

Out-of-State Enrollment, Financial Aid and Academic Outcomes: Evidence from Wisconsin

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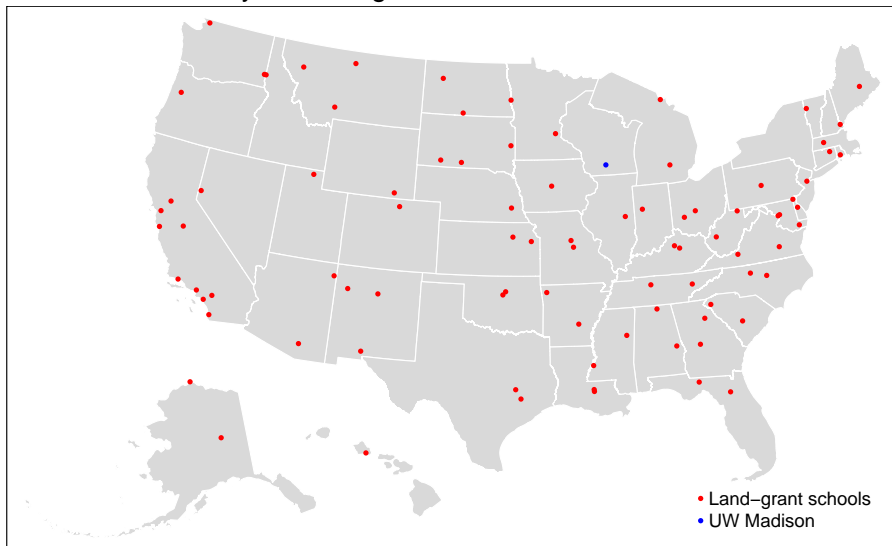
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Online Appendix

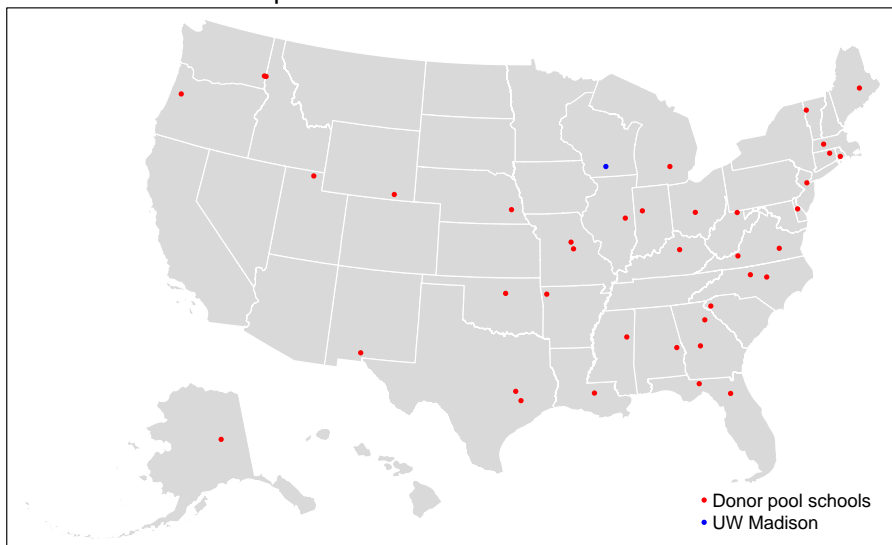
Updated: August 29, 2023

Figure A.1: Institution Locations (Primary Sample)

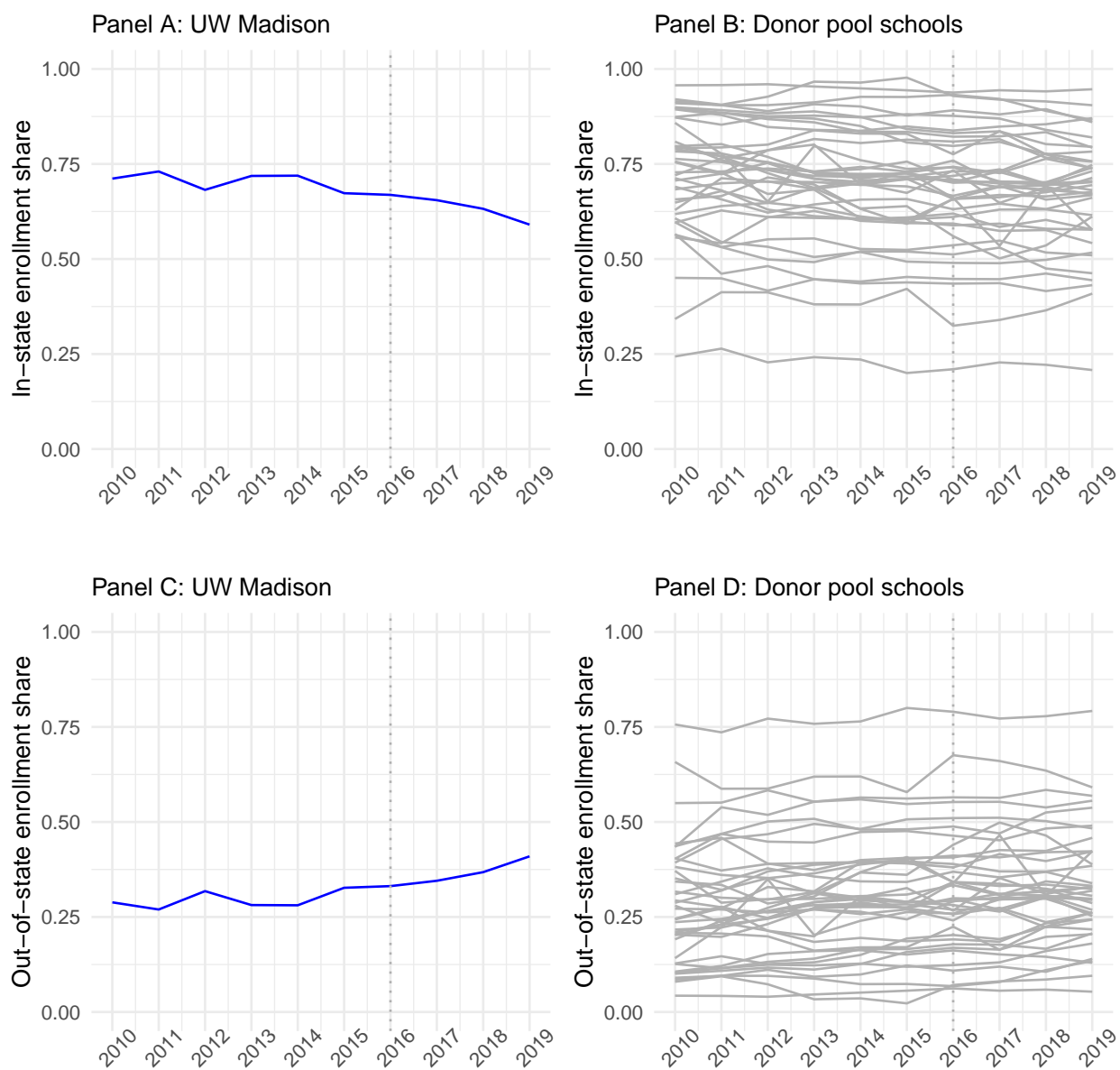
Panel A: Public 4-year land-grant institutions



Panel B: Final donor pool institutions

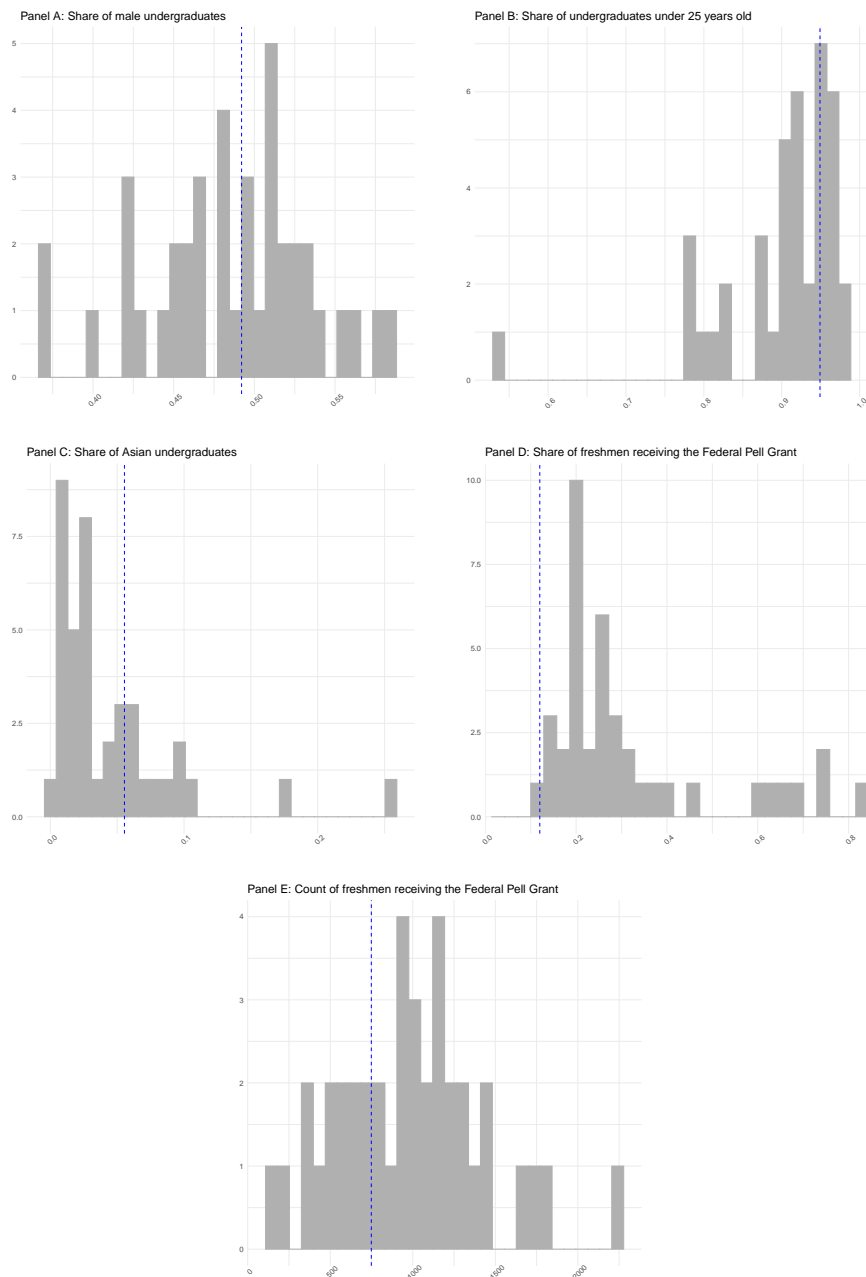


Note: Institution locations as reported in IPEDS. The primary donor pool consists of the 39 land-grant universities outside of Wisconsin and Minnesota for which we have observations for all outcome variables and covariates from 2010–2019.

Figure A.2: In- and Out-of-State Freshman Enrollment Shares

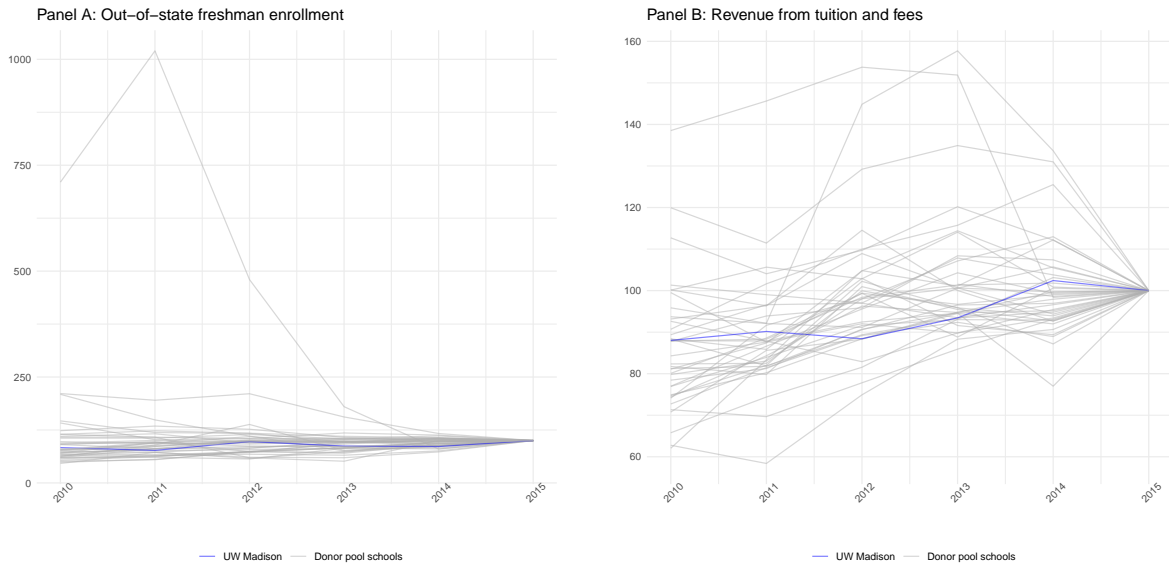
Note: The dotted vertical line shows 2016, the first year of treatment. Values calculated using data from IPEDS. The primary donor pool consists of the 39 land-grant universities outside of Wisconsin and Minnesota for which we have observations for all outcome variables and covariates from 2010–2019.

Figure A.3: Control Variables Summary Statistics, 2015



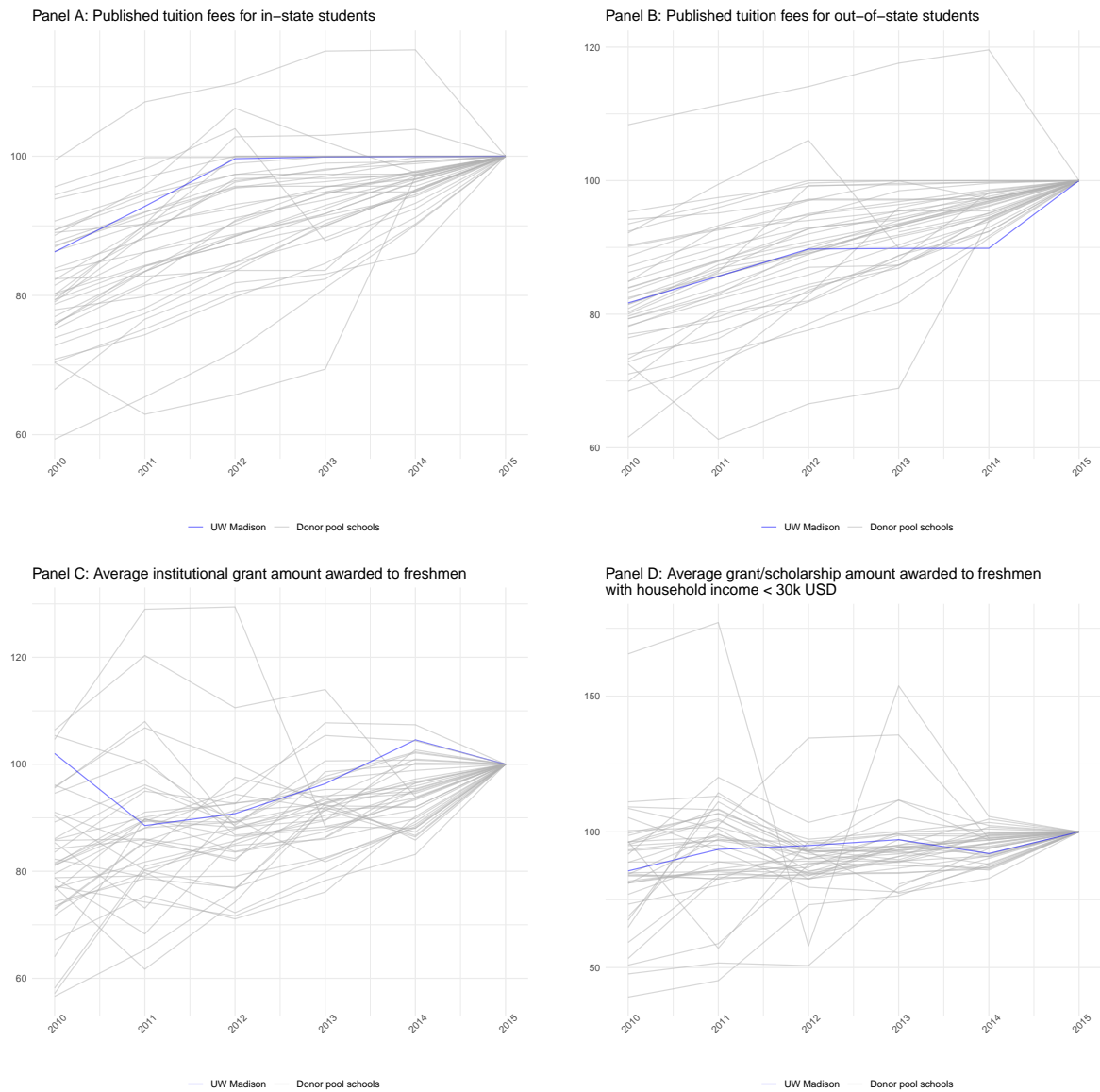
Note: Values calculated using data from IPEDS. The dashed blue line shows the value for the University of Wisconsin, Madison. The dark grey bars show the distribution for the primary donor pool institutions. The primary donor pool consists of the 39 land-grant universities outside of Wisconsin and Minnesota for which we have observations for all outcome variables and covariates from 2010–2019.

Figure A.4: First Stage Summary Statistics



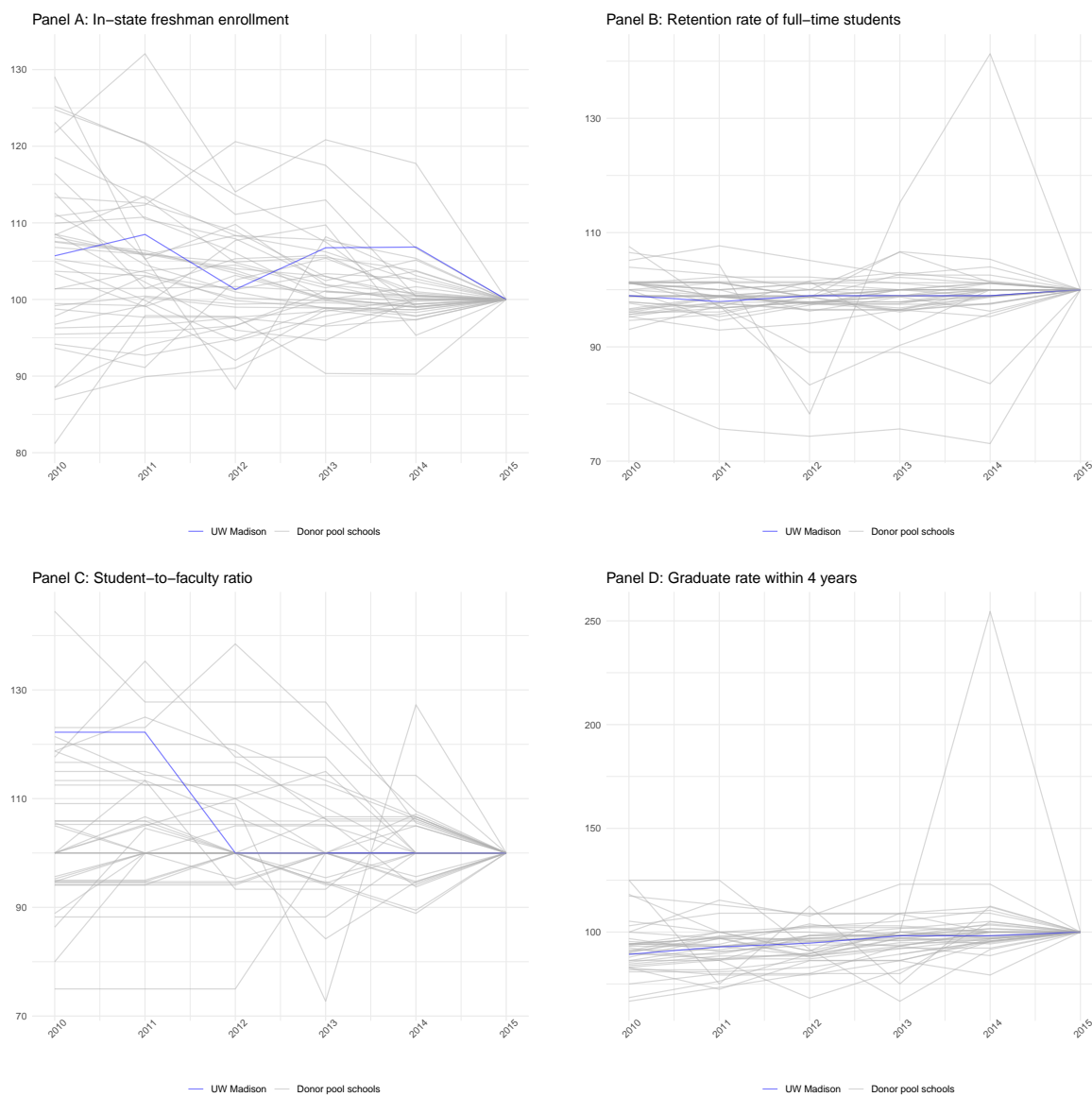
Note: Values calculated using data from IPEDS and normalized to 100 in 2015. The primary donor pool consists of the 39 land-grant universities outside of Wisconsin and Minnesota for which we have observations for all outcome variables and covariates from 2010–2019.

Figure A.5: Financial Outcomes Summary Statistics



Note: Values calculated using data from IPEDS and normalized to 100 in 2015. The primary donor pool consists of the 39 land-grant universities outside of Wisconsin and Minnesota for which we have observations for all outcome variables and covariates from 2010–2019.

Figure A.6: Academic Outcomes Summary Statistics



Note: Values calculated using data from IPEDS and normalized to 100 in 2015. The primary donor pool consists of the 39 land-grant universities outside of Wisconsin and Minnesota for which we have observations for all outcome variables and covariates from 2010–2019.

Table A.1 Primary Control Group/Donor Pool Institutions

Auburn University	Clemson University
Delaware State University	Florida A & M University
Fort Valley State University	Lincoln University
Louisiana State University and A&M	Michigan State University
Mississippi State University	New Mexico State University-Main Campus
North Carolina A & T State University	North Carolina State University at Raleigh
Ohio State University-Main Campus	Oklahoma State University-Main Campus
Oregon State University	Prairie View A & M University
Purdue University-Main Campus	Rutgers University-New Brunswick
Texas A & M University-College Station	University of Alaska Fairbanks
University of Arkansas	University of Connecticut
University of Florida	University of Georgia
University of Idaho	University of Illinois at Urbana-Champaign
University of Kentucky	University of Maine
University of Massachusetts-Amherst	University of Missouri-Columbia
University of Nebraska-Lincoln	University of Rhode Island
University of Vermont	University of Wyoming
Utah State University	Virginia Polytechnic Institute and State University
Virginia State University	Washington State University
West Virginia University	

Note: List of institutions in our primary control group/donor pool. Includes land grant universities outside Wisconsin and Minnesota that have observations for each of our covariates from 2010–2019 in IPEDS.

Table A.2 First Stage (robustness checks)

Outcome	Synthetic Control (1)	Synthetic Control (2)	Synthetic Control (3)	Synthetic Control (4)	TWFE (5)	Synthetic DiD (6)
Out-of-state Freshman Enrollment						
Treatment Effect (%)	30.601	26.894	31.001	49.829	44.800	39.810
Ranked-RMSPE-based p -value	0.025	0.075	0.362	0.011		
Asymptotic p -value					0.000	
Placebo-variance-based p -value						0.034
Revenue from Tuition and Fees						
Treatment Effect (%)	45.177	19.722	52.563	43.810	38.575	45.974
Ranked-RMSPE-based p -value	0.050	0.075	0.072	0.058		
Asymptotic p -value					0.000	
Placebo-variance-based p -value						0.000
Covariates	Restricted	All	All	All	All*	All*
Year of estimate	2019	2018	2019	2019	2019	2019
Control universities	Land grant	Land grant	R1+R2	Pub. 4-yr	Land grant	Land grant
N	40	40	69	190	40	40

Note: Estimated effects using data from IPEDS. Column (1) presents the bias-corrected synthetic control estimates for 2019 using the restricted set of covariates, with the set of control universities restricted to land grant institutions with a complete panel for the full set of covariates (our “preferred” sample of control universities). Column (2) presents the bias-corrected synthetic control estimates for 2018 using the full set of covariates and the preferred sample of controls, Column (3) presents the bias-corrected synthetic control estimates for 2019, with the set of control universities restricted to R1 and R2 institutions with a complete panel for the full set of covariates. Column (4) presents the bias-corrected synthetic control estimates for 2019, with the set of control universities restricted to public, four-year-degree-granting institutions with a complete panel for the full set of covariates. Column (5) presents the TWFE estimates for 2019 using the preferred sample of controls, and Column (6) presents the synthetic difference-in-differences estimates for 2019 using the preferred sample of controls. For each outcome, Row (1) presents estimated treatment effects, Row (2) presents p -values from ranking the RMSPEs of the empirical distribution of in-space placebo treatment effects through the year of estimation (for the synthetic control estimates), Row (3) presents the large-sample asymptotic p -values resulting from the event study estimate for 2019 with standard errors clustered by state (for the TWFE estimates), and Row (4) presents estimated p -values from the variance of the empirical distribution of in-space placebo treatment effects in 2019 (for the SDiD estimates). All p -values for *Out-of-state Freshman Enrollment*, *Domestic Out-of-state Freshman Enrollment* and *Revenue from Tuition and Fees* are one-sided. * Including the synthetic control covariates makes no difference to the TWFE or SDiD estimated coefficients of interest, as the covariates are pre-treatment averages observed in each institution and are effectively controlled for by the unit fixed effects. This selection of covariates maintains consistency with the synthetic control specifications and also ensures there is no bias from using “bad controls”.

Table A.3 Financial Outcomes (robustness checks)

Outcome	Synthetic Control (1)	Synthetic Control (2)	Synthetic Control (3)	Synthetic Control (4)	TWFE (5)	Synthetic DiD (6)
Published In-state Tuition Fees						
Treatment Effect (%)	-2.396	1.383	-3.811	0.132	-13.323	-5.288
Ranked-RMSPE-based p -value	0.450	0.675	0.551	0.695		
Asymptotic p -value					0.000	
Placebo-variance-based p -value						0.298
Published Out-of-state Tuition Fees						
Treatment Effect (%)	8.747	16.217	2.094	10.216	16.325	10.377
Ranked-RMSPE-based p -value	0.525	0.225	0.942	0.811		
Asymptotic p -value					0.000	
Placebo-variance-based p -value						0.060
Average Institutional Grant Awarded						
Treatment Effect (%)	26.121	22.931	22.528	29.262	31.441	30.287
Ranked-RMSPE-based p -value	0.025	0.100	0.246	0.016		
Asymptotic p -value					0.000	
Placebo-variance-based p -value						0.067
Average Fin. Aid Awarded to Students from Households Earning < \$30k						
Treatment Effect (%)	33.470	21.382	19.983	28.071	14.405	17.438
Ranked-RMSPE-based p -value	0.125	0.100	0.072	0.121		
Asymptotic p -value					0.001	
Placebo-variance-based p -value						0.292
Covariates	Restricted	All	All	All	All*	All*
Year of estimate	2019	2018	2019	2019	2019	2019
Control universities	Land grant	Land grant	R1+R2	Pub. 4-yr	Land grant	Land grant
N	40	40	69	190	40	40

Note: Estimated effects using data from IPEDS. Column (1) presents the bias-corrected synthetic control estimates for 2019 using the restricted set of covariates, with the set of control universities restricted to land grant institutions with a complete panel for the full set of covariates (our “preferred” sample of control universities). Column (2) presents the bias-corrected synthetic control estimates for 2018 using the full set of covariates and the preferred sample of controls, Column (3) presents the bias-corrected synthetic control estimates for 2019, with the set of control universities restricted to R1 and R2 institutions with a complete panel for the full set of covariates. Column (4) presents the bias-corrected synthetic control estimates for 2019, with the set of control universities restricted to public, four-year-degree-granting institutions with a complete panel for the full set of covariates. Column (5) presents the TWFE estimates for 2019 using the preferred sample of controls, and Column (6) presents the synthetic difference-in-differences estimates for 2019 using the preferred sample of controls. For each outcome, Row (1) presents estimated treatment effects, Row (2) presents p -values from ranking the RMSPEs of the empirical distribution of in-space placebo treatment effects through the year of estimation (for the synthetic control estimates), Row (3) presents the large-sample asymptotic p -values resulting from the event study estimate for 2019 with standard errors clustered by state (for the TWFE estimates), and Row (4) presents estimated p -values from the variance of the empirical distribution of in-space placebo treatment effects in 2019 (for the SDiD estimates). All p -values for *Average Institutional Grant Awarded* and *Average Financial Aid Awarded to Students from Households earnings < \$30k* are one-sided. All p -values for *In-state Tuition Fees* and *Out-of-state Tuition Fees* are two-sided. * Including the synthetic control covariates makes no difference to the TWFE or SDiD estimated coefficients of interest, as the covariates are pre-treatment averages observed in each institution and are effectively controlled for by the unit fixed effects. This selection of covariates maintains consistency with the synthetic control specifications and also ensures there is no bias from using “bad controls”.

Table A.4 Academic Outcomes (robustness checks)

Outcome	Synthetic Control (1)	Synthetic Control (2)	Synthetic Control (3)	Synthetic Control (4)	TWFE (5)	Synthetic DiD (6)
In-state Freshman Enrollment						
Treatment Effect (%)	-2.007	-7.030	1.347	-2.721	2.475	-1.203
Ranked-RMSPE-based p -value	0.525	0.200	0.884	0.826		
Asymptotic p -value					0.439	
Placebo-variance-based p -value						0.936
Full-time Retention Rate						
Treatment Effect (%)	-0.415	0.365	-0.750	-1.350	-1.442	-1.005
Ranked-RMSPE-based p -value	0.275	0.425	0.348	0.332		
Asymptotic p -value					0.031	
Placebo-variance-based p -value						0.645
Student-to-faculty Ratio						
Treatment Effect (%)	-13.076	2.189	1.959	0.854	-7.663	-10.344
Ranked-RMSPE-based p -value	0.750	0.900	0.870	1.000		
Asymptotic p -value					0.000	
Placebo-variance-based p -value						0.180
4-year Graduation Rate						
Treatment Effect (%)	8.316	9.830	3.766	2.289	-4.960	-6.251
Ranked-RMSPE-based p -value	0.150	0.375	0.609	0.789		
Asymptotic p -value					0.211	
Placebo-variance-based p -value						0.839
Covariates	Restricted	All	All	All	All*	All*
Year of estimate	2019	2018	2019	2019	2019	2019
Control universities	Land grant	Land grant	R1+R2	Pub. 4-yr	Land grant	Land grant
N	40	40	69	190	40	40

Note: Estimated effects using data from IPEDS. Column (1) presents the bias-corrected synthetic control estimates for 2019 using the restricted set of covariates, with the set of control universities restricted to land grant institutions with a complete panel for the full set of covariates (our “preferred” sample of control universities). Column (2) presents the bias-corrected synthetic control estimates for 2018 using the full set of covariates and the preferred sample of controls, Column (3) presents the bias-corrected synthetic control estimates for 2019, with the set of control universities restricted to R1 and R2 institutions with a complete panel for the full set of covariates. Column (4) presents the bias-corrected synthetic control estimates for 2019, with the set of control universities restricted to public, four-year-degree-granting institutions with a complete panel for the full set of covariates. Column (5) presents the TWFE estimates for 2019 using the preferred sample of controls, and Column (6) presents the synthetic difference-in-differences estimates for 2019 using the preferred sample of controls. For each outcome, Row (1) presents estimated treatment effects, Row (2) presents p -values from ranking the RMSPEs of the empirical distribution of in-space placebo treatment effects through the year of estimation (for the synthetic control estimates), Row (3) presents the large-sample asymptotic p -values resulting from the event study estimate for 2019 with standard errors clustered by state (for the TWFE estimates), and Row (4) presents estimated p -values from the variance of the empirical distribution of in-space placebo treatment effects in 2019 (for the SDiD estimates). All p -values for *In-state Freshman Enrollment*, *Full-time Retention Rate*, *Student-to-faculty Ratio*, and *4-year Graduation Rate* are two-sided. * Including the synthetic control covariates makes no difference to the TWFE or SDiD estimated coefficients of interest, as the covariates are pre-treatment averages observed in each institution and are effectively controlled for by the unit fixed effects. This selection of covariates maintains consistency with the synthetic control specifications and also ensures there is no bias from using “bad controls”.