



Financing US universities through bonds: The financial value of reputation

Eu-SPRI Early Career Researcher Conference

“Sowing the seeds of the future: The financing of tomorrow’s innovations”

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University of Bergamo, 26th June 2015

A new phenomenon: academia comes to the debt market

“University bonds: An education in finance. America's colleges embrace the capital markets”

The Economist, 18th May 2006

“Elite universities consider bond issue to raise cash”

The Guardian, 19th May 2010

“Is it viable to finance higher education through the capital markets? ”

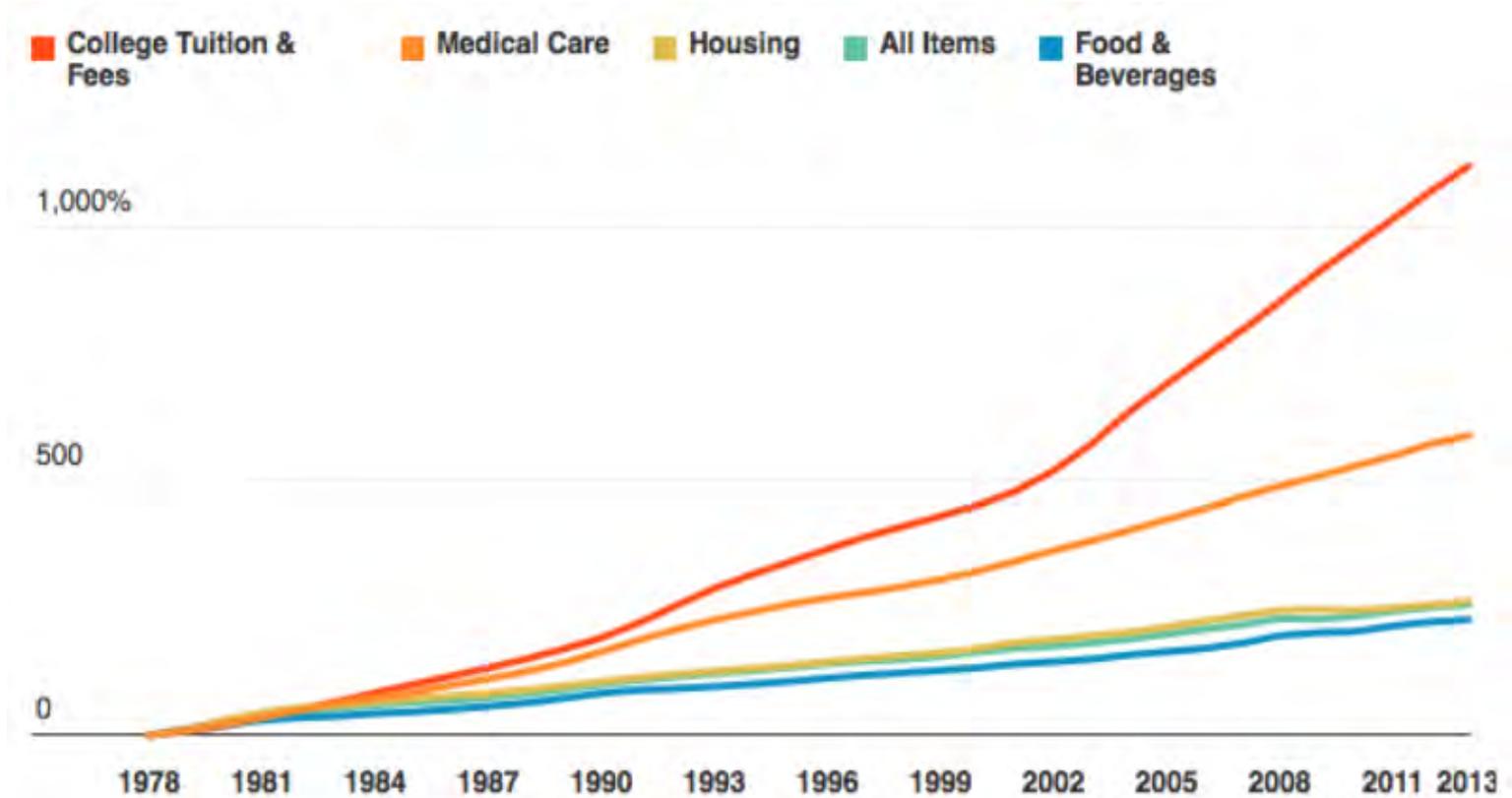
The Guardian, 13rd August 2012

“British Universities Turn to Capital Markets”

The New York Times, 24th May 2014

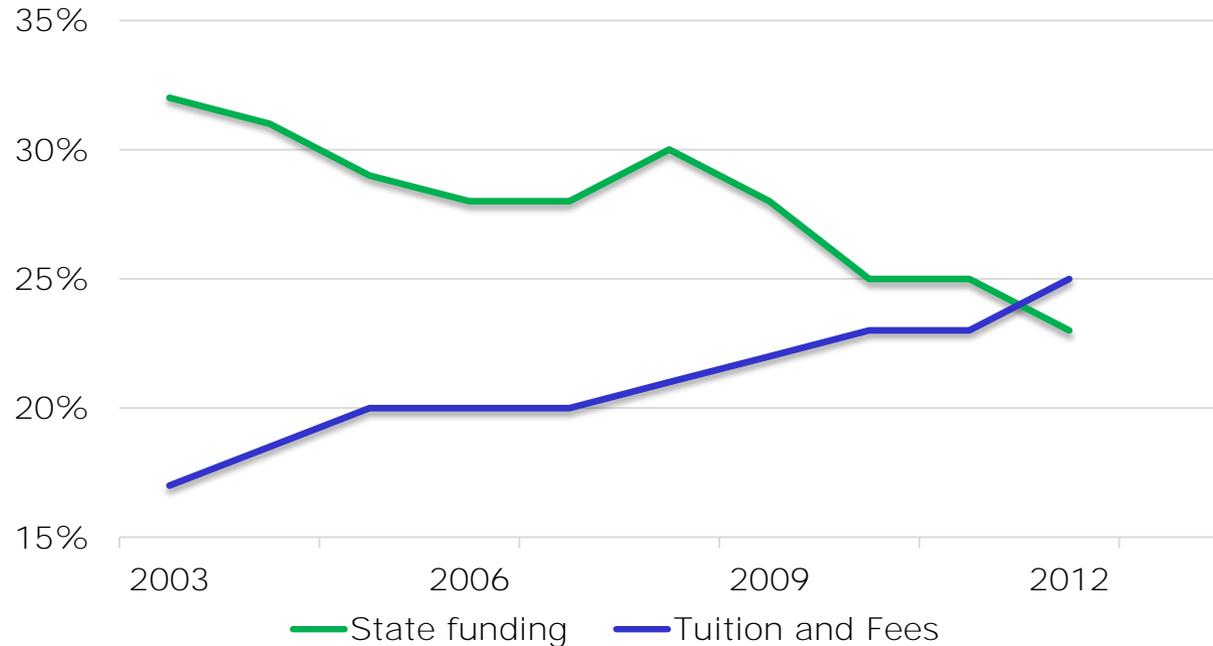
Raise in tuition fees

Percentage change in indexed college tuition fees and other commodities since 1978



Source: U.S. Bureau of Labor Statistics

Increasing dependence on tuition fees



Source: *U.S. Accountability Government office*

- Colleges and universities began **receiving less of their total funding from states** increasingly relying on **tuition revenue** in the last decade
- For public colleges, state funding decreased by 12% overall while median tuition rose 55%

Competition for students

- Universities all over the U.S. have begun to build **classrooms, stadiums, theatres, gyms** and whatever else it takes to hold teenagers' imaginations (The Economist, 18th May 2006)
- Competition for students has become fiercer and more costly for universities. The high capital requirements associated with these investments has pushed universities to start to **issue debt**
- The amount of debt issued by universities has **increased at a torrid pace** over the last few years (Eaton et al., 2014)

Research question 1: does scientific reputation matter?

- Universities, different from traditional equity and debt issuers, have a peculiar asset: **scientific reputation**. This may act as a signaling mechanism because:
 - It is publicly observable: university reputation is measured by international rankings
 - It is costly to imitate: gaining reputation implies consumption of time and resources
 - More reputable universities are **better positioned** to:
 - Attract students, thereby increasing income from tuition fees (Marginson 2006)
 - Attract research grants, thanks to highly skilled and prestigious scholars (Bornman and Daniel 2006)
 - Attract the interest of external funding parties, as licensed technology is more worthy of funding (Sine et al. 2003)
- We investigate whether more reputable universities are able to raise debt capital at a lower cost

Rating Action: Moody's assigns Aaa rating to Yale University's \$100 million of Revenue Bonds, Series 2013A; outlook is stable

STRENGTHS

*Globally recognized leader in education and research resulting in extraordinary student demand as demonstrated by a first-time freshman acceptance rate of 7% and yield on accepted students of 68% in fall 2012. Both measures rank in the top five among the nation's diversified universities.

*Robust balance sheet, with expendable financial resources of \$16.5 billion in FY 2012 covering pro-forma debt by 4.2 times and operating expenses by 5.9 times. Strong long-term investment returns and superior gift revenue have driven growth.

*Large and diverse operating lines of business help insulate the university from volatility in any single revenue stream.

*Adequate internal liquidity combined with bank facilities and strong treasury management to support the demand feature of variable rate bonds and commercial paper.

Rating Action: Moody's assigns Aa3 to Boston College's \$335M Ser. S and 2013 bonds; outlook stable

Global Credit Research - 07 Aug 2013

STRENGTHS

*Excellent student market position as a Jesuit, Catholic institution benefits BC with enrollment of over 13,000 full-time equivalent students and net tuition per student of \$27,462 in fiscal 2012. Increasing geographic diversity points to the university's national reputation aided by strong educational outcomes and timely graduation rates.

*The university's management and board have demonstrated a long history of strategic and operational planning that has contributed to highly consistent and favorable operating results. A strong operating cash flow margin of 18.1% in FY 2012 produced debt service coverage of 2.7 times.

*Substantial \$1.9 billion pool of cash and investments as of fiscal end 2012, 49% of which is unrestricted, underpins credit strength. Monthly days cash on hand remains uncommonly strong at 564 days for fiscal 2012.

*Solid donor support as the university has raised over \$1 billion towards its \$1.5 billion Light the World Campaign. The three-year average annual gift revenue of \$87 million helps foster revenue diversity and build financial resources.

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Research question 2: use of bond proceeds

- **Student-oriented bonds:** aimed at financing the creation of general facilities (classrooms, stadiums, theatres, etc.) aimed at attracting new students
 - The higher the reputation of a university, the higher the likelihood that these investments will attract more students and generate positive cash flows
 - **Research-oriented bonds:** aimed at financing research projects (laboratories, skilled personnel, etc.)
 - More reputable universities tend to undertake more risky, high-profile research projects. This makes cash flows associated with these investments more uncertain
- When does reputation matter more? We investigate whether the relation between scientific reputation and cost of debt is moderated by the use of bond proceeds

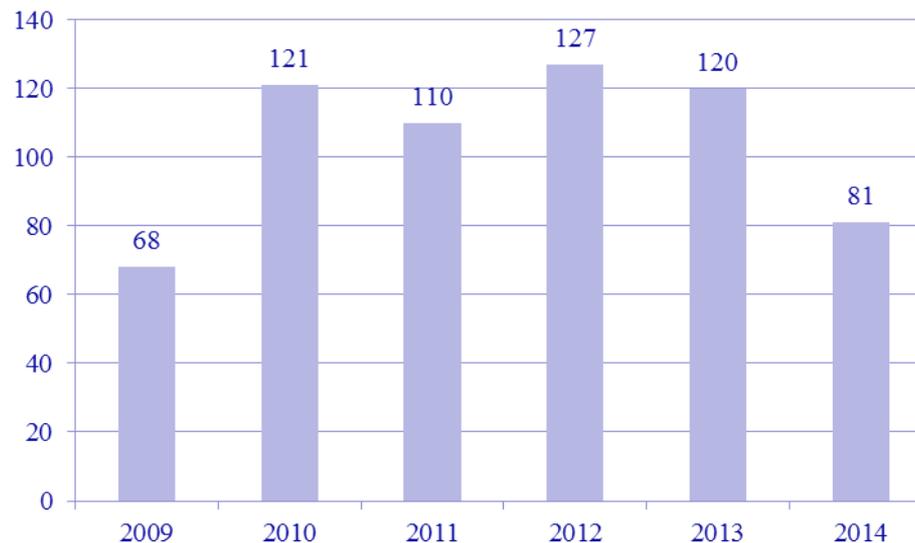
Sources and Data

Sources

- *Bond issues*: EMMA (Electronic Municipal Market Access) Database filtered using key words as «University» and «College»
- *University-level variables*: IPEDS Data Center (Integrated Postsecondary Education Data System)

Data

- Sample of 627 bond issues by 210 U.S universities in the period 2009-2014



Dependent variable

- *Yield to maturity*: discount rate which equates the discounted value of a bond's future cash flows to its current market price

Explanatory variables

- *Reputation (scientific)*: measured using **Scimago international ranking** as the product between normalized impact factor and total number of publications of each university, normalized with the number of academic staff (Lepori et al. 2015).
- *Bond motivations*: bonds are issued for **different purposes**. We create a dummy for teaching motivate bonds, which takes value 1 when bonds are issued for teaching goals.

Two main ways to use bond proceeds

Teaching: attempt to increase the university's attractiveness towards students



Research: attempt to raise the university's scientific profile



(Source: Bond prospectus sources)

As in Bao et al. (2011)

- *Principal amount*: amount of the issue
- *Duration*: years till the debt will be repaid
- *Yield curve*: level indicator measured as (10 Year Treasury Yield)
- *Slope of yield curve*: slope indicator measured as

$$(10 \text{ Year Treasury Yield}) - (3 \text{ Month Treasury Yield})$$

(Source: *Federal Reserve Bank of New York*)

- *Credit rating*: numerical translation of Moody's rating: 1=Aaa and 21=C.
- *Private university*: dummy equal to 1 for private universities

Frequent bond issuers

University	No. issues	Avg issue size (\$m)	Avg duration (yrs)
Oregon University	11	52.9	21.1
University of Illinois	9	80.1	19.7
Colorado State University	8	68.7	21.3
New Mexico State University	8	18.1	14.5
University of Connecticut	8	96.3	14.4
University of Minnesota	8	84.7	22.0
University of Washington	8	145.7	25.0
University of Wyoming	8	14.5	18.1
Henderson State University	7	3.5	15.0
Iowa State University	7	22.0	18.7
Stanford University	7	137.4	26.4
University of Houston	7	80.1	22.6
University of Nebraska	7	33.3	16.6
University of Vermont	7	72.7	27.0
Arizona State University	6	75.6	23.0
Austin College	6	25.3	16.0
California State University	6	257.3	25.0
Eastern Michigan University	6	37.4	21.5
Fordham University	6	58.0	21.7
Morehead State University	6	8.8	15.3
Oklahoma State University	6	73.7	17.2
Rowan University	6	63.6	18.7
Temple University	6	67.9	19.2
University of Hawaii	6	66.9	15.8
University of Maryland	6	69.9	13.8
University of Utah	6	40.9	16.8

The table reports the list of universities that have issued more than 5 bonds during the sample period

Largest bond issues

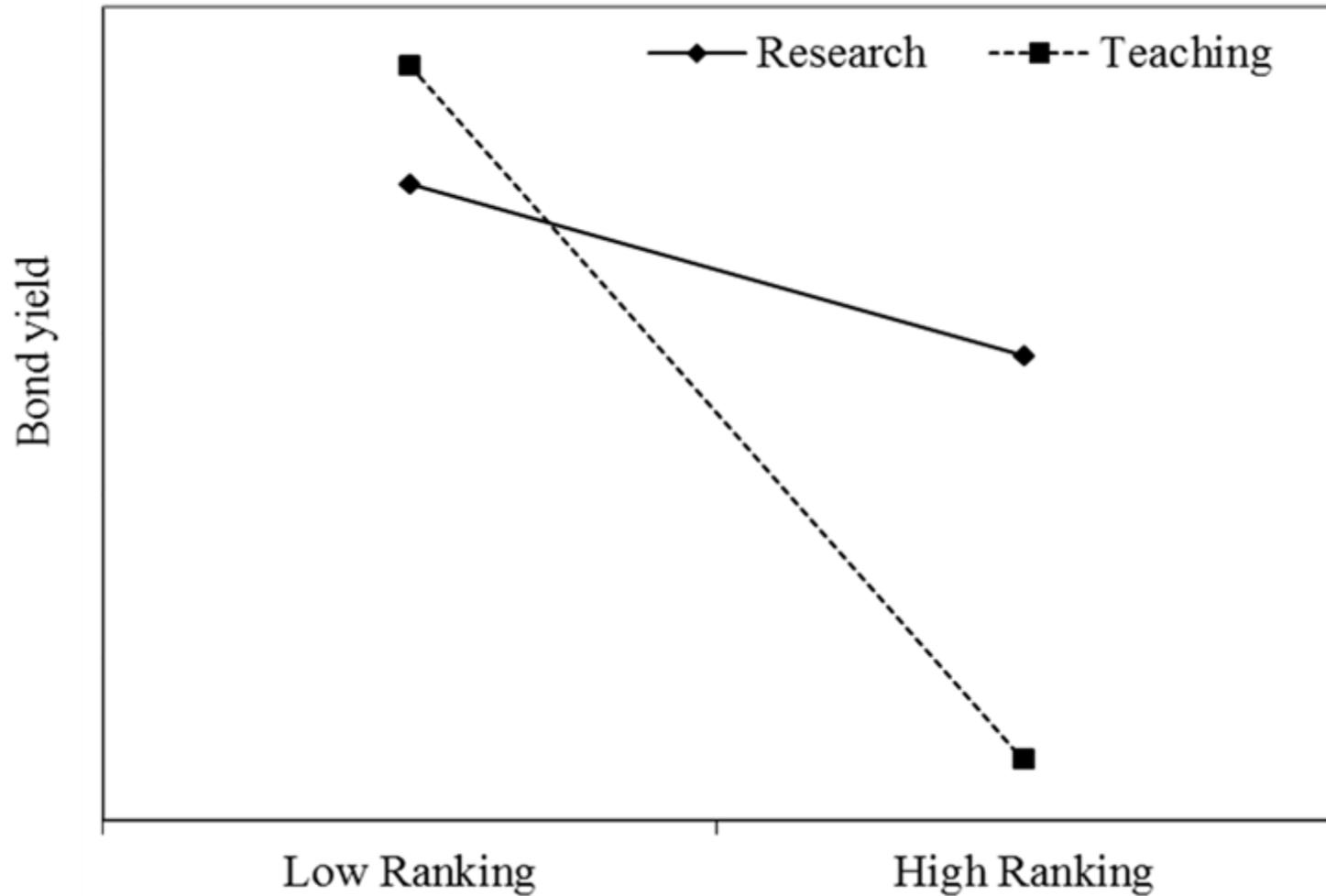
<i>Year of issue</i>	<i>University</i>	<i>Issue size (\$m)</i>
2012	University of California	860.0
2010	Ohio State University	654.8
2014	University of Chicago (Medical Center)	573.6
2009	Princeton University	500.0
2009	Harvard University	480.0
2013	Northern Kentucky University	473.8
2012	California State University	436.2
2011	California State University	429.9
2009	University of Pittsburgh	373.4
2010	Harvard University	362.6
2013	University of New Jersey	352.1
2013	University of New Jersey	340.9
2013	Ohio State University	338.0
2010	University of Minnesota	335.3
2009	A&M University	320.8
2013	California State University	308.9
2011	Columbia University	300.0
2013	University of Washington	299.4
2010	Cornell University	285.0

The table reports the list of TOP 20 issues for size during the sample period

Regression results

OLS regression	Yield to maturity		
	(1)	(2)	(3)
10y T-bill yield	0.076*** (0.019)	0.078*** (0.011)	0.099*** (0.022)
Slope	-0.069*** (0.019)	-0.072*** (0.012)	-0.097*** (0.024)
Duration	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Principal amount	-0.000* (0.000)	-0.000*** (0.000)	-0.000* (0.000)
Private Univ	0.006*** (0.002)	0.005*** (0.001)	0.005*** (0.001)
Credit rating (dummy)	-0.002 (0.004)	-0.006** (0.003)	-0.002 (0.004)
Credit rating (value)	0.001* (0.001)	0.002*** (0.000)	0.002*** (0.000)
University reputation	-0.029** (0.010)	-0.027*** (0.004)	-0.022*** (0.005)
Teaching purpose		0.000 (0.001)	0.005** (0.002)
Reputation * Teaching Purpose			-0.067** (0.026)
Constant	-0.012*** (0.003)	-0.011*** (0.003)	-0.004 (0.005)
R-squared	0.791	0.802	0.818

When reputable universities issue for different purposes



- More **scientific reputation** is associated with **lower bond yields** – increasing the long-run credibility of institutions- implying that more reputable universities face a lower cost of debt.
- Scientific reputation is perceived by the financial market as a **quality signal and higher future prospectus**, and is not associated with a lower insolvency risk.
- The yield spread between more and less reputable universities is found to vary based on the motivation underlying the bond issuance:
 - More reputable universities financing **research projects** have higher borrowing costs as research activities are perceived of higher risk.
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Thank you

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