

The Role of Debt in Financing Higher Education

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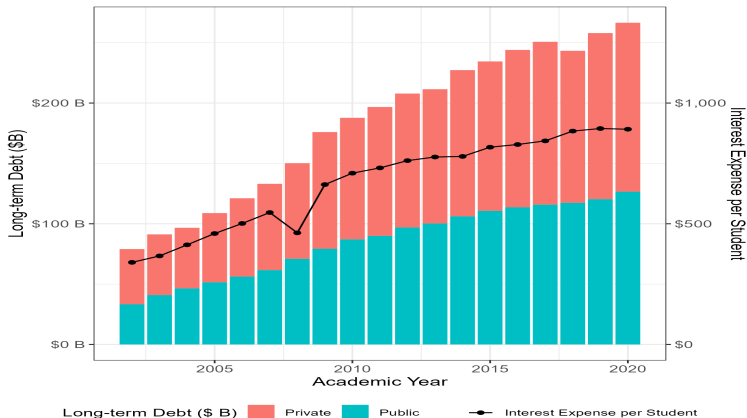
July 2024

Cornell Joins Ivy League Bond Boom With \$1.1 Billion Debt Sale

Sri Taylor, Bloomberg News



Increasing Use of Debt by Universities



Goals and Inputs

Goals

- ▶ Document descriptive debt trends *over* time
- ▶ Examine variation *within* time, location, and bond features to understand the behavior of universities

Inputs

1. University debt issues
2. University operating and financial related data

Main Results

1. Large changes in universities' use of debt over time
 - Increasing use of taxable issues
 - Increasing leverage for public universities
 - Increasing excess issue yield
2. Public universities have a lower cost of debt
3. Declines in state support linked to increases in leverage for *public* universities
4. Increases in leverage linked to increases in quality expenses rather than improvements in educational quality
 - Costs borne by in-state students

Institutional Details

- ▶ Debt serves as primary source of external financing for universities
- ▶ Universities have the ability to issue tax-exempt and taxable debt
 - Proceeds from taxable bonds are more flexible
- ▶ Universities typically issue revenue bonds
- ▶ Credit rating agencies provide signal of underlying credit quality
- ▶ Many universities relied on bond insurance *prior* to the Great Recession

Harvard Bond Issue

\$346,680,000
MASSACHUSETTS DEVELOPMENT FINANCE AGENCY
Revenue Bonds
Harvard University Issue, Series 2020A

<u>Due October 15,</u>	<u>Amount</u>	<u>Interest Rate</u>	<u>Yield</u>	<u>CUSIP Number*</u>
2025	\$57,780,000	5.000%	0.890%	57584YZJ1
2026	57,780,000	5.000	0.920	57584YZK8
2027	57,780,000	5.000	0.950	57584YZL6
2028	57,780,000	5.000	1.000	57584YZM4
2029	57,780,000	5.000	1.060	57584YZN2
2030	57,780,000	5.000	1.130	57584YZP7

Data Sources and Sample

1. Debt Issue Level: Data on bond features at the issue level from Refinitiv SDC Platinum
 - 9,473 bond issues from 1985 to 2022 for U.S. 4-year public and private non-profit universities
 - We keep the bond with the longest maturity
2. University \times Year Level: Data on financial position and operations of universities from 1985 to 2022 from Integrated Postsecondary Education Data System (IPEDS)

Summary Statistics: Bond Features

University Type:	Public	Private	HBCU	R1	System	Hospital	NCAA D1
% of Observations:	62%	38%	2%	41%	35%	13%	63%

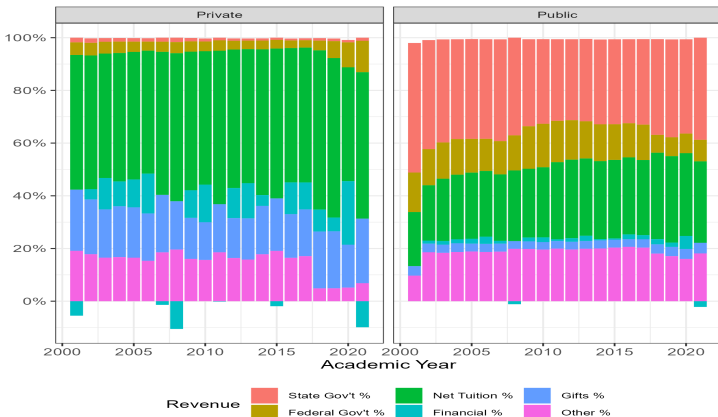
Panel A: Bond Characteristics

<u>Yield Measures</u>							
Yield	4.50	4.96	5.00	4.57	4.57	4.57	4.58
Yield - R_f Rate	-0.03	0.15	0.18	-0.17	-0.05	-0.12	-0.07
<u>Bond Characteristics</u>							
Gross Spread	7.12	8.04	8.20	6.38	6.94	6.67	6.93
Years to Maturity	20.47	22.53	22.06	20.69	20.83	20.68	20.92
Issue Amount	76.09	53.97	32.69	107.02	96.60	154.64	83.37
Refinancing	0.42	0.45	0.46	0.43	0.41	0.40	0.43
Tax-Exempt	0.86	0.91	0.88	0.85	0.84	0.83	0.86
Revenue Bond	0.93	0.96	0.98	0.91	0.94	0.86	0.93
Insured	0.31	0.17	0.46	0.24	0.29	0.20	0.29
<u>Bond Ratings</u>							
AAA Rated Underlying	0.04	0.06	0.01	0.09	0.05	0.07	0.06
AA Rated Underlying	0.36	0.13	0.11	0.46	0.42	0.44	0.36
Below AA Rated Underlying	0.25	0.35	0.30	0.17	0.19	0.16	0.26
Unrated Underlying	0.35	0.46	0.58	0.29	0.34	0.33	0.33

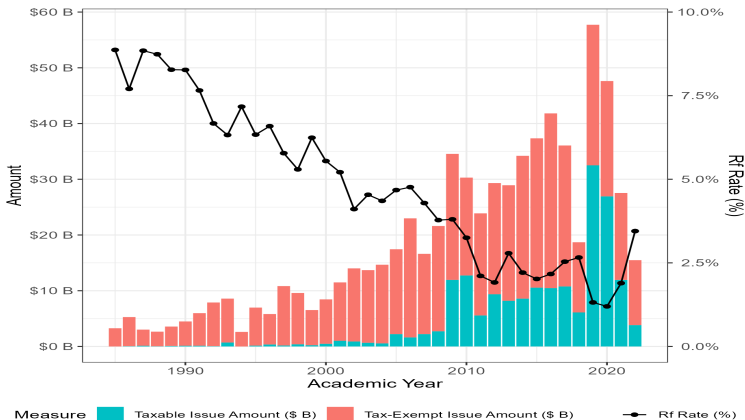
Summary Statistics: Balance Sheet University Issuers

University Type:	Public	Private	HBCU	R1	System	Hospital	NCAA D1
% of Observations:	62%	38%	2%	41%	35%	13%	63%
Panel A: Bond Characteristics							
<i>Yield Measures</i>							
Issuance Yield	4.50	4.96	5.00	4.57	4.57	4.57	4.58
Issuance Yield - R_f	-0.03	0.15	0.18	-0.17	-0.05	-0.12	-0.07
Panel B: Issuer Characteristics							
<i>Balance Sheet Measures (\$B)</i>							
Assets	1.96	1.73	0.30	4.03	2.07	5.78	2.56
Liabilities	0.79	0.51	0.13	1.42	0.81	2.15	0.93
Long-term Debt	0.40	0.31	0.08	0.72	0.41	1.07	0.48
Value of Endowment	0.60	0.79	0.05	1.34	0.70	1.76	0.85
Long-term Debt/Assets	0.26	0.23	0.28	0.23	0.24	0.22	0.24
Liabilities/Assets	0.45	0.33	0.46	0.39	0.43	0.40	0.41
Endowment/Assets	0.23	0.40	0.14	0.34	0.25	0.34	0.28
<i>University Prestige</i>							
Total Enrollment	23.02	6.26	5.15	28.49	25.11	26.99	23.37
Average SAT	11.34	11.98	9.10	12.24	11.57	12.49	11.70

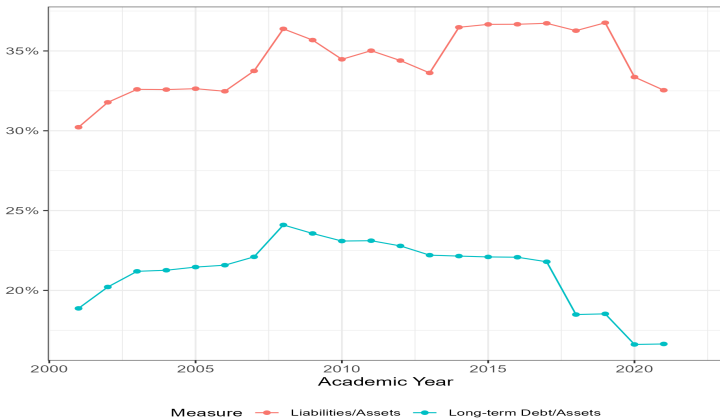
Revenue Breakdown Private vs. Public Universities



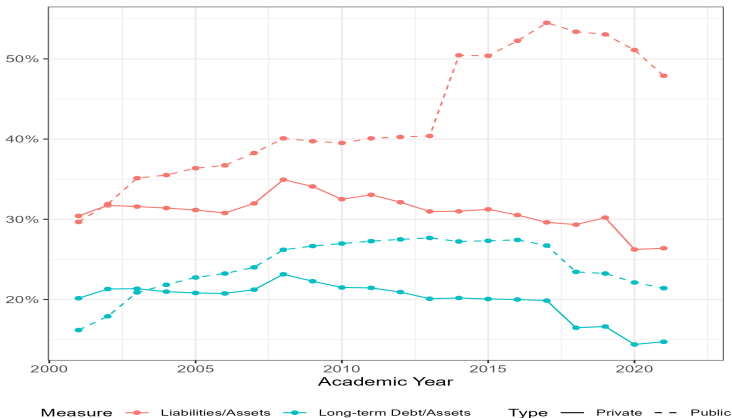
Taxable vs. Tax-Exempt Issues Over Time



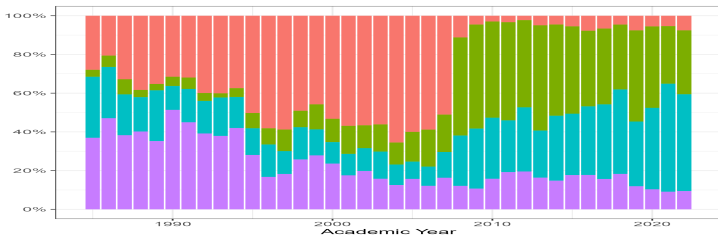
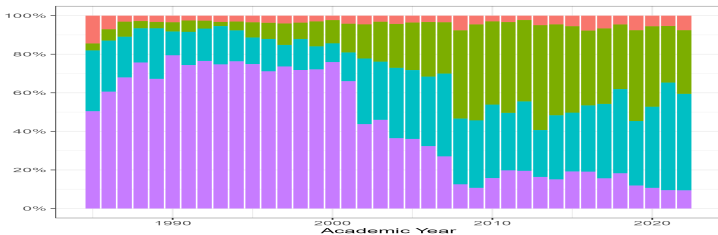
Unconditional Leverage Levels



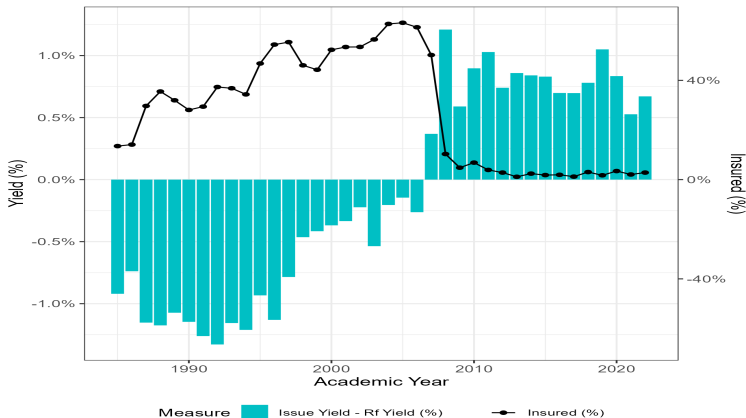
Conditional Leverage Levels



Underlying Rating and Bond Ratings Over Time



↑ Excess Return as ↓ Insured Issues



Public Universities Have Lower Cost of Debt

	Yield							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Public	-0.35*** [0.07]	-0.26*** [0.05]	-0.18*** [0.04]	-0.15*** [0.04]	-0.21*** [0.04]	-0.28*** [0.07]	-0.16** [0.07]	-0.56*** [0.16]
State Economic Activity	-0.01** [0.00]							
State Unemployment Rate	0.04** [0.02]							
Log(Maturity)		0.67*** [0.06]	0.69*** [0.05]	0.69*** [0.05]	0.67*** [0.05]	0.75*** [0.08]	0.77*** [0.09]	0.80*** [0.11]
Log(Issue Amount)		-0.06*** [0.01]	-0.08*** [0.01]	-0.08*** [0.01]	-0.04*** [0.01]	-0.02 [0.01]	-0.02 [0.02]	-0.05 [0.03]
Underlying Rating			-0.06*** [0.01]	-0.06*** [0.01]	-0.04*** [0.01]	-0.05*** [0.01]	0.00 [0.00]	-0.01 [0.01]
Public × Taxable				-0.30*** [0.10]				
Average SAT					-0.09*** [0.02]	-0.10*** [0.03]	-0.07** [0.03]	0.02 [0.06]
HHI Revenue					0.19* [0.10]	0.22 [0.19]	0.04 [0.22]	-0.20 [0.34]
Log(Revenue)					-0.03 [0.02]	-0.03 [0.03]	-0.02 [0.02]	0.12* [0.06]
Long-Term Debt/Assets						0.27 [0.19]	0.36* [0.19]	1.34** [0.59]
Log(Endowment)						-0.02 [0.02]	0.00 [0.01]	-0.17*** [0.05]
Observations	9439	9185	9185	9185	8615	5051	4399	2786
Adjusted R^2	0.68	0.78	0.84	0.84	0.85	0.75	0.80	0.84
Year & State F.E.	Yes	No	No	No	No	No	No	No
Year × State F.E.	No	Yes	Yes	Yes	Yes	Yes	No	No
Year × State × Rating F.E.	No	No	No	No	No	No	Yes	No
Year × County × Rating F.E.	No	No	No	No	No	No	No	Yes
Issuer Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bond Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Y-mean	4.67	4.65	4.65	4.65	4.66	3.90	3.88	3.84

↓ in State Support ↑ *Public University Leverage*

	Long-Term Debt/Assets _{t+1}			Liabilities/Assets _{t+1}		
	(1)	(2)	(3)	(4)	(5)	(6)
% Government Revenue	-0.06** [0.03]			-0.20*** [0.07]		
% State Revenue		-0.10 [0.07]	0.03 [0.07]		-0.26 [0.15]	0.19* [0.10]
Public × % State Revenue			-0.17* [0.08]			-0.71*** [0.21]
% Federal Revenue		-0.05* [0.03]	-0.06** [0.03]		-0.23 [0.13]	0.00 [0.08]
Public × % Federal Revenue			-0.00 [0.08]			-0.90*** [0.26]
Observations	28507	28507	28507	31583	31583	31583
Adjusted R ²	0.74	0.74	0.74	0.77	0.77	0.77
University Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year × State F.E.	Yes	Yes	Yes	Yes	Yes	Yes
University Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Revenue Composition Controls	Yes	Yes	Yes	Yes	Yes	Yes
Y-mean	0.22	0.22	0.22	0.36	0.36	0.36

↑ Debt Linked to ↑ Quality Expenses and Capacity

Panel A: Quality & Capacity

	Quality Exp. (%) _{t+1}	$\frac{\text{Quality Exp.}_{t+1}}{\text{Academic Exp.}_{t+1}}$	$\text{Log} \left(\frac{\text{Quality Exp.}_{t+1}}{\text{Enrollment}_{t+1}} \right)$	Log(Dorm Cap.) _{t+1}
	(1)	(2)	(3)	(4)
LTD/Assets _t	0.01* [0.00]	0.04* [0.02]	0.15*** [0.03]	0.23*** [0.04]
Controls	Yes	Yes	Yes	Yes
Observations	28200	28200	26452	25283
Adjusted R^2	0.90	0.85	0.91	0.97
Year × State F.E.	Yes	Yes	Yes	Yes
University F.E.	Yes	Yes	Yes	Yes
Y-mean	0.25	0.60	8.60	6.96

↑ Debt Linked to ↑ In-State Tuition & ↑ Out-State Students

Panel B: Cost and Enrollment

	Tuition		Enrollment	
	$\text{Log(In-State)}_{t+1}$	$\text{Log(Out-State)}_{t+1}$	Log(Total)_{t+1}	$\text{Log(Out-State)}_{t+1}$
	(1)	(2)	(3)	(4)
LTD/Assets _t	0.08*** [0.03]	0.01 [0.02]	0.01 [0.01]	0.18** [0.06]
Controls	Yes	Yes	Yes	Yes
Observations	25871	25871	26644	19574
Adjusted R^2	0.98	0.94	1.00	0.94
Year × State F.E.	Yes	Yes	Yes	Yes
University F.E.	Yes	Yes	Yes	Yes
Y-mean	9.69	9.97	7.89	4.72

Conclusion

- ▶ Document growth in universities' use of debt which has been targeted towards amenities rather than instructional quality
 - Increases in leverage for public universities while decline for private universities
- ▶ Declines in state support lead to increases in debt for public universities
- ▶ Trends in this market to aid practitioners' understanding
 1. Increasing use of taxable debt
 2. Breakdown of municipal bond insurance market leading to increase in issue yields in excess of the risk free rate