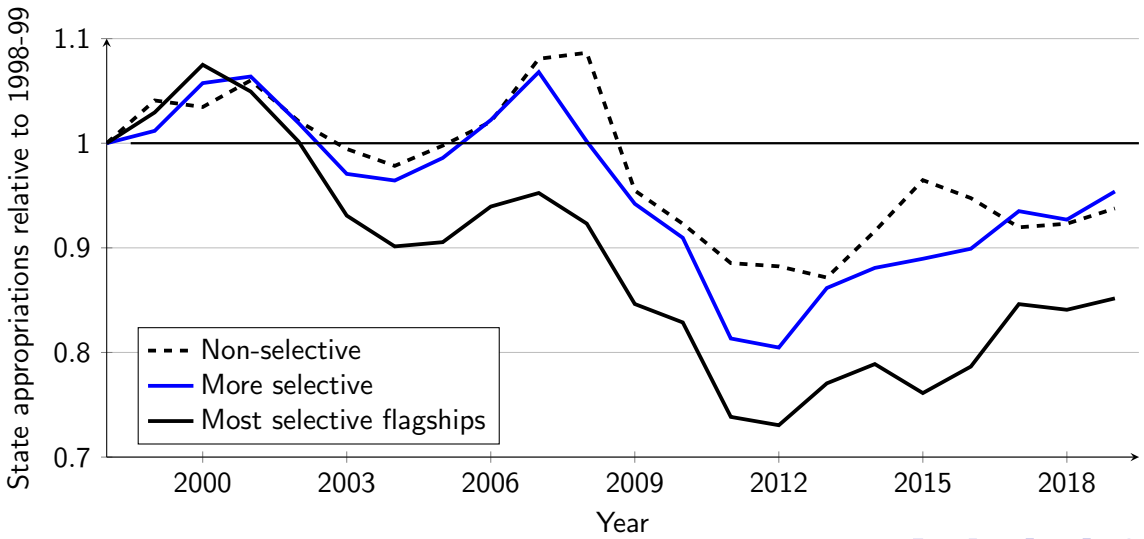
The Unintended Effect of Decreasing State Support for Higher Education on Student Diversity

Dora Gicheva

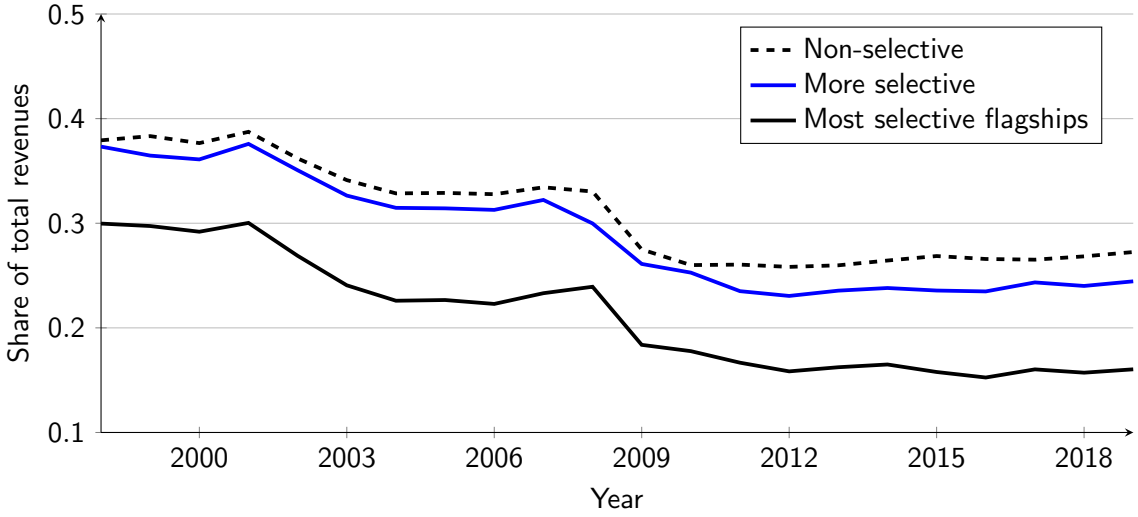
Department of Economics, University of North Carolina at Greensboro

January 5, 2024

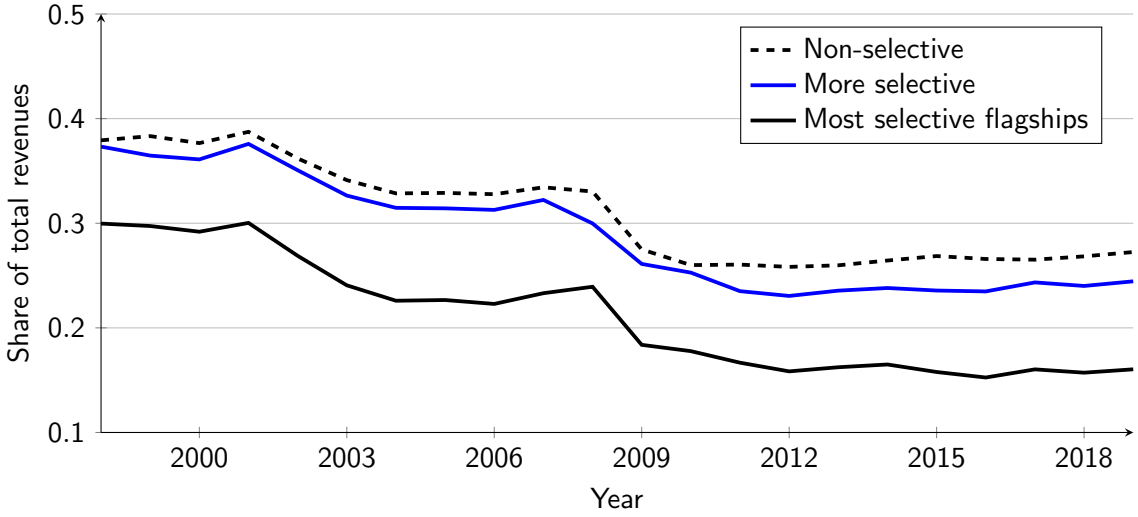
State Appropriations for Public Four-Year Institutions



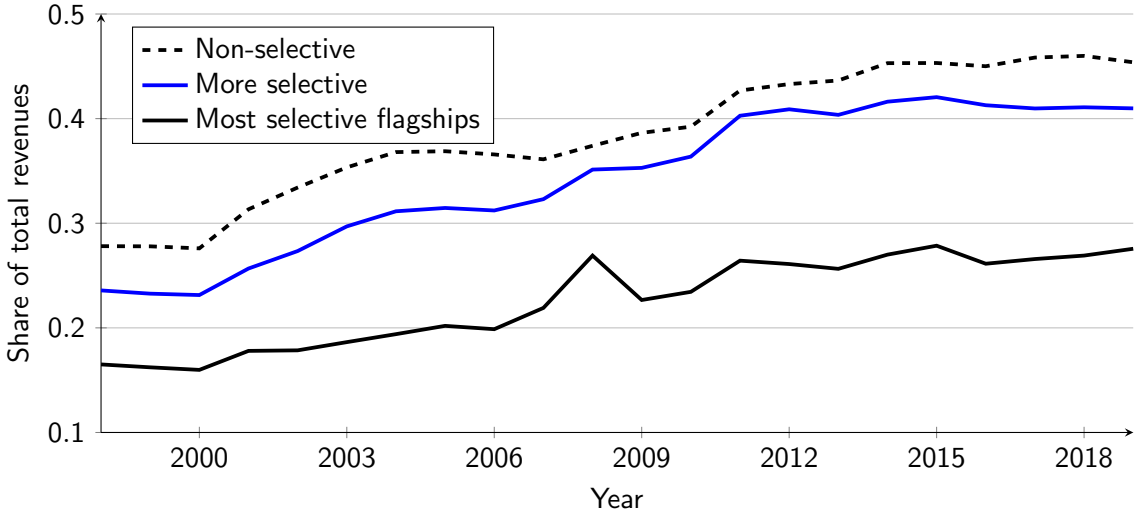
Appropriations as Share of Revenues



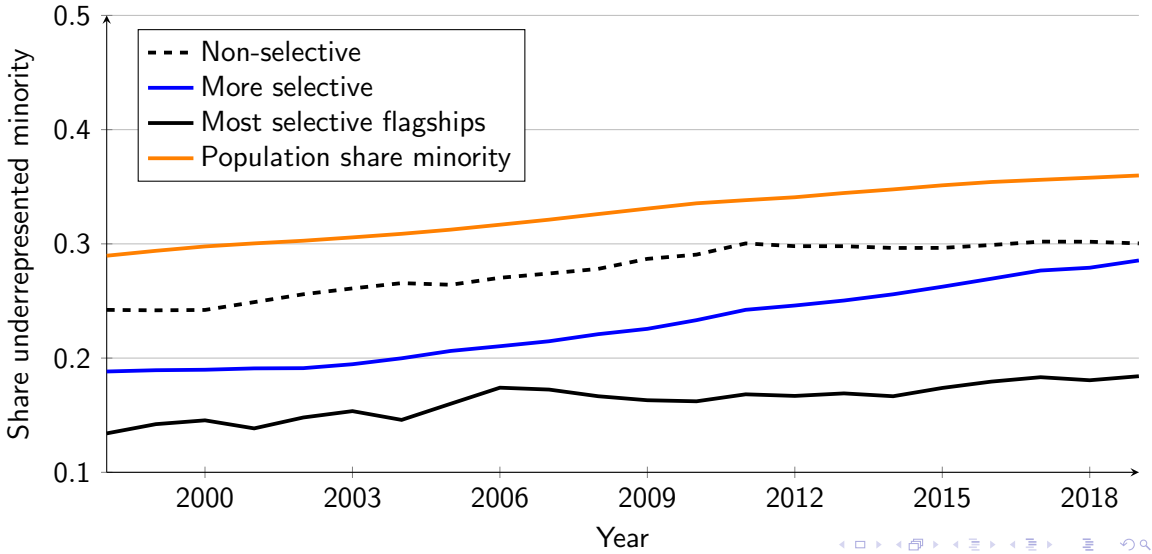
Appropriations as Share of Revenues



Tuition as Share of Revenues



Minority Student Representation at Public Four-Year Institutions



Research Questions

- Do changes in state funding for higher education impact the share of minority students enrolling at public four-year institutions?
- Do the impacts vary by institution selectivity level?
- What are the mechanisms driving the relationship?

Research Questions

- Do changes in state funding for higher education impact the share of minority students enrolling at public four-year institutions?
- Do the impacts vary by institution selectivity level?
- What are the mechanisms driving the relationship?
  - Price
  - Financial aid
  - Other institutional spending

Broader Implications

Broader Implications

Long-term trajectory of diversifying higher education?

Broader Implications

Long-term trajectory of diversifying higher education?

Postsecondary budget cuts have impacts beyond quality of education

Broader Implications

Long-term trajectory of diversifying higher education?

Postsecondary budget cuts have impacts beyond quality of education

Links between cost of attendance and college decisions of marginal students

Broader Implications

Long-term trajectory of diversifying higher education?

Postsecondary budget cuts have impacts beyond quality of education

Links between cost of attendance and college decisions of marginal students

Importance of financial aid for institutional diversity

Prior Literature

- Cuts in state funding for higher education associated with:
  - **Higher tuition** (Webber, 2017)
  - **More student debt** (Chakrabarti, Gorton, and Lovenheim, 2020)
  - **Shift of students into for-profit institutions** (Goodman and Volz, 2020)
  - **Decrease in overall enrollment** (Deming and Walters, 2018; Monarrez, Hernandez, and Rainer, 2021)
  - **Relative increase in out-of-state** (Jaquette and Curs, 2015) **and international** (Bound, Braga, Khanna, and Turner, 2020) **student enrollment**

Data

- IPEDS data for 1998-99 to 2019-20
  - Data from every postsecondary institution in the U.S. eligible for federal financial aid
  - Fall enrollment of first-time undergraduate students by race and ethnicity
  - Institution-level appropriations
  - Posted tuition and fees; share of students receiving financial aid
  - Institutional spending

Data

- IPEDS data for 1998-99 to 2019-20
  - Data from every postsecondary institution in the U.S. eligible for federal financial aid
  - Fall enrollment of first-time undergraduate students by race and ethnicity
  - Institution-level appropriations
  - Posted tuition and fees; share of students receiving financial aid
  - Institutional spending

- State Higher Education Executive Officers Association (SHEEO): state-level funding
  - Includes state ($\sim$90%) but not local ($\sim$10%) support
  - Includes federal stimulus funding
  - Excludes funding for research, hospitals, medical education

Data

- IPEDS data for 1998-99 to 2019-20
  - Data from every postsecondary institution in the U.S. eligible for federal financial aid
  - Fall enrollment of first-time undergraduate students by race and ethnicity
  - Institution-level appropriations
  - Posted tuition and fees; share of students receiving financial aid
  - Institutional spending
- State Higher Education Executive Officers Association (SHEEO): state-level funding
  - Includes state ($\sim$90%) but not local ($\sim$10%) support
  - Includes federal stimulus funding
  - Excludes funding for research, hospitals, medical education
- State- and county-level demographics and unemployment

Empirical Approach

- Equation of interest for institution i in county c in state s:

$$ShareMinority_{icst} = \beta_0 + \beta_1 \ln(Appropriations_{it}) + X_{cst}\gamma + \mu_i + \eta_t + \varepsilon_{icst}$$

  - Controls for state and county unemployment rate and state- and county-level shares of Black, Hispanic, Asian, and Native American residents among population age 18–25
  - Errors clustered at the state level

Empirical Approach

- Equation of interest for institution i in county c in state s:

$$ShareMinority_{icst} = \beta_0 + \beta_1 \ln(Appropriations_{it}) + X_{cst}\gamma + \mu_i + \eta_t + \varepsilon_{icst}$$

  - Controls for state and county unemployment rate and state- and county-level shares of Black, Hispanic, Asian, and Native American residents among population age 18–25
  - Errors clustered at the state level

- Institutional appropriations likely correlated with the error term
  - Targeted support to institutions
  - Reverse causality

Empirical Approach

- Use shift-share instrument for institutional appropriations

$$Z_{it} = \left(\frac{Appropriations_{i,1997}}{Revenues_{i,1997}} \right) [\ln(StateAppropriations_{st})]$$

Empirical Approach

- Use shift-share instrument for institutional appropriations

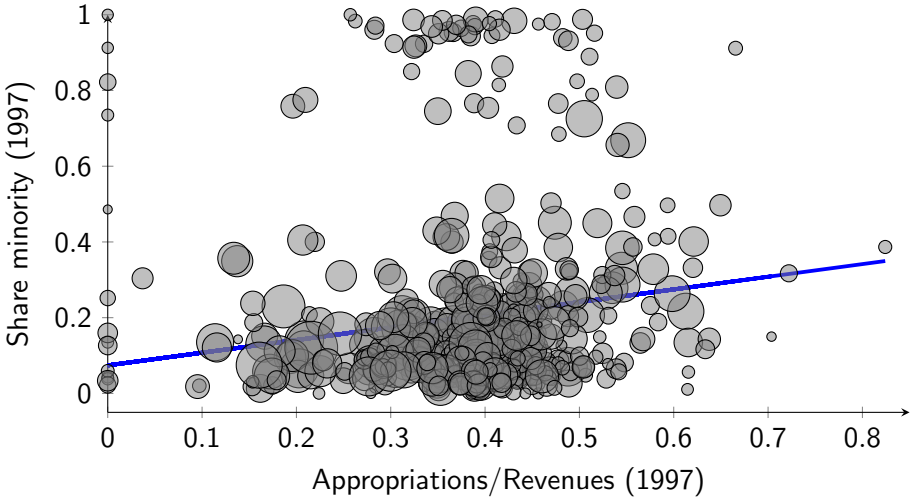
$$Z_{it} = \left(\frac{Appropriations_{i,1997}}{Revenues_{i,1997}} \right) [\ln(StateAppropriations_{st})]$$

- Requires exogenous shift (Borusyak, Hull & Jaravel, 2018) or exogenous baseline share (Goldsmith-Pinkham, Sorkin & Swift, 2020)

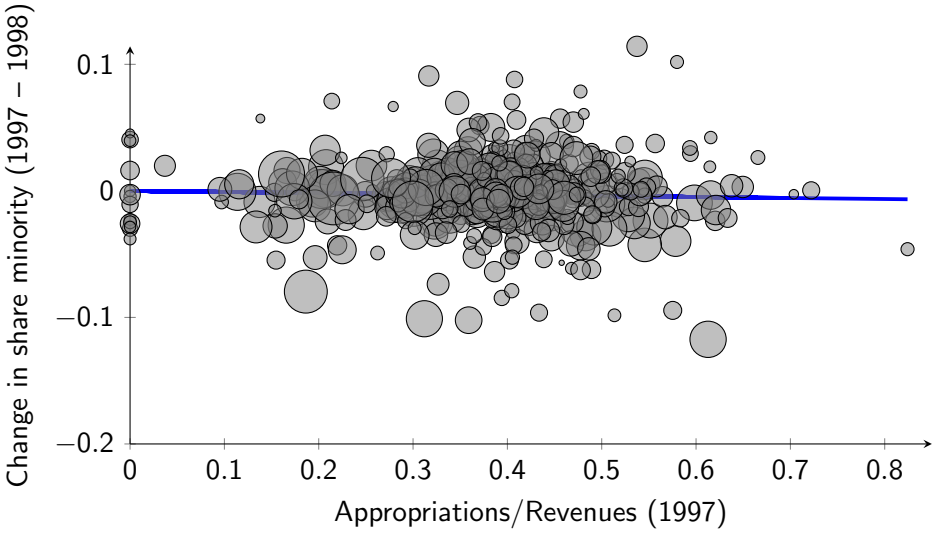
Potential Threats to Validity

- Baseline reliance on appropriations is related to changes in student body composition
- Economic conditions driving changes in appropriations and changes in minority enrollment

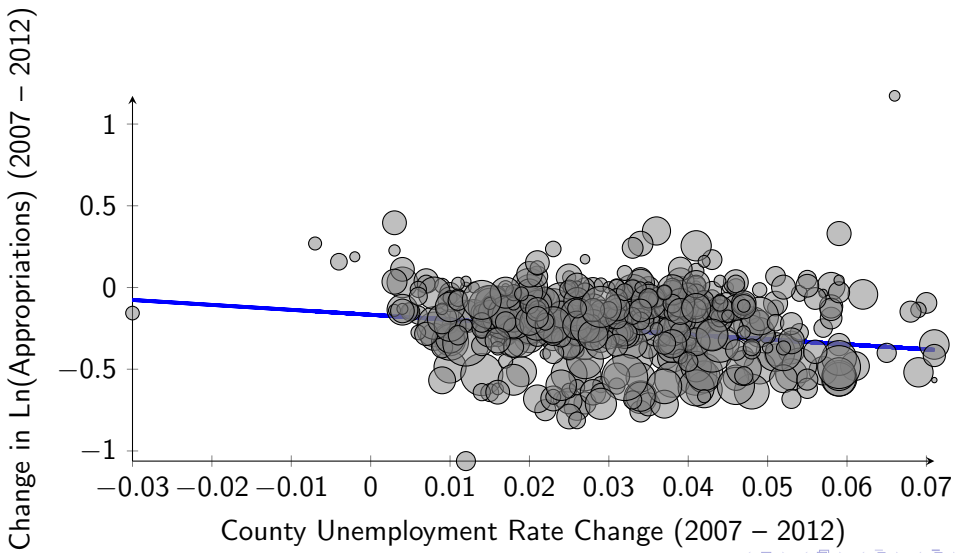
Share minority is positively correlated with reliance on appropriations...



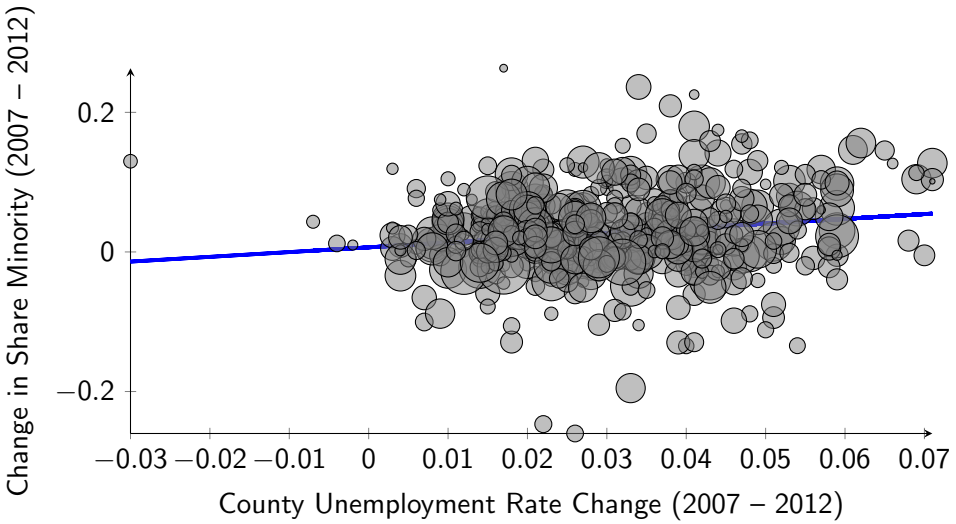
...But the change in share minority is not



Economic Conditions and Appropriations



Economic Conditions and Minority Enrollment



State Funding and Incoming Student Composition

Excluded institutions:		**Flagships**	**Nonselective**	**HBCUs**
Number of schools	523	513	431	484
Number of observations	8120	7960	6710	7503

State Funding and Incoming Student Composition

Excluded institutions:		**Flagships**	**Nonselective**	**HBCUs**
Number of schools	523	513	431	484
Number of observations	8120	7960	6710	7503
Share minority				
Ln(State appropriations)	0.065***	0.067***	0.065**	0.068***
	(0.021)	(0.021)	(0.024)	(0.019)
Mean of dependent variable	0.276	0.278	0.271	0.228

State Funding and Incoming Student Composition

Excluded institutions:		**Flagships**	**Nonselective**	**HBCUs**
Number of schools	523	513	431	484
Number of observations	8120	7960	6710	7503
Share minority				
Ln(State appropriations)	0.065***	0.067***	0.065**	0.068***
	(0.021)	(0.021)	(0.024)	(0.019)
Mean of dependent variable	0.276	0.278	0.271	0.228
Share Black				
Ln(State appropriations)	0.022	0.022	0.011	0.021
	(0.016)	(0.016)	(0.020)	(0.017)
Mean of dependent variable	0.157	0.158	0.151	0.101

State Funding and Incoming Student Composition

Excluded institutions:		**Flagships**	**Nonselective**	**HBCUs**
Number of schools	523	513	431	484
Number of observations	8120	7960	6710	7503
Share minority				
Ln(State appropriations)	0.065***	0.067***	0.065**	0.068***
	(0.021)	(0.021)	(0.024)	(0.019)
Mean of dependent variable	0.276	0.278	0.271	0.228
Share Black				
Ln(State appropriations)	0.022	0.022	0.011	0.021
	(0.016)	(0.016)	(0.020)	(0.017)
Mean of dependent variable	0.157	0.158	0.151	0.101
Share Hispanic				
Ln(State appropriations)	0.039***	0.040***	0.044***	0.041***
	(0.014)	(0.014)	(0.015)	(0.014)
Mean of dependent variable	0.110	0.110	0.112	0.117

Accounting for Differential Treatment Timing

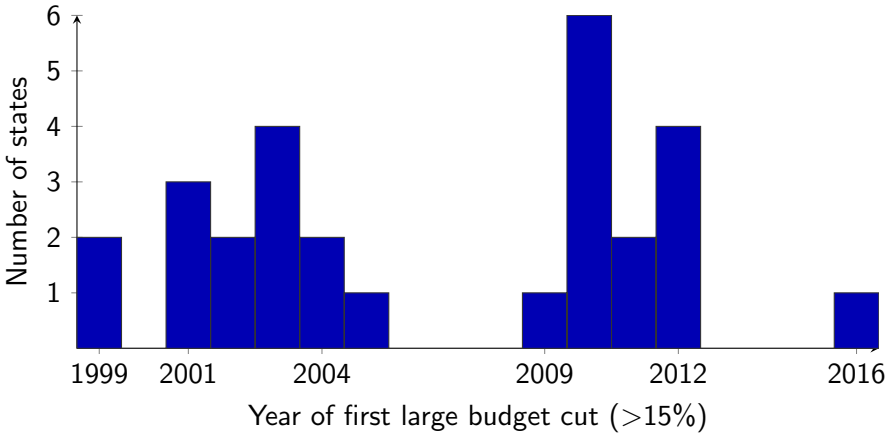
Accounting for Differential Treatment Timing

- TWFE model with staggered continuous and possibly endogenous treatment

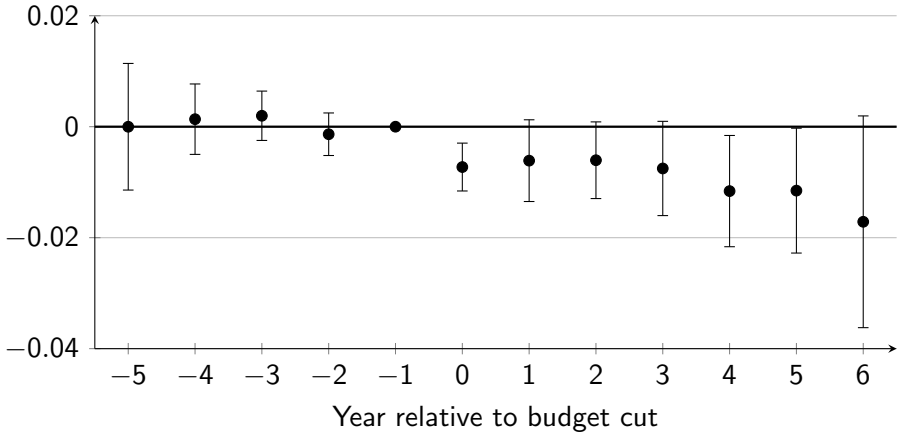
Accounting for Differential Treatment Timing

- TWFE model with staggered continuous and possibly endogenous treatment
- Consider model with binary treatment
  - First year when state experienced large ($> 15\%$) budget cut

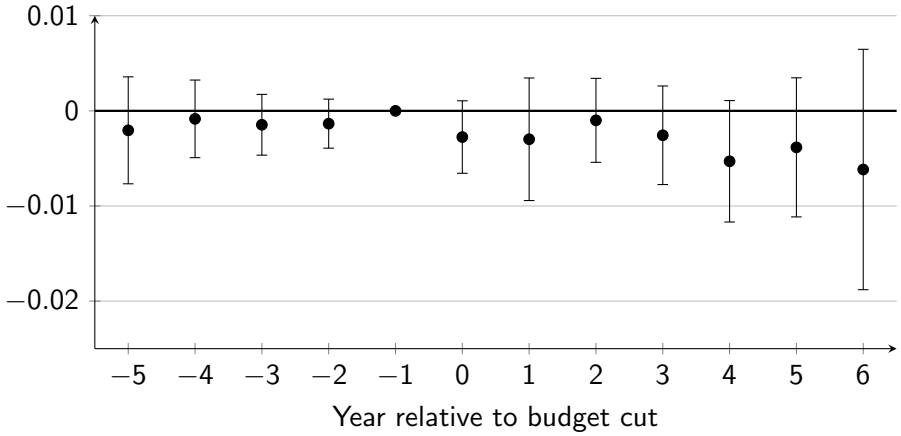
Distribution of First Year with Large Budget Cut



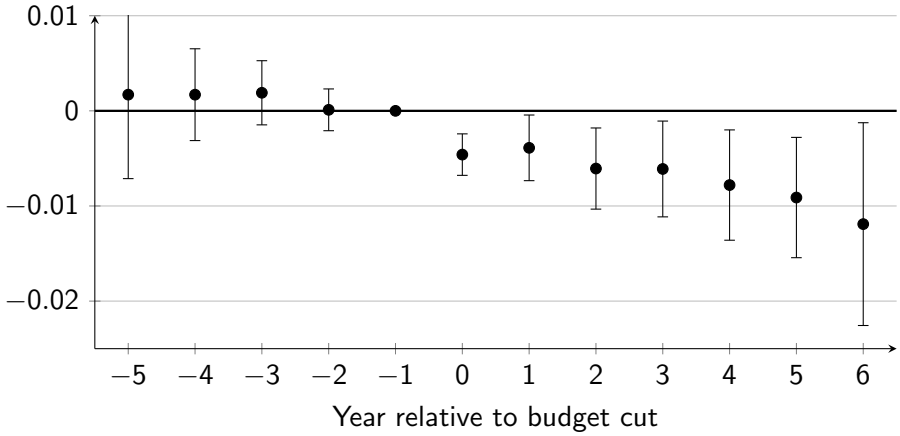
Event Study Estimates: Share Minority



Event Study Estimates: Share Black



Event Study Estimates: Share Hispanic



Potential Mechanism – Cost of Attendance

- Posted tuition and fees
  - Large tuition increases shift low-SES and lower-achieving students from 4-year to 2-year colleges (Hemelt & Marcotte, 2016)
  - Tuition increases at non-selective 4-years negatively related to diversity of student body (Allen & Wolniak, 2019)
- Generosity of state and institutional aid
  - Large literature on effects of aid on college access
- Student debt
  - Evidence that Hispanic students are more averse to borrowing (Boatman, Evans & Soliz, 2017)

State Funding and Cost of Attendance

Excluded institutions:		**Flagships**	**Nonselective**	**HBCUs**
Ln(posted tuition and fees): 1998-2019				
Ln(State appropriations)	-0.15*	-0.16*	-0.15	-0.15*
	(0.089)	(0.087)	(0.10)	(0.091)
Mean of dependent variable	8.884	8.879	8.921	8.899

State Funding and Cost of Attendance

Excluded institutions:		**Flagships**	**Nonselective**	**HBCUs**
Ln(posted tuition and fees): 1998-2019				
Ln(State appropriations)	-0.15*	-0.16*	-0.15	-0.15*
	(0.089)	(0.087)	(0.10)	(0.091)
Mean of dependent variable	8.884	8.879	8.921	8.899
Ln(posted tuition and fees): 2004-2019				
Ln(State appropriations)	-0.24***	-0.24***	-0.23**	-0.24***
	(0.077)	(0.076)	(0.088)	(0.079)
Mean of dependent variable	9.009	9.003	9.048	9.024

State Funding and Student Borrowing

Excluded institutions:		**Flagships**	**Nonselective**	**HBCUs**
Share of students with loans: 1998-2019				
Ln(State appropriations)	-0.051	-0.049	-0.027	-0.066
	(0.040)	(0.040)	(0.045)	(0.042)
Mean of dependent variable	0.515	0.519	0.515	0.500

State Funding and Student Borrowing

Excluded institutions:		**Flagships**	**Nonselective**	**HBCUs**
Share of students with loans: 1998-2019				
Ln(State appropriations)	-0.051	-0.049	-0.027	-0.066
	(0.040)	(0.040)	(0.045)	(0.042)
Mean of dependent variable	0.515	0.519	0.515	0.500
Share of students with loans: 2004-2019				
Ln(State appropriations)	-0.080**	-0.079**	-0.069*	-0.084**
	(0.033)	(0.034)	(0.039)	(0.035)
Mean of dependent variable	0.537	0.541	0.537	0.520

State Funding and Cost of Attendance

	Share with state grants	Share with institution grants	Share with federal grants	Ln(scholarship spending per FTE)
Ln(State appropriations)	0.18*	0.095	-0.017	0.75***
	(0.099)	(0.063)	(0.029)	(0.26)
Mean of dep. variable	0.391	0.447	0.403	2.27

Spillover Effects

- Are there spillovers to other types of institutions?
  - Evidence from prior studies (Goodman & Volz, 2020; Bound & Simon, 2021)

- Estimate state-level model of incoming student characteristics by institution type:

$$y_{jst} = \beta_0 + \sum_j \beta_j \ln(StateAppropriations_{s,t-1}) + X_{st}\beta_1 + (\mu_j \times \eta_t) + (\mu_j \times \eta_s) + \varepsilon_{jst}$$

where

$$j = \{\text{public 4-year, public 2-year, private nonprofit 4-year, private for-profit}\}$$

Spillover Effects

	Share minority	Share Black	Share Hispanic
Public 4-year	0.054**	0.017	0.033***
	(0.021)	(0.022)	(0.0096)
Public 2-year	0.025	-0.0022	0.030***
	(0.019)	(0.012)	(0.010)
Private 4-year nonprofit	-0.012	-0.011	-0.0019
	(0.013)	(0.010)	(0.012)
For-profit	-0.029	-0.0077	-0.021
	(0.029)	(0.023)	(0.015)

Effect on Degrees Earned

	Share minority degrees$_{t+3}$		**Share Black degrees$_{t+3}$**		**Share Hispanic degrees$_{t+3}$**	
Ln(State appropriations)$_t$	0.028**	0.0089	0.00053	-0.0064	0.036***	0.023**
	(0.012)	(0.012)	(0.0060)	(0.0040)	(0.012)	(0.0095)
Share incoming students$_t$		0.32***		0.28***		0.40***
		(0.029)		(0.038)		(0.063)

Discussion

- Decreases in postsecondary funding associated with fewer incoming underrepresented minority students
- Cost of attendance is likely an important factor
- Other mechanisms?
- Findings may be relevant for student body composition at other types of institutions
- Evidence of impact on degrees awarded