Online Supplemental Materials (Appendixes)

Appendix A: Additional Tables and Figures

Table A1

Estimated intergenerational elasticities in permanent family income on log income variables not truncated at 1 and 99 percent.

Model	Graduates (b_0)	Nongraduates (b_1)	Δ $(b_1 - b_0)$
Model 0	0.32***	0.26***	-0.07
No correction	(0.04)	(0.07)	(0.08)
Model 1	0.23***	0.71**	0.48*
Standard ES model	(0.05)	(0.24)	(0.24)
Model 2	0.24***	0.71**	0.47*
1st order polynomial	(0.05)	(0.23)	(0.23)
Model 3	0.24***	0.71**	0.48*
2nd order polynomial	(0.05)	(0.23)	(0.23)
Model 4	0.24***	0.63**	0.39
Semiparametric ES model	(0.05)	(0.24)	(0.25)

Note: N=1,308. Standard errors for the semiparametric model are based on bootstrapping with 200 replications.
† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < 0.001$.

Table A2

Estimates from models fitted to imputed data. Standard errors in parentheses. Standard errors for Model 4 (semiparametric model) were derived from bootstrapping (200 replications).

Model	Income (log)			Income (rank)			Occupation SES		
	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$
Model 0	0.31***	0.15*	-0.16*	0.29***	0.13*	-0.15*	0.22***	0.08†	-0.15**
No correction	(0.03)	(0.06)	(0.07)	(0.03)	(0.05)	(0.06)	(0.02)	(0.04)	(0.05)
Model 1	0.25***	0.51**	0.26	0.23***	0.34*	0.11	0.17***	0.25	0.07
Standard ES model	(0.05)	(0.17)	(0.18)	(0.04)	(0.15)	(0.09)	(0.04)	(0.15)	(0.16)
Model 2	0.26***	0.50**	0.24	0.24***	0.33*	0.09	0.18***	0.25†	0.07
1st order polynomial	(0.05)	(0.16)	(0.17)	(0.04)	(0.15)	(0.15)	(0.04)	(0.15)	(0.15)
Model 3	0.25***	0.49**	0.14	0.23***	0.32*	0.09	0.17***	0.23	0.06
2nd order polynomial	(0.05)	(0.16)	(0.17)	(0.04)	(0.15)	(0.15)	(0.04)	(0.15)	(0.15)
Model 4	0.24***	0.45*	0.21	0.22***	0.29*	0.07	0.18***	0.16	-0.01
Semiparametric ES model	(0.05)	(0.18)	(0.19)	(0.04)	(0.13)	(0.04)	(0.04)	(0.18)	(0.19)
N			1,683			1,747			1,747

$\dagger\ p < 0.10$; $^*\ p < 0.05$; $^{**}\ p < 0.01$; $^{***}\ p < 0.001$.

Notes: Same size for log income is slightly lower that the total sample of 1,747 because we omit outliers (as they influence the parameters, see the main text).

Table A3

Estimated intergenerational elasticities in permanent family income by trimmed support percentage.

Model	5% trim		10% trim	
	Nongraduates (b_0)	Δ $(b_1 - b_0)$	Nongraduates (b_0)	Δ $(b_1 - b_0)$
Model 1	0.30***	0.14	0.31***	-0.0003
Standard ES model	(0.04)	(0.16)	(0.04)	(0.18)
Model 2	0.29***	0.13	0.31***	0.11
1st order polynomial	(0.04)	(0.16)	(0.04)	(0.15)
Model 3	0.30***	0.14	0.31***	0.11
2nd order polynomial	(0.04)	(0.16)	(0.04)	(0.15)
Model 4	0.30	0.13	0.31	0.13
Semiparametric ES model				

Note: N=1,195 for 5% trimmed support; N=1,132 for 10% trimmed support. Standard errors for semiparametric not estimated.

† p < .10; * p < .05; ** p < .01; *** p < 0.001.

Table A4

Estimated intergenerational rank associations in family income by trimmed support percentage.

Model	5% trim		10% trim	
	Nongraduates (b_0)	Δ $(b_1 - b_0)$	Nongraduates (b_0)	Δ $(b_1 - b_0)$
Model 1 Standard ES model	0.28*** (0.04)	0.13 (0.16)	0.29*** (0.03)	0.09 (0.16)
Model 2 1st order polynomial	0.28*** (0.04)	0.12 (0.16)	0.29*** (0.03)	0.14 (0.14)
Model 3 2nd order polynomial	0.28*** (0.04)	0.11 (0.16)	0.29*** (0.03)	0.14 (0.14)
Model 4 Semiparametric ES model	0.28	0.12	0.29	0.16

Note: N=1,245 for 5% trimmed support; N=1,181 for 10% trimmed support. Standard errors for semiparametric not estimated.
† p < .10; * p < .05; ** p < .01; *** p < 0.001.

Table A5

Estimated intergenerational associations in Duncan's SEI by support trimming percentage.

Model	5% trim		10% trim	
	Nongraduates (b_0)	Δ ($b_1 - b_0$)	Nongraduates (b_0)	Δ ($b_1 - b_0$)
Model 1 Standard ES model	0.21*** (0.04)	0.06 (0.12)	0.20*** (0.03)	-0.25 (0.21)
Model 2 1st order polynomial	0.21*** (0.03)	0.05 (0.11)	0.21*** (0.03)	-0.04 (0.09)
Model 3 2nd order polynomial	0.20*** (0.04)	0.03 (0.12)	0.21*** (0.03)	-0.05 (0.09)
Model 4 Semiparametric ES model	0.20	0.06	0.21	-0.03

Note: N=1,466 for 5% trimmed support; N=1,389 for 10% trimmed support. Standard errors for semiparametric not estimated.
† p < .10; * p < .05; ** p < .01; *** p < 0.001.

Table A6
Complete Standard ES Model Results Including the First and Second Stages, Log Income.

First Stage	b	SE	z	p
Presence of 4-year college	1.407	0.812	1.73	0.083
Presence of 4-year college X AFQT	0.159	0.177	0.90	0.367
Presence of 4-year college X Mother's Education	-0.137	0.061	-2.23	0.026
Presence of 4-year college X Number of siblings	0.073	0.077	0.94	0.347
Log average wage in county of residence at 17	-1.938	2.489	-0.78	0.436
Log average wage in county of residence at 17 X AFQT	-0.429	0.542	-0.79	0.429
Log average wage in county of residence at 17 X Mother's Education	0.090	0.185	0.49	0.627
Log average wage in county of residence at 17 X Number of siblings	-0.020	0.225	-0.09	0.928
Average unemployment in state of residence at 17	0.255	0.234	1.09	0.276
Average unemployment in state of residence at 17 X AFQT	-0.087	0.046	-1.91	0.056
Average unemployment in state of residence at 17 X Mother's Education	-0.008	0.018	-0.47	0.638
Average unemployment in state of residence at 17 X Number of Siblings	-0.008	0.020	-0.40	0.692
Average tuition in public 4-year colleges	-0.079	0.052	-1.53	0.127
Average tuition in public 4-year colleges X AFQT	0.025	0.011	2.29	0.022
Average tuition in public 4-year colleges X Mother's Education	0.004	0.004	1.04	0.297
Average tuition in public 4-year colleges X Number of siblings	0.003	0.005	0.58	0.561
Parental log income	1.348	3.107	0.43	0.664
Residualized experiences	0.085	0.076	1.11	0.268
Residualized experiences squared	0.026	0.006	-4.44	0.000
Residualized AFQT	5.096	5.507	0.93	0.355
Residualized AFQT squared	0.065	0.076	0.85	0.394
Residualized Mother's Education	0.408	1.860	-0.22	0.826
Residualized Mother's Education Squared	0.014	0.008	-1.77	0.077
Residualized Number of Siblings	0.055	2.274	0.02	0.981
Residualized Number of Siblings Squared	0.006	0.015	0.40	0.692
Residualized Urban Status	0.058	0.144	0.41	0.685
Residualized Log average permanent wage in county of residence at 17	-49.768	27.708	-1.80	0.072
Residualized Average permanent unemployment in state of residence at 17	-0.594	0.623	-0.95	0.340
Residualized Log average permanent wage in county of residence at 17, squared	2.429	1.350	1.80	0.072
Residualized Average permanent unemployment in state of residence at 17, squared	0.042	0.048	0.88	0.381
Residualized Cohort Dummy (Born in 1957)	2.153	0.311	6.93	0.000
Residualized Cohort Dummy (Born in 1958)	1.562	0.266	5.88	0.000
Residualized Cohort Dummy (Born in 1959)	1.030	0.263	3.91	0.000
Residualized Cohort Dummy (Born in 1960)	0.915	0.234	3.91	0.000
Residualized Cohort Dummy (Born in 1961)	0.808	0.226	3.57	0.000
Residualized Cohort Dummy (Born in 1962)	0.716	0.223	3.21	0.001
Residualized Cohort Dummy (Born in 1963)	0.348	0.188	1.85	0.064
Residualized Log average wage in county of residence in 1991	1.306	0.421	3.10	0.002
Residualized Average unemployment in state of residence in 1991	-0.063	0.055	-1.14	0.255
Constant	-5.866	37.790	-0.16	0.877
Second Stage				
b0 (non-degree holders)				

Parental log income	0.273	0.049	5.59	0.000
Residualized experiences	-0.001	0.036	-0.03	0.978
Residualized experiences squared	0.003	0.002	1.45	0.149
Residualized AFQT	0.096	0.035	2.76	0.006
Residualized AFQT squared	-0.067	0.027	-2.51	0.012
Residualized Mother's Education	-0.057	0.045	-1.28	0.199
Residualized Mother's Education Squared	0.002	0.002	1.00	0.318
Residualized Number of Siblings	0.016	0.031	0.51	0.610
Residualized Number of Siblings Squared	-0.003	0.003	-0.91	0.363
Residualized Urban Status	-0.030	0.050	-0.60	0.547
Residualized Log average permanent wage in county of residence at 17	-11.208	11.374	-0.99	0.325
Residualized Average permanent unemployment in state of residence at 17	0.086	0.219	0.39	0.694
Residualized Log average permanent wage in county of residence at 17, squared	0.535	0.555	0.96	0.335
Residualized Average permanent unemployment in state of residence at 17, squared	-0.005	0.017	-0.29	0.774
Residualized Cohort Dummy (Born in 1957)	-0.447	0.145	-3.08	0.002
Residualized Cohort Dummy (Born in 1958)	-0.214	0.132	-1.63	0.104
Residualized Cohort Dummy (Born in 1959)	-0.104	0.106	-0.98	0.328
Residualized Cohort Dummy (Born in 1960)	-0.019	0.096	-0.20	0.842
Residualized Cohort Dummy (Born in 1961)	-0.044	0.091	-0.49	0.627
Residualized Cohort Dummy (Born in 1962)	0.003	0.082	0.04	0.970
Residualized Cohort Dummy (Born in 1963)	0.042	0.084	0.50	0.614
Residualized Log average wage in county of residence in 1991	0.519	0.168	3.09	0.002
Residualized Average unemployment in state of residence in 1991	0.013	0.024	0.53	0.594
Constant	7.976	0.519	15.37	0.000
b1-b0 (interaction term with college dummy)				
Parental log income	0.172	0.213	0.81	0.419
Residualized experiences	-0.035	0.080	-0.43	0.666
Residualized experiences squared	0.002	0.008	0.31	0.756
Residualized AFQT	0.422	0.306	1.38	0.168
Residualized AFQT squared	-0.048	0.101	-0.47	0.637
Residualized Mother's Education	0.399	0.235	1.70	0.090
Residualized Mother's Education Squared	-0.014	0.008	-1.68	0.092
Residualized Number of Siblings	-0.139	0.102	-1.36	0.175
Residualized Number of Siblings Squared	0.012	0.015	0.81	0.420
Residualized Urban Status	0.063	0.148	0.43	0.669
Residualized Log average permanent wage in county of residence at 17	34.837	23.710	1.47	0.142
Residualized Average permanent unemployment in state of residence at 17	-0.531	0.589	-0.90	0.367
Residualized Log average permanent wage in county of residence at 17, squared	-1.693	1.155	-1.47	0.143
Residualized Average permanent unemployment in state of residence at 17, squared	0.039	0.046	0.84	0.398
Residualized Cohort Dummy (Born in 1957)	0.362	0.452	0.80	0.423
Residualized Cohort Dummy (Born in 1958)	0.294	0.366	0.80	0.423
Residualized Cohort Dummy (Born in 1959)	0.027	0.328	0.08	0.933
Residualized Cohort Dummy (Born in 1960)	-0.211	0.293	-0.72	0.472
Residualized Cohort Dummy (Born in 1961)	0.033	0.257	0.13	0.899
Residualized Cohort Dummy (Born in 1962)	-0.056	0.229	-0.24	0.808

Residualized Cohort Dummy (Born in 1963)	0.000	0.209	0.00	0.999
Residualized Log average wage in county of residence in 1991	0.310	0.452	0.69	0.492
Residualized Average unemployment in state of residence in 1991	-0.006	0.060	-0.10	0.916
Constant	-1.718	2.811	-0.61	0.541
Selection term				
Inverse mills ratio	-0.673	0.463	-1.45	0.146
Derived college 'treatment' effects				
ATE	0.222	0.554	0.40	0.688
ATT	1.009	0.225	4.49	0.000
ATU	-0.030	0.747	-0.04	0.968

Notes: Number of observations: 1,259.
Treated and untreated refer to graduates ad nongraduates, respectively.

Table A7

Complete Standard ES Model Results Including the First and Second Stages, Income Ranks

First Stage (Probit)	b	SE	z	p
Presence of 4-year college	1.293	0.806	1.60	0.109
Presence of 4-year college X AFQT	0.168	0.174	0.97	0.333
Presence of 4-year college X Mother's Education	-0.129	0.061	-2.12	0.034
Presence of 4-year college X Number of siblings	0.071	0.075	0.94	0.350
Log average wage in county of residence at 17	-1.610	2.454	-0.66	0.512
Log average wage in county of residence at 17 X AFQT	-0.400	0.533	-0.75	0.453
Log average wage in county of residence at 17 X Mother's Education	0.056	0.182	0.31	0.757
Log average wage in county of residence at 17 X Number of siblings	-0.022	0.220	-0.10	0.922
Average unemployment in state of residence at 17	0.246	0.230	1.07	0.285
Average unemployment in state of residence at 17 X AFQT	-0.092	0.045	-2.03	0.043
Average unemployment in state of residence at 17 X Mother's Education	-0.008	0.017	-0.46	0.647
Average unemployment in state of residence at 17 X Number of Siblings	-0.007	0.019	-0.36	0.720
Average tuition in public 4-year colleges	-0.073	0.051	-1.43	0.153
Average tuition in public 4-year colleges X AFQT	0.027	0.011	2.45	0.014
Average tuition in public 4-year colleges X Mother's Education	0.003	0.004	0.89	0.371
Average tuition in public 4-year colleges X Number of siblings	0.002	0.005	0.51	0.614
Parental income ranks	4.693	7.729	0.61	0.544
Residualized experiences	0.071	0.075	0.95	0.344
Residualized experiences squared	-0.025	0.006	-4.35	0.000
Residualized AFQT	4.818	5.411	0.89	0.373
Residualized AFQT squared	0.062	0.074	0.84	0.402
Residualized Mother's Education	-0.041	1.826	-0.02	0.982
Residualized Mother's Education Squared	-0.014	0.008	-1.81	0.071
Residualized Number of Siblings	0.051	2.234	0.02	0.982
Residualized Number of Siblings Squared	0.009	0.013	0.69	0.490
Residualized Urban Status	0.048	0.141	0.34	0.732
Residualized Log average permanent wage in county of residence at 17	-56.260	27.258	-2.06	0.039
Residualized Average permanent unemployment in state of residence at 17	-0.365	0.617	-0.59	0.554
Residualized Log average permanent wage in county of residence at 17, squared	2.748	1.327	2.07	0.038
Residualized Average permanent unemployment in state of residence at 17, squared	0.026	0.048	0.54	0.589
Residualized Cohort Dummy (Born in 1957)	2.216	0.303	7.31	0.000
Residualized Cohort Dummy (Born in 1958)	1.537	0.262	5.88	0.000
Residualized Cohort Dummy (Born in 1959)	1.020	0.261	3.91	0.000
Residualized Cohort Dummy (Born in 1960)	0.932	0.231	4.03	0.000
Residualized Cohort Dummy (Born in 1961)	0.823	0.222	3.70	0.000
Residualized Cohort Dummy (Born in 1962)	0.717	0.218	3.28	0.001
Residualized Cohort Dummy (Born in 1963)	0.356	0.185	1.92	0.055
Residualized Log average wage in county of residence in 1991	1.236	0.412	3.00	0.003
Residualized Average unemployment in state of residence in 1991	-0.058	0.054	-1.07	0.284
Constant	6.976	9.435	0.74	0.460
Second Stage				

b0 (non-degree holders)				
Parental income ranks	0.263	0.040	6.52	0.000
Residualized experiences	0.001	0.013	0.04	0.967
Residualized experiences squared	0.001	0.001	1.46	0.146
Residualized AFQT	0.045	0.013	3.50	0.000
Residualized AFQT squared	-0.019	0.009	-2.03	0.042
Residualized Mother's Education	-0.017	0.017	-1.00	0.319
Residualized Mother's Education Squared	0.001	0.001	0.85	0.393
Residualized Number of Siblings	0.004	0.011	0.32	0.745
Residualized Number of Siblings Squared	-0.001	0.001	-0.81	0.415
Residualized Urban Status	-0.013	0.019	-0.70	0.483
Residualized Log average permanent wage in county of residence at 17	-1.659	4.191	-0.40	0.692
Residualized Average permanent unemployment in state of residence at 17	0.014	0.080	0.18	0.858
Residualized Log average permanent wage in county of residence at 17, squared	0.077	0.205	0.37	0.708
Residualized Average permanent unemployment in state of residence at 17, squared	-0.001	0.006	-0.09	0.926
Residualized Cohort Dummy (Born in 1957)	-0.184	0.054	-3.43	0.001
Residualized Cohort Dummy (Born in 1958)	-0.119	0.048	-2.49	0.013
Residualized Cohort Dummy (Born in 1959)	-0.041	0.039	-1.06	0.290
Residualized Cohort Dummy (Born in 1960)	-0.016	0.035	-0.44	0.659
Residualized Cohort Dummy (Born in 1961)	-0.048	0.033	-1.45	0.147
Residualized Cohort Dummy (Born in 1962)	-0.025	0.030	-0.83	0.409
Residualized Cohort Dummy (Born in 1963)	-0.012	0.031	-0.37	0.708
Residualized Log average wage in county of residence in 1991	0.178	0.061	2.90	0.004
Residualized Average unemployment in state of residence in 1991	0.003	0.009	0.32	0.751
Constant	0.347	0.022	15.49	0.000
b1-b0 (interaction term with college dummy)				
Parental income ranks	0.074	0.197	0.37	0.708
Residualized experiences	-0.008	0.028	-0.27	0.788
Residualized experiences squared	0.000	0.003	0.10	0.920
Residualized AFQT	0.104	0.116	0.90	0.369
Residualized AFQT squared	-0.019	0.038	-0.51	0.609
Residualized Mother's Education	0.132	0.085	1.56	0.120
Residualized Mother's Education Squared	-0.004	0.003	-1.50	0.133
Residualized Number of Siblings	-0.025	0.037	-0.66	0.509
Residualized Number of Siblings Squared	0.002	0.005	0.40	0.686
Residualized Urban Status	0.031	0.054	0.58	0.564
Residualized Log average permanent wage in county of residence at 17	6.625	8.774	0.76	0.450
Residualized Average permanent unemployment in state of residence at 17	-0.144	0.212	-0.68	0.496
Residualized Log average permanent wage in county of residence at 17, squared	-0.320	0.427	-0.75	0.454
Residualized Average permanent unemployment in state of residence at 17, squared	0.011	0.017	0.63	0.527
Residualized Cohort Dummy (Born in 1957)	0.188	0.164	1.14	0.253
Residualized Cohort Dummy (Born in 1958)	0.142	0.132	1.08	0.281
Residualized Cohort Dummy (Born in 1959)	-0.017	0.120	-0.14	0.889
Residualized Cohort Dummy (Born in 1960)	-0.093	0.107	-0.86	0.388
Residualized Cohort Dummy (Born in 1961)	0.035	0.093	0.38	0.704

Residualized Cohort Dummy (Born in 1962)	-0.021	0.083	-0.25	0.800
Residualized Cohort Dummy (Born in 1963)	0.030	0.075	0.39	0.696
Residualized Log average wage in county of residence in 1991	0.044	0.159	0.27	0.784
Residualized Average unemployment in state of residence in 1991	0.002	0.022	0.11	0.914
Constant	0.077	0.314	0.25	0.805
Selection term				
Inverse mills ratio	-0.175	0.169	-1.04	0.300
Derived college 'treatment' effects				
ATE	0.127	0.203	0.62	0.532
ATT	0.338	0.081	4.16	0.000
ATU	0.057	0.275	0.21	0.835

Notes: Number of observations: 1,312.
Treated and untreated refer to graduates ad nongraduates, respectively.

Table A8

Complete Standard ES Model Results Including the First and Second Stages, Duncan SEI.

First Stage	b	SE	z	p
Presence of 4-year college	1.436	0.730	1.97	0.049
Presence of 4-year college X AFQT	0.001	0.168	0.00	0.997
Presence of 4-year college X Mother's Education	-0.111	0.055	-2.01	0.045
Presence of 4-year college X Number of siblings	0.064	0.064	1.00	0.318
Log average wage in county of residence at 17	-3.359	2.208	-1.52	0.128
Log average wage in county of residence at 17 X AFQT	-0.234	0.498	-0.47	0.639
Log average wage in county of residence at 17 X Mother's Education	0.171	0.162	1.05	0.292
Log average wage in county of residence at 17 X Number of siblings	-0.052	0.197	-0.27	0.791
Average unemployment in state of residence at 17	0.272	0.201	1.35	0.176
Average unemployment in state of residence at 17 X AFQT	-0.048	0.043	-1.12	0.262
Average unemployment in state of residence at 17 X Mother's Education	-0.016	0.015	-1.04	0.298
Average unemployment in state of residence at 17 X Number of Siblings	0.000	0.017	0.00	0.997
Average tuition in public 4-year colleges	-0.078	0.047	-1.66	0.097
Average tuition in public 4-year colleges X AFQT	0.019	0.010	1.83	0.068
Average tuition in public 4-year colleges X Mother's Education	0.005	0.004	1.37	0.172
Average tuition in public 4-year colleges X Number of siblings	0.002	0.004	0.50	0.616
Parental occupational status (Duncan SEI)	-0.011	0.091	-0.13	0.900
Residualized experiences	0.176	0.070	2.52	0.012
Residualized experiences squared	-0.033	0.005	-6.32	0.000
Residualized AFQT	3.109	5.051	0.62	0.538
Residualized AFQT squared	0.011	0.075	0.15	0.879
Residualized Mother's Education	-1.352	1.615	-0.84	0.402
Residualized Mother's Education Squared	-0.010	0.007	-1.53	0.125
Residualized Number of Siblings	0.404	1.989	0.20	0.839
Residualized Number of Siblings Squared	0.001	0.011	0.07	0.942
Residualized Urban Status	-0.012	0.128	-0.10	0.924
Residualized Log average permanent wage in county of residence at 17	-57.821	23.539	-2.46	0.014
Residualized Average permanent unemployment in state of residence at 17	-0.022	0.555	-0.04	0.968
Residualized Log average permanent wage in county of residence at 17, squared	2.826	1.148	2.46	0.014
Residualized Average permanent unemployment in state of residence at 17, squared	-0.004	0.043	-0.08	0.933
Residualized Cohort Dummy (Born in 1957)	2.359	0.258	9.15	0.000
Residualized Cohort Dummy (Born in 1958)	1.982	0.241	8.23	0.000
Residualized Cohort Dummy (Born in 1959)	1.229	0.239	5.14	0.000
Residualized Cohort Dummy (Born in 1960)	1.223	0.209	5.84	0.000
Residualized Cohort Dummy (Born in 1961)	0.803	0.211	3.80	0.000
Residualized Cohort Dummy (Born in 1962)	0.713	0.209	3.40	0.001
Residualized Cohort Dummy (Born in 1963)	0.285	0.183	1.56	0.118
Residualized Log average wage in county of residence in 1991	1.074	0.379	2.83	0.005
Residualized Average unemployment in state of residence in 1991	-0.074	0.050	-1.47	0.142
Constant	14.643	7.644	1.92	0.055
Second Stage				

b0 (non-degree holders)

Parental occupational status (Duncan SEI)	0.182	0.043	4.18	0.000
Residualized experiences	-1.427	1.038	-1.37	0.170
Residualized experiences squared	0.137	0.055	2.48	0.013
Residualized AFQT	4.534	0.925	4.90	0.000
Residualized AFQT squared	-0.416	0.719	-0.58	0.563
Residualized Mother's Education	0.346	1.301	0.27	0.790
Residualized Mother's Education Squared	-0.008	0.060	-0.13	0.896
Residualized Number of Siblings	0.040	0.797	0.05	0.960
Residualized Number of Siblings Squared	-0.031	0.082	-0.37	0.708
Residualized Urban Status	1.318	1.394	0.95	0.344
Residualized Log average permanent wage in county of residence at 17	467.607	330.517	1.41	0.157
Residualized Average permanent unemployment in state of residence at 17	-0.682	6.389	-0.11	0.915
Residualized Log average permanent wage in county of residence at 17, squared	-22.644	16.124	-1.40	0.160
Residualized Average permanent unemployment in state of residence at 17, squared	0.011	0.494	0.02	0.982
Residualized Cohort Dummy (Born in 1957)	-6.002	3.827	-1.57	0.117
Residualized Cohort Dummy (Born in 1958)	-2.084	3.625	-0.58	0.565
Residualized Cohort Dummy (Born in 1959)	-3.384	2.993	-1.13	0.258
Residualized Cohort Dummy (Born in 1960)	-0.091	2.839	-0.03	0.974
Residualized Cohort Dummy (Born in 1961)	2.191	2.640	0.83	0.407
Residualized Cohort Dummy (Born in 1962)	0.448	2.450	0.18	0.855
Residualized Cohort Dummy (Born in 1963)	0.251	2.502	0.10	0.920
Residualized Log average wage in county of residence in 1991	1.697	4.696	0.36	0.718
Residualized Average unemployment in state of residence in 1991	1.115	0.678	1.64	0.100
Constant	27.220	1.256	21.66	0.000

b1-b0 (interaction term with college dummy)

Parental occupational status (Duncan SEI)	0.039	0.158	0.25	0.803
Residualized experiences	0.377	1.984	0.19	0.849
Residualized experiences squared	-0.158	0.170	-0.93	0.352
Residualized AFQT	1.622	7.670	0.21	0.833
Residualized AFQT squared	2.855	2.732	1.05	0.296
Residualized Mother's Education	-6.180	5.036	-1.23	0.220
Residualized Mother's Education Squared	0.242	0.183	1.32	0.186
Residualized Number of Siblings	-3.183	2.222	-1.43	0.152
Residualized Number of Siblings Squared	0.178	0.278	0.64	0.520
Residualized Urban Status	0.848	3.601	0.24	0.814
Residualized Log average permanent wage in county of residence at 17	-527.437	605.839	-0.87	0.384
Residualized Average permanent unemployment in state of residence at 17	-24.206	15.257	-1.59	0.113
Residualized Log average permanent wage in county of residence at 17, squared	26.013	29.533	0.88	0.379
Residualized Average permanent unemployment in state of residence at 17, squared	1.928	1.209	1.59	0.111
Residualized Cohort Dummy (Born in 1957)	25.444	9.763	2.61	0.009
Residualized Cohort Dummy (Born in 1958)	15.333	8.859	1.73	0.084
Residualized Cohort Dummy (Born in 1959)	12.824	7.876	1.63	0.104
Residualized Cohort Dummy (Born in 1960)	11.737	7.201	1.63	0.103
Residualized Cohort Dummy (Born in 1961)	2.458	6.669	0.37	0.713

Residualized Cohort Dummy (Born in 1962)	8.133	6.081	1.34	0.181
Residualized Cohort Dummy (Born in 1963)	7.232	5.797	1.25	0.212
Residualized Log average wage in county of residence in 1991	7.878	10.197	0.77	0.440
Residualized Average unemployment in state of residence in 1991	-3.028	1.505	-2.01	0.044
Constant	7.828	16.791	0.47	0.641
Selection term				
Inverse mills ratio	-23.536	10.155	-2.32	0.021
Derived college treatment effects				
ATE	9.647	10.099	0.96	0.340
ATT	31.020	5.465	5.68	0.000
ATU	1.091	14.606	0.07	0.940

Treated and untreated refer to graduates ad nongraduates, respectively.

Table A9
Estimates from models fitted to data excluding those with advanced degrees from college-degree holders.

Model	Income (log)			Income (rank)			Occupation SES		
	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$
Model 0	0.30***	0.13	-0.17*	0.31***	0.13	-0.18†	0.23***	0.005	-0.24**
No correction	(0.03)	(0.08)	(0.08)	(0.04)	(0.09)	(0.08)	(0.03)	(0.05)	(0.05)
Model 1	0.27***	0.49*	0.22	0.29***	0.40	0.11	0.19***	-0.06	0.07
Standard ES model	(0.04)	(0.25)	(0.26)	(0.05)	(0.29)	(0.29)	(0.04)	(0.18)	(0.16)
Model 2	0.28***	0.45	0.17	0.30***	0.36	0.06	0.19***	-0.06	0.07
1st order polynomial	(0.04)	(0.25)	(0.25)	(0.04)	(0.28)	(0.28)	(0.03)	(0.17)	(0.15)
Model 3	0.28***	0.45	0.18	0.30***	0.36	0.06	0.20***	-0.06	0.06
2nd order polynomial	(0.04)	(0.25)	(0.25)	(0.05)	(0.28)	(0.28)	(0.04)	(0.17)	(0.15)
Model 4	0.27***	0.52*	0.25	0.29***	0.47	0.18	0.20***	-0.07	-0.01
Semiparametric ES model	(0.04)	(0.26)	(0.26)	(0.05)	(0.29)	(0.30)	(0.04)	(0.18)	(0.19)
N			1,180			1,132			1,370

$p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table A10
Estimates from **log-income** models fitted to data leaving out specific or sets of IVs

Model	Standard ES Model			Semiparametric			2nd Order Polynomial		
	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$
Model A: Original model with all four IVs	0.27***	0.44*	0.17	0.28***	0.40†	0.12	0.28***	0.45*	0.17
	(0.05)	(0.21)	(0.21)	(0.05)	(0.21)	(0.22)	(0.05)	(0.20)	(0.21)
Model B: Omits local unemployment	0.27***	0.51*	0.24	0.27***	0.50*	0.23	0.27***	0.51*	0.24
	(0.05)	(0.21)	(0.22)	(0.05)	(0.24)	(0.24)	(0.05)	(0.21)	(0.22)
Model C: Omits local earnings	0.28***	0.41†	0.13	0.29***	0.40†	0.11	0.28***	0.44*	0.16
	(0.05)	(0.22)	(0.22)	(0.05)	(0.22)	(0.22)	(0.05)	(0.21)	(0.22)
Model D: Omits both local unemployment and earnings	0.27***	0.49*	0.22	0.28***	0.51*	0.23	0.28***	0.51*	0.23
	(0.05)	(0.23)	(0.24)	(0.05)	(0.23)	(0.24)	(0.05)	(0.23)	(0.23)
Model E: Omits public university	0.28***	0.35	0.08	0.28***	0.30	0.01	0.28***	0.39†	0.11
	(0.05)	(0.22)	(0.23)	(0.05)	(0.25)	(0.26)	(0.05)	(0.22)	(0.22)
Model F: Omits tuition	0.29***	0.60**	0.31	0.30***	0.56**	0.26	0.30***	0.62**	0.32
	(0.05)	(0.22)	(0.23)	(0.04)	(0.22)	(0.22)	(0.05)	(0.22)	(0.22)
N			1,259			1,259			1,259

$p < 0.10$; $^* p < 0.05$; $^{**} p < 0.01$; $^{***} p < 0.001$.

Table A11
Estimates from **rank-income** models fitted to data leaving out specific or sets of IVs

Model	Standard ES Model			Semiparametric			2nd Order Polynomial		
	Nongraduates (b_0)	Graduates (b_1)	Δ ($b_1 - b_0$)	Nongraduates (b_0)	Graduates (b_1)	Δ ($b_1 - b_0$)	Nongraduates (b_0)	Graduates (b_1)	Δ ($b_1 - b_0$)
Model A: Original model with all four IVs	0.26***	0.34†	0.07	0.27***	0.34†	0.07	0.27***	0.34†	0.07
	(0.04)	(0.19)	(0.20)	(0.04)	(0.18)	(0.19)	(0.04)	(0.19)	(0.19)
Model B: Omits local unemployment	0.25***	0.35†	0.09	0.26***	0.36*	0.10	0.27***	0.34†	0.07
	(0.04)	(0.20)	(0.20)	(0.04)	(0.19)	(0.19)	(0.04)	(0.19)	(0.19)
Model C: Omits local earnings	0.27***	0.32	0.05	0.27***	0.34†	0.06	0.27***	0.34†	0.07
	(0.04)	(0.21)	(0.21)	(0.04)	(0.19)	(0.20)	(0.04)	(0.19)	(0.19)
Model D: Omits both local unemployment and earnings	0.26***	0.34	0.08	0.26***	0.35†	0.08	0.26***	0.35	0.09
	(0.04)	(0.22)	(0.23)	(0.04)	(0.21)	(0.21)	(0.04)	(0.21)	(0.22)
Model E: Omits public university	0.26***	0.28	0.02	0.27***	0.24	-0.03	0.26***	0.31	0.04
	(0.04)	(0.21)	(0.21)	(0.04)	(0.19)	(0.20)	(0.04)	(0.20)	(0.20)
Model F: Omits tuition	0.28***	0.48*	0.21	0.28***	0.48**	0.20	0.28***	0.49*	0.21
	(0.04)	(0.21)	(0.21)	(0.04)	(0.17)	(0.17)	(0.04)	(0.20)	(0.21)
N			1,312			1,312			1,312

$p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table A12
Estimates from **SEI** models fitted to data leaving out specific or sets of IVs

Model	Standard ES Model			Semiparametric			2nd Order Polynomial		
	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$	Nongraduates (b_0)	Graduates (b_1)	Δ $(b_1 - b_0)$
Model A: Original model with all four IVs	0.18***	0.22	0.04	0.20***	0.18	-0.02	0.19***	0.23	0.04
	(0.04)	(0.15)	(0.16)	(0.05)	(0.17)	(0.17)	(0.04)	(0.15)	(0.15)
Model B: Omits local unemployment	0.20***	0.28†	0.08	0.19***	0.17	-0.02	0.18***	0.21	0.03
	(0.04)	(0.17)	(0.17)	(0.05)	(0.16)	(0.17)	(0.04)	(0.15)	(0.15)
Model C: Omits local earnings	0.18***	0.20	0.02	0.23***	0.28†	0.05	0.21***	0.32*	0.11
	(0.04)	(0.16)	(0.16)	(0.05)	(0.17)	(0.18)	(0.04)	(0.16)	(0.17)
Model D: Omits both local unemployment and earnings	0.20***	0.28	0.08	0.22***	0.28	0.06	0.21***	0.32†	0.11
	(0.05)	(0.17)	(0.18)	(0.05)	(0.20)	(0.21)	(0.04)	(0.17)	(0.17)
Model E: Omits public university	0.17***	0.20	0.02	0.20***	0.12	-0.08	0.18***	0.22	0.04
	(0.04)	(0.16)	(0.17)	(0.05)	(0.17)	(0.18)	(0.04)	(0.15)	(0.16)
Model F: Omits tuition	0.19***	0.21	0.03	0.20***	0.17	-0.02	0.19***	0.20	0.01
	(0.04)	(0.16)	(0.17)	(0.05)	(0.18)	(0.19)	(0.04)	(0.16)	(0.16)
N			1,544			1,544			1,544

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table A13

Regressions of alternative pathways on full set of first-stage predictors

	Religious attendance in 2000	Did unpaid volunteer work in 2005	Migrated across county from age 17 to 30	Migrated across state from age 17 to 30	Used Social Network for Job, 1994	Used Social Network for Job, 1996
Parental income rank	0.189	0.120	0.392	-0.285	0.211	-0.006
	(0.356)	(0.354)	(0.296)	(0.339)	(0.377)	(0.379)
Experiences	-0.142	-0.071	-0.115	-0.123	-0.129	0.000
	(0.084)	(0.082)	(0.078)	(0.085)	(0.091)	(0.094)
Experiences squared	0.005	0.002	0.000	0.000	0.011 *	0.006
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
AFQT	-4.183	-4.314	1.610	2.860	13.289 *	12.636 *
	(5.638)	(5.824)	(4.634)	(5.604)	(5.878)	(6.182)
AFQT squared	0.101	0.013	0.021	-0.081	-0.007	-0.043
	(0.064)	(0.072)	(0.058)	(0.071)	(0.072)	(0.076)
Mother's Education	0.080	-3.853	0.473	-0.577	2.045	-0.545
	(2.424)	(2.532)	(1.940)	(2.213)	(2.398)	(2.605)
Mother's Education Squared	-0.008	-0.018	0.004	0.003	-0.004	0.009
	(0.008)	(0.009)	(0.006)	(0.006)	(0.007)	(0.007)
Number of Siblings	-5.703	-4.841	3.235	5.600	5.144	7.197 *
	(2.967)	(2.949)	(2.419)	(2.951)	(3.170)	(3.256)
Number of Siblings Squared	-0.019	0.010	-0.006	-0.008	-0.002	0.017
	(0.015)	(0.014)	(0.012)	(0.014)	(0.015)	(0.016)
Urban Status	0.075	0.147	-0.042	0.271	-0.163	-0.143
	(0.177)	(0.176)	(0.150)	(0.181)	(0.190)	(0.190)
Log average permanent wage in county of residence at 17	24.970	19.278	-5.647	28.969	-7.474	-0.710
	(36.283)	(35.240)	(29.830)	(33.218)	(38.206)	(37.754)
Average permanent unemployment in state of residence at 17	-1.074	-0.960	-0.730	-2.465 **	1.032	1.012
	(0.728)	(0.749)	(0.654)	(0.725)	(0.830)	(0.842)
Log average permanent wage in county of residence at 17, squared	-1.202	-0.935	0.223	-1.444	0.396	0.066
	(1.772)	(1.720)	(1.455)	(1.620)	(1.864)	(1.842)

Average permanent unemployment in state of residence at 17, squared	0.092	0.087	0.062	0.193 **	-0.052	-0.086
	(0.056)	(0.058)	(0.051)	(0.056)	(0.064)	(0.066)
Cohort Dummy (Born in 1957)	-0.213	1.297 **	0.098	0.420	-0.627	-0.884
	(0.446)	(0.387)	(0.341)	(0.397)	(0.458)	(0.484)
Cohort Dummy (Born in 1958)	0.590	0.594	-0.064	0.205	-0.473	-0.711
	(0.361)	(0.366)	(0.308)	(0.356)	(0.392)	(0.401)
Cohort Dummy (Born in 1959)	0.707 *	1.058 **	0.364	0.528	-0.013	-1.233 **
	(0.330)	(0.332)	(0.284)	(0.325)	(0.357)	(0.411)
Cohort Dummy (Born in 1960)	0.433	0.873 **	0.258	0.423	-0.221	-0.295
	(0.309)	(0.313)	(0.264)	(0.301)	(0.328)	(0.339)
Cohort Dummy (Born in 1961)	0.156	0.804 *	0.100	0.437	-0.639	-0.302
	(0.315)	(0.314)	(0.259)	(0.294)	(0.338)	(0.333)
Cohort Dummy (Born in 1962)	0.173	0.540	0.047	0.378	-0.435	-0.129
	(0.299)	(0.304)	(0.250)	(0.282)	(0.315)	(0.309)
Cohort Dummy (Born in 1963)	-0.064	0.345	-0.306	-0.337	-0.154	0.143
	(0.268)	(0.268)	(0.221)	(0.254)	(0.273)	(0.269)
Log average wage in county of residence in 1991	-0.825	0.935	3.114 **	2.042 **	-0.644	-0.995
	(0.588)	(0.567)	(0.516)	(0.557)	(0.621)	(0.652)
Average unemployment in state of residence in 1991	0.016	-0.088	-0.172 **	-0.202 **	0.000	0.110
	(0.074)	(0.075)	(0.066)	(0.072)	(0.084)	(0.085)
Instrumental variables						
Presence of 4-year college	-1.371	0.744	0.368	0.551	0.088	0.121
	(1.027)	(1.042)	(0.843)	(0.950)	(1.056)	(1.044)
Presence of 4-year college X AFQT	-0.069	0.445 *	-0.280	-0.128	-0.169	-0.157
	(0.175)	(0.185)	(0.149)	(0.182)	(0.189)	(0.196)
Presence of 4-year college X Mother's Education	0.072	-0.089	-0.038	-0.043	-0.015	-0.009
	(0.080)	(0.080)	(0.066)	(0.073)	(0.082)	(0.083)
Presence of 4-year college X Number of siblings	0.095	0.005	-0.050	-0.024	0.035	0.052
	(0.090)	(0.088)	(0.075)	(0.092)	(0.099)	(0.098)
Log average wage in county of residence at 17	-1.853	-8.363 *	0.361	0.359	2.784	1.379
	(3.187)	(3.371)	(2.543)	(2.950)	(3.120)	(3.283)
Log average wage in county of residence at 17 X AFQT	0.369	0.471	-0.123	-0.275	-1.283 *	-1.192

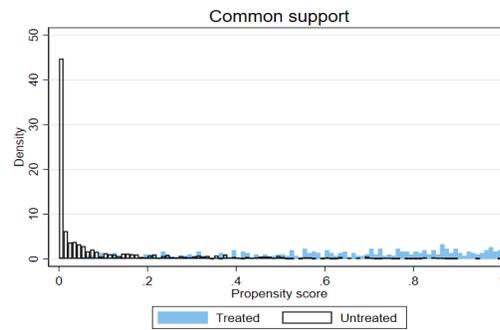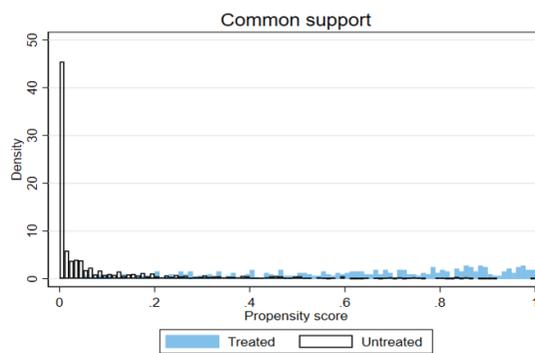|						
	(0.559)	(0.578)	(0.459)	(0.554)	(0.583)	(0.611)
Log average wage in county of residence at 17 X Mother's Education	-0.008	0.433	-0.068	0.054	-0.199	0.014
	(0.242)	(0.255)	(0.192)	(0.219)	(0.236)	(0.257)
Log average wage in county of residence at 17 X Number of siblings	0.534	0.444	-0.296	-0.522	-0.533	-0.720 *
	(0.294)	(0.293)	(0.239)	(0.291)	(0.315)	(0.322)
Average unemployment in state of residence at 17	-0.330	-0.146	-0.055	-0.027	-0.773 *	-0.067
	(0.308)	(0.300)	(0.237)	(0.266)	(0.316)	(0.289)
Average unemployment in state of residence at 17 X AFQT	0.049	-0.095	0.043	0.048	-0.003	0.025
	(0.048)	(0.050)	(0.042)	(0.048)	(0.051)	(0.054)
Average unemployment in state of residence at 17 X Mother's Education	0.014	0.011	0.004	0.002	0.041	0.005
	(0.023)	(0.023)	(0.018)	(0.020)	(0.024)	(0.023)
Average unemployment in state of residence at 17 X Number of Siblings	0.018	0.018	0.001	0.025	0.040	-0.025
	(0.025)	(0.023)	(0.020)	(0.023)	(0.025)	(0.028)
Average tuition in public 4-year colleges	-0.091	0.045	-0.084	0.019	0.080	-0.041
	(0.067)	(0.067)	(0.056)	(0.062)	(0.071)	(0.071)
Average tuition in public 4-year colleges X AFQT	0.010	0.013	-0.016	-0.003	-0.006	-0.018
	(0.011)	(0.012)	(0.009)	(0.011)	(0.011)	(0.012)
Average tuition in public 4-year colleges X Mother's Education	0.003	-0.004	0.009 *	0.001	-0.007	0.005
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)
Average tuition in public 4-year colleges X Number of siblings	0.009	0.005	-0.008	-0.017 **	0.003	0.008
	(0.006)	(0.006)	(0.005)	(0.006)	(0.007)	(0.007)
Intercept	-96.836	-25.915	4.400	-162.229	10.849	-4.649
	(188.004)	(181.462)	(154.667)	(172.626)	(198.038)	(198.113)
Joint Test of Instrument Block, P-value	0.113	0.048	0.084	0.266	0.061	0.275
Number of observations	1227	1149	1280	1280	911	883

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

Note: To account for the six hypotheses tested, we apply a Bonferroni correction. The adjusted significance threshold is $\alpha=0.05/6\approx0.0083$.

Figure A1. Common support 'density overlap' graphs for the three main analyses.
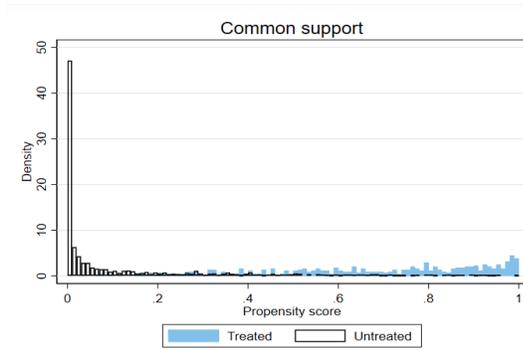
a. Log-income analysis

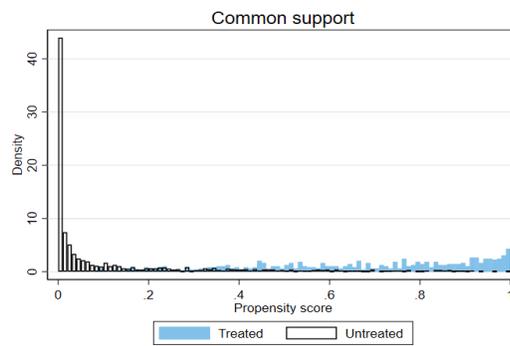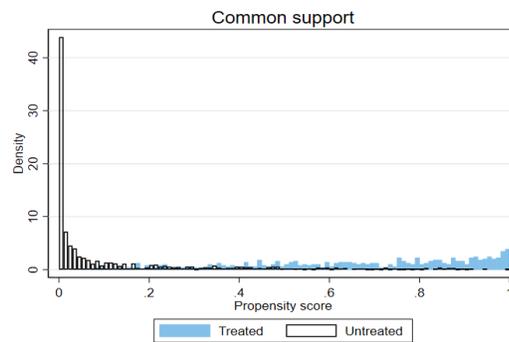

b. Income ranks analysis

c. Duncan's SEI

Note: Treated and untreated refer to graduates and nongraduates, respectively. See Appendix Figure A2 for common support graphs for the full samples based on imputation.

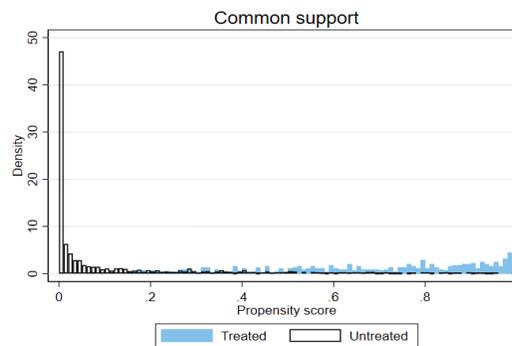**Figure A2.** Common support graphs for the three analyses based on imputation.

A. Log-income analysis

B. Income ranks analysis

C. Duncan's SEI

Note: Treated and untreated refer to graduates and nongraduates, respectively. See Appendix Figure A2 for common support graphs for the full samples based on imputation.

Appendix B: Proof

Proof of $E(e_1|D = 1 \cdot ((x|D = 1) - \mu_{x|D=1})) = -\rho_{e_{1,u}}\sigma_u cov\left(\frac{\varphi(\alpha+\beta x)}{\Phi(\alpha+\beta x)}, x|D = 1\right).$

$$E\big(e_1|D = 1 \cdot ((x|D = 1) - \mu_{x|D=1})\big)$$

$$= \iint e_1|D = 1 \cdot ((x|D = 1) - \mu_{x|D=1}) \, \varphi\left(e_1\Big|D = 1, \big((x|D = 1) - \mu_{x|D=1}\big)\right) \partial(e_1|D$$

$$= 1)\partial((x|D = 1) - \mu_{x|D=1})$$

$$= \iint e_1|D = 1 \cdot (x|D = 1)\varphi(e_1|D = 1, x|D = 1)\partial(e_1|D = 1)\partial(x|D = 1)$$

$$= \int x|D = 1 \int e_1|D = 1 \, \varphi(e_1|D = 1|x|D = 1)\varphi(x|D = 1)\partial(e_1|D = 1)\partial(x|D = 1)$$

$$= -\rho_{e_{1,u}}\sigma_u \int x|D = 1 \frac{\varphi(\alpha + \beta x)}{\Phi(\alpha + \beta x)}\varphi(x|D = 1)\partial(x|D = 1)$$

$$= -\rho_{e_{1,u}}\sigma_u cov\left(\frac{\varphi(\alpha + \beta x)}{\Phi(\alpha + \beta x)}, x|D = 1\right)$$