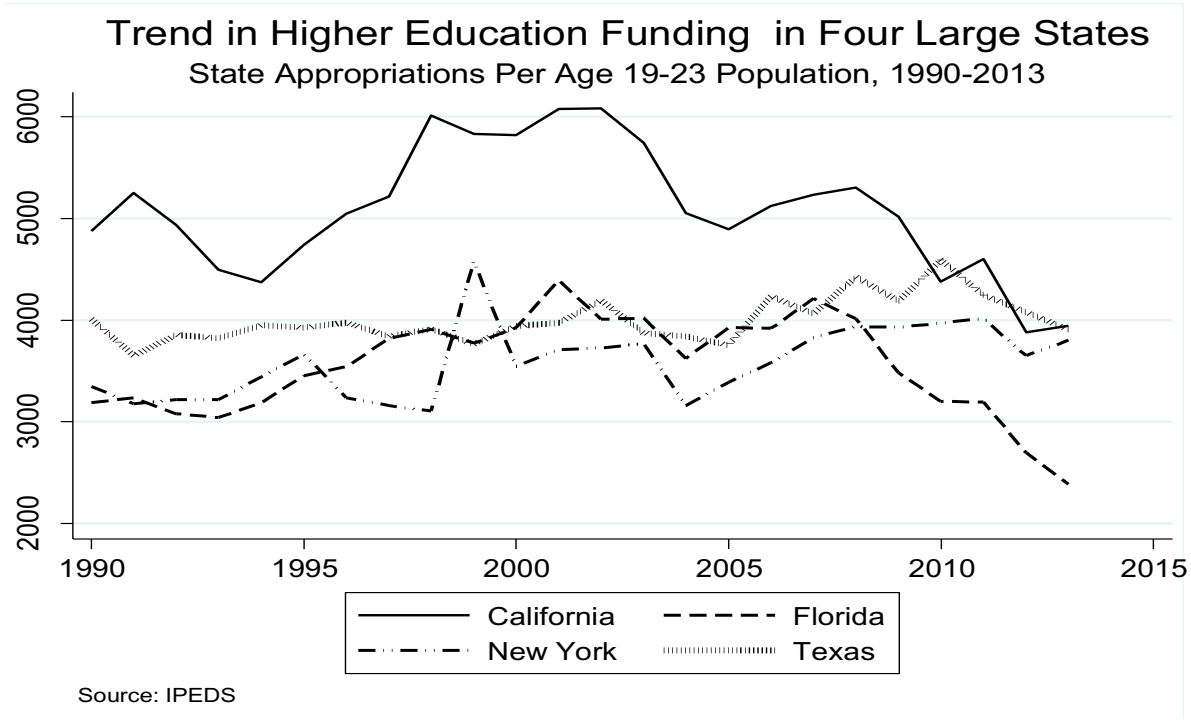
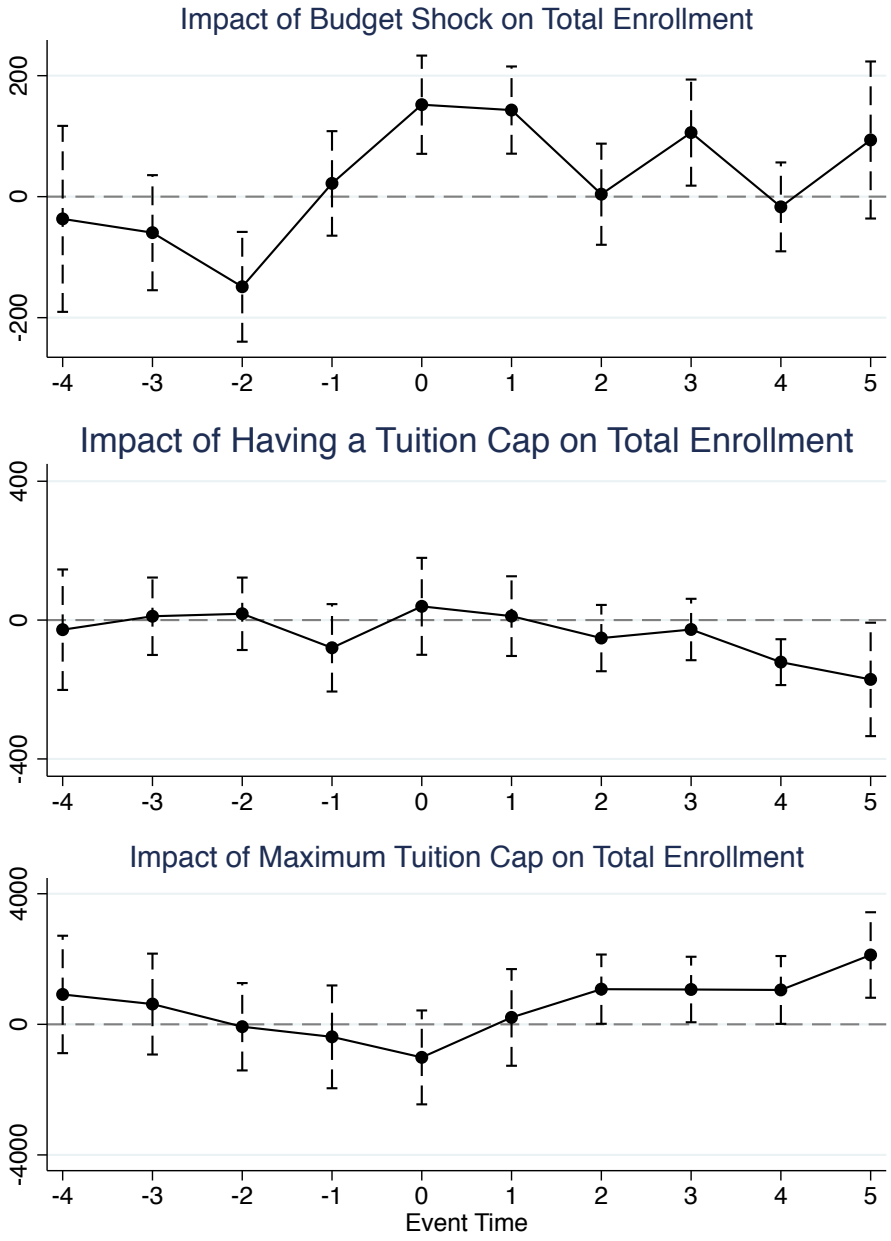
Figure A1 - Evolution of appropriations for four large states



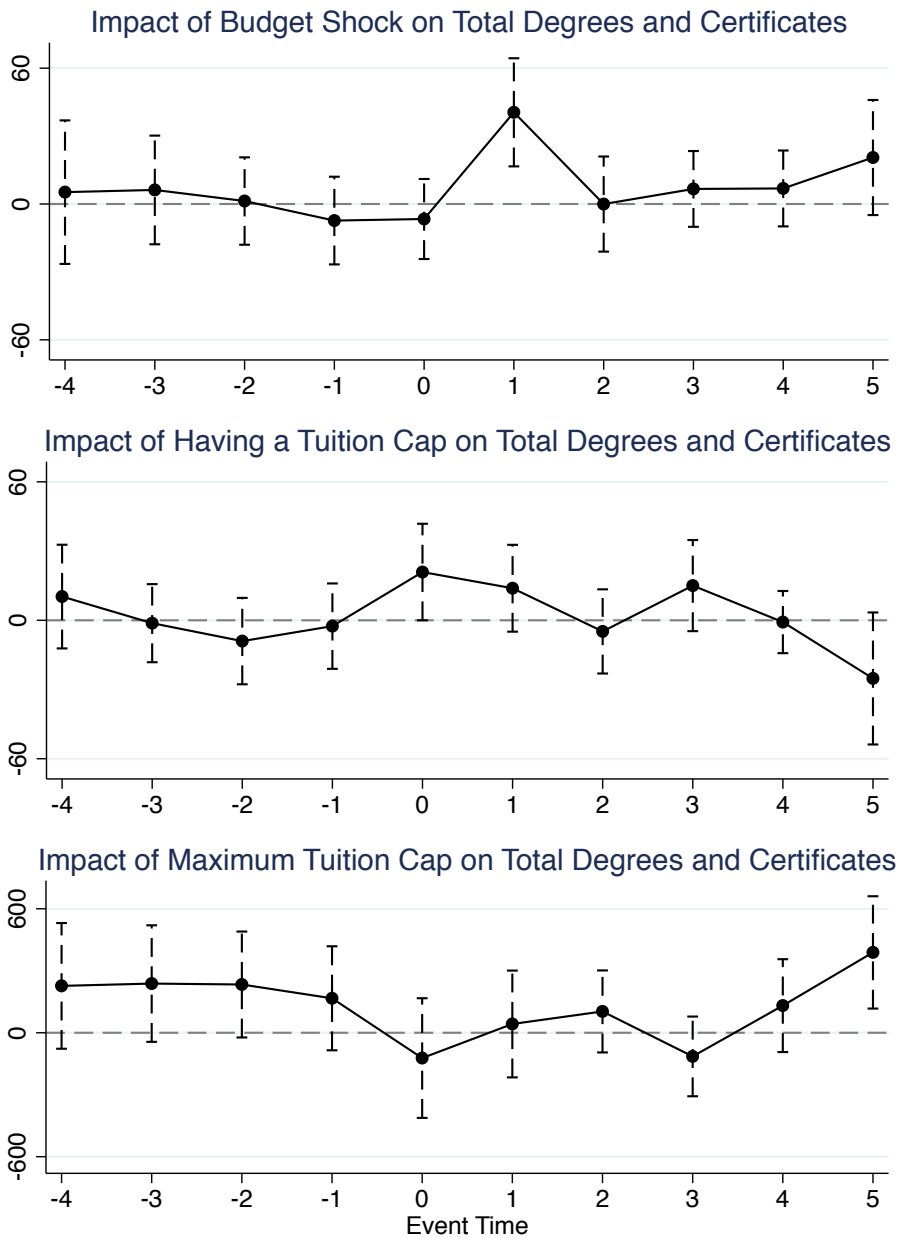
Notes: This figure plots trends in state appropriations for higher education per college-age population for California, Florida New York and Texas. Data come from the Integrated Postsecondary Education Data System (IPEDS) for 1990-2013.

Figure A2



Notes: This figure presents estimates and 95 percent confidence intervals from a regression of total enrollment (in levels) for public institutions on lags and leads of the state budget shock instrument (the share of each institution's revenue from state appropriations in 1990 times yearly state appropriations per capita, in $1000s), an indicator for whether a tuition cap is in place, and the maximum percentage increase allowed under the cap (set to zero when no cap is in place). The model also controls for lags and leads of county and state unemployment rates, time-varying county and institution characteristics, institution fixed effects, year fixed effects, and state-specific time trends. Standard errors are clustered at the institution level.

Figure A3



Notes: This figure presents estimates and 95 percent confidence intervals from a regression of total degrees awarded (in levels) on lags and leads of the state budget shock instrument (the share of each institution's revenue from state appropriations in 1990 times yearly state appropriations per capita, in $1000s), an indicator for whether a tuition cap is in place, and the maximum percentage increase allowed under the cap (set to zero when no cap is in place). The model also controls for lags and leads of county and state unemployment rates, time-varying county and institution characteristics, institution fixed effects, year fixed effects, and state-specific time trends. Standard errors are clustered at the institution level.

Table A1 - List of tuition caps and freezes by state, 1990-2013

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Alabama[2]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0	--	--	--
Alaska	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arizona	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arkansas	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
California	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colorado	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Connecticut[1]	--	--	--	--	--	--	--	--	--	--	0	--	--	--	--	--	--	--	--	--	--	--	0	--
Delaware	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Florida	--	--	--	--	--	0	--	--	--	--	--	--	--	--	--	--	--	--	0	--	--	--	--	--
Georgia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hawaii	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Idaho	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	--	0.1	0.1
Illinois	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indiana	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iowa	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Kansas	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Kentucky	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Louisiana	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maine[2]	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0	0	--	--	--	--	--	0	--	0
Maryland[1]	--	--	--	--	--	--	--	--	0.04	0.04	0.04	0.04	0.04	--	--	--	--	0	0	0	0	0.03	0.03	0.03
Massachusetts	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Michigan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minnesota	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mississippi	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Missouri[1]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	--	--
Montana	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	--	--	--	--
Nebraska	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nevada	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
New Hampshire[2]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	--	0	--	--	--	0
New Jersey[1]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.08	0.08	0.08	--	--	0.03	0.04	--	--
New Mexico	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
New York[3]	--	--	--	--	0	0	--	0	0	0	0	0	0	0	--	0	0	0	0	0	--	--	--	--
North Carolina[1]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	--	--	0	--	--	0.065	--
North Dakota	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ohio	--	--	--	--	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	--	--	--	0.06	0.06	0.035	0.035	0.035	0.035	0.035	0.035
Oklahoma[4]	--	--	--	--	--	--	--	--	--	--	--	--	0.07	0.07	--	--	--	--	--	--	0	--	--	--
Oregon[1]	--	--	--	--	--	--	--	--	0	0	0	0	--	--	--	--	0.03	0.03	--	--	--	--	--	--
Pennsylvania	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rhode Island	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
South Carolina	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
South Dakota	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tennessee	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Texas	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Utah	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vermont	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Virginia	--	--	--	--	--	0.03	0.03	0	0	0	-0.2	0	0	--	--	--	--	--	0.06	0.04	--	--	--	--
Washington	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
West Virginia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Wisconsin[1]	--	--	--	--	--	--	--	--	--	--	--	0	--	0.08	--	--	--	--	--	--	--	--	0.055	0.055
Wyoming	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes : This table lists states and years where state legislatures impose in-state tuition caps and freezes at public institutions. We compiled these data by referencing official sources when available, combined with Lexis-Nexis searches of state newspapers going back to 1990. In some cases we checked actual tuition data to confirm the imposition of a cap, although in no case did we code a tuition cap or freeze unless it could be independently verified. 1 - Applies only to four-year institutions in the state. 2 - Applies only to two-year institutions in the state. 3 - Applies only to CUNY (except 2003) and Cornell (all years). 4 - Applies to all institutions except the Oklahoma Technology Centers.

Table A2 - Correlates of reliance on state appropriations

	All	Two year	Four year
	(1)	(2)	(3)
Two year	-0.457***		
	(0.107)		
Selective			-0.667***
			(0.124)
As a share of total spending:			
Tuition and fees	0.134***	-0.018	0.276***
	(0.029)	(0.040)	(0.060)
State appropriations	0.605***	0.472***	0.628***
	(0.029)	(0.052)	(0.043)
Local appropriations	-0.399***	-0.337***	-0.031*
	(0.034)	(0.055)	(0.018)
Total grants	0.040***	0.028	0.151***
	(0.015)	(0.018)	(0.030)
Instructional spending	0.067***	0.062***	0.156***
	(0.016)	(0.020)	(0.030)
Academic support	0.022***	0.011	0.021
	(0.006)	(0.008)	(0.014)
Student services	0.012*	0.002	0.050***
	(0.007)	(0.008)	(0.018)
Administration	-0.012	-0.030***	0.055***
	(0.009)	(0.010)	(0.019)
Scholarships	0.013*	0.017*	0.069***
	(0.008)	(0.010)	(0.013)
Log total spending	-0.612***	-0.204	-2.884***
	(0.203)	(0.130)	(0.381)
Log enrollment	-0.322	-0.572*	-0.699
	(0.242)	(0.342)	(0.455)
Sample size	30072	17568	12504

Notes: This table describes relationships between public institution characteristics and reliance on state appropriations, defined as the share of each institution's revenue from state appropriations in 1990. Each row shows the coefficient from a regression of a characteristic on this measure of reliance using data from 1991-2013, controlling for state effects and year effects. Column (1) shows results for all public institutions, column (2) shows results for two year institutions, and column (3) shows results for four year institutions. Standard errors, clustered at the institution level, are in parentheses.

*significant at 10-percent; **significant at 5-percent; ***significant at 1-percent

Table A3 - 2SLS estimates of the impacts of tuition and spending on other enrollment outcomes

	Current year	T+1	T+2	T+3
Two Year Institutions				
Panel A: log FTUG enrollment	(1)	(2)	(3)	(4)
Log total spending	0.129	0.130	0.083	0.049
	(0.282)	(0.353)	(0.366)	(0.322)
Log tuition	-0.021	-0.094	-0.019	-0.200
	(0.151)	(0.177)	(0.193)	(0.187)
Sample size	16797	16107	15387	14662
Panel B: log PTUG enrollment				
Log total spending	0.406	1.787***	1.852***	1.672***
	(0.475)	(0.547)	(0.591)	(0.517)
Log tuition	-0.175	0.251	0.246	-0.035
	(0.214)	(0.305)	(0.323)	(0.293)
Sample size	16750	16060	15341	14618
Four Year Institutions				
Panel C: log FTUG enrollment				
Log total spending	0.071	0.384***	0.246	0.182
	(0.090)	(0.148)	(0.150)	(0.172)
Log tuition	-0.080	0.040	-0.065	-0.100
	(0.065)	(0.103)	(0.094)	(0.100)
Sample size	11391	10844	10293	9755
Panel D: log PTUG enrollment				
Log total spending	0.572**	0.283	1.106***	0.786*
	(0.270)	(0.311)	(0.333)	(0.422)
Log tuition	0.173	-0.399*	-0.276	-0.629**
	(0.241)	(0.239)	(0.251)	(0.312)
Sample size	11353	10804	10253	9715

Notes : This table reports two-stage least squares estimates of the effects of tuition and spending on log full-time and part-time undergraduate enrollment at four-year institutions. In the first stage we regress each institution's yearly change in log total spending and log tuition on the change in the budget shock instrument (the share of each institution's revenue from state appropriations in 1990 times yearly state appropriations per capita), the change in an indicator for whether a tuition cap is in place in the current state and year, and the change in the maximum percentage increase allowed under the cap (set to zero when no cap is in place). The second stage regresses each institution's yearly change in log enrollment on changes in tuition and spending from the first stage. Panel A reports results for full-time undergraduate enrollment and Panel B reports results for part time enrollment. Panels A and B restrict the sample to two-year institutions, while Panels C and D repeat the pattern for four-year institutions. Both stages also control for time-varying county demographic and economic covariates, time-invariant institution characteristics such as sector, selectivity and highest degree offered, year fixed effects, and state fixed effects. Standard errors, clustered at the institution level, are in parentheses.

*significant at 10-percent; **significant at 5-percent; ***significant at 1-percent

Table A4 - 2SLS estimates of the impacts of spending and tuition on enrollment by race

	Current year	T+1	T+2	T+3
Panel A: non-whites	(1)	(2)	(3)	(4)
Log total spending	0.113	0.787***	0.854***	0.857***
	(0.144)	(0.207)	(0.228)	(0.233)
Log tuition	-0.119	0.086	0.031	-0.038
	(0.082)	(0.119)	(0.134)	(0.142)
Sample size	28197	26958	25687	24422
Panel B: whites				
Log total spending	0.481***	0.857***	0.905***	0.874***
	(0.146)	(0.188)	(0.219)	(0.221)
Log tuition	0.076	0.070	0.055	-0.079
	(0.081)	(0.104)	(0.124)	(0.131)
Sample size	28189	26950	25679	24414

Notes : This table reports two-stage least squares estimates of the effects of tuition and spending on log enrollment for non-white and white students. In the first stage we regress each institution's yearly change in log total spending and log tuition on the change in the budget shock instrument (the share of each institution's revenue from state appropriations in 1990 times yearly state appropriations per capita), the change in an indicator for whether a tuition cap is in place in the current state and year, and the change in the maximum percentage increase allowed under the cap (set to zero when no cap is in place). The second stage regresses each institution's yearly change in log non-white enrollment or log white enrollment on the changes in tuition and spending from the first stage. Both stages also control for time-varying county demographic and economic covariates, time-invariant institution characteristics such as sector, selectivity and highest degree offered, year fixed effects, and state fixed effects. Standard errors, clustered at the institution level, are in parentheses.

*significant at 10-percent; **significant at 5-percent; ***significant at 1-percent

Table A5 - 2SLS estimates by four-year college selectivity

Panel A: less selective	Current year	T+1	T+2	T+3
Log enrollment	(1)	(2)	(3)	(4)
Log total spending	0.299**	0.541**	0.814**	0.747**
	(0.151)	(0.244)	(0.328)	(0.355)
Log tuition	0.024	-0.021	0.075	0.078
	(0.087)	(0.131)	(0.206)	(0.201)
Sample size	4558	4362	4165	3969
Log total awards				
Log total spending	0.441	0.727	1.035**	0.829*
	(0.352)	(0.456)	(0.461)	(0.472)
Log tuition	0.158	0.441	0.663**	0.652**
	(0.212)	(0.300)	(0.328)	(0.323)
Sample size	4503	4307	4111	3916
Panel B: more selective				
Log enrollment				
Log total spending	0.229*	0.417**	0.615***	0.469*
	(0.118)	(0.208)	(0.231)	(0.261)
Log tuition	-0.016	-0.077	-0.066	-0.176
	(0.093)	(0.137)	(0.162)	(0.172)
Sample size	5980	5713	5442	5173
Log total awards				
Log total spending	0.337	0.254	0.441	0.556
	(0.267)	(0.329)	(0.333)	(0.383)
Log tuition	0.183	0.045	0.072	0.286
	(0.207)	(0.200)	(0.225)	(0.235)
Sample size	5964	5691	5420	5152

Notes : This table reports two-stage least squares estimates of the effects of tuition and spending on certificates and degrees awarded by selectivity for four-year institutions. More selective institutions are those with admission rates less than 60 percent, in state student shares less than 90 percent, and 2009 Barrons rankings of one or two. Less selective institutions are those with admissions rates above 60 percent, in state shares above 90 percent, and Barrons rankings above two. In the first stage we regress each institution's yearly change in log total spending and log tuition on the change in the budget shock instrument (the share of each institution's revenue from state appropriations in 1990 times yearly state appropriations per capita), the change in an indicator for whether a tuition cap is in place in the current state and year, and the change in the maximum percentage increase allowed under the cap (set to zero when no cap is in place). The second stage regresses each institution's yearly change in certificates or degrees on the changes in tuition and spending from the first stage. Panels A and B report results for less- and more-selective four-year institutions. Both stages also control for time-varying county demographic and economic covariates, time-invariant institution characteristics such as sector, selectivity and highest degree offered, year fixed effects, and state fixed effects. Standard errors, clustered at the institution level, are in parentheses.
*significant at 10-percent; **significant at 5-percent; ***significant at 1-percent

Table A6 - Alternative state-by-time controls

Outcome is log enrollment	Log Spending	Log Tuition
	(1)	(2)
Changes, state effects	0.300**	-0.017
(baseline model)	(0.134)	(0.076)
Changes, state trends	0.268	-0.037
	(0.166)	(0.080)
Changes, state-by-four-year effects	0.244	-0.046
	(0.158)	(0.081)
Changes, institution effects	0.330**	-0.014
	(0.145)	(0.075)
Levels, institution effects	0.417***	-0.051
	(0.081)	(0.164)
Levels, institution effects	0.380***	-0.111
and state trends	(0.124)	(0.104)
Levels, institution effects	0.287	-0.160
and state-by-four-year effects	(0.274)	(0.212)
Sample size	27659	

Notes : This table reports two-stage least squares estimates of the effects of tuition and spending on log total fall enrollment with alternative controls for state-by-time variation in outcomes. "Changes" specifications use the yearly change in log enrollment as the dependent variable and changes in log tuition and log spending as the endogenous regressors, instrumenting with the change in the budget shock instrument, the change in whether a tuition cap is in place, and the change in the maximum percentage increase allowed under the cap (set to zero when no cap is in place). "Levels" specifications use log enrollment as the dependent variable, log tuition and log spending as endogenous regressors, and the budget shock, presence of a tution cap, and level of the cap as instruments. "Changes" models control for time-varying county demographic and economic covariates, time-invariant institution characteristics, and year effects, while "levels" models controls for time-varying county demographic and economic covariates, institution characteristics interacted with a time trend, and year effects. Standard errors, clustered at the institution level, are in parentheses.

*significant at 10-percent; **significant at 5-percent; ***significant at 1-percent

Table A7 - 2SLS estimates of the effects of spending and tuition based on appropriations

	Current year	T+1	T+2	T+3
Panel A: log enrollment	(1)	(2)	(3)	(4)
Log total spending	0.331***	0.563***	0.480***	0.344***
	(0.095)	(0.079)	(0.080)	(0.064)
Log tuition	-0.021	0.030	-0.031	-0.139
	(0.064)	(0.077)	(0.087)	(0.095)
Sample size	28197	26958	25687	24422
Panel B: log total awards				
Log total spending	0.473***	0.666***	0.514***	0.483***
	(0.123)	(0.120)	(0.119)	(0.104)
Log tuition	0.153	0.207	0.111	-0.041
	(0.131)	(0.146)	(0.146)	(0.149)
Sample size	28108	26834	25564	24304

Notes : This table reports two-stage least squares estimates of the effects of tuition and spending on total enrollment and log total awards using actual appropriations rather than the budget shock to instrument for spending. In the first stage we regress each institution's yearly change in log spending and log tuition on the change in their actual log appropriations, the change in an indicator for whether a tuition cap is in place in the current state and year, and the change in the maximum percentage increase allowed under the cap (set to zero when no cap is in place). The second stage regresses each institution's yearly changes in outcomes on predicted changes in log spending and tuition from the first stage. Panel A reports results for log enrollment, and Panel B reports results for log total awards. Both stages also control for time-varying county demographic and economic covariates, time-invariant institution characteristics such as sector, selectivity and highest degree offered, year fixed effects, and state fixed effects. Standard errors, clustered at the institution level, are in parentheses.
*significant at 10-percent; **significant at 5-percent; ***significant at 1-percent

Table A8 - Spillover impacts of public budget shocks on private institutions, by award type

Panel A: log certificates	Current year	T+1	T+2	T+3
	(1)	(2)	(3)	(4)
County average budget shock	-0.024	-0.052*	-0.018	-0.010
	(0.025)	(0.030)	(0.037)	(0.041)
Any tuition cap	-0.013	-0.014	-0.005	-0.029*
	(0.013)	(0.015)	(0.016)	(0.017)
Sample size	33507	29403	25844	22701
Panel B: log associate's degrees				
County average budget shock	-0.106***	-0.202***	-0.115*	-0.083
	(0.040)	(0.050)	(0.061)	(0.065)
Any tuition cap	0.011	0.033*	0.024	0.002
	(0.018)	(0.020)	(0.022)	(0.024)
Sample size	16969	15148	13490	11957
Panel C: log bachelor's degrees				
County average budget shock	0.013	0.000	-0.063	-0.021
	(0.041)	(0.044)	(0.052)	(0.054)
Any tuition cap	0.013	0.021	0.007	0.011
	(0.012)	(0.013)	(0.015)	(0.015)
Sample Size	18966	17188	15547	13969

Notes : This table reports reduced form estimates of the impacts of the change in the average enrollment-weighted budget shock instrument (the share of each institution's revenue from state appropriations in 1990 times yearly state appropriations per capita) across public institutions in a county and the change in an indicator for whether any tuition cap is in place in the current state and year on the change in outcomes in private (not-for-profit and for-profit) institutions in the same county. Panels A, B, and C report results for log certificates, log associate's degrees and log bachelor's degrees respectively. The regressions also control for time-varying county demographic and economic covariates, time-invariant institution characteristics such as sector, selectivity and highest degree offered, year fixed effects, and state fixed effects. Standard errors, clustered at the institution level, are in parentheses.

*significant at 10-percent; **significant at 5-percent; ***significant at 1-percent

Table A9 - Impacts of county-level budget shocks on outcomes in public institutions

Panel A: log enrollment	Current year	T+1	T+2	T+3
	(1)	(2)	(3)	(4)
Log total spending	0.528**	0.824***	1.141***	0.996***
	(0.209)	(0.250)	(0.312)	(0.292)
Log tuition	0.138	0.090	0.255	0.023
	(0.130)	(0.150)	(0.192)	(0.179)
Sample size	28197	26958	25687	24422
Panel B: log total awards				
Log total spending	0.139	0.819**	1.312***	1.171***
	(0.337)	(0.412)	(0.483)	(0.449)
Log tuition	0.073	0.199	0.402	0.369
	(0.210)	(0.244)	(0.298)	(0.273)
Sample size	28108	26834	25564	24304

Notes : This table reports reduced form estimates of the impacts of the change in the average enrollment-weighted budget shock instrument (the share of each institution's revenue from state appropriations in 1990 times yearly state appropriations per capita) across public institutions in a county and the change in an indicator for whether any tuition cap is in place in the current state and year on the change in outcomes for all public institutions in a county. Panels A and B report results for log enrollment and log total awards. The regressions also control for time-varying county demographic and economic covariates, time-invariant institution characteristics such as sector, selectivity and highest degree offered, year fixed effects, and state fixed effects. Standard errors, clustered at the institution level, are in parentheses.

*significant at 10-percent; **significant at 5-percent; ***significant at 1-percent

Table A10 - 2SLS estimates of effects on freshman and upperclassman enrollment

	Current year	T+1	T+2	T+3
Panel A: log FTE freshmen				
Log total spending	0.580*	0.032	1.276***	0.829**
	(0.349)	(0.391)	(0.480)	(0.421)
Log tuition	0.148	-0.206	0.713**	0.414
	(0.194)	(0.197)	(0.281)	(0.253)
Sample size	27311	26093	24841	23610
Panel B: log FTE upperclassmen				
Log total spending	1.298**	0.356	-0.299	1.676***
	(0.589)	(0.474)	(0.464)	(0.522)
Log tuition	0.836**	-0.231	-0.054	0.406
	(0.373)	(0.272)	(0.272)	(0.302)
Sample size	27896	26646	25364	24107

Notes : This table reports two-stage least squares estimates of the effects of tuition and spending on enrollment for freshman and upperclassmen. In the first stage we regress each institution's yearly change in log total spending and log tuition on the change in the budget shock instrument (the share of each institution's revenue from state appropriations in 1990 times yearly state appropriations per capita), the change in an indicator for whether a tuition cap is in place in the current state and year, and the change in the maximum percentage increase allowed under the cap (set to zero when no cap is in place). The second stage regresses each institution's yearly change in certificates or degrees on the changes in tuition and spending from the first stage. Panel A reports results for full-time equivalent freshmen, and Panel B reports results for upperclassmen (with part-time students counting as 0.5 in both cases). Both stages also control for time-varying county demographic and economic covariates, time-invariant institution characteristics such as sector, selectivity and highest degree offered, year fixed effects, and state fixed effects. Standard errors, clustered at the institution level, are in parentheses.

*significant at 10-percent; **significant at 5-percent; ***significant at 1-percent