

The Effects of Education on Mortality: Evidence Using College Expansions

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Appendices

Appendix A

In the main analysis of the text, we aggregate the number of colleges to those of own county colleges and within-state neighboring counties. This appendix shows the results for two alternative measures of colleges: number of own county colleges and number of own county colleges in addition to all neighboring county colleges regardless of being within the same state or not. The effects, reported in Appendix Table A-1, are comparable to the main findings of Table 4.

Appendix Table A-1 - Alternative Measures of College Aggregation

	<i>Outcome: Death Age (Months)/Explanatory variable:</i>					
	Only Own County Colleges			Own County+Neighboring County Colleges (No within State Restriction)		
	(1)	(2)	(3)	(4)	(5)	(6)
4-Year College	0.2954*** (0.107)	0.3125*** (0.1134)	0.2301* (0.1346)	0.213*** (0.0429)	.2248*** (0.0443)	0.1873*** (0.0723)
2-Year College	-0.0211 (0.143)	-0.0292 (0.1567)	0.0172 (0.1076)	-0.0355 (0.0615)	-0.04 (0.0669)	0.0445 (0.0549)
Female		6.68*** (0.0892)	6.6889*** (0.0894)		6.6778*** (0.0892)	6.6864*** (0.0894)
Other		-2.6128*** (0.5487)	-2.641*** (0.5494)		-2.6106*** (0.5483)	-2.6405*** (0.5493)
Black		-1.202** (0.5494)	-1.2048** (0.5499)		-1.1889** (0.5491)	-1.1922** (0.5499)
Hispanic		0.3035 (0.2853)	0.3084 (0.2883)		0.2614 (0.2811)	0.2794 (0.2847)
First Generation Immigrant		1.4406** (0.5818)	1.5335*** (0.5793)		1.508** (0.5875)	1.5474*** (0.5825)
Second-generation Immigrant		0.7804*** (0.1074)	0.8144*** (0.1085)		0.7987*** (0.1086)	0.8179*** (0.1086)
Observations	3855600	3855600	3855600	3849792	3849792	3849792
R-squared	0.4448	0.4469	0.4474	0.4448	0.4469	0.4474
Mean DV	831.4	831.4	831.4	831.4	831.4	831.4
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Birth Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	No	Yes	Yes
County by Birth Cohort Linear Trend	No	No	Yes	No	No	Yes

Note. Each column represents a separate regression. Individual controls include dummies for female, white, black, Hispanic, first-generation immigrant, and second-generation immigrant. Standard errors, clustered at the county level, are in parentheses.

Appendix B

This appendix replicates the main results of Table 4 for the DMF dataset which covers male's death between 1975-2005 that are linked to the 1940 census. While the marginal effects of the period that matches the death in Numident data are very close to the main results, the earlier death data reveals smaller coefficients and even negative effects.

Appendix Table B-1- Replicating the Main Results using Censoc DMF Data 1975-2005

	<i>Outcome: Death Age (Months)</i>					
	Years 1975-1987			Years 1988-2005		
	(1)	(2)	(3)	(4)	(5)	(6)
4-Year College	0.0629 (0.0843)	0.0684 (0.0843)	-0.0891 (0.132)	0.1252 (0.0809)	0.1331 (0.0829)	0.1344 (0.1082)
2-Year College	-0.065 (0.0993)	-0.0652 (0.1)	0.0635 (0.1224)	0.1117* (0.061)	0.1084* (0.0633)	0.0546 (0.0835)
Other		-3.5138*** (1.0852)	-3.1932*** (1.0922)		-0.9717 (0.7598)	-0.9427 (0.7615)
Black		-1.5085*** (0.2954)	-1.4412*** (0.2983)		-4.4504*** (0.2493)	-4.3977*** (0.2486)
Hispanic		-1.627*** (0.4517)	-1.5869*** (0.451)		1.6133*** (0.3479)	1.6164*** (0.344)
First Generation Immigrant		0.2982 (0.7977)	0.2983 (0.8045)		1.5648** (0.6258)	1.6416*** (0.6215)
Second-generation Immigrant		0.2987 (0.1839)	0.333* (0.1838)		0.6973*** (0.1445)	0.7679*** (0.1436)
Observations	470539	470539	470539	1530341	1530341	1530341
R-squared	0.6277	0.6277	0.6302	0.4323	0.4325	0.4337
Mean DV	632.7	632.7	632.7	825.2	825.2	825.2
Elasticity of 4-Year College	0.00123	0.00134	-0.00174	0.00186	0.00198	0.002
Elasticity of 2-Year College	-0.00037	-0.00037	0.00036	0.00049	0.00047	0.00024
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Birth Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	No	Yes	Yes
County by Birth Cohort Linear Trend	No	No	Yes	No	No	Yes

Note. Each column represents a separate regression. Individual controls include dummies for female, white, black, Hispanic, first-generation immigrant, and second-generation immigrant. Standard errors, clustered at the county level, are in parentheses.

**** p<.01, ** p<.05, * p<.1*

Appendix C

Appendix Table C-1 reports the results of two-sample two-stage least square regressions in which the college education (having at least one year of college education) is instrumented with the presence of 4-year and 2-year colleges at the local area of residence. The local area in this part is either a county or a PUMA whichever is larger. In areas where a county constitutes several PUMAs, we consider county as the local area. In areas where a PUMA represents several counties, we consider PUMA as the local area. In all other areas, PUMA (which represents a county) is the aggregated measure of local area.

In the census 1960, we observe the education of individuals and in the census 1940 we observe individuals' county of residence which is used to capture the number of colleges when they turn 17. Since these two samples are not linked, we apply a two-sample 2SLS method in which the primary independent variable (educational attainment) comes from the 1960 census and the outcome (mortality) comes from the 1940 census that is linked to Numident. To eliminate cohorts who may have not yet completed education, we focus on individuals aged 22 and above. To mitigate the migration issues, we implement two additional restrictions. We keep individuals whose state of residence 5 years ago is different than their current state of residence. We restrict the sample to those who age less than 30 at 1960. The results are comparable without these exclusions.

Appendix Table C-1 - College Education and Age-at-death: Two-Sample 2SLS Results

	<i>Outcome: Age-at-death (Months):</i>		
	(1)	(2)	(3)
Education: Some College or More	25.430 ^{***} (9.373)	25.141 ^{***} (9.351)	19.562 [*] (11.616)
Observations	1,144,557	1,144,557	1,144,557
Mean DV	786.6	786.6	786.6
Birth Year FE	Yes	Yes	Yes
PUMA-County FE	Yes	Yes	Yes
Individual Controls	No	Yes	Yes
PUMA-County by Birth Year	No	No	Yes
Trend			

Note. Each column represents a separate regression. The excluded instruments are 4-year and 2-year colleges at the PUMA level. Individual controls include dummies for female, white, black, Hispanic, first-generation immigrant, and second-generation immigrant. Standard errors, clustered at the PUMA level, are in parentheses.

**** p<.01, ** p<.05, * p<.1*

Appendix D

This appendix shows the heterogeneity of the first stage results (Table 6) by race/gender/ethnicity. Each panel in Appendix Table D-1 shows the results of first stage where our measures of college expansion is interacted with dummies for gender, race, and ethnicity.

Appendix Table D-1 - Heterogeneity in the First Stage Effects by Demographic Characteristics

	Outcomes:			
	Education: At Least One Year of College	Education: At Least Two Years of College	Education: At Least Three Years of College	Education: At Least Four Years of College
	(1)	(2)	(3)	(4)
Panel A				
4-Year College×Male	0.0018 (0.0012)	0.0016 (0.0011)	0.0018* (0.001)	0.0017** (0.0008)
2-Year College×Male	0.0006 (0.0015)	0.0003 (0.0014)	-0.0009 (0.0012)	-0.001 (0.001)
4-Year College	0.010*** (0.0032)	0.0083*** (0.0028)	0.0062*** (0.0023)	0.0041** (0.0017)
2-Year College	0.0002 (0.0035)	-0.0019 (0.0029)	-0.0034 (0.0025)	-0.0008 (0.0019)
Male	0.0533*** (0.0039)	0.0515*** (0.0034)	0.0428*** (0.0031)	0.038*** (0.0024)
R-Squared	0.0549	0.0475	0.0387	0.0338
Panel B				
4-Year College×Other	0.0017 (0.005)	0.0027 (0.0052)	0.0019 (0.0049)	0.0039 (0.0045)
2-Year College×Other	0.0106 (0.0074)	0.0055 (0.0077)	0.0039 (0.0071)	-0.0015 (0.0065)
4-Year College	0.0108*** (0.0033)	0.009*** (0.003)	0.007*** (0.0024)	0.0048*** (0.0018)
2-Year College	0.0004 (0.0035)	-0.0018 (0.0029)	-0.0039 (0.0025)	-0.0012 (0.0019)
Other	-0.0771*** (0.0168)	-0.0507*** (0.0155)	-0.0462*** (0.0131)	-0.0342*** (0.0124)
R-Squared	0.0548	0.0474	0.0386	0.0337
Panel C				
4-Year College×Black	-0.0036 (0.0023)	-0.0043** (0.0021)	-0.0042** (0.0019)	-0.004** (0.0016)
2-Year College×Black	0.0039 (0.0026)	0.0039* (0.0023)	0.0035* (0.0019)	0.0036** (0.0016)
4-Year College	0.011*** (0.0034)	0.0093*** (0.003)	0.0073*** (0.0025)	0.005*** (0.0018)
2-Year College	0.0001 (0.0035)	-0.0022 (0.0029)	-0.0042* (0.0025)	-0.0016 (0.0019)
Black	-0.1093*** (0.008)	-0.084*** (0.0067)	-0.0648*** (0.0056)	-0.0521*** (0.0047)
R-Squared	0.0548	0.0475	0.0388	0.034
Panel D				
4-Year College×Hispanic	-0.0008 (0.002)	-0.0022 (0.0019)	-0.003* (0.0017)	-0.0024 (0.0015)
2-Year College×Hispanic	-0.0039 (0.0028)	-0.0005 (0.0026)	0.0029 (0.0024)	0.0025 (0.0021)

4-Year College	0.0108*** (0.0034)	0.0091*** (0.003)	0.0071*** (0.0025)	0.0049*** (0.0018)
2-Year College	0.0006 (0.0035)	-0.0018 (0.0029)	-0.004 (0.0025)	-0.0014 (0.0019)
Hispanic	-0.1725*** (0.0108)	-0.1382*** (0.0088)	-0.1069*** (0.007)	-0.0855*** (0.0059)
R-Squared	0.0548	0.0474	0.0385	0.0337
Observations	341834	341834	341834	341834
Mean DV	0.204	0.156	0.113	0.086

Notes. Each column within each panel represents a separate regression. Individual controls include dummies for female, white, black, Hispanic, first-generation immigrant, and second-generation immigrant. Standard errors, clustered at the county-PUMA level, are in parentheses.

*** p<.01, ** p<.05, * p<.1