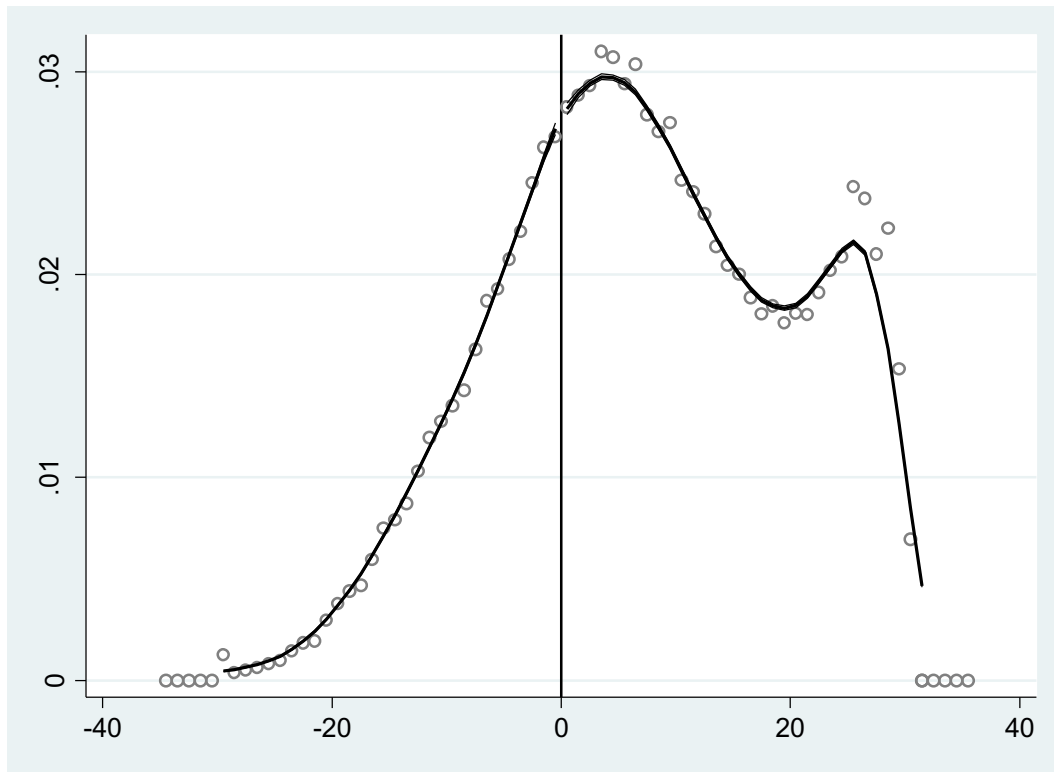


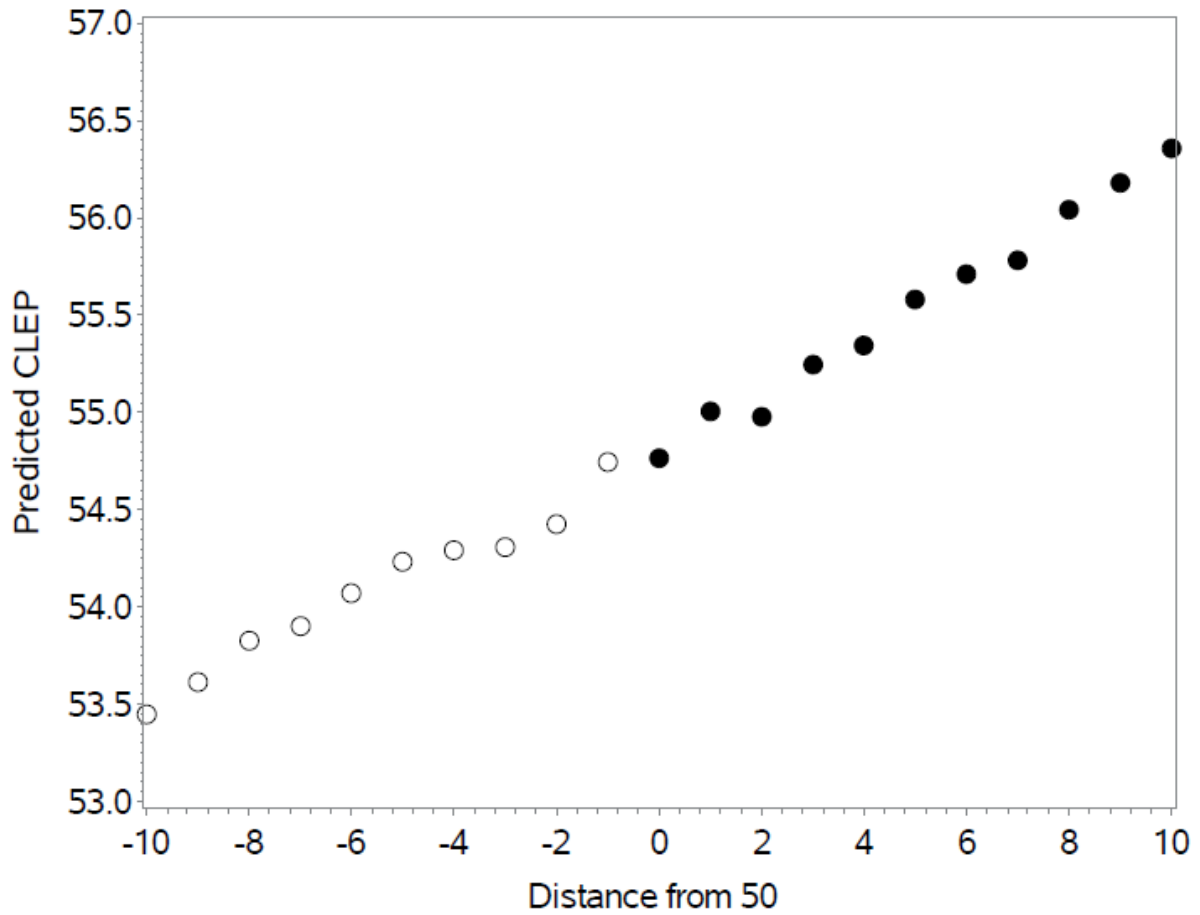
Online Appendix A – Supplemental Figures and Tables

Figure A1: Density of Observations



Notes: Includes all CLEP exam-takers between 2008 and 2015.

Figure A2 – Covariate Balancing Test



Notes: Using all CLEP exam-takers between 2008 and 2015 within a 10 point bandwidth of a CLEP score of 50.

Appendix Table A1: First CLEP Exams Statistics

<u>Exam</u>	<u>Freq.</u>	<u>Percent</u>	<u>Avg. Score</u>	<u>Std. Dev.</u>
Spanish Language	206208	23.8%	68.9	10.1
Analyzing and Interpreting Lit	93367	10.8%	57.9	9.8
College Algebra	54972	6.3%	49.5	12.5
College Mathematics	45015	5.2%	52.9	12.3
College Composition	42865	4.9%	54.1	5.8
College Composition Modular	31617	3.6%	55.3	6.8
Introductory Sociology	31525	3.6%	53.6	7.4
Principles of Management	27821	3.2%	49.4	10.8
History of United States I	25238	2.9%	51.5	10.7
Introductory Psychology	21786	2.5%	56.8	9.7
Biology	21252	2.5%	53.3	10.0
English Composition	20005	2.3%	46.5	11.4
Humanities	19857	2.3%	49.9	8.8
Human Growth and Development	19210	2.2%	53.8	7.8
Info Systems and Computer Appl	18696	2.2%	53.7	11.2
French Language	18520	2.1%	65.0	11.9
Freshman College Composition	17516	2.0%	57.1	11.0
American Government	16997	2.0%	47.3	11.8
History of United States II	15337	1.8%	49.8	9.8
English Composition with Essay	14825	1.7%	51.6	10.7
Natural Sciences	13503	1.6%	48.3	9.6
Principles of Marketing	11847	1.4%	55.9	10.8
Social Sciences and History	8864	1.0%	48.9	10.8
Precalculus	6901	0.8%	52.8	10.5
German Language	6849	0.8%	64.8	14.9
American Literature	6649	0.8%	45.9	12.6
Western Civilization I	6435	0.7%	54.5	9.0
Principles of Microeconomics	6168	0.7%	53.0	13.9
Principles of Macroeconomics	5859	0.7%	53.2	13.1
Calculus	5444	0.6%	53.2	12.4
Chemistry	5196	0.6%	46.4	11.5
Intro to Educational Psych	4718	0.5%	50.5	12.3
English Literature	4115	0.5%	49.8	10.3
Western Civilization II	4001	0.5%	50.5	8.6
Introductory Business Law	3862	0.4%	47.0	12.6
Financial Accounting	3853	0.4%	49.4	12.9

Notes: Full sample includes all first time CLEP exam takers between 2008 and 2015.

Appendix Table A2: Comparing Exam Takers

Variable	Non-CLEP Takers (N = 12,461,229)				CLEP and SAT Takers (N = 115,578)				CLEP and Non-SAT Takers (N = 417,524)			
	Mean	Std Dev	Min	Max	Mean	Std Dev	Min	Max	Mean	Std Dev	Min	Max
Male	0.459	0.498	0	1	0.494	0.500	0	1	0.551	0.497	0	1
White	0.613	0.487	0	1	0.557	0.497	0	1	0.562	0.496	0	1
Black	0.128	0.335	0	1	0.091	0.288	0	1	0.088	0.284	0	1
Hispanic	0.127	0.333	0	1	0.259	0.438	0	1	0.240	0.427	0	1
Asian	0.083	0.276	0	1	0.048	0.214	0	1	0.042	0.201	0	1
Parental Education - Less tha HS	0.045	0.207	0	1	0.055	0.229	0	1	--	--	--	--
Parental Education - HS Degree	0.129	0.335	0	1	0.124	0.330	0	1	--	--	--	--
Parental Education - Some College, no BA	0.267	0.442	0	1	0.270	0.444	0	1	--	--	--	--
Parental Education - BA or Higher	0.559	0.496	0	1	0.551	0.497	0	1	--	--	--	--
Parental Income < \$50k	0.202	0.401	0	1	0.233	0.423	0	1	--	--	--	--
Parental Income - \$50k - \$100k	0.226	0.418	0	1	0.262	0.440	0	1	--	--	--	--
Parental Income > \$100k	0.260	0.439	0	1	0.230	0.421	0	1	--	--	--	--
High School GPA	3.087	0.982	0	4	3.068	1.044	0	4	--	--	--	--
Took PSAT	0.803	0.398	0	1	0.782	0.413	0	1	-	-	-	-
Took an AP	0.473	0.499	0	1	0.444	0.497	0	1	-	-	-	-
PSAT Score	99.428	19.959	40	160	99.850	18.629	40	160	-	-	-	-
SAT Score	1,029.831	206.914	400	1600	1,040.397	188.441	400	1600	-	-	-	-
Military Personnel	--	--	--	--	0.249	0.433	0	1	0.361	0.480	0	1
Home Schooled	--	--	--	--	0.049	0.215	0	1	0.044	0.204	0	1
Number of CLEP Exams	--	--	--	--	1.686	1.578	1	27	1.798	1.785	1	33
First CLEP Exam Score	--	--	--	--	57.980	12.161	20	80	56.119	12.965	20	80
Average CLEP Exam Score	--	--	--	--	57.670	11.636	20	80	55.823	12.346	20	80

*Notes: Used SAT takers who graduated high school between 2004-2015 and CLEP takers between 2008-2015 who are under 30 years old (did not graduate high school prior to 2004). Among the 811k CLEP takers, 514k are under 30 and had enough information for matching.

Appendix Table A3: Covariate Balancing and Density Tests

<i>Density</i>			
Above Threshold	-0.004 (0.009)		
<hr/>			
	<u>BW = 5</u>	<u>BW = 7</u>	<u>BW = 10</u>
<i>Covariates</i>			
Asian	-0.000 (0.002)	-0.001 (0.002)	-0.003** (0.001)
Black	-0.001 (0.003)	-0.002 (0.003)	-0.003* (0.002)
Hispanic	-0.006** (0.003)	-0.003 (0.002)	-0.003 (0.002)
White	0.013*** (0.004)	0.011*** (0.004)	0.013*** (0.003)
Other	-0.006** (0.002)	-0.005*** (0.002)	-0.004** (0.002)
Missing Race	0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)
Female	-0.000 (0.005)	-0.000 (0.004)	-0.001 (0.003)
Age	-0.116 (0.087)	-0.105 (0.070)	-0.090 (0.058)
Military Member	-0.002 (0.002)	-0.002* (0.001)	-0.002* (0.001)
Home Schooled	0.002 (0.002)	0.003** (0.001)	0.002** (0.001)
<hr/>			
<i>Highest Level of Education at time of CLEP</i>			
In High School	-0.001 (0.003)	-0.001 (0.002)	-0.002 (0.002)
High School Graduate	-0.006* (0.003)	-0.005* (0.003)	-0.002 (0.002)
Enrolled in College	0.003 (0.004)	0.003 (0.004)	0.001 (0.003)
College Graduate	0.004 (0.003)	0.003 (0.002)	0.003 (0.002)
Predicted CLEP Score	-0.033 (0.039)	0.012 (0.031)	0.018 (0.026)
Observations	214,710	301,184	415,325

Notes: Heteroskedasticity robust standard errors are in parentheses (* p<.10 ** p<.05 *** p<.01). Each estimate comes from a local linear regression of the covariates on the forcing variable (distance from 50), an indicator variable for whether the forcing variable is greater than or equal to 0 (i.e. eligible for credit), the interaction of these two terms, and CLEP exam and testing center fixed effects. We use triangular kernels and include testing center and CLEP exam fixed effects. The discontinuities in density come from formal McCrary tests and represent the log difference in height. We obtain predicted CLEP scores from regressing all covariates listed in this table on the student's CLEP score.

Appendix Table A4: Robustness Tests

	Tri. 3	Rect. 3	Tri. 5	Rect. 5	Tri. 10	Rect. 10	Tri. 10	Rect. 10	Tri. 10	Rect. 10	Tri. IK	Rect. IK	Tri. IK	Rect. IK
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Second Order Polynomials	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		
Kernel														
BW														
Covariates														
Any Degree	0.009 (0.008)	0.010 (0.008)	0.024*** (0.005)	0.029*** (0.005)	0.025*** (0.003)	0.026*** (0.003)	0.023*** (0.005)	0.022*** (0.005)	0.025*** (0.003)	0.025*** (0.003)	0.024*** (0.003)	0.025*** (0.003)	0.025*** (0.003)	0.025*** (0.003)
N	120,824	120,824	214,710	214,710	415,325	415,325	415,325	415,325	448,418	448,418	448,418	448,418	448,418	448,418
Bachelor's Degree	0.000 (0.007)	0.001 (0.007)	0.011** (0.004)	0.013*** (0.004)	0.010*** (0.003)	0.012*** (0.003)	0.009** (0.004)	0.008* (0.004)	0.011*** (0.004)	0.010*** (0.004)	0.011*** (0.004)	0.010*** (0.004)	0.011*** (0.004)	0.010*** (0.003)
N	120,824	120,824	214,710	214,710	415,325	415,325	415,325	415,325	258,172	258,172	258,172	258,172	258,172	258,172
Associate's Degree	0.015*** (0.006)	0.015*** (0.006)	0.022*** (0.003)	0.024*** (0.003)	0.022*** (0.002)	0.021*** (0.002)	0.022*** (0.004)	0.022*** (0.004)	0.022*** (0.003)	0.022*** (0.003)	0.021*** (0.002)	0.021*** (0.002)	0.021*** (0.002)	0.021*** (0.002)
N	120,824	120,824	214,710	214,710	415,325	415,325	415,325	415,325	341,570	341,570	341,570	341,570	341,570	341,570
Estimated Income	442.123 (711.925)	463.823 (708.585)	1,301.425*** (445.722)	1,452.835*** (426.107)	977.412*** (297.952)	802.035*** (279.505)	1,473.749*** (471.138)	1,464.875*** (447.568)	1,234.919*** (369.802)	1,149.417*** (349.838)	1,077.981*** (340.539)	949.538*** (322.041)	949.538*** (322.041)	949.538*** (322.041)
N	97,719	97,719	173,665	173,665	336,665	336,665	336,665	336,665	243,699	243,699	243,699	243,699	243,699	243,699
Credit Score >= 600	0.001 (0.007)	0.000 (0.007)	0.001 (0.004)	0.002 (0.004)	0.002 (0.003)	0.002 (0.003)	0.002 (0.004)	0.002 (0.004)	0.002 (0.003)	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)	0.000 (0.003)
N	97,892	97,892	174,024	174,024	337,433	337,433	337,433	337,433	307,766	307,766	307,766	307,766	307,766	307,766
Credit Score >= 700	-0.007 (0.009)	-0.007 (0.009)	0.003 (0.006)	0.006 (0.005)	0.007* (0.004)	0.007** (0.003)	0.005 (0.006)	0.007* (0.006)	0.004 (0.004)	0.007* (0.004)	0.004 (0.004)	0.008** (0.004)	0.008** (0.004)	0.005 (0.004)
N	97,892	97,892	174,024	174,024	337,433	337,433	337,433	337,433	307,766	307,766	307,766	307,766	307,766	307,766
Delinquent on Debt in Last 12 Months	-0.003 (0.006)	-0.003 (0.006)	-0.003 (0.004)	-0.001 (0.004)	-0.004 (0.002)	-0.004* (0.002)	-0.002 (0.004)	-0.002 (0.004)	-0.003 (0.003)	-0.002 (0.003)	-0.005* (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.003)
N	99,267	99,267	176,577	176,577	342,690	342,690	342,690	342,690	281,347	281,347	281,347	281,347	281,347	281,347
Total Past Due in Last 12 Months	-73.644 (69.075)	-75.048 (68.510)	-74.302* (41.772)	-77.486** (37.658)	-63.710** (25.525)	-57.213*** (22.087)	-88.182** (43.821)	-84.287** (39.446)	-46.969** (19.765)	-44.544** (19.694)	-31.677* (17.010)	-29.159* (16.989)	-29.159* (16.989)	-29.159* (16.989)
N	98,887	98,887	175,895	175,895	341,383	341,383	341,383	341,383	484,284	484,284	484,284	484,284	484,284	484,284
Outstanding Government Loans	419.980 (580.029)	426.196 (577.424)	473.156 (363.864)	315.820 (349.152)	188.674 (243.858)	112.839 (229.096)	405.194 (384.934)	423.298 (365.906)	246.337 (287.030)	269.412 (282.578)	157.971 (258.079)	229.521 (254.121)	229.521 (254.121)	229.521 (254.121)
N	97,953	97,953	174,099	174,099	337,535	337,535	337,535	337,535	277,218	277,218	277,218	277,218	277,218	277,218
Outstanding Private Student Loans	-20.213 (180.362)	-1.602 (180.738)	87.357 (110.341)	82.838 (107.153)	-11.712 (76.726)	-32.287 (72.772)	56.215 (116.833)	9.427 (112.969)	-18.004 (74.253)	-23.161 (74.134)	-48.952 (68.834)	-51.119 (68.713)	-51.119 (68.713)	-51.119 (68.713)
N	97,953	97,953	174,099	174,099	337,535	337,535	337,535	337,535	364,500	364,500	364,500	364,500	364,500	364,500
Delinquent on Student Loans in Last 12 Months	0.003 (0.004)	0.004 (0.004)	0.002 (0.002)	0.001 (0.002)	-0.001 (0.002)	-0.002* (0.001)	0.003 (0.002)	0.003 (0.002)	-0.000 (0.002)	0.000 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.001)
N	99,267	99,267	176,577	176,577	342,690	342,690	342,690	342,690	312,522	312,522	312,522	312,522	312,522	312,522
Has Mortgage	0.008 (0.008)	0.008 (0.008)	0.012** (0.005)	0.012** (0.005)	0.007** (0.003)	0.006** (0.003)	0.012** (0.005)	0.009* (0.005)	0.009** (0.004)	0.008** (0.004)	0.005 (0.004)	0.004 (0.003)	0.004 (0.003)	0.004 (0.003)
N	99,265	99,265	176,572	176,572	342,677	342,677	342,677	342,677	281,335	281,335	281,335	281,335	281,335	281,335

Notes: Heteroskedasticity robust standard errors are in parentheses (* p<.10 ** p<.05 *** p<.01). Each estimate comes from a local linear regression of the outcomes on the forcing variable- distance from 50, an indicator variable for whether the forcing variable is greater than or equal to 0 (i.e. eligible for credit) and interaction of these two terms. All estimates include testing center and CLEP exam fixed effects. In specifications 7 and 8, we include squared expressions of the forcing variable and the interaction term. In specifications 10 and 12 we include covariates for race (Black, Hispanic, White, Asian, Other Race), sex, military status, and whether the student was non-traditional age (>=25). Models fitted with rectangular kernels exclude endpoints.

Appendix Table A5: Impact of Receiving CLEP Credit on Degree Attainment (College Fixed Effects)

	College Graduates										
	<u>Any Degree</u> (1)	<u>AA Degree</u> (2)	<u>BA Degree</u> (3)	<u>Associates Degree Within 3 Years</u> (4)	<u>Bachelors Degree Within 6 Years</u> (5)	<u>Days Between Initial Enrollment and Any Degree</u> (6)	<u>Days Between Initial Enrollment and Associate Degree</u> (7)	<u>Days Between Initial Enrollment and Bachelor's Degree</u> (8)	<u>Days Between CLEP Date and Any Degree</u> (9)	<u>Days Between CLEP Date and Associate Degree</u> (10)	<u>Days Between CLEP Date and Bachelor's Degree</u> (11)
Above 50	0.027*** (0.003)	0.025*** (0.003)	0.013*** (0.004)	0.022*** (0.003)	0.009* (0.004)	-44.937*** (7.457)	-63.319*** (12.028)	-19.979** (9.089)	-59.192*** (6.178)	-76.317*** (10.387)	-30.919*** (7.060)
Observations	370,807	281,313	211,932	312,682	211,932	206,256	90,546	125,016	156,086	63,864	112,278
Optimal Bandwidth	10.687	7.774	5.479	8.119	5.347	10.614	13.262	8.732	7.416	8.340	7.996
Control Mean	0.451	0.163	0.321	0.102	0.285	1,276.818	1,122.365	1,415.074	677.523	778.983	707.420

Notes: Heteroskedasticity robust standard errors are in parentheses (* p<.10 ** p<.05 *** p<.01). Each estimate comes from a local linear regression with a triangular kernel of the outcomes regressed on a forcing variable representing the distance between the student's first CLEP score and 50, an indicator variable for whether the forcing variable is greater than or equal to 0 (i.e. eligible for credit) and interaction of these two terms. All estimates include fixed effects for first college attended after/during CLEP and CLEP exam fixed effects.

Appendix Table A6: Impact of Receiving CLEP Credit on Financial Outcomes (College Fixed Effects)

	<u>Estimated</u>	<u>Credit</u>	<u>Credit</u>	<u>Delinquent</u>	<u>Total Past</u>	<u>Outstanding</u>	<u>Outstanding</u>	<u>Delinquent on</u>	
	<u>Income</u>	<u>Score >=</u>	<u>Score >=</u>	<u>on Debt in</u>	<u>Due in Last 12</u>	<u>Government</u>	<u>Private Student</u>	<u>Student Loans</u>	<u>Has</u>
	<u>(1)</u>	<u>600</u>	<u>700</u>	<u>Last 12</u>	<u>Months</u>	<u>Student Loans</u>	<u>Loans</u>	<u>in Last 12</u>	<u>Mortgage</u>
		<u>(2)</u>	<u>(3)</u>	<u>Months</u>	<u>(4)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>	<u>(9)</u>
Above 50	1,226.610*** (389.995)	0.001 (0.003)	0.005 (0.004)	-0.003 (0.003)	-35.176** (17.305)	285.184 (308.624)	-60.985 (80.264)	0.000 (0.002)	0.009** (0.004)
Observations	219,847	277,883	277,883	253,410	437,781	250,180	329,633	281,681	253,399
Optimal Bandwidth	6.538	8.341	8.244	7.477	15.211	7.204	10.670	8.654	7.157
Control Mean	78,775.522	0.831	0.522	0.131	226.986	16,611.388	1,699.995	0.044	0.325

Notes: Heteroskedasticity robust standard errors are in parentheses (* p<.10 ** p<.05 *** p<.01). Each estimate comes from a local linear regression with a triangular kernel of the outcomes regressed on a forcing variable representing the distance between the student's first CLEP score and 50, an indicator variable for whether the forcing variable is greater than or equal to 0 (i.e. eligible for credit) and interaction of these two terms. All estimates include fixed effects for first college attended after/during CLEP and CLEP exam fixed effects.

Appendix Table A7: Impact of Receiving CLEP Credit on Degree Enrollment, CLEP Takers Prior to Enrollment

	<u>Enrolled in College</u> (1)	<u>First Enrolled in 2-Yr College</u> (2)	<u>First Enrolled in 4-Yr College</u> (3)	<u>First Enrolled in College Where Primary Degree is AA</u> (4)	<u>First Enrolled in College Where Primary Degree is BA</u> (5)	<u>First Enrolled in College Where Highest Degree</u> (6)	<u>First Enrolled in College Where Highest Degree is BA</u> (7)
Above 50	0.003 (0.007)	-0.003 (0.005)	0.005 (0.007)	-0.002 (0.005)	0.004 (0.007)	0.009 (0.007)	0.003 (0.007)
Observations	89,522	108,224	99,091	108,224	89,522	89,522	99,091
Optimal Bandwidth	7.980	9.535	8.056	9.620	7.900	7.799	8.281
Control Mean	0.605	0.162	0.443	0.184	0.415	0.546	0.448

Notes: Heteroskedasticity robust standard errors are in parentheses (* p<.10 ** p<.05 *** p<.01). Each estimate comes from a local linear regression with a triangular kernel of the outcomes regressed on a forcing variable representing the distance between the student's first CLEP score and 50, an indicator variable for whether the forcing variable is greater than or equal to 0 (i.e. eligible for credit) and interaction of these two terms. All estimates include testing center and CLEP exam fixed effects.

Appendix Table A8: Sensitivity Analyses to Sample Selection

	Forcing Variable= Distance from credit-granting threshold at first institution			Forcing Variable= Distance from 50 on first-CLEP					
				Full sample (n=866,893)			Trans Union Sample (n=811,507)		
	<u>Any Degree</u> (1)	<u>Associates Degree among Students Starting at 2-yr Colleges</u> (2)	<u>Bachelor's Degree among Students Starting at 4-yr Colleges</u> (3)	<u>Any Degree</u> (4)	<u>Associates Degree</u> (5)	<u>Bachelor's Degree</u> (6)	<u>Any Degree</u> (7)	<u>Associates Degree</u> (8)	<u>Bachelor's Degree</u> (9)
<i>Treatment</i>	0.030*** (0.005)	0.057*** (0.008)	0.012*** (0.004)	0.025*** (0.003)	0.022*** (0.003)	0.011*** (0.004)	0.027*** (0.004)	0.024*** (0.003)	0.012*** (0.004)
Observations	243,845	67,840	276,034	448,418	341,570	258,172	316,460	316,460	278,844
Optimal Bandwidth	7.174	11.086	11.848	10.687	7.774	5.479	7.944	7.013	6.594
Control Mean	0.562	0.329	0.459	0.451	0.163	0.321	0.486	0.176	0.347

Notes: Heteroskedasticity robust standard errors are in parentheses (* p<.10 ** p<.05 *** p<.01). Each estimate comes from a local linear regression with a triangular kernel of the outcomes regressed on a forcing variable representing the distance between the student's first CLEP score and 50 (or the college-specific minimum credit-granting threshold), an indicator variable for whether the forcing variable is greater than or equal to 0 (i.e. eligible for credit) and interaction of these two terms. In specifications 7-9, we exclude the testing center and exam-type fixed effects.

Online Appendix B – TransUnion Credit Bureau Data

B.1. – Matching Process

The College Board securely sent TransUnion the CLEP data, including first and last name, birthdate, social security number, and home address, as listed when registering for CLEP. Not all exam takers have complete information, but a vast majority do.

TransUnion then performed the match using their proprietary matching algorithm. They then de-identified the data and securely sent it back to the College Board, destroying it immediately upon sending such that in the end, no party had matched identifiable data. The procedure resulted in an approximately 90 percent match rate, which is similar to Scott-Clayton and Zafar (2016) who perform the analysis with Equifax credit bureau for all West Virginia public school students. All observations were returned to the College Board, regardless of match status.

B.2. – Variable Definitions

Our Variable Name	TransUnion Definition	Our Operation
Estimated Income*	CreditVision Income Estimator	
Credit Score*	VantageScore3.0	Must discretize when outcome
Delinquent on Outstanding Debt in Last 12 Months	Total past due amount of open trades verified in past 12 months	Equals 1 if value ≥ 0 , otherwise equals 0
Total Past Due in Last 12 Months	Total past due amount of open trades verified in past 12 months	
Outstanding Government Student Loans	Total balance of open government student loan trades updated in the past 12 months	
Outstanding Private Student Loans	Total balance of open student private loan trades updated in the past 12 months	
Delinquent on Outstanding Student Loans in Last 12 Months	Months since most recent student loan delinquency	Equals 1 if value between 0 and 12, otherwise equals 0
Has Mortgage	Number of open mortgage trades verified in past 12 months	Equals 1 if value ≥ 1 , otherwise 0

* We separately discuss these outcomes in the next section.

B.3. Estimated Income

With its proprietary algorithm, TransUnion uses a wide range of financial characteristics to estimate a consumer's joint gross adjusted income (line 37 of the 1040 federal tax form). This algorithm is based on multiple income sources including: investment income, alimony, business income, IRA distributions, pensions and annuities, real estate income, unemployment compensation, and Social Security benefits. In addition, debt service parameters are also factored in such as: monthly spend data, and up to 30 months of extended account history. This history includes credit lines, length of credit history, historical credit card balances, and recent credit card transactions.¹ The estimate does not account for whether someone is employed, but rather predicts a value that is restricted to between \$0 and \$1 million.

In Figure B1, we compare the median earnings from the College Scorecard to the TransUnion income estimator. To do so, we used the College Board sample of approximately 17 million observations matched to TransUnion data (and National Student Clearinghouse). This allows us to construct college-specific incomes for different cohorts, similar to the reporting level in the College Scorecard.²

The left panel plots college level median earnings from the College Scorecard versus median estimated income from TransUnion for students eight years after initial enrollment. The 45-degree line represents a one-to-one correspondence. Most dots are below the 45-degree line, suggesting that the TransUnion income estimator is substantially higher than the Scorecard earnings. However, this is largely a level shift, as the slope of the regression line is parallel to the 45-degree line. This makes sense since the income estimator is joint income and not just earnings, as in the Scorecard. Also, the correlation is about 0.7. The right panel shows colleges where at least 80 percent of students enrolled appear in the College Board data. We see the correlation jump to almost 0.8 but the slope of the line changes. We observe similar patterns in Figure B2, which performs the same exercise for students 10 years since initial enrollment.

Overall, we view this as compelling evidence that TransUnion's income estimate contains accurate and valuable information about an individual's income.

B.4. Credit Score

The credit score is known by TransUnion as the VantageScore 3.0. The score was developed jointly by TransUnion, Equifax, and Experian, and is used by many major lenders across the U.S. It serves as their alternative to the FICO score, as it analyzes 24 months of an individual's credit history to develop a score between 300 and 850.

¹ Further details on potential uses for the TransUnion CreditVision Income Estimator can be found at <https://www.transunion.com/resources/transunion/doc/products/resources/product-creditvision-income-estimator-as.pdf>.

² The College Scorecard includes all students who received federal financial aid. The College Board data contains observations for people who did and did not receive financial aid, but misses students who did not take the PSAT, SAT, or Advanced Placement exams.

Due to privacy concerns, TransUnion requires that we do not use this raw credit score as an outcome. Consequently, we dichotomize it in several ways, such as credit score greater than or equal to 600 or separately, greater than or equal to 700.

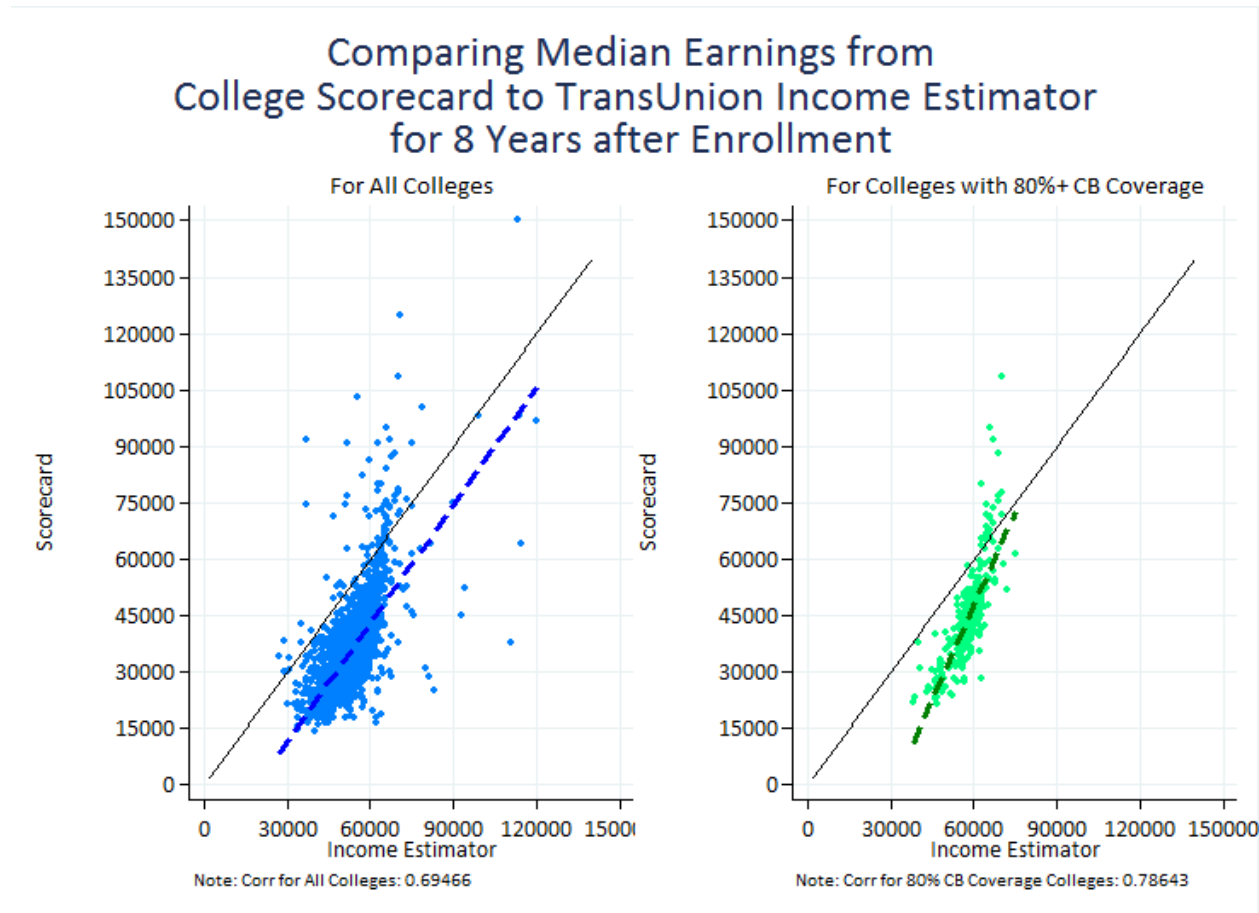
B.5. – Matching, Missingness, and Identification

Our primary specification in equation (1) relies on no strategic manipulation around a CLEP exam score of 50, the score that commonly earns college credit. One concern is that our matching with TransUnion data is somehow related to earning a 50 or higher. For example, perhaps earning a 50 improves college completion rates, which in turn increases the odds of opening credit cards, which creates a credit history. This could bias our results in unknown ways, depending on what type of person receives the credit history.

We formally test for such endogenous match rates in Online Appendix Table B1. To do so, we loop through each of our primary financial outcomes and generate a new outcome variable equal to 1 if it is missing a value in the TransUnion data, and equals 0 otherwise. The value can be missing if there was not a successful match, or if there was a match, but the value of the variable was missing.

The table shows that we do not see students with populated variables discontinuously around the 50 threshold. A few coefficients show up as marginally significant but they are small in magnitude and not for the variables where we see significant effects in our main analyses. In the last column, we simply test the match rate around the 50 threshold and find no statistical differences. Overall, we take this as evidence that our identification strategy is not threatened by missing data.

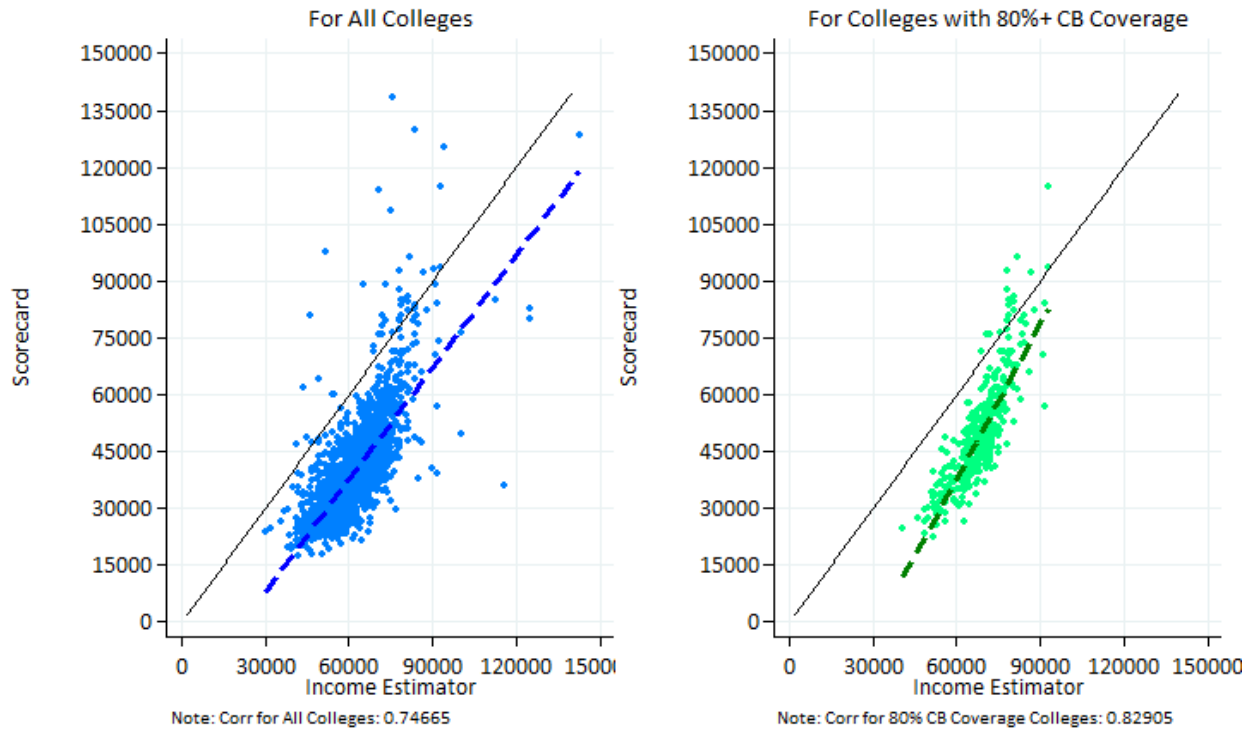
Figure B1



Notes: Scorecard data are from the College Scorecard aggregated data at the college-year level, which is freely available online. Income estimator comes from TransUnion credit bureau. It is merged to individual-level CLEP data and aggregated to the college-year level.

Figure B2

Comparing Median Earnings from College Scorecard to TransUnion Income Estimator for 10 Years after Enrollment



Notes: Scorecard data are from the College Scorecard aggregated data at the college-year level, which is freely available online. Income estimator comes from TransUnion credit bureau. It is merged to individual-level CLEP data and aggregated to the college-year level.

Appendix Table B1: Missing Credit Bureau Data

	<u>Estimated</u>	<u>Credit Score</u>	<u>Credit Score</u>	<u>Delinquent on Debt in</u>	<u>Total Past Due</u>	<u>Outstanding</u>	<u>Outstanding Private</u>	<u>Delinquent on</u>		<u>Missing</u>
	<u>Income</u>	<u>>= 600</u>	<u>>= 700</u>	<u>Last 12 Months</u>	<u>in Last 12</u>	<u>Government</u>	<u>Student Loans</u>	<u>Student Loans in</u>	<u>Has Mortgage</u>	<u>Records</u>
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>Months</u>	<u>Student Loans</u>	<u>Student Loans</u>	<u>Last 12 Months</u>	<u>(9)</u>	<u>Matched to</u>
					<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>		<u>(10)</u>
Above 50	-0.004 (0.003)	-0.004* (0.002)	-0.004* (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.004 (0.003)	-0.004* (0.002)	-0.003 (0.002)	-0.004 (0.003)	-0.003 (0.002)
Observations	278,844	351,514	351,514	316,460	546,320	316,460	416,287	351,514	316,460	351,514
Optimal Bandwidth	6.538	8.341	8.244	7.477	15.211	7.204	10.670	8.654	7.157	8.624
Control Mean	0.125	0.123	0.123	0.110	0.115	0.122	0.122	0.110	0.110	0.110

Notes: Heteroskedasticity robust standard errors are in parentheses (* p<.10 ** p<.05 *** p<.01). Each estimate comes from a local linear regression with a triangular kernel of the outcomes regressed on a forcing variable representing the distance between the student's first CLEP score and 50, an indicator variable for whether the forcing variable is greater than or equal to 0 (i.e. eligible for credit) and interaction of these two terms. All estimates include testing center and CLEP exam fixed effects. The TransUnion sample includes 811,5017 students