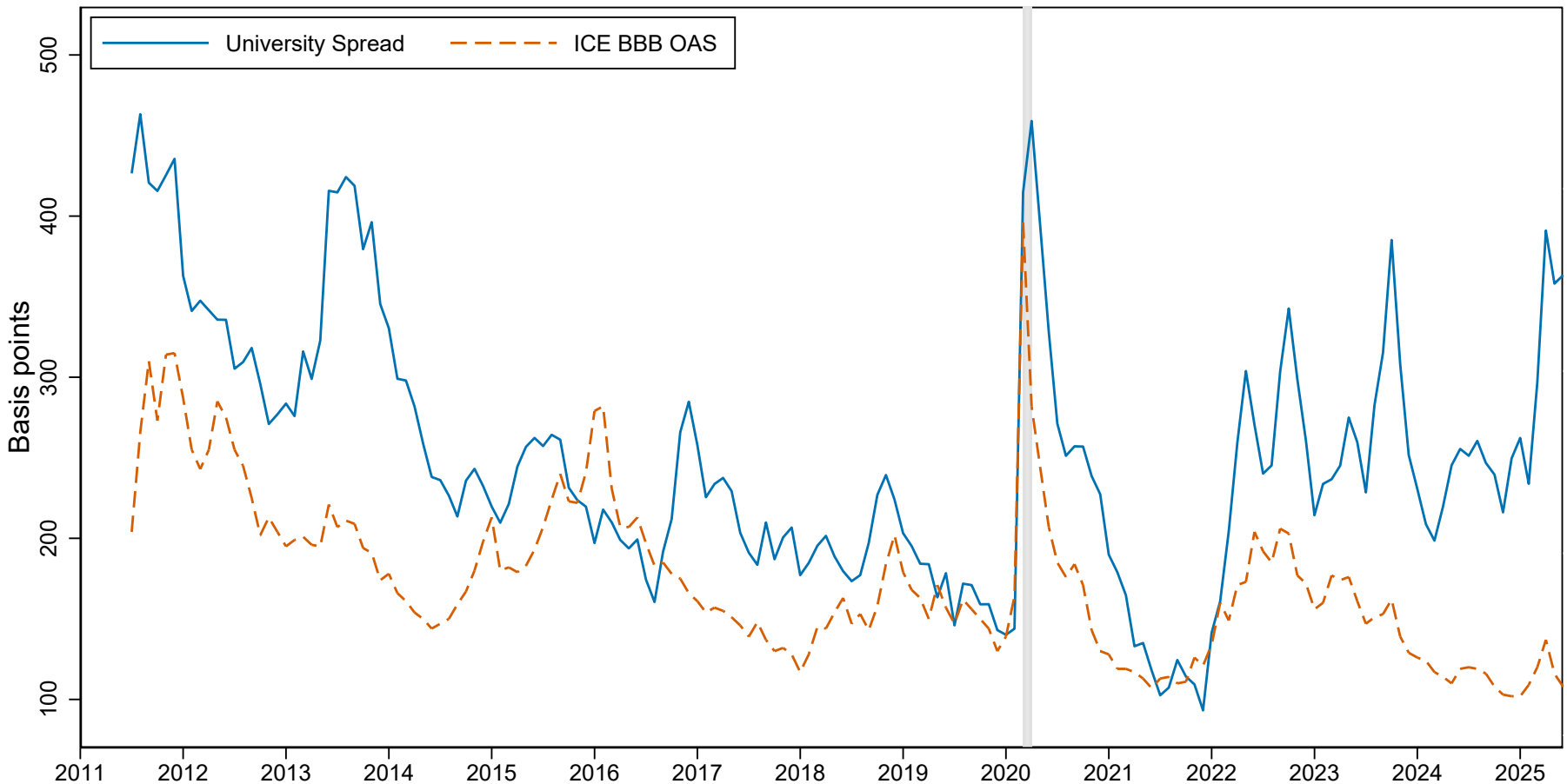
Our sample covers 55–65% of the universe by assets and 25–30% by student enrollment.

Aggregate University Index vs. Stock Market



University index (Vol.=35% per month) tracks CRSP 2011–2021; post-2022 divergence as university spreads remain elevated.

Credit Spread Divergence



University spreads remain at March 2020 levels (310→436 bps, Feb–Apr 2025) while BBB corporate spreads are at their lowest.

University Rankings by Equity Value (Top 25)

Rank	Name	Equity ($M)	Equity M/B	Spread (%)	USN Rank
1	Yale University	151,193	4.19	0.70	5
2	Harvard University	150,916	2.80	0.62	3
3	Stanford University	134,866	3.06	0.63	3
4	Massachusetts Institute of Technology	83,181	2.95	0.65	2
5	University of Notre Dame	52,867	3.28	0.73	20
6	New York University	49,721	7.73	1.63	35
7	Princeton University	46,189	1.44	1.09	1
8	Columbia University	45,834	2.64	0.93	12
9	University of Southern California	36,758	3.97	0.68	28
10	Cornell University	30,674	2.62	0.78	12
11	University of Pennsylvania	29,773	1.25	1.91	6
12	Emory University	29,089	2.29	1.10	24
13	Duke University	25,633	1.98	1.23	7
14	Dartmouth College	23,757	3.02	0.64	18
15	Northwestern University	21,992	1.55	1.03	9
16	Johns Hopkins University	21,952	2.41	0.68	9
17	University of Rochester	15,744	4.21	2.10	47
18	Boston University	15,552	3.20	1.22	43
19	University of Chicago	14,716	1.85	2.94	12
20	Boston College	11,969	2.92	1.22	39
21	Carnegie Mellon University	11,091	2.22	0.95	24
22	Brown University	10,270	1.55	1.21	9
23	Northeastern University	8,835	3.21	1.14	53
24	Thomas Jefferson University	6,813	10.77	2.07	142
25	Syracuse University	6,748	2.61	1.27	67

Average equity value over July 2020 – June 2025. US News rank based on 2024.

University Rankings by Equity Value (Ranks 26–50)

Rank	Name	Equity ($M)	Equity M/B	Spread (%)	USN Rank
26	Georgetown University	6,717	3.51	1.98	22
27	University of Miami	6,703	2.27	2.49	67
28	Baylor University	6,091	2.38	1.06	93
29	The Rockefeller University	5,811	2.18	1.74	
30	Baylor College of Medicine	5,516	3.76	1.28	
31	Mount Sinai School of Medicine	5,339	4.51	1.85	
32	Case Western Reserve University	5,037	1.89	1.11	53
33	Tufts University	4,881	1.40	1.09	40
34	Tulane University of Louisiana	4,379	2.08	1.86	73
35	Williams College	4,089	1.10	1.87	
36	Texas Christian University	4,001	1.54	0.92	98
37	Wesleyan University	3,815	2.10	0.87	
38	Pepperdine University	3,426	2.29	1.04	76
39	Swarthmore College	3,291	1.21	1.26	
40	Wake Forest University	3,096	1.99	2.02	47
41	Pomona College	2,944	0.96	1.09	
42	Southern Methodist University	2,822	1.01	1.87	89
43	Saint Louis University	2,685	1.39	2.53	105
44	Drexel University	2,500	2.02	2.33	98
45	Claremont McKenna College	2,437	1.60	1.23	
46	St. John's University-New York	2,416	2.40	1.66	
47	Wellesley College	2,145	0.72	2.46	
48	Babson College	2,125	2.56	1.26	
49	Midwestern University-Glendale	2,110	1.47	1.32	
50	Colgate University	2,050	1.71	0.59	

Yale ($151.2B) $\approx$ McDonald's. Distribution highly right-skewed: Yale $= 3.3\times$ Columbia (#8), $17.1\times$ Northeastern (#23).

Case Study: Bond Defaults

Do bond prices reflect investors' expectations of future cash flows?

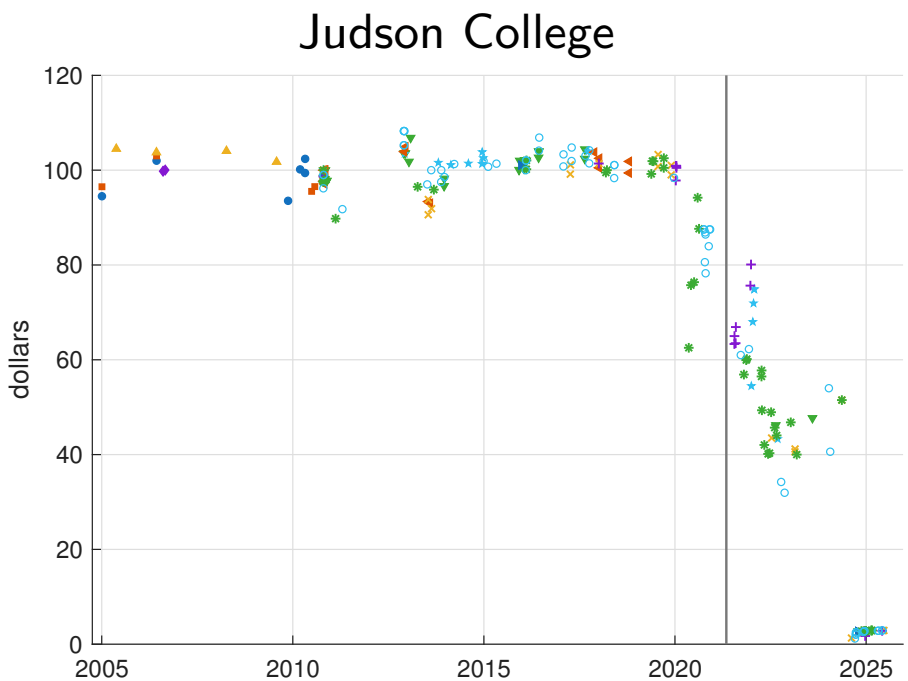
Name	Default Date	Event	Bond Prices		Credit Rating		Outcome
			Before Default	After Default	Original	Before Default	
Mid-Continent College	2014/04	Missed principal	99.6	98.1	–	–	Ch. 11 Sep 2014; closed 2015
Dowling College	2015/06	Bankruptcy	–	81.4	B+	CC	Ch. 11 Nov 2016; closed 2016
College of New Rochelle	2017/07†	Missed principal	84.4	69.6	BBB-	BB+	Ch. 11 Sep 2019; closed 2019
Ohio Valley University	2019/09†	Missed interest	–	15.0	–	–	Ch. 7 Feb 2022; closed Dec 2021
Judson College	2021/05	Missed principal	–	64.7	BBB-	BB	Ch. 11 2021; closed Jul 2021
Medaille University	2023/05	Closure	90.1	59.1	BB+*	BB-	Closed Aug 2023
College of Saint Rose	2023/11	Closure	48.9	24.6	BBB	BBB-	Ch. 11 Oct 2024; campus sold
Birmingham-Southern College	2025/04	Missed P&I	81.6	59.9	BB+	CCC+	Closed May 2024
(Average)			80.9	59.0			

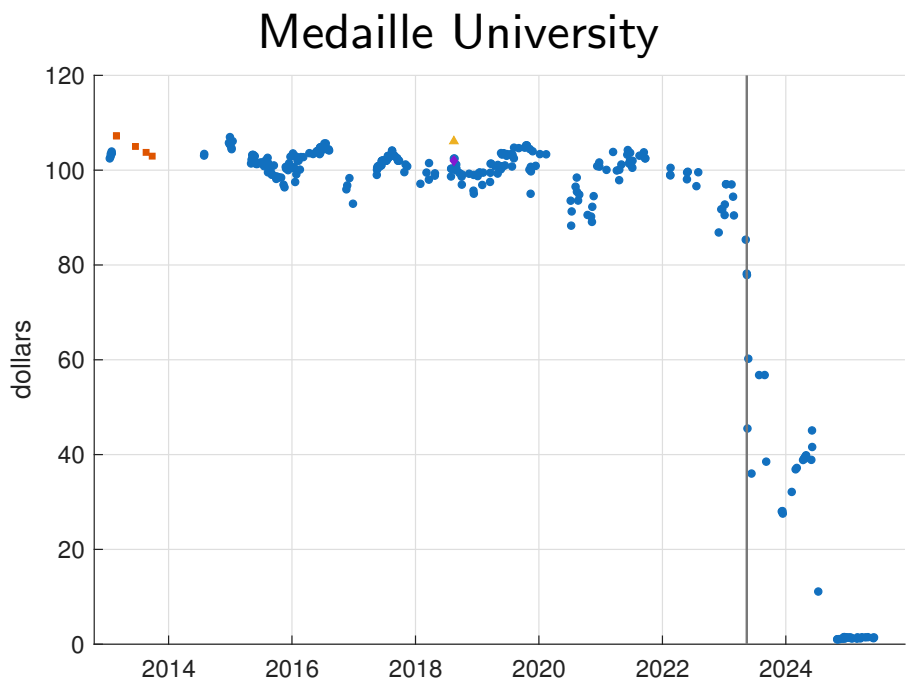
Prices in % of par, averaged over 3 months before/after the event. †Date payment was due (no dissemination record).
*Average rating 11.7 (between BB+ and BB).

- Bond prices decline sharply at default; average post-default price = 59.0% of par
- $\Rightarrow$ Loss given default $\approx$ 41%. Rating agencies downgraded issuers before default.
- Investors should price in default risk.

Bond Prices of Defaulted Universities

Bond prices decline sharply upon default and drift toward zero as universities cease operations.





Liquidity Analysis: University vs. Corporate Bonds

Concern: Municipal bonds may be illiquid ⇒ spreads reflect liquidity, not credit risk

	AAA	AA	A	BBB	HY
			Panel A: University bonds		
Turnover (%)	7.363	8.078	10.294	13.026	7.686
	(28.38)	(58.01)	(66.81)	(32.65)	(6.66)
Obs.	16,070	44,106	52,659	10,732	753
			Panel B: Corporate bonds		
Turnover (%)	5.386	7.305	6.697	6.830	10.245
	(23.16)	(43.29)	(100.37)	(116.73)	(81.22)
Obs.	8,720	64,952	399,968	507,727	144,828
			Panel C: Difference between the two groups		
Difference	1.977***	0.773***	3.597***	6.196***	-2.559**
	(5.68)	(3.53)	(21.43)	(15.38)	(-2.22)

Turnover = monthly trading volume / amount outstanding. University bonds more liquid for AAA–BBB; difference largest for BBB.

SV Model's Fit to the Corporate Credit Spreads

Average credit spreads of the equal-weighted portfolio of corporate bonds in each rating group.

Rating group	Model	Data	Difference	N
AAA	32.5	33.1	−0.6	2,565
	(10.9)	(15.7)	(-0.2)	
AA	41.1	44.3	−3.2	9,678
	(8.7)	(16.3)	(-1.0)	
A	63.9	65.8	−1.9	46,776
	(12.9)	(14.4)	(-0.5)	
BBB	132.6	133.2	−0.6	95,355
	(17.6)	(13.4)	(-0.1)	
HY	507.4	505.8	1.5	92,500
	(21.0)	(10.6)	(0.0)	

Determinants of Equity M/B

Multivariate regression with year-month FEs. Standardized coefficients.

$$\log S_{i,t}/S^B_{i,t} = \beta \mathbf{X}_{i,t} + \theta_t + \varepsilon_{i,t}$$

Category	Variable	Coef	t-stat	Var. dec. [%]
Revenue	ROA	0.170^{***}	(8.66)	2.97
	Change in ROA	0.006	(0.33)	0.09
Op. risk	ROA vol.	-0.069^{***}	(-3.32)	1.12
Fin. risk	Book leverage	0.592^{***}	(20.72)	**23.75**
	Investment/Assets	0.148^{***}	(4.59)	-0.12
	Cash/Assets	0.038^{*}	(1.92)	0.28
	Credit rating	Included		9.90
Reputation	US News rank	0.101^{***}	(3.86)	-0.84
	Ivy League	0.099	(1.08)	0.50
Adj. $R^2 = 0.586$		$N = 12{,}812$		

Policy Impact Analysis: Framework

Difference-in-Differences Design:

$$\log S_{i,t} = \beta \; Post_t \times Treat_i + \gamma' \mathbf{X}_{i,t} + \psi_i + \theta_t + \epsilon_{i,t}$$

Advantages of market-based equity measure:

- Book values do not react to policy changes over short windows
- Market values from bond prices reflect **real-time** investor assessments
- Enables quantification of policy impacts in **dollar terms**

Three policy events examined:

1. Federal research funding freeze (March 2025)
2. Visa restrictions on Chinese students (May 2024)
3. Federal student loan payment pause (March 2020)

Event 1: Research Funding Freeze (March 2025)

Policy:

- Mar 7: \$400M in grants/contracts to Columbia canceled
- Mar 10: OCR warnings to 60 institutions
- Mar 11: WEST Act proposed (6% excise tax on endowments >\$11.9B)
- Mar 31: Audit of Harvard's \$8.7B in grants

DiD Design:

- Four nested treatment groups of increasing severity:
  (1) Endowment > WEST Act threshold (\$11.9B)
  (2) + subject to funding freezes
  (3) + received OCR warning letters
  (4) Intersection of all three
- Post: March–June 2025; Sample: November 2024 – June 2025

Event 1: Results

	Dep. Var = Log(Equity market)				
	(1)	(2)	(3)	(4)	(5)
Post 4 months×Treat 1	-0.253***				
	(-2.80)				
Post 4 months×Treat 2		-0.310***			
		(-3.14)			
Post 4 months×Treat 3			-0.285***		
			(-2.77)		
Post 4 months×Treat 4				-0.394***	
				(-5.34)	
Post 3 months×Treat 4					-0.443***
					(-6.10)
# of treated universities	8	5	6	4	4
University controls	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓
Year-month FEs	✓	✓	✓	✓	✓
Adj. R^2	0.945	0.945	0.945	0.945	0.951
Obs.	885	885	885	885	795

Most affected (Treat 4): -39.4%. Avg. equity = \$64.1B $\Rightarrow$ loss of $\approx$\$25.3B.

t-stats clustered at university level.

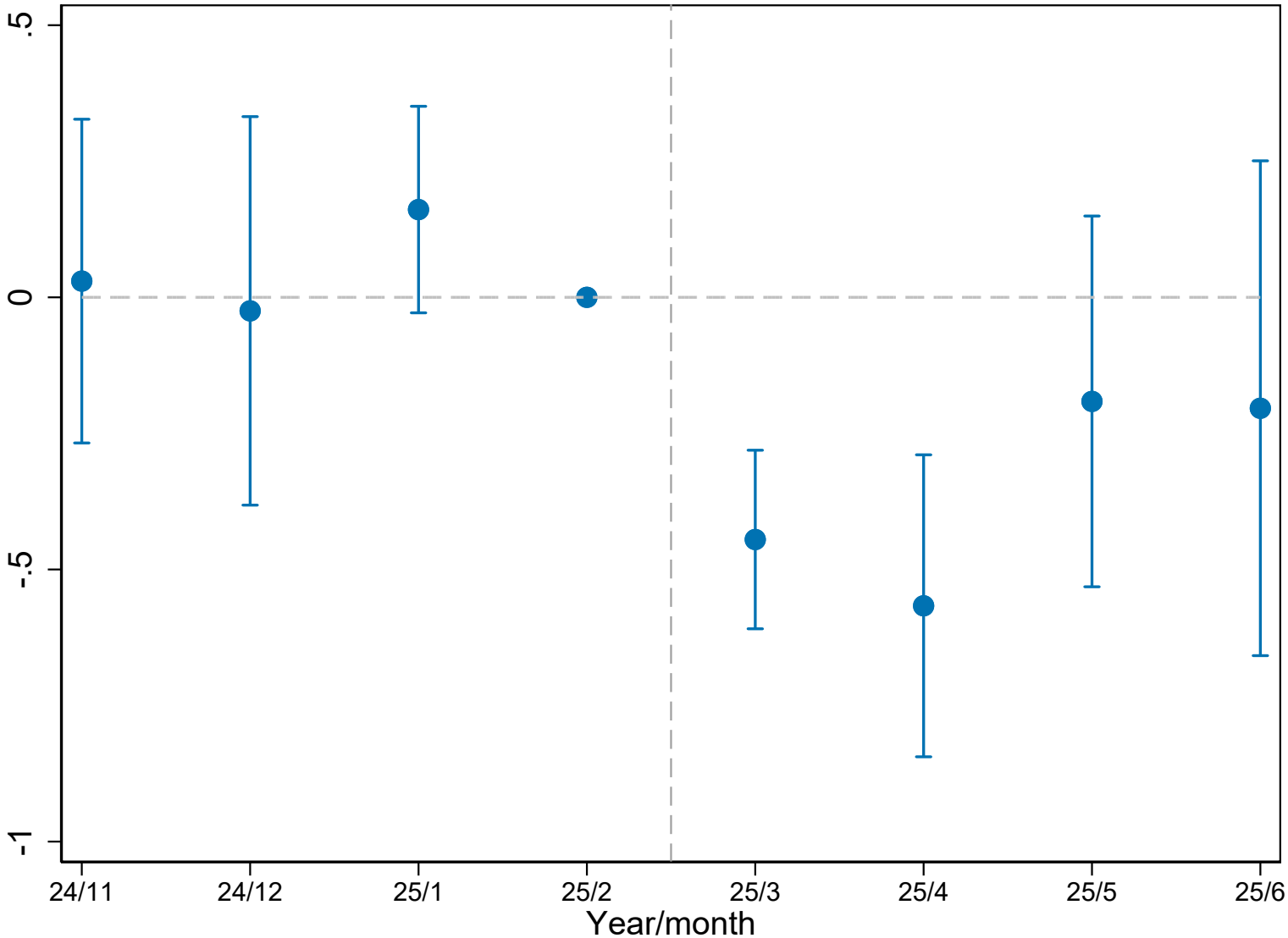
Event 1: Results (Synthetic DiD)

Synthetic DiD (Arkhangelsky et al., 2021) reweights control units and pre-treatment periods to construct a synthetic control that matches the treated group's pre-trends.

	Dep. Var = Log(Equity market)	
	(1)	(2)
Post 4 months×Treat 4	-0.281**	
	(-2.42)	
Post 3 months×Treat 4		-0.306***
		(-2.72)
# of treated universities	3	3
University controls	✓	✓
University FEs	✓	✓
Year-month FEs	✓	✓
Obs.	864	810

Synthetic DiD estimator for Treat 4. Effects remain economically large and statistically significant.

Event 1: Dynamic Effects



Immediate ∼50% drop in March 2025, attenuated to ∼10% in May–June.

Benchmark: Feb 2025.

Event 2: Visa Restrictions on Chinese Students (May 2024)

Policy:

- Amid US-China tensions, intensified visa restrictions and deportations
- Apr 20: Major news coverage of airport interrogations, visa cancellations
- Chinese Embassy: >70 students deported since July 2021
- Raised concerns about enrollment disruptions and tuition revenue loss

DiD Design:

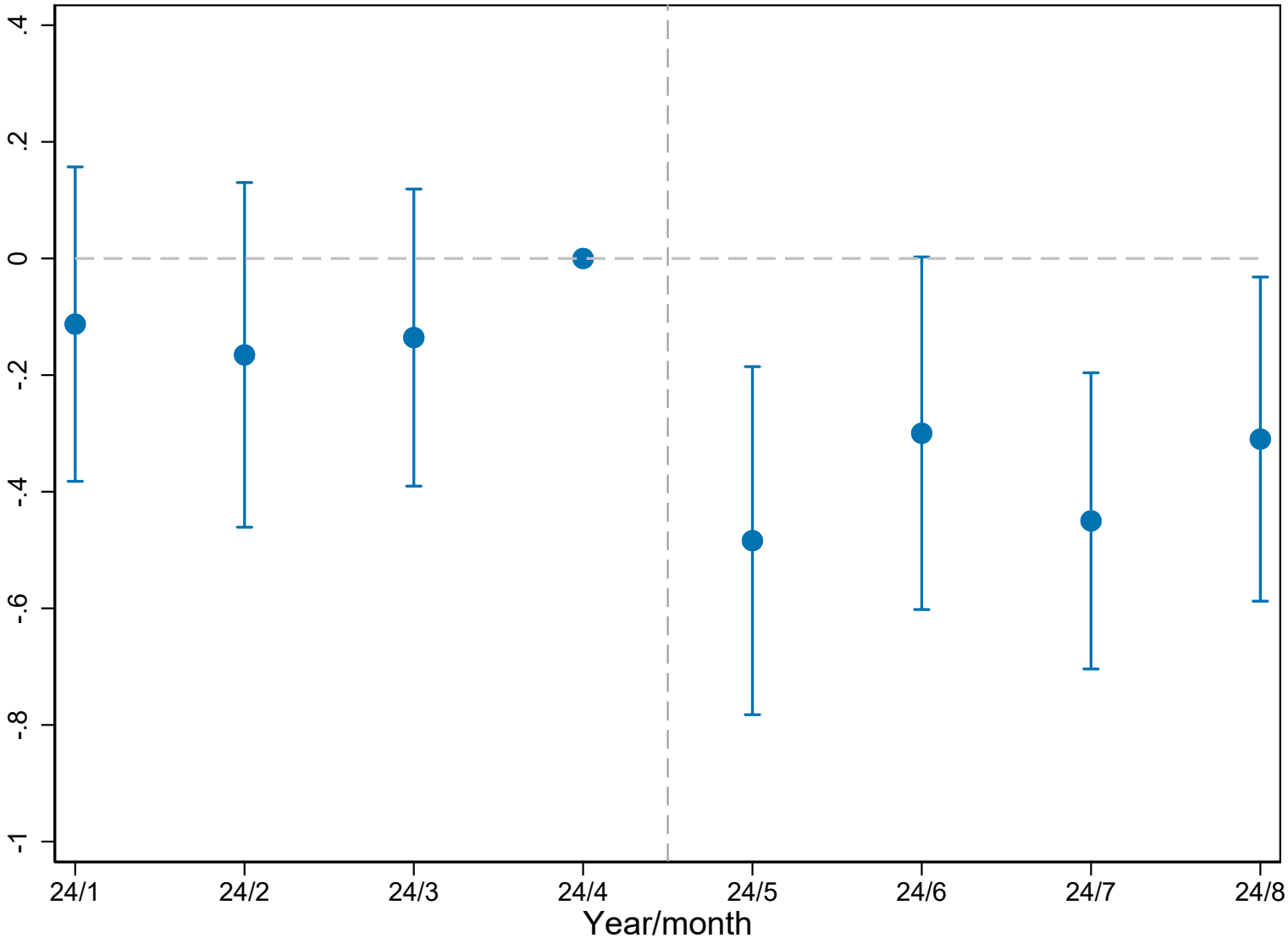
- Treatment: Top tercile in both % international *and* % Asian students (IPEDS, 2023)
- Post: May–August 2024; Sample: January 2024 – August 2024

Event 2: Results

	Dep. Var = Log(Equity market)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post 4 months×High Foreign Asian student	-0.283***		-0.274***	-0.081	-0.364***	-0.150	-0.109
	(-3.76)		(-3.10)	(-0.60)	(-4.39)	(-1.05)	(-0.67)
Post 3 months×High Foreign Asian student		-0.305***					
		(-3.73)					
Post 4 months×High Foreign Asian student×High Foreign Asian faculty			-0.038				
			(-0.30)				
Post 4 months×High Foreign Asian student×High Foreign student (Q5)				-0.284*			
				(-1.94)			
Post 4 months×High Foreign Asian student×High Asian student (Q5)					0.129		
					(1.09)		
Post 4 months×High Foreign Asian student×Large Student enrollment						-0.206	
						(-1.36)	
Post 4 months×High Foreign Asian student×PhD degree offer							-0.195
							(-1.13)
# of treated universities	26	26	26	26	26	26	26
University controls	✓	✓	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓	✓	✓
Year-month FEs	✓	✓	✓	✓	✓	✓	✓
Adj. R^2	0.956	0.955	0.956	0.956	0.956	0.956	0.956
Obs.	981	848	981	981	981	981	981

Treated universities: -28.3%. Avg. equity = \$46.7B $\Rightarrow$ loss of $\approx$\$13.2B per university.

Event 2: Dynamic Effects



Equity values plunge in May 2024 and remain significantly lower from June to August, indicating prolonged impact.

Event 3: Student Loan Payment Pause (March 2020)

Policy:

- Mar 13, 2020: National emergency declaration $\Rightarrow$ payment suspension
- Mar 27, 2020: CARES Act enacted (retroactive to Mar 13)
- Suspended payments and interest on federal student loans

DiD Design:

- Treatment: Top tercile by % students with federal loans (IPEDS, 2019)
- Post: March–June 2020; Sample: November 2019 – June 2020

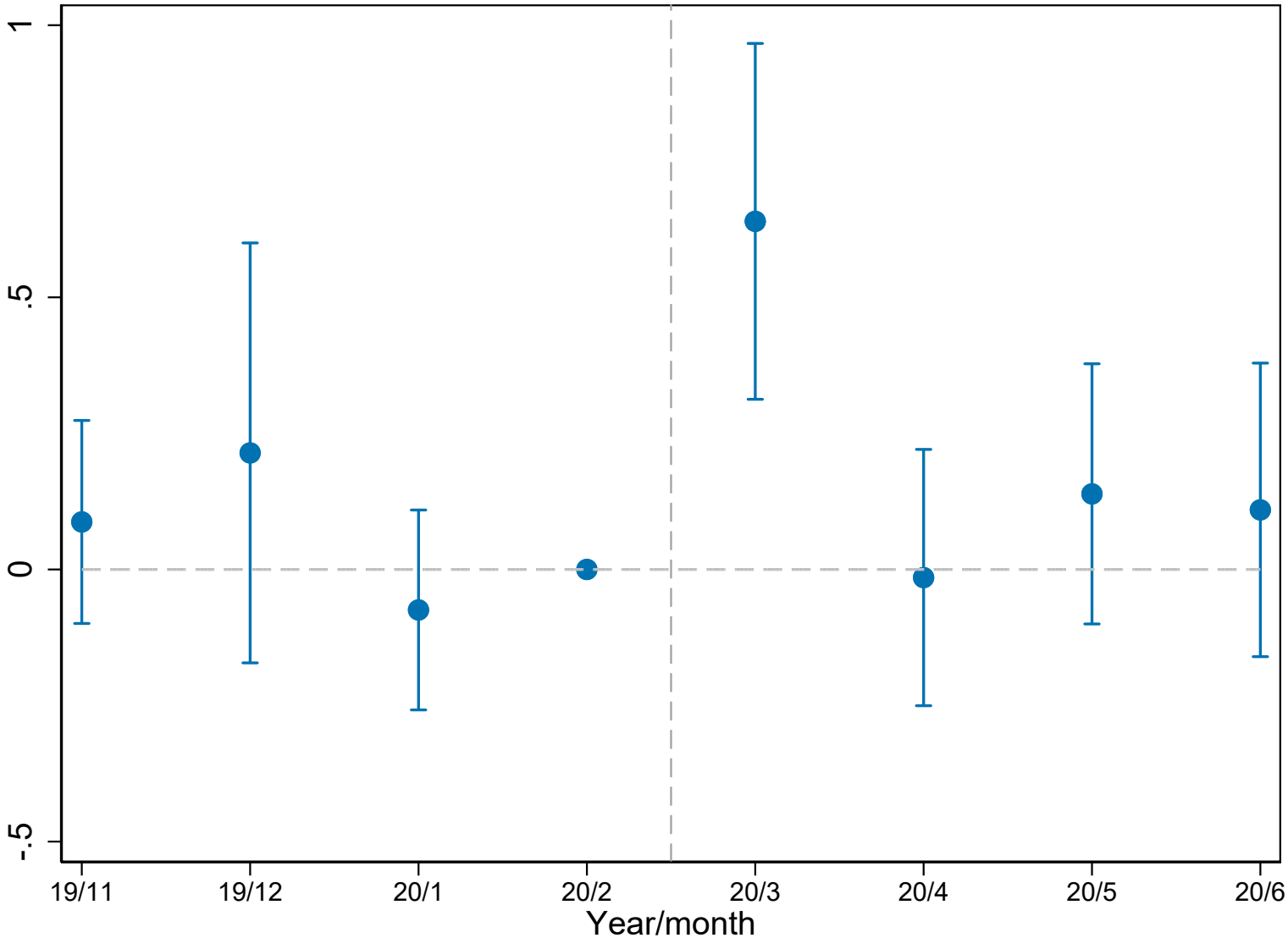
Event 3: Results

	Dep. Var = Log(Equity market)				
	(1)	(2)	(3)	(4)	(5)
Post 4 months×High loan share	0.174**				
	(1.98)				
Post 3 months×High loan share		0.218**	0.079	-0.000	0.231**
		(2.21)	(0.86)	(-0.00)	(2.24)
Post 3 months×High loan share×Low Gov't grant			0.650**		
			(2.41)		
Post 3 months×High loan share×Low student #				0.475***	
				(2.79)	
Post 3 months×High loan share×Low loan size					-0.233**
					(-2.44)
# of treated universities	29	29	29	29	29
University controls	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓
Year-month FEs	✓	✓	✓	✓	✓
Adj. R^2	0.949	0.949	0.950	0.950	0.949
Obs.	780	678	678	678	678

Four-month window: +17.4%. Avg. equity = \$666M ⇒ gain of ≈\$116M per university.

Amplified for smaller institutions.

Event 3: Dynamic Effects



Effects pronounced in March–April 2020, dissipating by May. Treatment: top tercile by % students with federal loans.

Summary of Policy Impacts

	Funding Freeze (Mar 2025)	**Loan Pause (Mar 2020)**	**Visa Restrictions (May 2024)**
DiD estimate	$-39.4\%^{***}$	$+17.4\%^{**}$	$-28.3\%^{***}$
Dollar impact	−$25.3B	+$116M	−$13.2B
Treatment	Endowment tax + freeze + OCR	Top loan % tercile	Top intl + Asian tercile
Most affected	Ivy League, high donations	Low gov't grants, fewer students	High foreign student share

Key Takeaway

Our market-based equity measure enables **real-time, dollar-denominated** assessment of policy impacts on the education sector—something book values cannot provide.

Conclusion

1. **Novel valuation framework** for nonprofit universities
   - Reverse-engineer equity values from municipal bond prices using a structural credit-risk model with stochastic volatility
2. **Universities are economically significant**
   - Aggregate market cap $\approx$ 2–4% of U.S. stock market
   - Top universities (Yale, Harvard, Stanford) rival major corporations; distribution highly right-skewed
3. **Valuation drivers:**
   - Book leverage dominates (23.8%) and credit rating adds 9.9%
   - ROA (3.0%) and ROA volatility (1.1%, negative) are smaller but significant
   - Reputation (US News rank, Ivy League) matters modestly
4. **Policy shocks are large, dollar-denominated, and measurable in real time:**
   - Funding freeze (Mar 2025): -39.4% / $-\$25.3$B; Loan pause (Mar 2020): $+17.4\%$ / $+\$116$M per school; Visa restrictions (May 2024): -28.3% / $-\$13.2$B

Summary Statistics: Input Variables

	N	Mean	SD	Min	p1	p10	p50	p90	p99	Max
Panel A: Input variables										
Spread (bps)	15,154	246.07	166.05	0.21	22.09	75.20	207.78	467.69	815.15	999.86
Coupon (%)	15,154	4.85	0.46	1.11	3.00	4.00	5.00	5.00	5.54	6.50
Treasury yield (%)	15,154	2.26	1.32	0.11	0.21	0.65	1.90	4.23	4.76	5.05
Time to worst (yr)	15,154	4.93	1.40	2.00	2.09	2.90	5.00	6.96	7.86	7.99
BondVOL	15,154	0.10	0.07	0.01	0.03	0.05	0.08	0.16	0.32	1.81
FCFF ($M)	15,154	107	334	−1,487	−280	−25	26	274	1,784	4,006
Asset book ($M)	15,154	4,983	9,993	65	145	448	1,566	12,727	57,547	75,288
Liability book ($M)	15,154	1,348	2,711	17	59	132	413	3,532	11,368	35,024

Summary Statistics: Output Variables

	N	Mean	SD	Min	p1	p10	p50	p90	p99	Max
Panel B: Output variables										
Equity Mkt ($M)	15,154	8,206	29,921	−133	27	147	1,046	16,262	148,108	950,602
Equity M/B	15,154	1.50	1.79	−0.58	0.09	0.33	1.02	3.07	7.89	62.11
Log(Equity M/B)	15,121	0.01	0.91	−6.32	−2.31	−1.10	0.03	1.12	2.07	4.13
Asset Mkt ($M)	15,154	9,426	31,849	29	104	289	1,477	19,695	159,509	978,719
Asset M/B	15,154	1.24	0.99	0.13	0.26	0.48	0.98	2.24	4.80	31.87
Market Leverage	15,154	0.34	0.19	0.01	0.05	0.13	0.31	0.59	0.91	2.56
Asset Variance	15,154	0.37	0.35	0.00	0.02	0.07	0.29	0.77	1.36	16.78

- Average equity market value = \$8.2B, but median = \$1,046M $\Rightarrow$ highly right-skewed
- Average equity M/B = 1.50, median = 1.02
- Average market leverage = 34%