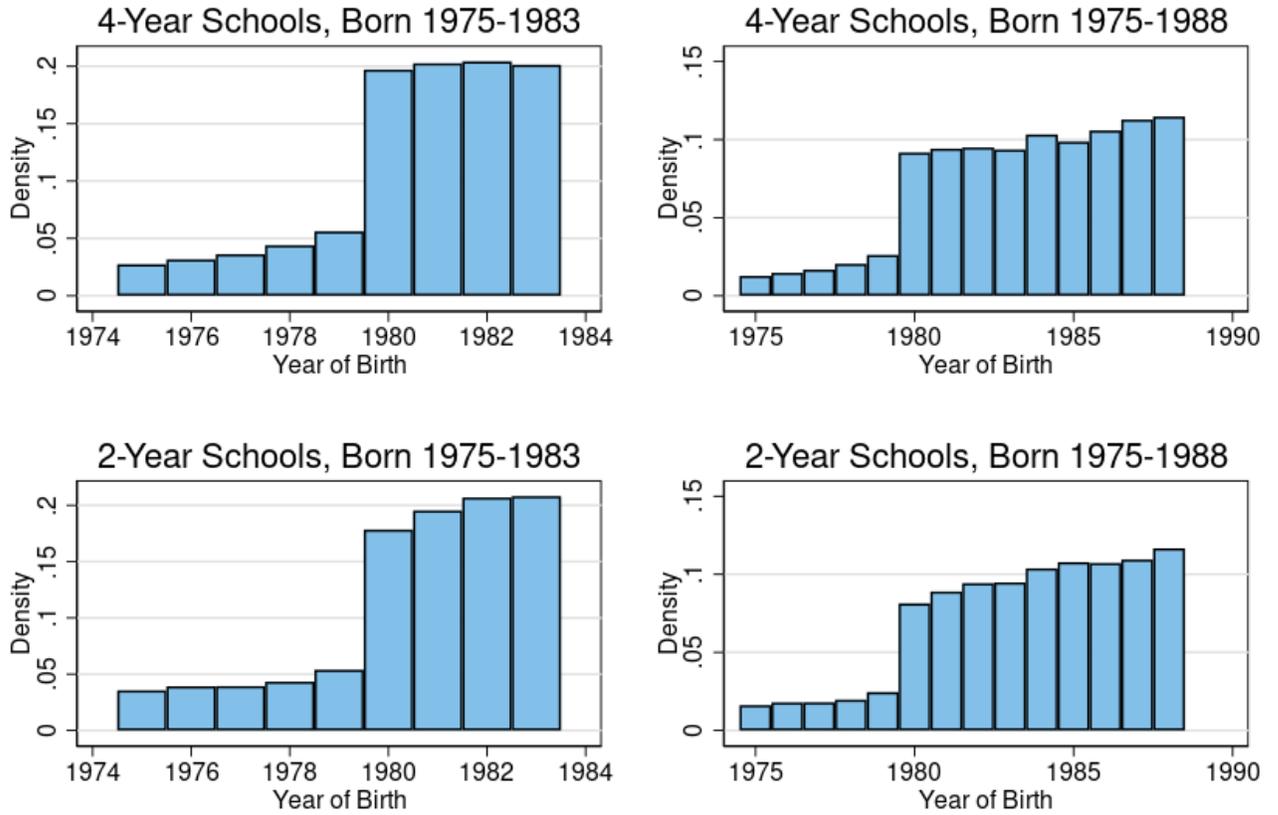


## Online Appendix

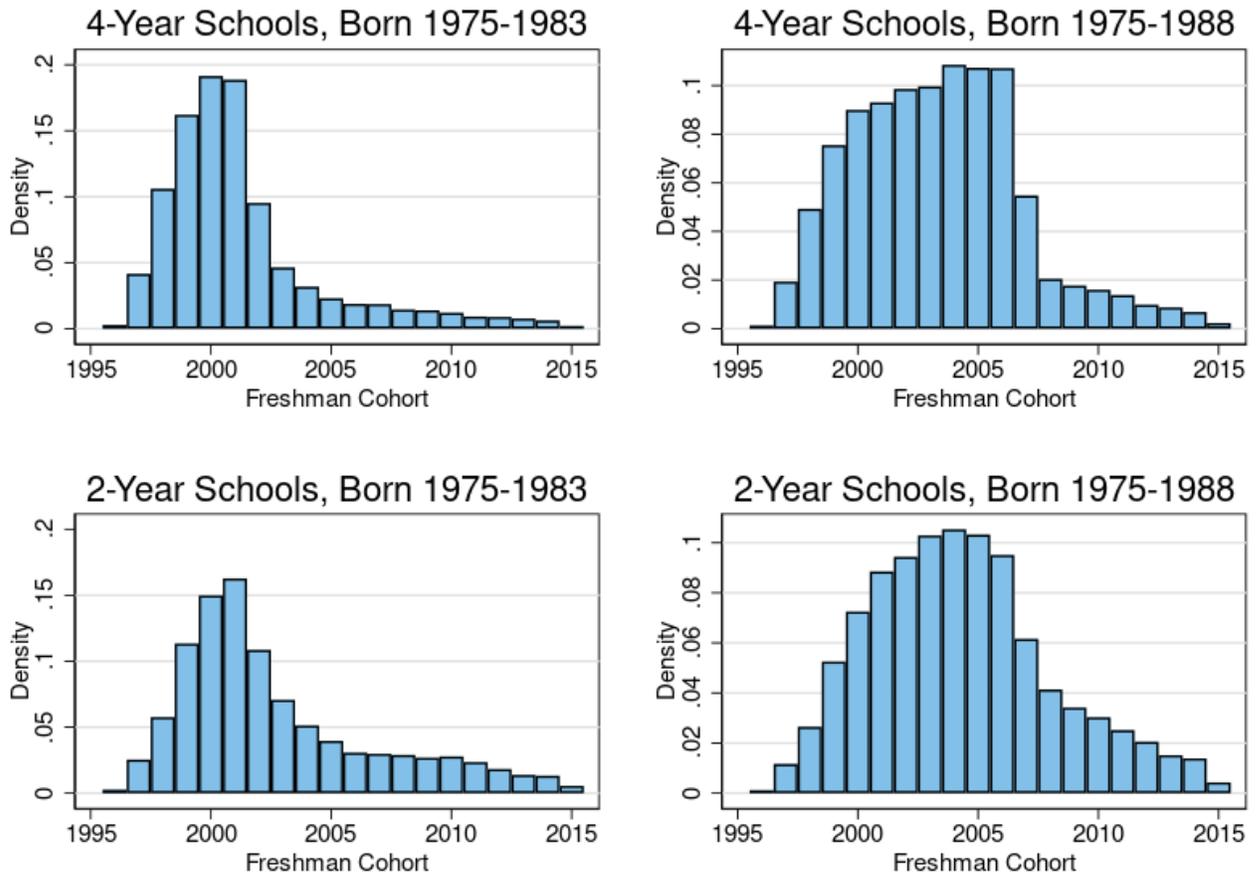
Online Appendix: Not for Publication

Figure A-1: The Distribution of Cohorts by Institution Level and Birth Year



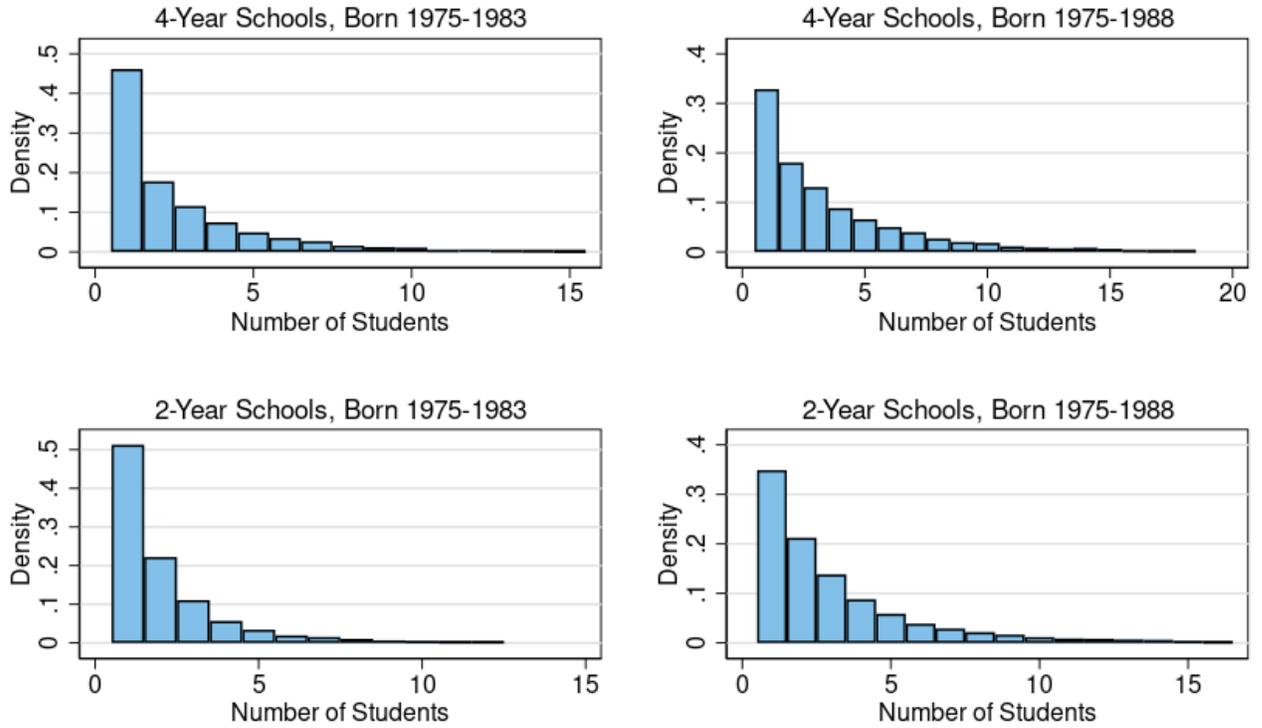
Source: Linked CCP-NSC data as described in the text.

Figure A-2: The Distribution of Cohorts by Institution Level and Freshman Year



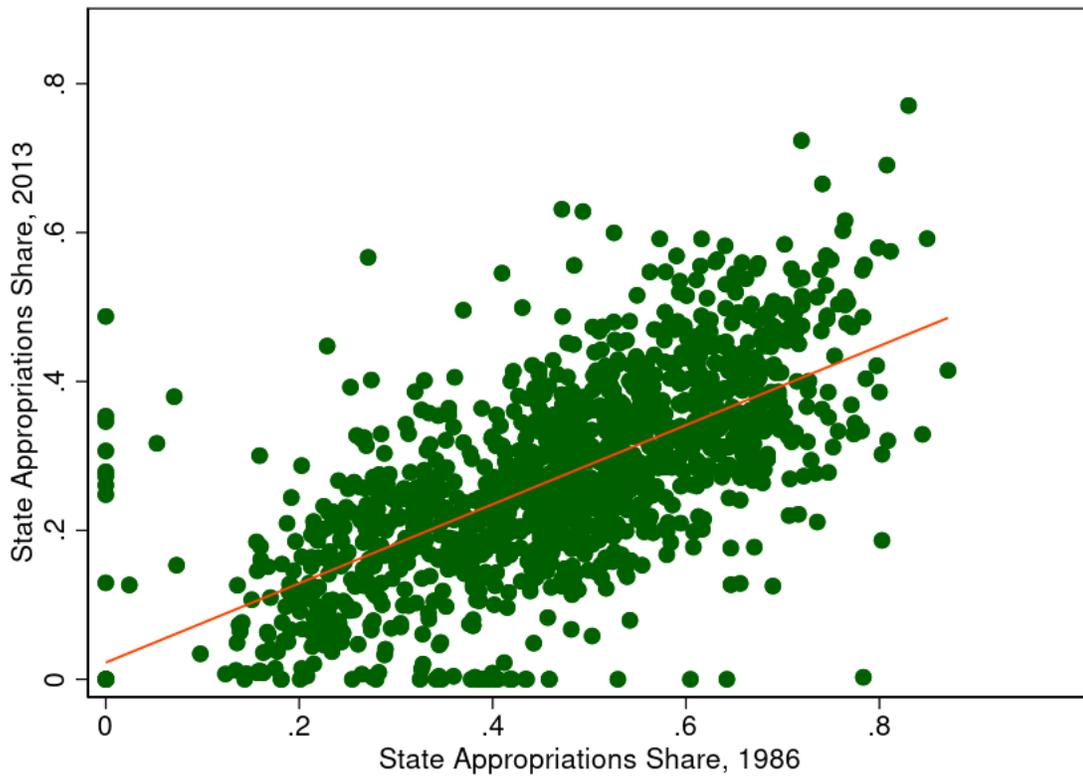
Source: Linked CCP-NSC data as described in the text. Years refer to the fall of the academic year.

Figure A-3: The Distribution of Institution-Cohorts Cell Sizes by Institution Level and Sample



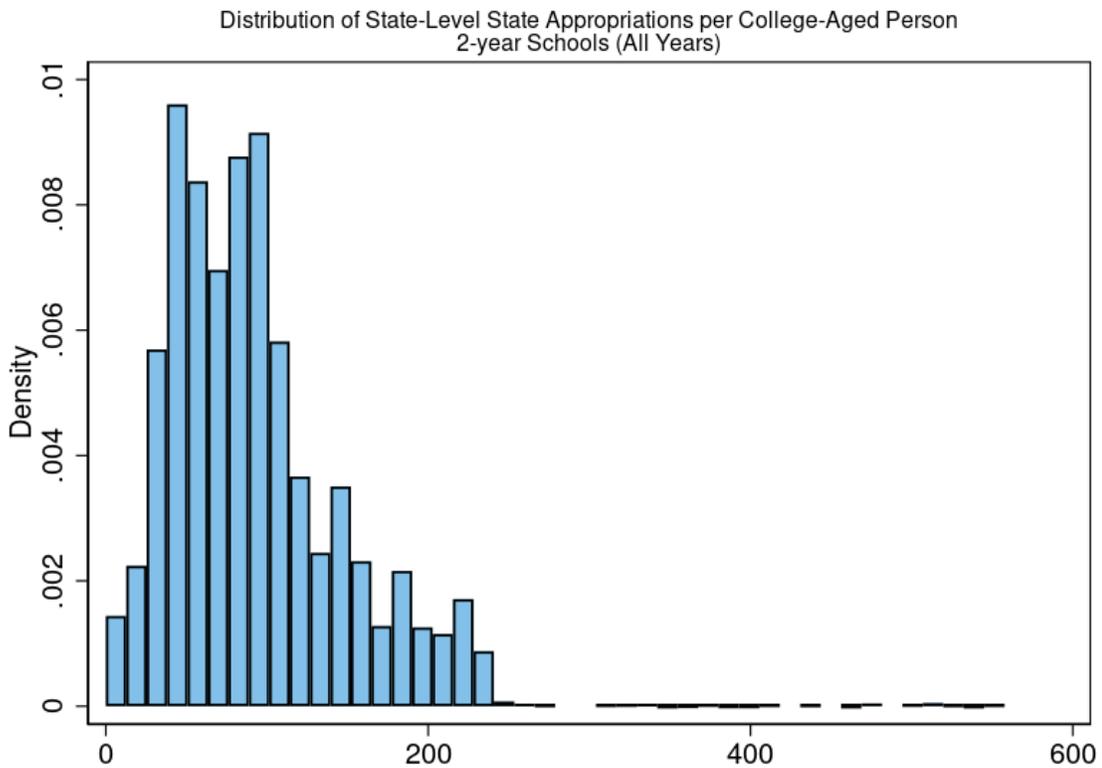
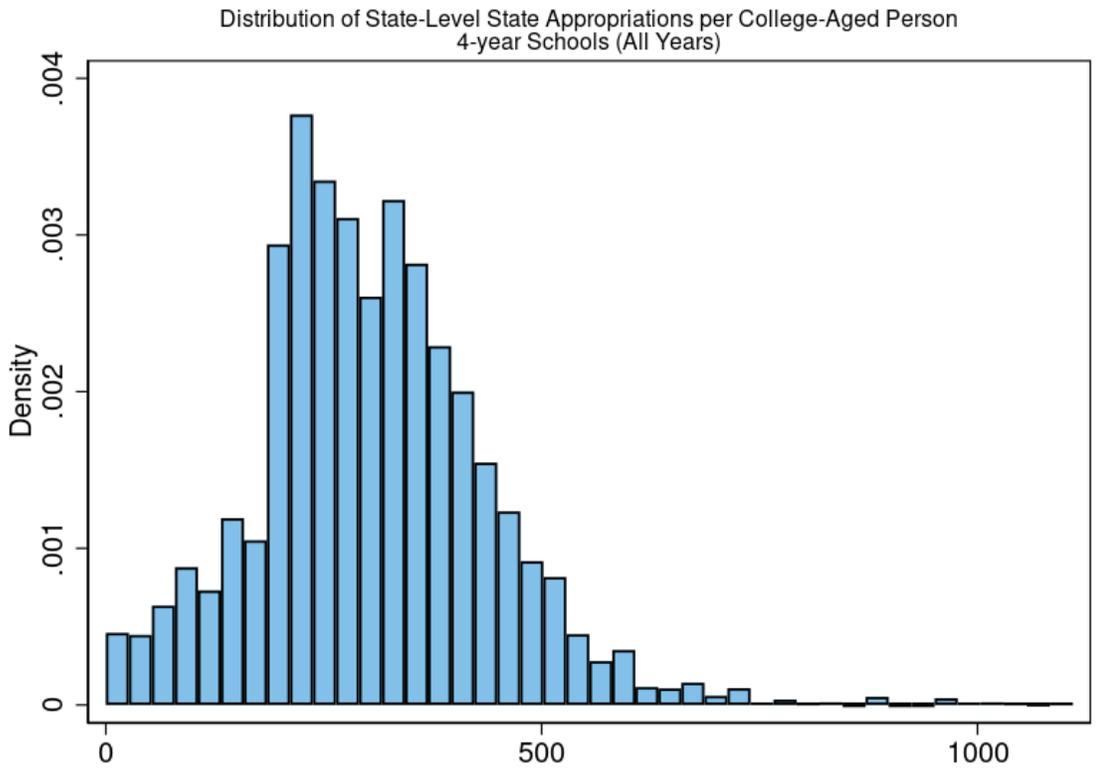
Source: Linked CCP-NSC data as described in the text.

Figure A-4: Within-Institution Change in Share, 1986 & 2013



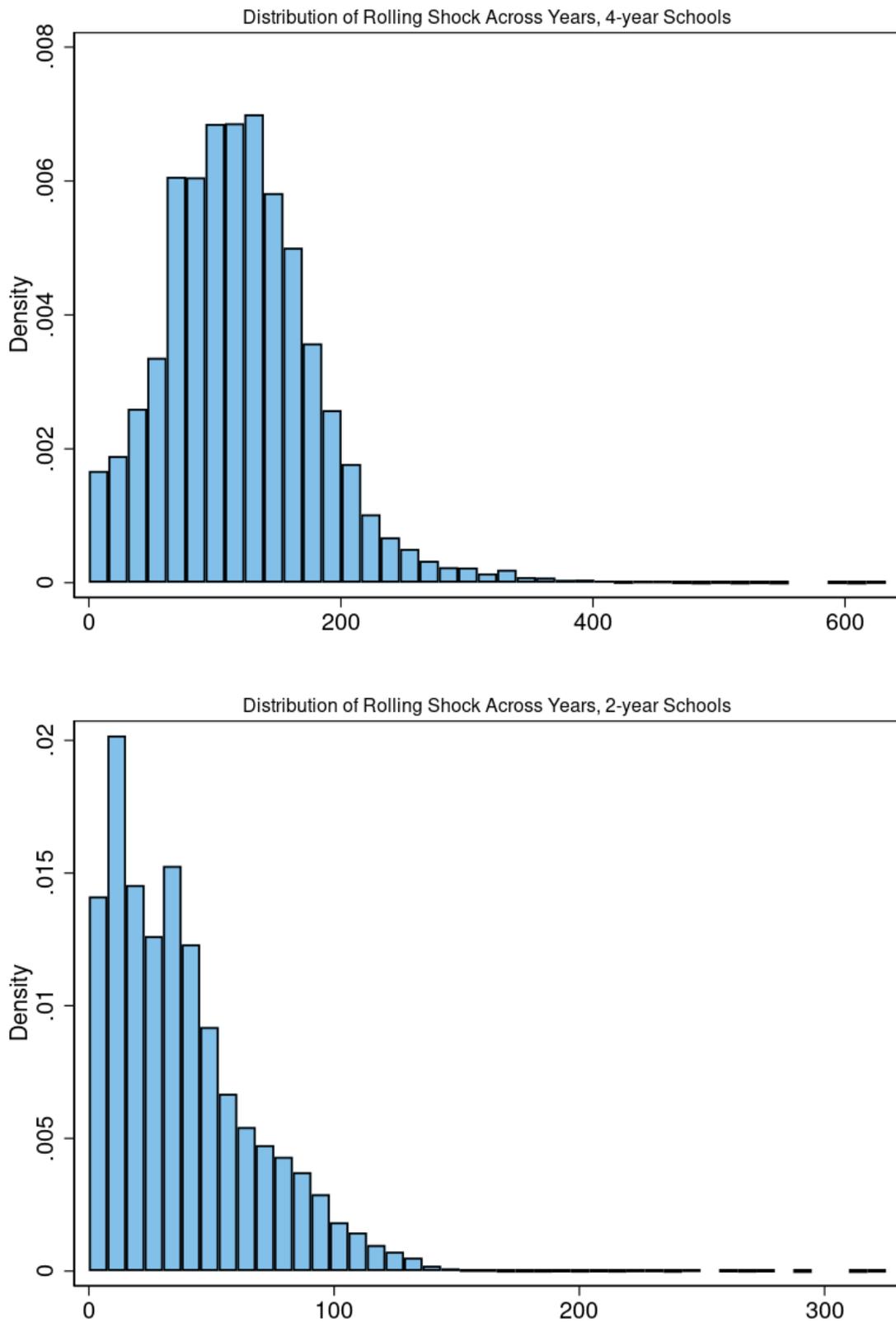
Source: IPEDS, 1986 and 2013. Each point is a separate postsecondary institution.

Figure A-5: State-Level Appropriations per College-Age Resident (All Years)



Each panel shows the distribution state-level appropriations per college-age resident. The top panel shows the four-year distribution, and the bottom panel shows two-year schools.

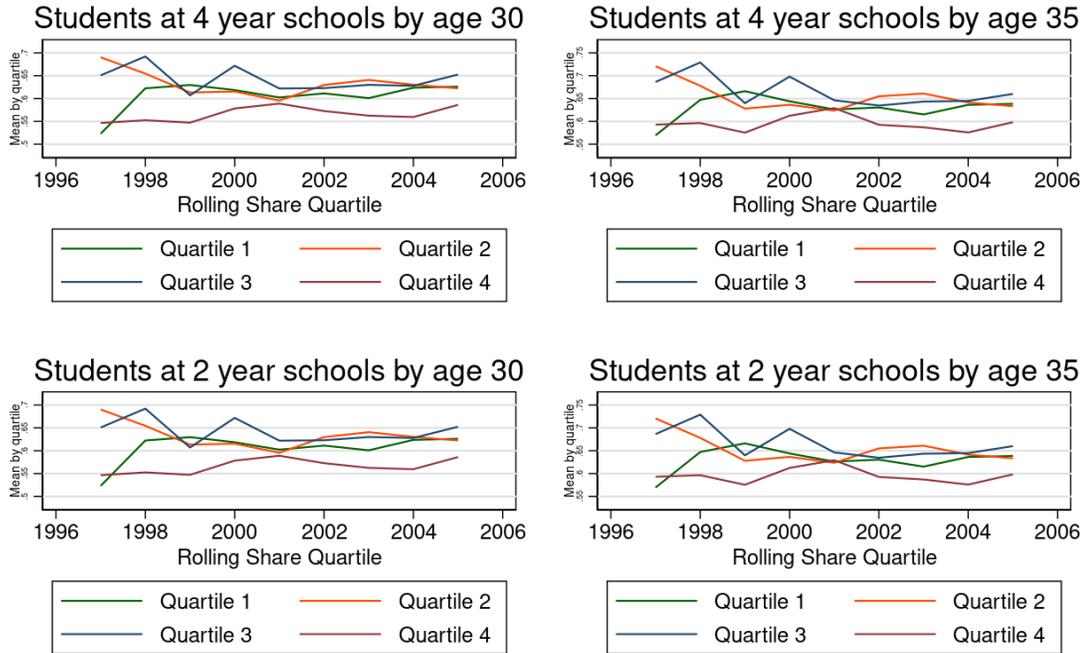
Figure A-6: Distribution of the Shift-Share State Appropriations Instrument, by Year



Each panel shows the distribution of the 3-year rolling baseline shift-share instrument. The top panel shows the four-year distribution, and the bottom panel shows two-year schools.

Figure A-7: Pre-Trends Relative to 2005 – Ever Originate Student Loan

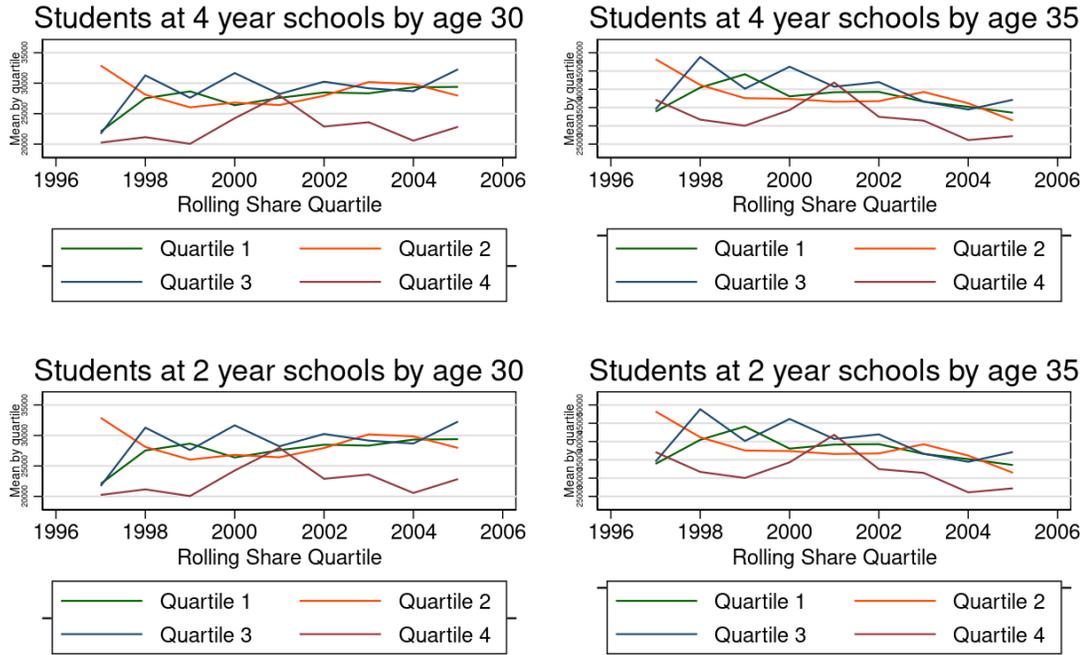
By year, sorted by quartile of 2005 SA share



The figure shows pre-2005 trends in the variable by quartile of the 2005 baseline share.

Figure A-8: Pre-Trends Relative to 2005 – Student Loan Amount

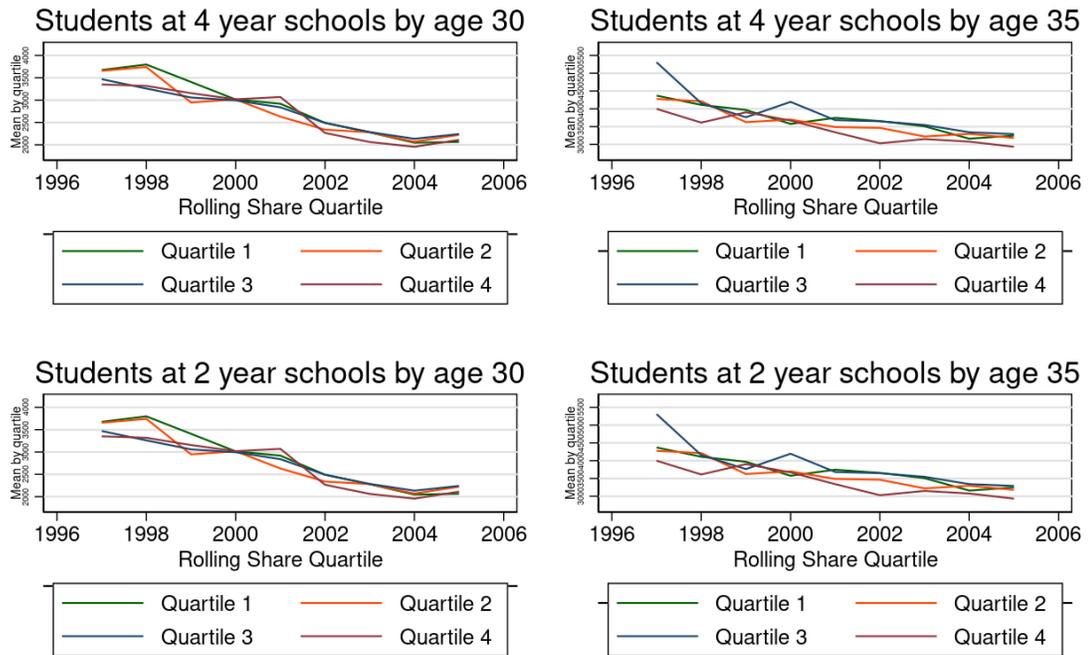
By year, sorted by quartile of 2005 SA share



The figure shows pre-2005 trends in the variable by quartile of the 2005 baseline share.

Figure A-9: Pre-Trends Relative to 2005 – Credit Card Balance

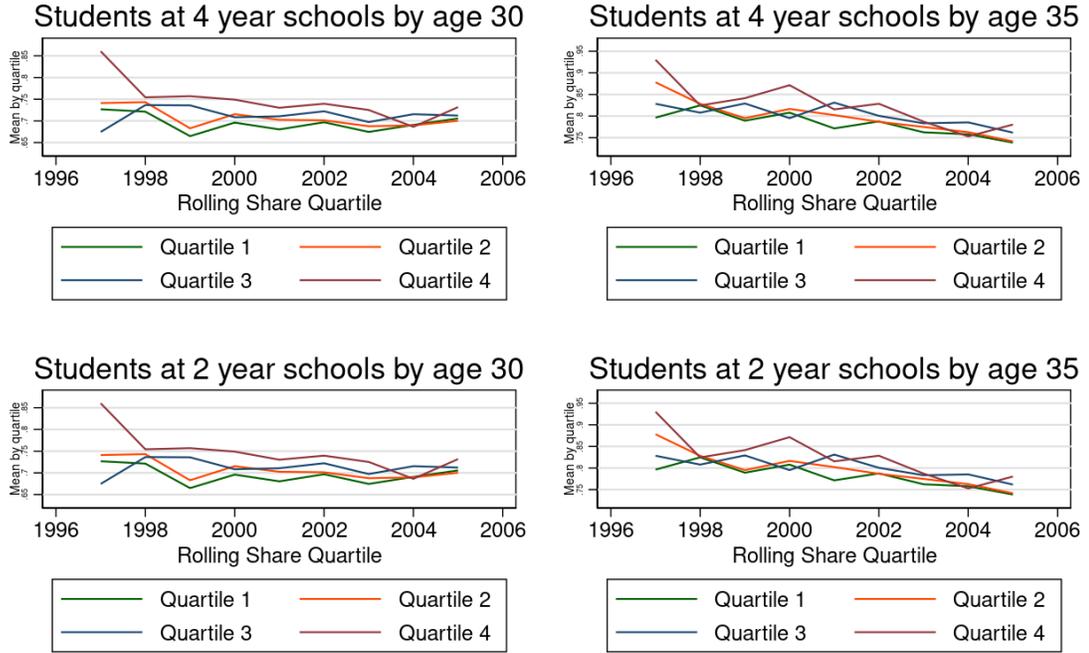
By year, sorted by quartile of 2005 SA share



The figure shows pre-2005 trends in the variable by quartile of the 2005 baseline share.

Figure A-10: Pre-Trends Relative to 2005 – Own Car

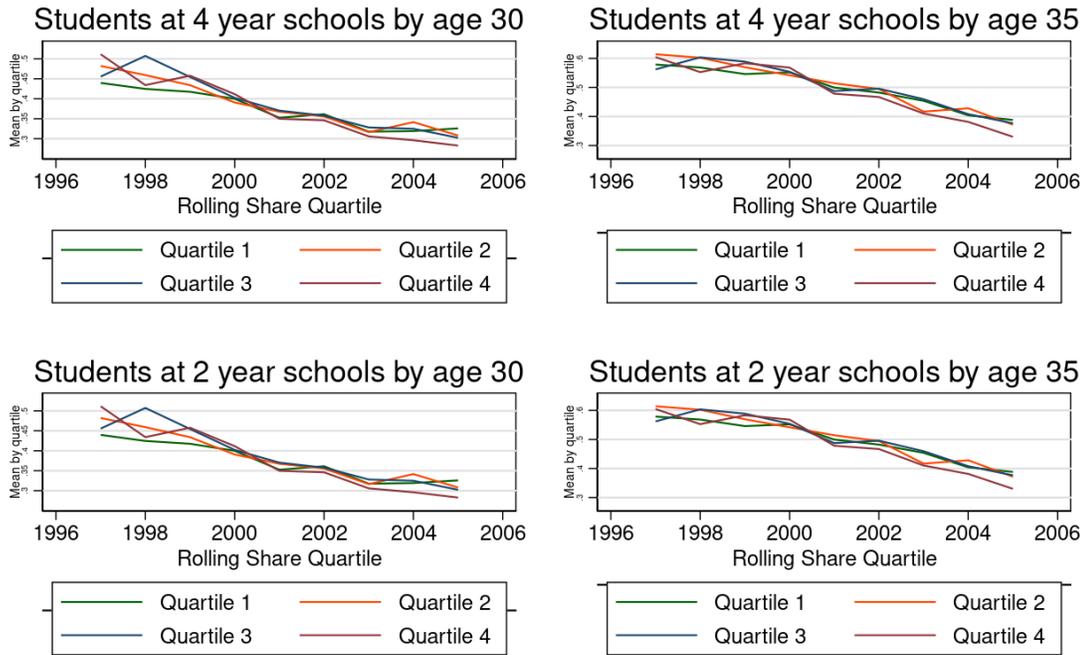
By year, sorted by quartile of 2005 SA share



The figure shows pre-2005 trends in the variable by quartile of the 2005 baseline share.

Figure A-11: Pre-Trends Relative to 2005 – Own Home

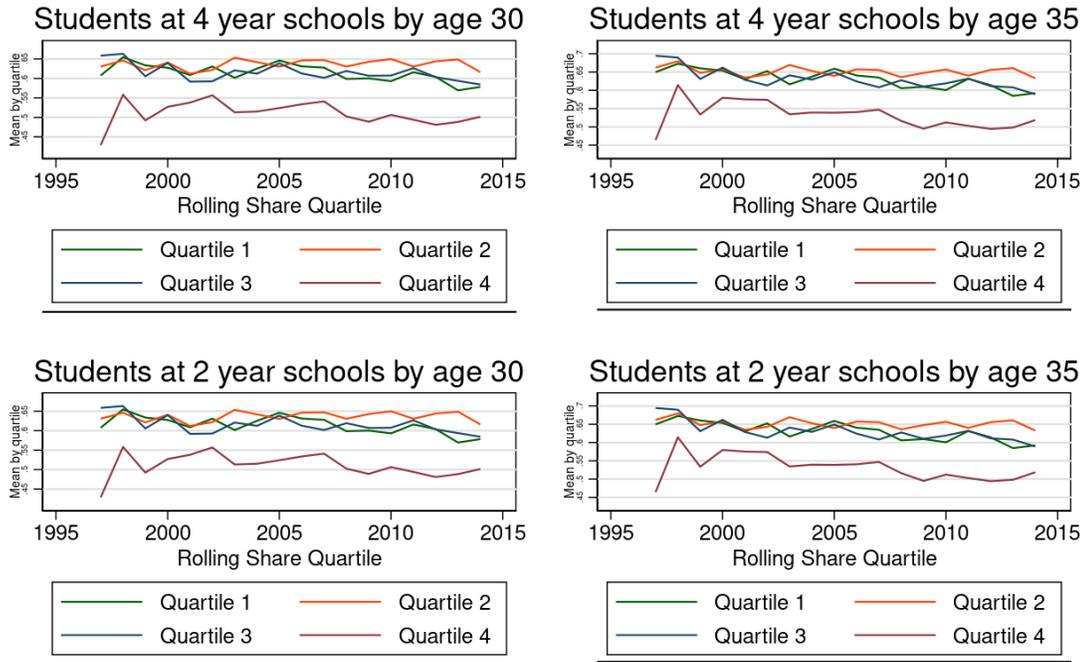
By year, sorted by quartile of 2005 SA share



The figure shows pre-2005 trends in the variable by quartile of the 2005 baseline share.

Figure A-12: Pre-Trends Relative to 2014 – Ever Originate Student Loan

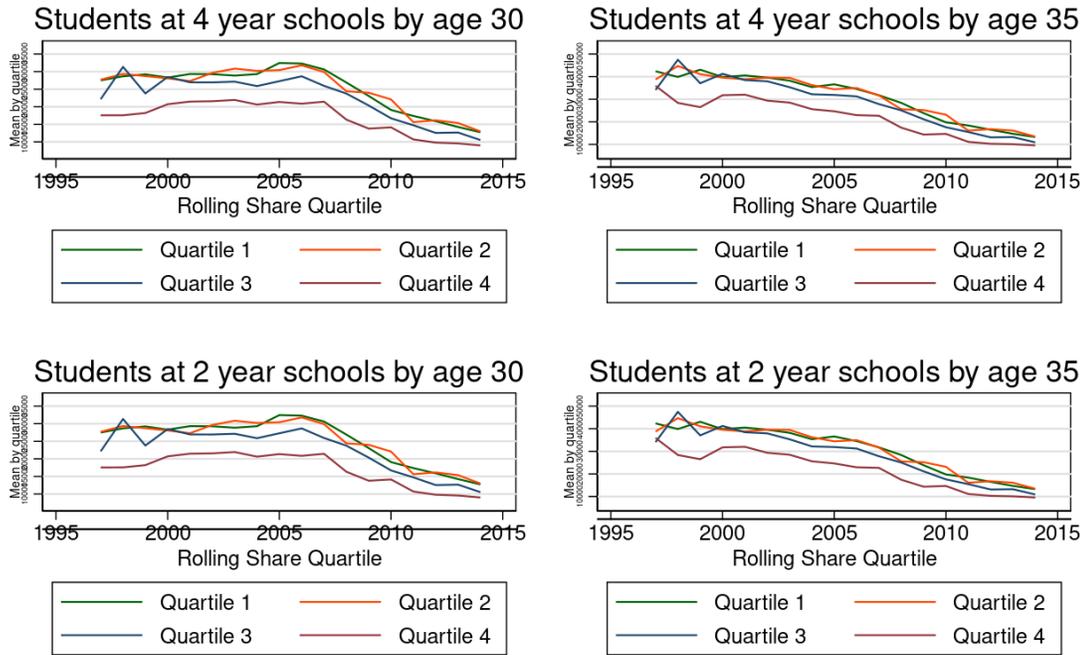
By year, sorted by quartile of 2014 SA share



The figure shows pre-2014 trends in the variable by quartile of the 2014 baseline share.

Figure A-13: Pre-Trends Relative to 2014 – Student Loan Amount

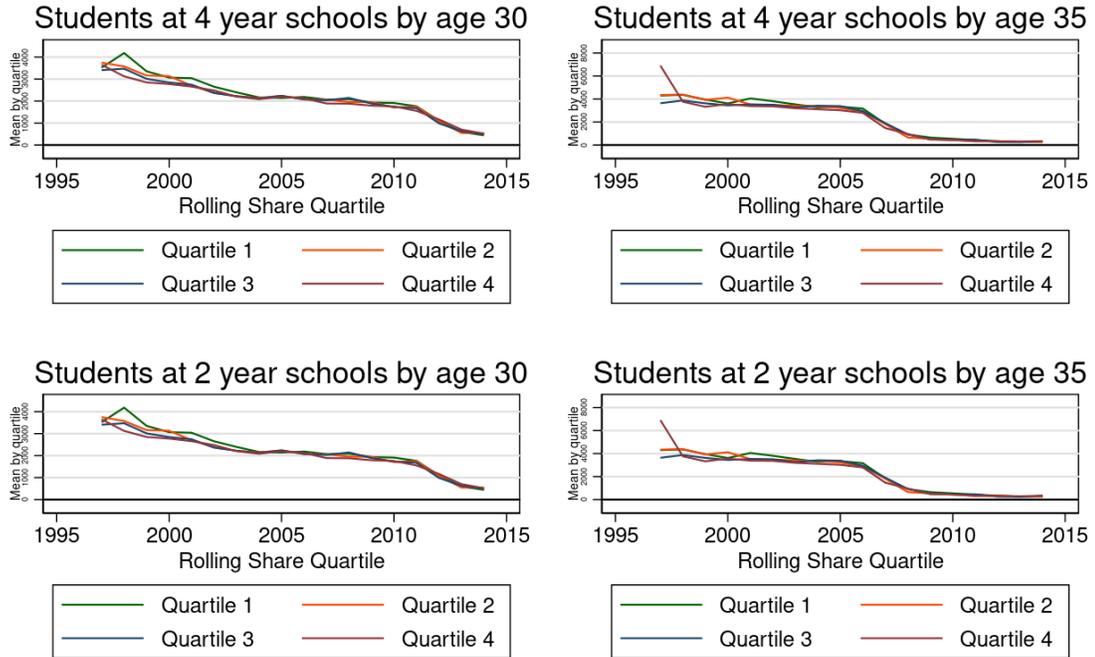
By year, sorted by quartile of 2014 SA share



The figure shows pre-2014 trends in the variable by quartile of the 2014 baseline share.

Figure A-14: Pre-Trends Relative to 2014 – Credit Card Balance

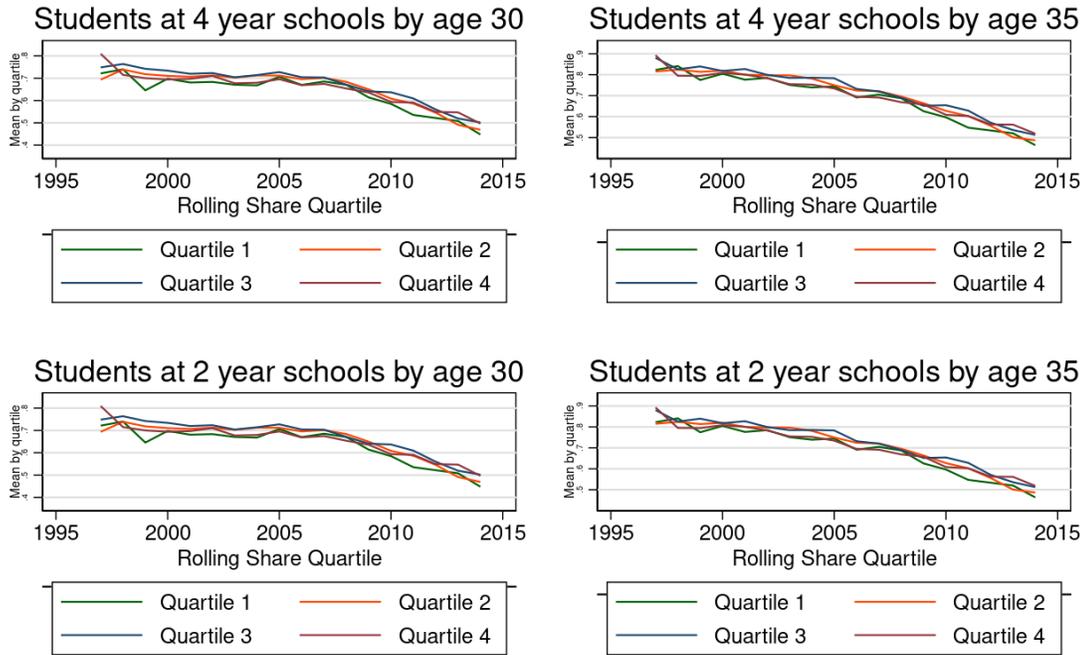
By year, sorted by quartile of 2014 SA share



The figure shows pre-2014 trends in the variable by quartile of the 2014 baseline share.

Figure A-15: Pre-Trends Relative to 2014 – Own Car

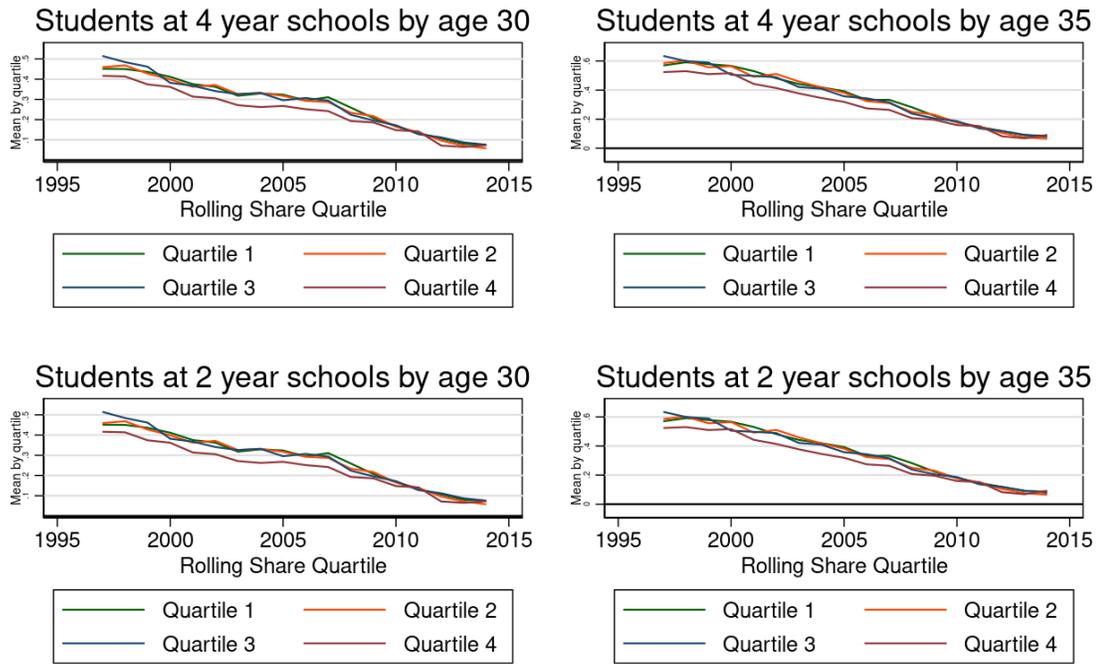
By year, sorted by quartile of 2014 SA share



The figure shows pre-2014 trends in the variable by quartile of the 2014 baseline share.

Figure A-16: Pre-Trends Relative to 2014 – Own Home

By year, sorted by quartile of 2014 SA share



The figure shows pre-2014 trends in the variable by quartile of the 2014 baseline share.

**Table A-1: Cohorts Studied**

Panel A: FRBNY/Equifax Consumer Credit Panel			
<b>Age at Outcome</b>	<b>Birth cohorts</b>	<b>Freshman Age</b>	<b>Freshman Year</b>
22	1975-1996	19 [18]	2006 [2006]
25	1975-1993	19 [18]	2005 [2005]
25-30	1975-1988	20 [18]	2003 [2003]
30-35	1975-1983	21 [19]	2001 [2000]

Panel B: National Student Clearinghouse			
<b>Age at Outcome</b>	<b>Birth cohorts</b>	<b>Freshman Age</b>	<b>Freshman Year</b>
25	1975-1989	19 [18]	2003 [2003]
30	1975-1984	20 [18]	2001 [2000]
By ever	1975-1996	19 [18]	2004 [2004]

Source: Merged FRBNY/Equifax Consumer Credit Panel and National Student Clearinghouse data as described in the text. Mean value in cells; median value in brackets.

**Table A-2: Summary Statistics of National Student Clearinghouse Variables**

Variable	4-year Schools		2-year Schools	
	mean	std. dev.	mean	std. dev.
<i>Student Loans:</i>				
Transfer to 4-year – age 30			0.18	0.38
Transfer to 4-year – ever			0.23	0.42
Transfer to More Selective School – age 30	0.04	0.20	0.11	0.31
Transfer to More Selective School – ever	0.06	0.23	0.15	0.35
Years of Postsecondary Education – age 25	4.12	2.39	2.72	2.51
Years of Postsecondary Education – age 30	5.08	2.97	3.41	3.05
Years of Postsecondary Education – ever	4.80	2.84	3.72	2.99
Earn BA+ – age 25	0.56	0.50	0.17	0.37
Earn BA+ – age 30	0.65	0.48	0.20	0.40
Earn BA+ – ever	0.51	0.50	0.19	0.40
Highest Degree = BA – age 25	0.47	0.50	0.13	0.34
Highest Degree = BA – age 30	0.43	0.49	0.14	0.35
Highest Degree = BA – ever	0.37	0.48	0.14	0.35
Earn Graduate Degree – age 25	0.09	0.29	0.03	0.13
Earn Graduate Degree – age 30	0.22	0.42	0.06	0.23
Earn Graduate Degree – ever	0.14	0.35	0.05	0.22
Earn STEM Degree – age 25	0.20	0.40	0.09	0.28
Earn STEM Degree – age 30	0.24	0.43	0.10	0.31
Earn STEM Degree – ever	0.19	0.39	0.10	0.30
Earn Business Degree – age 25	0.16	0.37	0.06	0.25
Earn Business Degree – age 30	0.19	0.39	0.08	0.28
Earn Business Degree – ever	0.14	0.34	0.07	0.25
Earn Liberal Arts Degree – age 25	0.20	0.40	0.10	0.30
Earn Liberal Arts Degree – age 30	0.23	0.42	0.11	0.32
Earn Liberal Arts Degree – ever	0.17	0.38	0.11	0.31
Earn Vocational Degree – age 25	0.17	0.38	0.10	0.31
Earn Vocational Degree – age 30	0.20	0.40	0.14	0.34
Earn Vocational Degree – ever	0.15	0.36	0.12	0.32

Source: Merged Consumer Credit Panel, National Student Clearinghouse, and IPEDS data as described in the text. The 1975-1989 birth year cohorts constitute the sample for age 25 outcomes, the 1975-1984 birth year cohorts constitute the sample for age 30 outcomes, and the 1975-1996 cohorts constitute the sample for the “ever” outcomes. All tabulations are done at the individual-level.

**Table A-3: Selection into College as a Function of the Once-Lagged Instrument Among First-Year Students**

Dependent Variable	4-Year		2-Year	
	Estimate	Effect Size ( $\frac{\$1000}{Student}$ )	Estimate	Effect Size ( $\frac{\$1000}{Student}$ )
HH Income (Census Block)	-1569.37* (888.53)	-589.55	-2046.96* (1064.58)	-982.23
HH Income (Zip - Tax Data)	-409.45 (825.70)	-153.81	-2282.90** (805.33)	-1095.44
Above Median HH Income (Zip)	-0.02** (0.01)	-0.008	0.01 (0.02)	0.005
Percent White	-0.01 (0.01)	-0.004	-0.01 (0.01)	-0.005
Percent Black	0.00 (0.00)	0.000	-0.02** (0.00)	-0.010
Percent Married	-0.00 (0.00)	0.000	0.00 (0.01)	0.000
Percent HH with Kids<18	-0.00 (0.00)	0.000	-0.01 (0.01)	0.000
Percent BA+	-0.01 (0.00)	-0.004	-0.02** (0.01)	-0.010
Percent Some College	0.00 (0.00)	0.000	-0.00 (0.00)	0.000
Percent No College	0.00 (0.00)	0.000	0.02** (0.01)	0.010
Median Gross Rent	-16.45 (13.82)	-6.18	-40.97*** (14.98)	-19.66
Median Home Value	-8289.05* (4813.48)	-3113.84	-24000*** (6892.72)	-11516.31
LFP Rate	-0.01* (0.00)	-0.004	-0.01** (0.00)	-0.005
Employment Rate	-0.00 (0.00)	0.000	0.00 (0.00)	0.000
Total Population	-3.09 (45.58)	-1.16	-7.83 (83.72)	-3.76
Total Population $\geq 25$	-22.93 (26.83)	-8.61	-14.76 (45.76)	-7.08

Authors' estimation of equation (4) using the linked CCP-NSC data described in the text and the 3-year rolling baseline shift-share instrument. All regressions include freshman cohort-by-age and institution fixed effects as well as controls for baseline state appropriations share, state college-age population, and a dummy for 1980 and later birth cohorts. Cohorts are defined as the year in which each individual first entered college, and college sectors (4-year/2-year) refer to the sector in which each individual was first enrolled in college. Each cell in the "Estimate" columns is a separate regression. The instrument is in units of \$100 per college-age resident. The "Effect Size" shows the reduced form estimate divided by the first stage in Table 4. Standard errors clustered at the state-by-cohort level are in parentheses: \*\*\* indicates significance at the 1% level, \*\* indicates significance at the 5% level, and \* indicates significance at the 10% level.

**Table A-4: First Stage Estimates For Age 22 and 25 NSC-CCP Samples**

Panel A: 4-Year				
Birth years	1975-1988		1975-1983	
Age	22		25	
	(1)	(2)	(3)	(4)
$\widehat{SA}$	24.49*** (1.90)	26.12*** (0.91)	23.82*** (2.05)	26.39*** (0.92)
Institution FE	N	Y	N	Y
Observations	26683	26668	21330	21311

Panel B: 2-Year				
Birth years	1975-1988		1975-1983	
Age	22		25	
	(1)	(2)	(3)	(4)
$\widehat{SA}$	16.90*** (0.91)	19.76*** (0.98)	17.55*** (1.00)	20.50*** (1.00)
Institution FE	N	Y	N	Y
Observations	40633	40614	30802	30777

Authors' estimation of equation (4) using the linked CCP-NSC data described in the text. All regressions include cohort-by-age and institution fixed effects as well as controls for state college-age population and a dummy for 1980 and later birth cohorts. Cohorts are defined as the year in which each individual first entered college, and college sectors (4-year/2-year) refer to the sector in which each individual was first enrolled in college. State appropriations is expressed in \$ per student and the state appropriations instrument is expressed in \$ per college-age resident in the state. The 1975-1988 birth year cohorts constitute the sample for age 22 NSC-CCP outcomes and the 1975-1983 birth year cohorts constitute the sample for age 25 NSC-CCP outcomes. Standard errors clustered at the state-by-cohort level are in parentheses: \*\*\* indicates significance at the 1% level, \*\* indicates significance at the 5% level, and \* indicates significance at the 10% level.

**Table A-5: First Stage Estimates For NSC Sample**

Panel A: 4-Year			
Birth years	1975-1989	1975-1984	1975-2000
Age	25	30	Ever
	(1)	(2)	(3)
$\widehat{SA}$	26.39*** (0.92)	25.62*** (1.04)	25.93*** (0.96)
Observations	21311	11085	26882

Panel B: 4-Year, Degree Attainment Outcomes			
Birth years	1975-1989	1975-1984	1975-2000
Age	25	30	Ever
	(1)	(2)	(3)
$\widehat{SA}$	26.39*** (0.92)	25.71*** (1.04)	25.97*** (0.96)
Observations	21311	10966	26575

Panel C: 2-Year			
Birth years	1975-1989	1975-1984	1975-2000
Age	25	30	Ever
	(1)	(2)	(3)
$\widehat{SA}$	20.50*** (1.00)	19.63*** (1.11)	19.72*** (0.99)
Observations	30777	15242	46875

Panel D: 2-Year, Educational Attainment Outcomes			
Birth years	1975-1989	1975-1984	1975-2000
Age	25	30	Ever
	(1)	(2)	(3)
$\widehat{SA}$	20.50*** (1.00)	19.66*** (1.12)	19.74*** (0.99)
Observations	30777	14994	46107

Authors' estimation of equation (4) using the NSC data as described in the text. All regressions include cohort-by-age and institution fixed effects as well as controls for state college-age population and a dummy for 1980 and later birth cohorts. Cohorts are defined as the year in which each individual first entered college, and college sectors (4-year/2-year) refer to the sector in which each individual was first enrolled in college. State appropriations is expressed in \$ per student and the state appropriations instrument is expressed in \$ per college-age resident in the state. Standard errors clustered at the state-by-cohort level are in parentheses: \*\*\* indicates significance at the 1% level, \*\* indicates significance at the 5% level, and \* indicates significance at the 10% level.

**Table A-6: First Stage Results: Birth Cohorts 1975-1988 and 1975-1983 Using Fixed Baseline Instrument**

Dep. Var.: State Appropriations per Student				
Panel A: 4-Year				
Birth years	1975-1986		1975-1981	
Age	25-30		30-35	
	(1)	(2)	(3)	(4)
$\widetilde{SA}$	19.53*** (1.79)	23.21*** (0.98)	15.31*** (1.97)	21.48*** (1.35)
Institution FE	N	Y	N	Y
Observations	18948	18935	9001	8979

Panel B: 2-Year				
Birth years	1975-1986		1975-1981	
	(1)	(2)	(3)	(4)
$\widetilde{SA}$	13.70*** (0.96)	17.47*** (0.92)	12.12*** (1.24)	18.02*** (1.04)
Institution FE	N	Y	N	Y
Observations	25753	25739	11629	11592

Authors' estimation of equation (4) using the linked CCP-NSC data described in the text. All regressions include cohort-by-age fixed effects as well as controls for state college-age population and a dummy for 1980 and later birth cohorts. Cohorts are defined as the year in which each individual first entered college, and college sectors (4-year/2-year) refer to the sector in which each individual was first enrolled in college. State appropriations is expressed in \$ per student and the state appropriations instrument is expressed in \$ per college-age resident in the state. The 1975-1988 birth year cohorts constitute the sample for age 25-30 outcomes and the 1975-1983 birth year cohorts constitute the sample for age 30-35 outcomes. The state appropriations instrument ( $\widetilde{SA}$ ) uses the 1989 fixed baseline state appropriations share. Standard errors clustered at the state-by-cohort level are in parentheses: \*\*\* indicates significance at the 1% level, \*\* indicates significance at the 5% level, and \* indicates significance at the 10% level.

**Table A-7: Summary Statistics of Variables Used to Examine Mechanisms**

Variable	4-Year		2-Year	
	Mean	SD	Mean	SD
In-State Tuition/Fees	5,425.75	2,262.78	2,455.82	1,584.89
Out-of-State Tuition/Fees	14,017.07	4,799.89	5,702.79	2,440.31
Net Tuition Revenue	5,369.09	2,902.14	1,362.14	866.99
Capital Grants & Gifts	389.34	639.93	67.14	245.50
Capital Appropriations	592.62	741.36	275.84	471.11
Local Appropriations	39.79	359.81	1,115.88	1,294.66
Federal Appropriations	59.48	751.91	11.89	159.68
Total Appropriations	6,404.42	3,900.89	3,260.79	1,357.67
Instructional Expenditures	7,431.01	5,052.00	2,859.97	1,146.78
Research Expenditures	3,279.22	4,806.11	2.62	13.61
Academic Support Expend.	1,948.38	1,545.29	542.67	309.97
Student Services	1,162.00	587.25	674.64	349.91
Institutional Support	1,875.40	1,084.83	957.53	484.93
Faculty/Student Ratio (FTE)	0.06	0.02	0.05	0.02
Fraction International	0.019	0.026	0.007	0.016
Fraction Out-of-State	0.149	0.134	0.052	0.078

Source: IPEDS data from years that overlap with enrollment of the CCP-NSC sample.