

Competition in US Higher Education
by
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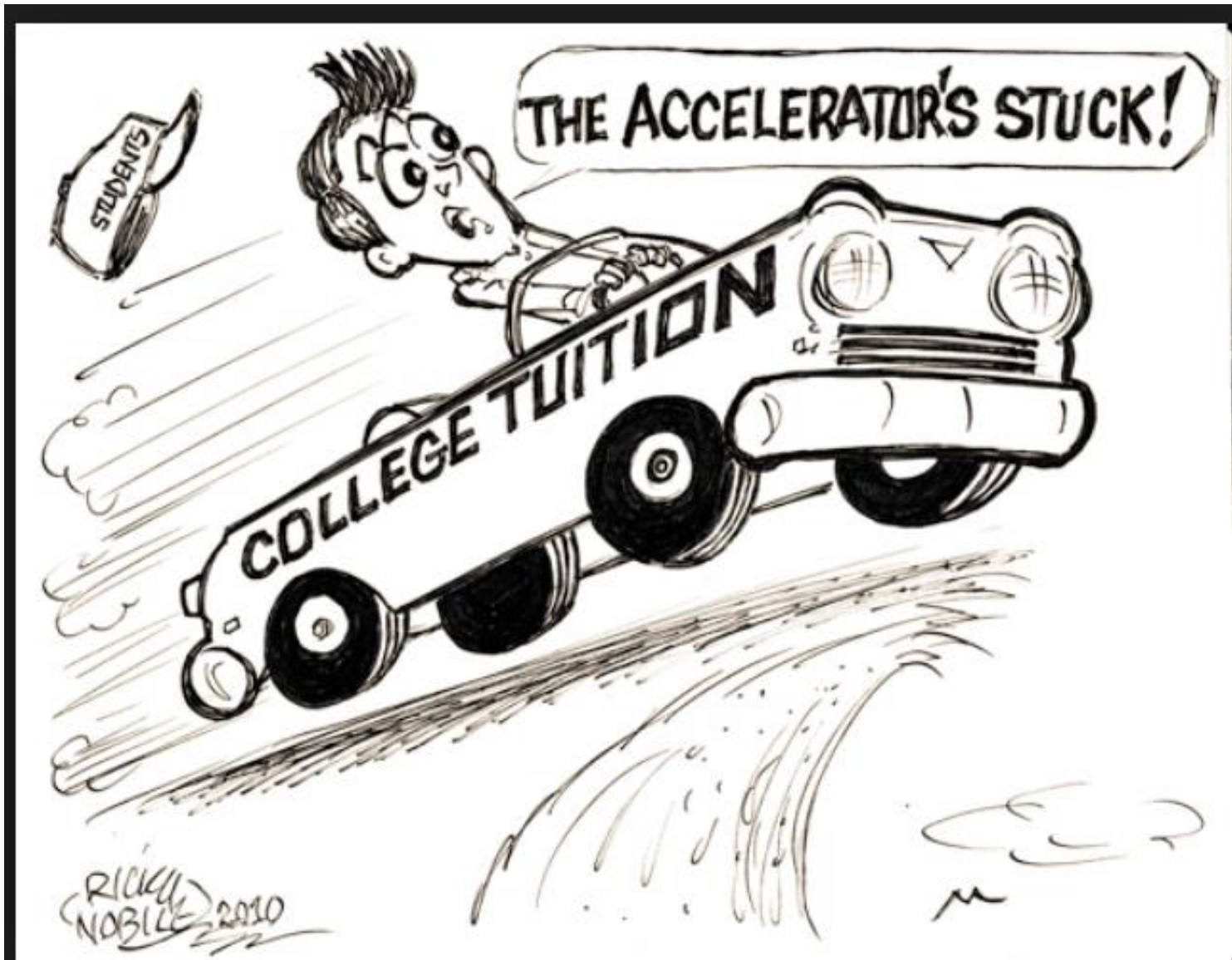
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This presentation is based on joint research with:

- ❑ Richard E. Romano, University of Florida
 - ❑ Sinan Sarpca, Koc University
 - ❑ Holger Sieg, University of Pennsylvania
- “The U.S. Market for Higher Education: A General Equilibrium Analysis of Public Funding Policies” forthcoming in *Journal of Public Economics*.

US Higher Education

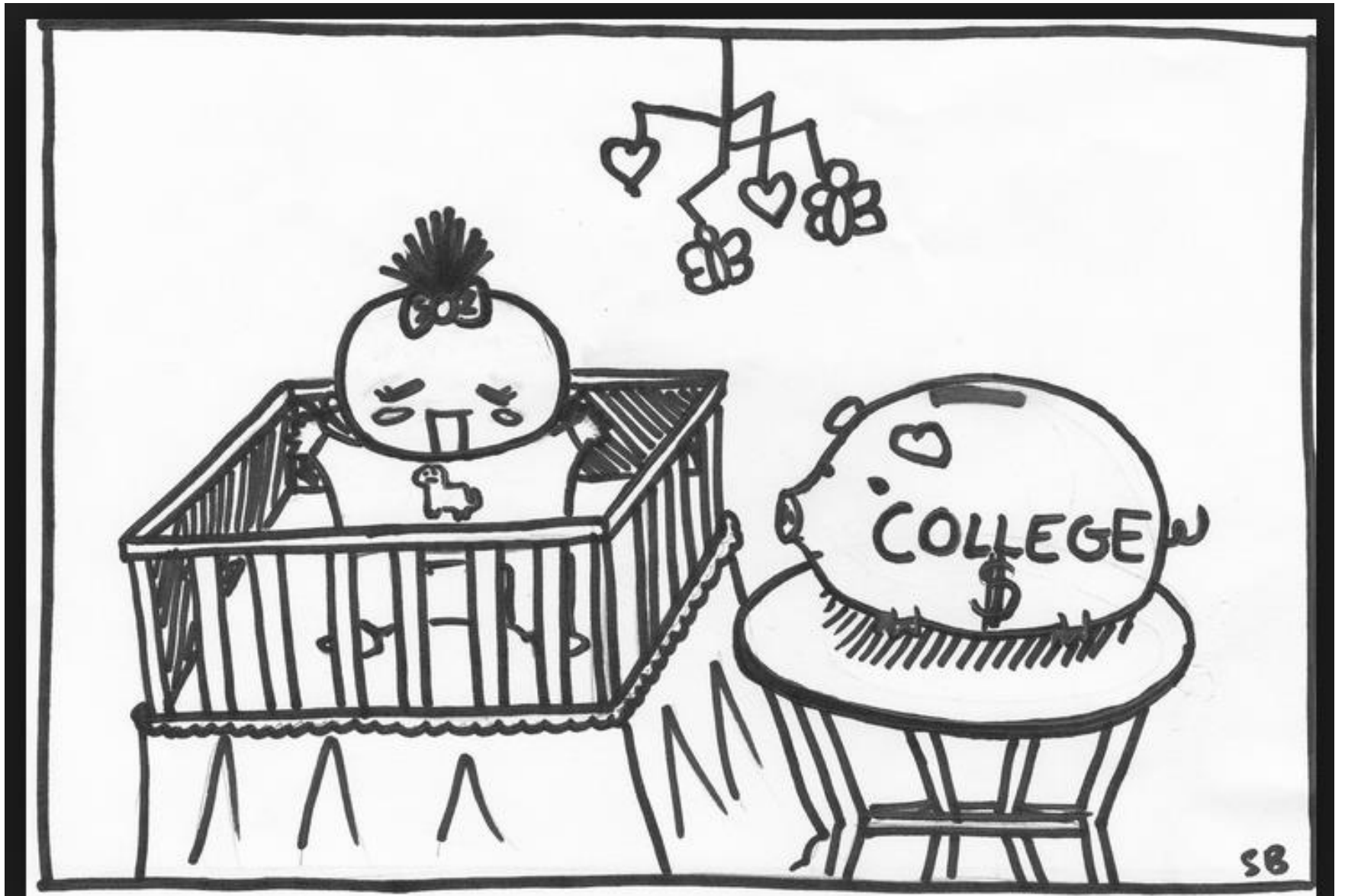
- ❑ There are both public (state) and private providers.
- ❑ Approximately 40% of the US college-aged population is enrolled (on a full-time equivalent basis) in four-year undergraduate programs at colleges and universities.
- ❑ Approximately 70% of four-year enrollment is in public colleges.
- ❑ Colleges and universities are under increasing scrutiny as costs of college attendance continue to outpace inflation.
- ❑ Our goal, is to model the competition among providers and investigate impacts of alternate government policies on attendance and cost to students.
- ❑ Notes:
 - ❑ I henceforth use “college” as a shorthand to denote an institution providing four-year undergraduate education, whether a college or university.
 - ❑ We do not study the for-profit sector.



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Policy Issues

- ❑ Tuition and fees, net of financial aid, have risen at an annual rate twice the rate of inflation over the past three decades. (Source: BLS)
- ❑ Student debt has more than tripled over the past decade as both number of students receiving loans and loan amount per student have risen (Source: Federal Reserve)
- ❑ Fiscal pressures are leading to reduced state support of state universities.
- ❑ Federal support for higher education has been a subject of intense congressional debate in recent years.



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Policy Issues Continued

- ❑ Can state and federal aid policies be designed to increase aid to students and increase attendance without bidding up net college tuitions?
- ❑ For example, does increased federal aid reduce the financial aid that colleges provide from their own funds?

Modeling College Competition

Analyzing effects of changes in government funding policies requires answering “what if” questions (i.e., general equilibrium analysis).

This in turn requires modeling:

- ❑ College objectives and associated admission, tuition, and financial aid policies.
- ❑ Types of colleges and distribution of resources by type.
- ❑ Student preferences(i.e. student and student’s household).
- ❑ Distribution of student characteristics, student preferences, and household resources.

The above features are captured in our model.

Plan of Remainder of Talk

Time does not permit going into details of our model.

- ❑ Instead, I will highlight key features of the market that are captured in our model.
- ❑ I then discuss our findings with respect to how changes in federal financial aid and state funding policies affect costs to students and attendance.

Workings of the Market for Higher Education

Private colleges focus on quality, not quantity. (This is encouraged by rankings of colleges, which place no weight on enrollment.) Hence:

- ❑ Private colleges focus on attracting a relatively small number of high-ability students and then spending heavily on those students (small classes, high-end facilities, faculty with strong research reputations).
- ❑ To obtain revenues, private colleges set a high sticker price and then vary financial aid based on student ability and household income.
- ❑ Competition results in cross-subsidization: Students of modest ability from families with high income pay the sticker price while competition for high ability students results in awards of financial aid to more able students from low-income families.

Workings of the Market for Higher Education

It is not much of an exaggeration to say that private colleges are in an “arms race” to increase quality.

- ❑ Schools with high endowments have an advantage in this competition, and they tend to occupy the upper reaches of the quality hierarchy.
- ❑ Their infusion of endowment revenues increases expenditures and thereby increases the financial pressure on colleges lower in the endowment hierarchy.
- ❑ The objective of obtaining revenues to compete on quality is the key driver of high tuitions in private colleges.

Workings of the Market for Higher Education

State colleges receive funding from their state governments.

This funding is typically accompanied by implicit or explicit mandates for:

- ❑ Low tuition to in-state students.
- ❑ Enrollment of students from a relatively broad ability range.

Thus public colleges have an incentive to balance concerns for quality with concerns for enrollment.

While typically less elite than their private counterparts, the lower tuitions and expansive enrollment policies of public colleges help limit the scope for private colleges to raise tuition.

Federal Subsidies and Aid

- ❑ The federal government and state governments use different approaches to subsidize higher education.
- ❑ The federal government provides direct aid to students and their families via aid policies administered by colleges.
- ❑ The amount of aid is determined by the difference between the tuition that is charged by the college and the federally determined expected family contribution, as long as the difference is below a maximum amount of aid.
- ❑ Federal aid, therefore, can benefit students at both public and private universities.

State Government Subsidies and Aid

Public universities obtain direct subsidies from their state legislatures.

State colleges provide access to higher education at subsidized rates to in-state students.

- ❑ Tuition to out-of-state students is typically much higher, typically by a factor of two or more.
- ❑ To achieve admission, out-of-state students must be of relatively high ability.

Thus out-of-state student cross-subsidize in-state students while also providing high ability peers for in-state students.

Computational Model

- ❑ We create a computational counterpart to our theoretical framework.
- ❑ We calibrate the model to match empirical evidence on key features of the model and to match outcomes observed in US higher education:
 - ❑ The joint distribution of ability (SAT) and income in the US population,
 - ❑ A cost function for college operating costs,
 - ❑ Endowments,
 - ❑ Student preferences as reflected in evidence on demand for college,
 - ❑ State and federal aid policies.

Modeling State and Federal Policy

- ❑ State and federal Policies in our model are calibrated to observed values.
- ❑ The **Federal Government** computes a student's Expected Family Contribution (EFC) as an increasing function of family income.
- ❑ Federal aid is then the difference between tuition at the college a student attends and EFC, up to a specified maximum.
 - ❑ In policy analysis reported below, we consider two alternatives. One increases the maximum federal aid by \$2,000 per student. The other decreases maximum aid by \$2,000 per student.
- ❑ In our model, **State Governments** set tuitions for in-state and out-of-state students and provide a subsidy per student.
 - ❑ In policy analysis reported below, we consider a decrease in state subsidy of \$2,000 combined with an offsetting tuition increase of \$2,000.
- ❑ Our model is broadly consistent with U.S. data as shown next slide.

Equilibrium of Model Compared to Data

Variable	Data	Model
Enrollment	40%	40%
State share	70%	71%
Proportion in-state	90%	90.6%
Fract.receive Fed Aid (State)	.30-.40	30
Fract.receive Fed Aid (Pvt)	.30-.40	39
Fract. receive Inst'l Aid (Pvt)	67%	69%

Our model also matches the dollar amounts of tuition and Financial aid quite well.

Equilibrium Distributions (of Student-Age Population) by Ability and Household Income in Private and State Colleges

Deciles of ability and income:

Private Colleges

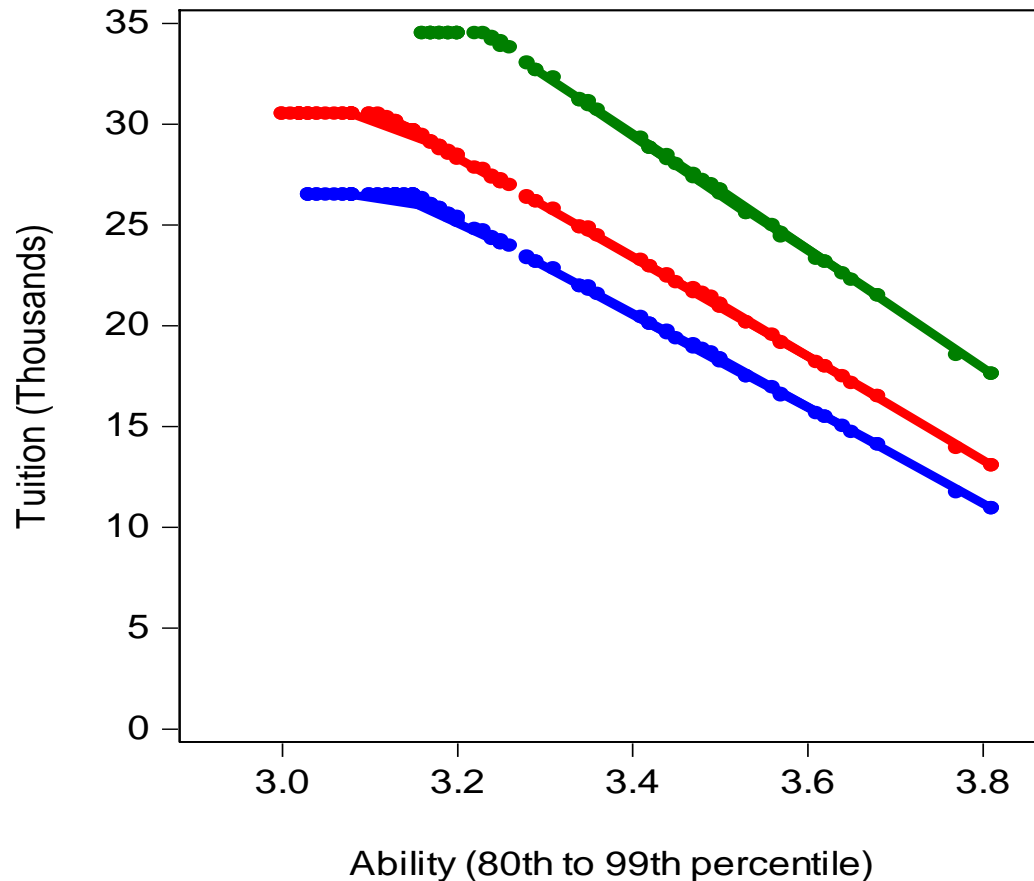
		All Private Colleges							
		Ability Deciles							
		1 to 3	4	5	6	7	8	9	10
Income Deciles	10	0%	0%	0%	0%	0%	45%	82%	92%
	9	0%	0%	0%	0%	0%	21%	49%	83%
	8	0%	0%	0%	0%	0%	16%	43%	86%
	7	0%	0%	0%	0%	0%	8%	31%	83%
	6	0%	0%	0%	0%	0%	1%	9%	67%
	5	0%	0%	0%	0%	0%	0%	1%	43%
	4	0%	0%	0%	0%	0%	0%	0%	19%
	3	0%	0%	0%	0%	0%	0%	0%	10%
	2	0%	0%	0%	0%	0%	0%	0%	3%
	1	0%	0%	0%	0%	0%	0%	0%	0%

State Colleges

		State Colleges							
		Ability Deciles							
		1 to 3	4	5	6	7	8	9	10
Income Deciles	10	0%	44%	96%	97%	97%	53%	18%	8%
	9	0%	37%	91%	92%	92%	73%	47%	16%
	8	0%	35%	83%	84%	84%	71%	48%	12%
	7	0%	29%	69%	70%	70%	65%	48%	12%
	6	0%	21%	47%	52%	52%	52%	47%	17%
	5	0%	23%	53%	54%	54%	54%	53%	31%
	4	0%	22%	54%	55%	55%	55%	55%	43%
	3	0%	7%	18%	19%	19%	19%	19%	18%
	2	0%	0%	1%	1%	1%	1%	1%	1%
	1	0%	0%	0%	0%	0%	0%	0%	0%

Tuition in Private Colleges as Function of Ability Holding Income Constant (2008 dollars)

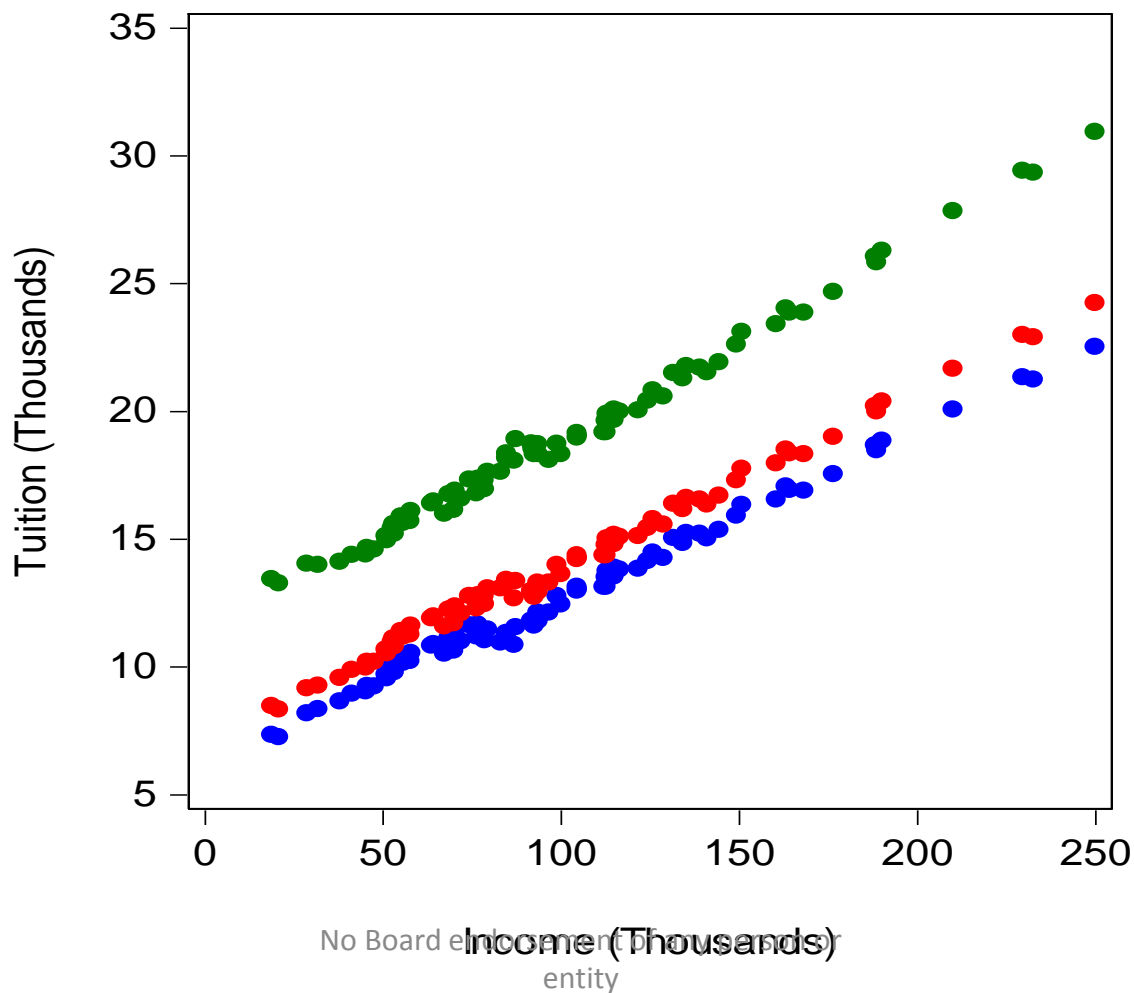
Tuition as Function of Ability for 75th Income Percentile
for Lowest, Middle, and Top Private Colleges



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Tuition in Private Colleges as Function of Income Holding Ability Constant (2008 dollars)

Tuition as Function of Income for Students at 99th Percentile of Ability in Lowest, Middle, and Highest Ranked Colleges



Policy: Effects of Increasing Maximum Federal Aid by \$2,000

- ❑ The share of the college-age population attending college increases by 6 percent (2.4 percentage points).
- ❑ This enrollment increase is almost entirely in state colleges. Private enrollment increase is slight.
- ❑ In state colleges, the percent getting some aid rises from 30 to 35.6, and almost all of the increased federal aid is passed through to students.

Policy: Effects of Increasing Maximum Federal Aid by \$2,000

- ❑ In private colleges, the increased demand caused by increased federal aid bids up net tuitions with the result that about 75% of the increased aid is passed through to students.
 - ❑ This increased aid is used to attract more high-ability, low-income students who displace some low-ability, high-income students.
 - ❑ The remaining 25% of increased federal aid is used to reduce institutional aid and instead increase expenditures in the colleges.
- ❑ A \$2,000 decrease in federal aid has roughly symmetric effects in the opposite direction to those summarized above.

Policy: Effects of Reducing State Subsidies by \$2,000 Per Student with Tuition Increases of \$2,000

Key effects of reduced state subsidies and increased tuitions

- ❑ The share of the college-age population attending college decreases by 7.5 percent (3 percentage points).
- ❑ This enrollment decrease is almost entirely in state colleges. Private enrollment change is slight.
- ❑ Private colleges:
 - ❑ Average tuition rises by \approx \$600 per student in private colleges as higher state college costs increases demand for private colleges.
 - ❑ Some able poor students displace some less able wealthy students resulting in 3% increase in private school students receiving financial aid.



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Concluding Comments

- ❑ Competition in higher education results in extensive variation in tuition and college access across students with differing abilities and differing household resources.
- ❑ Quality competition among private colleges leads to high overall tuitions and high expenditures per student.
- ❑ Competition among colleges also impacts the response to changes in state and federal aid policies.
 - ❑ Our results point to partial crowd out of increases in federal aid in private colleges, as well as some bidding up of private college tuitions when support for state universities is reduced.
- ❑ More remains to be done to refine our collective understanding of college competition and design government aid policies that achieve intended college attendance and educational outcomes.

Private College Pricing: Intuition

(If time permits)

- ❑ A typical private college has a very small market share. How can price discrimination by income persist in such a setting?
- ❑ A college recognizes that some students will have a special affinity for the college, but the college does not know which students have that special affinity.
- ❑ For students of comparable ability, the college sets a higher price to families with higher income.
- ❑ Why? The college correctly anticipates that wealthier parents of a son or daughter who “falls in love” with the college will pay the high tuition to enable their son or daughter to attend the college.
- ❑ Hence, pricing by income persists even though individual colleges have small market shares.

Equilibrium Distributions (of Student-Age Population) by Ability and Household Income in All Private and Top Private Colleges

Deciles of ability and income:

□ All Private Colleges

		All Private Colleges								
		<i>Ability Deciles</i>								
		<i>1 to 3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	
<i>Income Deciles</i>	<i>10</i>	0%	0%	0%	0%	0%	45%	82%	92%	
	<i>9</i>	0%	0%	0%	0%	0%	21%	49%	83%	
	<i>8</i>	0%	0%	0%	0%	0%	16%	43%	86%	
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	<i>5</i>	0%	0%	0%	0%	0%	0%	1%	43%	
	<i>4</i>	0%	0%	0%	0%	0%	0%	0%	19%	
	<i>3</i>	0%	0%	0%	0%	0%	0%	0%	10%	
	<i>2</i>	0%	0%	0%	0%	0%	0%	0%	3%	
	<i>1</i>	0%	0%	0%	0%	0%	0%	0%	0%	

□ Top Private Colleges

		Top Private College								
		<i>Ability Deciles</i>								
		<i>1 to 3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	
<i>Income Deciles</i>	<i>10</i>	0%	0%	0%	0%	0%	0%	13%	21%	
	<i>9</i>	0%	0%	0%	0%	0%	0%	4%	13%	
	<i>8</i>	0%	0%	0%	0%	0%	0%	3%	14%	
	<i>7</i>	0%	0%	0%	0%	0%	0%	1%	6%	
	<i>6</i>	0%	0%	0%	0%	0%	0%	0%	4%	
	<i>5</i>	0%	0%	0%	0%	0%	0%	0%	2%	
	<i>4</i>	0%	0%	0%	0%	0%	0%	0%	1%	
	<i>3</i>	0%	0%	0%	0%	0%	0%	0%	0%	
	<i>2</i>	0%	0%	0%	0%	0%	0%	0%	0%	
	<i>1</i>	0%	0%	0%	0%	0%	0%	0%	0%	