非營利機構稅賦政策：誰是最終買單者？

Who Pays When the Government Taxes Nonprofits?

Nonprofits Colleges Responses to the Net Investment Income Tax

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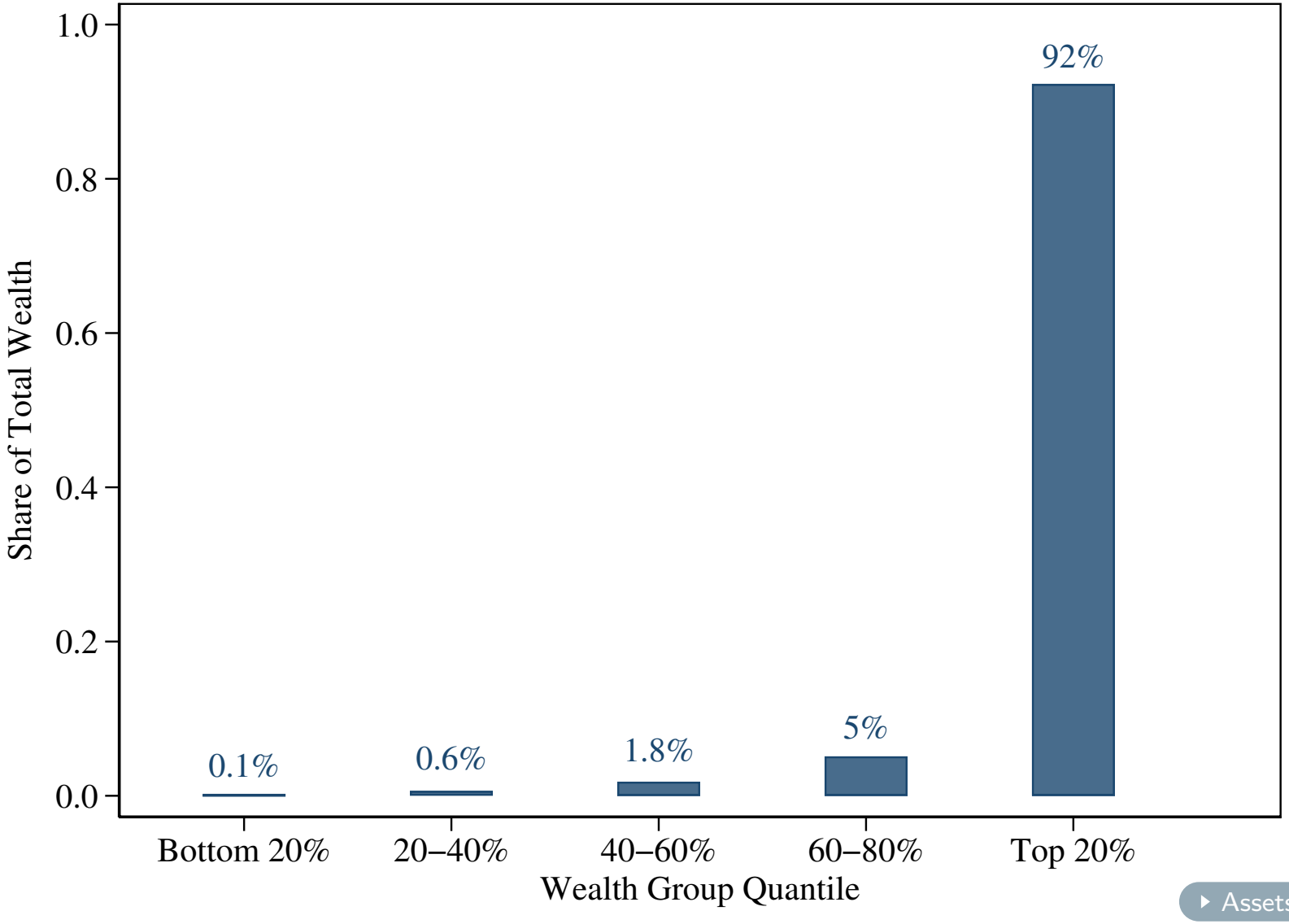
University of Missouri

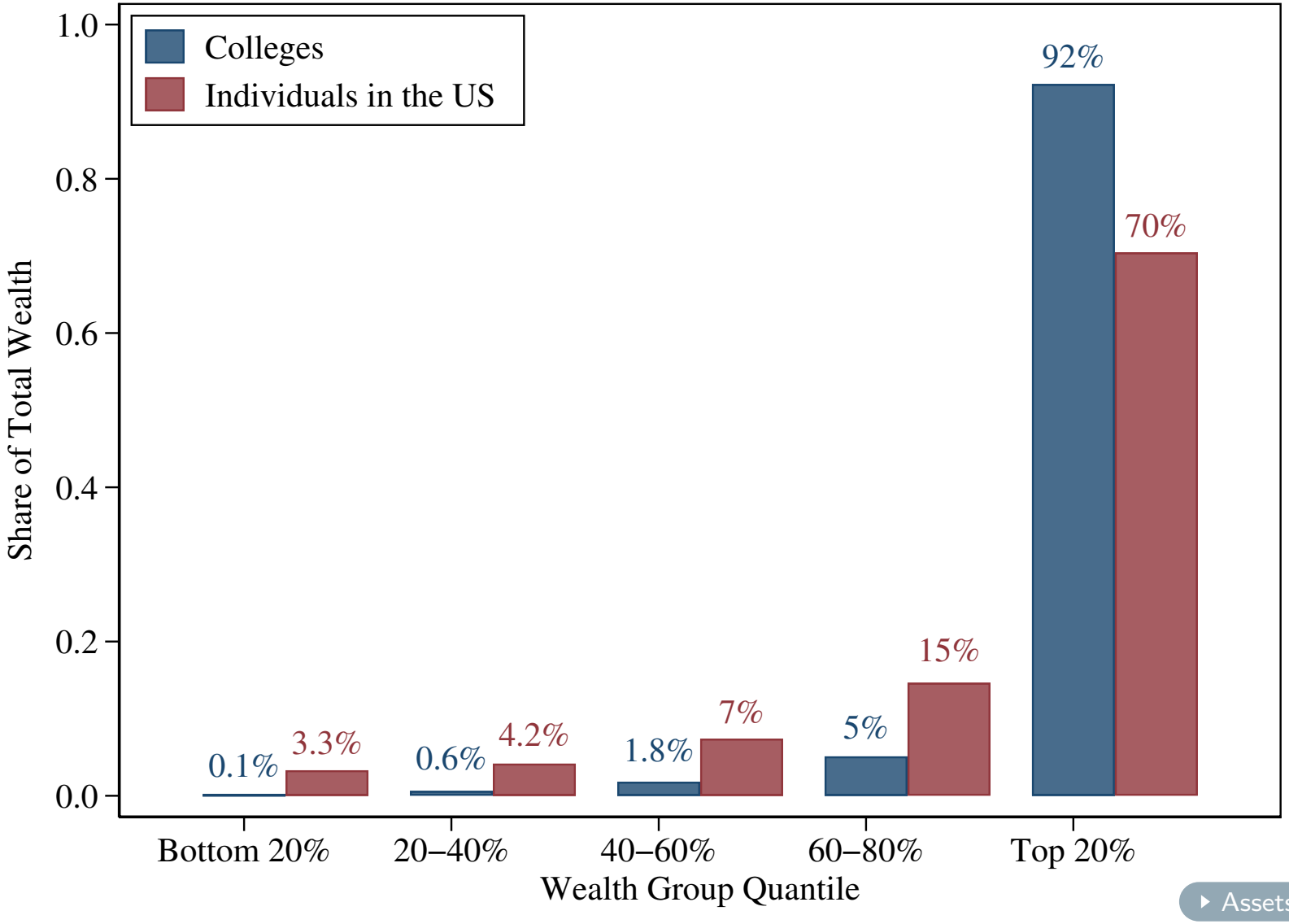
February 20, 2025

Inequality in Wealth Distribution in Nonprofit Colleges



▸ Assets Composition

Inequality in Wealth Distribution in Nonprofit Colleges



Assets Composition

How Much Taxes Do the Wealthy Paid?

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Harvard owns **$50 billion** in total wealth and paid **$35 million** in taxes in 2021 (**0.07%**)

Tax Exemptions to Nonprofits

- Nonprofits have historically benefited from tax exemptions
  - The annual federal tax benefit for nonprofits is estimated at $45 billion, making up 2% of total federal tax revenue (Brody & Cordes, 2006)
  - Indirect government support through tax exemptions surpasses direct subsidies (Humphreys & Solomon, 2012; Baum & Lee, 2019)

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  - Indirect government support through tax exemptions surpasses direct subsidies (Humphreys & Solomon, 2012; Baum & Lee, 2019)
- The justification of nonprofit tax exemption is that they provide the public goods that benefit society (Hassan et al., 2000; Stevens, 2010; Zare et al., 2022)
  - Scholars criticize that nonprofits do not use the tax benefits to enhance their service (Cowan, 2007; Nichols & Santos, 2016; Herring et al., 2018)

Research Questions

- **Big Question:** Does taxing nonprofits **improve** or **undermine** the overall society benefits?

Research Questions

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1. How do nonprofits respond to government taxation?
2. How does their behavior response affect the public good provision and societal welfare?
3. Overall, how does the government tax revenue earned compare to the consequences of behavioral responses?

Policy Background:

Net Investment Income Tax on Nonprofit Colleges

Net Investment Income Tax on Nonprofit Colleges

- The 2017 Tax Cuts and Jobs Act (TCJA) imposed a **1.4%** net investment income tax on non-profit colleges with: Choice of Case Policy Timeline
  - Enrolling more than 500 tuition-paying students
  - Hold $500,000 or more assets per student Bunching?
- Only 32 colleges are taxed in the first year List of Colleges
- Taxing on the capital returns Distribution of Income and Tax

> "The net investment income tax will impede our efforts to help students and improve education...We will each have less to give in aid, less for research, and less to support public engagement."
>
> —*Letters from 48 Colleges to the House*

> "The tax will reduce funds available from the endowment to support financial aid and support for our core academic mission."
>
> —*Stanford University*

> "The provision will constrain the resources that enable us to provide the financial aid that makes college more affordable and accessible."
>
> —*Harvard University*

> "It will reduce MIT's ability to undertake extensive financial aid for students, innovative education, and pioneering research."
>
> —*MIT*

Theoretical Framework

Different Types of Behavioral Responses on Tax

1. **Tax Evasion**: Illegal practice to reduce tax liability
   - e.g., Hiding income
2. **Tax Avoidance**: Utilizes legal loopholes or ambiguous areas of the tax system to reduce tax liability
   - e.g., Research grants vs. honorarium
   - e.g., Adjusting financial metrics to stay below tax thresholds
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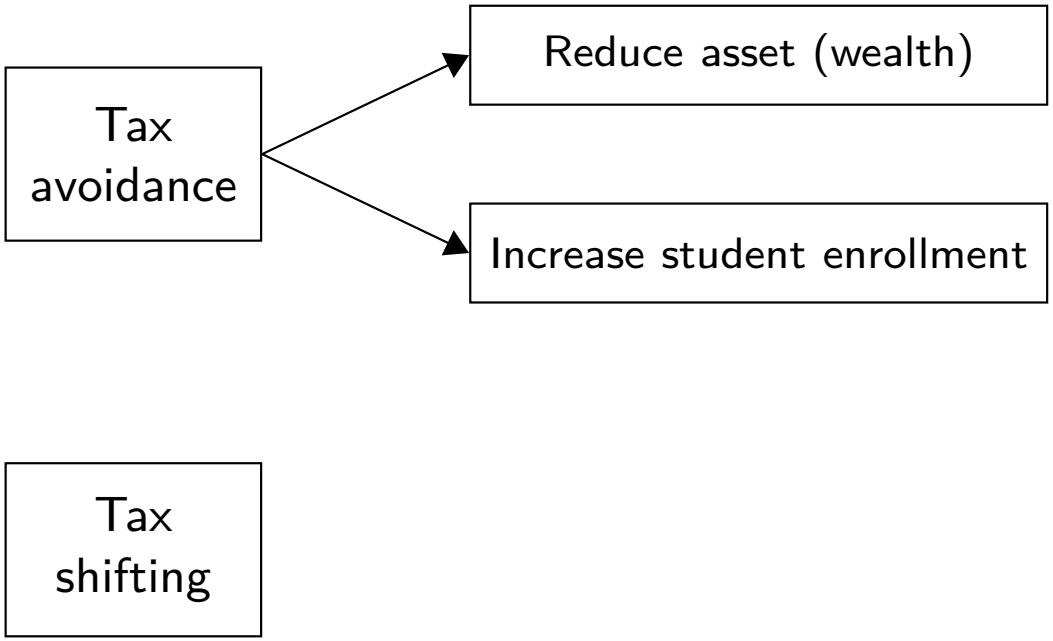
Theoretical Framework

Tax avoidance

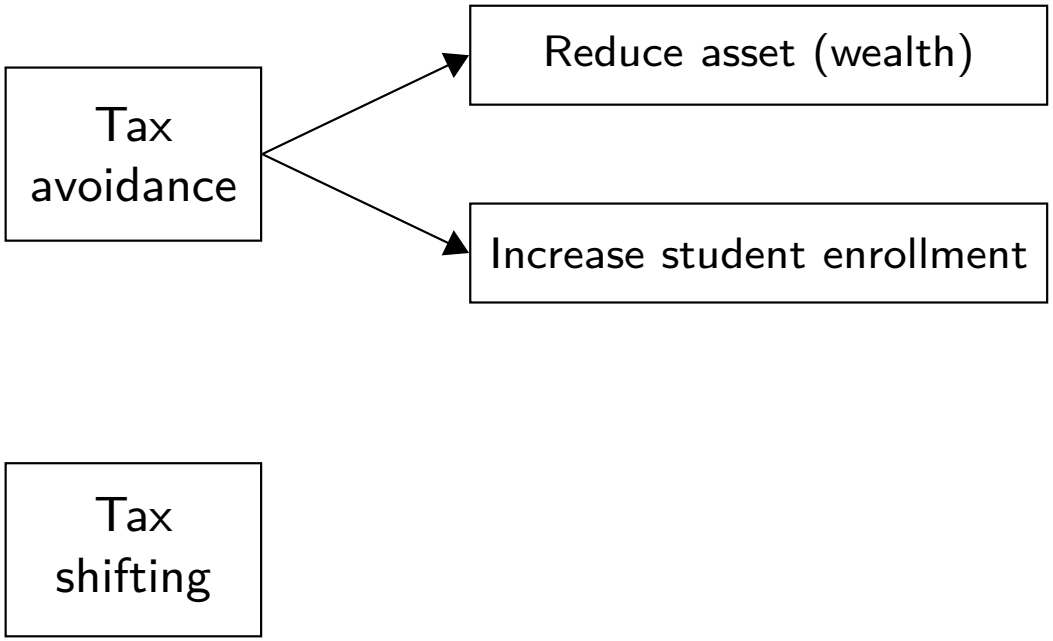
Tax shifting

Theoretical Framework



$$\frac{Assets}{Enrollment} \geq 500,000$$

Theoretical Framework



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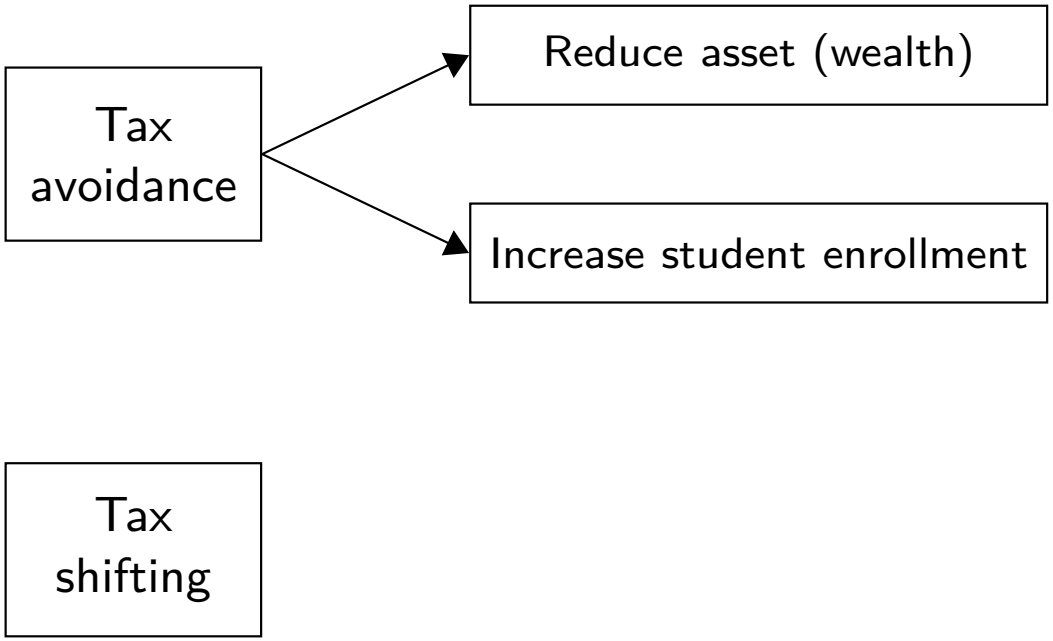

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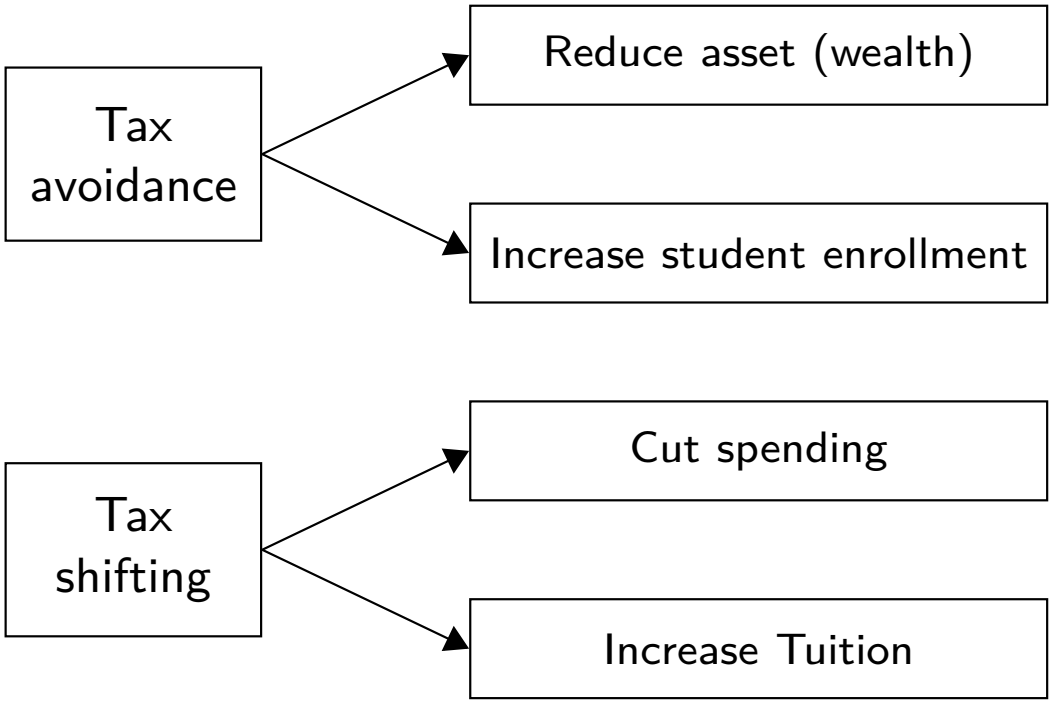

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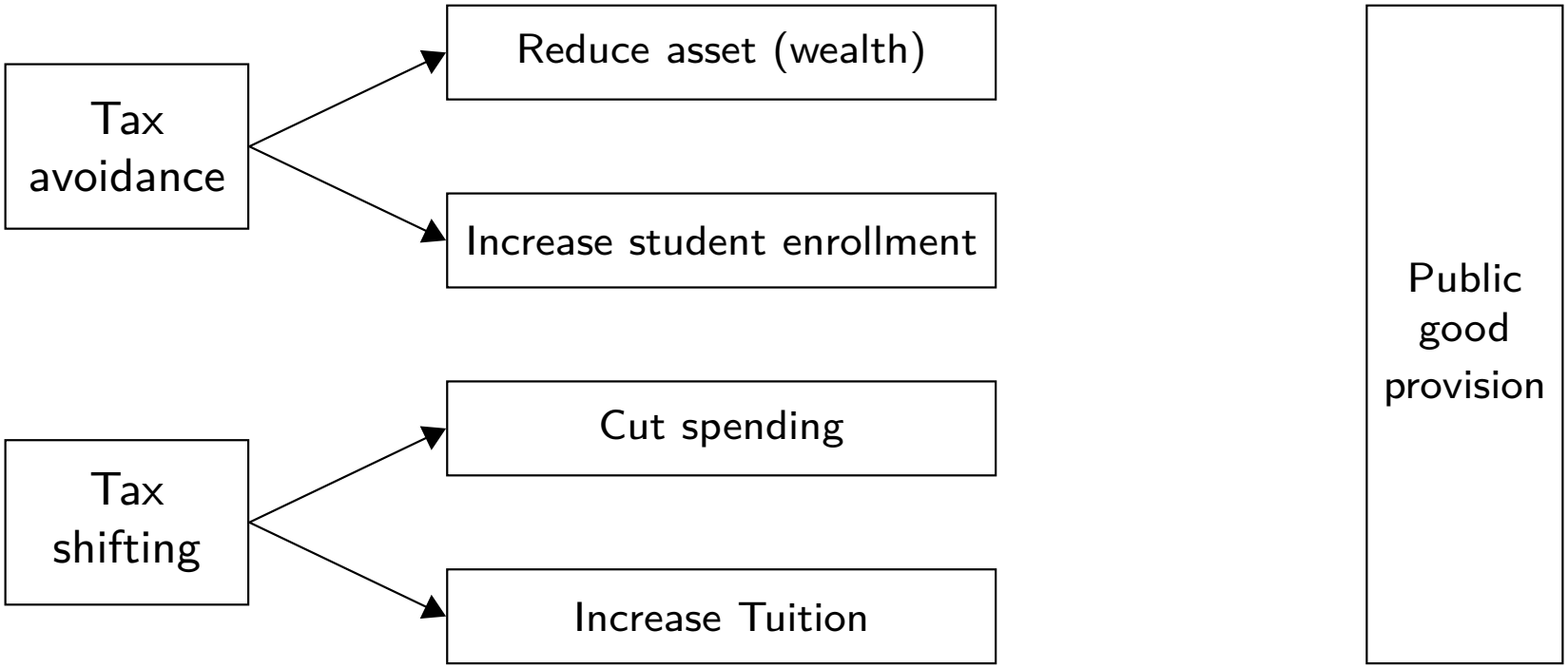

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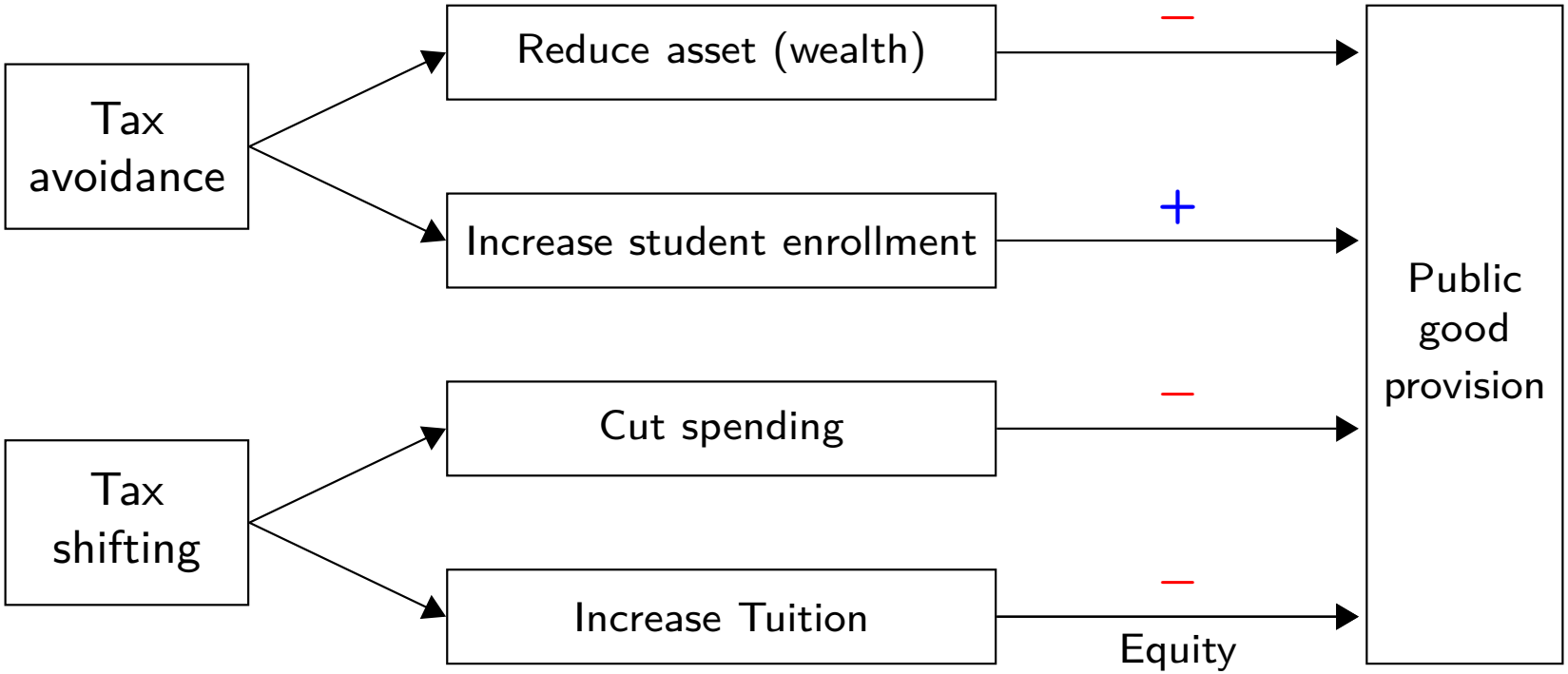

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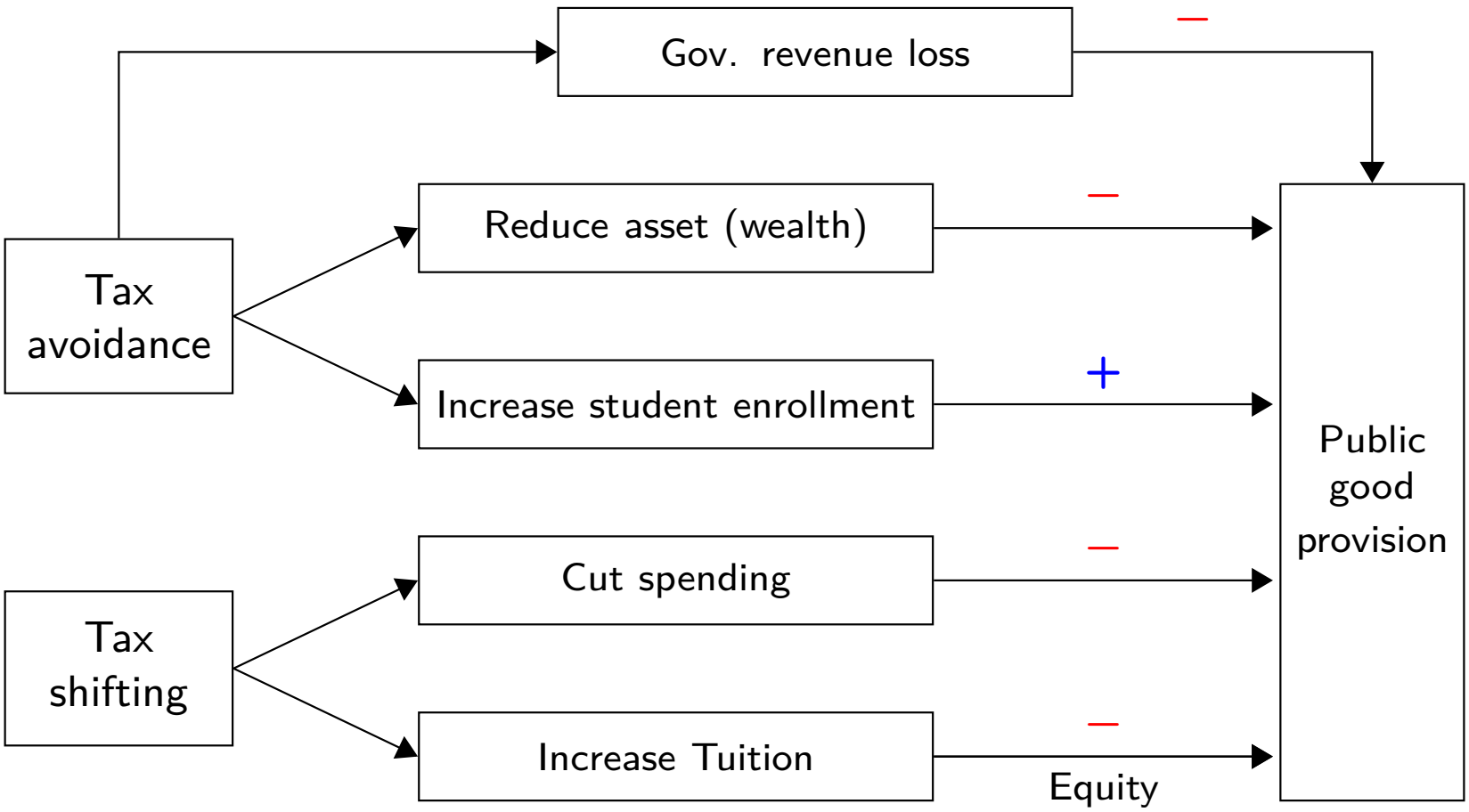

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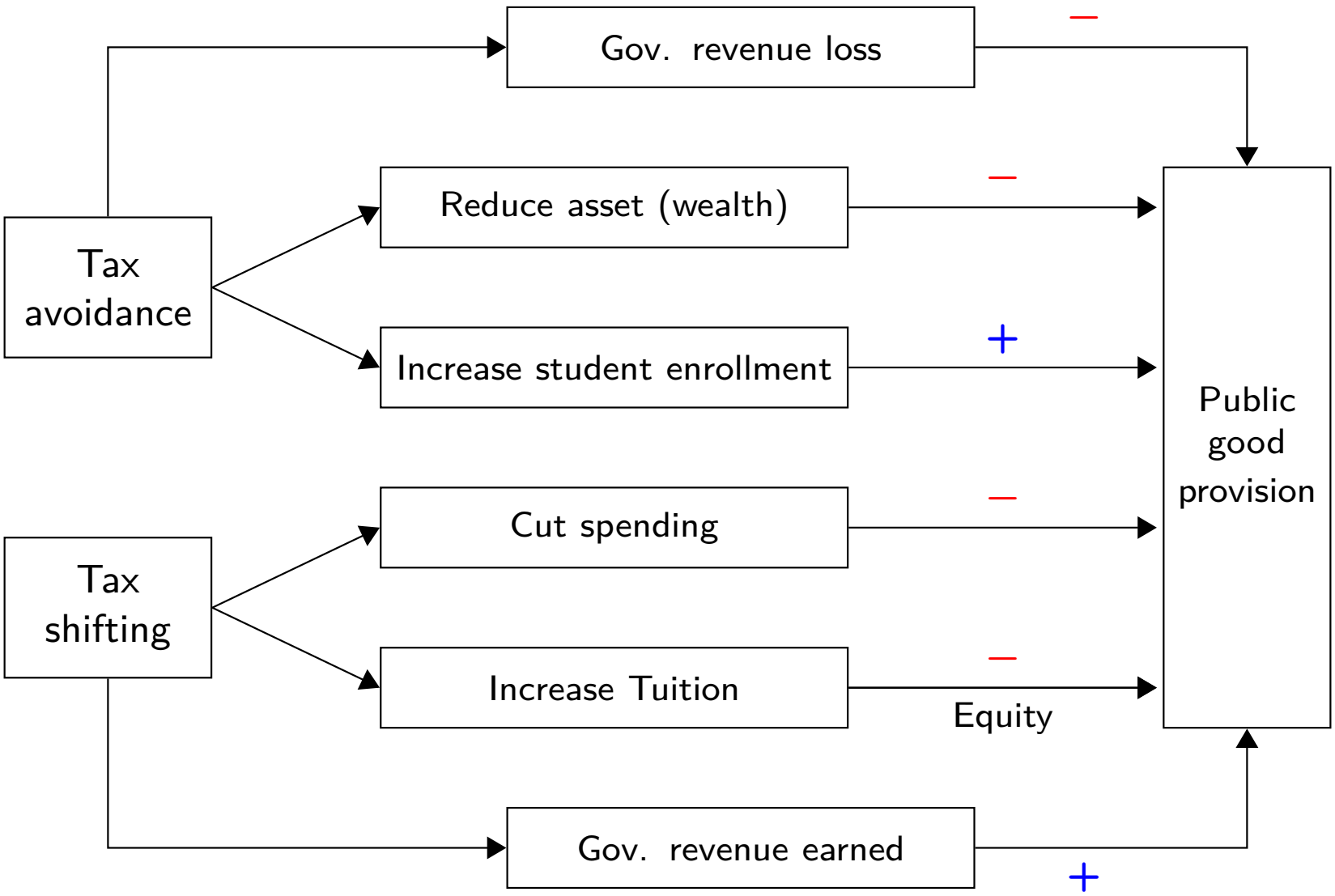
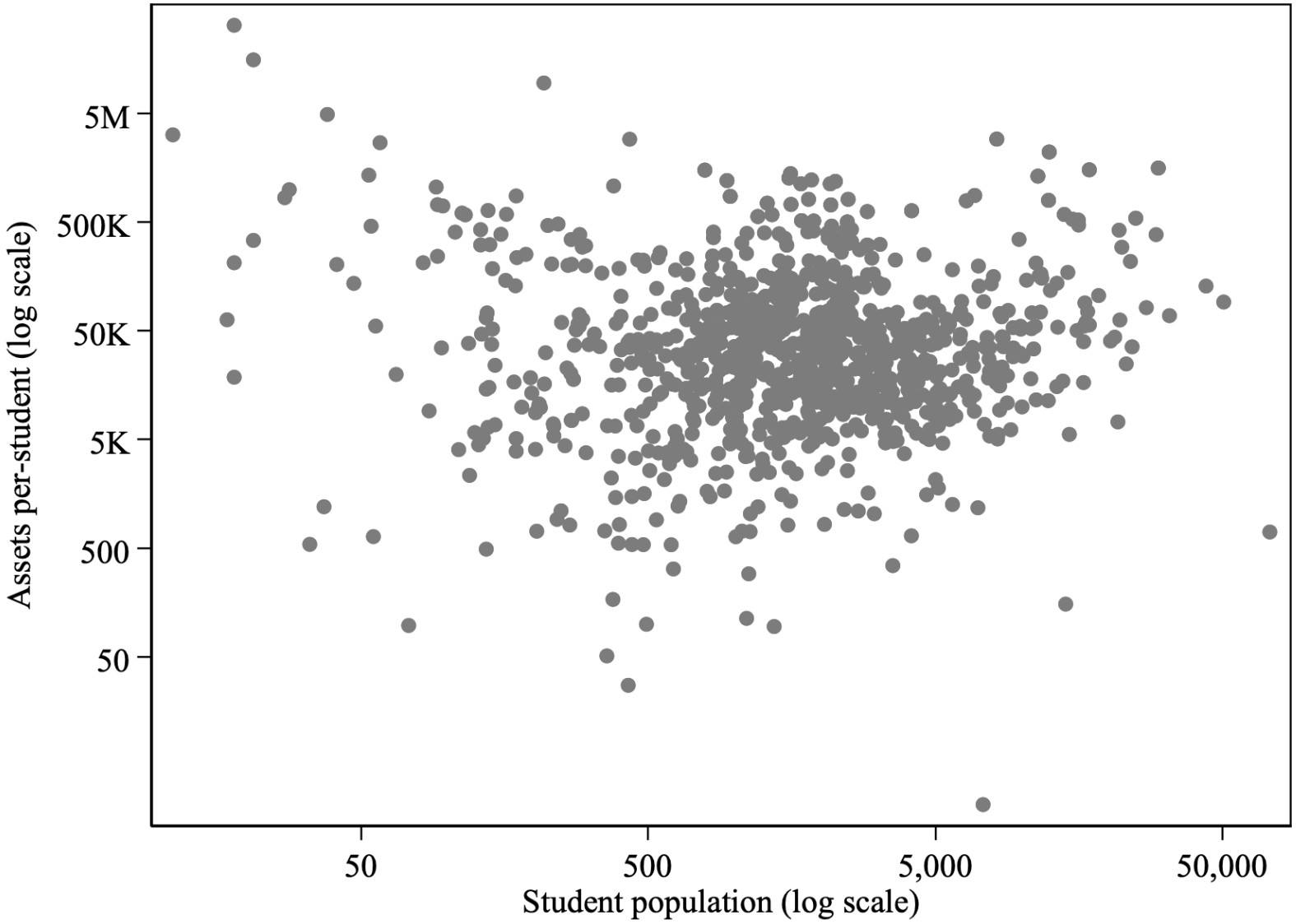


Data and Sample

Data and Sample

- Data
  - Integrated Postsecondary Education Data System (IPEDS)
  - Form 990 (Tax return of organizations exempt from income tax)
- Sample
  - **Private non-profit colleges** reported in the IPEDS and e-filed Form 990 every year from 2010 to 2023
  - Sample size: 993 Colleges
- Sample Period
  - From 2010 (July 2010 to June 2011) to 2022 (July 2022 to June 2023)

Data and Sample



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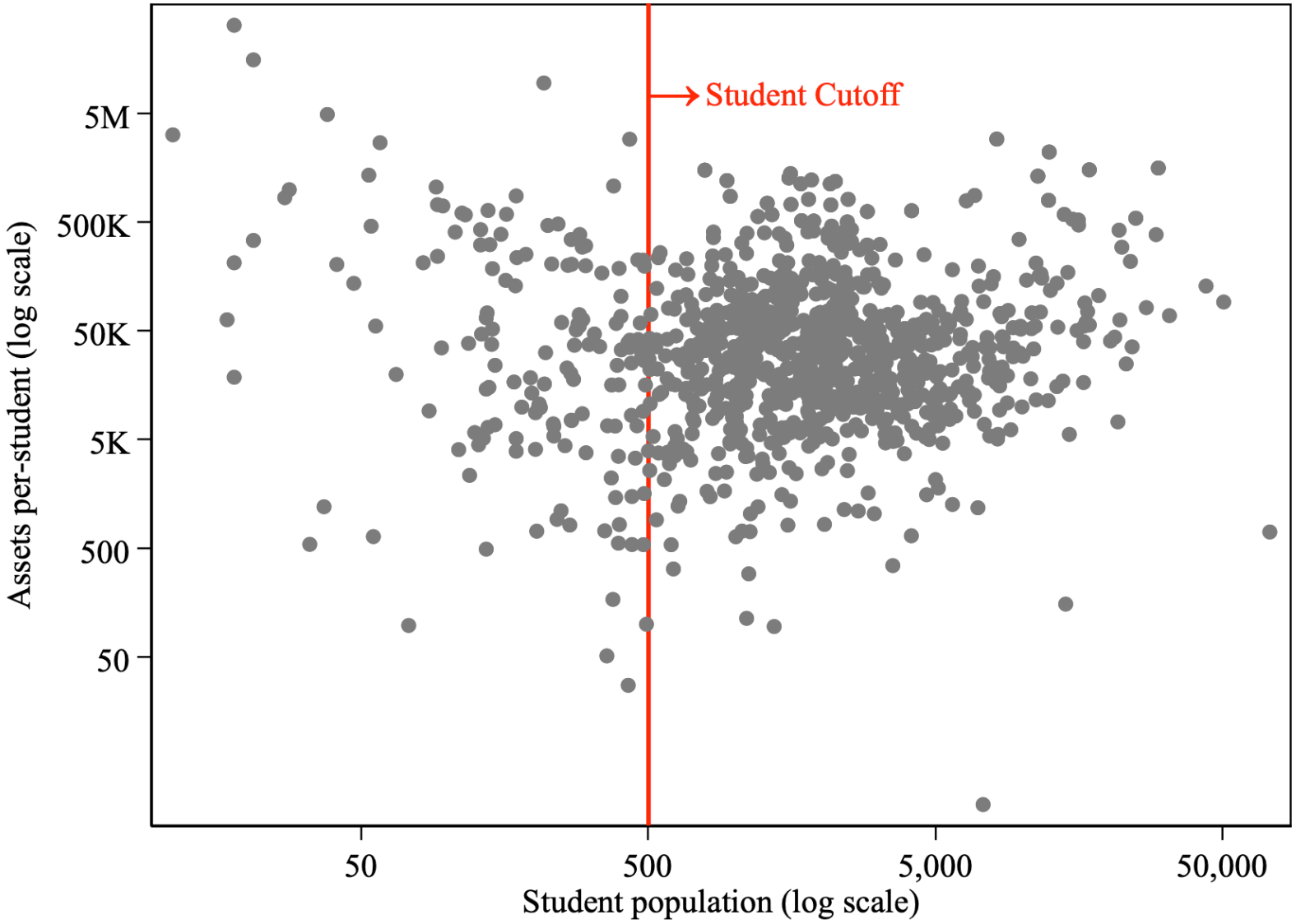

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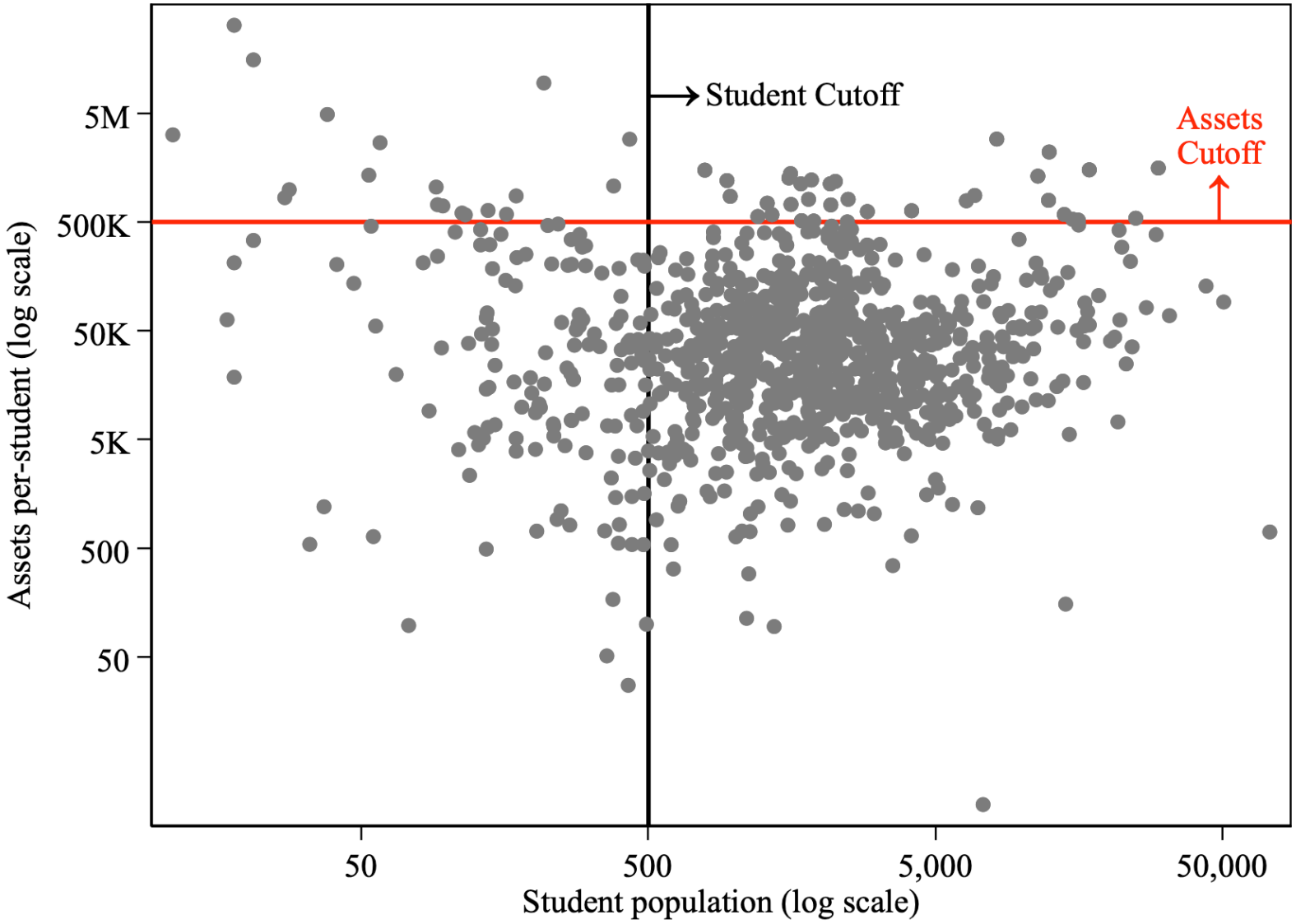

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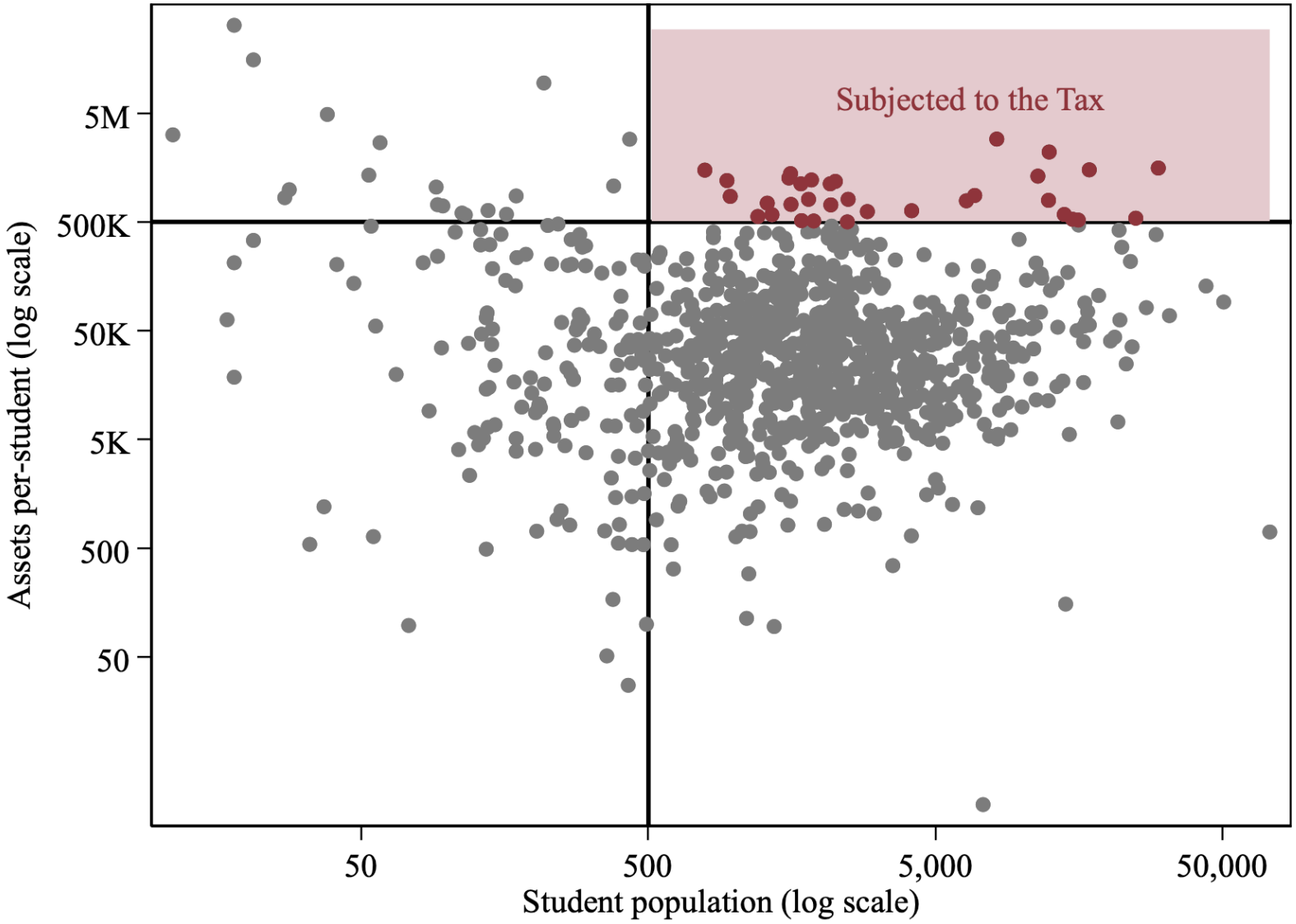
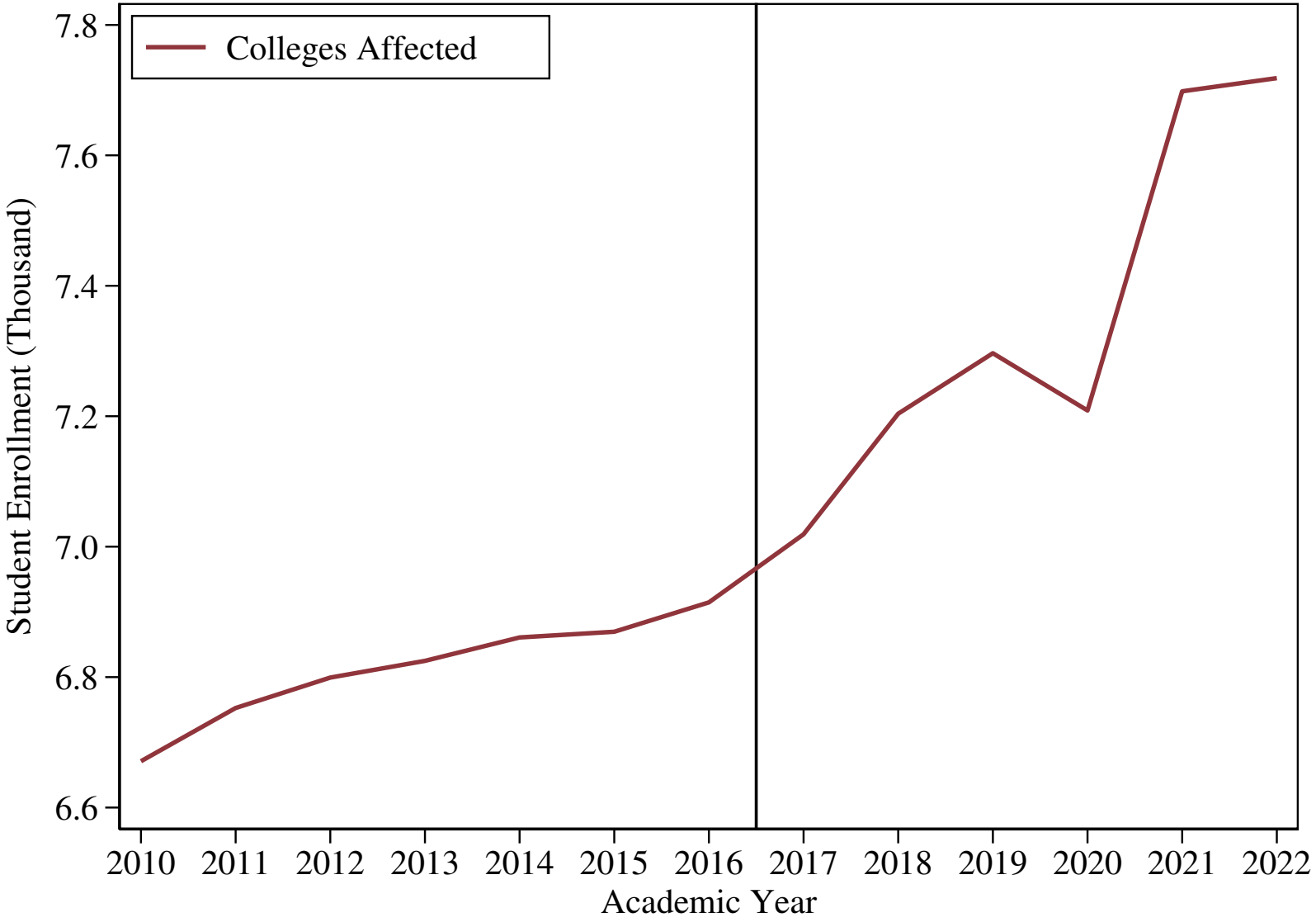


Empirical Method

Empirical Strategy: Difference-in-Differences



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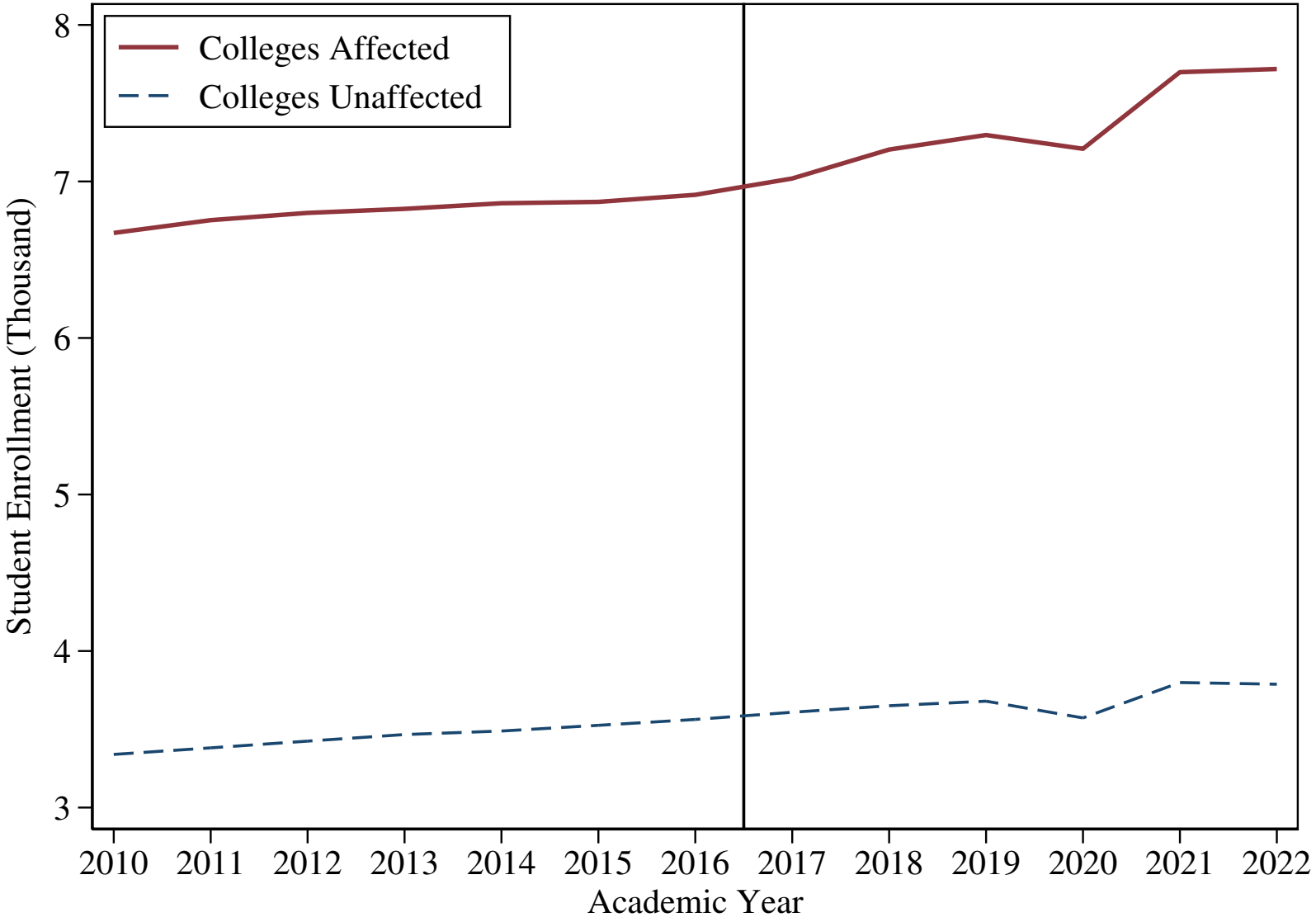

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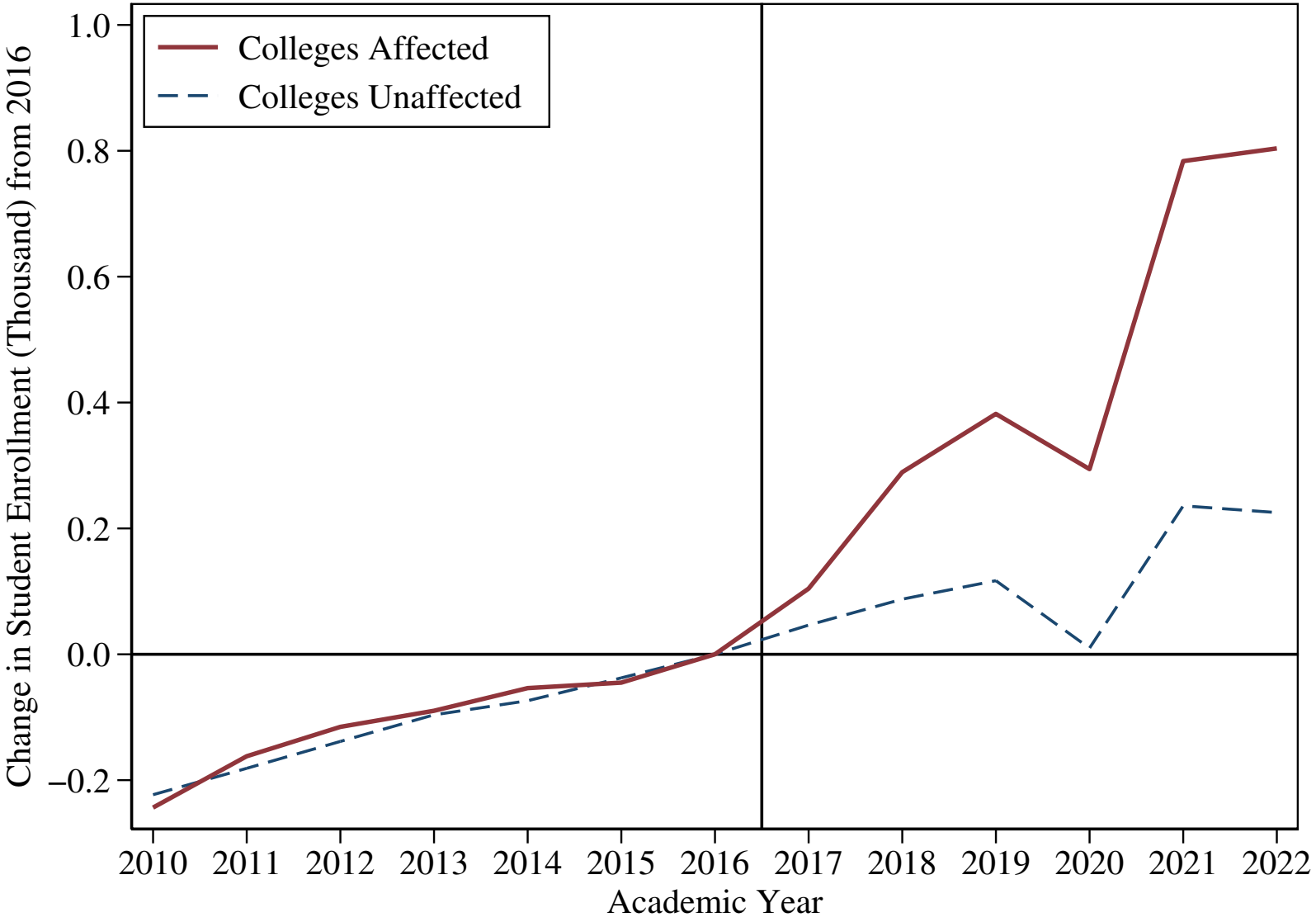
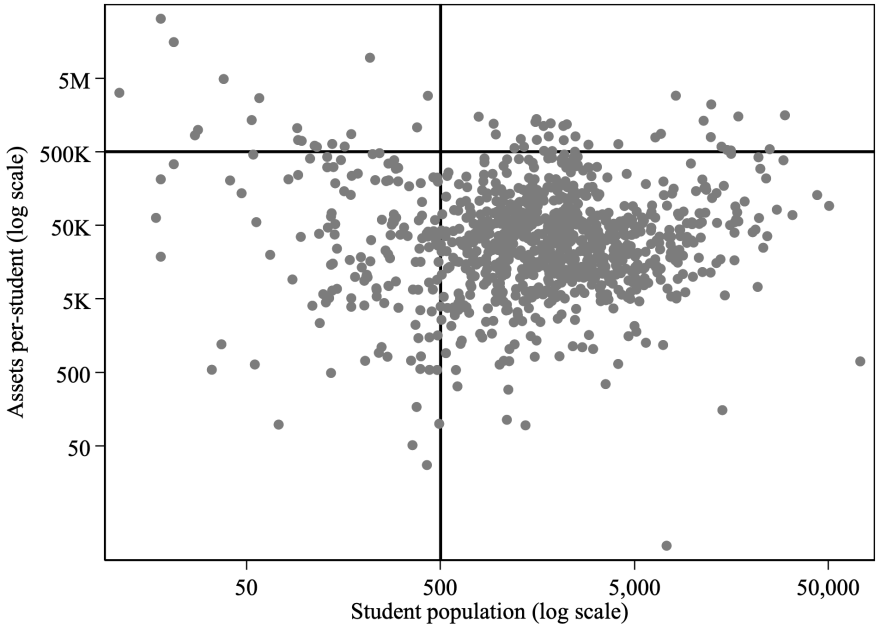


Treatment and Comparison Groups



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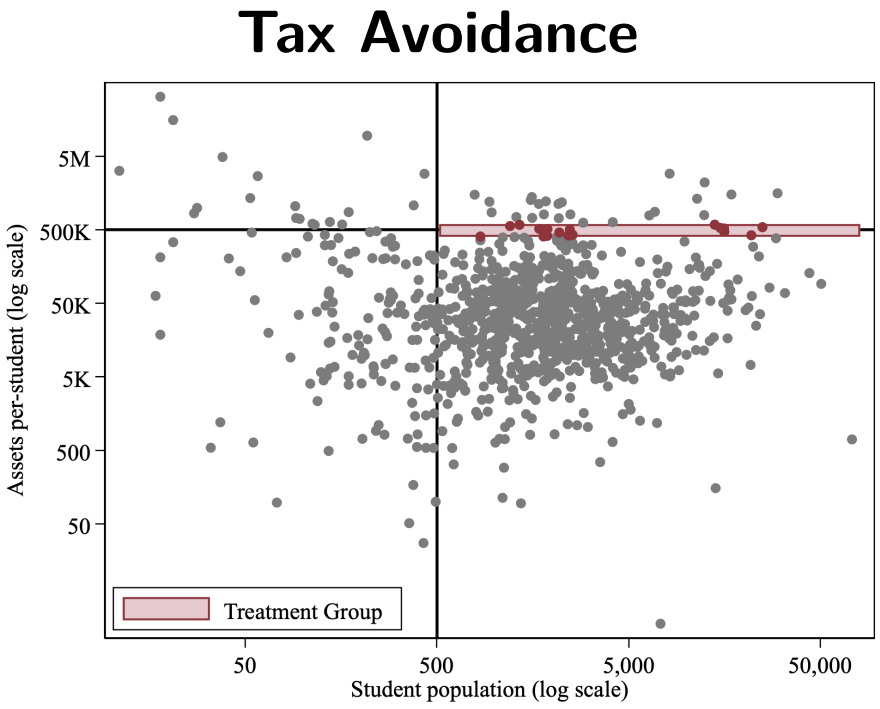
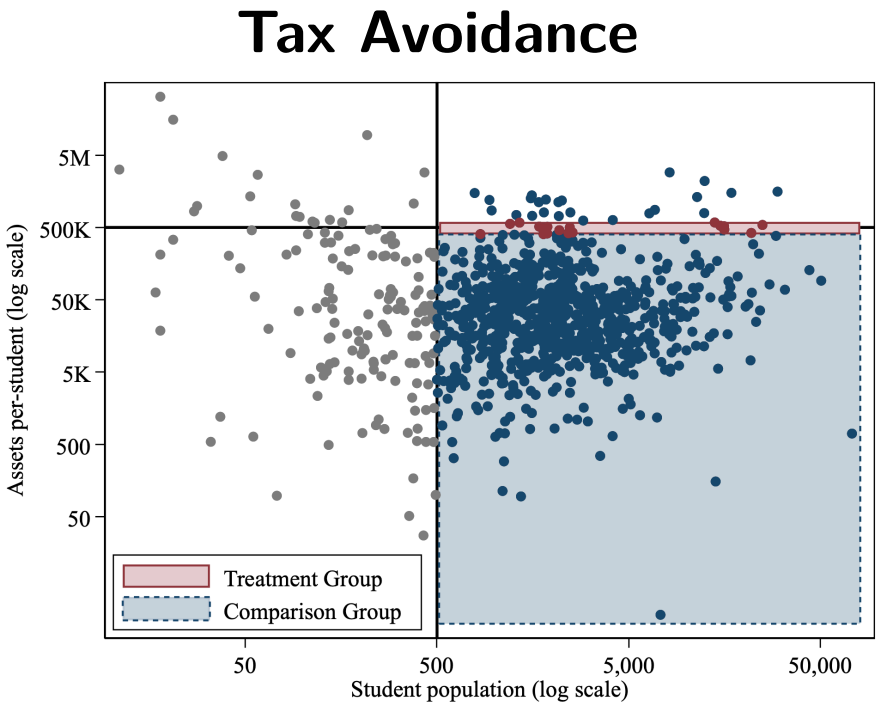


Treatment: Around the cutoff (400 to 600K)

Treatment and Comparison Groups

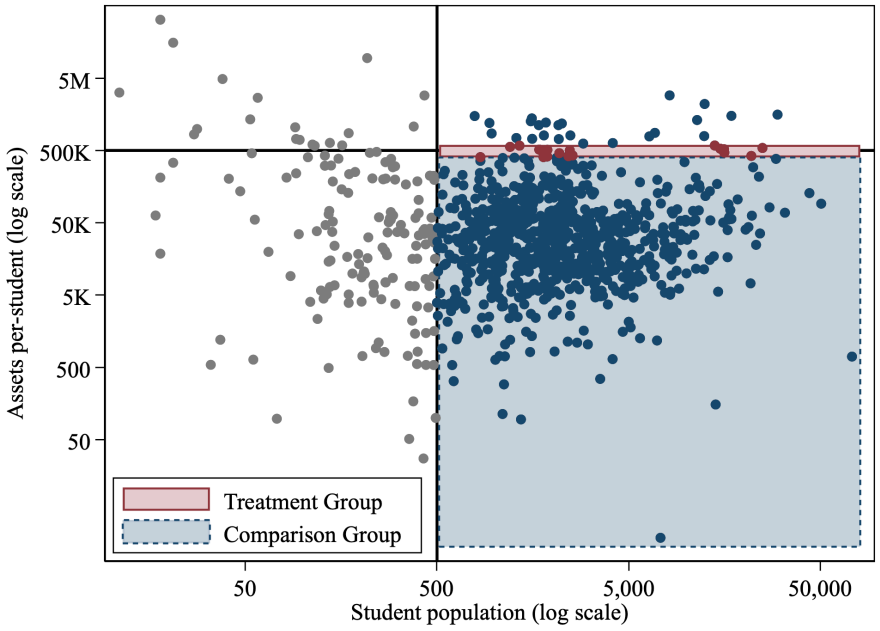


Treatment: Around the cutoff (400 to 600K)

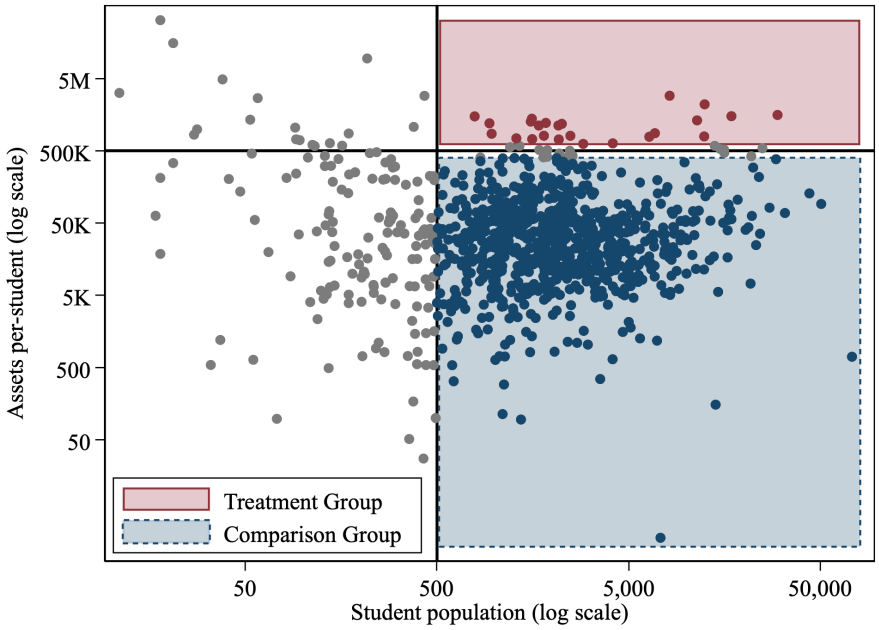
Control: Far below the cutoff

Treatment and Comparison Groups

Tax Avoidance



Tax Shifting



Treatment: Around the cutoff (400 to 600K)
Control: Far below the cutoff

Treatment: Above the cutoff
Control: Below the cutoff
Exclude: Around the cutoff

Details

Estimated Equations: Difference-in-Differences

$$Y_{it} = \beta_k Cutoff_i \times \sum_{k \neq 2016} \mathbf{Year}[t = k] + \theta_i + \delta_t \times X_i + \varepsilon_{it} \quad (1)$$

$$Y_{it} = \beta_k Wealthy_i \times \sum_{k \neq 2016} \mathbf{Year}[t = k] + \theta_i + \delta_t \times X_i + \varepsilon_{it} \quad (2)$$

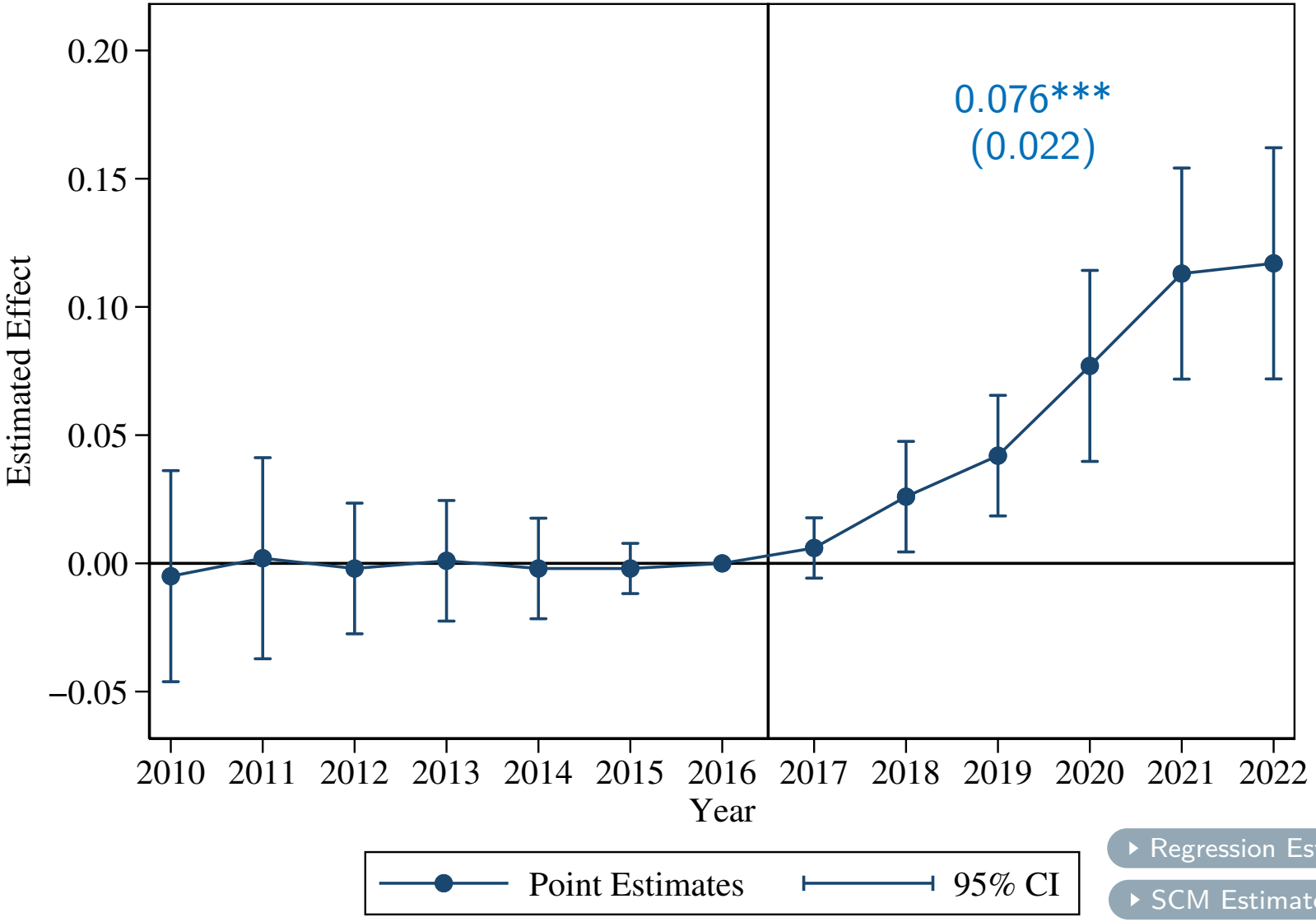
- Y_{it}: Outcomes of college i in fiscal/academic year t
- $Cutoff_i$: Had assets per student between \$400,000 and \$600,000
- $Wealthy_i$: Had assets per student above \$600,000
- $\sum \mathbf{Year}[t = k]$ A series of year dummies
- θ_i: Institution fixed effect
- δ_t: Year fixed effect
- X_i: Time-invariant college characteristics: Carnegie categorization

Empirical Methods (Robustness Check)

- **Synthetic Control Method (SCM):** Estimation of treatment effect on individual colleges ▸ Methodology Details ▸ Results
- **DD restricted to elite colleges:** Based on Barron's Selectivity Index & U.S. News Ranking ▸ Methodology Details ▸ Results
- **Triple-difference:** Use small colleges (number of students < 500) as additional control groups ▸ Methodology Details ▸ Results

Tax Avoidance

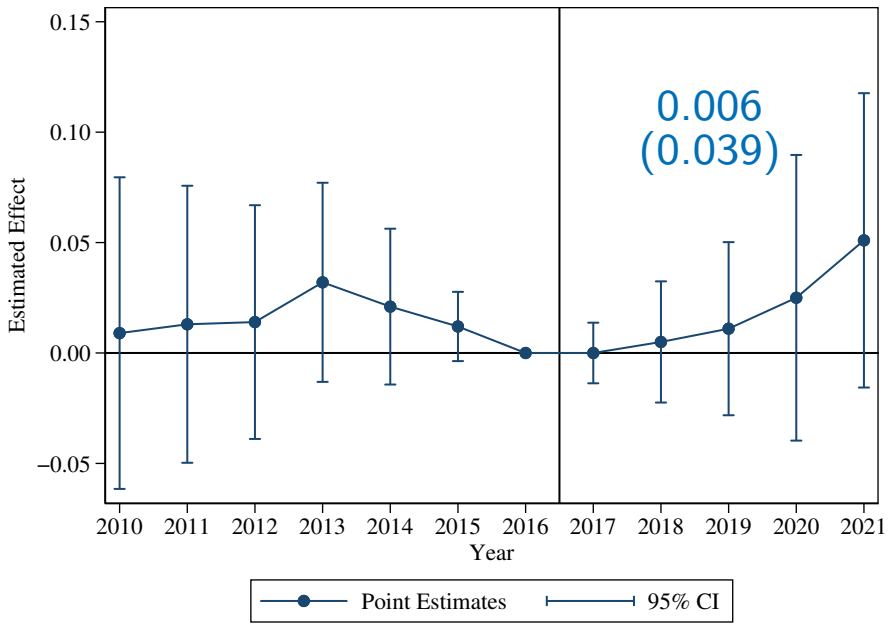
Tax Avoidance: Log Student Enrollment



Regression Estimates
SCM Estimates

Tax Avoidance: Log Assets and Assets per Student

Log Total Assets



Estimates by Asset Categories
SCM Estimates

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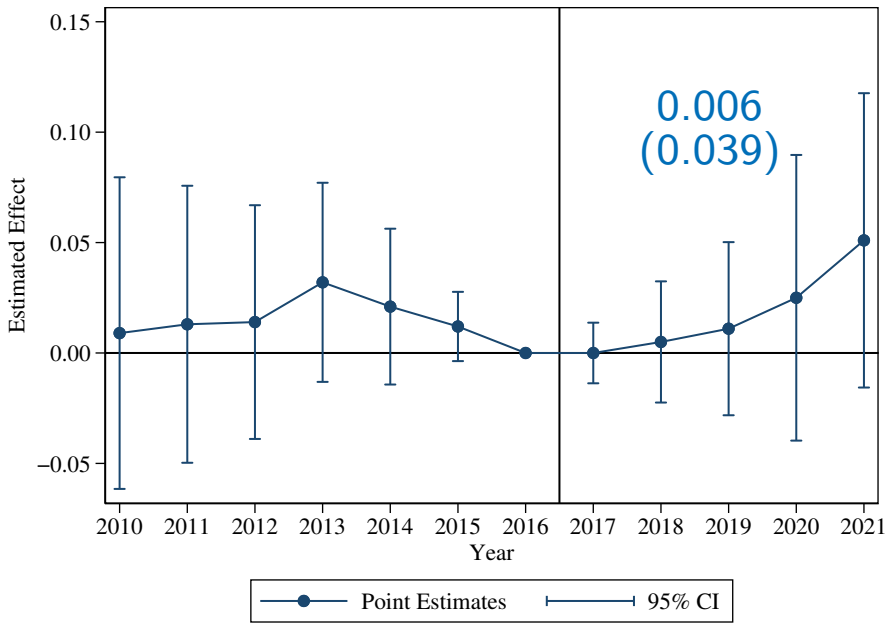

$$\frac{Assets}{Enrollment} \geq 500,000$$

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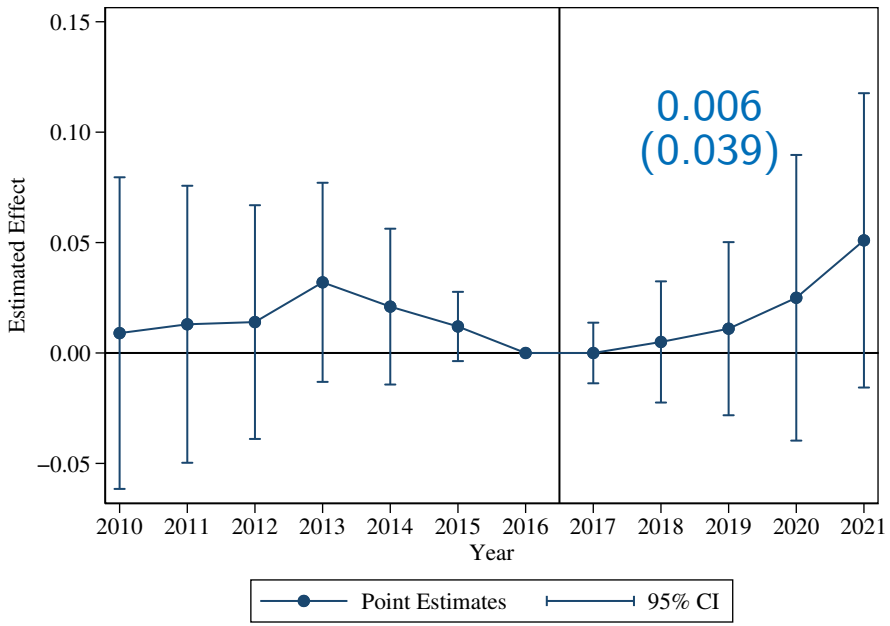

$$\uparrow \frac{\text{Assets}}{\text{Enrollment}} \geq 500,000 \downarrow$$

▸ Estimates by Asset Categories
▸ SCM Estimates

Tax Avoidance: Log Assets and Assets per Student

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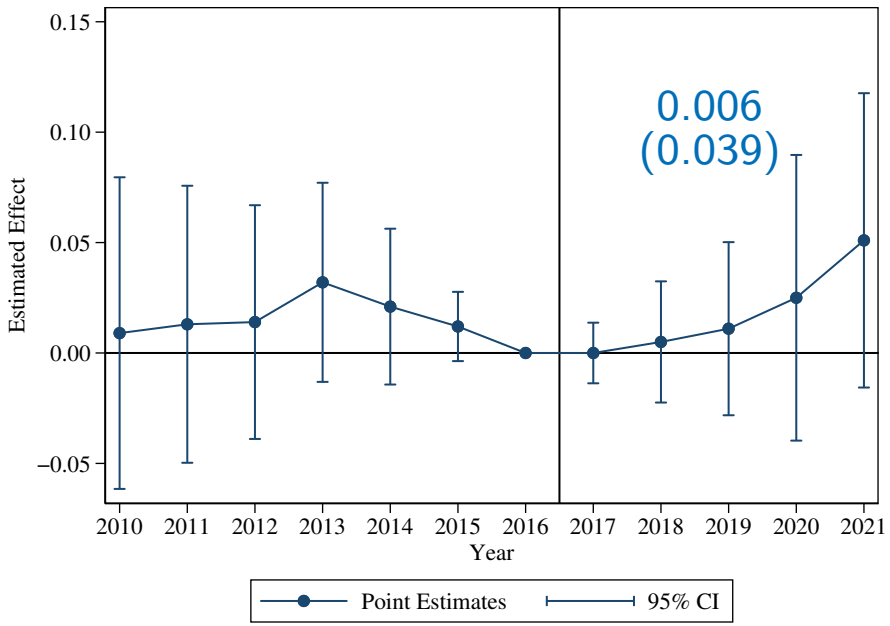

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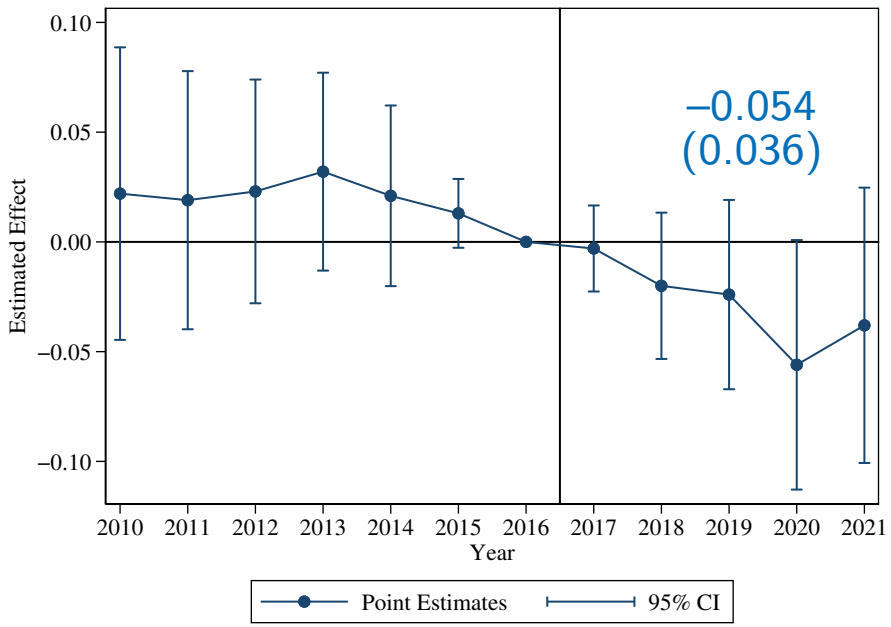


$$\cancel{\Delta} \quad \frac{Assets}{Enrollment} \geq 500,000 \downarrow$$

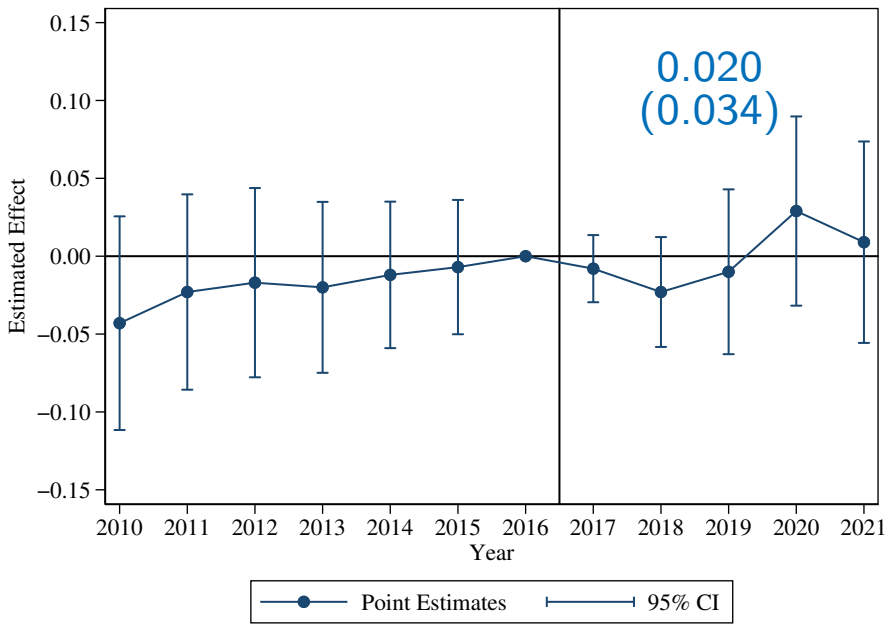
$\uparrow$

▸ Estimates by Asset Categories
▸ SCM Estimates

Tax Shifting

Tax Shifting: Log Total Spending & Financial Aids

Log Total Spending



▸ Estimates by Spending Categories
▸ SCM Estimates

Tax Shifting: Log Total Spending & Financial Aids

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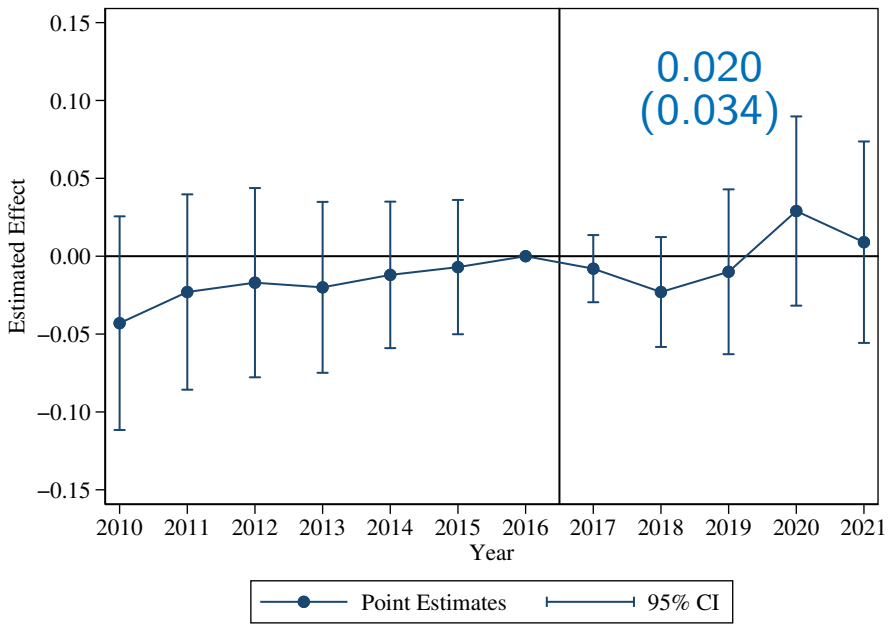
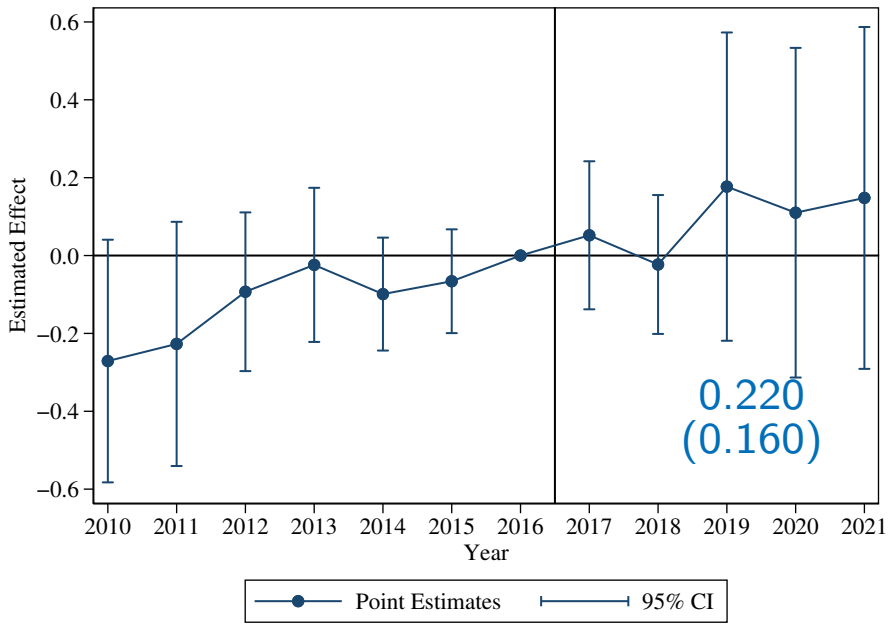


Log Institution Financial Aids



▸ Estimates by Spending Categories
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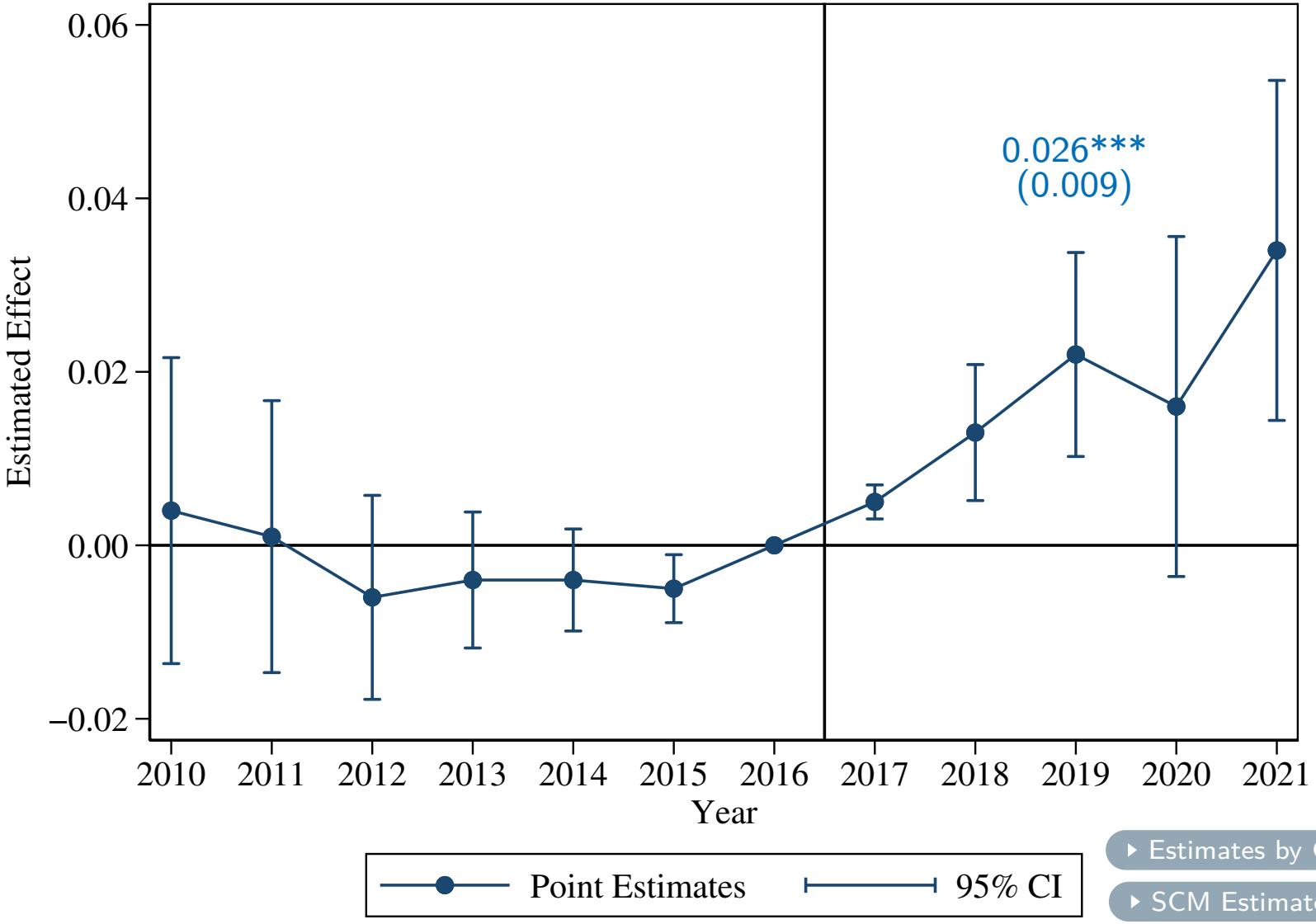
Tax Shifting: Log Listed Tuition



Estimates by Categories
SCM Estimates

Cost-and-Benefit Analysis

	Cost	Benefit
Tax Avoidance		
Tax Revenue Lost	$31 Million	
Enrollment Opportunity		$350 Million
Tax Shifting		
Tuition Increased	$1,186 Million	
Charge Increased	$249 Million	
Tax Revenue		$1,621 Million

Cost-and-Benefit Analysis

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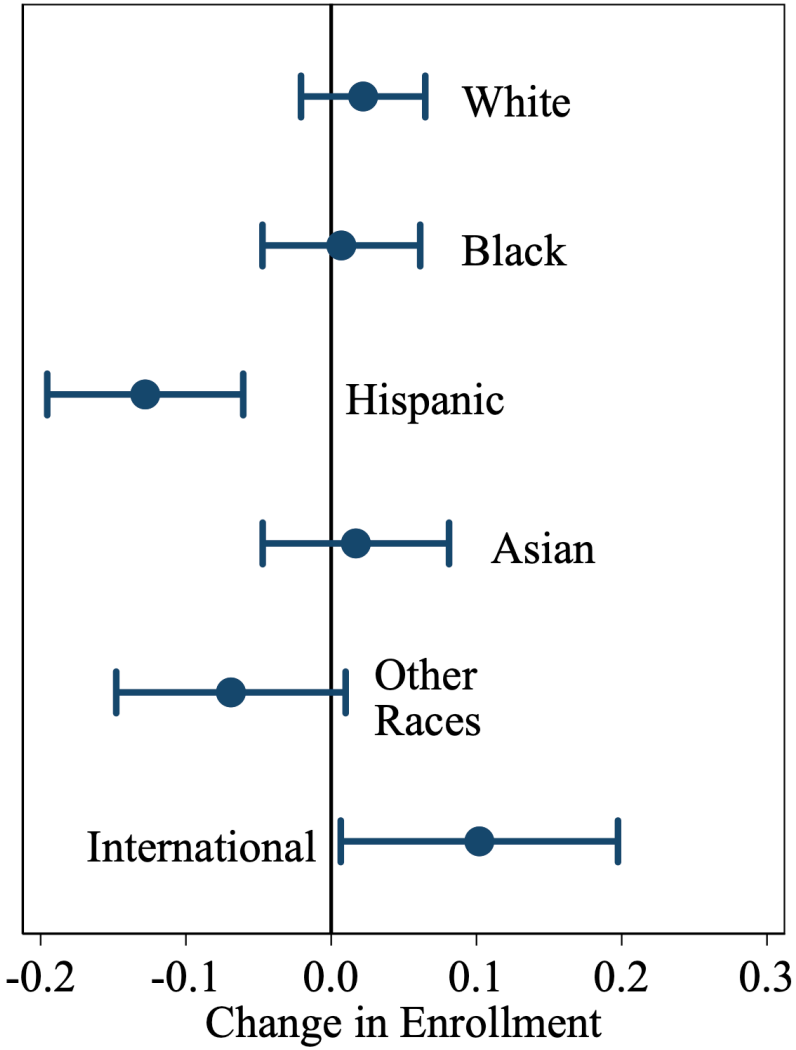
$$\textit{Tax Incidence on Students} = \frac{\$1{,}435}{\$1{,}621} = 89\%$$

Impact on Student Composition

Impact on Student Composition

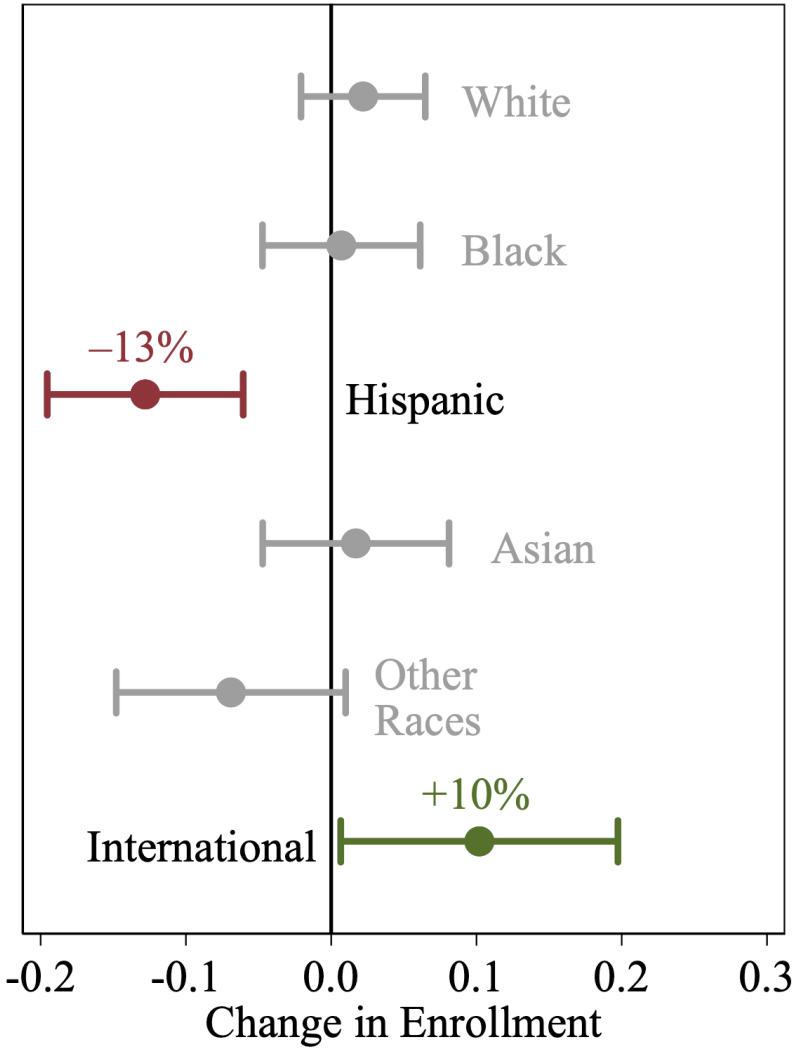
By Race/Ethnicity



Regression Estimates

Impact on Student Composition

By Race/Ethnicity



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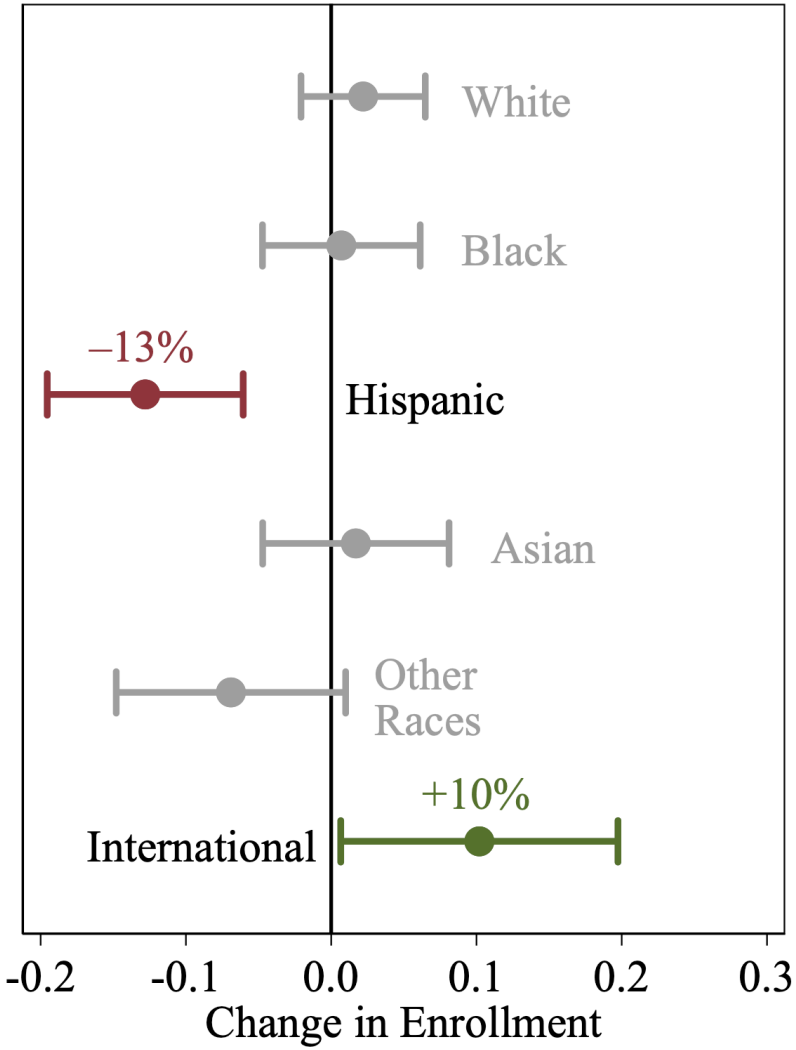
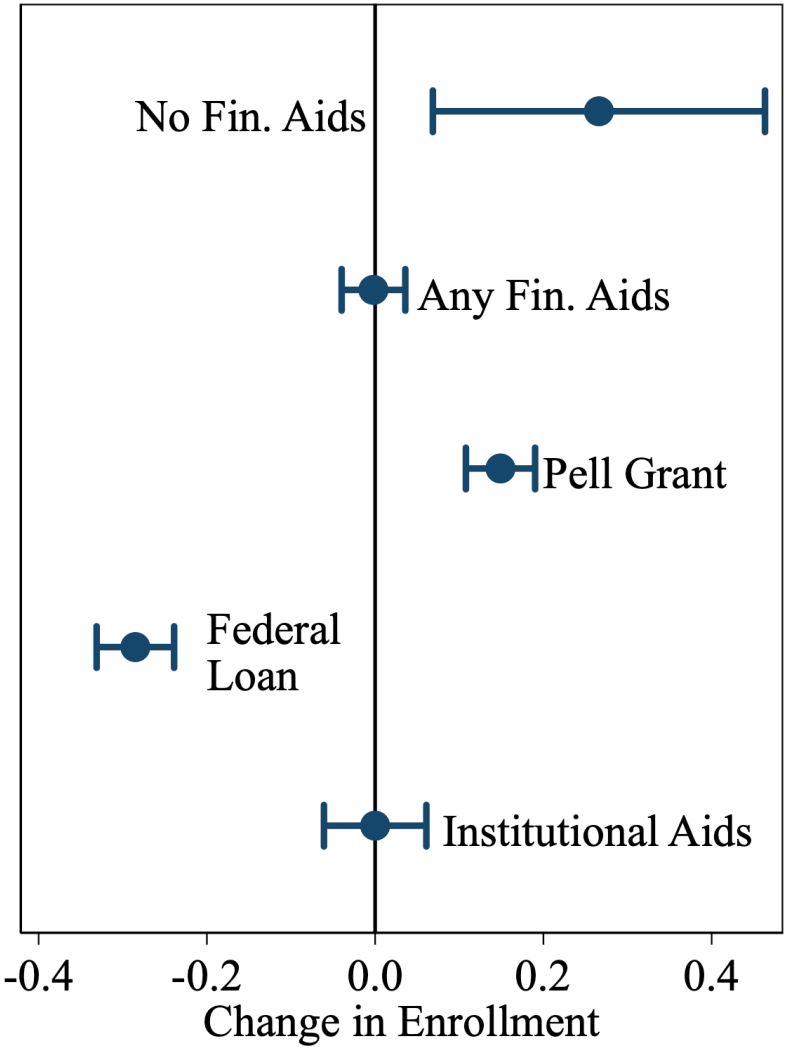


By Financial Aid Status



▸ Regression Estimates

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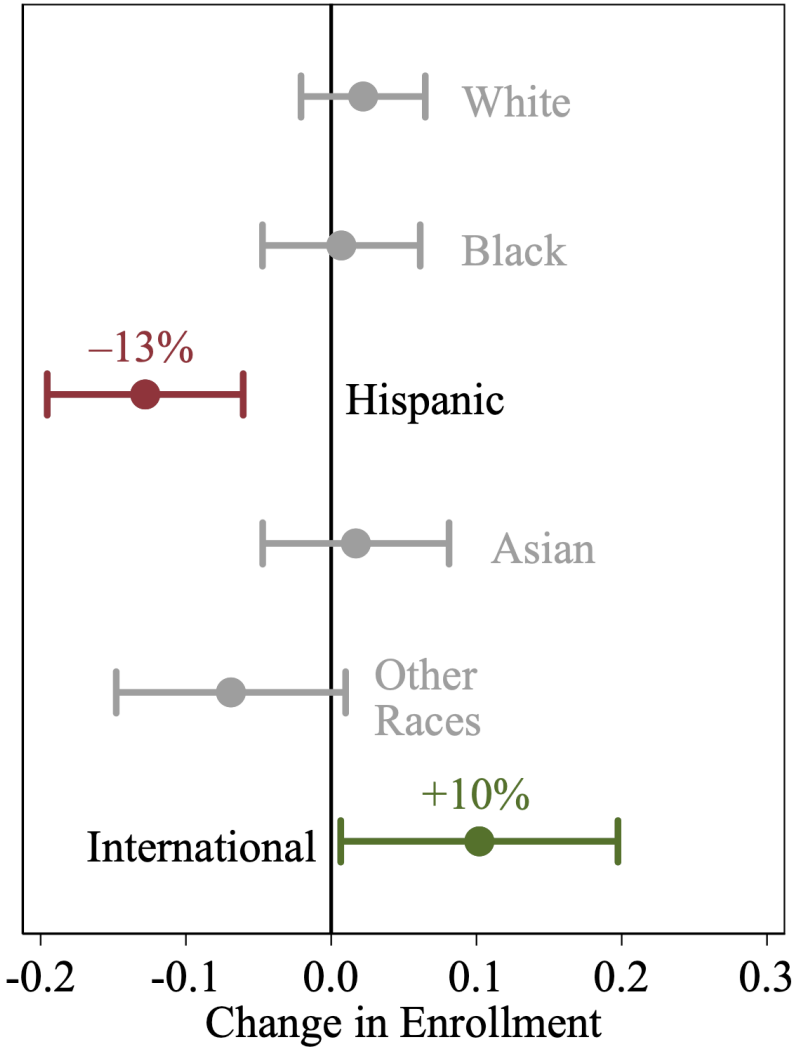

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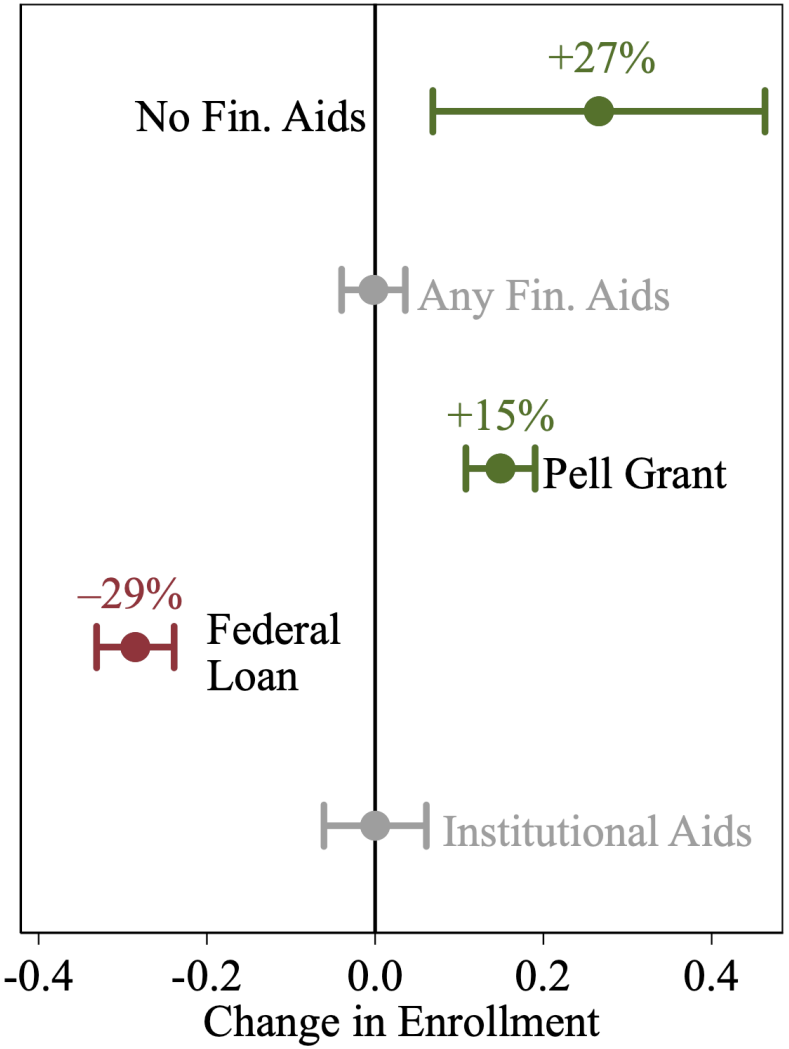

▸ Regression Estimates

Conclusion

Conclusion

- **Tax Avoidance:** Colleges opt to **increase enrollment** rather than ~~reduce assets~~
  - While creating tax losses, it prompts colleges to provide more public goods (education opportunities)
- **Tax Shifting:** Colleges opt to **increase tuition** rather than ~~cut spending~~
  - Tax revenue slightly excess the negative consequence
  - Reduces college access for Hispanic and middle-low-income students
- Policy Implication
  - The society might bear the cost of nonprofit taxation, but the government can redistribute tax revenue to those affected
  - The government can design the tax policy in ways that incentivize nonprofits to respond positively

Research Interest and Agenda

Ongoing and Future Research Agenda

1. Tax Policy (Income Tax & Property Tax)
2. Impact of Government Funding on Socioeconomic Development
3. Administrative Process in Government Funding/Contracting

Ongoing and Future Research Agenda

1. **Tax Policy (Income Tax & Property Tax)**
   - Colleges' responses to capital investment tax (Job Market Paper)
   - Impact of property tax on housing price and wealth distribution (Dissertation Chapter)
   - Impact of property tax on rental price (Future Research Agenda)
   - Nonprofits and private foundations' responses to taxation (Future Research Agenda)
2. Impact of Government Funding (Public Economics)
3. Administrative Process in Government Funding/Contracting

Ongoing and Future Research Agenda

1. Tax Policy (Income Tax & Property Tax)
2. **Impact of Government Funding (Public Economics)**
   - Impact of cash-transfer on fertility and household investment in housing and education (R&R at *Journal of Labor Economics*)
   - Impact of government contracting with small business (Works in Progress)
   - Impact of priority contracting to sheltered workshops and disability organizations (Future Research Agenda)
3. Administrative Process in Government Funding/Contracting

Ongoing and Future Research Agenda

1. Tax Policy (Income Tax & Property Tax)
2. Impact of Government Funding (Public Economics)
3. **Administrative Process in Government Funding/Contracting**
   - Impact of verification process in government funding on aid receipt and college enrollment (Published in *Economics of Education*)
   - Impact of government contracting process on bid participation and outcomes (Works in Progress)
   - Impact of reimbursement process of R&D funding on resource distribution and performance (Future Research Agenda)

Thank You!

Yung-Yu Tsai

University of Missouri

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Slides:

https://yungyutsai.github.io/files/JobTalk_NCCU.pdf

Main Presentation
- Introduction
- Policy Background
- Theoretical Framework
- Data & Sample
- Research Method
- Tax Avoidance
- Tax Shifting
- Student Composition
- Conclusion

Background
- Case Choice
- Asset Composition
- Wealth Inequality
- List of Affected Colleges
- Policy Timeline
- Estimated Burden
- Related Proposals
- Nonprofit Taxation

Literature
- Nonprofit Tax
- Higher Ed Literature
- Submerged State
- Instutionalism

Measurements
- Assets
- Student Enrollment
- Investment income

Methods
- DID
- DDD
- SCM

Robustness Checks
- Restricted to Selective Colleges
- DDD
- SCM

Additional Results
- Student Enrollment
- Assets
- Spending
- Tuition & Charges
- Race/Ethnicity
- Financial Aids
- Income Groups
- Cost-benefit Analysis
- Bunching Analysis

Research Agenda

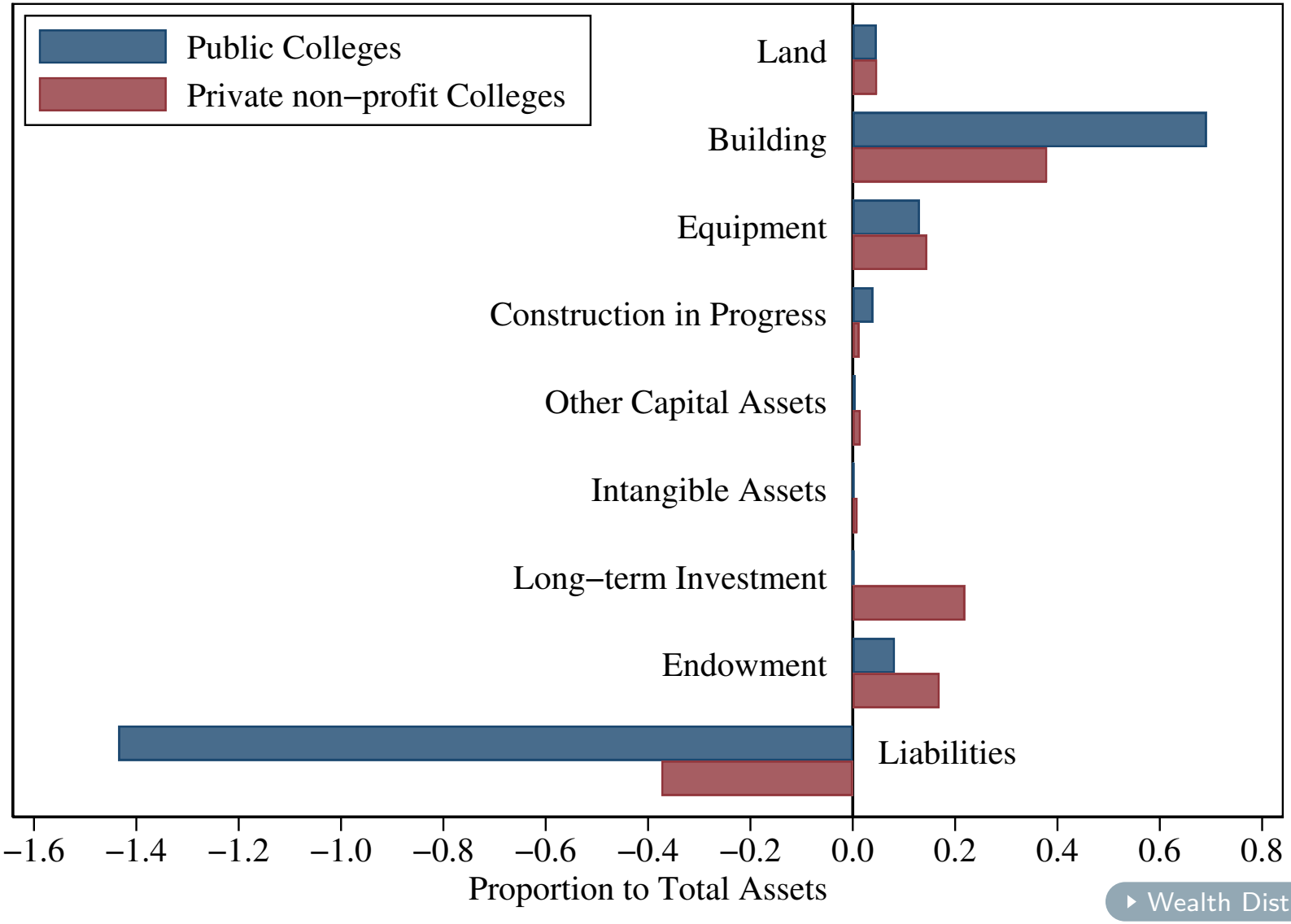
Teaching Interest

Why is This Case Suitable?

1. Wealth inequality challenges the justification for nonprofit tax exemptions
   - Investment income tax (or any asset-related tax) is a primary consideration for taxing nonprofits
2. Higher education is a significant sector of nonprofits
   - The wealthiest organizations
   - The second-highest revenue and expenditure, only surpassed by hospitals
   - Enjoys the largest share of tax exemptions
3. The specific tax threshold design in this policy allows colleges to respond by changing enrollment or assets
   - Offers an opportunity to examine whether nonprofits, when given a choice, respond in alignment with **self-interest** or **societal benefits**

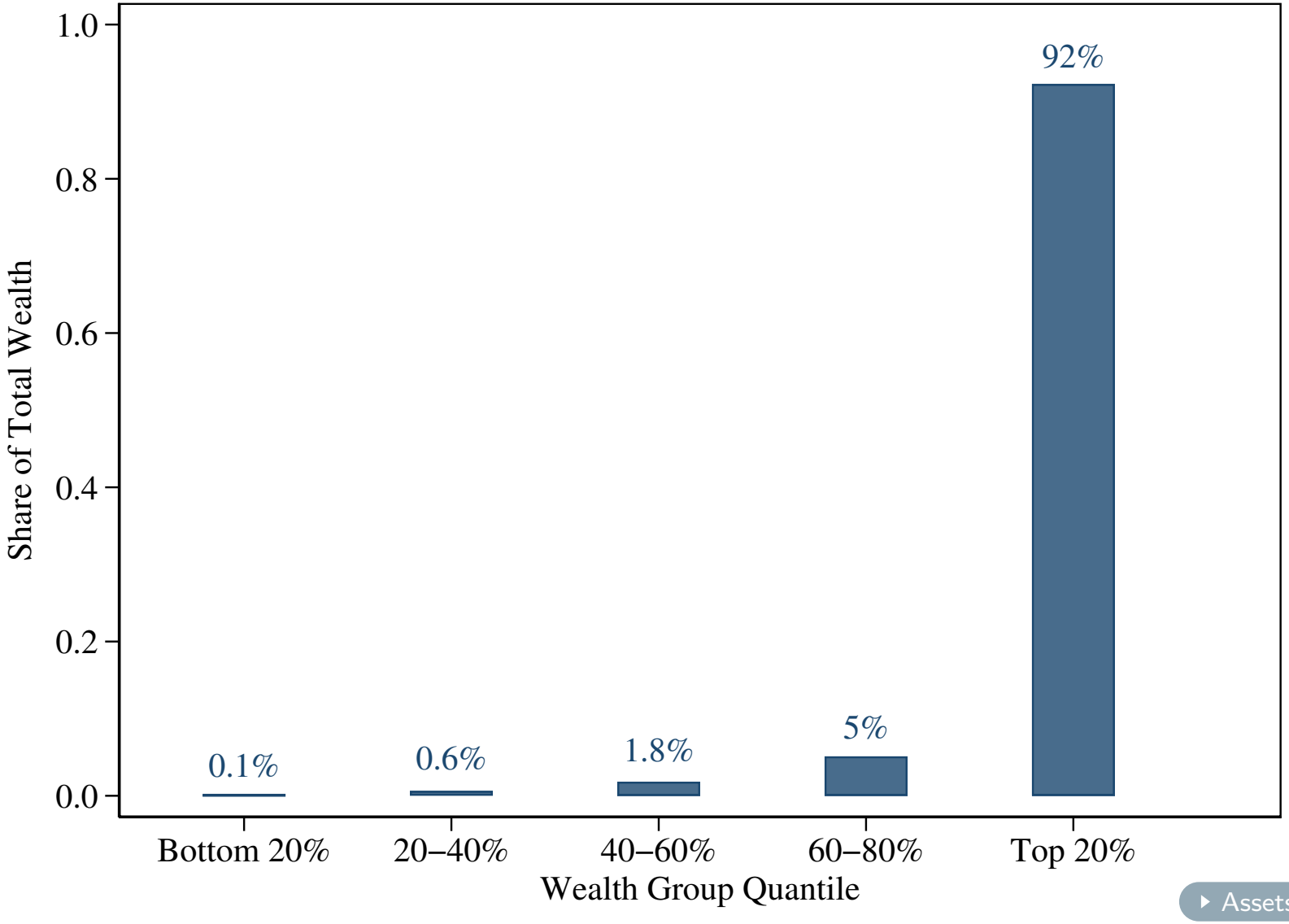
▸ Policy Background

Asset Composition



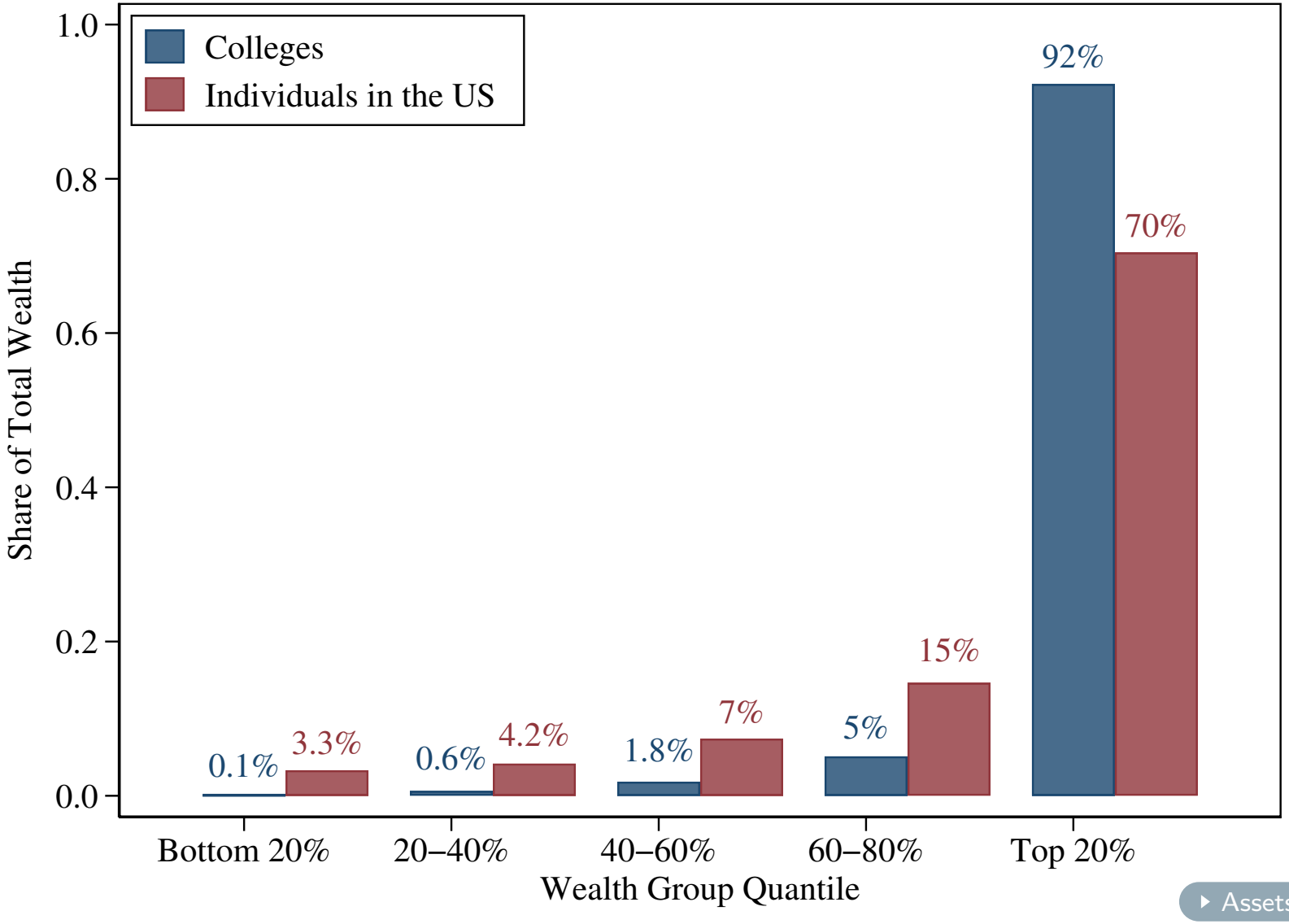
▸ Wealth Distribution

Inequality in Wealth Distribution in Higher Education



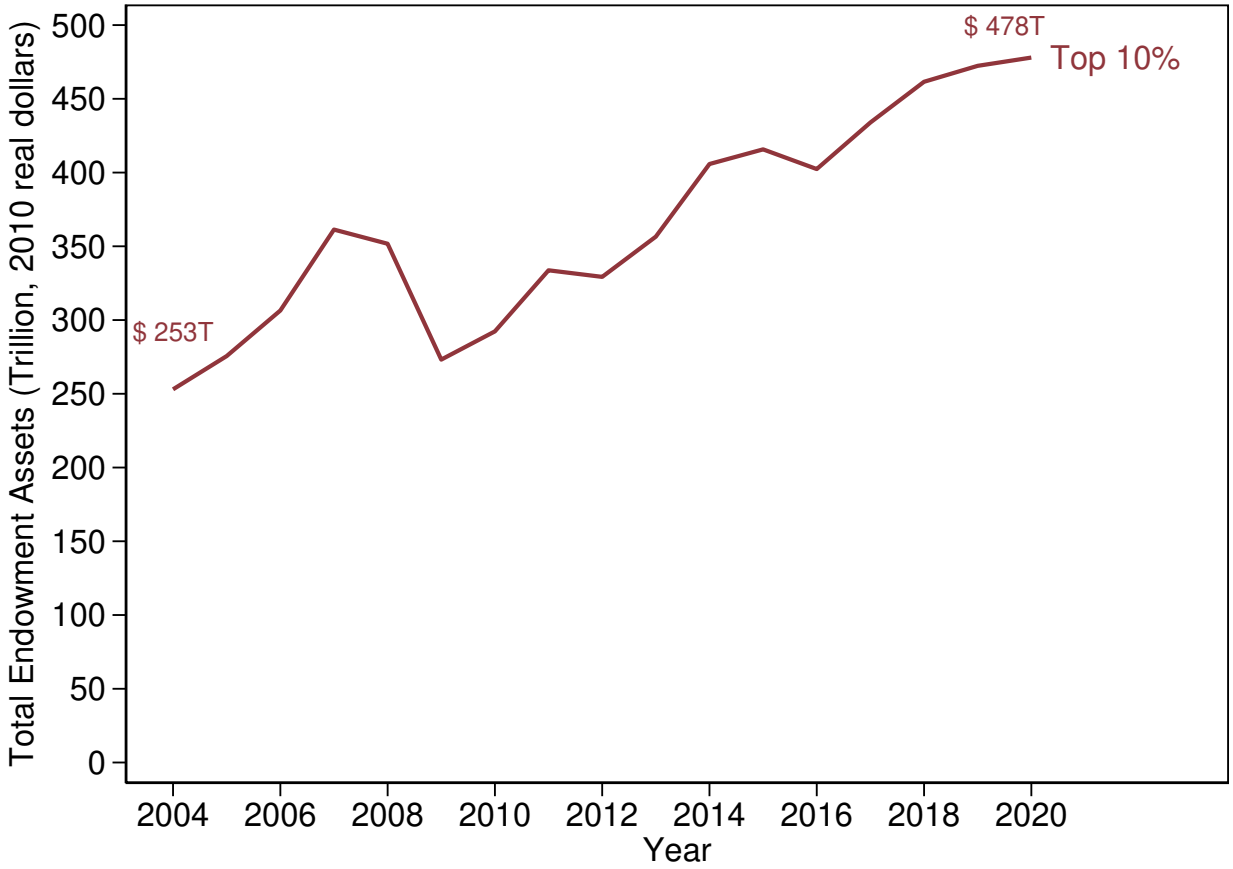
Assets Composition

Inequality in Wealth Distribution in Higher Education



Assets Composition

Inequality in Wealth Distribution Has Grown Overtime



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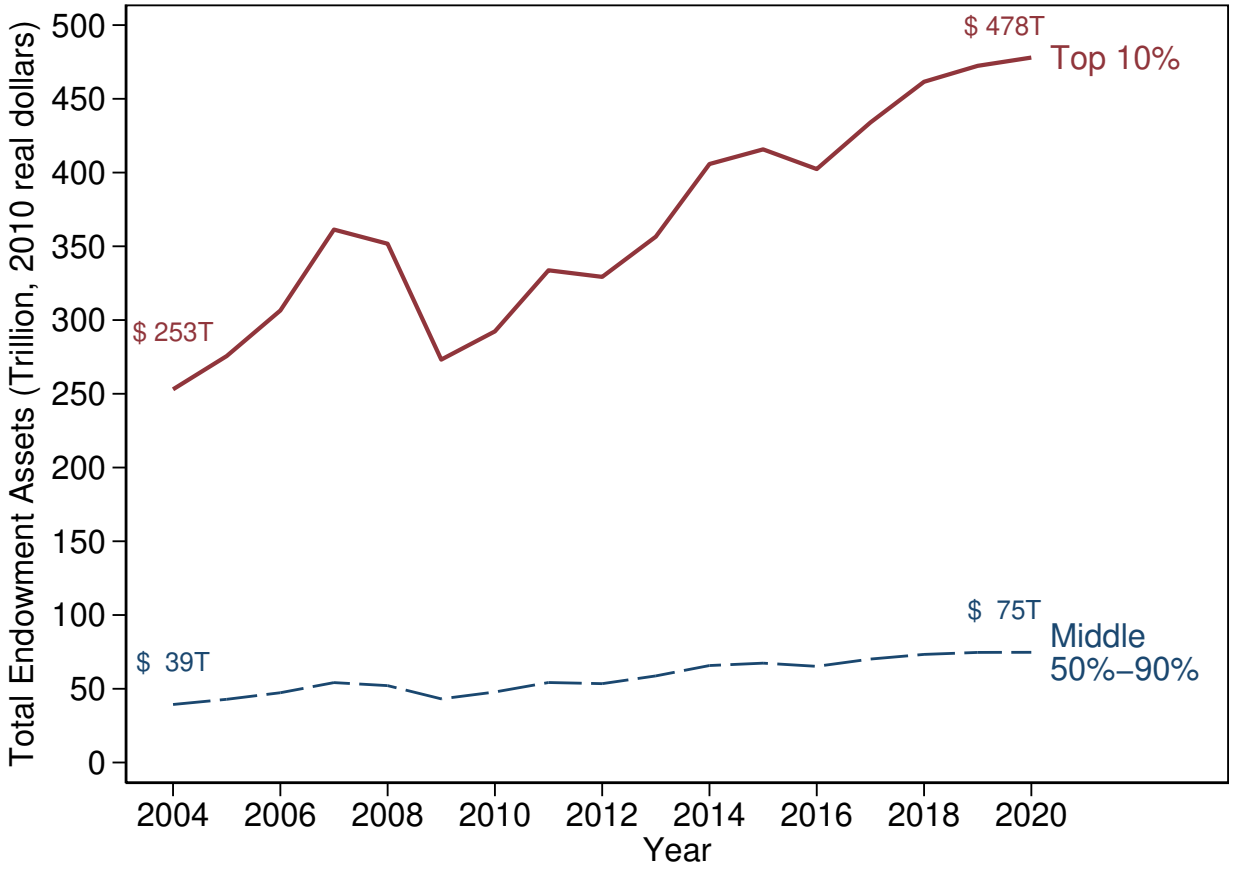

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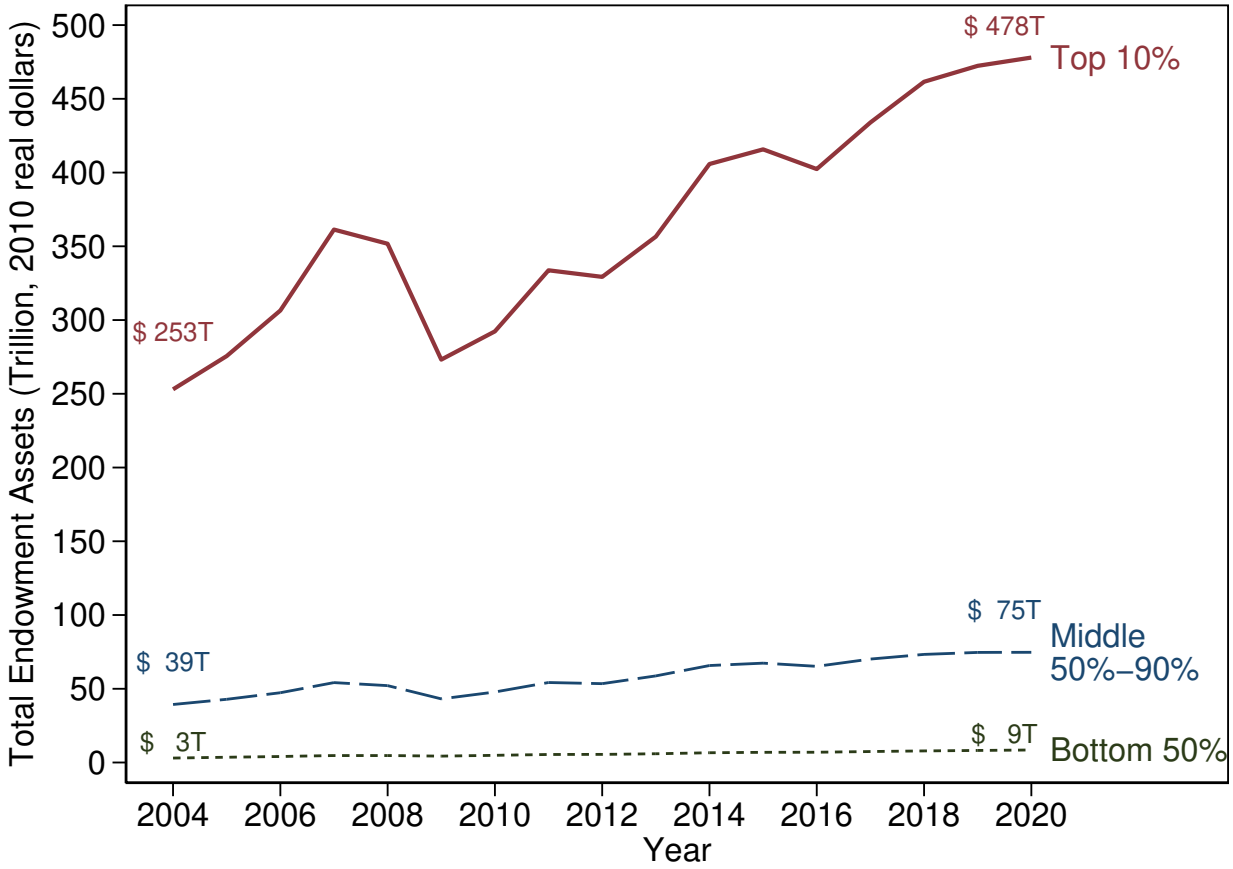


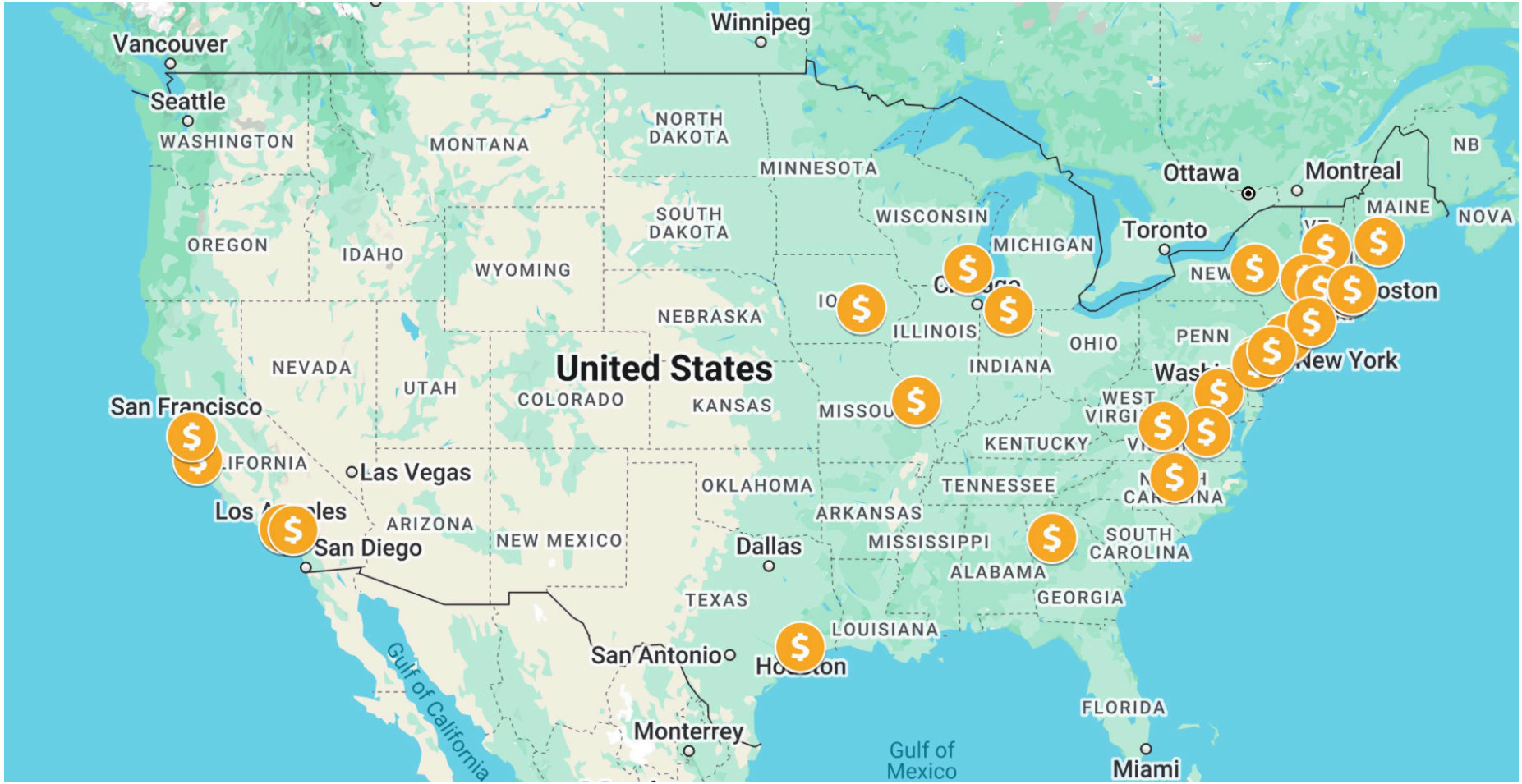
List of Affected Colleges

Research Universities	Master Colleges	Liberal Arts	Specialized
CalTech**	Middlebury**	Amherst**	Baylor College†
Dartmouth**	Trinity*	Bowdoin**	Wisconsin†
Duke**		Bryn Mawr**	Juilliard School†
Emory**		Claremont McKenna**	Cooper Union**
Harvard**		Grinnell*	
MIT**		Hamilton**	
Princeton**		Pomona**	
Rice**		Smith*	
Stanford**		Swarthmore**	
U of Notre Dame**		U of Richmond**	
U Pennsylvania**		Washington & Lee**	
WashU St Louis**		Wellesley**	
Yale**		Williams**	

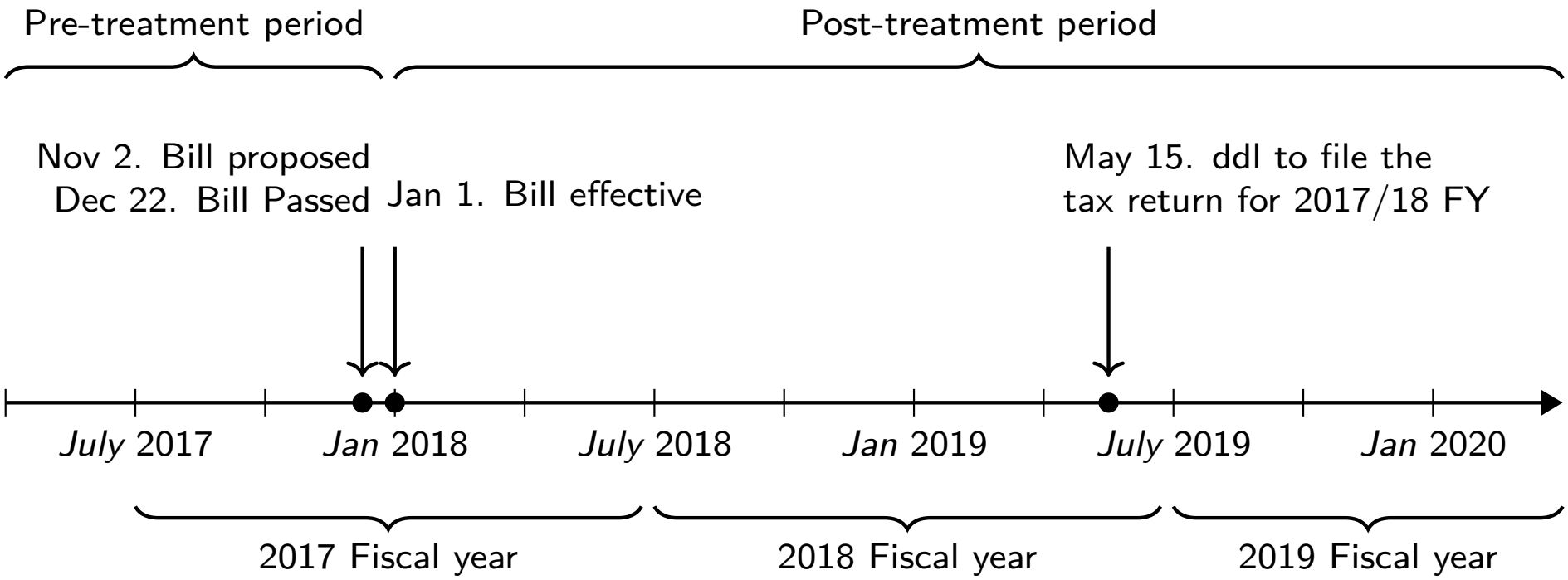
Barron's Ranking: **Most competitive, *Highly competitive, †Special

Policy Background

Map of Affected Colleges



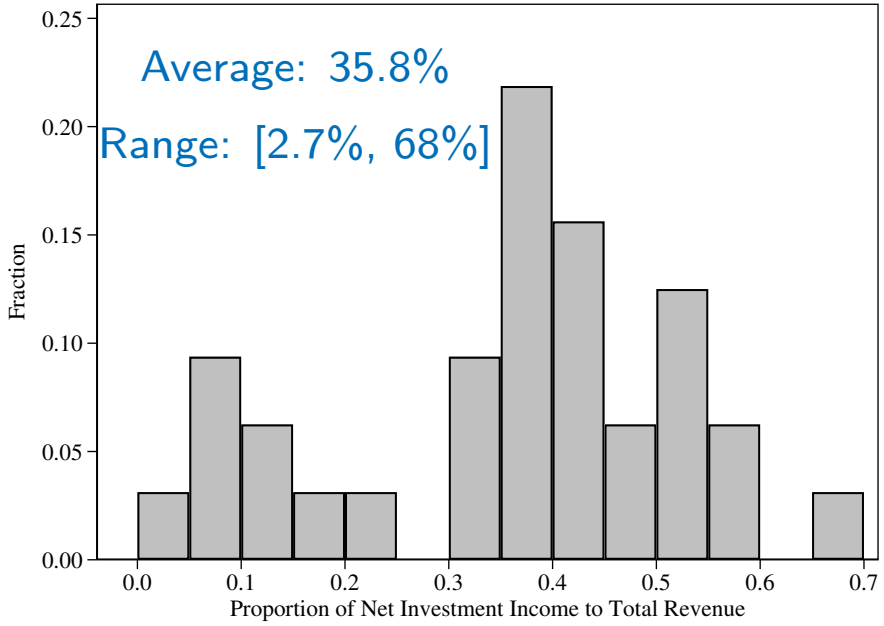
Policy Timeline



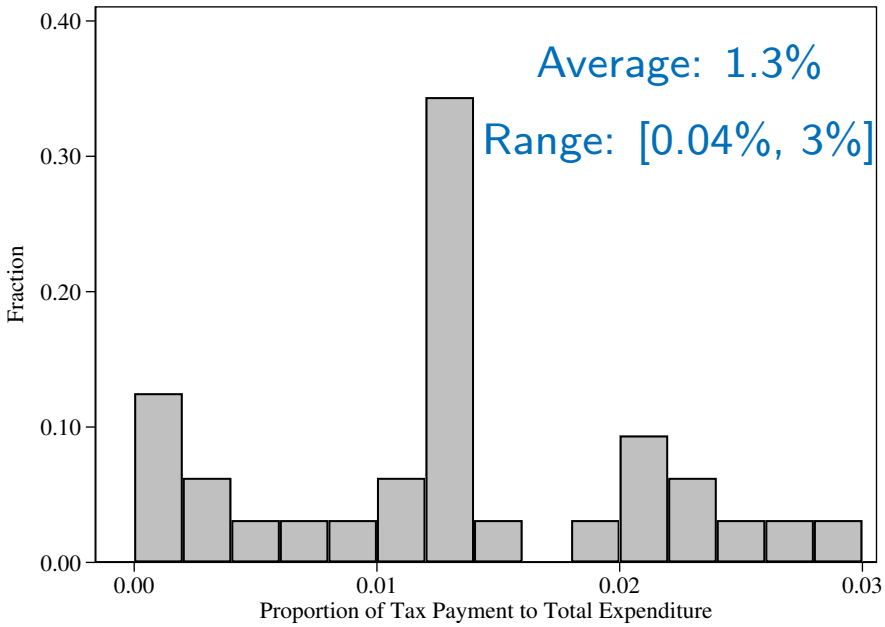
- Timeline of the TCJA
  - November 2, 2017: Proposed to the House
    - Targeting colleges with more than $100,000 assets per student
  - November 27, 2017: Sent to the Senate
    - Targeting colleges with more than $250,000 assets per student
  - December 20, 2017: Passed by the Senate
    - Targeting colleges with more than $500,000 assets per student

Estimated Tax Burden

$$\frac{\textit{Investment Income}}{\textit{Total Revenue}}$$



$$\frac{\textit{Tax Payment}}{\textit{Total Expenditure}}$$



Related Proposals in the Congress

- **Trump** proposes taxing nonprofit colleges' endowment to fund the American Academy
- **Bill S.3514**: Increasing the tax rate to 35% for colleges with endowments above $10 billion (affecting around 12 institutions) — James David Vance (vice president elected)
- **H.R.8883**: Suggests a 10% rate for colleges with per-student endowment assets above $250,000 (affecting over 150 institutions) — Jim Banks
- **Bill S.3465**: Proposes a one-time 6% tax on total endowment assets above $9 billion (affecting around 15 institutions) — Tom Cotton

Nonprofits Taxation Initiative

- Governments at various levels have been considering taxing nonprofits
  - Many local governments have started requesting nonprofits to pay property taxes (Fan et al., 2016)
  - Federal and state governments have begun reviewing the tax-exempt status of some museums and considering taxes on their profit-seeking or tourism-related activities (Halperin, 2015; Fobes, 2016)
  - The federal government has started taxing some colleges on their investment income and eliminated the charitable giving deduction for season tickets for sports (Kisska-Schulze, 2019; Seltzer, 2020)
  - Some legislators have proposed bills to tax nonprofit hospitals (Muoio, 2023). Some state governments have also begun reviewing the tax-exempt status of nonprofit hospitals (Miller & Hawryluk, 2023)

Literature: Nonprofit Tax Avoidance

- Do nonprofits engage in tax avoidance?
  - Yes (Sansing & Yetman, 2006; Omer & Yetman, 2007; Schmidt, 2007; St. Clair, 2016; Marx, 2018)

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- Do they respond by **increasing** or **reducing** their service level?
  - The policy context investigated by previous studies usually only provides nonprofits with one direction to respond
    - Nonprofits need to be exempted from reporting/auditing requirements by becoming **smaller** (St. Clair, 2016; Marx, 2018)
    - Nonprofits merely play some "trick" on the financial reports to avoid unrelated business income tax, **without any real change** in production level (Hofmann, 2007; Omer & Yetman, 2007)
    - Private foundations need to qualify for lower tax rates by spending **more** (Sansing & Yetman, 2006)

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$$\frac{Assets}{Enrollment} \geq 500,000$$

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  - Reduce asset values (become **smaller**) $\downarrow \frac{Assets}{Enrollment} \geq 500,000$

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- For the context examined in this study, colleges can choose:
  - Reduce asset values (become **smaller**) $\downarrow$
  - Increase enrollment (become **larger**) $\uparrow$

$$\frac{Assets}{Enrollment} \geq 500,000$$

Nonprofit Tax Shifting

- Do nonprofits engage in tax shifting?
  - They do **not** do so by cutting spending or service level
    - Nonprofit hospitals do not respond to tax exemption by changing community service level (Herring et al., 2018)
    - Nonprofits only have minimum to null responses to property tax by changing service level (Grimm Jr, 1999; Fei et al., 2016)
    - Private foundations do not respond to excise tax by cutting spending (Sansing & Yetman, 2006)

Nonprofit Tax Shifting

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    - Private foundations do not respond to excise tax by cutting spending (Sansing & Yetman, 2006)
  - Do they try to do so by raising the service charges or gathering more revenue with other means?
    - Unknown

Colleges Response to Financial Schock

- Negative capital market shocks (**temporary**)
  - Cutting spending (Brown et al., 2014; Rosen & Sappington, 2019; Bulman, 2022)
  - No change in tuition (Bulman, 2022)
- Government funding cut (**long-term, visible**)
  - Cutting spending (Mumper & Freeman, 2005; Altundemir, 2012)
  - Increasing tuition and fees (Filippakou et al., 2019; Civera et al., 2021)
- How about cutting in **invisible** & **strctured** tax benefit?

Submerged State

- A collection of government policies that deliver benefits through **indirect** means rather than **direct** government programs (Mettler, 2011)
  - Tax expenditure
  - Subsidies through private market
  - Contracting out
- Less visible to the public
- Undermine public trust and accountability

Perspectives from New Instutionalism

- **Rational Choice Institutionalism**
  - Colleges would choose the approach that best aligns with their self-interest, minimizing costs and maximizing benefits
  - They might choose to **cut** resource investments and spending, and/or **increase** tuition
- **Sociological Institutionalism**
  - Colleges' behaviors would be shaped by social norms, institutional mission, and interactions with other colleges
    - Nonprofits tend to maximize their public service output instead of self-interest (Brooks, 2005; Chang & Jacobson, 2011)
    - These colleges need to compete with other elite colleges for their academic standing (Bulman, 2022)
  - They might choose to **expand** student enrollment and be more cautious about cutting spending

Theory Implications

- Implications for the Submerged State
  - Taxing nonprofits disproportionately impacts underrepresented groups
    $\rightarrow$ Tax exemption might benefit these groups
  - No direct connection between tax payment and college spending
    $\rightarrow$ Tax exemption does not directly boost public service provision
  - Invisible tax exemption vs. visible government revenue (and associated spending)
- Implications for New Institutionalism
  - Nonprofit college responses align more with **Sociological Institutionalism** than **Rational Choice Institutionalism**
  - Institutional behaviors are shaped by norms, mission, and interactions with other actors
    $\rightarrow$ Government can leverage this to design policies that guide organizations to respond positively

Measurements: Assets

- **IRS' definition**: The aggregate **fair market value** of assets at the end of the preceding taxable year (other than assets used directly in carrying out the institution's exempt purpose)
  - **Fair market value**: The regulations at 53.4942(a)-2(c) allow the organization to use any reasonable method, but require that they use the chosen method consistently
  - **Related Organizations**: Colleges have to take into account assets held by "related organizations"
- **Definition in dataset**: Value of endowment assets at the end of the fiscal year. Consists of gross investments of endowment funds, term endowment funds, and funds functioning as endowments for the institution and any of its foundations and other affiliated organizations.

Measurements: Student Enrollment

- **IRS' definition**: Daily average number of full-time equivalent (FTE) students
  - **Full-time equivalent**: The school should base its counts on the daily average number of full-time students attending the institution, with part-time students being taken into account on a full-time equivalent basis
- **Definition in dataset**:
  - **Full-time student**: Undergraduate: A student enrolled for 12 or more semester (quarter) credits. Graduate: A student enrolled for 9 or more semester (quarter) credits or a student involved in thesis or dissertation preparation
  - **Full-time equivalent**: Full-time students $+ \frac{1}{3} \times$ Part-time students
  - **Reporting Timing**: Enrollment as of October 15 or the official fall reporting date of the institution

Measurements: Net Investment Income

- **IRS' definition**: Net investment income = (gross investment income + capital gain net income) – allowable deductions
  - **Gross Investment Income**: Interest, dividends, rents, payments on securities loans, royalties, and similar sources
  - **Allowable deductions** Ordinary and necessary expenses paid/ incurred for production or collection of gross investment income, or management, conservation, or maintenance of property held for the production of such income
- **Definition in dataset**: Investment return includes the following:
  - All investment income (i.e., interest, dividends, rents and royalties)
  - Gains and losses (realized and unrealized) from holding investments
  - Student loan interest
  - Amounts distributed from irrevocable trusts held by others

Form 990 Part V and Form 4720, Schedule O

Form 990 (2023) Page **5**

Part V **Statements Regarding Other IRS Filings and Tax Compliance** *(continued)*

			Yes	No
14a	Did the organization receive any payments for indoor tanning services during the tax year?	**14a**		
b	If "Yes," has it filed a Form 720 to report these payments? *If "No," provide an explanation on Schedule O*	**14b**		
15	Is the organization subject to the section 4960 tax on payment(s) of more than $1,000,000 in remuneration or excess parachute payment(s) during the year?	**15**		
	If "Yes," see the instructions and file Form 4720, Schedule N.			
16	Is the organization an educational institution subject to the section 4968 excise tax on net investment income?	**16**		
	If "Yes," complete Form 4720, Schedule O.			
17	**Section 501(c)(21) organizations.** Did the trust, or any disqualified or other person, engage in any activities that would result in the imposition of an excise tax under section 4951, 4952, or 4953?	**17**		
	If "Yes," complete Form 6069.			

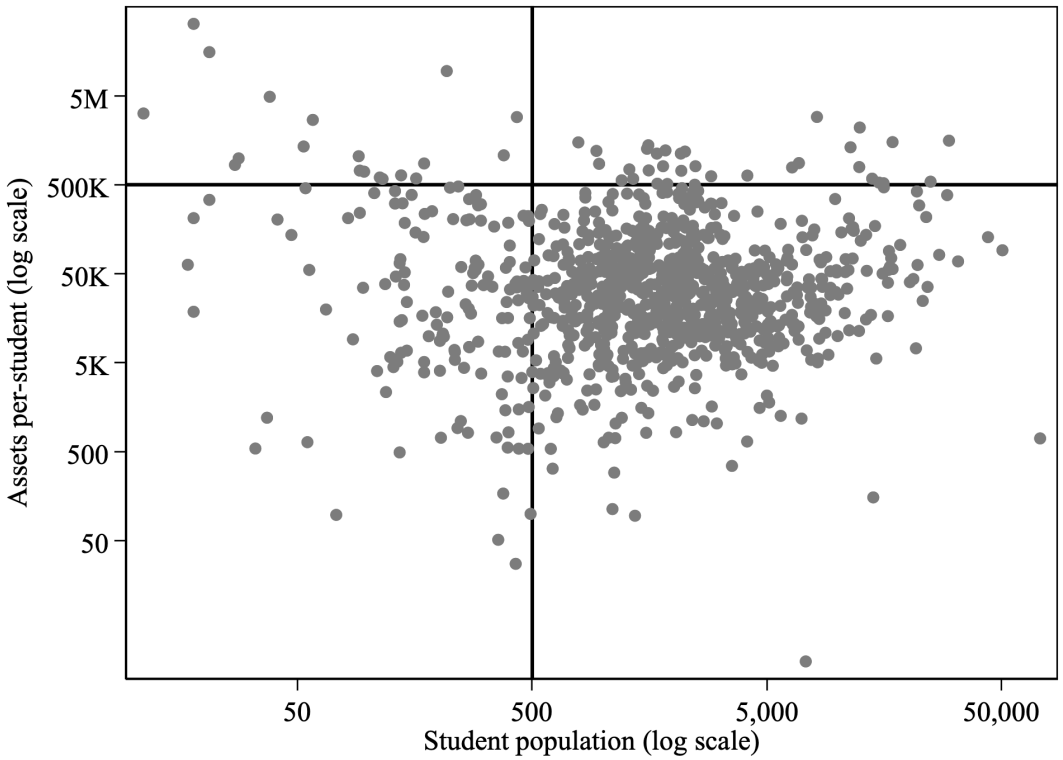
Form **990** (2023)

SCHEDULE O—Excise Tax on Net Investment Income of Private Colleges and Universities (Section 4968)

		(a) Name	**(b)** EIN	**(c)** Gross investment income (See instructions.)	**(d)** Capital gain net income	**(e)** Administrative expenses allocable to income included in cols. (c) and (d)	**(f)** Net investment income (See instructions.)
1	Filing Organization						
2	Related Organization						
3	Related Organization						
4	Related Organization						
5	Total from attachment, if necessary						
6	**Total**						
7	Excise Tax on Net Investment Income. Enter 1.4% of the amount in 6(f) here and on Part I, line 14						

Form **4720** (2023)

Tax Avoidance: Treatment and Comparison Groups



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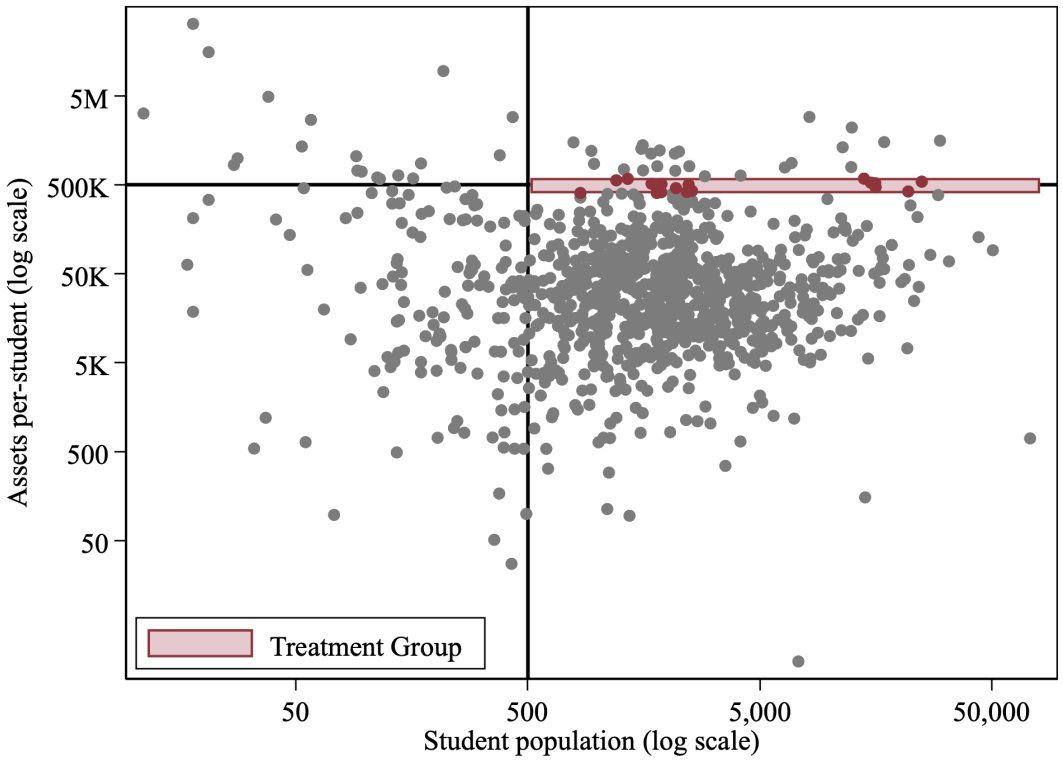
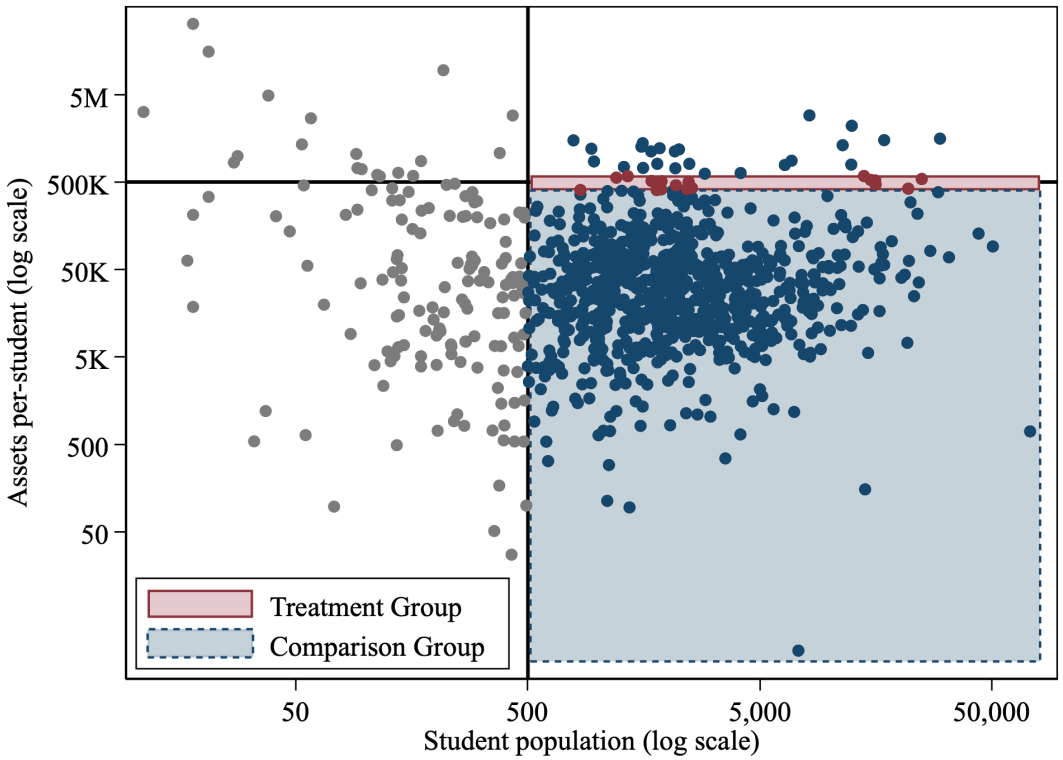


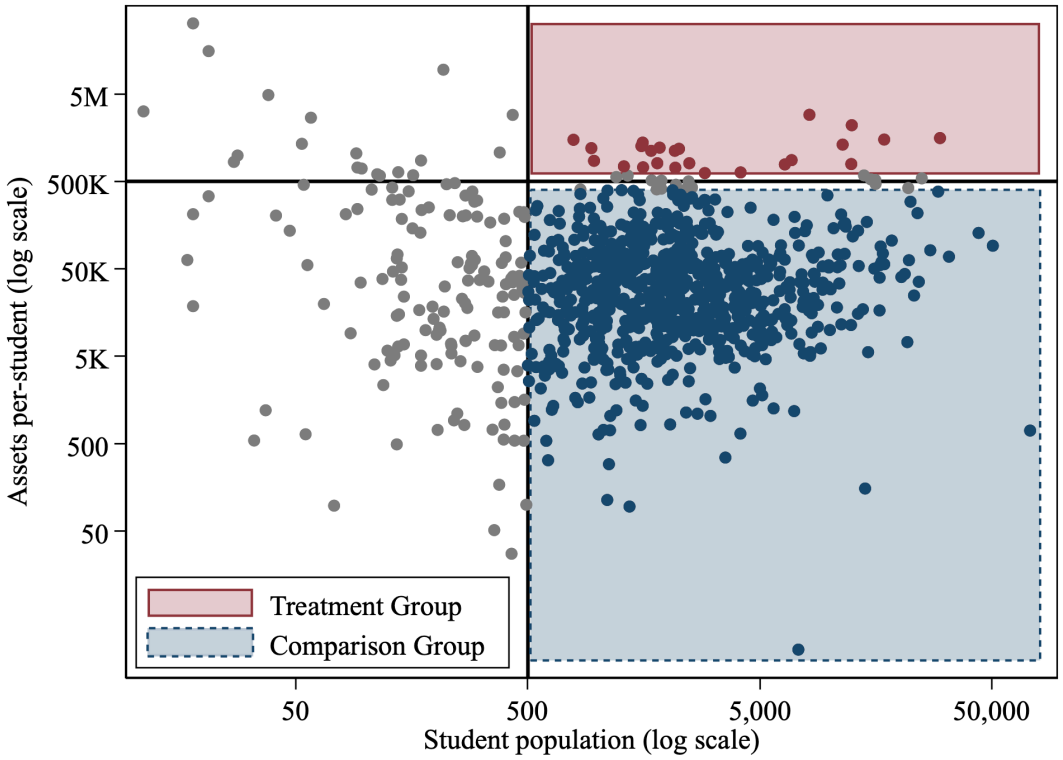
- **Treatment Group**: Colleges around the tax threshold (with assets per student between \$400,000–\$600,000)
  - **Just above the threshold**: They need only reduce their assets or increase enrollment by 0.05–17% to remain tax-exempt
  - **Just below the threshold**: They would face taxation if their assets grow by 7–24%, but their average annual asset growth rate is 3–6%

Tax Avoidance: Treatment and Comparison Groups



- **Comparison Group**: Colleges far **below** the tax threshold (with assets per student less than $400,000)

Tax Shifting: Treatment and Comparison Groups



- **Treatment Group**: Colleges subject to the tax (with assets per student above $600,000)
- **Comparison Group**: Colleges unaffected by the tax (with assets per student below $400,000)
- **Exclusion Group**: Colleges near the tax threshold (with incentives for tax avoidance)

Estimated Equations: Difference-in-Differences

$$Y_{it} = \beta_k Cutoff_i \times \sum_{k \neq 2016} \mathbf{Year}[t = k] + \theta_i + \delta_t \times X_i + \varepsilon_{it} \quad (3)$$

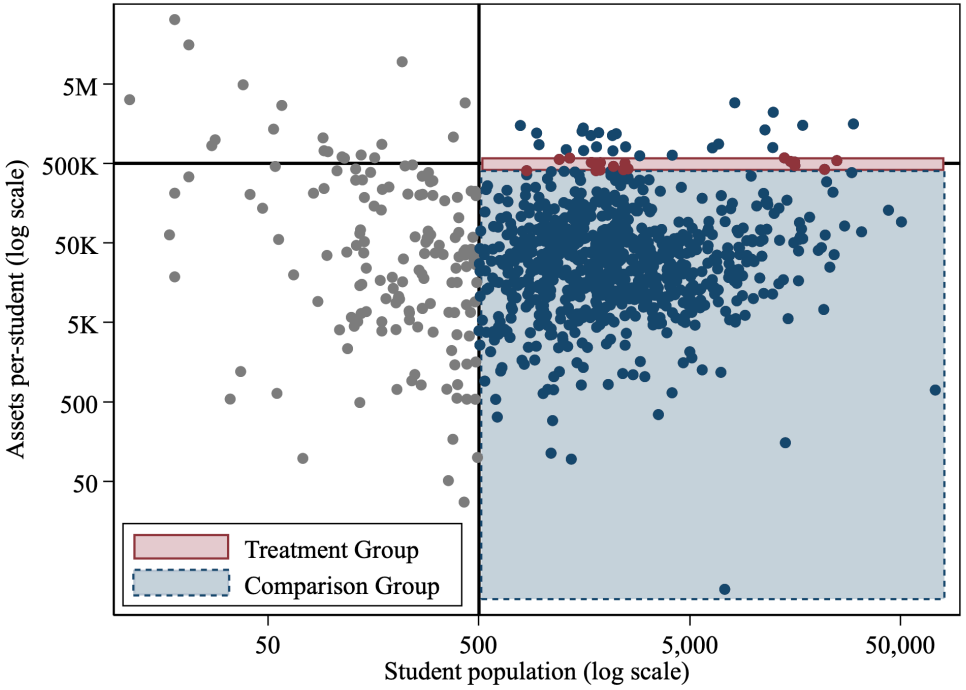
$$Y_{it} = \beta_k Wealthy_i \times \sum_{k \neq 2016} \mathbf{Year}[t = k] + \theta_i + \delta_t \times X_i + \varepsilon_{it} \quad (4)$$

- Y_{it}: Outcomes of college i in fiscal/academic year t
- $Cutoff_i$: Had assets per student between \$400,000 and \$600,000
- $Wealthy_i$: Had assets per student above \$600,000
- $\sum \mathbf{Year}[t = k]$ A series of year dummies
- θ_i: Institution fixed effect
- δ_t: Year fixed effect
- X_i: Time-invariant college characteristics: Carnegie categorization

Tax Avoidance: DID vs. DDD

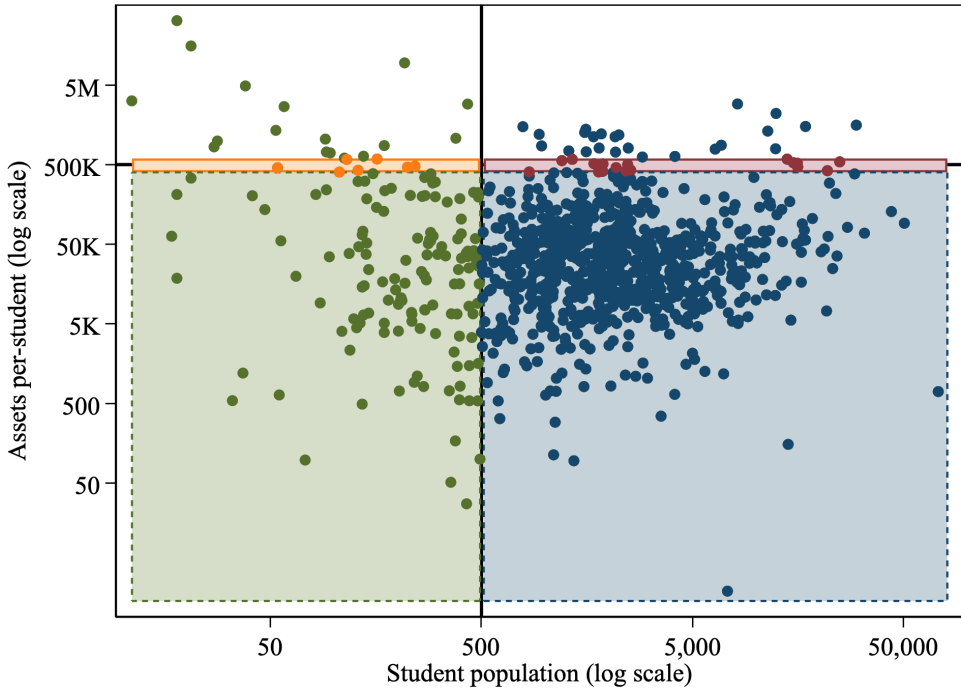
Difference-in-Differences

Around the Cutoff
vs. Far below the Cutoff



Triple-Difference

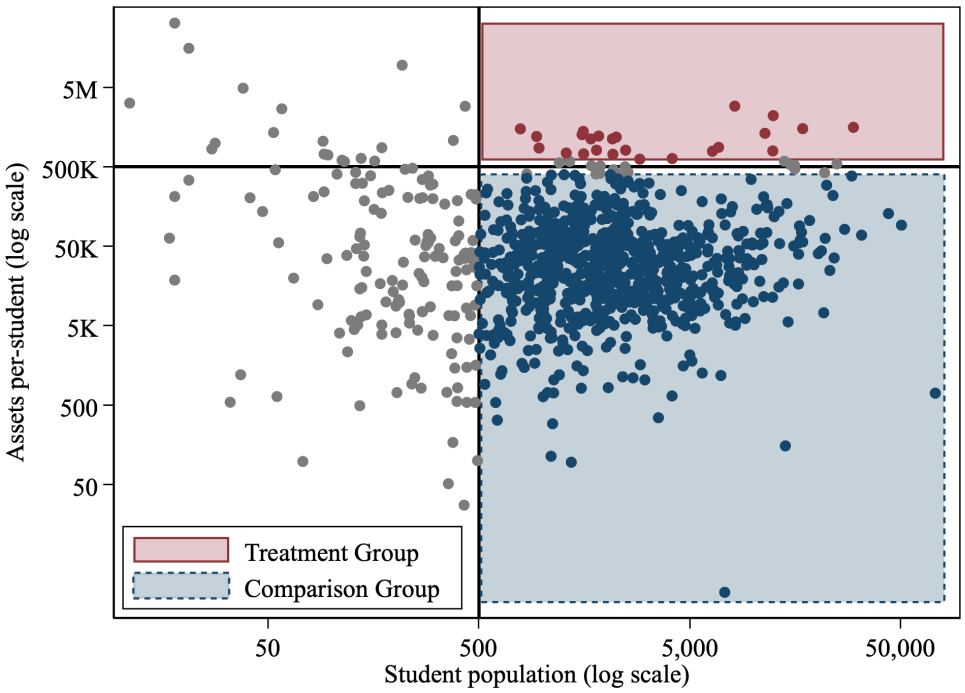
$(T_1 - C_1)$
vs. $(T_2 - C_2)$



Tax Shifting: DID vs. DDD

Difference-in-Differences

Above Cutoff
vs. Below the Cutoff



Triple-Difference

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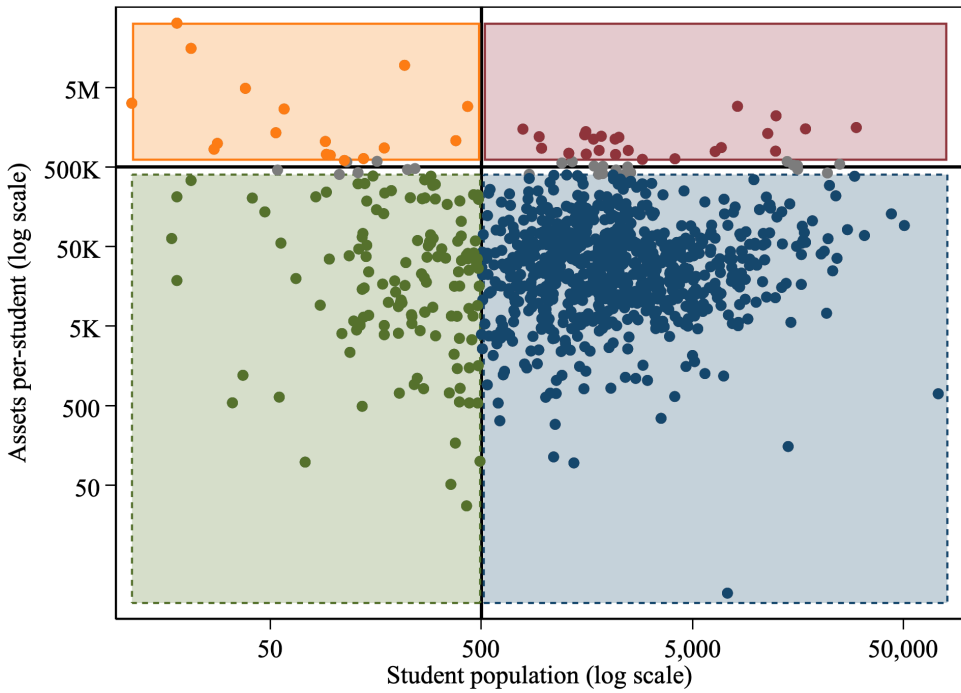


Tax Avoidance: DDD Equation

Difference-in-Differences

$$Y_{it} = \beta_k Cutoff_i \times \sum_{k \neq 2016} \textbf{Year}[t = k] + \theta_i + \delta_t \times X_i + \varepsilon_{it} \tag{5}$$

Triple-Difference

$$Y_{it} = \gamma_k Cutoff_i \times Large_i \times \sum_{k \neq 2016} \textbf{Year}[t = k] + \theta_i \tag{6}$$
$$+ Cutoff_i \times \delta_t + Large_i \times \zeta_t + \varepsilon_{it}$$

- Y_{it}: Outcomes of college i in fiscal/academic year t
- $Cutoff_i$: Had assets per student between \$400,000 and \$600,000 in 2016
- $Large_i$: Had number of total student above 500 in 2016

Tax Shifting: DDD Equation

Difference-in-Differences

$$Y_{it} = \beta_k Wealthy_i \times \sum_{k \neq 2016} \mathbf{Year}[t = k] + \theta_i + \delta_t \times X_i + \varepsilon_{it} \tag{7}$$

Triple-Difference

$$Y_{it} = \gamma_k Wealthy_i \times Large_i \times \sum_{k \neq 2016} \mathbf{Year}[t = k] + \theta_i \tag{8}$$
$$+ Wealthy_i \times \delta_t + Large_i \times \zeta_t + \varepsilon_{it}$$

- Y_{it}: Outcomes of college i in fiscal/academic year t
- $Wealthy_i$: Had assets per student above \$600,000 in 2016
- $Large_i$: Had number of total student above 500 in 2016

Illustration of DDD

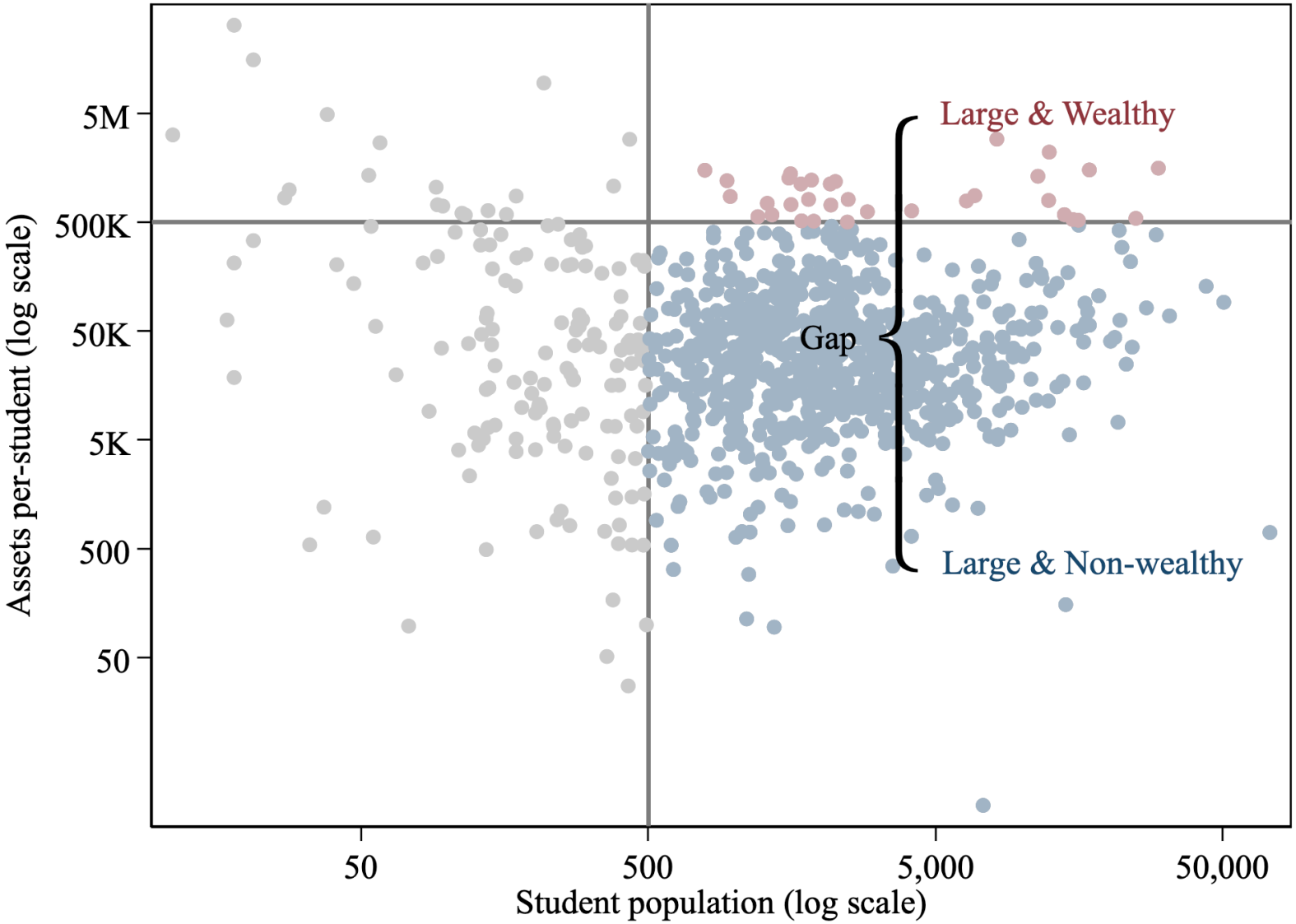


Illustration of DDD

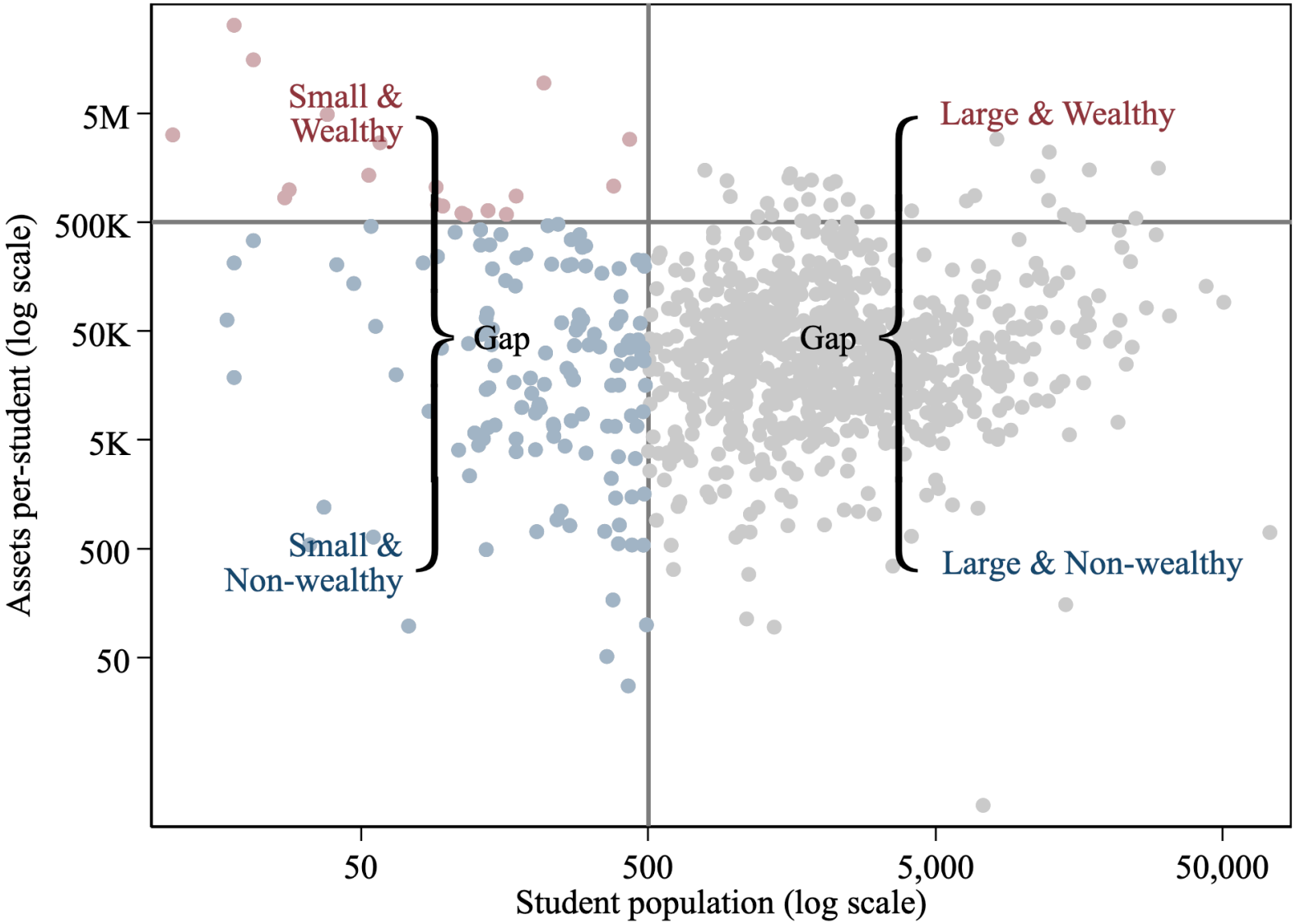


Illustration of DDD

Illustration of DDD: Trend in Total Spending

Large & Wealthy
vs. Large & Non-wealthy

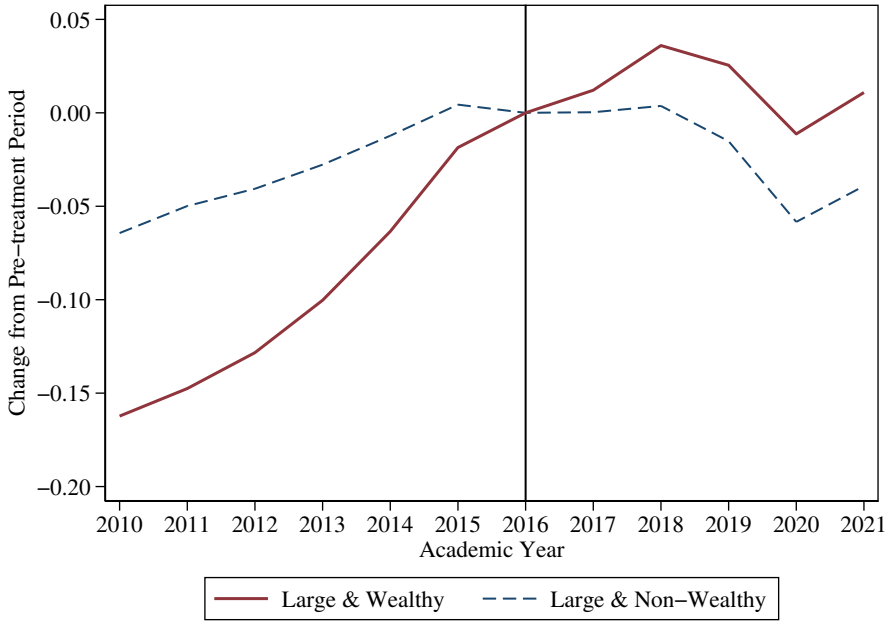
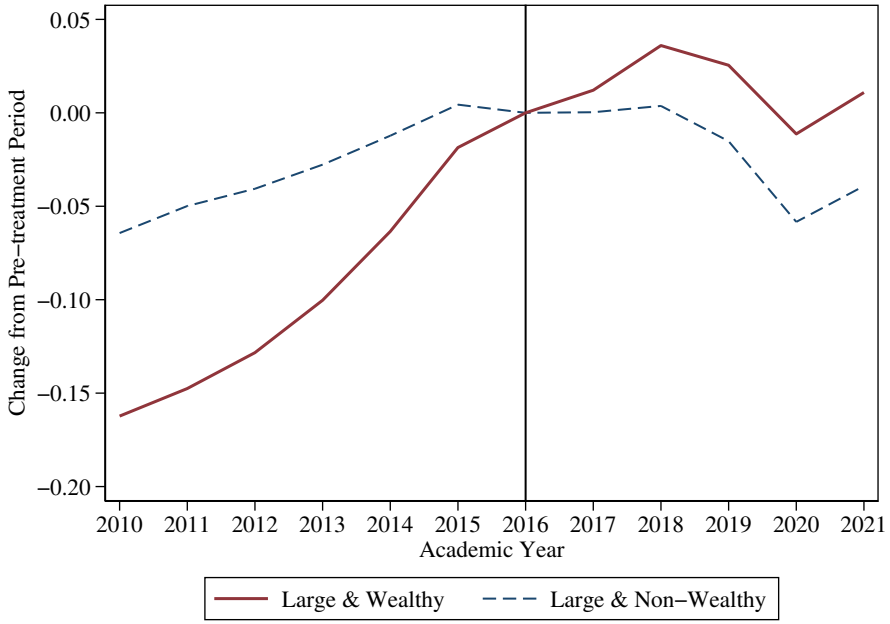


Illustration of DDD: Trend in Total Spending

Large & Wealthy
vs. Large & Non-wealthy



Small & Wealthy
vs. Small & Non-wealthy

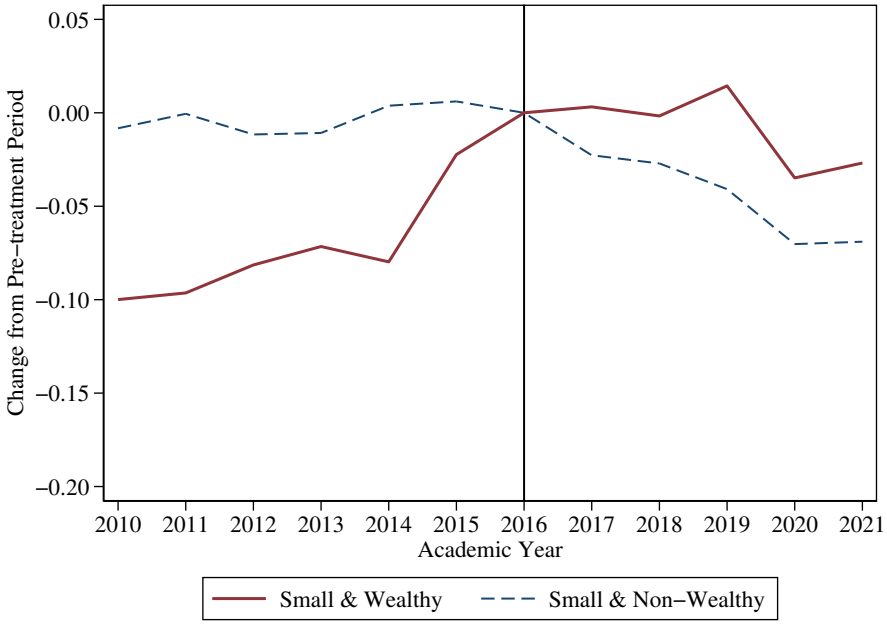
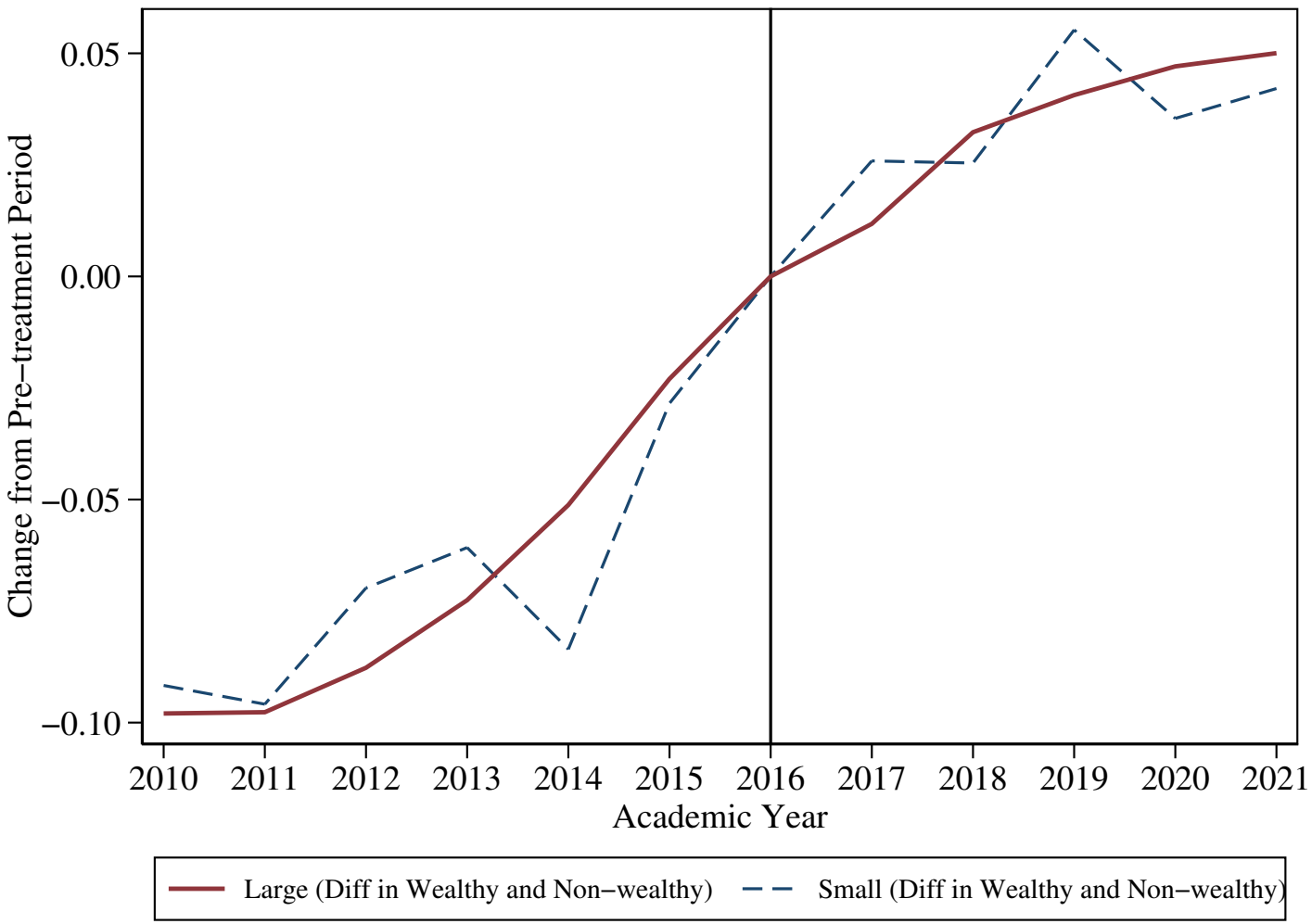


Illustration of DDD: Trend in Total Spending



Synthetic Control Method

$$\widehat{\beta_{it}} = (Y_{it} - Y_i) - \sum_{j=1}^{M} w_j^* (Y_{jt} - Y_j)$$

For example:

$$\begin{aligned} Harvard = {} & 0.45 \times University\ of\ Southern\ California \\ & + 0.27 \times New\ York\ University \\ & + 0.11 \times Brown\ University \\ & + 0.04 \times CMU + ... \end{aligned}$$

Tax Avoidance by Increasing Enrollment

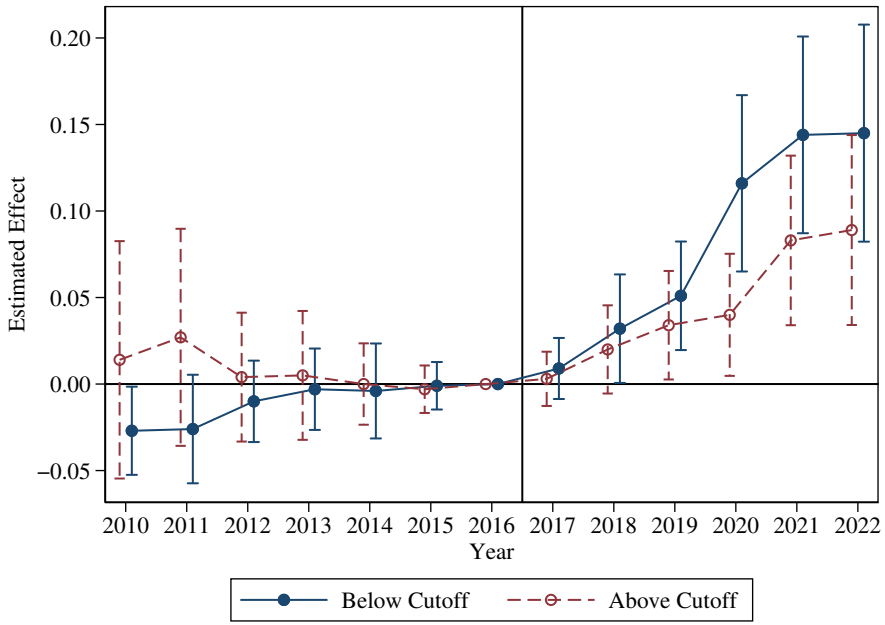
	(1)	(2)	(3)	(4)	(5)
	Log FTE	By Enrollment Status		By Student Level	
	Enrollment	Full-time	Part-time	Undergraduate	Graduate
Panel A: All Colleges					
Cutoff × *Post*	0.076***	0.077***	0.003	0.071***	–0.032
	(0.022)	(0.022)	(0.116)	(0.026)	(0.177)
Observations	9,997	9,997	9,997	9,997	9,997
Baseline Mean (Thousand)	6.915	6.617	0.894	3.774	3.141
Panel B: Colleges Below the Assets Threshold					
Cutoff × *Post*	0.107***	0.111***	0.057	0.107***	0.182
	(0.025)	(0.025)	(0.171)	(0.033)	(0.300)
Observations	9,880	9,880	9,880	9,880	9,880
Baseline Mean (Thousand)	5.578	5.288	0.870	3.242	2.336
Panel C: Colleges Above the Assets Threshold					
Cutoff × *Post*	0.046	0.046	–0.045	0.037	–0.225
	(0.031)	(0.031)	(0.145)	(0.035)	(0.153)
Observations	9,893	9,893	9,893	9,893	9,893
Baseline Mean (Thousand)	8.103	7.798	0.915	4.246	3.857

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

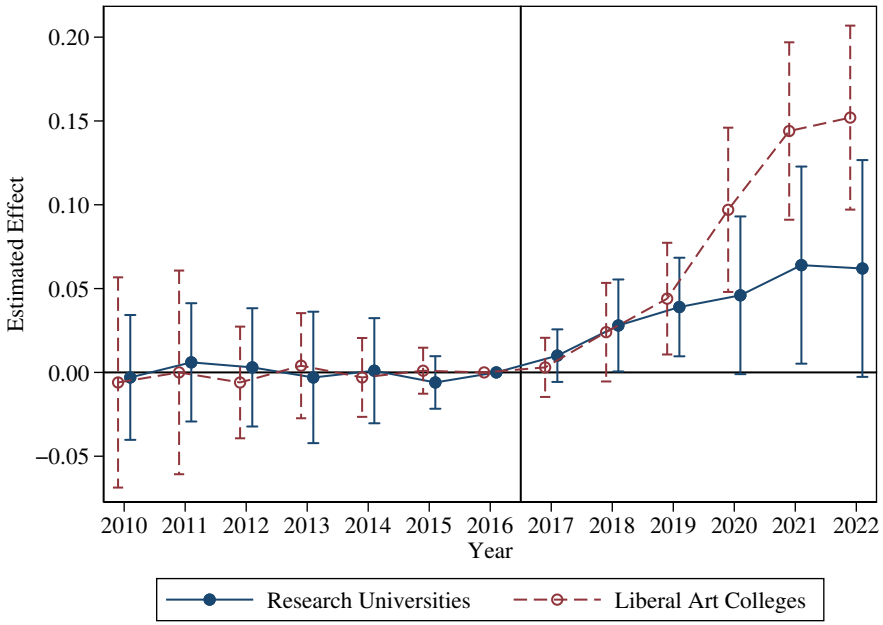
▸ Main Estimate

Tax Avoidance by Increasing Enrollment: Subgroup

By Tax Status



By Carnegie Categorization



Tax Avoidance by Reducing Assets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log Assets		By Restricted Status		By Category			
	Total	Per-student	Non-restricted	Restricted	Capital	Investment	Others	Liability
Panel A: All Colleges								
Cutoff × *Post*	0.043	–0.025	0.094	0.066**	0.075*	0.100**	–0.788	0.166*
	(0.039)	(0.038)	(0.251)	(0.032)	(0.040)	(0.047)	(0.826)	(0.091)
Observations	9,228	9,228	9,228	9,228	9,228	9,228	9,228	9,228
Baseline Mean (Million)	3,463	0.485	2,217	2,377	2,802	4,221	12	1,853
Panel B: Colleges Below the Assets Threshold								
Cutoff × *Post*	0.013	–0.084*	–0.074	0.074	0.067	0.044	–1.093	0.046
	(0.054)	(0.046)	(0.218)	(0.047)	(0.069)	(0.054)	(1.258)	(0.083)
Observations	9,120	9,120	9,120	9,120	9,120	9,120	9,120	9,120
Baseline Mean (Million)	2,432	0.426	1,247	1,805	1,639	2,845	22	1,167
Panel C: Colleges Above the Assets Threshold								
Cutoff × *Post*	0.070	0.029	0.249	0.057	0.084**	0.149**	–0.482	0.276*
	(0.050)	(0.050)	(0.318)	(0.037)	(0.036)	(0.066)	(0.958)	(0.142)
Observations	9,132	9,132	9,132	9,132	9,132	9,132	9,132	9,132
Baseline Mean (Million)	4,380	0.538	3,079	2,885	3,835	5,443	4	2,462

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

▸ Main Estimate

Tax Shifting Estimates by Expenditure Categories

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log Expenditure						
	Total	Instruction	Research	Public Service	Institution Support	Auxiliary Facilities	Institution Grant
Panel A: All Colleges							
Treat × *Post*	0.020	–0.002	0.005	0.021	–0.007	–0.019	0.220
	(0.034)	(0.037)	(0.088)	(0.097)	(0.047)	(0.046)	(0.160)
Observations	9,312	9,312	9,312	9,312	9,312	9,312	9,312
Baseline Mean (Million)	1,524	478	222	28	121	459	123
Panel B: Research Universities							
Treat × *Post*	0.062	0.047	0.267	–0.104	–0.112	0.014	–0.037
	(0.070)	(0.072)	(0.173)	(0.144)	(0.092)	(0.075)	(0.131)
Observations	3,756	3,756	3,756	3,756	3,756	3,756	3,756
Baseline Mean (Million)	2,866	957	411	15	227	871	227
Panel C: Liberal Arts Colleges							
Treat × *Post*	0.019	0.006	–0.075	0.126	0.053	–0.014	0.259
	(0.042)	(0.051)	(0.104)	(0.131)	(0.061)	(0.058)	(0.212)
Observations	5,556	5,556	5,556	5,556	5,556	5,556	5,556
Baseline Mean (Million)	407	79	65	38	33	115	36

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

▸ Main Estimate

Tax Shifting by Changing Enrollment or Tuition

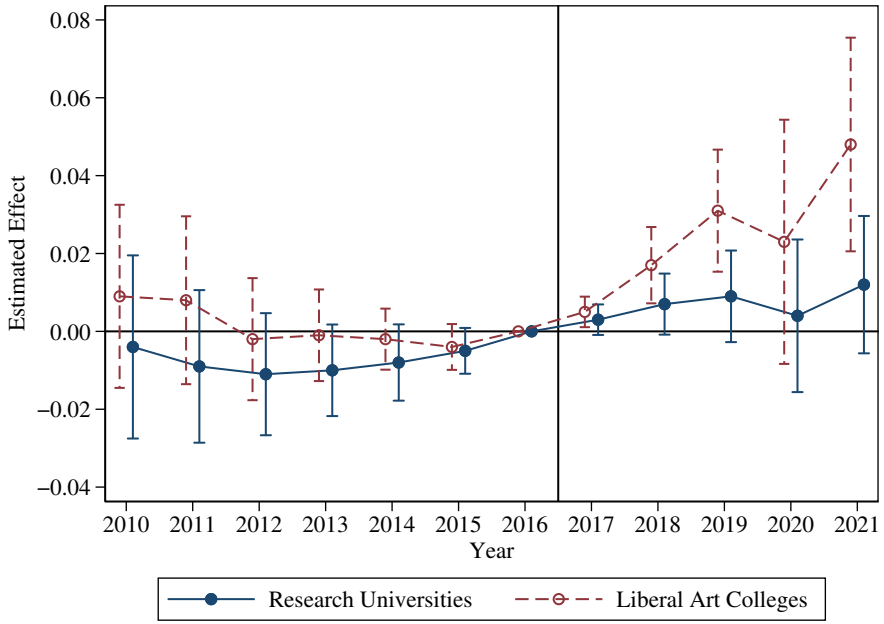
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log FTE Enroll.	Log Listed Price			Log Revenue			
		Tuition		Room & Board	Tuition		Auxiliary	
		Undergrad	Graduate		Total	Per Stdnt.	Total	Per Stdnt.
Panel A: All Colleges								
Treat × *Post*	0.034**	0.026***	0.002	0.040**	0.137***	0.107***	0.031	0.014
	(0.016)	(0.009)	(0.026)	(0.017)	(0.034)	(0.032)	(0.046)	(0.046)
Observations	10,088	10,088	10,088	10,088	9,312	9,312	9,312	9,312
Baseline Mean (Thousand)	6.037	42.853	31.228	12.572	178,833	26.235	67,258	10.067
Panel B: Research Universities								
Treat × *Post*	–0.005	0.015	0.068***	0.022	0.023	0.017	0.071	0.075
	(0.022)	(0.011)	(0.023)	(0.031)	(0.036)	(0.026)	(0.088)	(0.089)
Observations	4,069	4,069	4,069	4,069	3,756	3,756	3,756	3,756
Baseline Mean (Thousand)	11.127	46.025	43.484	13.497	334,854	25.547	125,134	10.406
Panel C: Liberal Arts Colleges								
Treat × *Post*	0.060***	0.034**	–0.040	0.052***	0.212***	0.166***	0.005	–0.027
	(0.019)	(0.013)	(0.039)	(0.018)	(0.045)	(0.047)	(0.049)	(0.047)
Observations	6,019	6,019	6,019	6,019	5,556	5,556	5,556	5,556
Baseline Mean (Thousand)	1.795	40.210	21.015	11.800	48,815	26.808	19,028	9.785

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

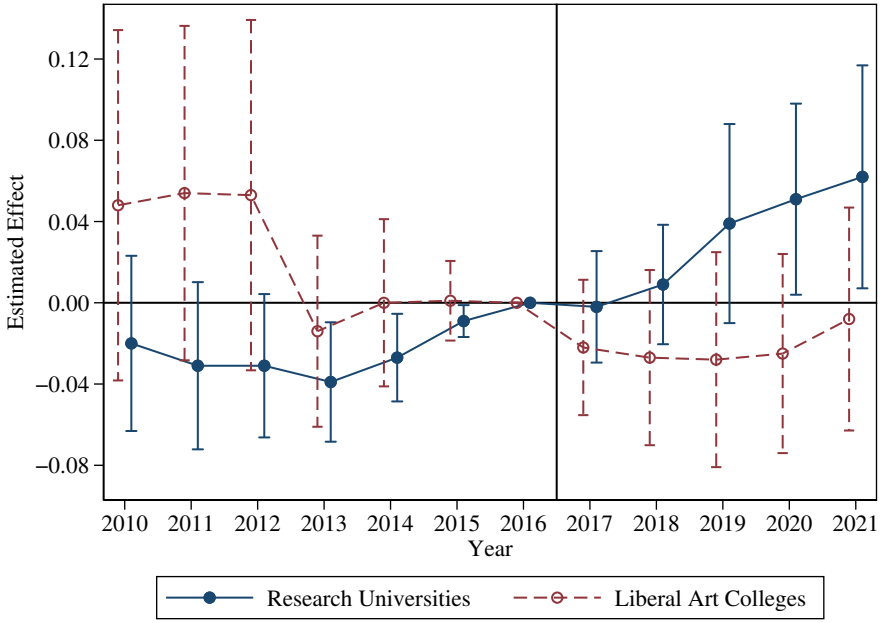
▸ Main Estimate

Tax Shifting by Increasing Tuition: Subgroup

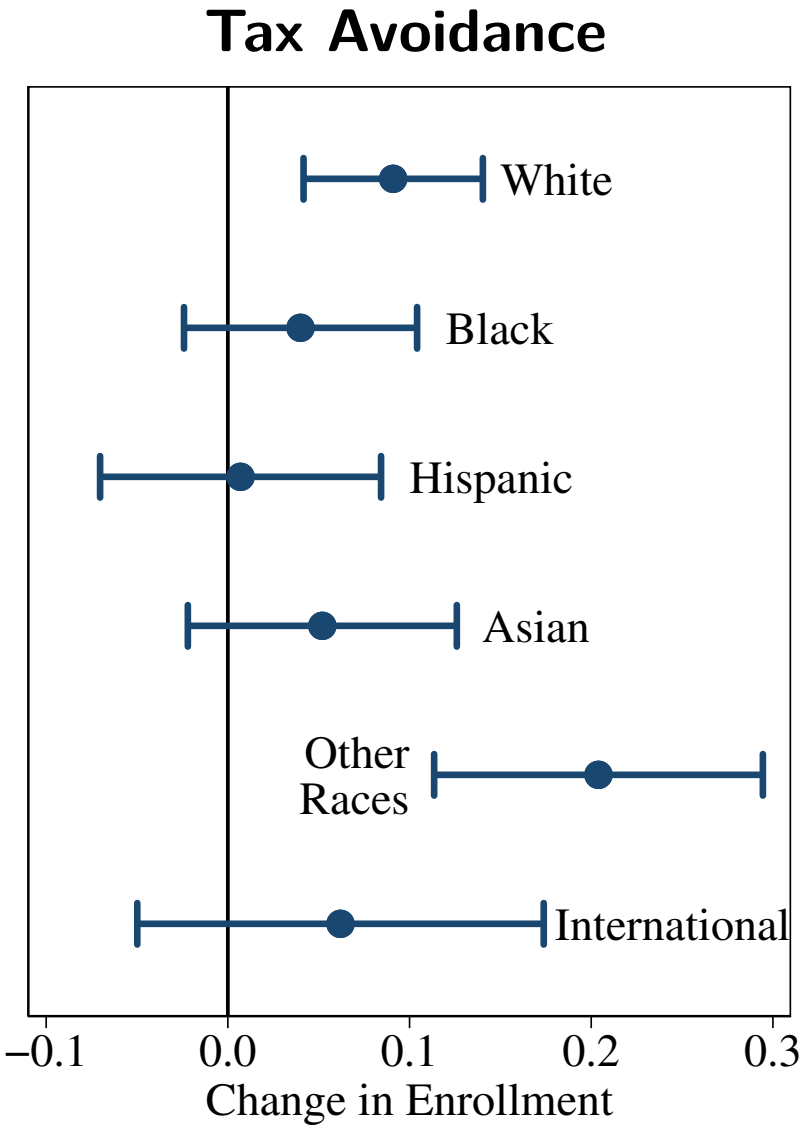
Undergraduate Tuition



Graduate Tuition

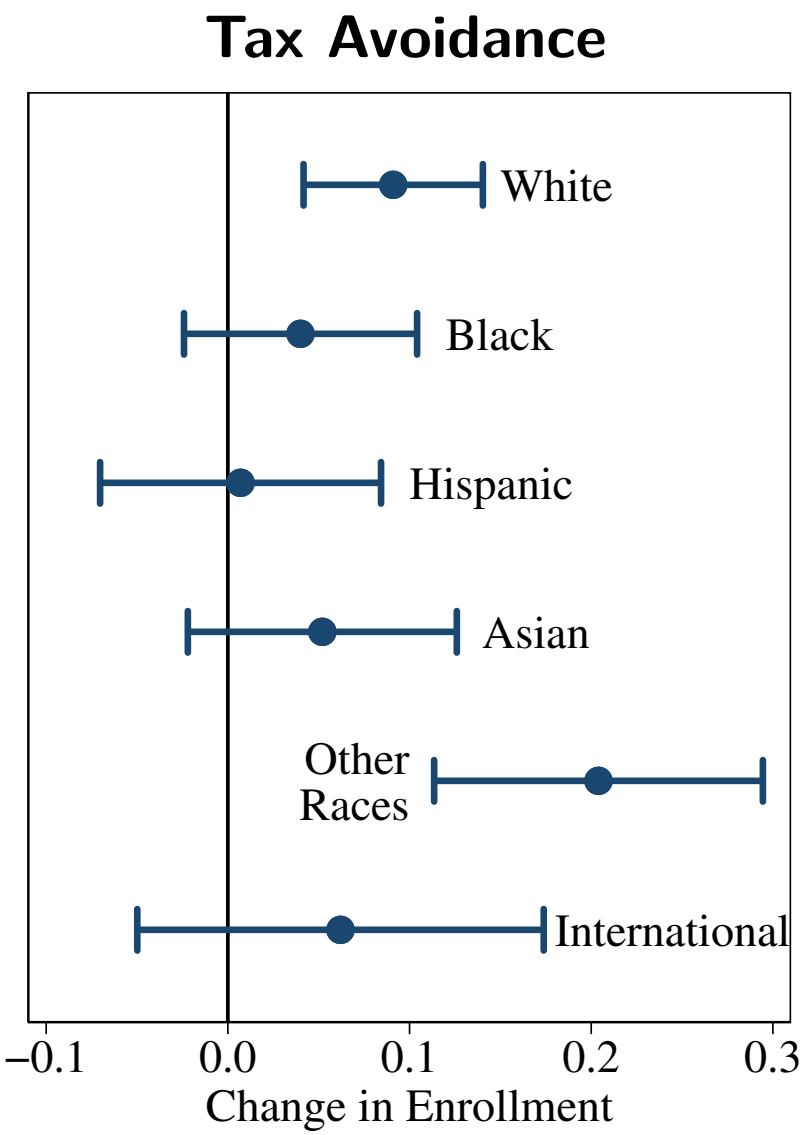


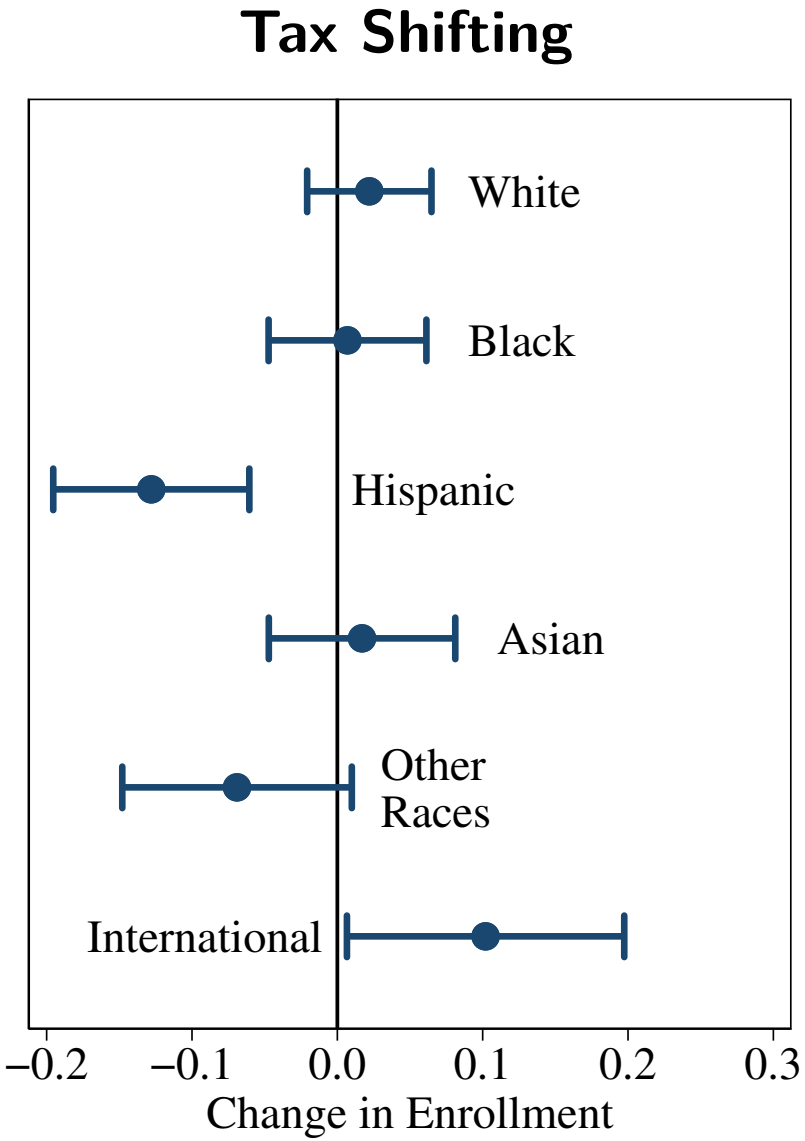
Impact on Student Composition by Race/Ethnicity



Regression Estimates

Impact on Student Composition by Race/Ethnicity





▸ Regression Estimates

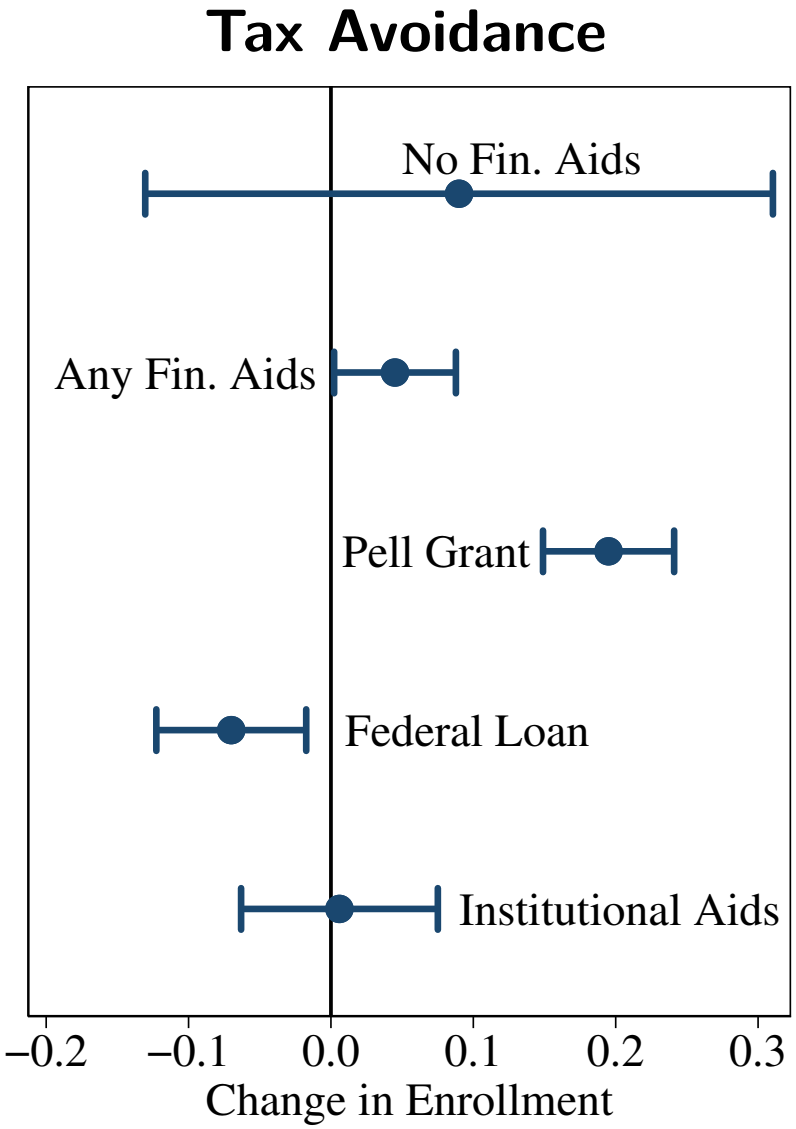
Impact on Student Enrollment by Race/Ethnicity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log FTE Enrollment							
	White	Black	Hispanic	Asian	NHPI	AIAN	TMR	NRA
Panel A: Tax Avoidance, All Colleges								
Cutoff × *Post*	0.091***	0.040	0.007	0.052	0.064	–0.043	0.190***	0.062
	(0.030)	(0.039)	(0.047)	(0.045)	(0.050)	(0.060)	(0.063)	(0.068)
Observations	9,997	9,997	9,997	9,997	9,997	9,997	9,997	9,997
Baseline Mean (Thousand)	2.331	0.298	0.386	0.646	0.002	0.010	0.163	0.889
Panel B: Tax Shifting, All Colleges								
Treat × *Post*	0.022	0.007	–0.128***	0.017	0.088**	0.099*	–0.102*	0.102*
	(0.026)	(0.033)	(0.041)	(0.039)	(0.043)	(0.051)	(0.054)	(0.058)
Observations	10,088	10,088	10,088	10,088	10,088	10,088	10,088	10,088
Baseline Mean (Thousand)	2.739	0.336	0.516	0.840	0.004	0.017	0.241	1.159
Panel C: Tax Shifting, Research Universities								
Treat × *Post*	–0.023	0.033	–0.128**	–0.054	0.133*	–0.047	–0.039	0.009
	(0.036)	(0.050)	(0.056)	(0.055)	(0.080)	(0.079)	(0.083)	(0.088)
Observations	4,069	4,069	4,069	4,069	4,069	4,069	4,069	4,069
Baseline Mean (Thousand)	2.739	0.336	0.516	0.840	0.004	0.017	0.241	1.159
Panel D: Tax Shifting, Non-Research Universities								
Treat × *Post*	0.052	–0.011	–0.129**	0.063	0.059	0.194***	–0.144**	0.162**
	(0.036)	(0.044)	(0.056)	(0.053)	(0.048)	(0.067)	(0.071)	(0.077)
Observations	6,019	6,019	6,019	6,019	6,019	6,019	6,019	6,019
Baseline Mean (Thousand)	2.739	0.336	0.516	0.840	0.004	0.017	0.241	1.159

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

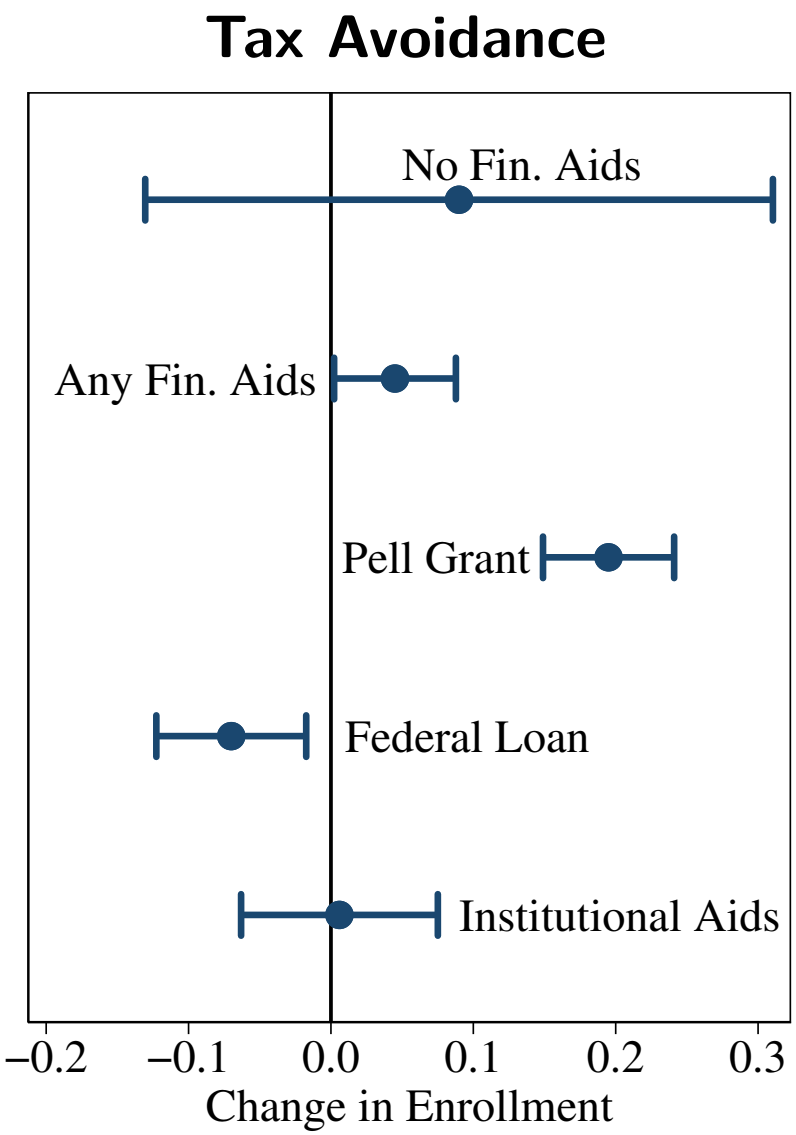
▸ Main Estimate

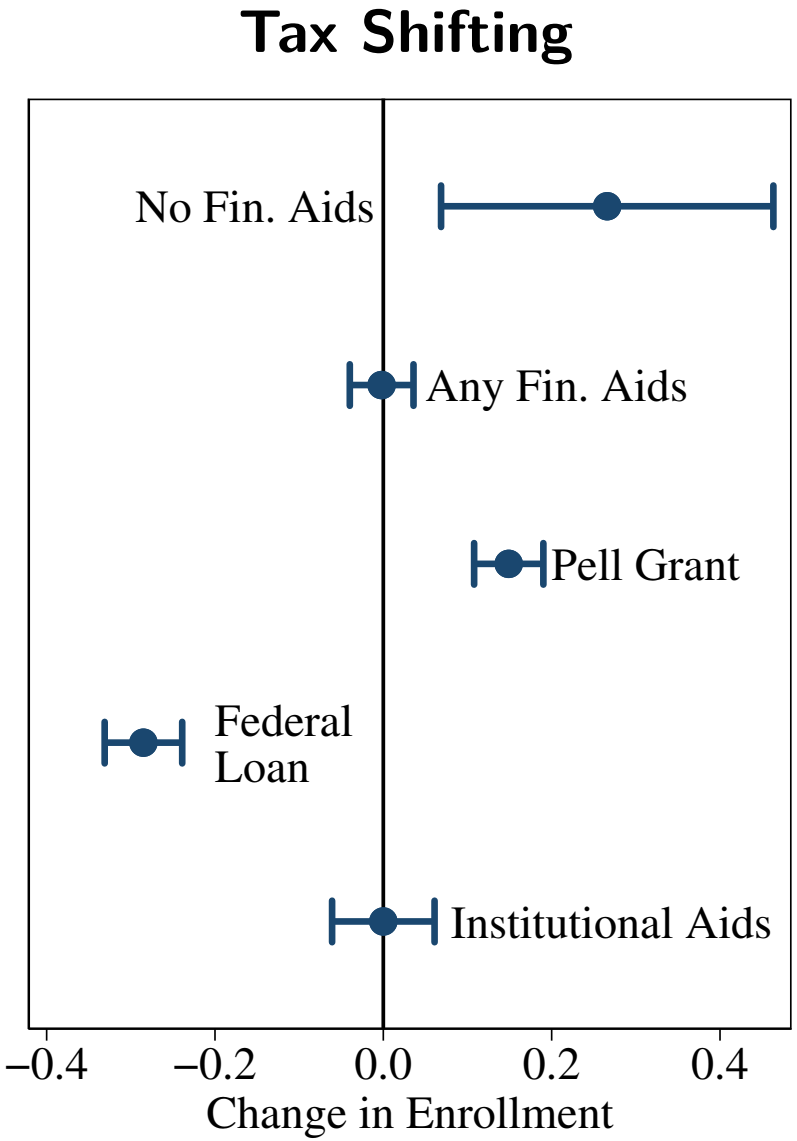
Impact on Student Composition by Financial Aid Status



Regression Estimates

Impact on Student Composition by Financial Aid Status





Regression Estimates

Impact on Student Enrollment by Financial Aid Status

	(1)	(2)	(3)	(4)	(5)
	Log Number of Students with:				
	No Fin. Aid	Any Fin. Aid	Pell Grant	Federal Loan	Institutional Aid
Panel A: Tax Avoidance, All Colleges					
Cutoff × *Post*	0.090	0.045*	0.195***	–0.070**	0.006
	(0.134)	(0.026)	(0.028)	(0.032)	(0.042)
Observations	8,388	8,388	8,388	8,388	8,388
Baseline Mean (Thousand)	1.638	2.253	0.552	1.002	0.516
Panel B: Tax Shifting, All Colleges					
Treat × *Post*	0.266**	–0.002	0.149***	–0.285***	0.000
	(0.120)	(0.023)	(0.025)	(0.028)	(0.037)
Observations	8,448	8,448	8,448	8,448	8,448
Baseline Mean (Thousand)	1.654	2.221	0.553	0.801	0.498
Panel C: Tax Shifting, Research Universities					
Treat × *Post*	–0.029	–0.073**	0.155***	–0.445***	–0.041
	(0.151)	(0.033)	(0.040)	(0.041)	(0.041)
Observations	3,696	3,696	3,696	3,696	3,696
Baseline Mean (Thousand)	1.654	2.221	0.553	0.801	0.498
Panel D: Tax Shifting, Liberal Arts College					
Treat × *Post*	0.460***	0.044	0.145***	–0.179***	0.028
	(0.175)	(0.031)	(0.032)	(0.039)	(0.056)
Observations	4,752	4,752	4,752	4,752	4,752
Baseline Mean (Thousand)	1.654	2.221	0.553	0.801	0.498

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

▸ Main Estimate

Impact on Student Enrollment by Income Groups (Within Student with Financial Aids)

	(1)	(2)	(3)	(4)	(5)
	Log Number of Students in Income Groups:				
	0–30K	30–48K	48–75K	75–110K	> 110K
Panel A: Tax Avoidance, All Colleges					
Cutoff × *Post*	0.125**	0.141***	0.120**	–0.048	–0.080
	(0.049)	(0.053)	(0.053)	(0.060)	(0.070)
Observations	8,386	8,386	8,386	8,386	8,386
Baseline Mean (Thousand)	0.045	0.044	0.053	0.057	0.169
Panel B: Tax Shifting, All Colleges					
Treat × *Post*	0.104**	0.159***	0.133***	–0.014	–0.143**
	(0.043)	(0.047)	(0.047)	(0.053)	(0.062)
Observations	8,446	8,446	8,446	8,446	8,446
Baseline Mean (Thousand)	0.047	0.045	0.049	0.047	0.133
Panel C: Tax Shifting, Research Universities					
Treat × *Post*	0.183***	0.190***	0.208***	0.016	–0.153
	(0.066)	(0.070)	(0.071)	(0.084)	(0.093)
Observations	3,696	3,696	3,696	3,696	3,696
Baseline Mean (Thousand)	0.047	0.045	0.049	0.047	0.133
Panel D: Tax Shifting, Non-Research Universities					
Treat × *Post*	0.053	0.140**	0.083	–0.033	–0.136
	(0.057)	(0.063)	(0.063)	(0.069)	(0.083)
Observations	4,750	4,750	4,750	4,750	4,750
Baseline Mean (Thousand)	0.047	0.045	0.049	0.047	0.133

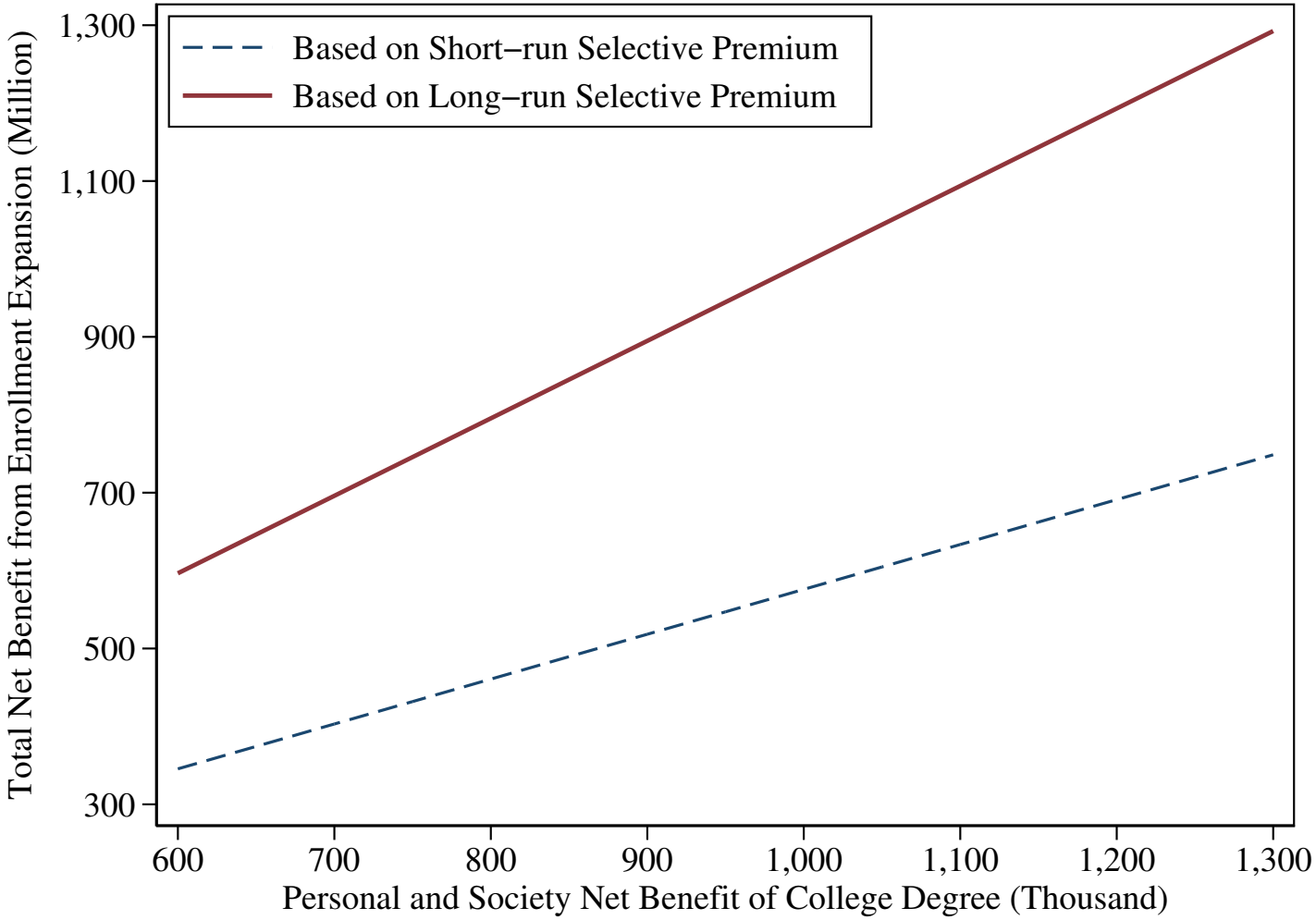
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Cost-and-Benefit Analysis

$$NetBenefit_{ij} = IncreaseEnrollment_i \times CompletionRate_i \times SelectivePremiums_j \times AvgNetBenefit$$

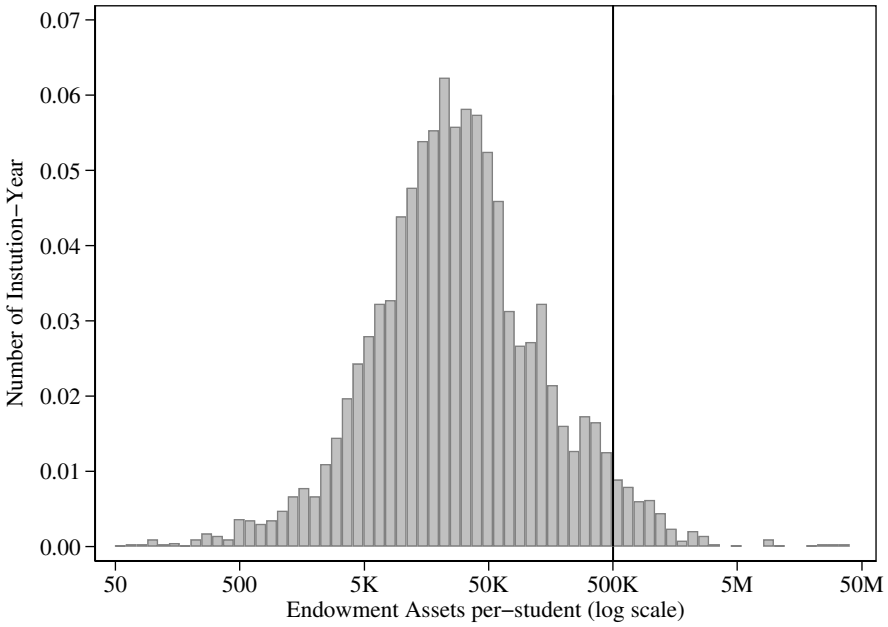
	Barron's Ranking	Increase in FT Undergrad	Average Degree Completion Rate	Increase in Bachelor Degree	Estimate Net Benefit ($ Million)
University of Chicago	Most competitive	1,695	0.956	1,620	65.118
Emory University	Most competitive	1,481	0.900	1,333	53.572
Northwestern University	Most competitive	941	0.965	908	36.505
Washington University in St Louis	Most competitive	872	0.937	817	32.857
University of Pennsylvania	Most competitive	741	0.961	712	28.609
Duke University	Most competitive	701	0.966	677	27.234
Colby College	Most competitive	538	0.880	474	19.043
Middlebury College	Most competitive	499	0.935	467	18.781
Vassar College	Most competitive	482	0.920	443	17.803
Berry College	Very competitive	457	0.647	296	8.345
Hamilton College	Most competitive	357	0.924	330	13.259
Davidson College	Most competitive	288	0.916	264	10.593
Trinity University	Highly competitive	246	0.758	187	7.502
Claremont McKenna College	Most competitive	139	0.913	127	5.088
Wabash College	Highly competitive	119	0.753	90	3.607
Bryn Mawr College	Most competitive	67	0.826	56	2.240
Total		9,623		8,799	350

Cost-and-Benefit Analysis

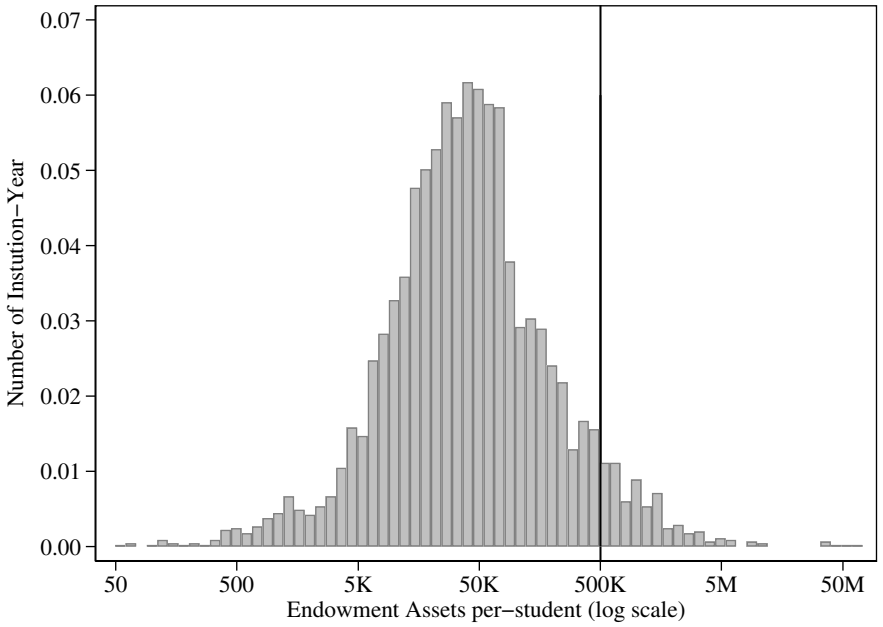


Bunching

Pre-Policy



Post-Policy



Restricted Sample to Selective Colleges

- Restricting the sample to institutions that:
  - With Barron's Selectivity Index of Most Competitive, Highly Competitive, or Very Competitive
  - Ranked in the top 100 by U.S. News in 2016
- Some examples are Cornell, Furman University, University of Dallas, Johns Hopkins University, Central College, Westminster College, etc.

	Number of Units	
Sub-sample	Treatment Group	Comparison Group
Tax Avoidance		
Main Results	17	752
Barron's Selectivity Index Above Very Competetive	16	268
US News' Ranking Top 100	14	108
Tax Shifting		
Main Results	24	752
Barron's Selectivity Index Above Very Competetive	20	268
US News' Ranking Top 100	19	108

Restricted Sample to Selective Colleges

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Tax Avoidance			Tax Shifting			
	Enrollment	Assets	Assets per Student	Total Expenditure	Enrollment	Listed Tuition	Tuition Revenue
Panel A: Barron's Rank Above Very Competetive							
Treat × *Post*	0.076***	–0.006	–0.095*	0.005	0.015	0.027*	0.109**
	(0.019)	(0.056)	(0.049)	(0.036)	(0.027)	(0.014)	(0.047)
Panel B: US News' Ranking Top 100							
Treat × *Post*	0.057***	–0.011	–0.088	–0.055	0.009	0.018*	0.042
	(0.020)	(0.062)	(0.054)	(0.050)	(0.025)	(0.010)	(0.050)

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

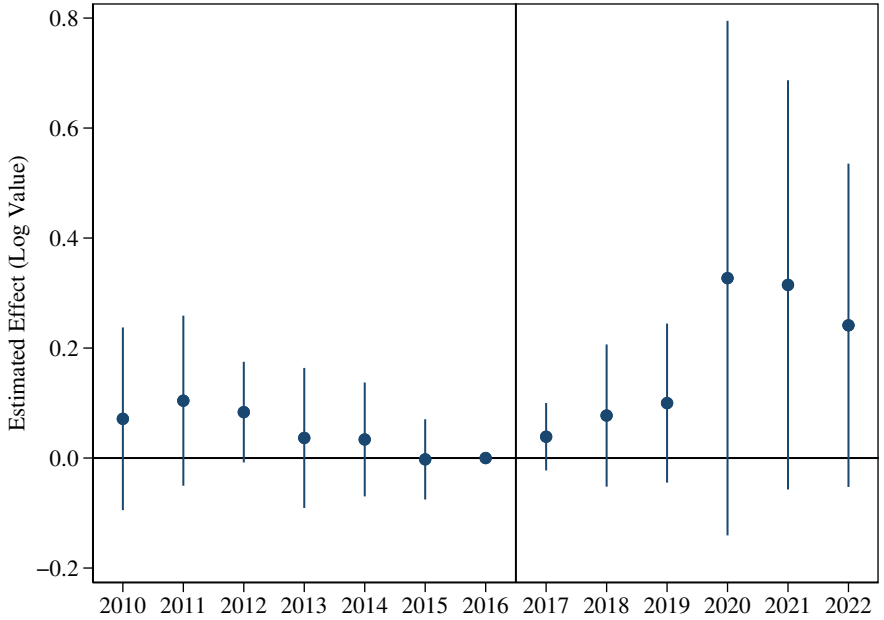
DDD Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Tax Avoidance			Tax Shifting			
	Enrollment	Assets	Assets per Student	Total Expenditure	Enrollment	Listed Tuition	Tuition Revenue
Treat × *Large* × *Post*	0.181	–0.136	–0.536**	0.002	–0.084	0.100***	0.214
	(0.134)	(0.132)	(0.249)	(0.043)	(0.079)	(0.033)	(0.212)

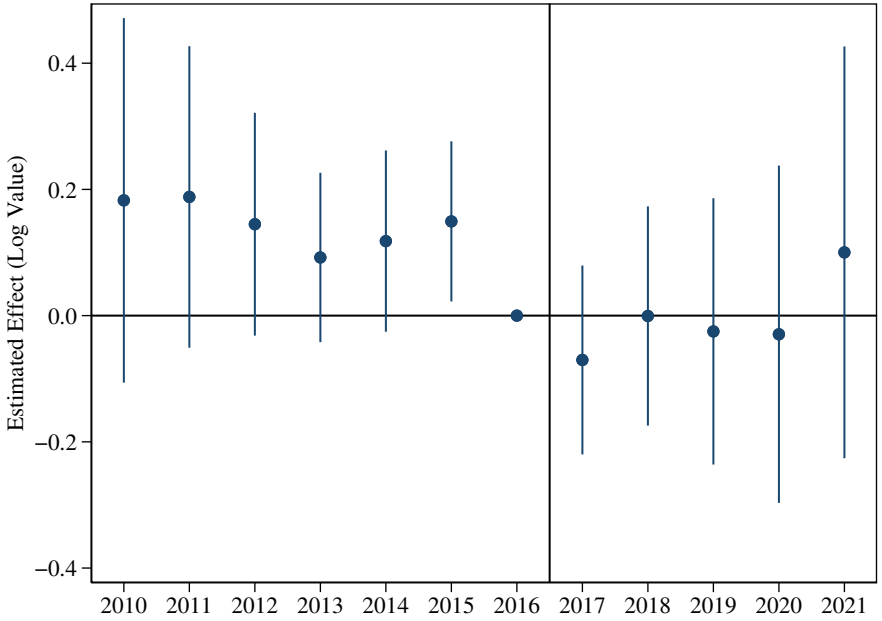
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

DDD Results: Tax Avoidance

Student Enrollment

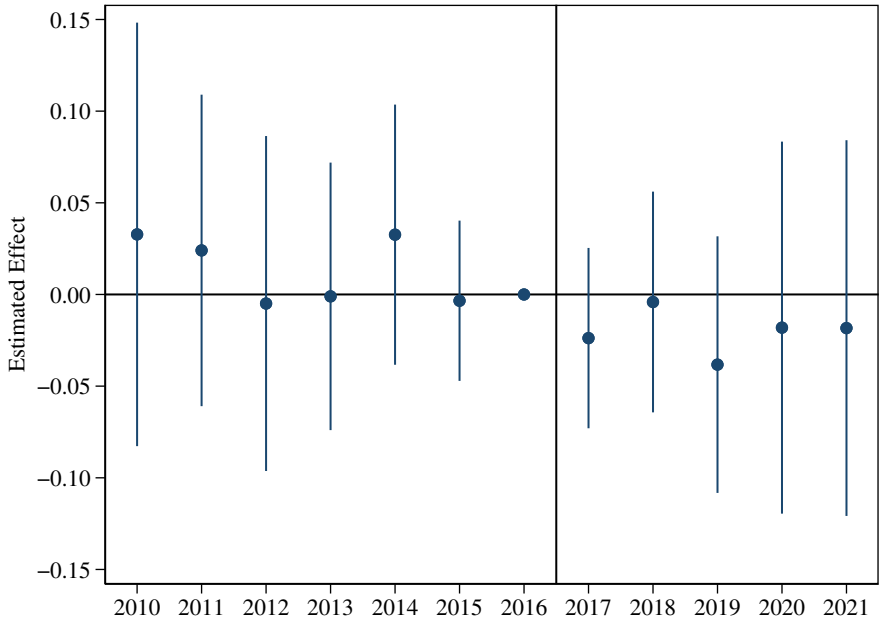


Total Net Assets

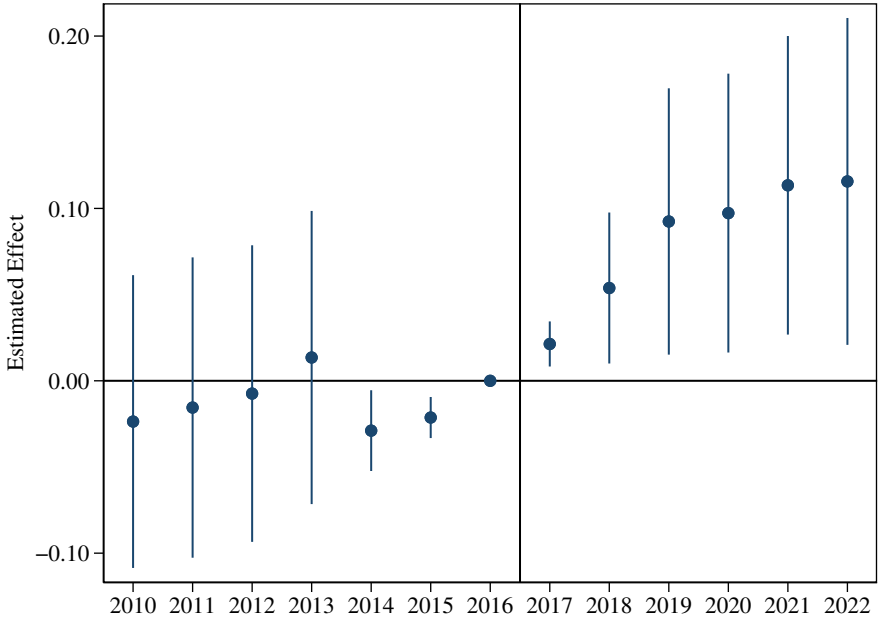


DDD Results: Tax Shifting

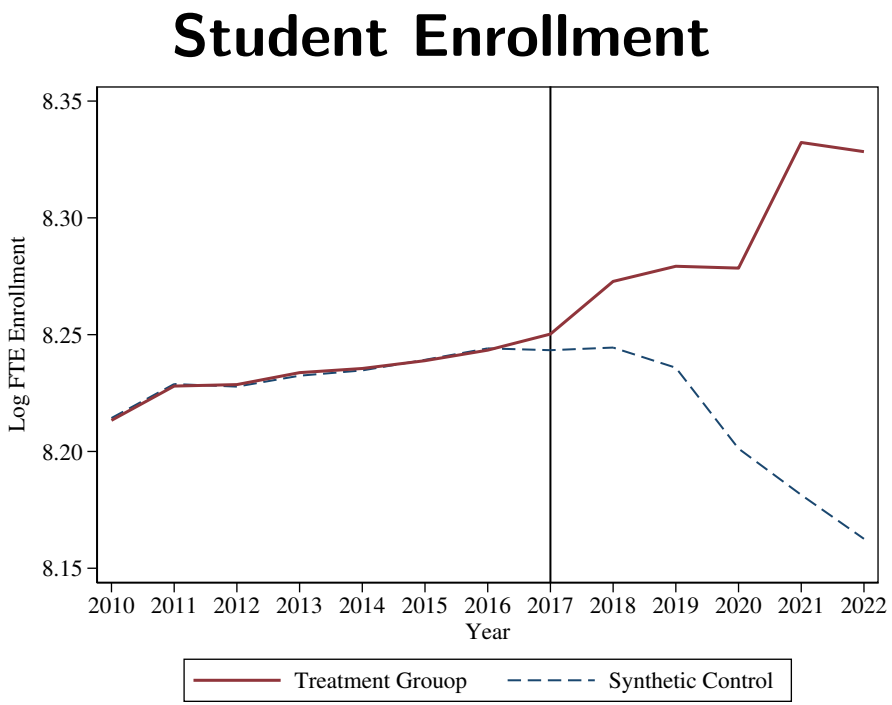
Total Expenditure

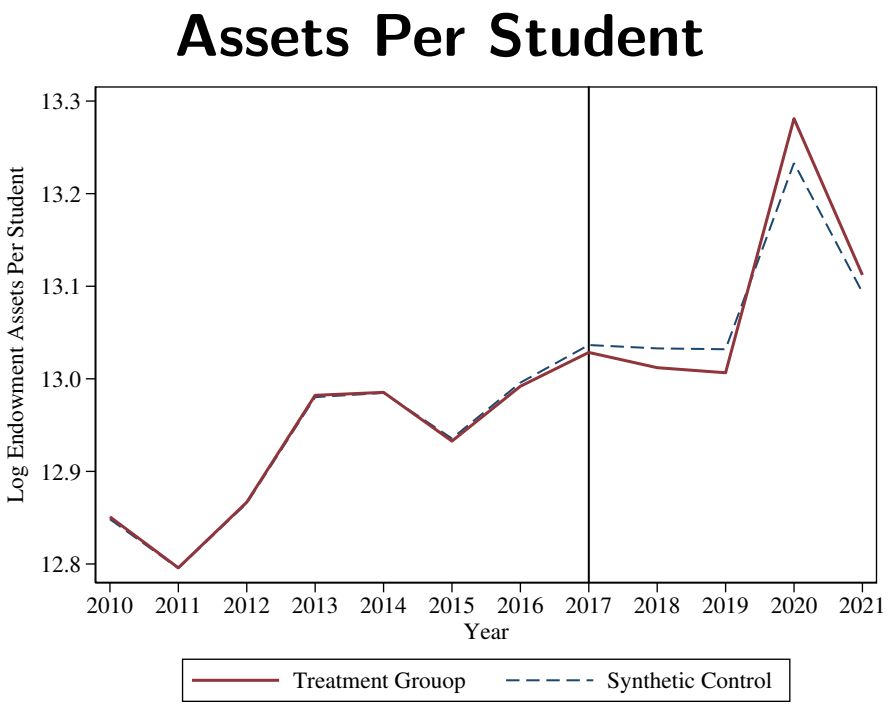


Listed Tuition

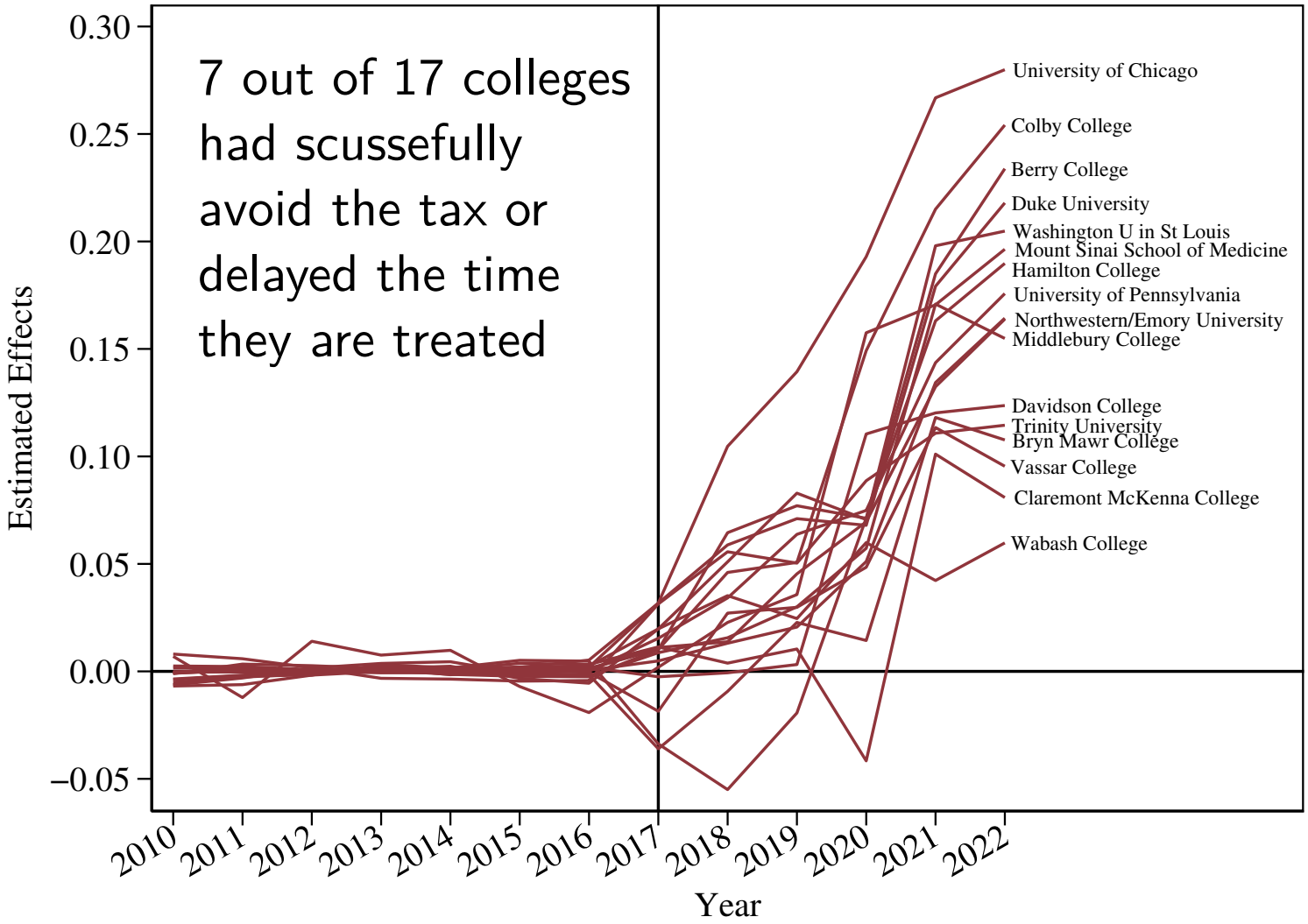


SCM Results: Tax Avoidance



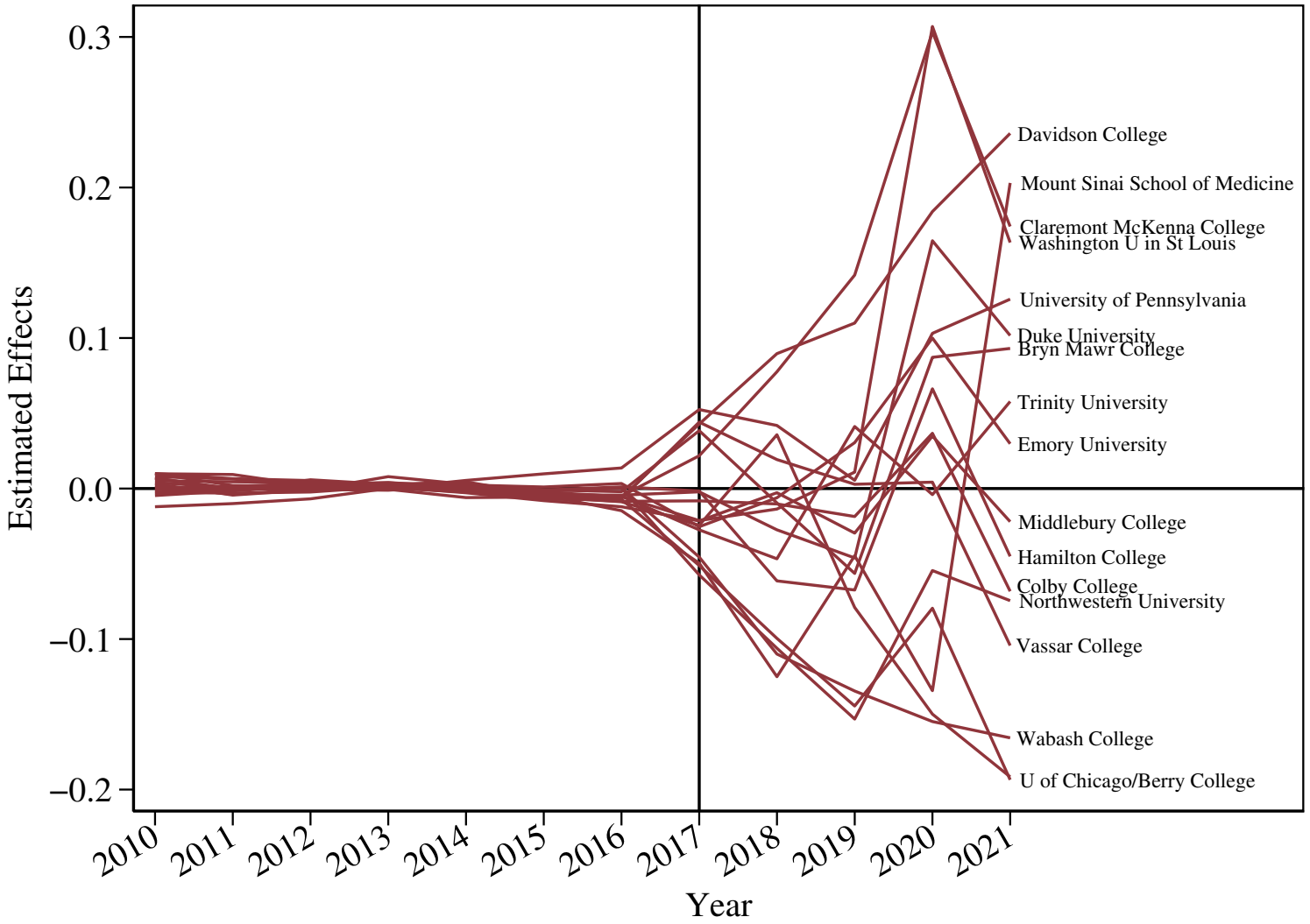


SCM Results: Enrollment-Related Tax Avoidance Response



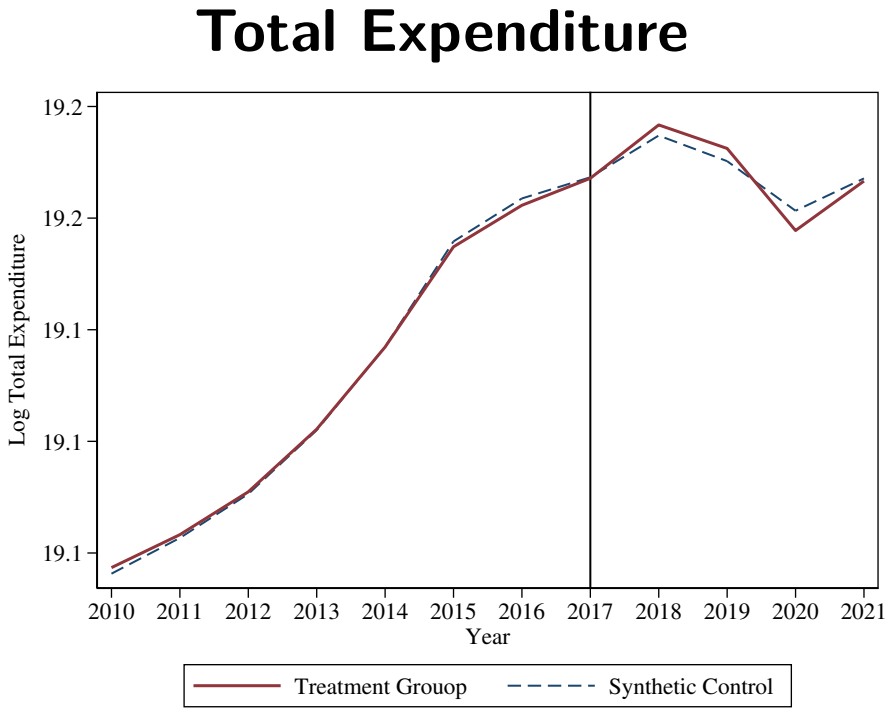
Main Estimate

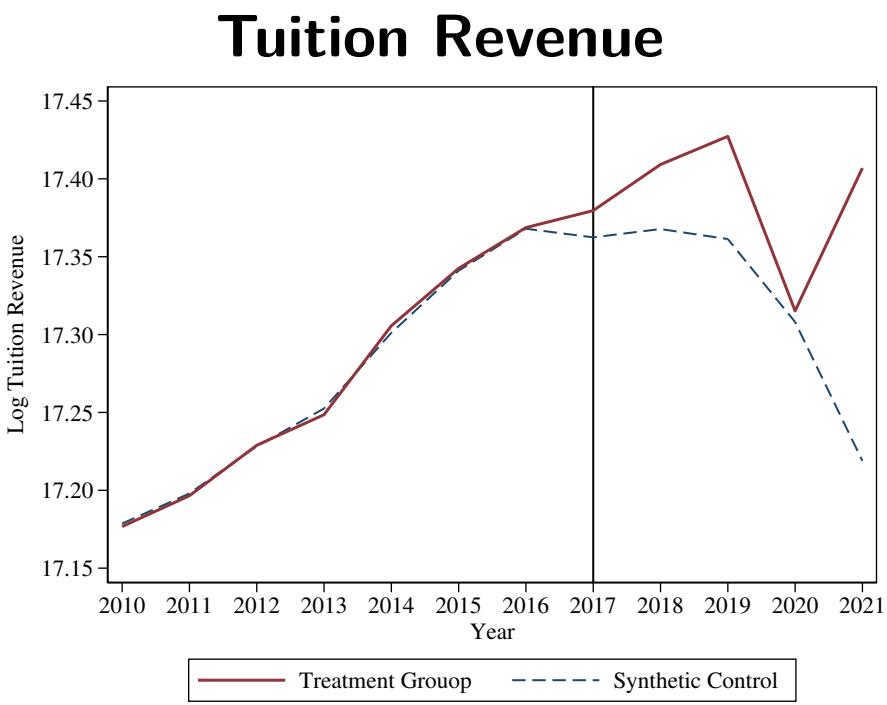
SCM Results: Assets-Related Tax Avoidance Response



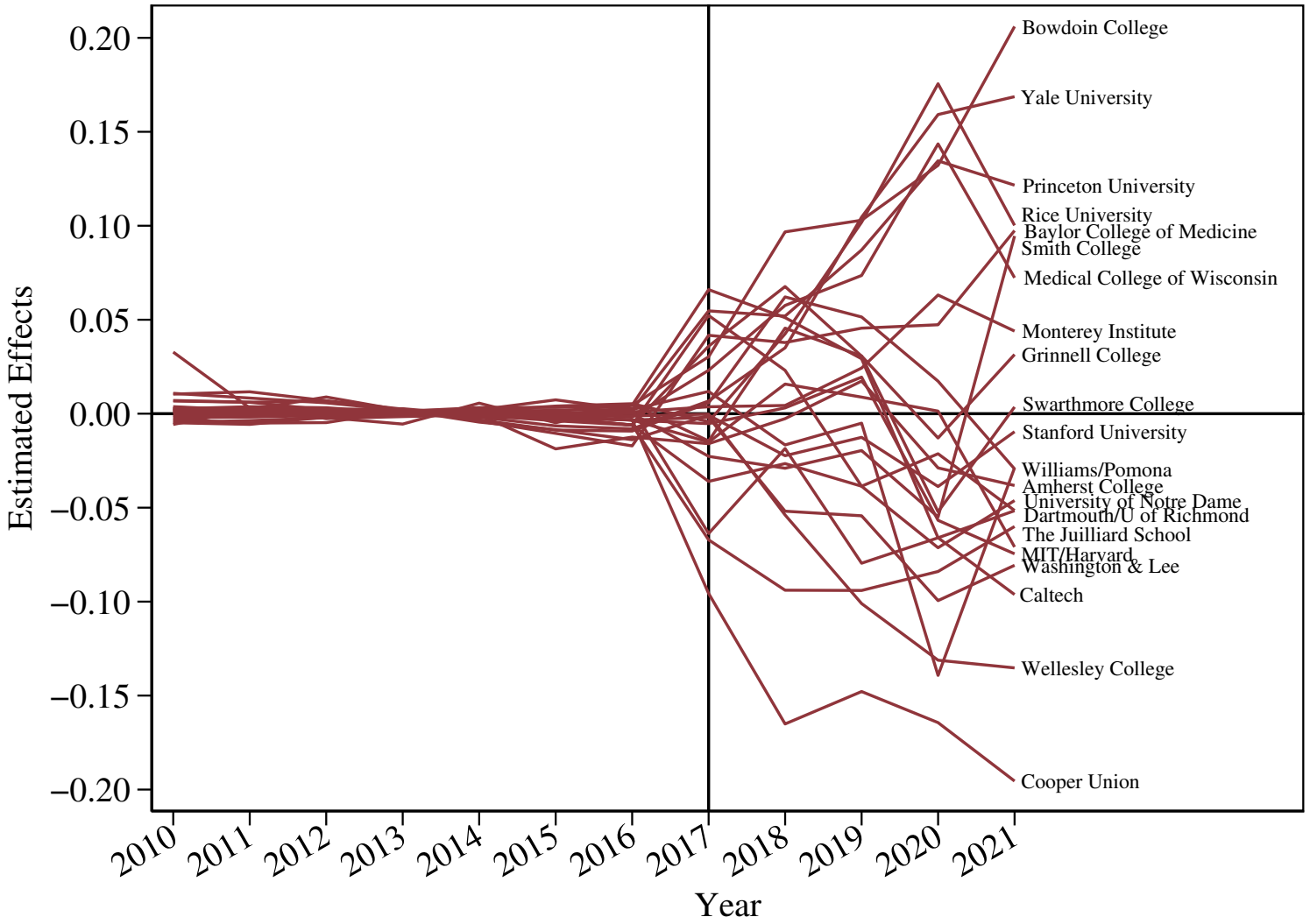
Main Estimate

SCM Results: Tax Shifting



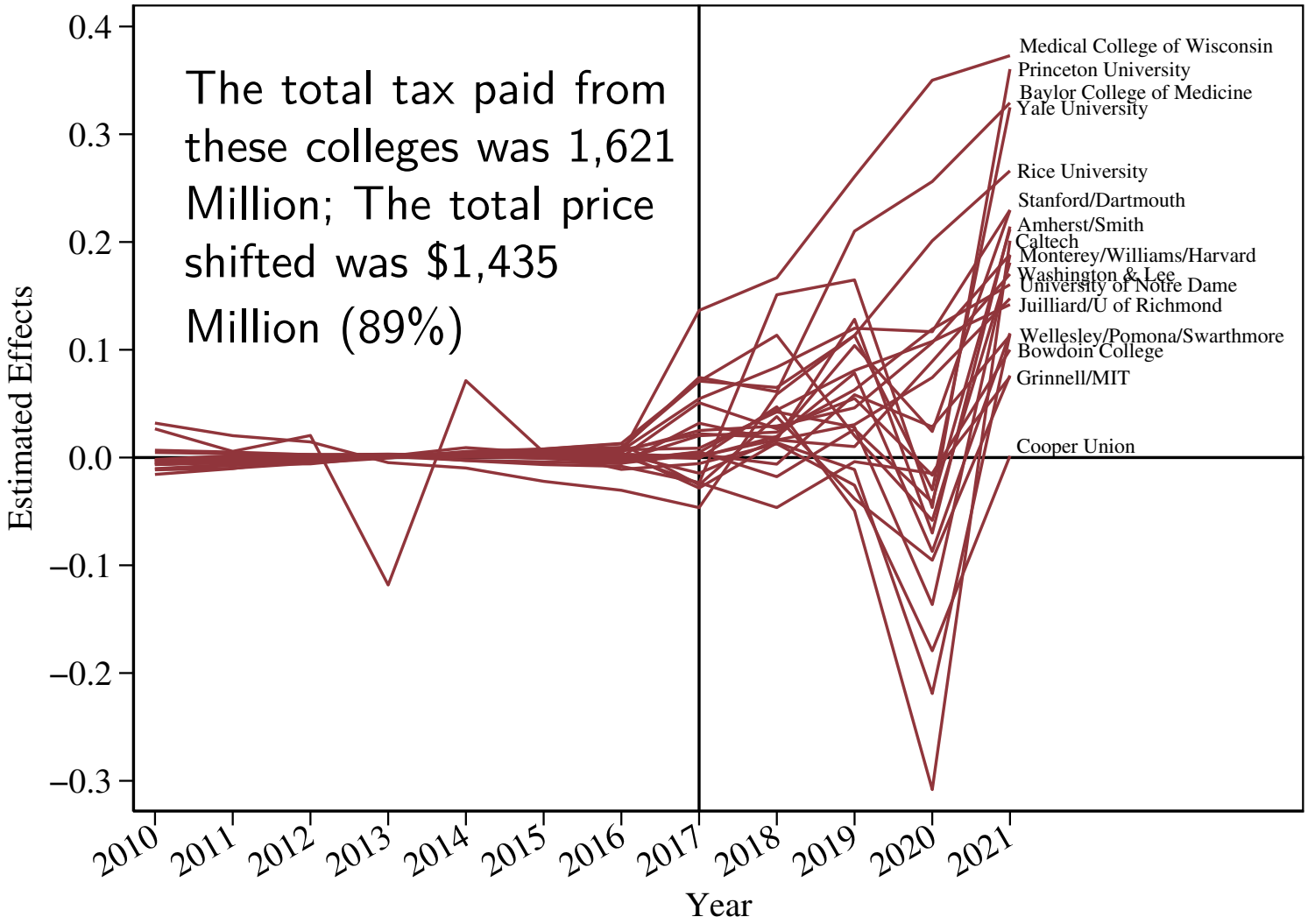


SCM Results: Expenditure-Related Tax Shifting Response



Main Estimate

SCM Results: Tuition-Related Tax Shifting Response



Main Estimate

Teaching Interest

- **Undergraduate**
  - 財政學
  - 統計學
  - 所得稅理論與制度
  - 財產稅理論與制度
  - 財務行政
  - 地方財政
  - 公共選擇理論
  - 成本效益分析
- **Graduate**
  - 稅務行政
  - 租稅理論專題研究
  - 公共支出分析與應用
  - 福利經濟學
  - 公共政策與財政專題研究
  - 地方財政
- **New Courses Development**
  - 教育財政
  - 非營利稅務專題