Online Appendix: "The Great Recession and the Widening Income Gap Between Alumni of Elite and Less Selective Universities"

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A Data Appendix and Additional Results

A.1 Additional Data from IPEDS

A.1.1 College Majors

Table A.7 shows clear differences in major composition between Tier 1 and Tier 3-5 universities, using the broad classifications from the American Community Survey. Tier 1 universities have a higher fraction in the group of majors including science, engineering, and social science, and lower fraction of business majors. Some of this difference is mechanical, as nearly 50% of the Tier 1 universities in the sample do not offer business degrees. This makes it challenging to identify the effect of tier conditional on major composition.

To determine whether the results are explained by differences in major composition across tiers of selectivity, I collect annual data on completions by major from IPEDS (U.S. Department of Education, National Center for Education Statistics, 2020). I use the set of institutions in 2002, and collect annual data on first and second majors for those institutions, for associate's and bachelor's degrees, from 2002 through 2013. I collect data for these years as I will merge the birth cohorts in the Chetty et al. (2020*a*) data (1980 through 1991) to completions by field of degree in the birth year + 22. Twenty-two is the median age at graduation for individuals from top-quartile selectivity universities, which should include some Tier 3-5 universities.

In 2002, the CIP codes used to classify majors are based on the 1990 CIP classification. I convert these to CIP codes using the 2000 classification, using the crosswalk from the Department of Education (U.S. Department of Education, National Center for Education Statistics, 2022). For each four-digit 1990 CIP code, I obtain the modal two-digit 2000 CIP code. In the case of 20.01 (consumer and homemaking education), there was no corresponding 2000 CIP code as the 1990 CIP code was deleted. I classified 1990 CIP code 20.01 as 2000 CIP code 19, which is where nearly all of 1990 CIP code 20 was assigned. There are 14 universities that report 1990 CIP code 1.99, which does not exist in the crosswalk. I assign 1990 CIP code 1.99 to 2000 CIP code 1, given that all of the 1990 CIP codes in the two-digit category of 1 were assigned to 2000 CIP code 1.

Starting in 2010, the CIP classification changed again, but there were no changes at the 2-digit level, except for the deletion of one of the 2000 two-digit CIP codes, CIP 21 (Technology Education/Industrial Arts). However, none of the universities in the data report completions in this code.

I then merge the completions by two-digit 2000 CIP codes for field of study to four-digit ACS codes for field of study using Classified List of Fields of Degree for ACS Coding (2022), which are assigned to groupings of major used in the 2010 American Fact Finder Tables (American Community Survey 2010 Field of Bachelor's Degree Groups, 2022). These groupings include five broad groups: Science and Engineering (including psychology and social science); Science and Engineering Related Fields; Business; Education; and Arts, Humanities, and Other. There are 15 narrow groups that comprise these five broad groups, one of which is Social Science, and another of which is Psychology.

Once I have completions by year and field of degree, I merge to the Chetty et al. (2020*a*) data, by using the OPEID to Super-OPEID crosswalk in Chetty et al. (2020*a*), as the earnings data in Chetty et al. (2020*a*) are reported by Super-OPEID, rather than OPEID. As in the main estimation of equation (2), I exclude observations for which multiple campuses are reported to one Super-OPEID. There are several universities in the IPEDS data, for which

more than one university is assigned to the same Super-OPEID, but they are not coded as multi universities in the Chetty et al. (2020*a*) data. I calculate share of degrees awarded by field of study grouping at the Super-OPEID/year level, by summing all of the degrees awarded in that group across all of the universities in the Super-OPEID/year, and dividing by the sum of all degrees awarded by all of the universities in the Super-OPEID/year.

Field of degree data is missing for seven two-year colleges (and 40 observations) in the main sample from equation (2). For two of those seven colleges, the field of degree data are missing in every year. These colleges were in the IPEDS dataset, but do not report degrees by major. For the other five colleges, these data are only missing in some years.

I estimate equation (2) additionally including interactions between birth cohort, $SevereRecession$, and major share. I estimate two specifications: one in which I use the five groups from the ACS, and a second in which I group together business with the social sciences as this may reflect a similar set of fields that as a group are available to students across tiers.[51] This latter specification yields very similar results (Figure A.42).[52] If there is a differential causal effect of majoring in business during a recession relative to another similar major, we would want to keep these separate from the other majors as this is a feature of graduating from a Tier 3-5 university. When keeping business in its own category, and grouping social science with science and engineering (as in the ACS groupings), we continue to see positive and large effects though they are slightly smaller in size and less precise. For the 1987 cohort the difference in magnitude is approximately 9%. For the 1990 cohort the difference is approximately 34%. These results suggest differences in major composition are not explaining most of the effects, and may explain very little of the effects.

Very few of the triple interactions between major share, birth cohort, and severe recession are statistically significant; however, in 1990 and 1991 the coefficients on the triple interactions with share in science (grouped with social science) are large and positive, while the

[51]Table A.7 shows that the sum of the fraction in social science and business is similar at Tier 1 and Tier 3-5 universities.

[52]The sample size falls by 84 in these regressions because we drop every observation for the seven universities that have missing field of degree data in at least one year.

triple interactions with business are large and negative. These are consistent with the larger decline in the coefficients on Tier 1 for these cohorts (Figure A.42). When including social science with business, the triple interaction with percent in science becomes less positive, consistent with the increase in the coefficient on Tier 1.

Results are also not explained by differences in composition of majors, using the composition in 2000 and the data and classifications from Chetty et al. (2020*b*) (Tables A.7 and A.11). I estimate equation (2) additionally including interactions between birth cohort, *SevereRecession*, and major share in 2000. I include interactions with the three largest major shares in Tier 3-5 universities. Alternatively, I include interactions with all eight major shares, but omitting one. Both yield results similar to the main specification.

A.1.2 Fraction In-State, and Fraction Foreign Students

Universities report to IPEDS the state of residence of students (or whether they were foreign) when the students were first admitted, for first-time freshman in the given year. These data are required only in even years. Unlike the Chetty et al. (2020*b*) data, these data are not at the birth cohort level, but by entering-class cohort. Data from the Beginning Postsecondary Students Survey suggest a very large fraction of students enter college without a delay from high school (Horn, Cataldi and Sikora, 2005).[53] Thus, for each university-birth cohort I assign the fraction in-state and fraction foreign students for the entering class in the Fall 18 years after their birth year.

I estimate equation (2), additionally interacting the fraction of in-state students and fraction of foreign students with cohort and severe recession. These coefficients are identified by within-tier-cohort-severe recession variation in fraction of in-state and foreign students.

Figure A.39 shows the results of two specifications. In the first, I use the fraction in-state and foreign for the 1988 cohort because universities are only required to report these data

[53]For people beginning their postsecondary education in 1995-1996, 16% delay their entry from high school to college for those enrolling in public four-year universities, and this figure is 12% at private not-for-profit four-year institutions. Of those who delay, a large fraction are delaying for just one year (Horn, Cataldi and Sikora, 2005).

in even years, and 99.8% of universities in the main sample report these data for the 1988 cohort. Universities may report these data in odd years, and roughly 65% to 80% do so. For the second specification, I interact with the fraction in-state and foreign for that cohort, using only the even cohorts since universities are required to report these data. I include only universities that report these data for each of the even cohorts so the sample is balanced.

Including these interactions leads to a slight reduction in the coefficients of interest, and makes them less precise, but the central pattern remains very similar (Figure A.39).[54]

A.1.3 Racial Composition

There are also differences in racial composition across selectivity tiers, with Tier 1 universities having a higher fraction of Asian students and lower fraction of Black students relative to Tier 3-5 universities (Table A.6).

To test for the role of racial composition, and changes in racial composition, I obtain annual data from IPEDS (U.S. Department of Education, National Center for Education Statistics, 2020) on enrollment of Black, Non-Hispanic; Hispanic; and Asian or Pacific Islander students. I collect these data for undergraduate, degree/certificate-seeking, first-time students. Again, because the data are by cohort of first-time students, rather than birth cohort, for each birth cohort I assign the racial composition for the entering class in the Fall 18 years after their birth year.

Including interactions between racial composition, birth cohort, and severe recession yields similar results (Figure A.40).

A.1.4 SAT Scores

The mobility report cards Chetty et al. (2020*a*) include the average SAT scores by university in 2001 and 2013. As discussed in Table A.6, we only have SAT data for 368 of the 611 Tier

[54]Figure A.2 is consistent with differences across tier in geographic mobility as a mechanism, as there are no statistically significant differential effects for students at elite universities in severely relative to mildly affected areas, though the confidence intervals are wide. Of course, this is consistent with other mechanisms as well.

3-5 universities. There is some evidence of a widening gap in SAT scores between Ivy Plus and Tier 3-5 universities over the years from 2001 to 2013, that is larger in more severely affected areas (Table A.12). However, in order to explain the income results, this differential increase would need to begin precisely for the 1987 cohort, and be flat beforehand.

A.2 Alternative measure of recession severity

Figure A.6b shows results interacting tier, cohort, and an indicator for 2007 to 2009 unemployment-rate change in the top quartile. There are only 16 Tier 1 universities in the top-quartile-affected CZs that are also in CZs with Tier 3-5 universities, making it difficult to identify an effect. The patterns are generally similar, but there is some more evidence of a downward trend between 1980 and 1985.

A.3 Employer Recruiting and Location Data

I collect locations for each firm in each year, similarly to the collection of recruiting strategies. I obtain the latitude and longitude of the office locations using the TIGERweb State-Based Data files (U.S. Census Bureau, 2019) and the Census Gazetteer files (U.S. Census Bureau, 2014), merging on the city name and state. For cities that could not be merged, I manually obtained the latitude and longitude from these files and additionally from the website latlong.net (Latitude and Longitude Finder, 2019). I additionally obtain university latitude and longitude by obtaining ZIP codes from IPEDS (U.S. Department of Education, National Center for Education Statistics, 2013), and merge to latitude and longitude using the Census Gazetteer ZIP Code Tabulation Areas Files (U.S. Census Bureau, 2010*a*) and 2010 Place Files (U.S. Census Bureau, 2010*b*). This is explained in detail in the online replication package.

For each firm/university pair, in each year I calculate the distance between the university and every office location of the firm in that year.[55] In addition to some firms having unar-

[55]Specifically, I compute the lengths of the great circle arcs connecting each university and each office

chived or broken location pages, there is some variation within firms across years in the types of locations they report. I code location as missing for firm/years in which the reporting of locations seems inconsistent with other years.[56]

Some universities report as a system, and the tier is associated with the largest university in the system. In estimating equation (3), I include the 17 universities reporting as a system, given they are likely the largest in their system based on their inclusion in the Princeton Review's 2012 ranking of the best 376 universities. Results are also very similar when excluding these universities. When including the other university covariates from the Chetty et al. (2020*a*) data in equation (3), I exclude these universities that report as a system, as the covariates pertain to all universities in the system while the recruiting variables do not.

A.4 Changes in recruiting by firm-university distance and university size

Figure A.43b shows suggestive evidence that firms are more likely to drop their target campuses that were a greater distance from the firm's office. For example, in 2009 firms were roughly 10 percentage points more likely to drop their target campuses that were 50-200 miles from their office relative to their campuses that were within 50 miles, conditional on tier and other university characteristics. The magnitude is similar in 2010, and the effects in 2009 and 2010 are jointly significant from zero at the 10% level, as are the effects in 2008, 2009, and 2010. Magnitudes also suggest firms are more likely to drop their campuses more than 200 miles away, though those effects are not statistically significant except in 2008. Including interactions with a continuous measure of distance also yields statistically significant negative coefficients in 2008 and 2009 (at the 1% and 5% level respectively), and a similar magnitude in 2010, and the effects in 2008, 2009, and 2010 are jointly significant

location for a given firm, located on the surface of a sphere. The arc length, measured in degrees, is then converted to statute miles as measured along a great circle on a sphere with radius 6371 kilometers, the mean radius of the earth. These calculations are performed using the arclen and deg2sm commands in MATLAB.

[56] Details are available upon request.

with $p = .01$.

Figure A.43c also shows firms are differentially likely to stop recruiting at smaller universities, conditional on university selectivity tier, distance, and other university characteristics. The coefficient on ln(students in cohort) in 2009 implies that all else equal, the likelihood of recruiting in 2009 at a 2007 target campus at the 75th percentile of size (4146 students) is roughly 17 percentage points higher than at the 25th percentile of size (1161 students), with a mean recruiting likelihood at 2007 targets in 2009 of roughly 45%.

A.5 Recruiting as a Mechanism

In Section 4.1, we use the fraction of firms to which the university lost access, rather than the number of firms to which the university lost access. Recruiting in 2007 for the firms in the sample is more prevalent at elite relative to Tier 3-5 universities.[57] Figure 4a shows the probability of dropping a target campus is higher for Tier 3-5 universities, but the number of recruiting firms falls more at elite universities. This suggests a larger percentage decline in the fraction of students with top quintile earnings. It also suggests a larger percentage point decline if the greater likelihood of dropping a less-selective campus extends to the high-wage firms not in our recruiting dataset, and these firms are more likely to recruit at less selective universities.[58]

The role of lost access to firms may be captured by both the interactions with recruiting firms in 2007, and the fraction of firms pausing their recruiting. Number of recruiting firms in 2007 is a measure of how attractive the university is to firms, implying firms may be less likely to decrease their recruiting at these more attractive universities. While we control for the fraction of firms dropping the university as a target, this may not capture all of the changes in recruiting, for example changes in the scale of recruiting at the university. In

[57] Among the recruiting relationships in 2007 when estimating (3), 257 are at the 44 elite universities in this recruiting sample and 186 are at the 62 Tier 3-5 universities in this sample.

[58] The sample firms are not the only ones enabling top earnings (for the 1987 birth cohort, the cutoff for top 5% earnings in 2014 was $68,100). Other high-wage firms may recruit more at Tier 3-5 universities, and more likely drop these as target campuses, similar to the firms in our sample.

this case, the number of firms recruiting in 2000 will also capture some of the mechanism of interest. Appendix Figures A.47 and A.48 show the results including only the interactions with the fraction dropping the campus, which also reduce the coefficients of interest.

Table A.1: Recession Effects by University Selectivity

Y = Ln(Median Income); positive earners	(1)	(2)	(3)
Recession*Severe, Ivy Plus	0.011	0.006	0.006
	(0.043)	(0.040)	(0.040)
Observations	144	144	144
R-Squared	0.762	0.987	0.987
Recession*Severe, Tier 1	0.002	-0.001	0.002
	(0.023)	(0.022)	(0.022)
Observations	720	720	708
R-Squared	0.730	0.972	0.971
Recession*Severe, Tier 2	-0.029	-0.026	-0.030
	(0.021)	(0.021)	(0.022)
Observations	960	948	876
R-Squared	0.689	0.973	0.973
Recession*Severe, Tier 3-5	-0.051***	-0.043***	-0.046***
	(0.006)	(0.006)	(0.007)
Observations	8,412	8,304	7,332
R-Squared	0.632	0.965	0.965
Recession*Severe, Nonselective Four-Year	-0.072***	-0.093***	-0.096***
	(0.024)	(0.019)	(0.022)
Observations	1,176	1,128	948
R-Squared	0.521	0.923	0.920
Recession*Severe, Two-Year	-0.039***	-0.035***	-0.034***
	(0.006)	(0.006)	(0.007)
Observations	5,628	5,556	4,644
R-Squared	0.662	0.960	0.962
University Fixed Effects	Y	Y	Y
University Controls	N	Y	Y
Cohort Fixed Effects	N	Y	Y
Table 2, Column 4 Sample	N	N	Y

Notes: This table shows results from estimating equation (1), but aggregating cohorts into recession and pre-recession cohorts. Each coefficient is from a separate regression. *Recession* indicates whether the birth cohort was graduating during or after the Great Recession, which includes the cohorts after and including 1986 for the Ivy Plus universities, Tier 1, Tier 2, and Tiers 3-5 universities. For the nonselective four-year universities, this includes the cohorts after and including 1983, and for the two-year colleges this includes the cohorts after and including 1985. The controls in Columns (2) and (3) are the $\mathbf{Z_{jt}}$ in equation (2). See text for further details.

Table A.2: Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities

	(1)	(2)	(3)	(4)	(5)	(6)
Y = Ln(Median Income); positive earners						
Recession*Ivy Plus*Severe	0.062	0.097**	0.096*	0.088*	0.107*	0.100*
	(0.041)	(0.047)	(0.051)	(0.051)	(0.059)	(0.057)
Recession*Tier 1*Severe	0.054**	0.087***	0.087***	0.084***	0.091**	0.084**
	(0.024)	(0.027)	(0.029)	(0.029)	(0.042)	(0.041)
Recession*Tier 2*Severe	0.022	0.029	0.030	0.024	0.026	0.035
	(0.022)	(0.023)	(0.025)	(0.025)	(0.029)	(0.029)
Recession*Nonselective Four-Year*Severe	-0.021	0.002	-0.002	-0.031	-0.024	
	(0.025)	(0.028)	(0.035)	(0.032)	(0.030)	
Recession*Two-Year*Severe	0.012	0.017*	0.016	0.009	0.005	
	(0.009)	(0.009)	(0.011)	(0.011)	(0.013)	
Observations	17,040	17,040	14,904	14,652	14,652	8,136
R-Squared	0.724	0.728	0.970	0.971	0.971	0.979
Y = Ln(Median Income)						
Recession*Ivy Plus*Severe	0.058	0.108**	0.108*	0.097*	0.122*	0.116*
	(0.048)	(0.054)	(0.059)	(0.058)	(0.068)	(0.069)
Recession*Tier 1*Severe	0.047	0.092***	0.092**	0.088**	0.100**	0.093*
	(0.029)	(0.033)	(0.036)	(0.036)	(0.050)	(0.050)
Recession*Tier 2*Severe	0.008	0.021	0.022	0.015	0.020	0.031
	(0.027)	(0.027)	(0.030)	(0.030)	(0.036)	(0.036)
Recession*Nonselective Four-Year*Severe	0.004	0.034	0.041	-0.008	0.004	
	(0.029)	(0.033)	(0.041)	(0.033)	(0.031)	
Recession*Two-Year*Severe	0.020*	0.026**	0.025*	0.016	0.017	
	(0.011)	(0.011)	(0.013)	(0.013)	(0.016)	
Observations	17,028	17,028	14,892	14,640	14,640	8,136
R-Squared	0.730	0.735	0.962	0.964	0.965	0.972
Y = Fraction in Top Income Quintile						
Recession*Ivy Plus*Severe	0.025	0.045**	0.046**	0.040*	0.047*	0.050*
	(0.017)	(0.021)	(0.023)	(0.023)	(0.027)	(0.027)
Recession*Tier 1*Severe	0.033***	0.050***	0.050***	0.048***	0.049**	0.052***
	(0.011)	(0.013)	(0.014)	(0.014)	(0.019)	(0.019)
Recession*Tier 2*Severe	-0.001	0.005	0.006	0.003	0.002	0.011
	(0.011)	(0.011)	(0.013)	(0.013)	(0.015)	(0.016)
Recession*Nonselective Four-Year*Severe	-0.009	-0.002	-0.004	-0.012	-0.007	
	(0.010)	(0.011)	(0.014)	(0.014)	(0.013)	
Recession*Two-Year*Severe	0.011**	0.016***	0.016***	0.013**	0.014**	
	(0.005)	(0.005)	(0.006)	(0.006)	(0.007)	
Observations	17,040	17,040	14,904	14,652	14,652	8,136
R-Squared	0.919	0.929	0.949	0.951	0.952	0.948
Recession-CZ Fixed Effects	N	Y	Y	Y	Y	Y
Birth Cohort-CZ Fixed Effects	N	N	Y	Y	Y	Y
University Controls	N	N	N	Y	Y	Y
Parental Income*Recession*Severe	N	N	N	N	Y	Y

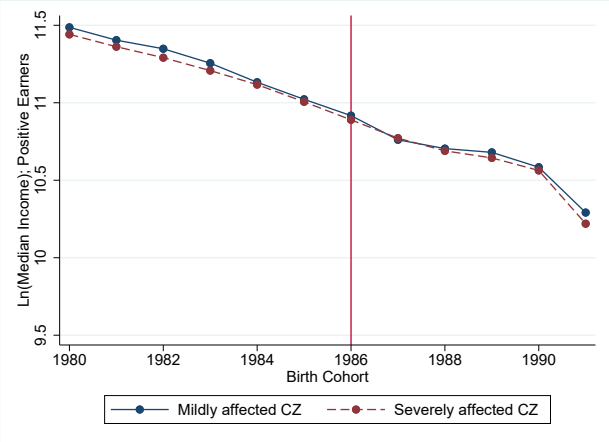
Notes: Columns 1 through 5 show results from the same regression as described in Table 2, but showing the coefficients on all tiers of university selectivity. Column 6 shows results from estimating the regression in column 5, but including only Ivy Plus, Tier 1, Tier 2, and Tiers 3-5, for which the *Recession* birth cohorts are the same across all tiers. See Table 2 for details.

Table A.3: Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities, Fixed Sample

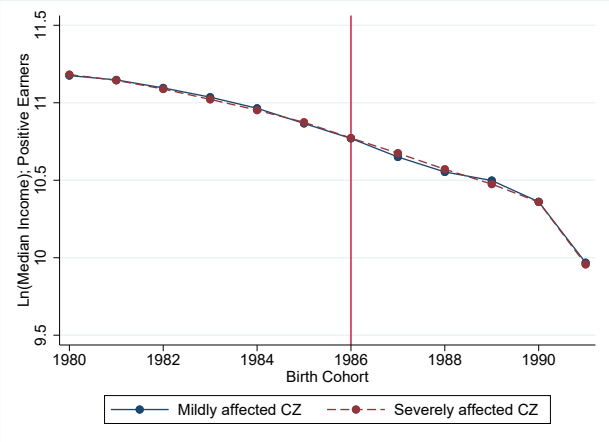
Y = Ln(Median Income); positive earners	(1)	(2)	(3)	(4)	(5)	(6)
Recession*Ivy Plus*Severe	0.063	0.097**	0.097*	0.088*	0.107*	0.100*
	(0.041)	(0.046)	(0.051)	(0.051)	(0.059)	(0.057)
Recession*Tier 1*Severe	0.057**	0.086***	0.087***	0.084***	0.091**	0.084**
	(0.024)	(0.026)	(0.029)	(0.029)	(0.042)	(0.041)
Recession*Tier 2*Severe	0.021	0.027	0.027	0.024	0.026	0.035
	(0.023)	(0.023)	(0.025)	(0.025)	(0.029)	(0.029)
Recession*Nonselective Four-Year*Severe	-0.039	-0.020	-0.030	-0.031	-0.024	
	(0.025)	(0.026)	(0.033)	(0.032)	(0.030)	
Recession*Two-Year*Severe	0.015	0.014	0.012	0.009	0.005	
	(0.010)	(0.009)	(0.011)	(0.011)	(0.013)	
Recession-CZ Fixed Effects	N	Y	Y	Y	Y	Y
Birth Cohort-CZ Fixed Effects	N	N	Y	Y	Y	Y
University Controls	N	N	N	Y	Y	Y
Parental Income*Recession*Severe	N	N	N	N	Y	Y
Observations	14,652	14,652	14,652	14,652	14,652	8,136
R-Squared	0.727	0.732	0.970	0.971	0.971	0.979

Notes: This table is the same as Table A.2, but keeping the sample the same as the sample in Column 4 of Table 2 for all regressions. See Table 2 and A.2 for details.

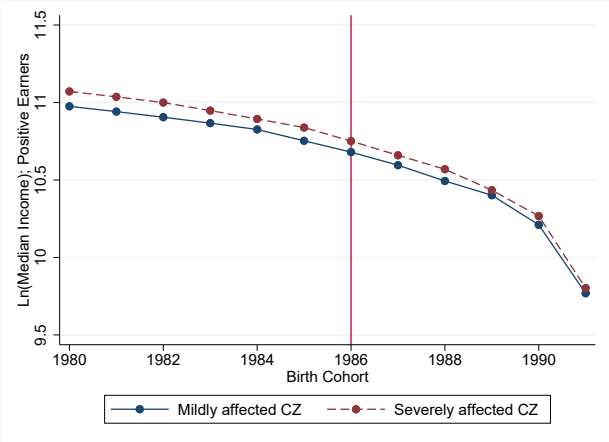
Figure A.1: **Median Incomes by Birth Cohort and University Selectivity**



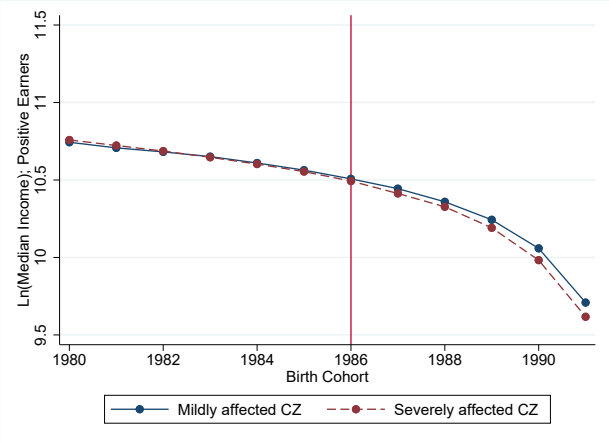
(a) Ivy Plus Universities



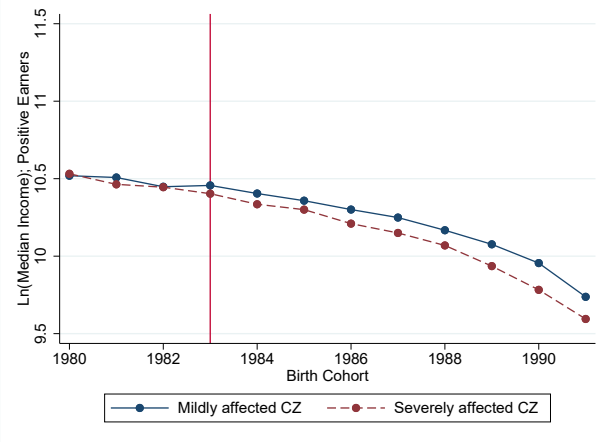
(b) Tier 1 Universities (Elite)



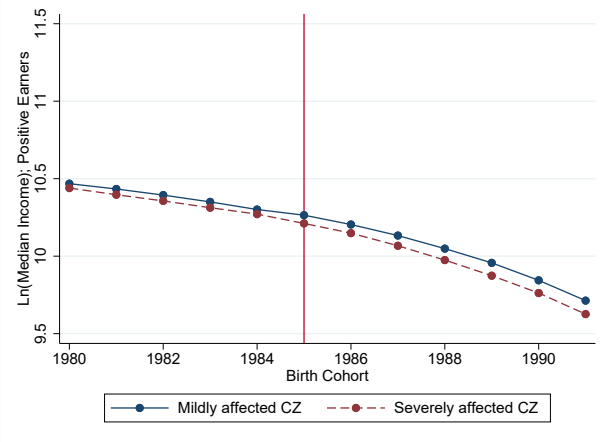
(c) Tier 2 Universities (Highly Selective)



(d) Tier 3-5 Universities (Selective)



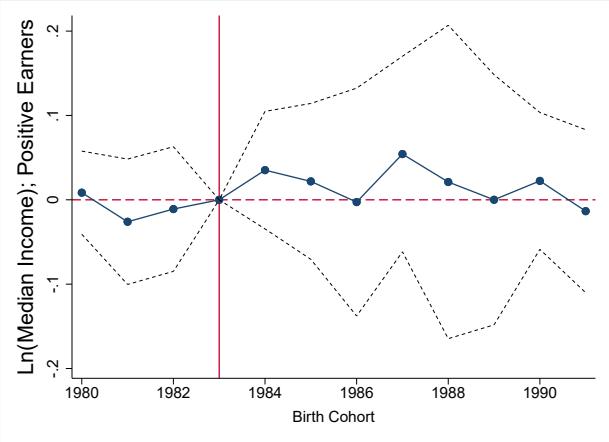
(e) Nonselective Four-Year Univ. (Public/NFP)



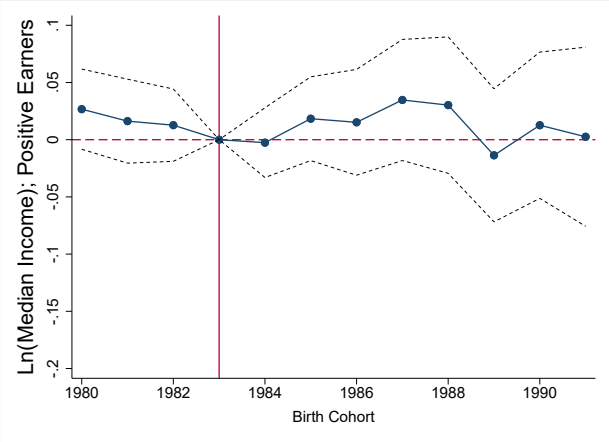
(f) Two-Year Colleges (Public/NFP)

Notes: Plots show the average log median income, conditional on positive earners, within birth cohort and university selectivity tier, separately for universities in severely and mildly affected areas. Vertical lines show birth cohorts that were graduating after the start of the recession, based on median age at graduation by tier. See text for details.

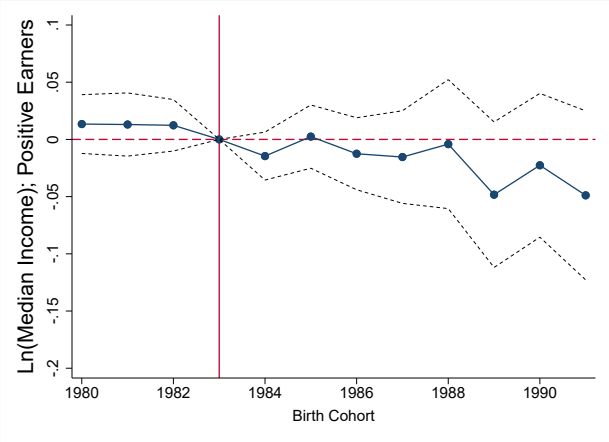
Figure A.2: **Recession Effects by University Selectivity**



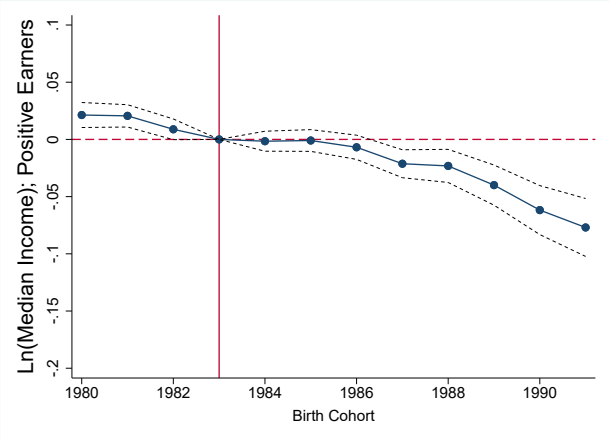
(a) Ivy Plus Universities



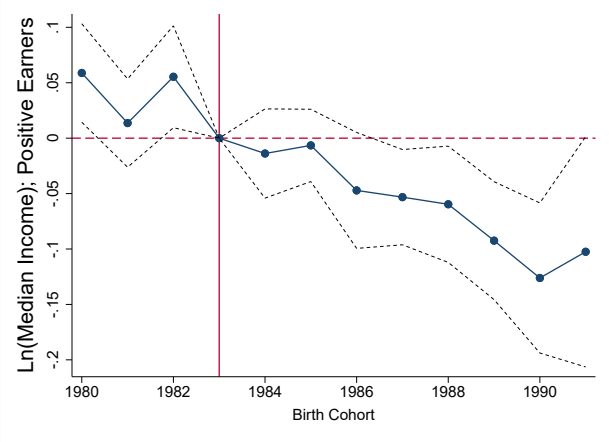
(b) Tier 1 Universities (Elite)



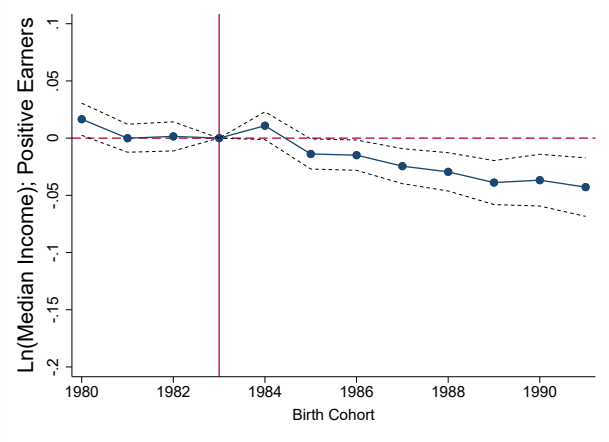
(c) Tier 2 Universities (Highly Selective)



(d) Tier 3-5 Universities (Selective)



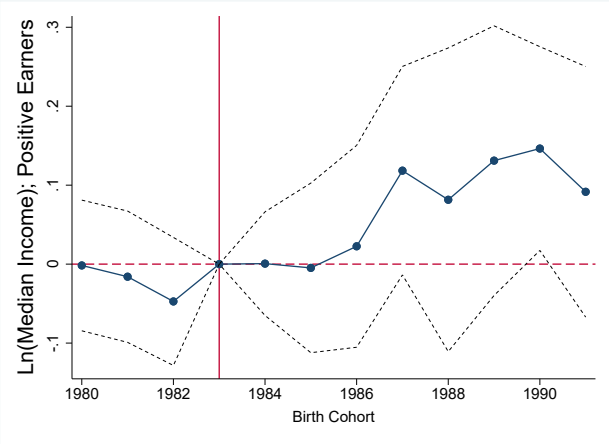
(e) Nonselective Four-Year Univ. (Public/NFP)



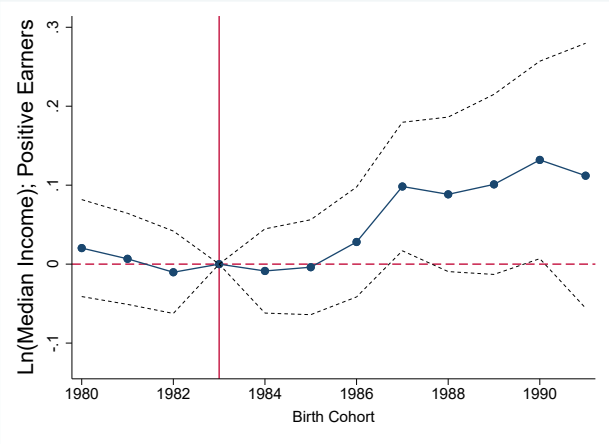
(f) Two-Year Colleges (Public/NFP)

Notes: Plots are from estimating equation (1) separately for each tier of selectivity, and show coefficients on the interaction between birth cohort fixed effects, and an indicator for severe recession in the CZ from 2007 to 2009. Dashed lines show 95% confidence intervals. I include only universities that have data for each cohort. Sample sizes (and R-squared) for each tier in decreasing order of selectivity are 144 (.99), 708 (.97), 876 (.97), 7,332 (.97), 948 (.92), 4,644 (.96). Because of the wide confidence intervals for Ivy Plus universities, this plot is on a slightly different scale.

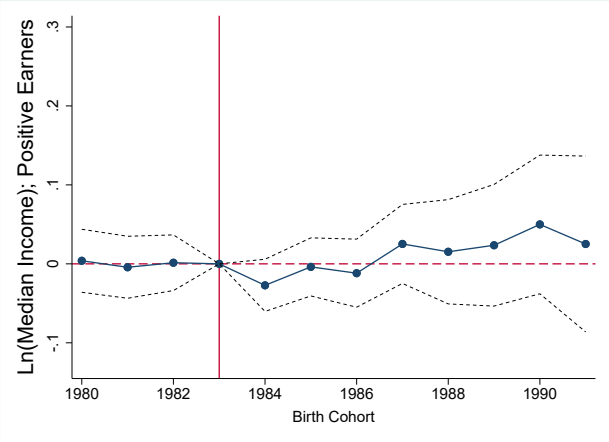
Figure A.3: **Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities: Triple Difference with CZ-Cohort Fixed Effects**



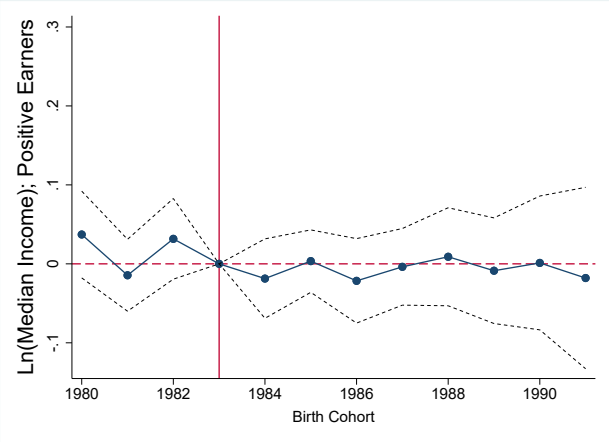
(a) Ivy Plus Universities



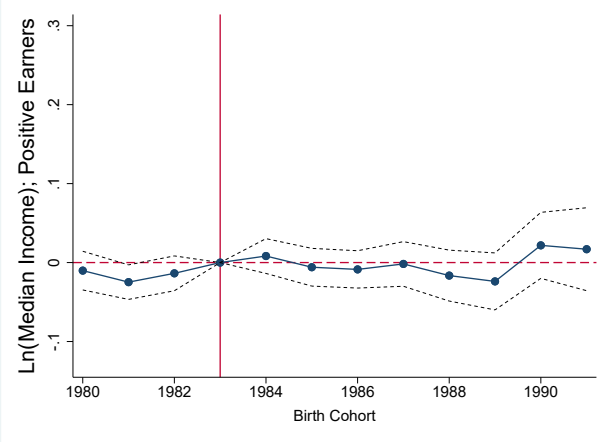
(b) Tier 1 Universities (Elite)



(c) Tier 2 Universities (Highly Selective)



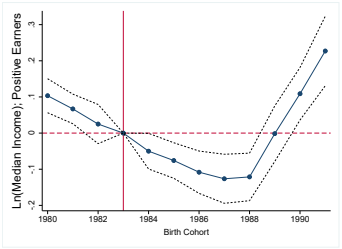
(d) Nonselective Four-Year Univ. (Public/NFP)



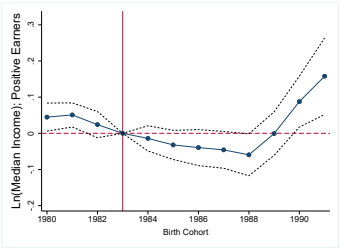
(e) Two-Year Colleges (Public/NFP)

Notes: Plots are from the same regression, equation (2), and show coefficients on the interaction between birth cohort fixed effects, university tier, and an indicator for severe recession in the CZ from 2007 to 2009. Dashed lines show 95% confidence intervals. I include only universities that have data for each cohort. Sample size is 14,652 and R-squared is .98. See text for details.

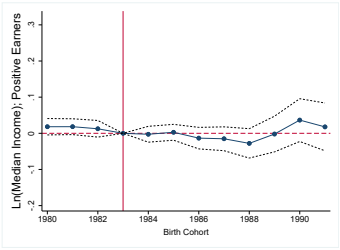
Figure A.4: **Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities: Severely Affected CZs**



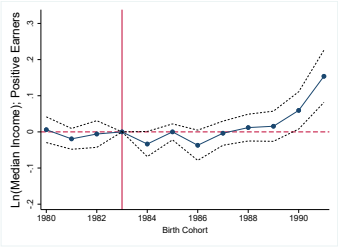
(a) Ivy Plus Universities



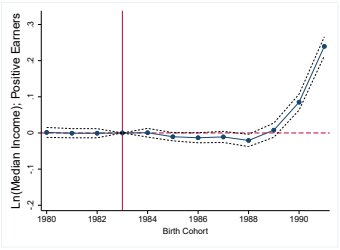
(b) Tier 1 Universities (Elite)



(c) Tier 2 Universities (Highly Selective)

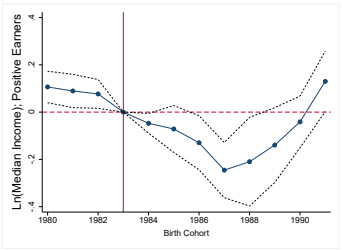


(d) Nonselective Four-Year Univ. (Public/NFP)

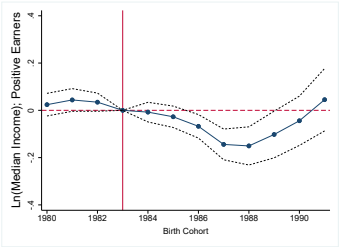


(e) Two-Year Colleges (Public/NFP)

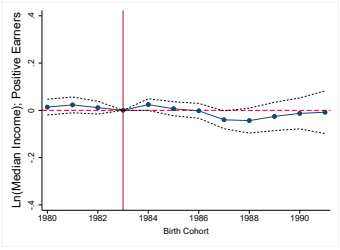
Figure A.5: **Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities: Mildly Affected CZs**



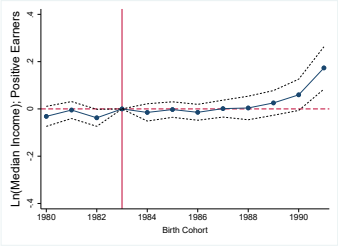
(a) Ivy Plus Universities



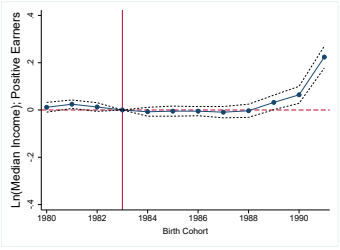
(b) Tier 1 Universities (Elite)



(c) Tier 2 Universities (Highly Selective)



(d) Nonselective Four-Year Univ. (Public/NFP)

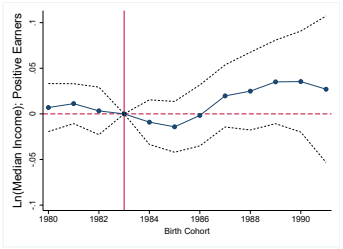


(e) Two-Year Colleges (Public/NFP)

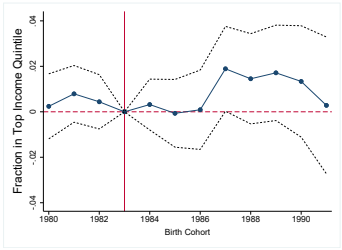
Notes: Plots show results from estimating (2) separately for severely and mildly affected CZs. See text for details.

Figure A.6

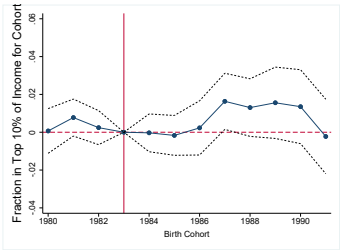
(a) **Recession Effects on Income, Tier 1 (Elite) Relative to Tier 3-5 (Selective) Universities: Using Change in Unemployment Rate as Alternative Measure of Shock**



Ln(Median Income), Positive Earners

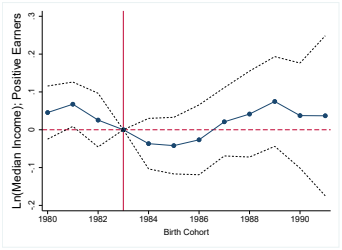


Fraction in Top Quintile

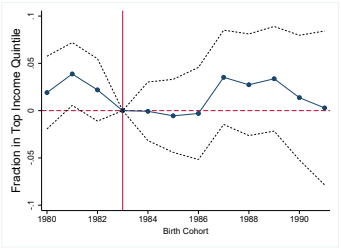


Fraction in Top 10%

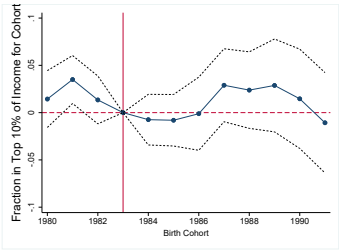
(b) **Recession Effects on Income, Tier 1 (Elite) Relative to Tier 3-5 (Selective) Universities: Indicator for Top Quartile of Unemployment Rate Change as Alternative Measure of Shock**



Ln(Median Income), Positive Earners



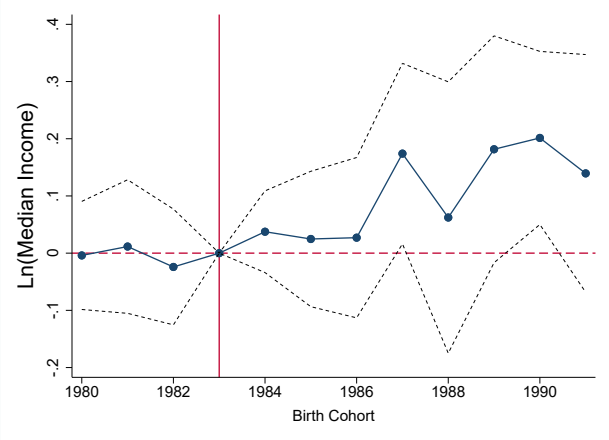
Fraction in Top Quintile



Fraction in Top 10%

Notes: Plots are analogous to those in Figures 2a and 2b, but with alternative measures of the Great Recession shock instead of indicator for above-median change in unemployment rate between 2007 and 2009. Figure A.6a interacts tier and cohort with the change in unemployment rate in the CZ between 2007 and 2009, and Figure A.6b interacts tier and cohort with an indicator for the CZ being in the top quartile of unemployment rate changes between 2007 and 2009. There are only 16 Tier 1 universities in top-quartile-affected CZs, that are also in a CZ with a Tier 3-5 university. See text for details.

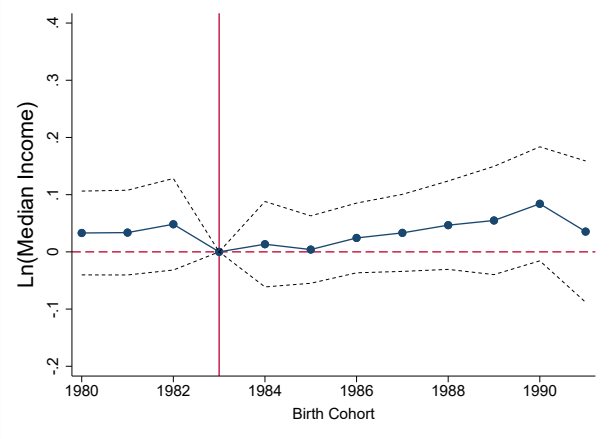
Figure A.7: **Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities: Triple Difference with CZ-Cohort Fixed Effects, Not Restricting to Positive Earners**



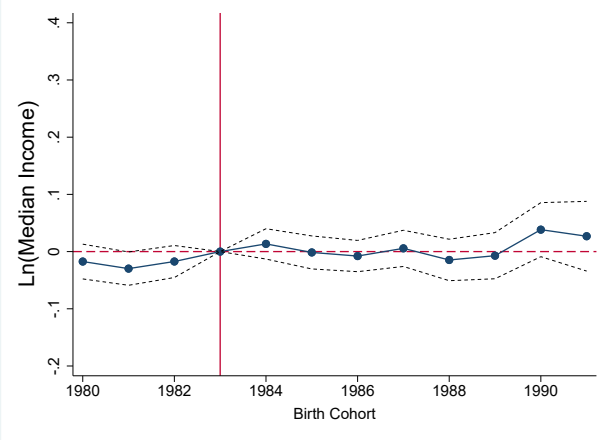
(a) Ivy Plus Universities

(b) Tier 1 Universities (Elite)

(c) Tier 2 Universities (Highly Selective)



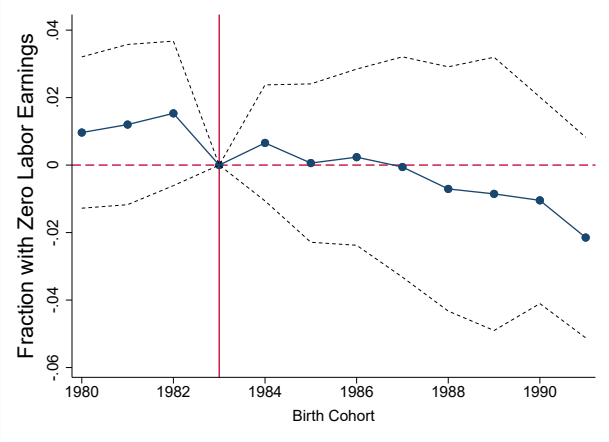
(d) Nonselective Four-Year Univ. (Public/NFP)



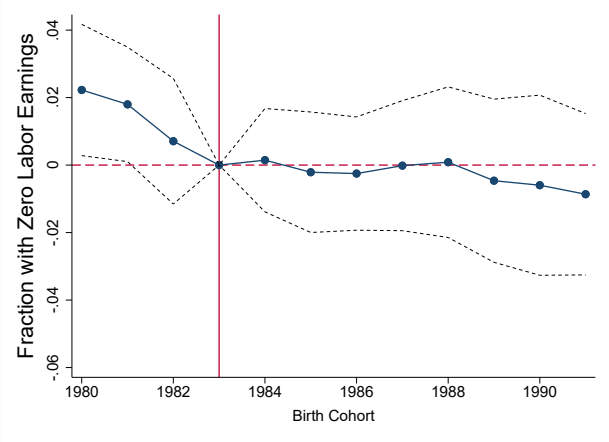
(e) Two-Year Colleges (Public/NFP)

Notes: Plots are analogous to those in Figure A.3, but the dependent variable is log of median income without restricting to positive earners. There is one nonselective university that does not have balanced data for this variable, but does when restricting to positive earners, so the sample size in this regression is 14,640. See Figure A.3 for details.

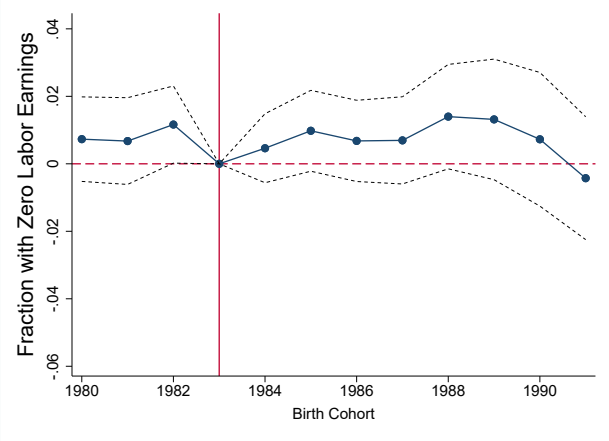
Figure A.8: **Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities: Triple Difference with CZ-Cohort Fixed Effects, Fraction with Zero Labor Earnings**



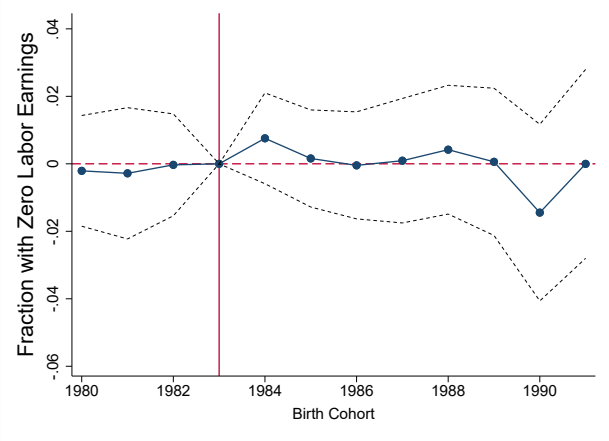
(a) Ivy Plus Universities



(b) Tier 1 Universities (Elite)



(c) Tier 2 Universities (Highly Selective)

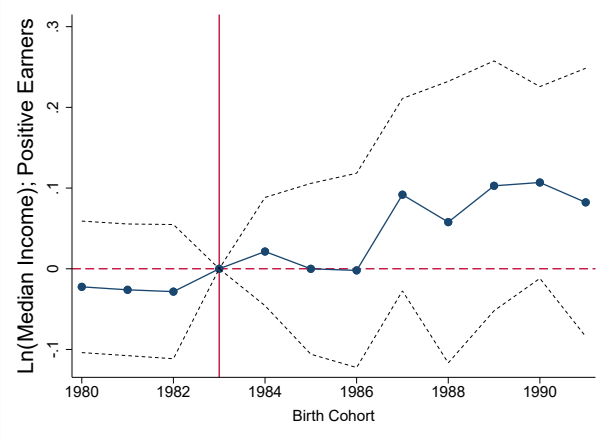


(d) Nonselective Four-Year Univ. (Public/NFP)

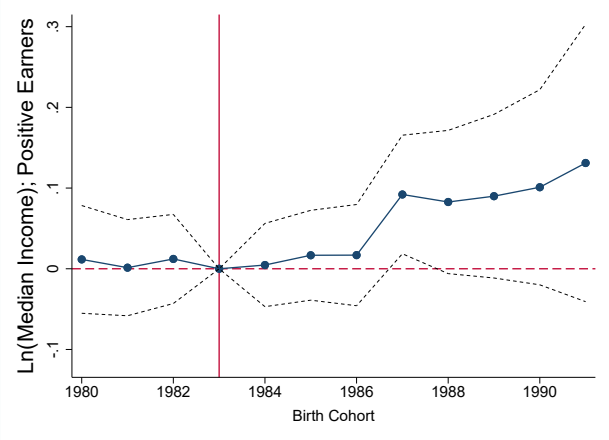
(e) Two-Year Colleges (Public/NFP)

Notes: Plots are analogous to those in Figure A.3, but the dependent variable is the fraction of students with zero labor earnings. See Figure A.3 for details.

Figure A.9: **Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities: Triple Difference with CZ-Cohort Fixed Effects, Sample with Data for 1983 Birth Cohort**



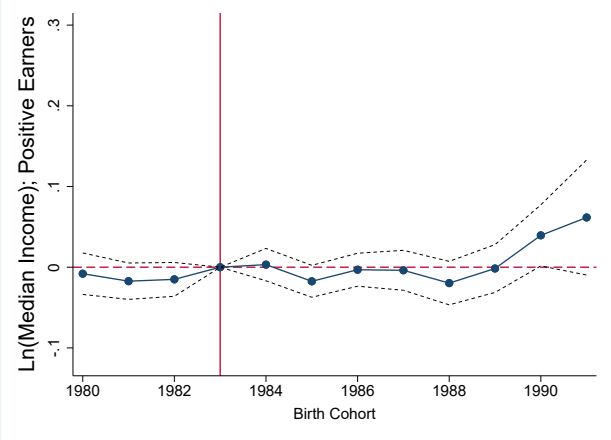
(a) Ivy Plus Universities



(b) Tier 1 Universities (Elite)

(c) Tier 2 Universities (Highly Selective)

(d) Nonselective Four-Year Univ. (Public/NFP)

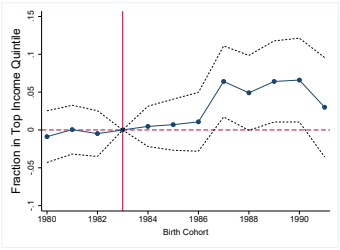


(e) Two-Year Colleges (Public/NFP)

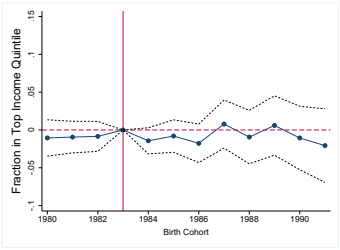
Notes: Plots are analogous to those in Figure A.3, but the regression includes only universities that have data for the 1983 cohort, rather than requiring the sample is completely balanced. Sample size is 19,297 and R-squared is .976. See Figure A.3 notes and text for details.

Figure A.10: **Likelihood of Top Quintile Earnings, Relative to Tier 3-5 (Selective) Universities: Triple Difference with CZ-Cohort Fixed Effects**

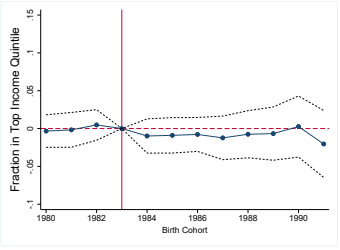
(a) Ivy Plus Universities



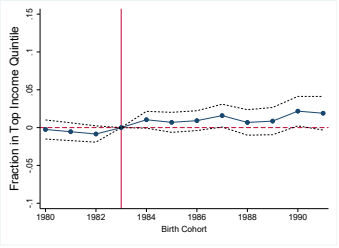
(b) Tier 1 Universities (Elite)



(c) Tier 2 Universities (Highly Selective)



(d) Nonselective Four-Year Univ. (Public/NFP)

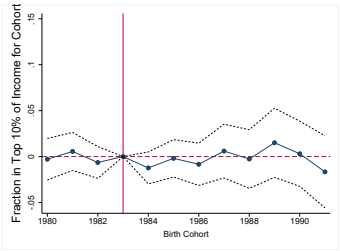


(e) Two-Year Colleges (Public/NFP)

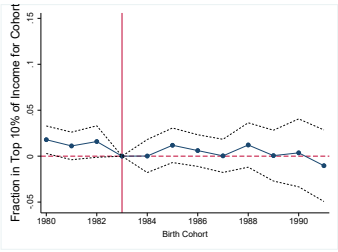
Figure A.11: **Likelihood of Top 10% Earnings, Relative to Tier 3-5 (Selective) Universities: Triple Difference with CZ-Cohort Fixed Effects**

(a) Ivy Plus Universities

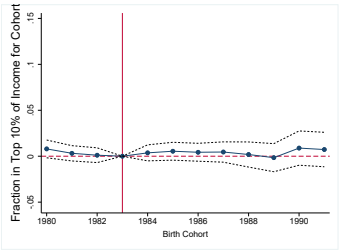
(b) Tier 1 Universities (Elite)



(c) Tier 2 Universities (Highly Selective)



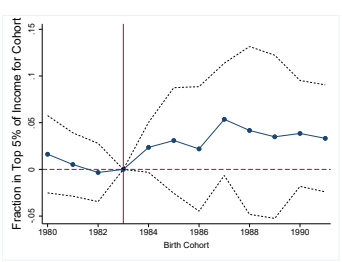
(d) Nonselective Four-Year Univ. (Public/NFP)



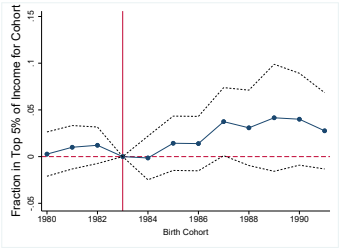
(e) Two-Year Colleges (Public/NFP)

Notes: Plots are analogous to those in Figure A.3, but with a different dependent variable. See Figure A.3 notes and text for details.

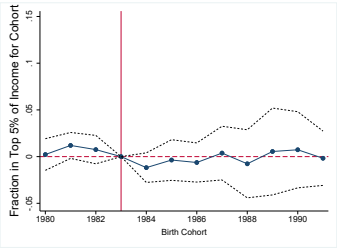
Figure A.12: **Likelihood of Top 5% Earnings, Relative to Tier 3-5 (Selective) Universities: Triple Difference with CZ-Cohort Fixed Effects**



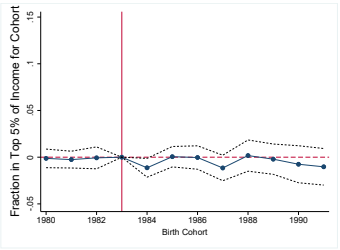
(a) Ivy Plus Universities



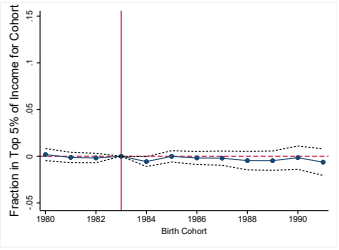
(b) Tier 1 Universities (Elite)



(c) Tier 2 Universities (Highly Selective)

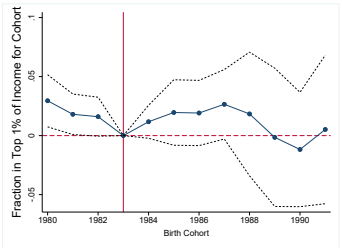


(d) Nonselective Four-Year Univ. (Public/NFP)

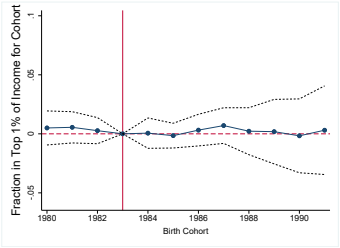


(e) Two-Year Colleges (Public/NFP)

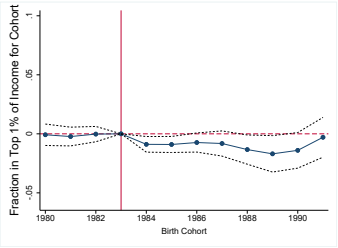
Figure A.13: **Likelihood of Top 1% Earnings, Relative to Tier 3-5 (Selective) Universities: Triple Difference with CZ-Cohort Fixed Effects**



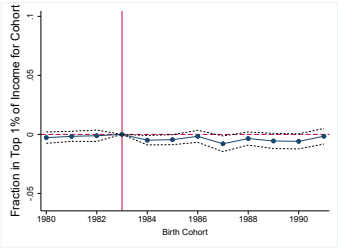
(a) Ivy Plus Universities



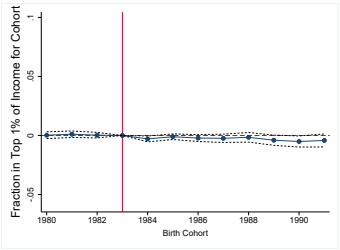
(b) Tier 1 Universities (Elite)



(c) Tier 2 Universities (Highly Selective)



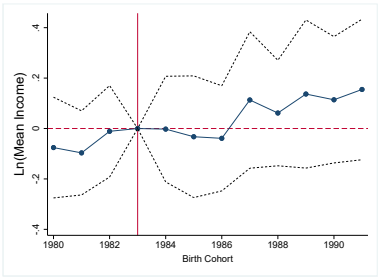
(d) Nonselective Four-Year Univ. (Public/NFP)



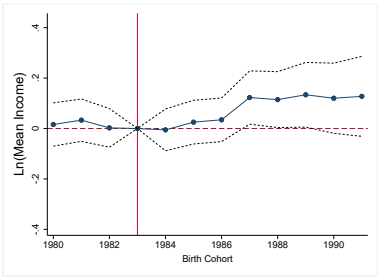
(e) Two-Year Colleges (Public/NFP)

Notes: Plots are analogous to those in Figure A.3, but with a different dependent variable. See Figure A.3 notes and text for details.

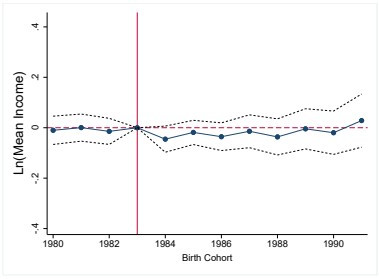
Figure A.14: **Average Income by University Selectivity, Relative to Tier 3-5 (Selective) universities: Triple Difference with CZ-Cohort Fixed Effects**



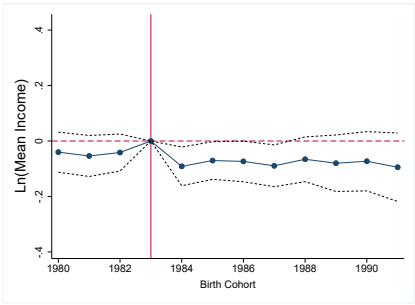
(a) Ivy Plus Universities



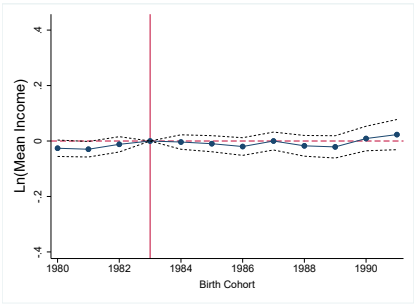
(b) Tier 1 Universities (Elite)



(c) Tier 2 Universities (Highly Selective)



(d) Nonselective Four-Year Univ. (Public/NFP)



(e) Two-Year Colleges (Public/NFP)

Notes: Plots are analogous to those in Figure A.3, but with a different dependent variable. Table A.6 shows that for the Tier 1 and Ivy Plus universities, mean earnings is substantially higher than the median among positive earners, as is the standard deviation. Chetty et al. (2020*b*) show the mean prediction error is higher for mean earnings. See Figure A.3 notes and text for details.

Table A.4: Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities, Conditional on Parental Income Quintile

Y = Likelihood of Top Quintile Income	(1)	(2)	(3)	(4)
Recession*Ivy Plus*Severe, Parent Quintile = 5	0.020	0.042	0.039	0.045
	(0.019)	(0.027)	(0.027)	(0.032)
Recession*Tier 1*Severe, Parent Quintile = 5	0.035***	0.056***	0.057***	0.056**
	(0.012)	(0.016)	(0.016)	(0.023)
Observations	17,040	14,904	14,652	14,652
R-squared	0.805	0.880	0.885	0.887
Recession*Ivy Plus*Severe, Parent Quintile = 4	0.026*	0.054**	0.047**	0.053*
	(0.016)	(0.023)	(0.023)	(0.028)
Recession*Tier 1*Severe, Parent Quintile = 4	0.020*	0.042***	0.040***	0.036*
	(0.011)	(0.016)	(0.015)	(0.021)
Observations	17,040	14,904	14,652	14,652
R-squared	0.834	0.889	0.891	0.893
Recession*Ivy Plus*Severe, Parent Quintile = 3	0.002	0.018	0.016	0.011
	(0.020)	(0.026)	(0.026)	(0.031)
Recession*Tier 1*Severe, Parent Quintile = 3	0.042***	0.056***	0.054***	0.045**
	(0.012)	(0.017)	(0.017)	(0.021)
Observations	17,040	14,904	14,652	14,652
R-squared	0.828	0.874	0.877	0.879
Recession*Ivy Plus*Severe, Parent Quintile = 2	0.037***	0.051***	0.044**	0.068**
	(0.013)	(0.019)	(0.019)	(0.027)
Recession*Tier 1*Severe, Parent Quintile = 2	-0.001	0.012	0.009	0.027
	(0.017)	(0.020)	(0.020)	(0.026)
Observations	17,040	14,904	14,652	14,652
R-squared	0.795	0.845	0.849	0.850
Recession*Ivy Plus*Severe, Parent Quintile = 1	0.007	0.029	0.023	0.020
	(0.025)	(0.033)	(0.032)	(0.039)
Recession*Tier 1*Severe, Parent Quintile = 1	0.025	0.040**	0.037*	0.025
	(0.016)	(0.020)	(0.020)	(0.026)
Observations	17,040	14,904	14,652	14,652
R-squared	0.728	0.790	0.795	0.796
Recession-CZ Fixed Effects	N	Y	Y	Y
Birth Cohort-CZ Fixed Effects	N	Y	Y	Y
University Controls	N	N	Y	Y
Parental Income*Recession*Severe	N	N	N	Y
P-value, Test for Equality of Effects Across all Quintiles				
Ivy Plus Relative to Tier 3-5	0.1	0.15	0.34	0.18
Tier 1 (Elite) Relative to Tier 3-5	0.02	0.14	0.1	0.66

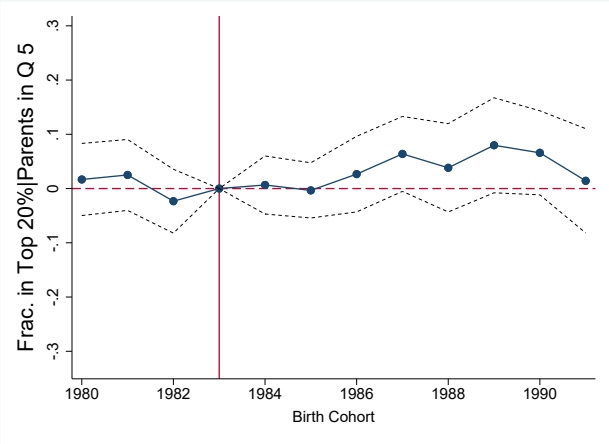
Notes: This table presents results from estimating the regressions displayed in Table 2, separately by the parental income quintile of the students. See Table 2 for details. Regressions include the triple differences shown as well as interactions between *Recession*, *Severe*, and the university selectivity tiers described in equation (1). All lower-level terms are included.

Table A.5: Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities, Conditional on Parental Income Quintile

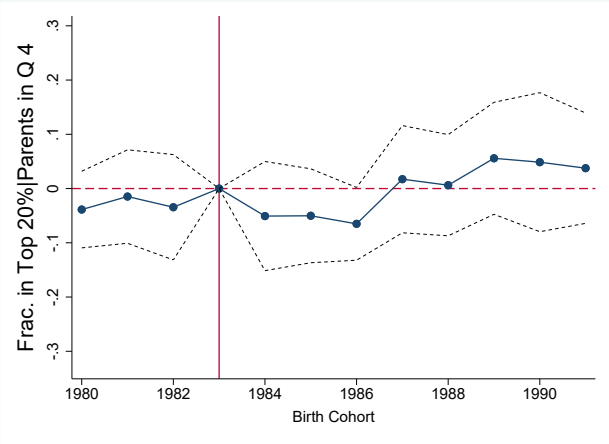
Y = Likelihood of Top 1% Income	(1)	(2)	(3)	(4)
Recession*Ivy Plus*Severe, Parent Quintile = 5	-0.002	-0.001	-0.002	-0.009
	(0.015)	(0.018)	(0.018)	(0.017)
Recession*Tier 1*Severe, Parent Quintile = 5	0.010	0.009	0.008	0.000
	(0.007)	(0.009)	(0.009)	(0.011)
Observations	17,040	14,904	14,652	14,652
R-squared	0.813	0.867	0.870	0.874
Recession*Ivy Plus*Severe, Parent Quintile = 4	0.017	0.017	0.016	0.007
	(0.015)	(0.018)	(0.018)	(0.017)
Recession*Tier 1*Severe, Parent Quintile = 4	0.013*	0.012	0.011	0.002
	(0.007)	(0.008)	(0.008)	(0.010)
Observations	17,040	14,904	14,652	14,652
R-squared	0.749	0.799	0.803	0.806
Recession*Ivy Plus*Severe, Parent Quintile = 3	-0.014	-0.015	-0.016	-0.020
	(0.019)	(0.022)	(0.022)	(0.023)
Recession*Tier 1*Severe, Parent Quintile = 3	0.015**	0.014*	0.014*	0.009
	(0.007)	(0.008)	(0.008)	(0.011)
Observations	17,040	14,904	14,652	14,652
R-squared	0.710	0.766	0.770	0.772
Recession*Ivy Plus*Severe, Parent Quintile = 2	0.013	0.010	0.010	0.011
	(0.026)	(0.032)	(0.032)	(0.034)
Recession*Tier 1*Severe, Parent Quintile = 2	-0.007	-0.006	-0.006	-0.006
	(0.008)	(0.009)	(0.009)	(0.011)
Observations	17,040	14,904	14,652	14,652
R-squared	0.594	0.662	0.666	0.667
Recession*Ivy Plus*Severe, Parent Quintile = 1	-0.007	-0.014	-0.015	-0.016
	(0.026)	(0.029)	(0.028)	(0.030)
Recession*Tier 1*Severe, Parent Quintile = 1	-0.005	-0.009	-0.010	-0.010
	(0.010)	(0.010)	(0.010)	(0.013)
Observations	17,040	14,904	14,652	14,652
R-squared	0.529	0.611	0.615	0.616
Recession-CZ Fixed Effects	N	Y	Y	Y
Birth Cohort-CZ Fixed Effects	N	Y	Y	Y
University Controls	N	N	Y	Y
Parental Income*Recession*Severe	N	N	N	Y
P-value, Test for Equality of Effects Across all Quintiles				
Ivy Plus Relative to Tier 3-5	0.01	0.01	0.01	0.08
Tier 1 (Elite) Relative to Tier 3-5	0.03	0.13	0.14	0.56

Notes: This table presents results from estimating the regressions displayed in Table 2, separately by the parental income quintile of the students. See Table 2 for details. Regressions include the triple differences shown as well as interactions between *Recession*, *Severe*, and the university selectivity tiers described in equation (1). All lower-level terms are included.

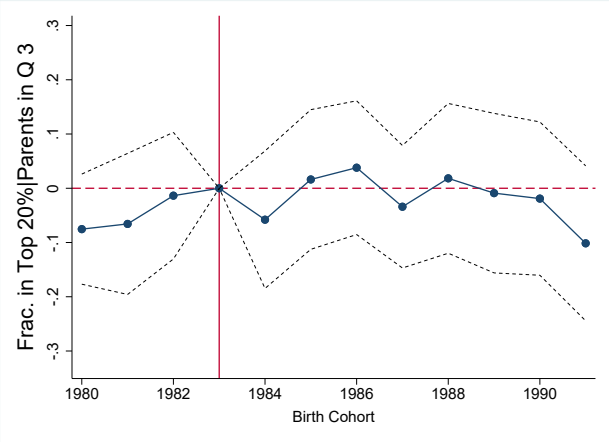
Figure A.15: **Likelihood of Top Quintile Income, Conditional on Parental-Income Quintile: Ivy Plus Relative to Selective Universities (Tiers 3-5)**



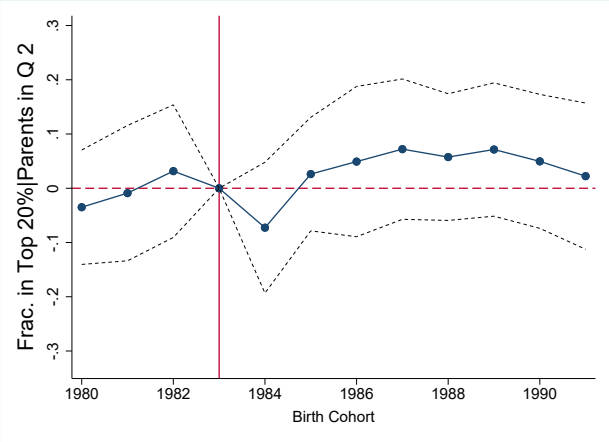
Parental Income in Quintile 5



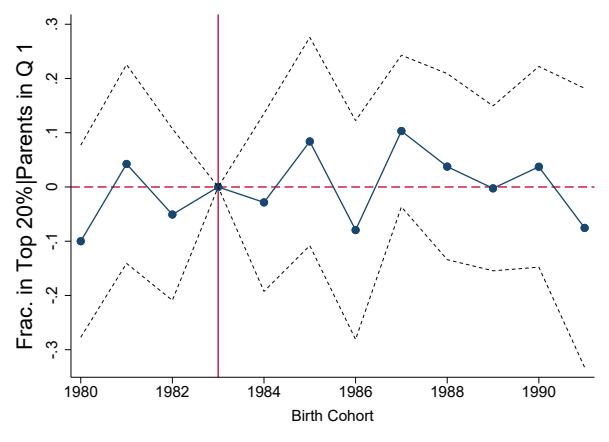
Parental Income in Quintile 4



Parental Income in Quintile 3



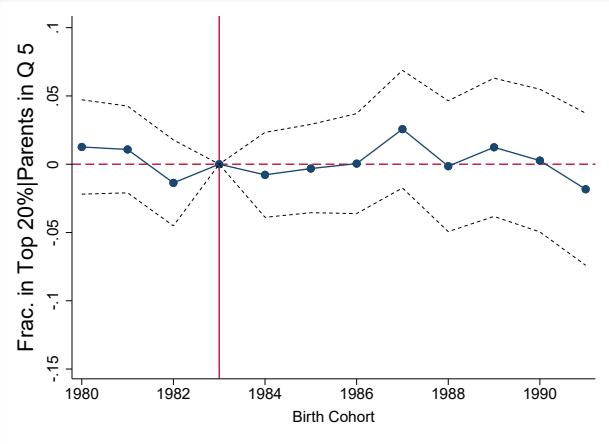
Parental Income in Quintile 2



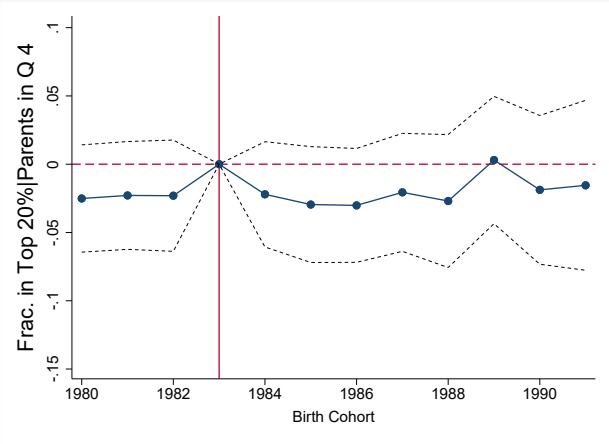
Parental Income in Quintile 1

Notes: Plots are analogous to Figure 3, but comparing Ivy Plus to Tier 3-5 universities. See Figure 3 for details.

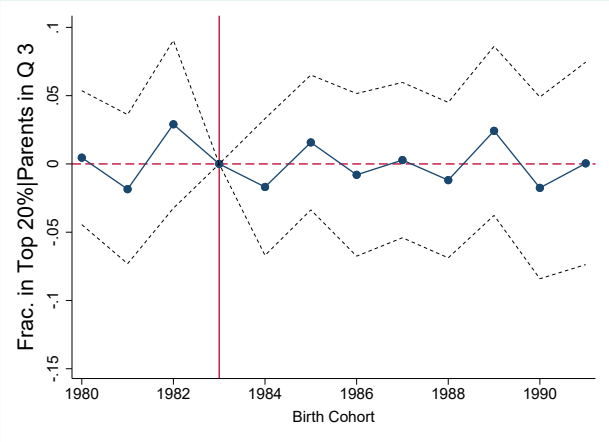
Figure A.16: **Likelihood of Top Quintile Income, Conditional on Parental-Income Quintile: Highly Selective Relative to Selective Universities (Tiers 3-5)**



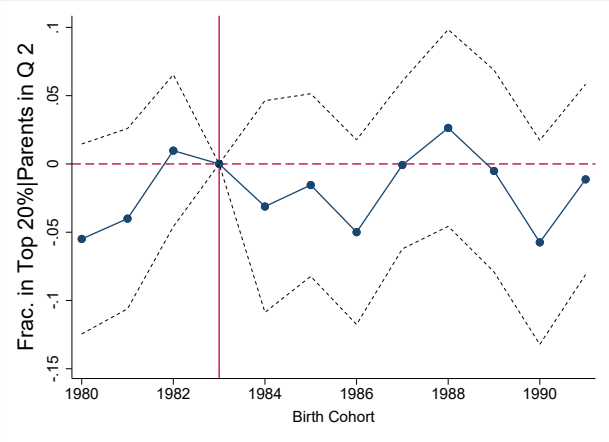
Parental Income in Quintile 5



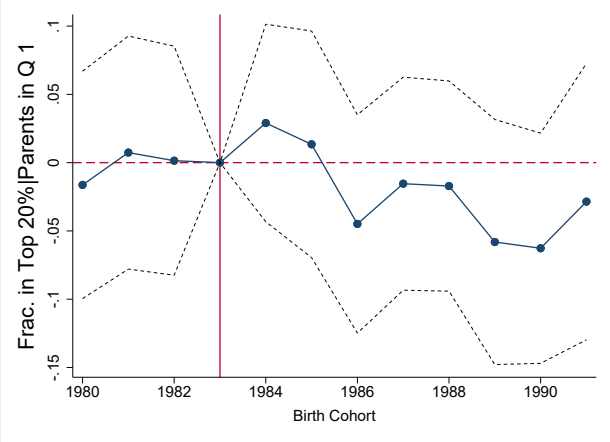
Parental Income in Quintile 4



Parental Income in Quintile 3



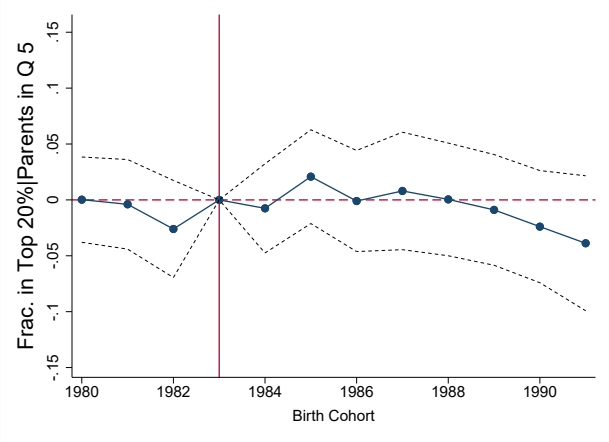
Parental Income in Quintile 2



Parental Income in Quintile 1

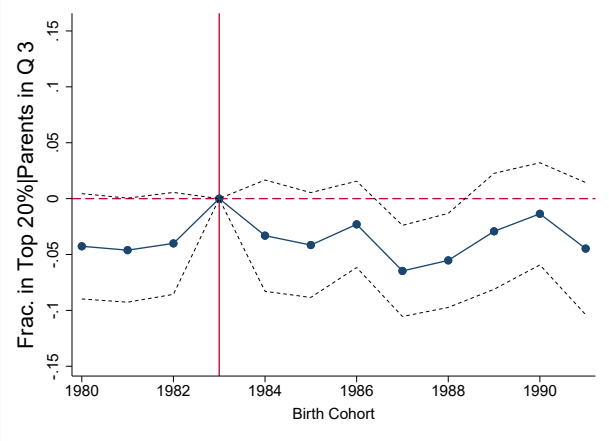
Notes: Plots are analogous to Figure 3, but comparing Highly Selective (Tier 2) to Tier 3-5 universities. See Figure 3 for details.

Figure A.17: **Likelihood of Top Quintile Income, Conditional on Parental-Income Quintile: Nonselective Four-Year (Public/NFP) Relative to Selective Universities (Tiers 3-5)**

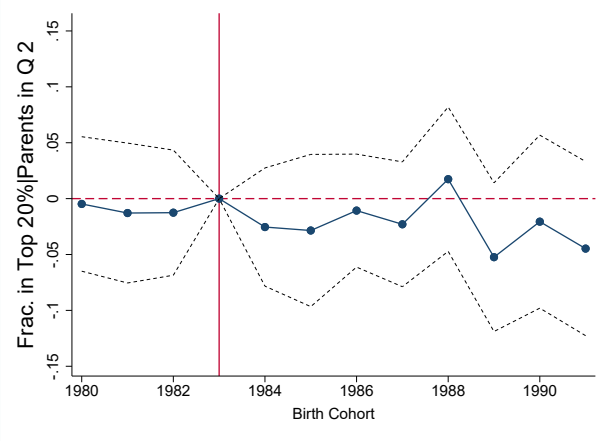


Parental Income in Quintile 5

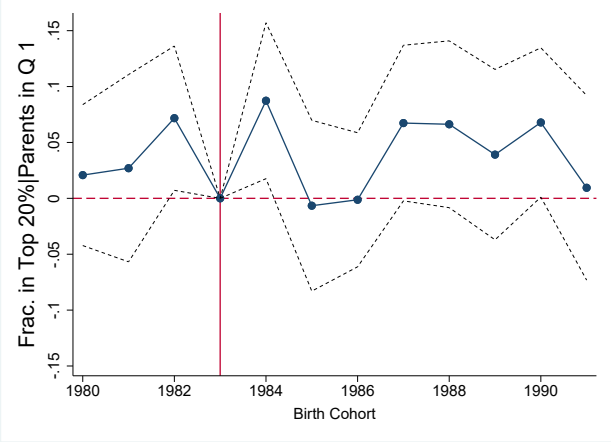
Parental Income in Quintile 4



Parental Income in Quintile 3



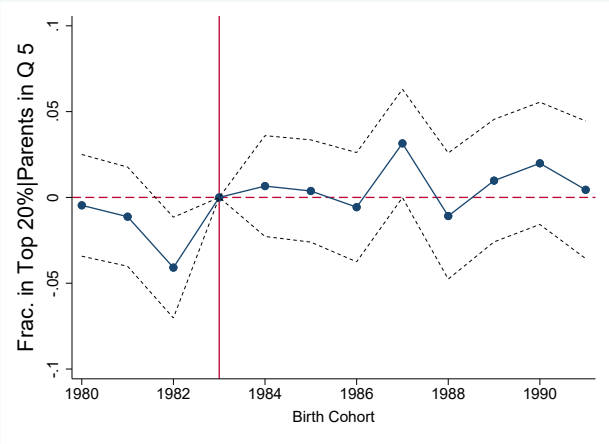
Parental Income in Quintile 2



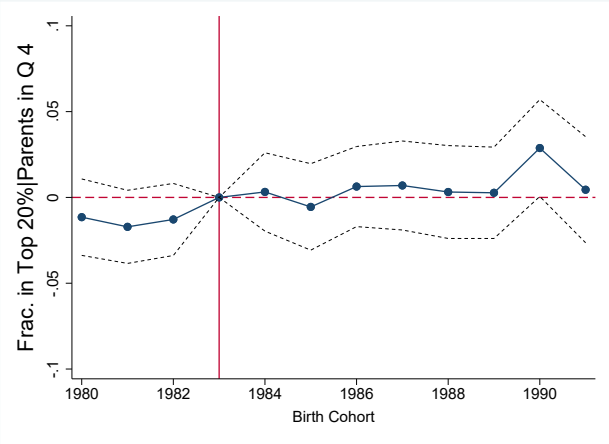
Parental Income in Quintile 1

Notes: Plots are analogous to Figure 3, but comparing nonselective four-year public and not-for-profit universities to Tier 3-5 universities. See Figure 3 for details.

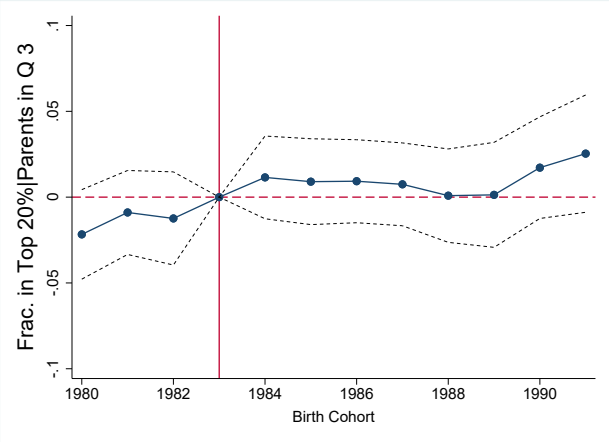
Figure A.18: **Likelihood of Top Quintile Income, Conditional on Parental-Income Quintile: Two-Year (Public/NFP) Relative to Selective Universities (Tiers 3-5)**



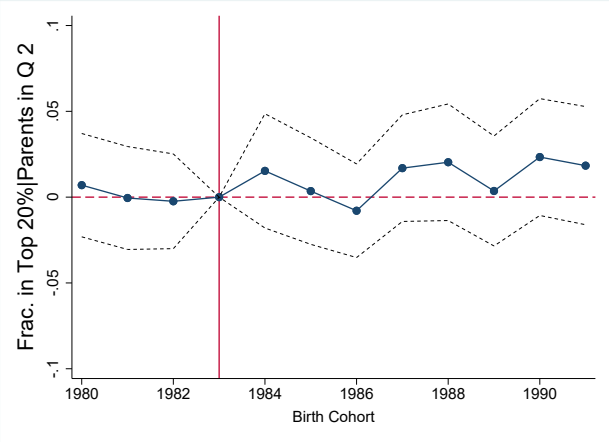
Parental Income in Quintile 5



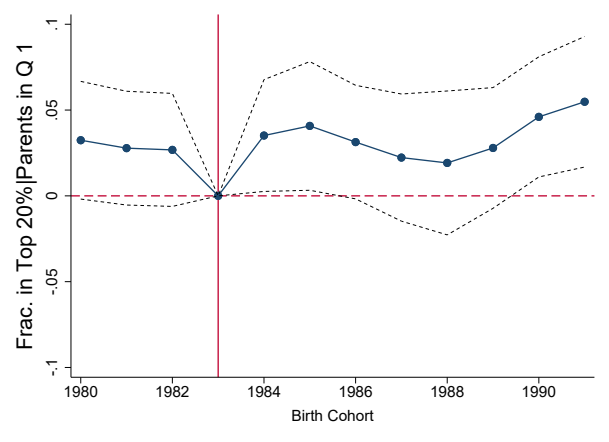
Parental Income in Quintile 4



Parental Income in Quintile 3



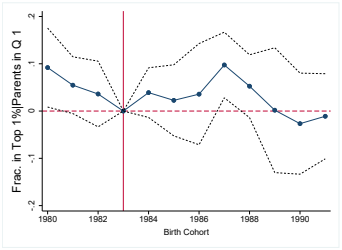
Parental Income in Quintile 2



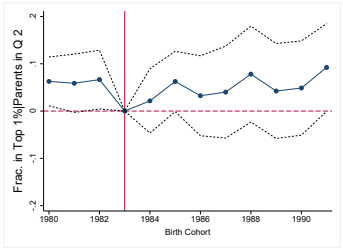
Parental Income in Quintile 1

Notes: Plots are analogous to Figure 3, but comparing two-year public and not-for-profit colleges to Tier 3-5 universities. See Figure 3 for details.

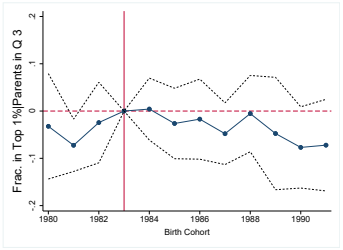
Figure A.19: **Likelihood of Top 1% Income, Conditional on Parental-Income Quintile: Ivy Plus Relative to Selective Universities (Tiers 3-5)**



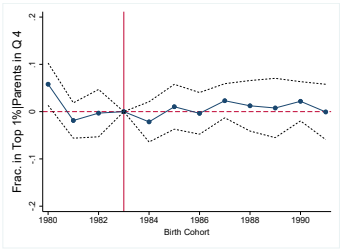
(a) Ivy Plus; Parents in Income Quintile 1



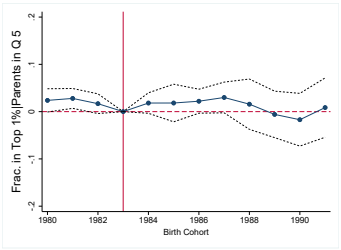
(b) Ivy Plus; Parents in Income Quintile 2



(c) Ivy Plus; Parents in Income Quintile 3

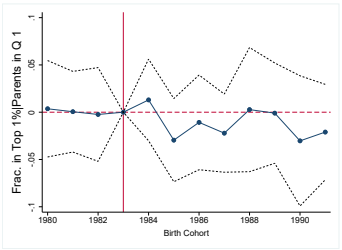


(d) Ivy Plus; Parents in Income Quintile 4



(e) Ivy Plus; Parents in Income Quintile 5

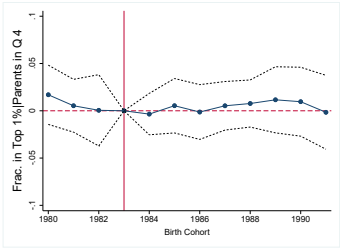
Figure A.20: **Likelihood of Top 1% Income, Conditional on Parental-Income Quintile: Tier 1 (Elite) Relative to Selective Universities (Tiers 3-5)**



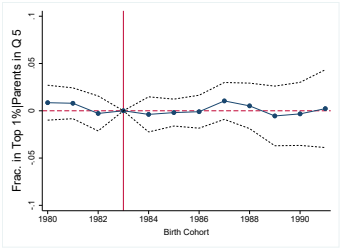
(a) Tier 1; Parents in Income Quintile 1

(b) Tier 1; Parents in Income Quintile 2

(c) Tier 1; Parents in Income Quintile 3



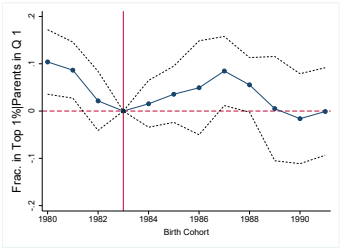
(d) Tier 1; Parents in Income Quintile 4



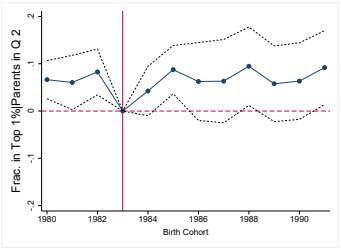
(e) Tier 1; Parents in Income Quintile 5

Notes: Plots are analogous to Figure 3, but with a different dependent variable. See Figure 3 for details.

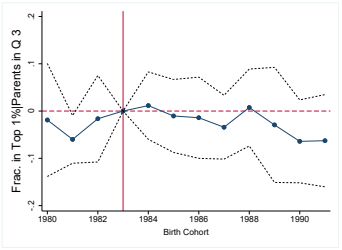
Figure A.21: **Likelihood of Top 1% Income, Conditional on Parental-Income Quintile: Ivy Plus Relative to Selective Universities (Tiers 3-5), Weighted**



(a) Ivy Plus; Parents in Income Quintile 1

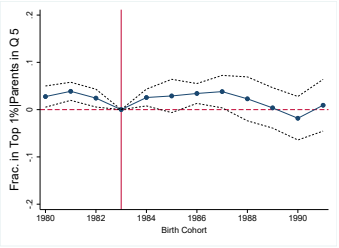


(b) Ivy Plus; Parents in Income Quintile 2



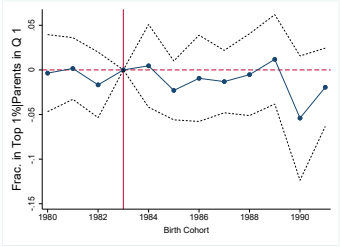
(c) Ivy Plus; Parents in Income Quintile 3

(d) Ivy Plus; Parents in Income Quintile 4

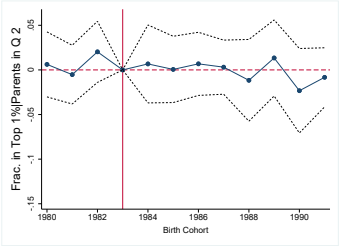


(e) Ivy Plus; Parents in Income Quintile 5

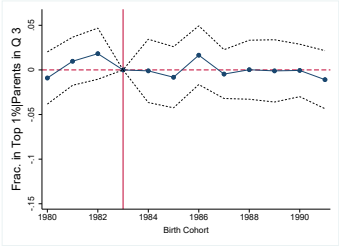
Figure A.22: **Likelihood of Top 1% Income, Conditional on Parental-Income Quintile: Tier 1 (Elite) Relative to Selective Universities (Tiers 3-5), Weighted**



(a) Tier 1; Parents in Income Quintile 1

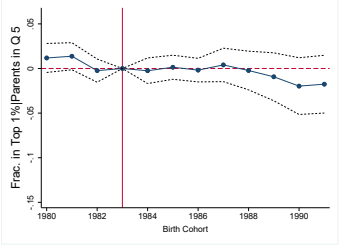


(b) Tier 1; Parents in Income Quintile 2



(c) Tier 1; Parents in Income Quintile 3

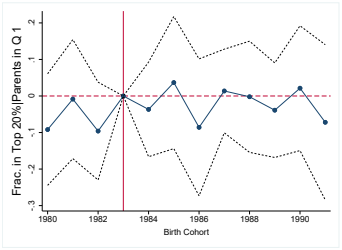
(d) Tier 1; Parents in Income Quintile 4



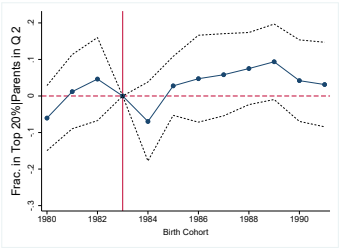
(e) Tier 1; Parents in Income Quintile 5

Notes: Plots are analogous to those in Figure A.19 and A.20, but observations are weighted by the size of the birth cohort-university-parental-income quintile cell.

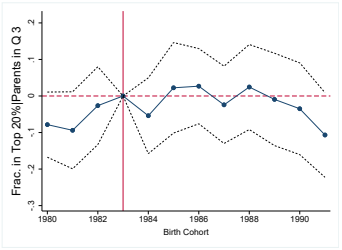
Figure A.23: **Likelihood of Top Quintile Income, Conditional on Parental-Income Quintile: Ivy Plus Relative to Selective Universities (Tiers 3-5), Weighted**



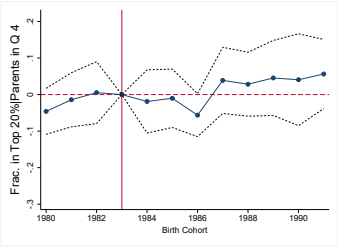
(a) Ivy Plus; Parents in Income Quintile 1



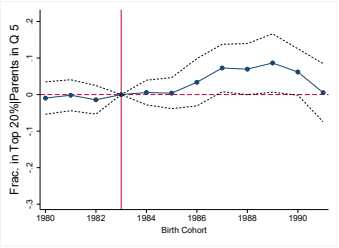
(b) Ivy Plus; Parents in Income Quintile 2



(c) Ivy Plus; Parents in Income Quintile 3



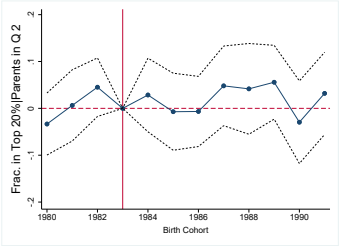
(d) Ivy Plus; Parents in Income Quintile 4



(e) Ivy Plus; Parents in Income Quintile 5

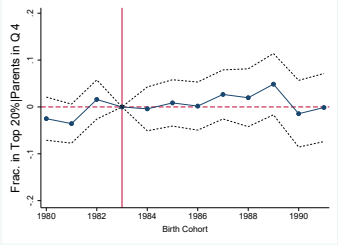
Figure A.24: **Likelihood of Top Quintile Income, Conditional on Parental-Income Quintile: Tier 1 (Elite) Relative to Selective Universities (Tiers 3-5), Weighted**

(a) Tier 1; Parents in Income Quintile 1

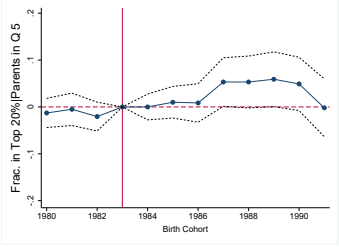


(b) Tier 1; Parents in Income Quintile 2

(c) Tier 1; Parents in Income Quintile 3



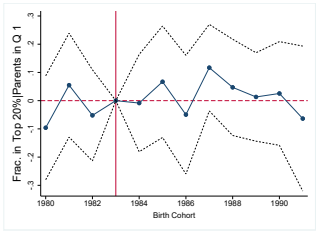
(d) Tier 1; Parents in Income Quintile 4



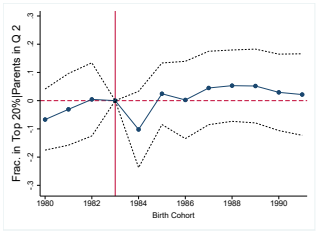
(e) Tier 1; Parents in Income Quintile 5

Notes: Plots are analogous to those in Figure 3 and A.15, but observations are weighted by the size of the birth cohort-university-parental-income quintile cell.

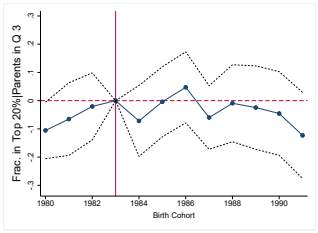
Figure A.25: **Likelihood of Top Quintile Income, Conditional on Parental-Income Quintile: Ivy Plus Relative to Selective Universities (Tiers 3-5), Including Interactions with Fraction Parents in Top 5 and Top 1%**



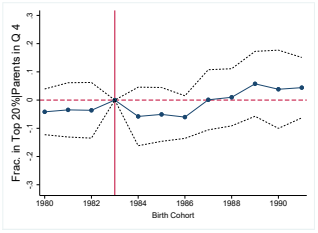
(a) Ivy Plus; Parents in Income Quintile 1



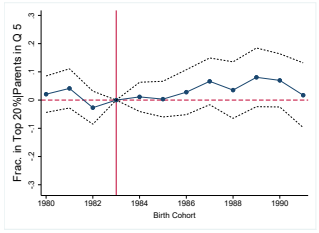
(b) Ivy Plus; Parents in Income Quintile 2



(c) Ivy Plus; Parents in Income Quintile 3

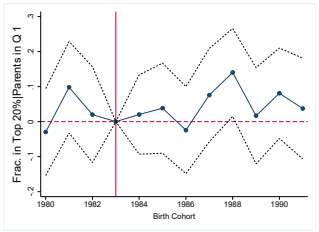


(d) Ivy Plus; Parents in Income Quintile 4

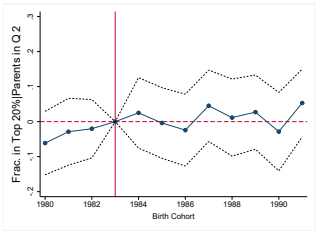


(e) Ivy Plus; Parents in Income Quintile 5

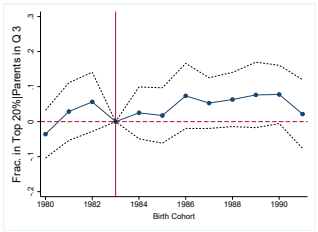
Figure A.26: **Likelihood of Top Quintile Income, Conditional on Parental-Income Quintile: Tier 1 (Elite) Relative to Selective Universities (Tiers 3-5), Including Interactions with Fraction Parents in Top 5 and Top 1%**



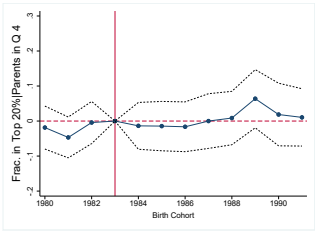
(a) Tier 1; Parents in Income Quintile 1



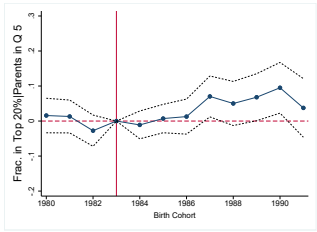
(b) Tier 1; Parents in Income Quintile 2



(c) Tier 1; Parents in Income Quintile 3



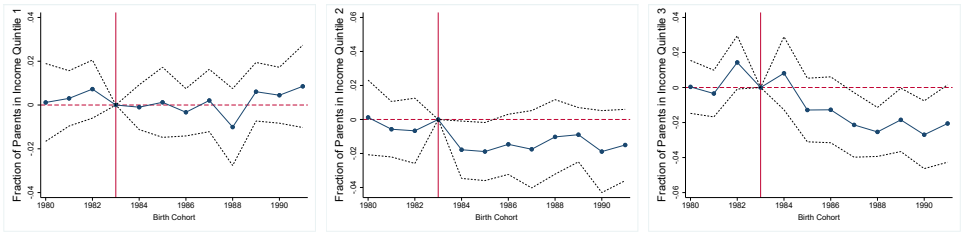
(d) Tier 1; Parents in Income Quintile 4



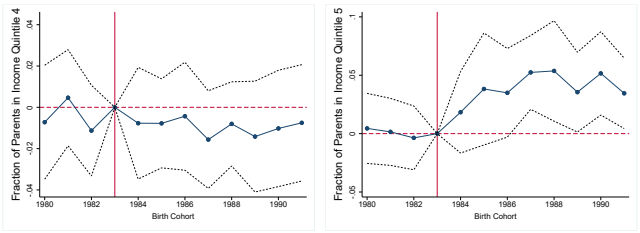
(e) Tier 1; Parents in Income Quintile 5

Notes: Plots are analogous to those in Figure 3 and A.15, but additionally include interactions between birth cohort, severe recession in the CZ, and fraction with parents in the top 5% of incomes, and separately in the top 1% of incomes.

Figure A.27: **Fraction of Students with Parents in Each Income Quintile, Ivy Plus Relative to Tier 3-5 (Selective) Universities**

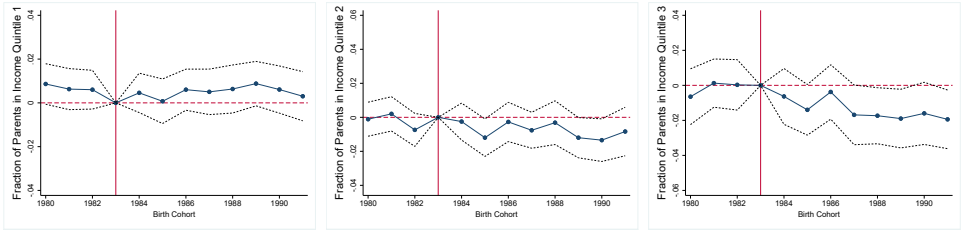


(a) Fraction of Parents in Income Quintile 1 (b) Fraction of Parents in Income Quintile 2 (c) Fraction of Parents in Income Quintile 3

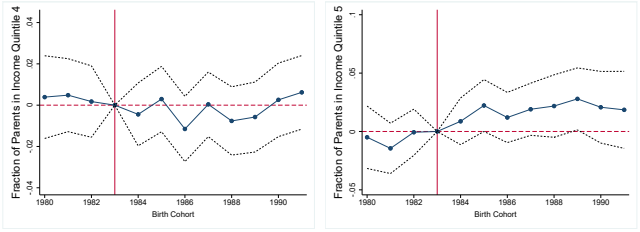


(d) Fraction of Parents in Income Quintile 4 (e) Fraction of Parents in Income Quintile 5

Figure A.28: **Fraction of Students with Parents in Each Income Quintile, Tier 1 Relative to Tier 3-5 (Selective) Universities**



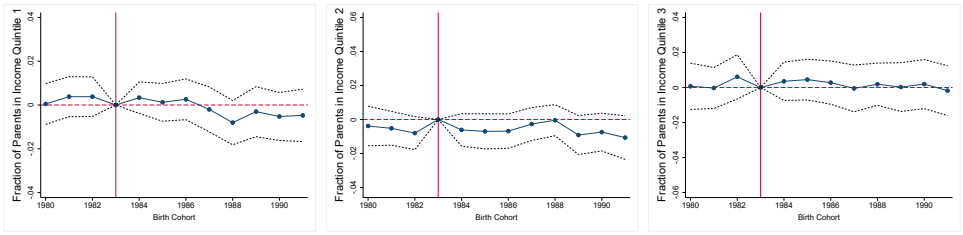
(a) Fraction of Parents in Income Quintile 1 (b) Fraction of Parents in Income Quintile 2 (c) Fraction of Parents in Income Quintile 3



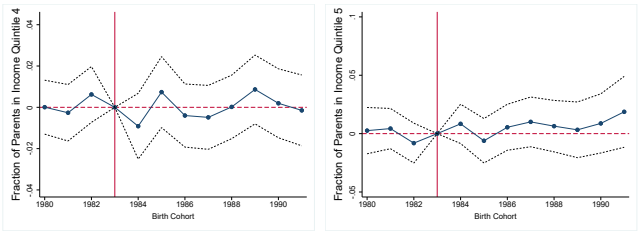
(d) Fraction of Parents in Income Quintile 4 (e) Fraction of Parents in Income Quintile 5

Notes: Each plot is from estimating a version of Equation (2), in which the dependent variable is the fraction of students with parents in the given income quintile. The coefficients are on the interaction between birth cohort, selectivity tier, and an indicator for severe recession in the CZ. The regression also includes birth cohort-selectivity tier fixed effects, birth cohort-CZ fixed effects, and university fixed effects, but does not include the other covariates in Equation (2). Standard errors are clustered at the university level.

Figure A.29: **Fraction of Students with Parents in Each Income Quintile, Tier 2 Relative to Tier 3-5 (Selective) Universities**

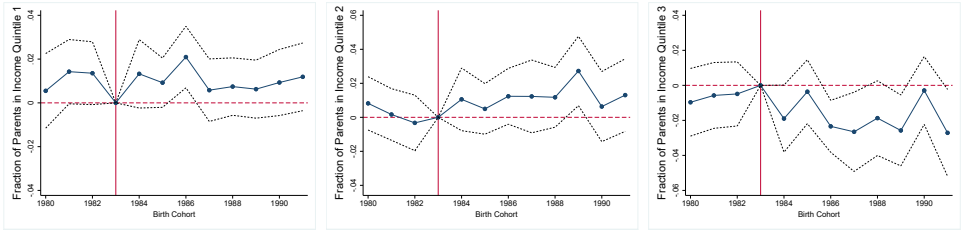


(a) Fraction of Parents in Income Quintile 1 (b) Fraction of Parents in Income Quintile 2 (c) Fraction of Parents in Income Quintile 3

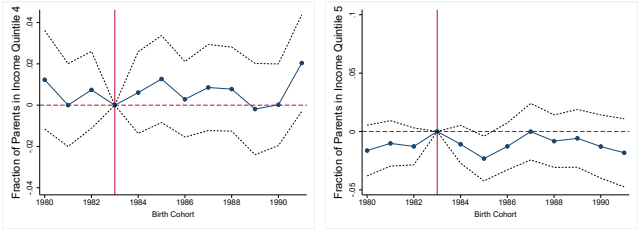


(d) Fraction of Parents in Income Quintile 4 (e) Fraction of Parents in Income Quintile 5

Figure A.30: **Fraction of Students with Parents in Each Income Quintile, Nonselective Relative to Tier 3-5 (Selective) Universities**



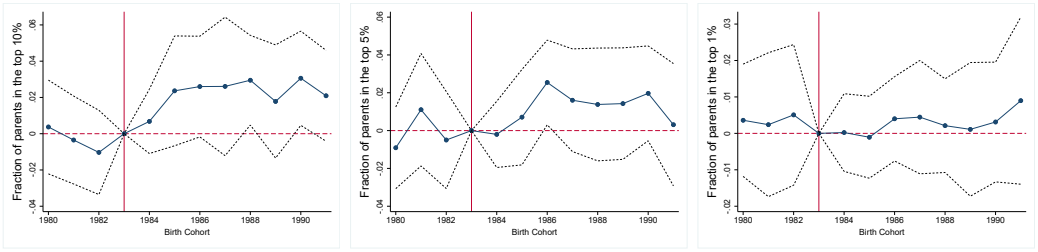
(a) Fraction of Parents in Income Quintile 1 (b) Fraction of Parents in Income Quintile 2 (c) Fraction of Parents in Income Quintile 3



(d) Fraction of Parents in Income Quintile 4 (e) Fraction of Parents in Income Quintile 5

Notes: Plots are analogous to those in Figure A.28, but showing comparisons of Tier 2 universities to Tier 3-5 universities, and nonselective four-year public and not-for-profit universities to Tier 3-5 universities. See Figure A.28 and text for details.

Figure A.31: **Fraction of Students with Parents in Top Income Percentiles, Ivy Plus Relative to Tier 3-5 (Selective) Universities**

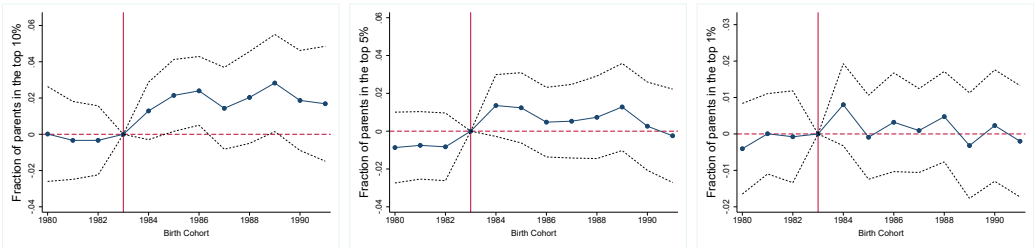


(a) Fraction of Parents in Top 10%

(b) Fraction of Parents in Top 5%

(c) Fraction of Parents in Top 1%

Figure A.32: **Fraction of Students with Parents in Top Income Percentiles, Tier 1 Relative to Tier 3-5 (Selective) Universities**



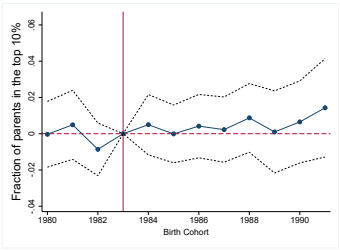
(a) Fraction of Parents in Top 10%

(b) Fraction of Parents in Top 5%

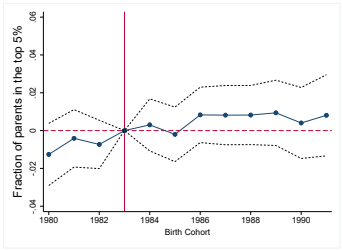
(c) Fraction of Parents in Top 1%

Notes: Plots are analogous to those in Figure A.27 and A.28, but the dependent variables are the fraction of students with parents in top income percentiles. See Figures A.27 and A.28 and text for details.

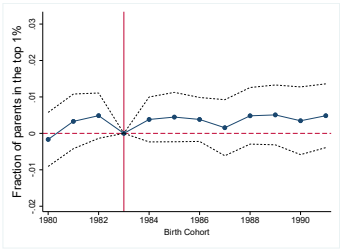
Figure A.33: **Fraction of Students with Parents in Top Income Percentiles, Tier 2 Relative to Tier 3-5 (Selective) Universities**



(a) Fraction of Parents in Top 10%

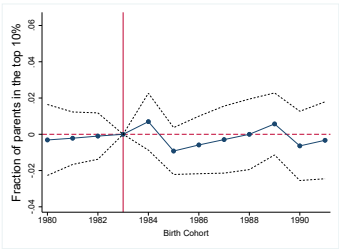


(b) Fraction of Parents in Top 5%

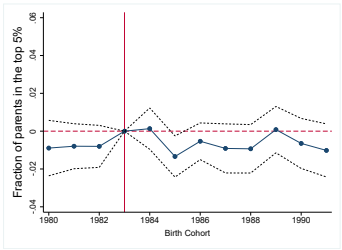


(c) Fraction of Parents in Top 1%

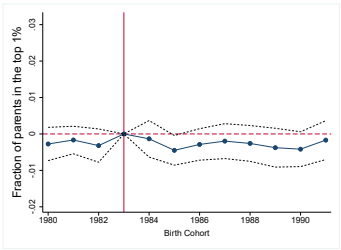
Figure A.34: **Fraction of Students with Parents in Top Income Percentiles, Nonselective Relative to Tier 3-5 (Selective) Universities**



(a) Fraction of Parents in Top 10%



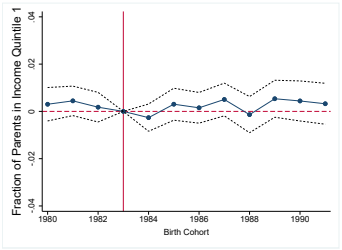
(b) Fraction of Parents in Top 5%



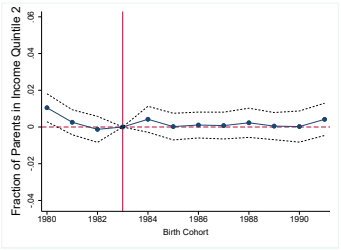
(c) Fraction of Parents in Top 1%

Notes: Plots are analogous to those in Figure A.29 and A.30, but the dependent variables are the fraction of students with parents in top income percentiles. See Figures A.29 and A.30 and text for details.

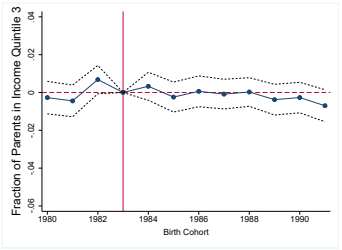
Figure A.35: **Fraction of Students with Parents in Each Income Quintile, Two-Year Relative to Tier 3-5 (Selective) Universities**



(a) Fraction of Parents in Income Quintile 1

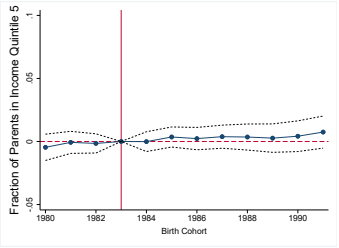


(b) Fraction of Parents in Income Quintile 2



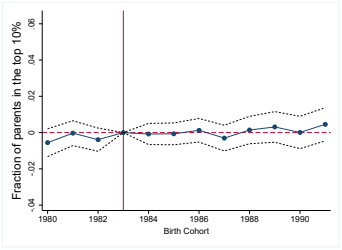
(c) Fraction of Parents in Income Quintile 3

(d) Fraction of Parents in Income Quintile 4

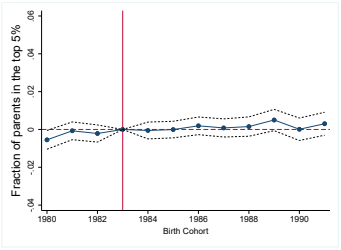


(e) Fraction of Parents in Income Quintile 5

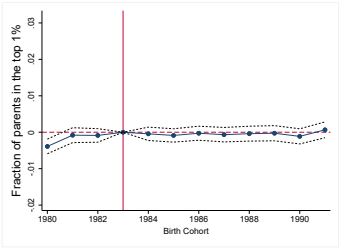
Figure A.36: **Fraction of Students with Parents in Top Income Percentiles, Two-Year Relative to Tier 3-5 (Selective) Universities**



(a) Fraction of Parents in Top 10%



(b) Fraction of Parents in Top 5%



(c) Fraction of Parents in Top 1%

Notes: Plots are analogous to those in Figures A.27 and A.31, but showing comparisons between two-year public and not-for-profit colleges and Tier 3-5 universities. See Figures A.27 and A.31, and text for details.

Table A.6: Summary Statistics by University Tier, 1987 Birth Cohort

University Tier	Ivy Plus	Tier 1, excl. Ivy (Elite)	Tier 2 (Highly Selective)	Tiers 3-5 (Selective)	Nonselect. Four Year (Pub/NFP)	Two Year (Pub/NFP)
Total universities in sample	12	59	73	611	79	387
Median earnings (positive earners), 2014	48,017	43,678	42,533	34,183	26,878	24,203
	[7,338]	[8,593]	[9,954]	[6,343]	[5,143]	[3,209]
Median earnings, 2014	42,983	40,037	40,104	32,430	23,818	21,410
	[7,256]	[8,856]	[10,340]	[6,545]	[5,390]	[3,459]
Mean earnings, 2014	64,789	48,657	43,896	34,441	26,366	23,813
	[11,872]	[11,064]	[10,287]	[6,717]	[5,111]	[3,374]
Fraction of graduates with top 20% earnings	0.51	0.48	0.48	0.33	0.21	0.16
	[.07]	[.11]	[.14]	[.11]	[.09]	[.06]
Fraction of graduates with top 10% earnings	0.39	0.33	0.3	0.17	0.09	0.07
	[.07]	[.11]	[.14]	[.09]	[.05]	[.03]
Fraction of graduates with top 5% earnings	0.29	0.21	0.17	0.08	0.04	0.03
	[.07]	[.09]	[.1]	[.06]	[.03]	[.02]
Fraction of graduates with top 1% earnings	0.15	0.07	0.04	0.01	0.01	0
	[.03]	[.04]	[.03]	[.02]	[.01]	[0]
Number of students	1,468	1,093	1,449	1,066	1,088	1,335
	[600]	[1,055]	[1,639]	[1,266]	[1,327]	[1,151]
Admissions rejection rate, 2013	0.91	0.73	0.47	0.33	0.33	.
	[.03]	[.11]	[.14]	[.14]	[.18]	[.]
Average SAT, 2001	1429	1327	1207	1037	.	.
	[36]	[64]	[59]	[89]	[.]	[.]
Average annual cost of attendance, 2000	25,488	21,511	16,651	9,641	6,255	1,971
	[618]	[6,208]	[7,282]	[6,152]	[6,499]	[1,475]
Flagship university	0	0.03	0.07	0.02	0	0
	[0]	[.18]	[.25]	[.15]	[0]	[0]
Public university	0	0.08	0.22	0.43	0.56	0.99
	[0]	[.28]	[.42]	[.5]	[.5]	[.11]
Instructional expenditures per student, 2000	27,306	16,349	8,774	4,890	4,146	2,522
	[8,935]	[8,957]	[2,955]	[2,039]	[3,312]	[1,140]
Fraction with parents in income quintile 1	0.04	0.04	0.04	0.08	0.13	0.16
	[.01]	[.02]	[.02]	[.06]	[.09]	[.07]
Fraction with parents in income quintile 2	0.06	0.05	0.07	0.13	0.17	0.2
	[.01]	[.02]	[.03]	[.06]	[.07]	[.05]
Fraction with parents in income quintile 3	0.09	0.09	0.12	0.19	0.21	0.24
	[.01]	[.02]	[.03]	[.05]	[.05]	[.04]
Fraction with parents in income quintile 4	0.14	0.15	0.2	0.26	0.24	0.25
	[.02]	[.03]	[.04]	[.06]	[.06]	[.06]
Fraction with parents in income quintile 5	0.67	0.66	0.57	0.33	0.24	0.16
	[.05]	[.07]	[.09]	[.14]	[.14]	[.08]
Fraction with parents in top 1% of incomes	0.15	0.12	0.07	0.01	0.01	0
	[.04]	[.05]	[.05]	[.02]	[.02]	[0]
Fraction female	0.5	0.54	0.54	0.58	0.53	0.52
	[.02]	[.14]	[.13]	[.13]	[.15]	[.06]
Fraction in-state students	0.16	0.29	0.52	0.74	0.76	0.96
	[.12]	[.22]	[.28]	[.22]	[.28]	[.07]
Fraction foreign students	0.09	0.05	0.03	0.01	0.01	0
	[.02]	[.03]	[.04]	[.03]	[.03]	[.01]
Fraction Black students	0.08	0.05	0.04	0.13	0.13	0.14
	[.02]	[.02]	[.02]	[.21]	[.17]	[.14]
Fraction Hispanic students	0.08	0.07	0.06	0.07	0.1	0.1
	[.02]	[.04]	[.04]	[.11]	[.17]	[.14]
Fraction Asian students	0.17	0.12	0.09	0.04	0.03	0.03
	[.04]	[.08]	[.1]	[.06]	[.03]	[.05]

Notes: Summary statistics for the 1987 birth cohort of universities in the regression sample for Figure 1b, except for percent in-state and percent foreign students which are for the 1988 cohort due to data availability. Standard deviations are in brackets. Not all universities have data for each variable. I omit average SAT score in columns (5) and (6), and average rejection rate for column (6) because of the small sample sizes. Only 15 of the 79 nonselective four-year universities, and three of the 387 two-year colleges, have SAT scores. Forty of the nonselective universities, and seven of the two-year colleges, have rejection rates. See text for details.

Table A.7: Distribution of Majors by University Tier, 1987 Birth Cohort

University Tier	Ivy Plus	Tier 1, excl. Ivy (Elite)	Tier 2 (Highly Selective)	Tiers 3-5 (Selective)	Nonselect. Four Year (Pub/NFP)	Two Year (Pub/NFP)
Total universities in sample	12	59	73	610	77	383
Percent of majors in:						
Science and Engineering (incl. Social Science)	68.4	60.2	47.4	26.7	8.7	9.2
	[11.1]	[13.8]	[19.5]	[13.]	[12.1]	[11.1]
Social Science	26.4	25.1	16.4	6.9	1.1	1.3
	[9.8]	[11.1]	[9.8]	[5.7]	[2.8]	[4.7]
Science and Engineering Related	2.8	2.9	3.7	10.7	15	25.2
	[2.8]	[4.1]	[5.5]	[11.5]	[16.2]	[12.4]
Business	4	7.1	16.6	22.2	14.4	13.6
	[7.5]	[9.9]	[17.]	[11.8]	[18.4]	[7.5]
Education	0.1	0.9	2	8.7	2.7	3.2
	[.3]	[2.9]	[3.4]	[7.7]	[6.3]	[4.9]
Arts, Humanities, and Other	24.7	29	30.4	31.7	59	48.4
	[8.6]	[10.]	[15.3]	[12.1]	[29.3]	[17.5]

Notes: Summary statistics for the 1987 birth cohort of universities in the regression sample for Figure 1b. Standard deviations are in brackets. See text for details.

Table A.8: Overlap in Commuting Zone, Across University Tier

	Severe Recession		Mild Recession	
	Univ. in Sample	Univ. in CZ with Tier 3-5 Univ.	Univ. in Sample	Univ. in CZ with Tier 3-5 Univ.
Ivy Plus	8	8	4	4
Tier 1 excluding Ivy (Elite)	36	32	23	22
Tier 2 (Highly Selective)	41	35	32	30
Tiers 3-5 (Selective)	402	402	209	209
Nonselective four year (Public/NFP)	56	52	23	20
Two year (Public/NFP)	278	248	109	96

Notes: This table shows the number of universities in the main regression sample (equation (2)), by selectivity tier, whether they are located in a severe- or mild-recession CZ, and whether they are in the same CZ as a Tier 3-5 university. See text for details.

Table A.9: Overlap in Commuting Zone, Across University Tier, 1983 Balance

	Severe Recession		Mild Recession	
	Univ. in Sample	Univ. in CZ with Tier 3-5 Univ.	Univ. in Sample	Univ. in CZ with Tier 3-5 Univ.
Ivy Plus	8	8	4	4
Tier 1 excluding Ivy (Elite)	38	36	25	25
Tier 2 (Highly Selective)	51	46	36	33
Tiers 3-5 (Selective)	544	544	302	302
Nonselective four year (Public/NFP)	94	84	38	33
Two year (Public/NFP)	398	354	180	155

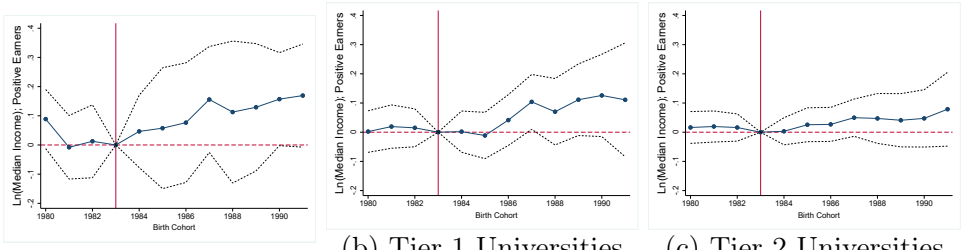
Notes: This table shows the number of universities in the regression sample (equation (2)), when requiring the university has data in 1983 rather than for every cohort, by selectivity tier, whether they are located in a severe- or mild-recession CZ, and whether they are in the same CZ as a Tier 3-5 university. See text for details.

Table A.10: Number of Universities in Sample With and Without CZ FE, Across University Tier

	Severe Recession		Mild Recession	
	Without CZ FE	With CZ FE	Without CZ FE	With CZ FE
Ivy Plus	8	8	4	4
Tier 1 excluding Ivy (Elite)	37	36	23	23
Tier 2 (Highly Selective)	45	42	35	32
Tiers 3-5 (Selective)	442	404	259	217
Nonselective four year (Public/NFP)	68	57	30	26
Two year (Public/NFP)	317	280	152	113

Notes: This table shows the number of universities in the regression sample with and without including CZ fixed effects (columns 1 and 2 of Table A.2 versus column 3), by selectivity tier, whether they are located in a severe- or mild-recession CZ. See text for details.

Figure A.37: **Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities, Males**



(a) Ivy Plus Universities

(b) Tier 1 Universities (Elite)

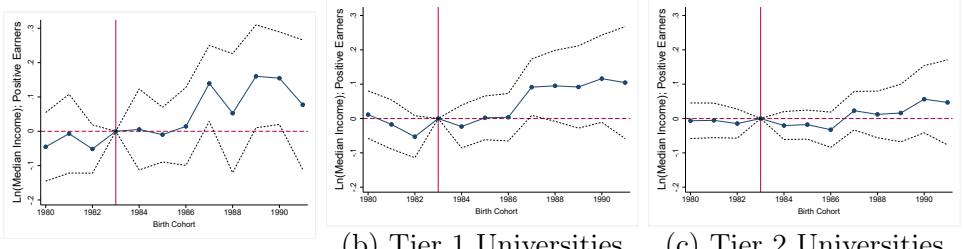
(c) Tier 2 Universities (Highly Selective)

(d) Nonselective Four-Year Univ. (Public/NFP)

(e) Two-Year Colleges (Public/NFP)

Notes: Plots are analogous to those in Figure A.3, but the dependent variable is specific to males. The explanatory variables are specific to males. For example, instead of the proportion of students with parents in the first quintile as an explanatory variable, we include the proportion of males with parents in the first quintile. One exception is that we include ln(students in cohort), in addition to ln(males in cohort). See text and Figure A.3 for details.

Figure A.38: **Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities, Females**



(a) Ivy Plus Universities

(b) Tier 1 Universities (Elite)

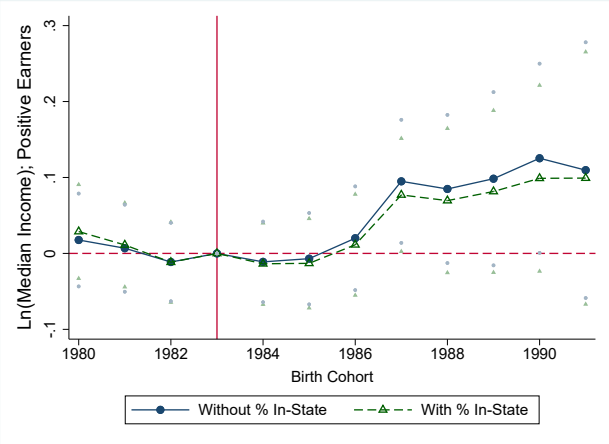
(c) Tier 2 Universities (Highly Selective)

(d) Nonselective Four-Year Univ. (Public/NFP)

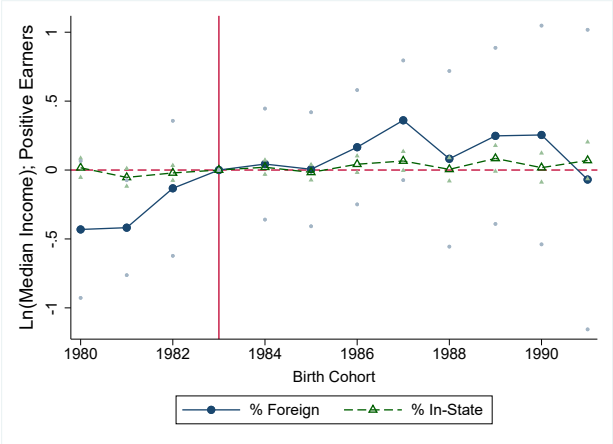
(e) Two-Year Colleges (Public/NFP)

Notes: Plots are analogous to those in Figure A.37, but for females.

Figure A.39: **Recession Effects: Tier 1 Relative to Tier 3-5 (Selective) Universities, Including Interactions with Fraction In-State and Fraction Foreign, Using the Fraction for the 1988 cohort**



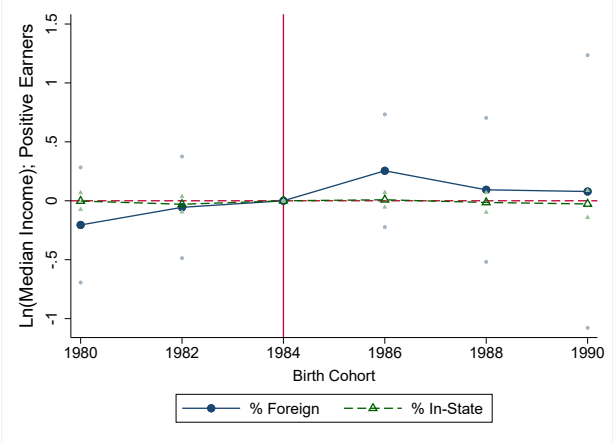
(a) Coefficients on Cohort*Tier 1*Severe Recession



(b) Coefficients on Cohort*Fraction In-State (Foreign)*Severe Recession

Recession Effects: Tier 1 Relative to Tier 3-5 (Selective) Universities, Including Interactions with Fraction In-State and Fraction Foreign, Using the Fractions for Each Cohort

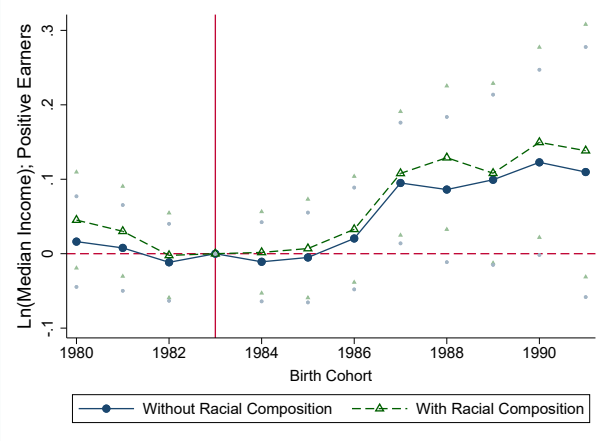
(c) Coefficients on Cohort*Tier 1*Severe Recession



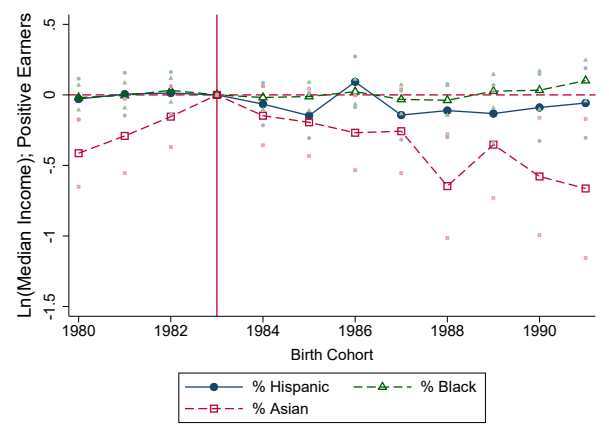
(d) Coefficients on Cohort*Fraction In-State (Foreign)*Severe Recession

Notes: Plots are similar to Figure A.3 but additionally include interactions between fraction in-state, cohort, and severe recession, as well as fraction foreign, cohort, and severe recession, and all lower-level terms. Plots A.39c and A.39d show coefficients only in even years because universities are required to report the data on in-state and foreign students only in even years. We restrict the sample to even cohorts, and to universities that have data for each of these cohorts. See text for details.

Figure A.40: **Recession Effects: Tier 1 Relative to Tier 3-5 (Selective) Universities, Including Interactions with Fraction Black, Hispanic, and Asian Students**



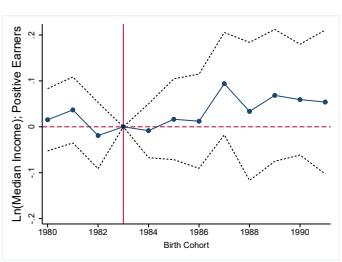
(a) Coefficients on Cohort*Tier 1*Severe Recession



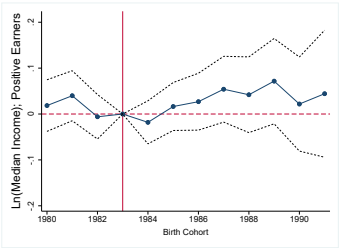
(b) Coefficients on Cohort*Fraction by Race*Severe Recession

Notes: Plots are similar to Figure A.3 but additionally include interactions between fraction Black, Hispanic, and Asian students, cohort, and severe recession, as well as all lower-level terms. See text for details.

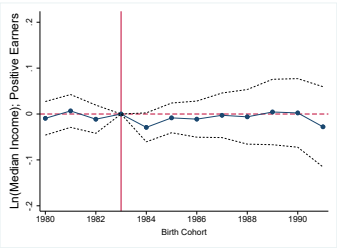
Figure A.41: **Recession Effects by University Selectivity, Relative to Tier 3-5 (Selective) Universities: State-Cohort Fixed Effects**



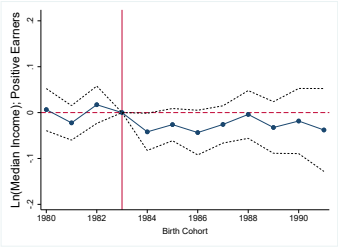
(a) Ivy Plus Universities



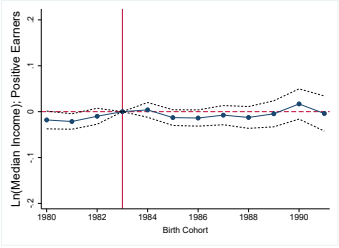
(b) Tier 1 Universities (Elite)



(c) Tier 2 Universities (Highly Selective)



(d) Nonselective Four-Year Univ. (Public/NFP)



(e) Two-Year Colleges (Public/NFP)

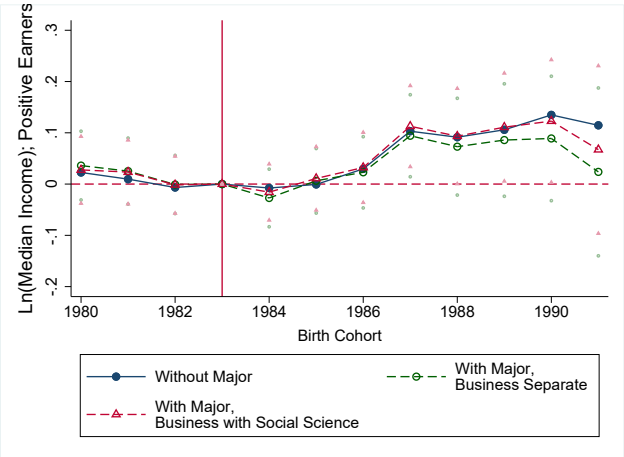
Notes: Plots are analogous to Figure A.3, except these use an indicator for severe recession in the state instead of CZ, and with state-cohort FE not CZ-cohort FE. Plots show coefficients on the interaction between birth cohort fixed effects, university tier, and an indicator for severe recession in the state from 2007 to 2009. Dashed lines show 95% confidence intervals. See text and notes to Figure A.3 for details.

Table A.11: **Additional Specifications, Effects Relative to Tier 3-5 Universities**

	Ln(Median Income, Positive Earners)				Ln(Students)	Share Female
1980*Ivy Plus	-0.002	-0.011	0.011	-0.026	0.049	-0.015
	(0.042)	(0.043)	(0.045)	(0.037)	(0.085)	(0.020)
1980*Elite	0.020	0.012	0.025	0.023	0.088	-0.015
	(0.031)	(0.033)	(0.035)	(0.029)	(0.061)	(0.017)
1981*Ivy Plus	-0.016	0.003	0.009	-0.014	0.034	-0.023
	(0.042)	(0.047)	(0.045)	(0.040)	(0.072)	(0.018)
1981*Elite	0.007	0.016	0.019	0.010	0.036	-0.015
	(0.029)	(0.032)	(0.032)	(0.030)	(0.060)	(0.016)
1982*Ivy Plus	-0.047	-0.066	-0.061	-0.053	0.034	0.002
	(0.041)	(0.043)	(0.044)	(0.041)	(0.063)	(0.021)
1982*Elite	-0.010	-0.025	-0.022	-0.011	0.030	-0.008
	(0.027)	(0.028)	(0.029)	(0.026)	(0.043)	(0.016)
1984*Ivy Plus	0.001	-0.020	-0.013	0.008	0.059	0.012
	(0.033)	(0.036)	(0.036)	(0.036)	(0.051)	(0.015)
1984*Elite	-0.009	-0.024	-0.020	0.002	-0.025	0.004
	(0.027)	(0.027)	(0.028)	(0.029)	(0.040)	(0.014)
1985*Ivy Plus	-0.005	0.014	0.007	0.004	0.033	0.004
	(0.055)	(0.049)	(0.049)	(0.059)	(0.065)	(0.016)
1985*Elite	-0.004	0.005	0.001	0.006	-0.025	-0.009
	(0.031)	(0.031)	(0.031)	(0.031)	(0.048)	(0.014)
1986*Ivy Plus	0.023	0.032	0.039	0.024	-0.025	0.001
	(0.065)	(0.059)	(0.061)	(0.064)	(0.060)	(0.024)
1986*Elite	0.028	0.032	0.038	0.031	-0.052	0.020
	(0.035)	(0.035)	(0.036)	(0.036)	(0.049)	(0.015)
1987*Ivy Plus	0.118*	0.121*	0.123*	0.118*	0.004	-0.004
	(0.067)	(0.064)	(0.064)	(0.068)	(0.071)	(0.021)
1987*Elite	0.098**	0.097**	0.100**	0.103**	-0.068	0.005
	(0.041)	(0.040)	(0.041)	(0.045)	(0.055)	(0.015)
1988*Ivy Plus	0.082	0.089	0.084	0.066	0.005	-0.012
	(0.098)	(0.084)	(0.086)	(0.101)	(0.075)	(0.023)
1988*Elite	0.088*	0.087*	0.086*	0.081	-0.046	-0.002
	(0.050)	(0.047)	(0.049)	(0.052)	(0.062)	(0.016)
1989*Ivy Plus	0.131	0.119	0.123	0.136	0.046	-0.002
	(0.087)	(0.074)	(0.077)	(0.092)	(0.078)	(0.025)
1989*Elite	0.101*	0.087*	0.091	0.111*	-0.035	0.006
	(0.058)	(0.053)	(0.056)	(0.062)	(0.069)	(0.018)
1990*Ivy Plus	0.146**	0.138**	0.133**	0.146**	0.067	-0.012
	(0.066)	(0.058)	(0.061)	(0.072)	(0.078)	(0.023)
1990*Elite	0.132**	0.114*	0.115*	0.140**	-0.059	-0.010
	(0.064)	(0.058)	(0.062)	(0.068)	(0.070)	(0.020)
1991*Ivy Plus	0.092	0.032	0.047	0.129	0.045	-0.022
	(0.081)	(0.075)	(0.078)	(0.092)	(0.093)	(0.027)
1991*Elite	0.112	0.064	0.075	0.139	-0.099	0.005
	(0.085)	(0.078)	(0.082)	(0.090)	(0.084)	(0.020)
N	14,652	14,616	14,616	14,652	14,652	14,652
R-Squared	0.982	0.983	0.982	0.982	0.989	0.960
Interactions with Majors	N	All	Top 3	N	N	N
Interactions with Fract. Parents in Top 5 and Top 1%	N	N	N	Y	N	N

Notes: *** p-value $\leq$ .01, ** p-value $\leq$ .05, * p-value $\leq$ .1. Coefficients are on birth cohort, university tier, *SevereRecession* interactions in equation (2) with different dependent variables. Column 1 presents the results from Figure A.3. Columns 2 and 3 additionally include interactions between birth cohort, indicator for severe recession, and share in major category in 2000 based on the eight classifications of college majors in Chetty et al. (2020*b*), as well as lower level terms. Column 2 includes interactions with all major categories, while column 3 shows interactions with the three categories that have the largest average share at Tier 3-5 universities. Column 4 shows interactions between birth cohort, indicator for severe recession, and fraction with parents in the top 5% of incomes and separately with fraction in top 1% of incomes. I do not show interactions with all tiers for space constraints. See Figure A.3 and text for details.

Figure A.42: **Recession Effects by University Selectivity, Tier 1 Relative to Tier 3-5 (Selective) Universities: Including Interactions with Major Composition**



Notes: Plots are each from a separate estimation of equation (2), and show coefficients on the interaction between birth cohort fixed effects, university tier, and an indicator for severe recession in the CZ from 2007 to 2009. Solid circles show coefficients without including interactions between major composition, birth cohort, and *Severe*. Open circles show coefficients when including in the regression interactions with share in each major category (using the five broad groupings from the ACS), keeping business as its own category, as in the ACS categories. Open triangles show coefficients when including in the regression interactions with share in each major category, grouping business and social science together, rather than grouping social science with science and engineering. This specification is included as roughly 50% of the Tier 1 universities do not offer business degrees. I also show 95% confidence intervals associated with the latter two plots. See text for details.

Table A.12: **Differential 2001-2013 Change in Average SAT scores in Severely Affected CZs, by University Selectivity, Relative to Tier 3-5 Universities**

Y = Change in Average SAT 2001-2013		
Ivy Plus*Severe Recession	51.421*	52.399***
	(31.049)	(20.180)
Tier 1* Severe Recession	-12.266	-5.735
	(18.043)	(17.630)
Tier 2*Severe Recession	-14.899	-30.152
	(23.926)	(24.088)
Interactions between Tier and Change in Parental Income	N	Y
Number of Observations	401	401
R-squared	0.383	0.514

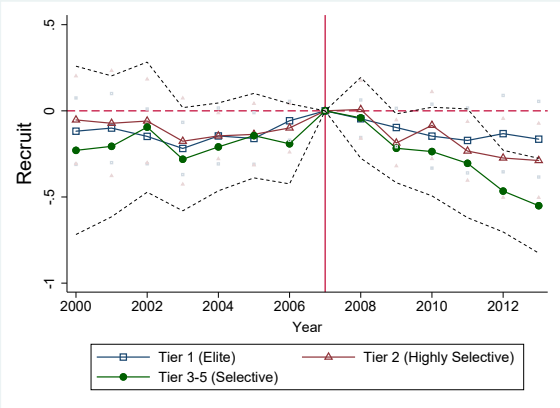
Notes: *** p-value $\leq$ .01, ** p-value $\leq$ .05, * p-value $\leq$ .1. There is one observation per university in the regression. Robust standard errors in parentheses. The regression also includes CZ fixed effects, and university tier fixed effects. The omitted interaction is between Tier 3-5 and Severe Recession. Data on average SAT scores are from the mobility report cards, for 2001 and 2013. These data are not available for universities that do not require SAT scores. We have data for 10 of the 12 Ivy Plus universities, 50 of the 59 Tier 1 universities, 51 of the 73 Tier 2 universities, 368 of the 611 Tier 3-5 universities, 12 of the 79 nonselective four-year not-for-profit and public universities, and zero of the 387 two-year public and not-for-profit colleges. While I include interactions between the nonselective tier and Severe Recession, I do not show the coefficients given the small number of these universities for which we have the data. The second column includes interactions between university selectivity tier fixed effects and the following variables: change in the fraction of students with parents in the second income quintile, the third, fourth, and fifth, and change in the fraction of students with parents in the top 10% of incomes. These changes are measured between the 1983 birth cohort and 1991 birth cohort, to approximate as best as possible given the data constraints, the period over which we are measuring the change in SAT scores.

Table A.13: **Changes in Recruiting Over Time within Firm-University Pairs, by University Tier, Relative to Ivy Plus Universities**

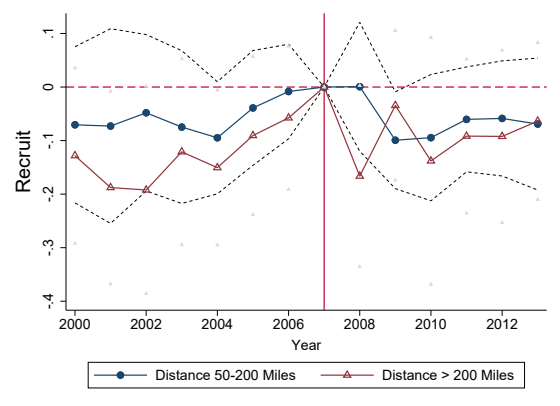
Y = Recruit	Main version			*Recruit*=0 instead of missing		
2000	-0.113*	-0.052	-0.174	-0.061	-0.029	-0.088
	(0.061)	(0.066)	(0.107)	(0.046)	(0.040)	(0.057)
2001	-0.102	-0.070	-0.114	-0.050	-0.040	-0.064
	(0.075)	(0.067)	(0.092)	(0.046)	(0.042)	(0.047)
2002	-0.114	-0.088	-0.076	-0.071	-0.057	-0.060
	(0.077)	(0.067)	(0.075)	(0.054)	(0.044)	(0.054)
2003	-0.183***	-0.100	-0.198**	-0.136**	-0.083	-0.144**
	(0.065)	(0.071)	(0.094)	(0.056)	(0.055)	(0.061)
2004	-0.100	-0.070	-0.134	-0.064	-0.024	-0.090
	(0.071)	(0.059)	(0.082)	(0.052)	(0.046)	(0.061)
2005	-0.170***	-0.118**	-0.201***	-0.140***	-0.098**	-0.191***
	(0.053)	(0.045)	(0.070)	(0.045)	(0.038)	(0.062)
2006	-0.073	-0.062	-0.131	-0.070*	-0.060	-0.134*
	(0.048)	(0.057)	(0.082)	(0.036)	(0.043)	(0.068)
2008	-0.072	-0.009	-0.098	-0.064*	-0.010	-0.094*
	(0.048)	(0.050)	(0.072)	(0.036)	(0.038)	(0.054)
2009	-0.115*	-0.176**	-0.318***	-0.109**	-0.137**	-0.219***
	(0.064)	(0.076)	(0.084)	(0.054)	(0.061)	(0.065)
2010	-0.140*	-0.076	-0.180***	-0.120*	-0.047	-0.121**
	(0.078)	(0.068)	(0.064)	(0.065)	(0.058)	(0.058)
2011	-0.167**	-0.155***	-0.203**	-0.120*	-0.080	-0.110*
	(0.078)	(0.055)	(0.083)	(0.071)	(0.056)	(0.059)
2012	-0.128	-0.115	-0.317***	-0.089	-0.116	-0.242***
	(0.102)	(0.098)	(0.065)	(0.081)	(0.074)	(0.055)
2013	-0.118	-0.159*	-0.410***	-0.112	-0.122	-0.364***
	(0.097)	(0.089)	(0.083)	(0.083)	(0.076)	(0.069)
Tier	Elite	Highly Selective	Selective	Elite	Highly Selective	Selective
N	6,341			9,264		
R-squared	0.723			.726		

Notes: The first three columns are estimated coefficients from the same regression (equation (3)), and correspond to the plots in Figure 4a. Estimates are relative to Ivy Plus universities. Columns four to six are estimated coefficients from the same regression (equation (3)), but use a version of Recruit set to zero instead of missing if the recruiting page is nonarchived for reasons other than being blocked to robots or nonworking links. See text and Figure 4a for details.

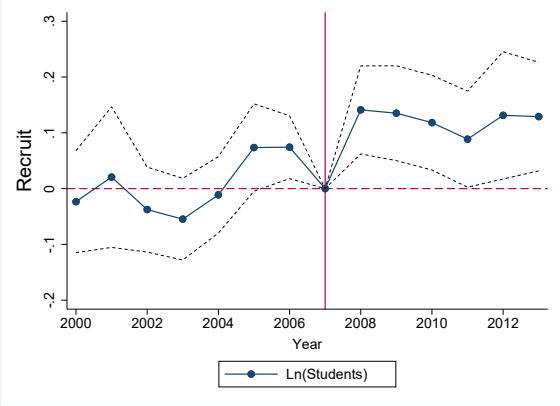
Figure A.43: **Changes in Recruiting Over Time within Firm-University Pairs, by University Characteristics based on the 1985 Birth Cohort, Including Firm-Year Fixed Effects**



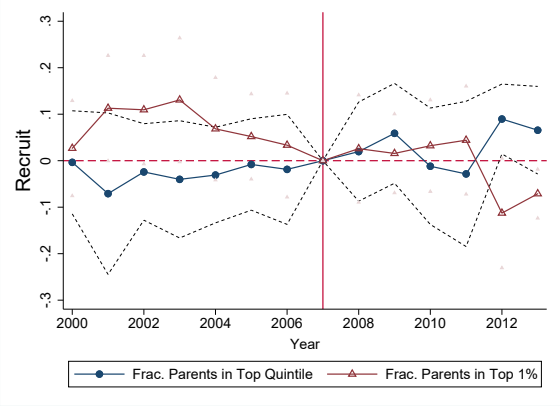
(a) By Tier, Relative to Ivy Plus



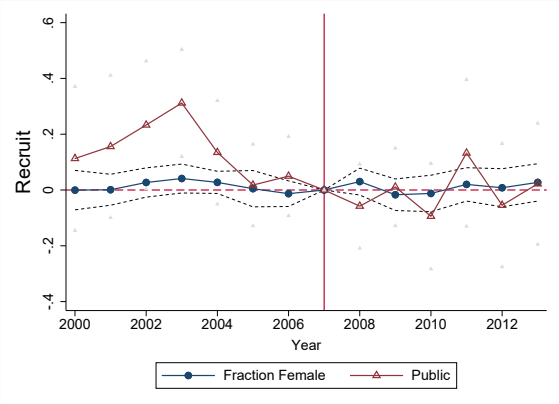
(b) By Firm-Univ. Distance in 2007, Relative to $\leq$ 50 Miles



(c) By ln(Students in 1985 Cohort)



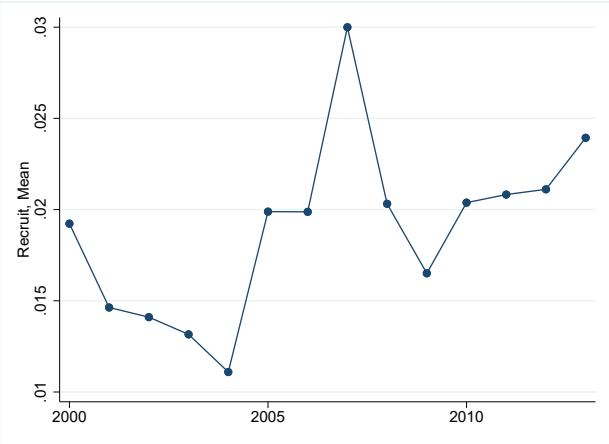
(d) By Parental Income, 1985 Cohort



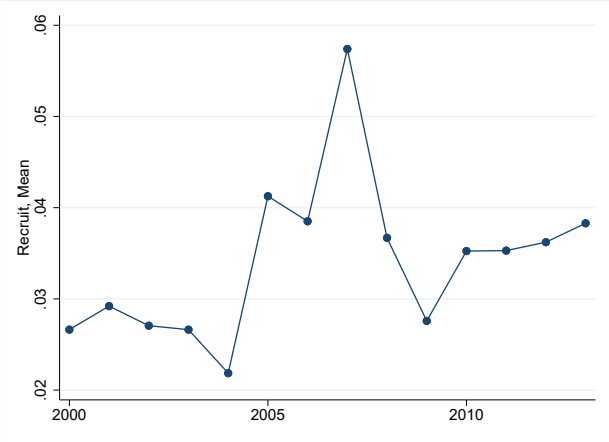
(e) By Public Univ. and Fraction Female, 1985 Cohort

Notes: All coefficients in plots A.43a through A.43e are from one regression, equation (3), and additionally including interactions between these university characteristics and year fixed effects. Dashed lines show 95% confidence intervals for Tier 3-5 universities in A.43a, and for the first plot of all the other subfigures. Lightly-colored markers are upper- and lower-bounds for 95% confidence intervals for the remaining plots. I include only universities not reporting as a system in these regressions, and pairs for which the firm-university distance is not missing. These restrictions were not implemented in Figure 4. Parental income and fraction female are standardized so they are mean zero and standard deviation one in the sample. See text and Appendix A.3 for details.

Figure A.44: **Mean Likelihood of Recruiting Over Time**



(a) All Firms and Universities

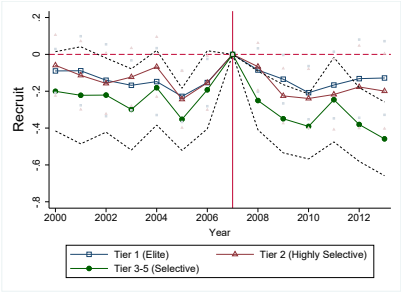


(b) Firm-Univ. Pairs with Non-Missing Recruiting Data in 2007, and Firms that Recruit at least once and universities that attract at least one firm from 2000-2013

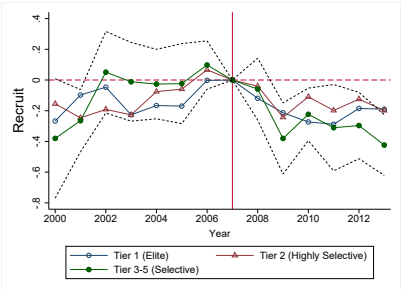
Notes: Figure A.44a shows the mean value of *Recruit* for all firm-university pairs, which includes data for 105 firms and 362 universities. Figure A.44b shows the mean value of *Recruit* for firm-university pairs with non-missing recruiting data in 2007, and firms that recruit at least once from 2000-2013, and universities that attract at least one firm from 2000-2013. This includes data for 65 firms at 236 universities.

Figure A.45: **Changes in Recruiting Over Time by University Tier, Relative to Ivy Plus Universities**

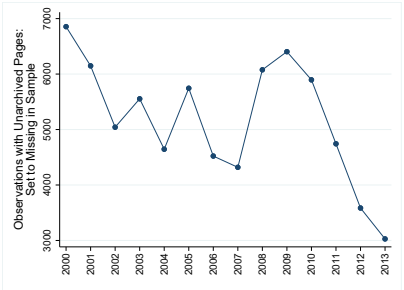
(a) **With Year Fixed Effects**



(b) **Balance in 2007, 2009, 2013**



(c) **Observations with Unarchived Pages**



Notes: Figure A.45a is the same as Figure 4a, but including year fixed effects instead of firm-year fixed effects. Figure A.45b is the same as Figure 4a, but requires that for each firm-university pair in the sample, the pair is in the regression sample in 2007, 2009, and 2013. See notes to Figure 4a for details. Figure A.45c shows the number of firm-university pairs with *Recruit* equal to missing, for reasons other than the website being blocked to robots or having nonworking links. I include in the sum in this figure only firm-university pairs for which the firm recruited at least once during the sample, and the university attracted at least one firm during the sample, and the firm-university pair had data based on this alternative measure in 2007. In Table A.13 columns four through six these are set to zero as this may reflect lack of recruiting.

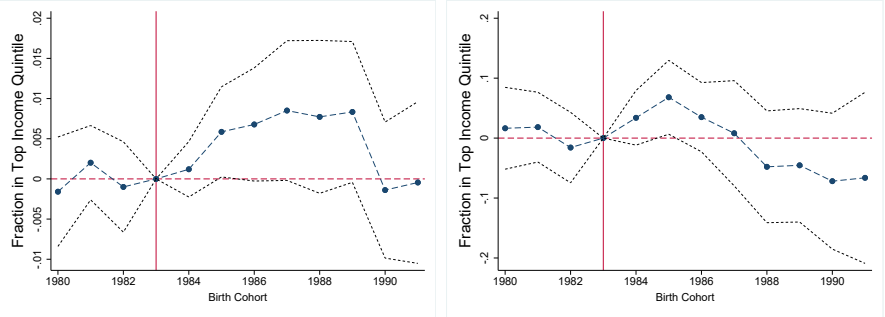
Table A.14: **Firms with Recruiting Data in 2007**

Firm	**Years with Data**	**Sample: Equation** (3)
Banks		
ABN AMRO	2000-2007	N
Bank of America	2005-2007, 2012-2013	Y
BNP Paribas	2001-2002, 2006-2007, 2013	Y
Citi	2000-2009	Y
Gleacher & Company	2000-2013	N
Houlihan Lokey	2000-2004, 2007, 2009-2013	Y
HSBC	2004-2013	N
Jefferies & Company	2000-2013	Y
JP Morgan Chase & Co.	2000, 2003, 2006-2007	N
Lazard	2000-2010	Y
Macquarie Group	2000-2004, 2006-2009	Y
Morgan Stanley	2001-2002, 2005-2009, 2011-2013	Y
Perella Weinberg Partners	2006-2009, 2012-2013	N
Piper Jaffray Companies	2000-2005, 2007, 2010, 2012-2013	Y
Raymond James Financial	2000-2002, 2004-2010, 2012-2013	Y
Robert W. Baird & Co.	2007-2011	Y
Rothschild	2002-2003, 2005-2008, 2011-2013	N
Thomas Wiesel Partners Group	2000, 2007-2009	Y
U.S. Bancorp	2002-2004, 2006-2013	N
Wachovia	2000-2008	Y
Consulting Firms		
A. T. Kearney	2004-2013	N
Analysis Group	2006-2013	Y
Arthur D. Little	2003-2008, 2010, 2012-2013	N
Bain & Company	2000-2007, 2011-2012	Y
BearingPoint	2007-2008	Y
Booz Allen Hamilton	2000, 2006-2009, 2011-2013	Y
Corporate Executive Board	2000-2008, 2010	Y
Dean & Company	2000-2011	Y
First Manhattan Consulting Group	2000-2008, 2010-2012	Y
FTI Consulting	2000, 2004-2007, 2009, 2012-2013	Y
Gallup	2000-2003, 2005, 2007-2013	N
Hewitt Associates	2000-2013	N
Huron Consulting Group	2002-2013	Y

Table A.14 – continued from previous page

Firm	**Years in Sample**	**Sample: Equation** (3)
Kurt Salmon	2000, 2005-2011	Y
Marakon	2000-2001, 2003-2013	N
McKinsey & Company	2007-2013	Y
Mercer	2004, 2006-2011, 2013	Y
Mitchell Madison Group	2003-2013	Y
Navigant	2005-2010, 2012-2013	Y
NERA Economic Consulting	2000, 2003, 2005-2013	Y
OC&C Strategy Consultants	2004-2007, 2011-2013	Y
Oliver Wyman	2001-2013	Y
PA Consulting Group	2003-2005, 2007, 2009-2013	Y
PRTM	2000-2010	Y
Putnam Associates	2000-2009, 2011-2012	Y
Roland Berger	2001-2002, 2006-2009, 2011-2013	N
The Boston Consulting Group	2001-2007, 2009-2013	Y
ZS Associates	2000-2005, 2007-2012	Y
Fortune 250 Firms		
ConAgra Foods	2002-2004, 2006-2008, 2010-2013	Y
ConocoPhillips	2000-2002, 2004-2013	Y
Eli Lilly	2001-2003, 2005-2013	N
General Electric	2000-2013	N
General Mills	2002-2010, 2012-2013	Y
Goodyear Tire & Rubber	2001-2013	N
Halliburton	2004-2005, 2007-2013	N
Honeywell International	2000-2004, 2007-2008, 2010-2013	N
KBR	2004, 2007-2013	Y
Kohl's	2002-2007, 2009-2012	N
Lowe's	2002-2008, 2010-2011	Y
McKesson	2000-2002, 2006-2013	Y
Monsanto	2000, 2002-2003, 2006-2010	Y
National Oilwell Varco	2005-2013	N
Occidental Petroleum	2000-2001, 2004, 2006-2007, 2013	N
PPG Industries	2000-2001, 2006-2009, 2011-2013	N
Progressive	2000-2002, 2006-2008, 2011-2013	N

Figure A.46: **Likelihood of Top Quintile Earnings, Coefficients on Cohort Fixed Effects Interacted with *SevereRecession* and Recruiting Variables**



(a) Number of Recruiting Firms in 2007

(b) Fraction of 2007 Recruiting Firms Dropping the Campus

Notes: Figures A.46a and A.46b show the coefficients on the interactions with the number of recruiting firms in 2007 and the fraction of firms recruiting in 2007 that paused their recruiting at some point between 2008 and 2013, respectively. These are from the same regression as the dashed line in Figure 4c. See text for details on all covariates included in the regression. Dashed lines in Figures A.46a and A.46b show 95% confidence intervals.

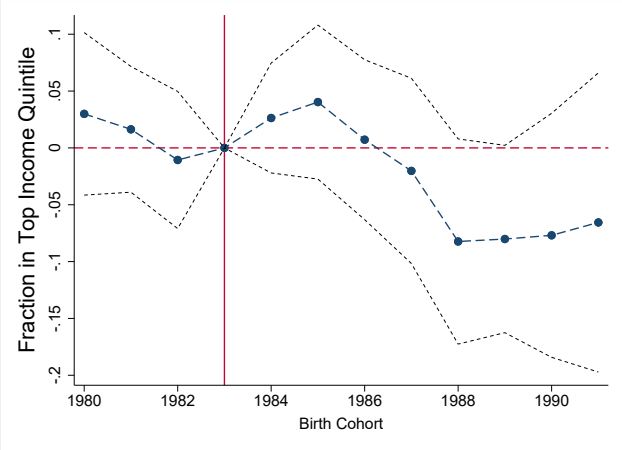
Table A.15: Likelihood of Top Quintile Earnings, Coefficients on Cohort Fixed Effects Interacted with *SevereRecession* and Recruiting Variables

Y = Fraction in Top Quintile Earnings	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Recession*Ivy Plus*Severe	0.028	0.020	0.037	-0.055	0.030	-0.052	-0.022	-0.121
	(0.021)	(0.025)	(0.044)	(0.059)	(0.037)	(0.055)	(0.059)	(0.080)
Recession*Tier 1*Severe	0.024	0.019	0.035	0.006	0.033	0.004	-0.026	-0.070
	(0.017)	(0.017)	(0.034)	(0.034)	(0.027)	(0.029)	(0.050)	(0.060)
Recession*Tier 2*Severe	-0.029	-0.030*	-0.011	-0.026	-0.021	-0.037	-0.056	-0.078*
	(0.018)	(0.018)	(0.038)	(0.035)	(0.031)	(0.029)	(0.038)	(0.040)
Recession*Fraction Firms Leaving*Severe		0.024		-0.047		-0.057*		-0.062*
		(0.031)		(0.033)		(0.030)		(0.032)
Recession*2007 Firms*Severe		0.002		0.005		0.004		0.004
		(0.001)		(0.003)		(0.003)		(0.003)
Recession-CZ Fixed Effects	N	N	Y	Y	Y	Y	Y	Y
Birth Cohort-CZ Fixed Effects	N	N	Y	Y	Y	Y	Y	Y
University Controls	N	N	N	N	Y	Y	Y	Y
Parental Income*Recession*Severe	N	N	N	N	N	N	Y	Y
Observations	1,548	1,548	840	840	840	840	840	840
R-Squared	0.837	0.838	0.925	0.927	0.930	0.932	0.932	0.934

Notes: This table is similar to Table A.2, but additionally including *Recession*FractionFirmsLeaving2008-2013*Severe* interactions as well as *Recession**2007*Firms***Severe* interactions, and on the sample of universities that attracted at least one recruiting firm in my data in 2007. See Table A.2 and Figure 4c for details.

Figure A.47: **Likelihood of Top Quintile Earnings, Tier 1 (Elite) Relative to Tier 3-5 (Selective) Universities: Role of Losing Access to High-Wage Firms, Controlling for Fraction of Firms Dropping the Campus**

Figure A.48: **Likelihood of Top Quintile Earnings, Coefficients on Cohort Fixed Effects Interacted with *SevereRecession*, and Fraction of 2007 Recruiting Firms Dropping the Campus**



Notes: Plots are similar to those in Figures 4c and A.46b, but including interactions with fraction of firms dropping the campus, and not the number of 2007 recruiting firms.

Table A.16: Number of Universities by Tier in Sample with Recruiting as Control

	Severe Recession			Mild Recession		
	No CZ FE	CZ FE	CZ FE With Tier 3-5 (Tier 1)	No CZ FE	CZ FE	CZ FE With Tier 3-5 (Tier 1)
Ivy Plus	8	7	6	4	3	2
Tier 1 excluding Ivy (Elite)	23	13	12	18	14	8
Tier 2 (Highly Selective)	17	8	6	14	8	5
Tiers 3-5 (Selective)	29	12	10	16	5	5

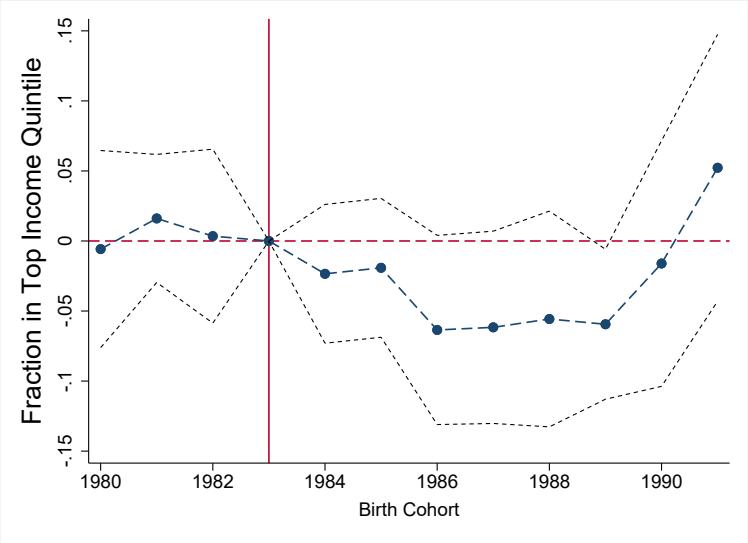
Notes: This table shows the number of universities in the regression samples with recruiting as a control variable (Table (A.15)), by selectivity tier, whether they are located in a severe- or mild-recession CZ, and whether they are in the same CZ as a Tier 3-5 university (denoted in columns 3 and 6). For the Tier 3-5 universities, columns 3 and 6 denote the number of these universities in the same CZ as a Tier 1 university. See text for details.

Table A.17: **Differential Changes in University Characteristics, for Universities Losing Access to Greater Fraction of Prestigious Firms Post-2007**

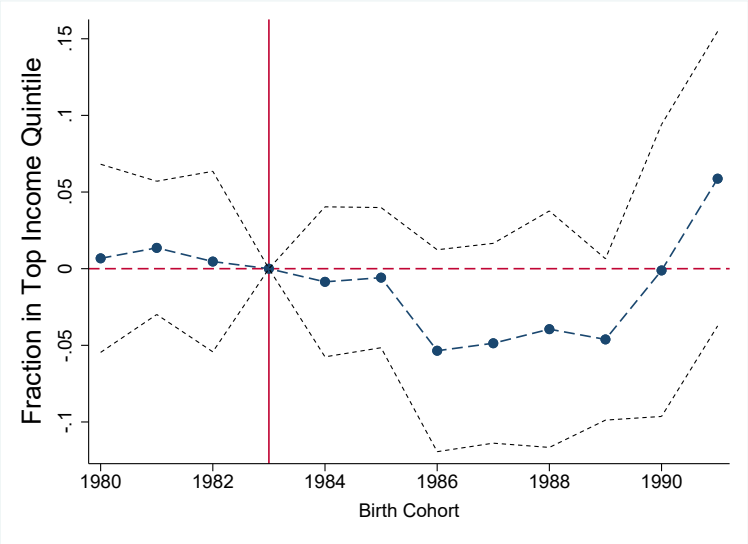
	Share with Parents in Income Quintile					Share with Parent Income in Top					
	1	2	3	4	5	10%	5%	1%	0.10%	Ln(Students)	Share Female
1980**FractionFirmsLeaving2008-2013*	-0.018**	-0.017	0.000	0.024*	0.011	0.033	0.046*	0.020*	-0.000	0.163**	-0.016
	(0.009)	(0.020)	(0.015)	(0.013)	(0.038)	(0.027)	(0.024)	(0.011)	(0.005)	(0.060)	(0.022)
1981**FractionFirmsLeaving2008-2013*	0.002	-0.011	-0.013	0.005	0.016	-0.007	0.021	0.005	-0.001	0.152***	0.011
	(0.010)	(0.015)	(0.013)	(0.020)	(0.029)	(0.027)	(0.024)	(0.010)	(0.005)	(0.051)	(0.026)
1982**FractionFirmsLeaving2008-2013*	-0.011	0.005	-0.010	0.014	0.001	0.015	0.030	0.004	0.000	0.030	0.002
	(0.008)	(0.012)	(0.013)	(0.016)	(0.020)	(0.017)	(0.019)	(0.010)	(0.005)	(0.061)	(0.023)
1984**FractionFirmsLeaving2008-2013*	-0.013	-0.011	0.015	0.048**	-0.038**	-0.011	0.005	-0.003	-0.003	0.022	-0.002
	(0.008)	(0.013)	(0.012)	(0.019)	(0.015)	(0.018)	(0.012)	(0.007)	(0.005)	(0.044)	(0.012)
1985**FractionFirmsLeaving2008-2013*	0.006	0.003	0.018	0.023	-0.051***	-0.018	0.006	-0.000	-0.005	-0.067	-0.031
	(0.012)	(0.017)	(0.015)	(0.024)	(0.018)	(0.016)	(0.020)	(0.006)	(0.005)	(0.074)	(0.021)
1986**FractionFirmsLeaving2008-2013*	0.005	0.025***	0.027***	0.033**	-0.090***	-0.035**	-0.022	0.002	0.004	-0.086	-0.012
	(0.013)	(0.009)	(0.010)	(0.015)	(0.022)	(0.016)	(0.017)	(0.009)	(0.005)	(0.057)	(0.017)
1987**FractionFirmsLeaving2008-2013*	0.013	0.005	0.020*	0.031**	-0.069***	-0.032	-0.030	0.011	0.005	-0.079	-0.021
	(0.015)	(0.012)	(0.010)	(0.013)	(0.018)	(0.022)	(0.023)	(0.009)	(0.005)	(0.084)	(0.018)
1988**FractionFirmsLeaving2008-2013*	0.018	0.016	-0.004	0.028*	-0.057**	-0.023	-0.032	0.000	-0.001	-0.097	-0.032
	(0.011)	(0.013)	(0.012)	(0.014)	(0.027)	(0.025)	(0.025)	(0.008)	(0.005)	(0.070)	(0.021)
1989**FractionFirmsLeaving2008-2013*	0.020	0.014	0.013	0.014	-0.060**	-0.058*	-0.033	-0.003	-0.000	-0.075	-0.021
	(0.013)	(0.015)	(0.017)	(0.016)	(0.030)	(0.031)	(0.024)	(0.011)	(0.005)	(0.079)	(0.038)
1990**FractionFirmsLeaving2008-2013*	0.018	0.013	0.029***	0.038**	-0.099***	-0.061	-0.022	-0.022	-0.004	-0.110	0.007
	(0.011)	(0.014)	(0.010)	(0.016)	(0.026)	(0.037)	(0.030)	(0.017)	(0.005)	(0.084)	(0.026)
1991**FractionFirmsLeaving2008-2013*	0.025**	0.008	0.012	0.041**	-0.086*	-0.076	-0.032	-0.008	-0.000	-0.122	-0.001
	(0.012)	(0.019)	(0.017)	(0.019)	(0.048)	(0.046)	(0.038)	(0.017)	(0.005)	(0.092)	(0.035)
Observations	432	432	432	432	432	432	432	432	432	432	432
R-squared	0.974	0.971	0.946	0.906	0.983	0.986	0.984	0.979	0.908	0.996	0.991
CZ-Cohort-Tier FE	Yes										
University FE	Yes										

Notes: *** p-value $\leq$ .01, ** p-value $\leq$ .05, * p-value $\leq$ .1. This table shows the results from estimating equation (4), but using the characteristics X as dependent variables. All columns include a balanced sample, CZ-birth cohort-university selectivity tier fixed effects, and university fixed effects. See text for details.

Figure A.49: **Earnings Outcomes, for Universities Losing Access to a Greater Fraction of Prestigious Firms Post-2007, CZ-Cohort-Tier Fixed Effects**



(a) Including parent income interactions



(b) Not including parent income interactions

Notes: Dashed lines show 95% confidence intervals. Plots show coefficients, from equation (4), on the interaction between birth cohort fixed effects and the fraction of 2007 recruiting firms who cease recruiting at the university at some point between 2008 and 2013. Plot A.49a shows results when additionally including interactions between birth cohort and fraction of parents in the top income quintile. Plot A.49b does not include those interactions, but includes controls for parental income measures. The sample includes only universities with data for each cohort. See text for details on all covariates included in the regression.

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