

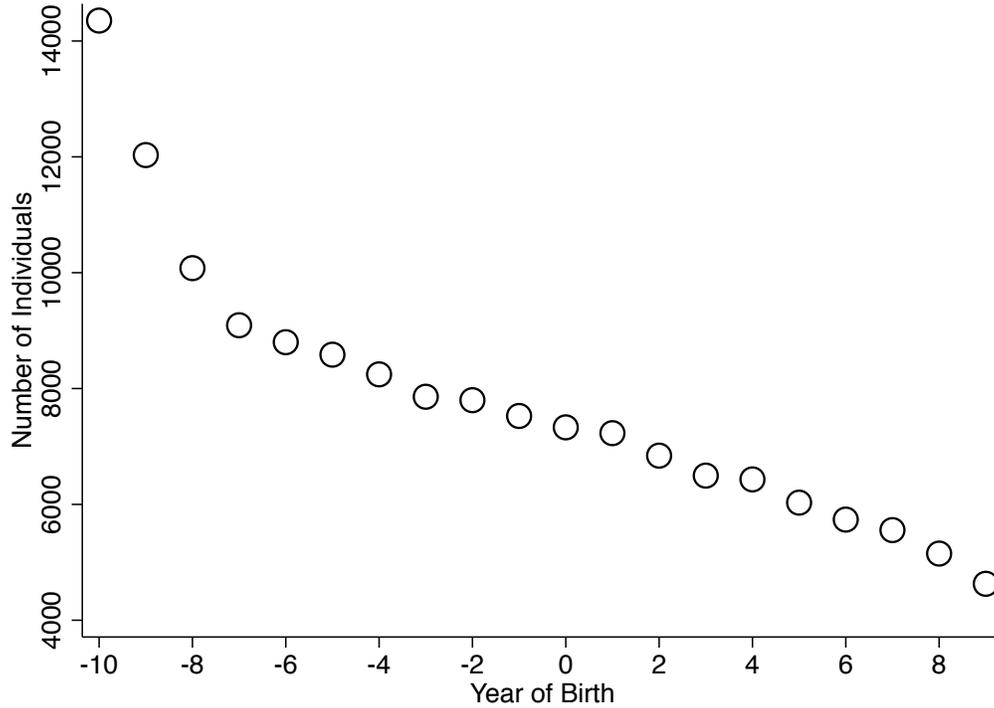
## APPENDIX LIST

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## APPENDIX A

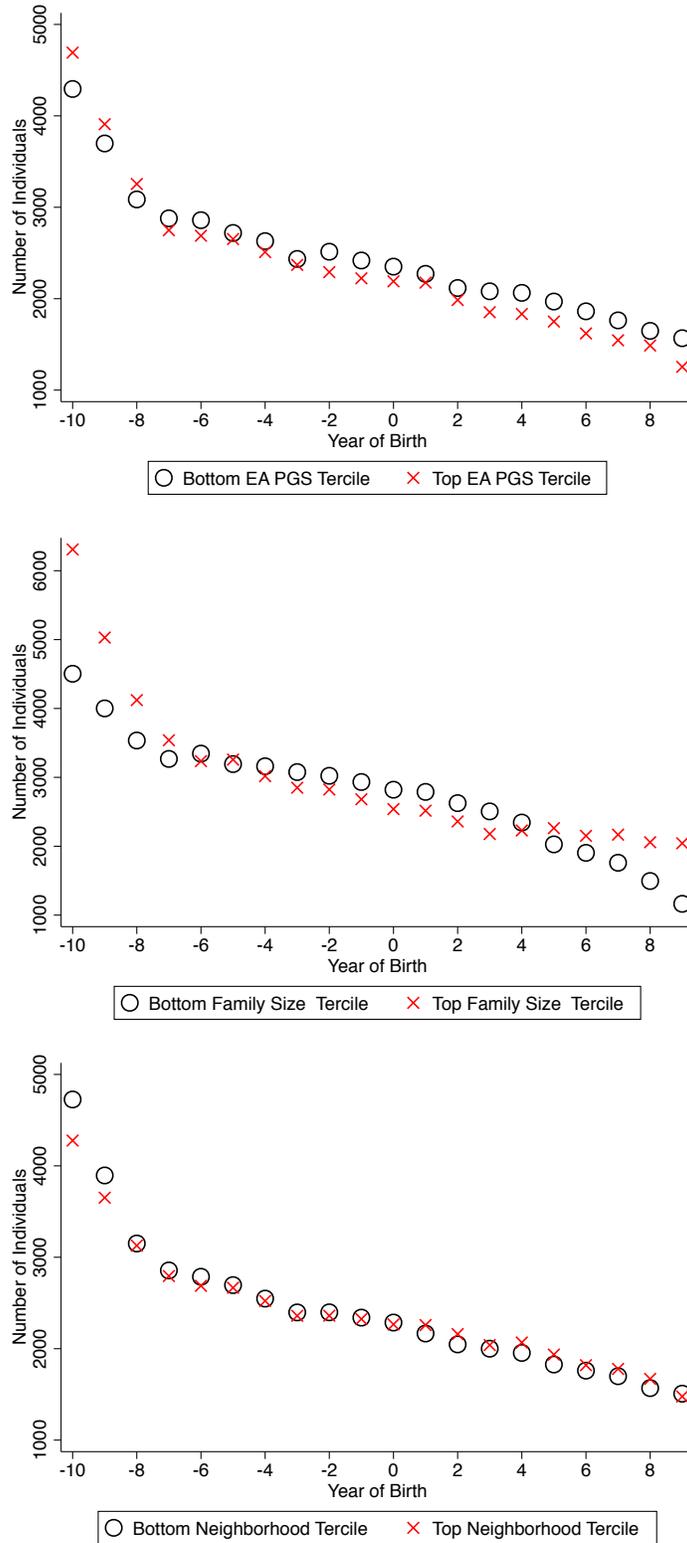
This Appendix conducts a McCrary Test and shows that predetermined variables and the proxies for early-life advantages are smooth around the September 1, 1957 threshold.

**Appendix Figure A1: McCrary Test**



*Notes:* The figure shows the number of study participants by year of birth. Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The estimated discontinuity of the density is -0.031 with a standard error of 0.023.  $N = 155,806$ .

**Appendix Figure A2: McCrary Test, by EA PGS, Family Size, and Neighborhood SES**



*Notes:* The figures show the number of study participants by year of birth, separately for those in the bottom tertile (black circles) and in the top tertile (red crosses) of the following distributions: EA PGS (top panel); family size (middle panel); and neighborhood SES (bottom panel). Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The estimated

discontinuity of the density is -0.013 [0.038] for the top tercile of the EA PGS and -0.028 [0.036] for the bottom tercile of the EA PGS – standard errors between brackets. For family size, the estimated discontinuity is -0.035 [0.034] for the bottom tercile and -0.052 [0.035] for the top tercile. Finally, for the neighborhood SES the estimated discontinuity is -0.002 [0.036] for the bottom tercile and -0.043 [0.036] for the top tercile.  $N = 96,263$  (EA PGS); 114,850 (family size); and 96,861 (neighborhood SES).

**Appendix Table A1: Balance Tests**

	EA PGS	Family	Neighborhood	Male	Country of Birth		
		Size	SES		England	Scotland	Wales
Post	0.004 [0.020]	0.010 [0.018]	-0.010 [0.019]	0.002 [0.009]	0.006 [0.007]	-0.004 [0.005]	-0.001 [0.004]
P-Value	0.833	0.574	0.599	0.801	0.371	0.365	0.752
Observations	105,693	112,395	109,177	114,025	114,025	114,025	114,025

	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10
Post	0.007 [0.011]	-0.005 [0.017]	0.014 [0.018]	-0.011 [0.017]	-0.019 [0.016]	0.031 [0.019]	0.002 [0.017]	0.026 [0.014]	-0.003 [0.019]	-0.017 [0.018]
P-Value	0.501	0.786	0.451	0.541	0.242	0.108	0.905	0.060	0.880	0.346
Observations	105,693	105,693	105,693	105,693	105,693	105,693	105,693	105,693	105,693	105,693

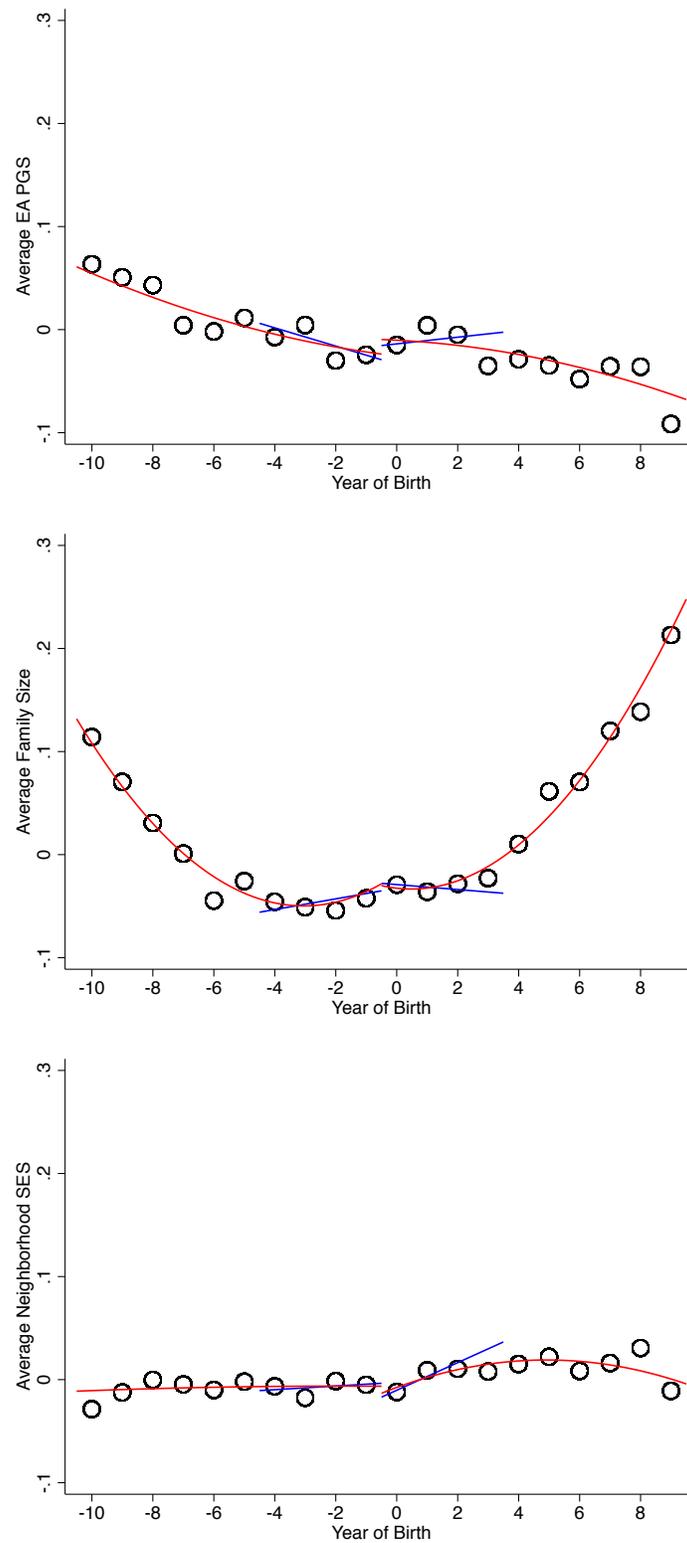
	PC11	PC12	PC13	PC14	PC15	PC16	PC17	PC18	PC19	PC20
Post	-0.021 [0.017]	0.003 [0.016]	0.021 [0.020]	-0.015 [0.020]	-0.023 [0.019]	-0.009 [0.019]	-0.022 [0.020]	0.010 [0.020]	-0.026 [0.020]	-0.038 [0.020]
P-Value	0.231	0.833	0.301	0.449	0.232	0.630	0.270	0.603	0.198	0.057
Observations	105,693	105,693	105,693	105,693	105,693	105,693	105,693	105,693	105,693	105,693

*Notes:* This table investigates whether predetermined characteristics are smooth around the September 1, 1957 cutoff. It reports the coefficient on an indicator for being born on or after September 1, 1957 (i.e., “Post”) from regressions where the dependent variable is listed in the column. The regressions include a quadratic polynomial in date of birth, which is allowed to be different before and after September 1, 1957. Bandwidth of 10 years. Robust standard errors between brackets. The pre-reform mean is 0.439 for male, 0.853 for England, 0.077 for Scotland, and 0.038 for Wales. All other variables were standardized. The p-value of a test of whether all variables shown in the columns can jointly predict the indicator for being born after September 1, 1957 (the regression includes the quadratic trends) is 0.0924.



*Notes:* This table investigates whether predetermined characteristics are smooth around the September 1, 1957 cutoff. It reports the coefficient on an indicator for being born on or after September 1, 1957 (i.e., “Post”) from regressions where the dependent variable is listed in the column. The regressions include a quadratic polynomial in date of birth, which is allowed to be different before and after September 1, 1957. Bandwidth of 10 years. Robust standard errors between brackets. The pre-reform mean is 0.439 for male, 0.853 for England, 0.077 for Scotland, and 0.038 for Wales. All other variables were standardized. The p-value corresponds to a test of whether the four independent variables shown can jointly predict the dependent variable.

**Appendix Figure A3: Average of Proxies by Year of Birth**



*Notes:* The top figure shows average (standardized) EA PGS by year of birth. The middle and bottom figures show average (standardized) family size and average (standardized) neighborhood SES by year of birth. Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear trends for a 4-year bandwidth (blue lines) and quadratic trends

for a 10-year bandwidth (red curves). We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 54,471$  (EA PGS 4-year bandwidth); 58,472 (family size 4-year bandwidth); 56,231 (neighborhood SES 4-year bandwidth); 143,924 (EA PGS 10-year bandwidth); 153,312 (family size 10-year bandwidth); and 148,674 (neighborhood SES 10-year bandwidth).

## APPENDIX B

This Appendix show estimates of homogeneous effects of the 1972 ROSLA (i.e., which are not allowed to vary with one of the proxies for early-life advantages).

Appendix Table B1 shows estimates presented in Figure 5 of the paper (with the exception of the last two columns).

**Appendix Table B1: Effect of the 1972 ROSLA on Education**

	<i>Fraction who Stayed in School until...</i>						School-Leaving	
	Age 16		Age 17		Age 18		Age (SLA)	
Post	0.247	0.246	0.031	0.044	0.016	0.029	0.307	0.329
	[0.007]	[0.006]	[0.010]	[0.009]	[0.008]	[0.007]	[0.020]	[0.019]
<i>Bandwidth</i>	<i>4 Yrs</i>	<i>10 Yrs</i>	<i>4 Yrs</i>	<i>10 Yrs</i>	<i>4 Yrs</i>	<i>10 Yrs</i>	<i>4 Yrs</i>	<i>10 Yrs</i>
Observations	46,308	114,025	46,308	114,025	46,308	114,025	46,308	114,025

Notes: Post is an indicator for being born on or after September 1, 1957. The odd-column regressions include linear trends in exact date of birth while the even-column regressions include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets.

**Appendix Table B2: School-Leaving Age and Wages**

	<i>OLS</i>		<i>Reduced-Form</i>		<i>2SLS</i>	
	Log Wages		Log Wages		Log Wages	
SLA	0.059	0.060			0.051	0.049
	[0.002]	[0.001]			[0.023]	[0.020]
Post			0.016	0.016		
			[0.007]	[0.007]		
<i>Bandwidth</i>	<i>4 Yrs</i>	<i>10 Yrs</i>	<i>4 Yrs</i>	<i>10 Yrs</i>	<i>4 Yrs</i>	<i>10 Yrs</i>
Observations	46,308	114,025	46,308	114,025	46,308	114,025

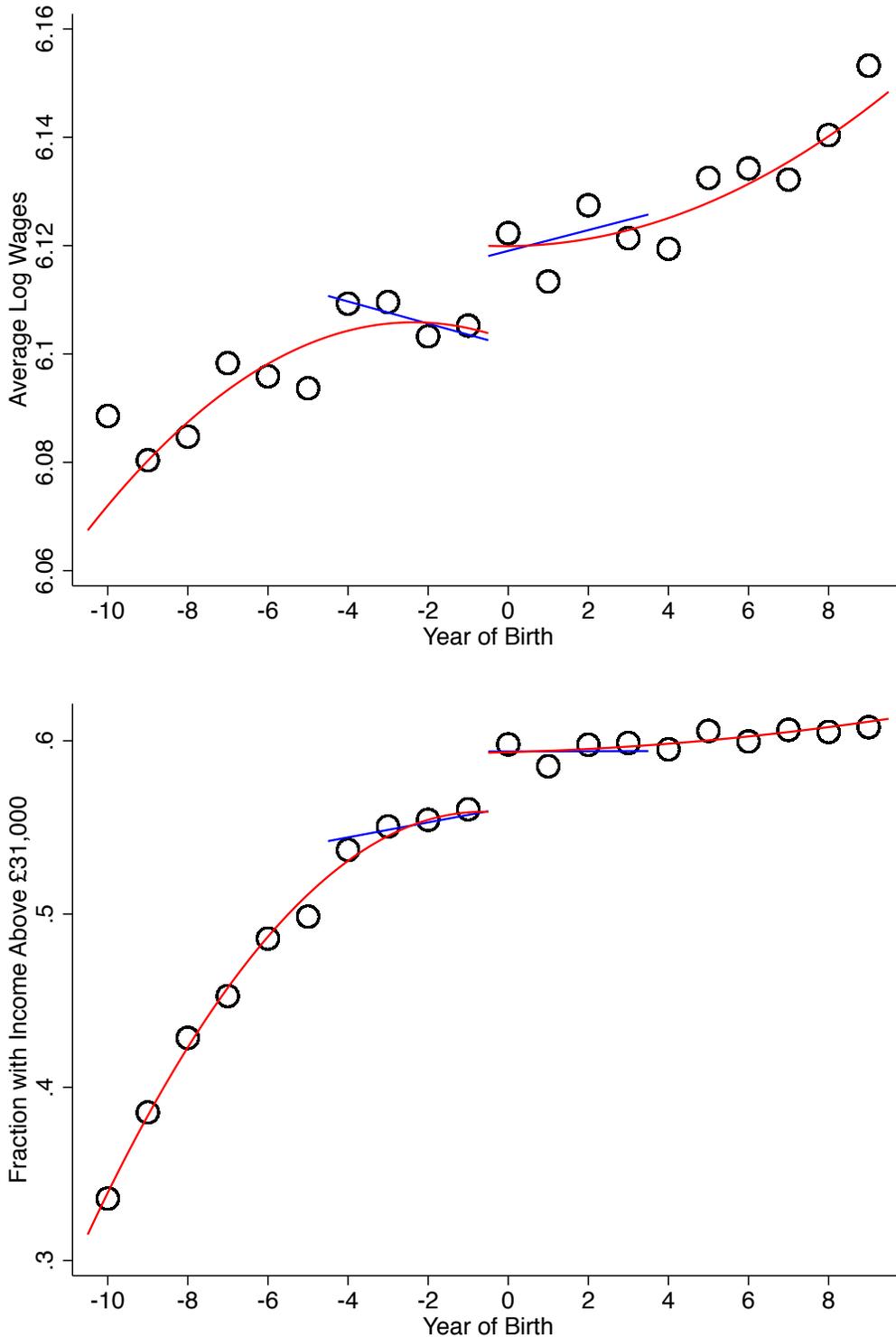
*Notes:* The dependent variable is log wages. SLA (“school-leaving age”) is the age at which the participant left school. Post is an indicator for being born on or after September 1, 1957. The odd-column regressions include linear cohort trends in exact date of birth while the even-column regressions include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets.

**Appendix Table B3: OLS Estimates of Returns to Staying in School until 16, 17, and 18**

	<i>OLS</i>	
	Log Wages	
Stayed in School until Age 16	0.110	0.111
	[0.006]	[0.004]
Stayed in School until Age 17	0.043	0.041
	[0.008]	[0.005]
Stayed in School until Age 18	0.054	0.062
	[0.009]	[0.006]
Constant	6.002	6.000
	[0.006]	[0.005]
<i>Bandwidth</i>	<i>4 Yrs</i>	<i>10 Yrs</i>
Observations	23,860	64,126

*Notes:* This table shows OLS estimates of the returns to staying in school until ages 16, 17, and 18. The dependent variable is log wages. If a student stayed in school until age A, then the dummies for ages smaller than A are all “switched on.” The odd-column regression includes linear cohort trends in exact date of birth while the even-column regression includes quadratic trends (not shown in the table). The sample is restricted to those born before September 1, 1957. Robust standard errors between brackets.

**Appendix Figure B1: Effect of the 1972 ROSLA on Wages and on Household Income**

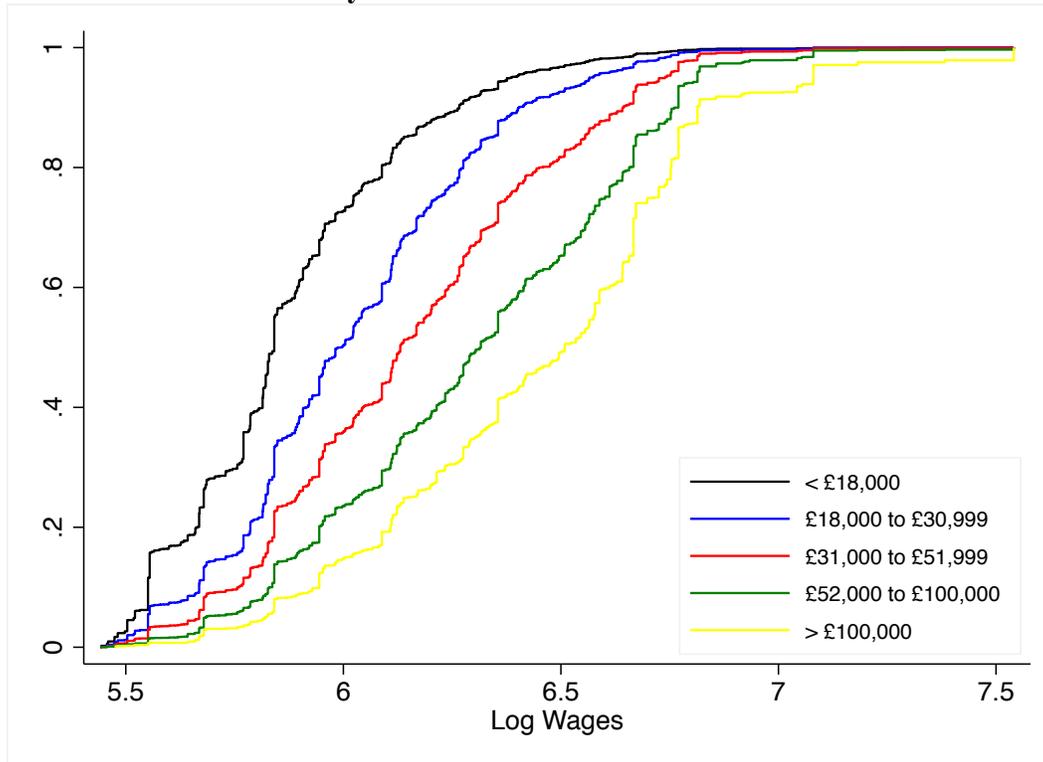


*Notes:* The top panel shows average log wages by year of birth. The bottom panel shows fraction with an annual household income of £31,000 or more by year of birth. Year of birth runs from September 1 of a given year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear trends for a 4-year bandwidth (blue lines) and quadratic trends for a 10-year bandwidth (red curves). We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 46,308$  (wages with 4-year bandwidth); 114,025 (wages with 10-year bandwidth); 51,499 (income with 4-year bandwidth); and 133,086 (income with 10-year bandwidth).

## APPENDIX C

This Appendix shows the relationship between annual household income and occupational wages.

**Appendix Figure C1: Cumulative Distribution Function of Log Wages by Annual Household Income**

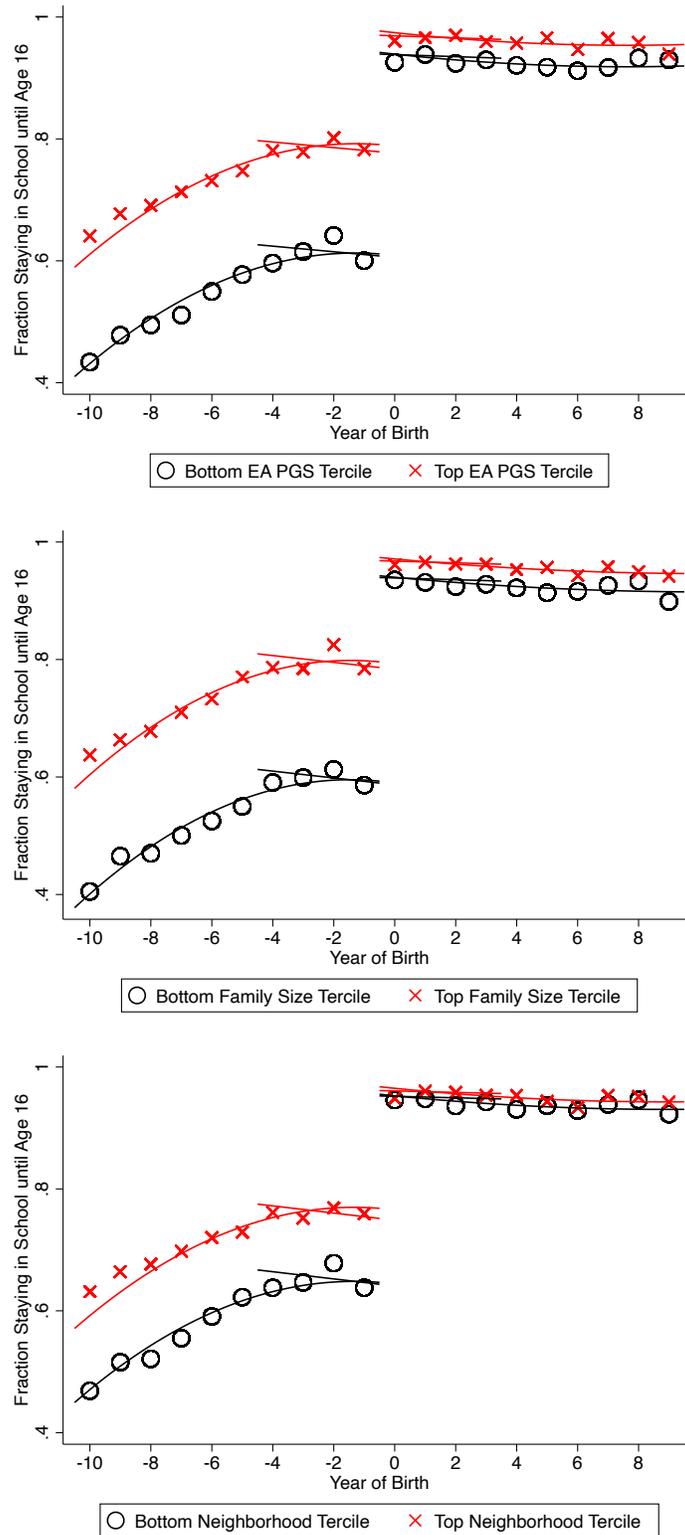


*Notes:* The figure shows the cumulative distribution of log wages for each one of the five brackets of annual household income.  $N = 100,201$ , which correspond to the number of the individuals in our sample who had information on both wages and household income.

## **APPENDIX D**

This Appendix shows estimates of the effects of the 1972 ROSLA on the fractions of students who stayed in school until ages 16, 17, and 18, separately by EA PGI, family size, and neighborhood SES. Appendix Table D4 shows estimates corresponding to Figure 7 in the paper.

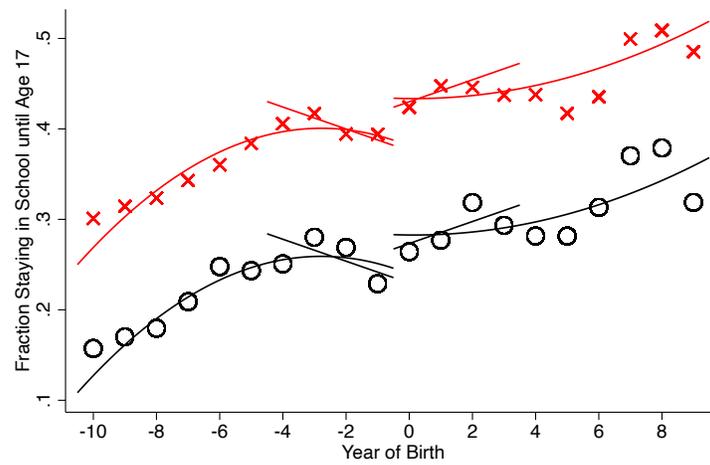
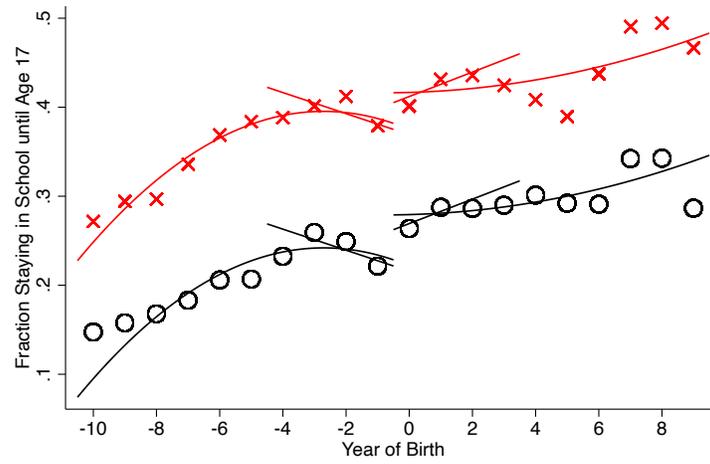
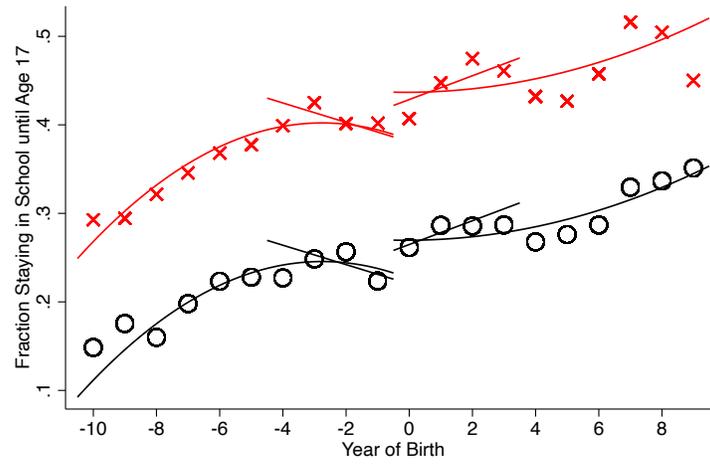
**Appendix Figure D1: Effect of 1972 ROSLA on Fraction Staying in School until Age 16, by EA PGI, Family Size, and Neighborhood SES**



*Notes:* The figures show the fraction who stayed in school until age 16 by year of birth, separately for those in the bottom tercile (black circles) and in the top tercile (red crosses) of the following distributions: EA PGI (top panel); family size (middle panel); and neighborhood SES (bottom

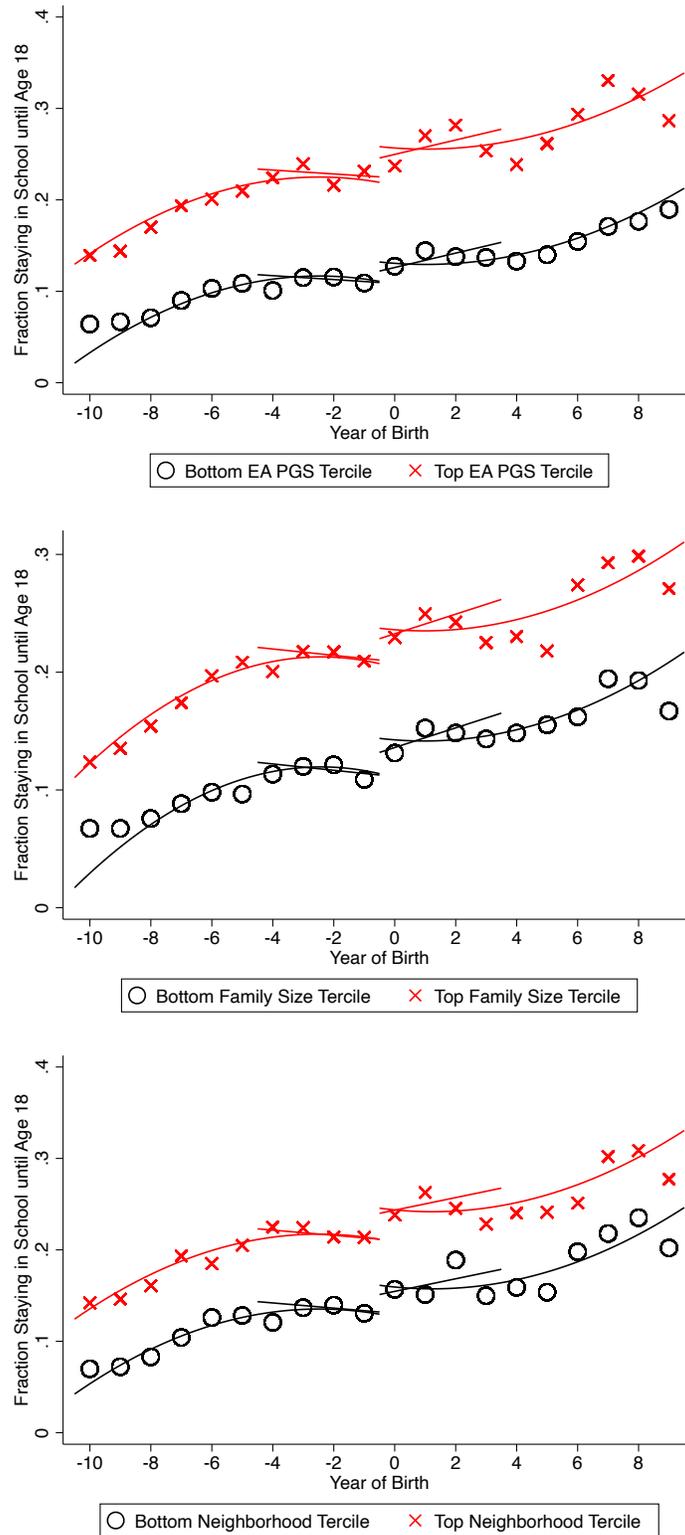
panel). Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear cohort trends for a 4-year bandwidth and quadratic cohort trends for a 10-year bandwidth. For a given proxy, all three terciles share the same cohort trends. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 42,731$  (EA PGI with 4-year bandwidth); 105,693 (EA PGI with 10-year bandwidth); 45,701 (family size with 4-year bandwidth); 112,395 (family size with 10-year bandwidth); 44,043 (neighborhood SES with 4-year bandwidth); and 109,177 (neighborhood SES with 10-year bandwidth).

**Appendix Figure D2: Effect of 1972 ROSLA on Fraction Staying in School until Age 17, by EA PGI, Family Size, and Neighborhood SES**



*Notes:* The figures show the fraction who stayed in school until age 17 by year of birth, separately for those in the bottom tercile (black circles) and in the top tercile (red crosses) of the following distributions: EA PGI (top panel); family size (middle panel); and neighborhood SES (bottom panel). Year of birth runs from September 1 of a given year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear cohort trends for a 4-year bandwidth and quadratic cohort trends for a 10-year bandwidth. For a given proxy, all three terciles share the same cohort trends. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 42,731$  (EA PGI with 4-year bandwidth); 105,693 (EA PGI with 10-year bandwidth); 45,701 (family size with 4-year bandwidth); 112,395 (family size with 10-year bandwidth); 44,043 (neighborhood SES with 4-year bandwidth); and 109,177 (neighborhood SES with 10-year bandwidth).

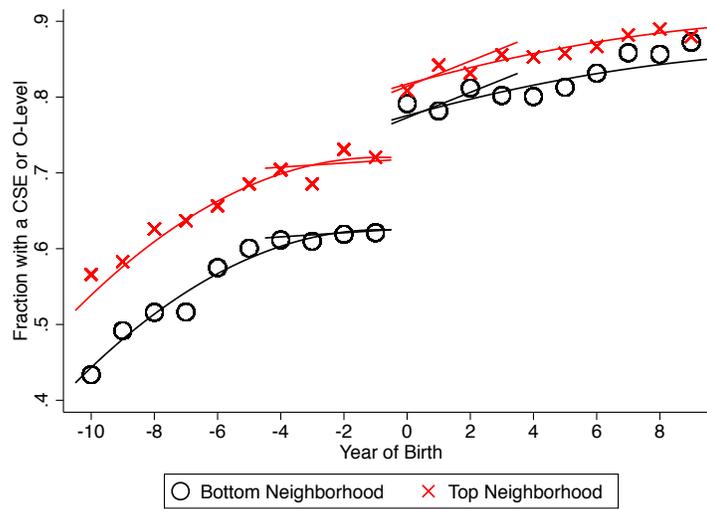
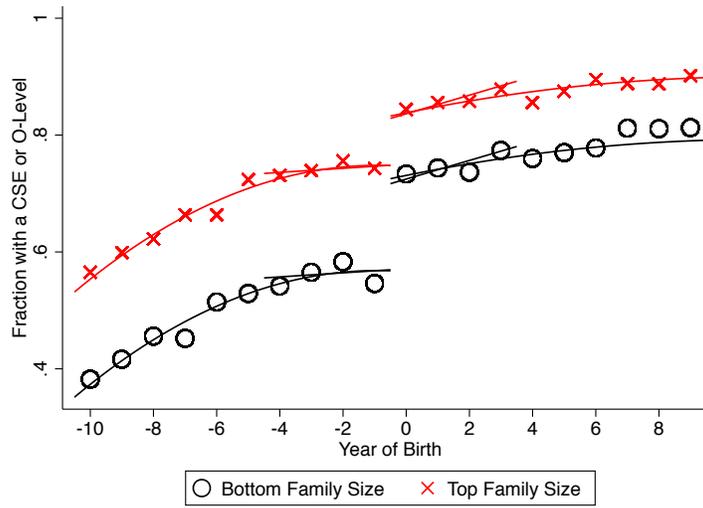
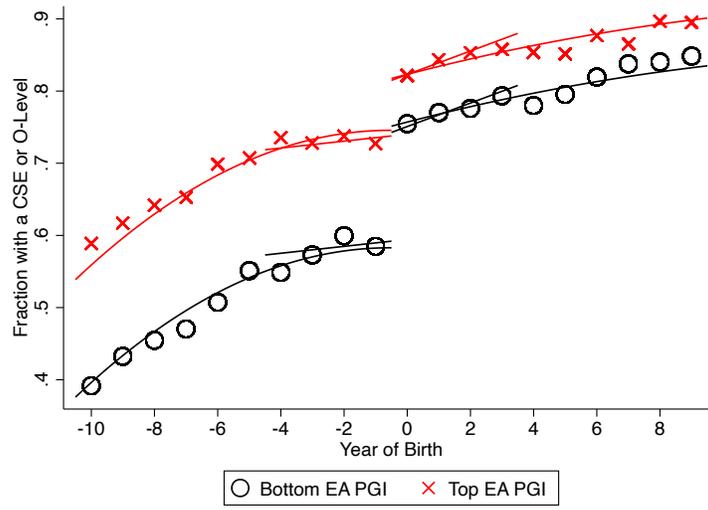
**Appendix Figure D3: Effect of 1972 ROSLA on Fraction Staying in School until Age 18, by EA PGI, Family Size, and Neighborhood SES**



*Notes:* The figures show the fraction who stayed in school until age 18 by year of birth, separately for those in the bottom tertile (black circles) and in the top tertile (red crosses) of the following distributions: EA PGI (top panel); family size (middle panel); and neighborhood SES (bottom

panel). Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear cohort trends for a 4-year bandwidth and quadratic cohort trends for a 10-year bandwidth. For a given proxy, all three terciles share the same cohort trends. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 42,731$  (EA PGI with 4-year bandwidth); 105,693 (EA PGI with 10-year bandwidth); 45,701 (family size with 4-year bandwidth); 112,395 (family size with 10-year bandwidth); 44,043 (neighborhood SES with 4-year bandwidth); and 109,177 (neighborhood SES with 10-year bandwidth).

**Appendix Figure D4: Effect of the 1972 ROSLA on Qualifications, by EA PGI, Family Size, and Neighborhood SES**



*Notes:* The figures show the fraction of study participants with some qualification by year of birth, separately for those in the bottom tercile (black circles) and in the top tercile (red crosses) of the following distributions: EA PGI (top panel); family size (middle panel); and neighborhood SES (bottom panel). Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born after Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear cohort trends for a 4-year bandwidth and quadratic cohort trends for a 10-year bandwidth. For a given proxy, all three terciles share the same cohort trends. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 42,701$  (EA PGI with 4-year bandwidth); 105,608 (EA PGI with 10-year bandwidth); 45,131 (family size with 4-year bandwidth); 110,909 (family size with 10-year bandwidth); 43,548 (neighborhood SES with 4-year bandwidth); and 107,842 (neighborhood SES with 10-year bandwidth).

**Appendix Table D1: Effect of the 1972 ROSLA on Staying in School Until Age 16,  
by EA PGS, Family Size, and Neighborhood SES**

		1 if Stayed in School until Age 16							
<b>Top Panel: Discrete</b>		<i>4-Year Bandwidth</i>				<i>10-Year Bandwidth</i>			
Top PGI * Post	-0.130 [0.009]			-0.123 [0.009]			-0.135 [0.006]		-0.125 [0.006]
Top Family * Post		-0.161 [0.008]		-0.160 [0.008]			-0.163 [0.005]		-0.160 [0.005]
Top Neighborhood * Post			-0.096 [0.009]	-0.085 [0.009]				-0.107 [0.006]	-0.094 [0.006]
Mid PGI * Post	-0.073 [0.010]			-0.069 [0.010]			-0.071 [0.006]		-0.066 [0.006]
Mid Family * Post		-0.110 [0.010]		-0.107 [0.010]			-0.114 [0.006]		-0.109 [0.006]
Mid Neighborhood * Post			-0.033 [0.010]	-0.035 [0.009]				-0.034 [0.006]	-0.034 [0.006]
Post	0.314 [0.009]	0.335 [0.009]	0.293 [0.009]	0.440 [0.012]	0.315 [0.008]	0.335 [0.007]	0.295 [0.007]	0.443 [0.009]	
<b>Bottom Panel: Continuous</b>									
PGI * Post	-0.057 [0.004]			-0.053 [0.004]			-0.059 [0.002]		-0.055 [0.002]
Family * Post		-0.074 [0.004]		-0.073 [0.004]			-0.077 [0.003]		-0.075 [0.003]
Neighborhood * Post			-0.043 [0.004]	-0.036 [0.004]				-0.048 [0.002]	-0.041 [0.002]
Post	0.248 [0.007]	0.247 [0.007]	0.250 [0.007]	0.251 [0.007]	0.247 [0.006]	0.246 [0.006]	0.249 [0.006]	0.251 [0.006]	
Observations	46,308	46,308	46,308	46,308	114,025	114,025	114,025	114,025	

*Notes:* The dependent variable is an indicator for staying in school until age 16. PGS is the polygenic score for educational attainment. Post is an indicator for being born on or after September 1, 1957. In the top panel, Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. In the bottom panel, PGS, Family, and Neighborhood are all standardized to have mean zero and standard deviation of 1. The first four columns include linear trends in exact date of birth while the last four include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. In the top panel, we omit the coefficients on Top PGS, Top Family, Top Neighborhood, Mid PGS, Mid Family, and Mid Neighborhood. In the bottom panel, we omit the coefficients on PGS, Family, and Neighborhood.

**Appendix Table D2: Effect of the 1972 ROSLA on Staying in School Until Age 17,  
by EA PGS, Family Size, and Neighborhood SES**

		<b>1 if Stayed in School until Age 17</b>							
<b>Top Panel: Discrete</b>		<i>4-Year Bandwidth</i>				<i>10-Year Bandwidth</i>			
Top PGI * Post	0.004 [0.013]			0.004 [0.013]		0.009 [0.008]			0.011 [0.008]
Top Family * Post		-0.023 [0.012]		-0.023 [0.012]			-0.021 [0.008]		-0.018 [0.007]
Top Neighborhood * Post			0.006 [0.013]	0.008 [0.013]				0.004 [0.008]	0.004 [0.008]
Mid PGI * Post	0.000 [0.012]			0.001 [0.012]		0.004 [0.008]			0.005 [0.008]
Mid Family * Post		-0.036 [0.013]		-0.037 [0.013]			-0.025 [0.008]		-0.023 [0.008]
Mid Neighborhood * Post			0.003 [0.012]	0.001 [0.012]				0.009 [0.008]	0.007 [0.008]
Post	0.029 [0.012]	0.049 [0.011]	0.029 [0.012]	0.046 [0.014]	0.038 [0.010]	0.058 [0.010]	0.040 [0.010]	0.047 [0.011]	
<b>Bottom Panel: Continuous</b>									
PGI * Post	0.008 [0.005]			0.007 [0.005]		0.007 [0.003]			0.007 [0.003]
Family * Post		-0.006 [0.005]		-0.006 [0.005]			-0.003 [0.003]		-0.002 [0.003]
Neighborhood * Post			0.002 [0.005]	0.002 [0.005]				0.001 [0.003]	-0.000 [0.003]
Post	0.031 [0.010]	0.031 [0.009]	0.032 [0.009]	0.031 [0.009]	0.043 [0.009]	0.043 [0.009]	0.044 [0.009]	0.043 [0.009]	
Observations	46,308	46,308	46,308	46,308	114,025	114,025	114,025	114,025	

*Notes:* The dependent variable is an indicator for staying in school until age 17. PGS is the polygenic score for educational attainment. Post is an indicator for being born on or after September 1, 1957. In the top panel, Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. In the bottom panel, PGS, Family, and Neighborhood are all standardized to have mean zero and standard deviation of 1. The first four columns include linear trends in exact date of birth while the last four include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. In the top panel, we omit the coefficients on Top PGS, Top Family, Top Neighborhood, Mid PGS, Mid Family, and Mid Neighborhood. In the bottom panel, we omit the coefficients on PGS, Family, and Neighborhood.

**Appendix Table D3: Effect of the 1972 ROSLA on Staying in School Until Age 18,  
by EA PGS, Family Size, and Neighborhood SES**

		<b>1 if Stayed in School until Age 18</b>							
<b>Top Panel: Discrete</b>		<i>4-Year Bandwidth</i>				<i>10-Year Bandwidth</i>			
Top PGI * Post	0.014 [0.011]			0.014 [0.010]		0.018 [0.007]			0.020 [0.007]
Top Family * Post		-0.006 [0.010]		-0.006 [0.010]			-0.003 [0.006]		-0.001 [0.006]
Top Neighborhood * Post			0.003 [0.011]	0.003 [0.011]				-0.003 [0.007]	-0.005 [0.007]
Mid PGI * Post	0.018 [0.010]			0.019 [0.010]		0.013 [0.006]			0.014 [0.006]
Mid Family * Post		-0.003 [0.010]		-0.004 [0.010]			-0.003 [0.007]		-0.002 [0.007]
Mid Neighborhood * Post			-0.001 [0.010]	-0.002 [0.010]				-0.002 [0.006]	-0.004 [0.006]
Post	0.005 [0.009]	0.019 [0.009]	0.016 [0.009]	0.009 [0.011]		0.017 [0.008]	0.031 [0.008]	0.031 [0.008]	0.020 [0.009]
<b>Bottom Panel: Continuous</b>									
PGI * Post	0.008 [0.004]			0.007 [0.004]		0.008 [0.003]			0.008 [0.003]
Family * Post		-0.003 [0.004]		-0.004 [0.004]			0.001 [0.003]		0.002 [0.003]
Neighborhood * Post			0.003 [0.005]	0.002 [0.005]				-0.000 [0.003]	-0.001 [0.003]
Post	0.016 [0.008]	0.015 [0.008]	0.017 [0.008]	0.016 [0.008]		0.027 [0.007]	0.028 [0.007]	0.029 [0.007]	0.027 [0.007]
Observations	46,308	46,308	46,308	46,308		114,025	114,025	114,025	114,025

*Notes:* The dependent variable is an indicator for staying in school until age 18. PGS is the polygenic score for educational attainment. Post is an indicator for being born on or after September 1, 1957. In the top panel, Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. In the bottom panel, PGS, Family, and Neighborhood are all standardized to have mean zero and standard deviation of 1. The first four columns include linear trends in exact date of birth while the last four include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. In the top panel, we omit the coefficients on Top PGS, Top Family, Top Neighborhood, Mid PGS, Mid Family, and Mid Neighborhood. In the bottom panel, we omit the coefficients on PGS, Family, and Neighborhood.

**Appendix Table D4: Effect of the 1972 ROSLA on Having a CSE or O-Level,  
by EA PGS, Family Size, and Neighborhood SES**

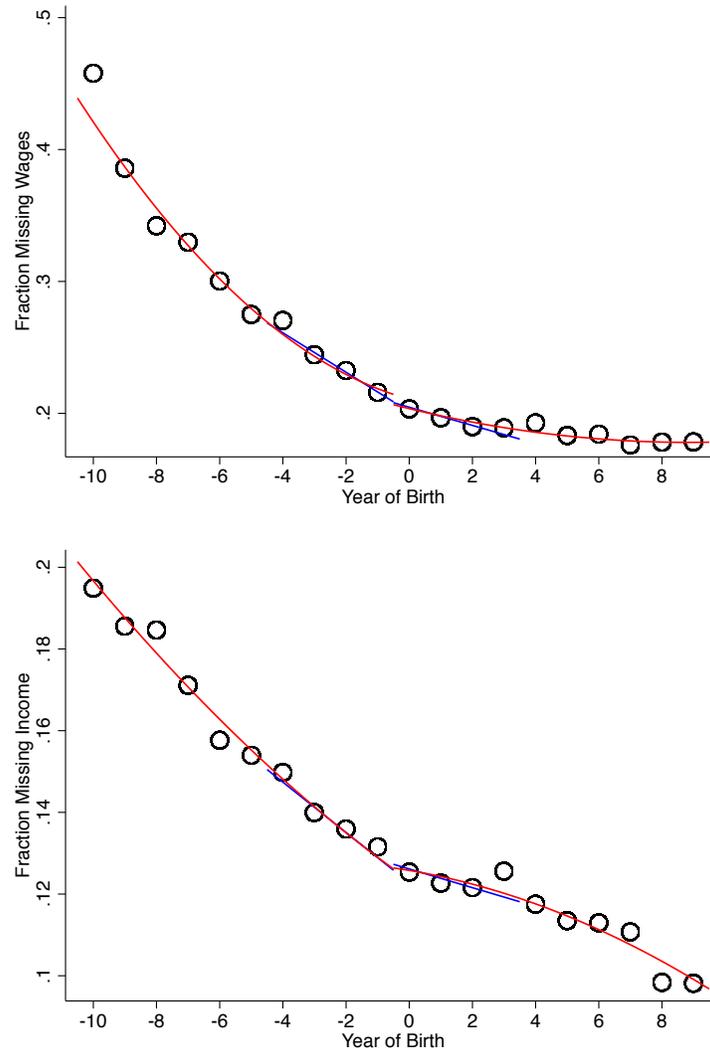
		1 if Have CSE or O-Level							
<b>Top Panel: Discrete</b>		<i>4-Year Bandwidth</i>				<i>10-Year Bandwidth</i>			
Top PGS * Post	-0.074 [0.012]			-0.071 [0.012]		-0.097 [0.008]			-0.092 [0.007]
Top Family * Post		-0.067 [0.011]		-0.067 [0.011]		-0.073 [0.007]			-0.071 [0.007]
Top Neighborhood * Post			-0.051 [0.012]	-0.045 [0.012]				-0.054 [0.007]	-0.046 [0.007]
Mid PGS * Post	-0.041 [0.012]			-0.039 [0.012]		-0.050 [0.008]			-0.047 [0.008]
Mid Family * Post		-0.035 [0.012]		-0.035 [0.012]		-0.039 [0.008]			-0.036 [0.008]
Mid Neighborhood * Post			-0.026 [0.012]	-0.026 [0.012]				-0.020 [0.008]	-0.019 [0.008]
Post	0.151 [0.012]	0.146 [0.011]	0.139 [0.012]	0.209 [0.015]	0.170 [0.010]	0.157 [0.009]	0.146 [0.010]	0.227 [0.011]	
<b>Bottom Panel: Continuous</b>									
PGS * Post	-0.031 [0.005]			-0.029 [0.005]		-0.041 [0.003]			-0.038 [0.003]
Family * Post		-0.027 [0.005]		-0.027 [0.005]		-0.028 [0.003]			-0.027 [0.003]
Neighborhood * Post			-0.023 [0.005]	-0.020 [0.005]				-0.026 [0.003]	-0.022 [0.003]
Post	0.114 [0.009]	0.111 [0.009]	0.114 [0.009]	0.115 [0.009]	0.122 [0.008]	0.119 [0.008]	0.121 [0.008]	0.123 [0.008]	
Observations	45,727	45,727	45,727	45,727	112,510	112,510	112,510	112,510	

*Notes:* The dependent variable is an indicator for having a CSE or O-Level qualification. PGS is the polygenic score for educational attainment. Post is an indicator for being born on or after September 1, 1957. In the top panel, Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. In the bottom panel, PGS, Family, and Neighborhood are all standardized to have mean zero and standard deviation of 1. The first four columns include linear trends in exact date of birth while the last four include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. In the top panel, we omit the coefficients on Top PGS, Top Family, Top Neighborhood, Mid PGS, Mid Family, and Mid Neighborhood. In the bottom panel, we omit the coefficients on PGS, Family, and Neighborhood.

## APPENDIX E

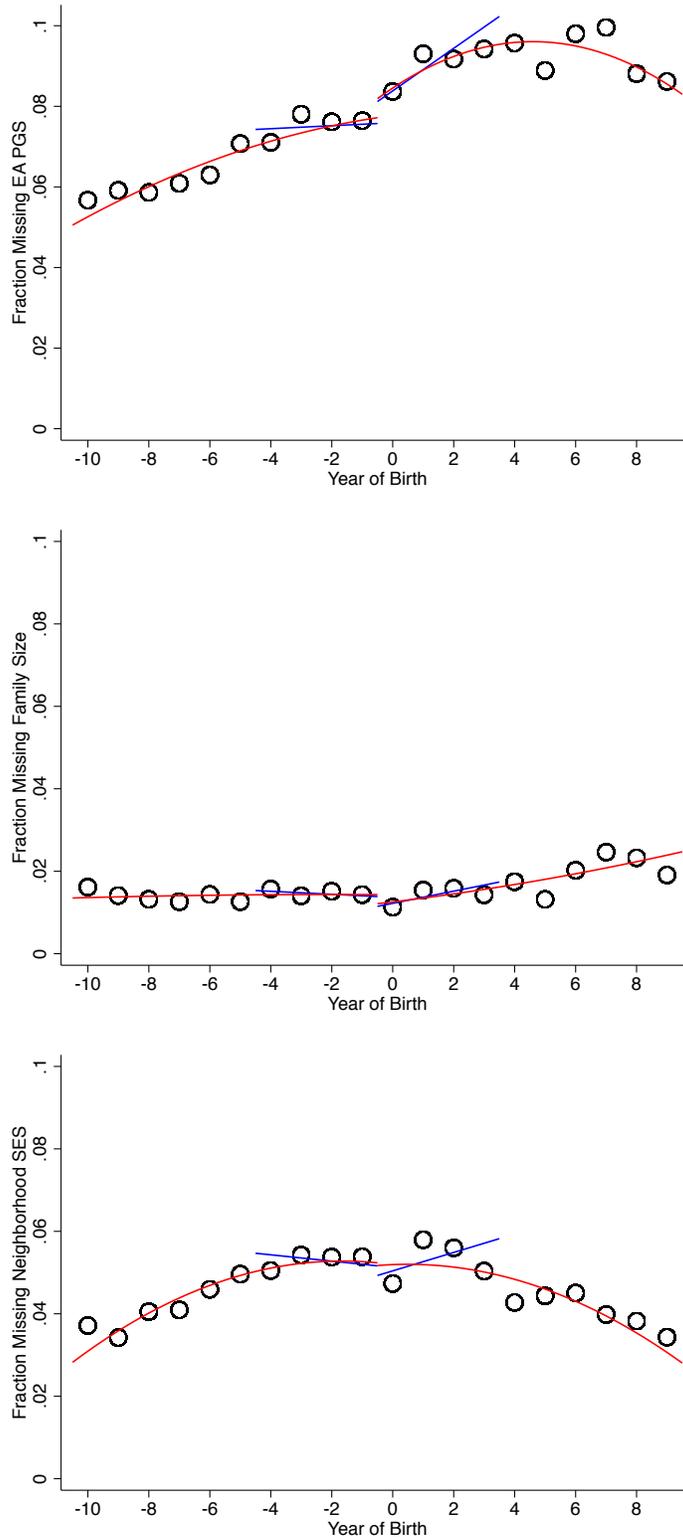
This Appendix shows that the fractions of study participants missing one of the proxies, missing wages, or missing income are all smooth around the September 1, 1957 cutoff of the 1972 ROSLA.

**Appendix Figure E1: Fraction Missing Wages and Income by Year of Birth**



*Notes:* The top figure shows fraction of participants for whom data on wages was not available by year of birth. The bottom figure shows fraction of participants for whom data on income was missing. Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear trends for a 4-year bandwidth (blue lines) and quadratic trends for a 10-year bandwidth (red curves). We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 59,329$  (4-year bandwidth) and 155,716 (10-year bandwidth).

**Appendix Figure E2: Fraction Missing Proxies by Year of Birth**



*Notes:* The figures show fraction of participants for whom data on proxies was not available by year of birth. Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear trends for a 4-year

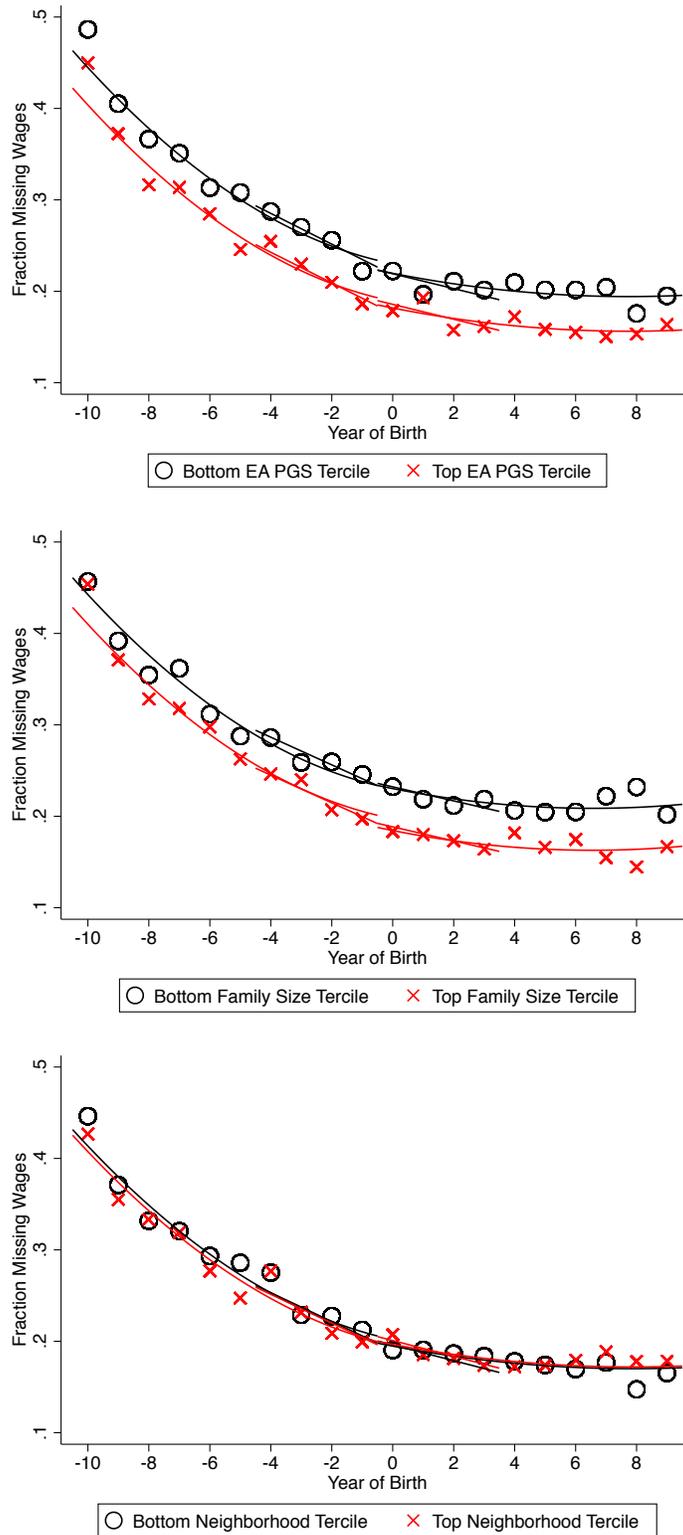
bandwidth (blue lines) and quadratic trends for a 10-year bandwidth (red curves). We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 59,329$  (4-year bandwidth) and 155,716 (10-year bandwidth).

**Appendix Table E1: Missing Wages, Income, EA PGS, Family Size, and Neighborhood SES**

	1 if Missing Wages		1 if Missing Income		1 if Missing EA PGS		1 if Missing Family Size		1 if Missing Neighborhood SES	
Post	-0.000	-0.008	0.004	0.000	0.004	0.005	-0.003	-0.002	-0.003	-0.001
	[0.011]	[0.007]	[0.009]	[0.006]	[0.007]	[0.004]	[0.003]	[0.002]	[0.006]	[0.004]
<i>Bandwidth</i>	<i>4 Yrs</i>	<i>10 Yrs</i>	<i>4 Yrs</i>	<i>10 Yrs</i>	<i>4 Yrs</i>	<i>10 Yrs</i>	<i>4 Yrs</i>	<i>10 Yrs</i>	<i>4 Yrs</i>	<i>10 Yrs</i>
Mean of Y	0.229	0.270	0.134	0.150	0.075	0.070	0.014	0.014	0.053	0.049
Observations	59,329	155,716	59,329	155,716	59,329	155,716	59,329	155,716	59,329	155,716

*Notes:* This table assesses whether there is a discontinuous change in missings at the threshold. Post is an indicator for being born on or after September 1, 1957. The odd-column regressions include linear cohort trends in exact date of birth while the even-column regressions include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets.

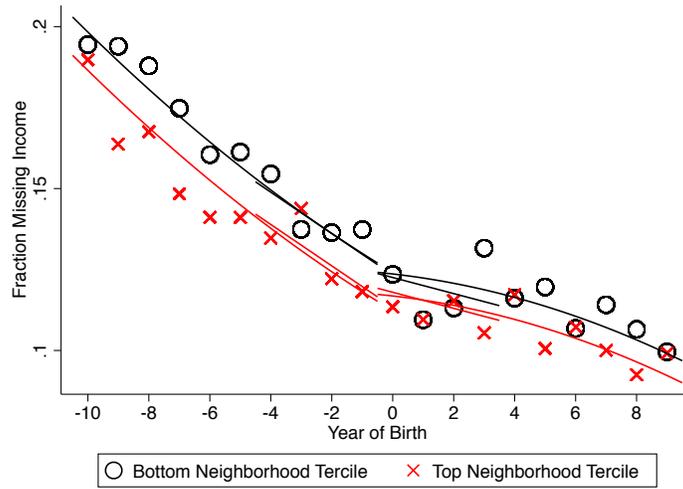
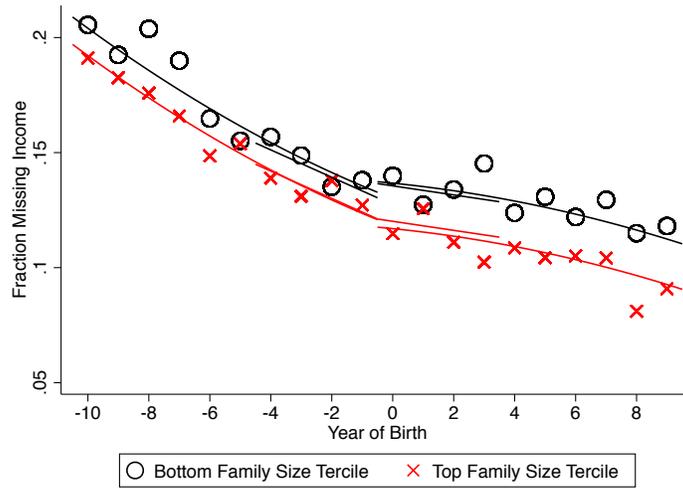
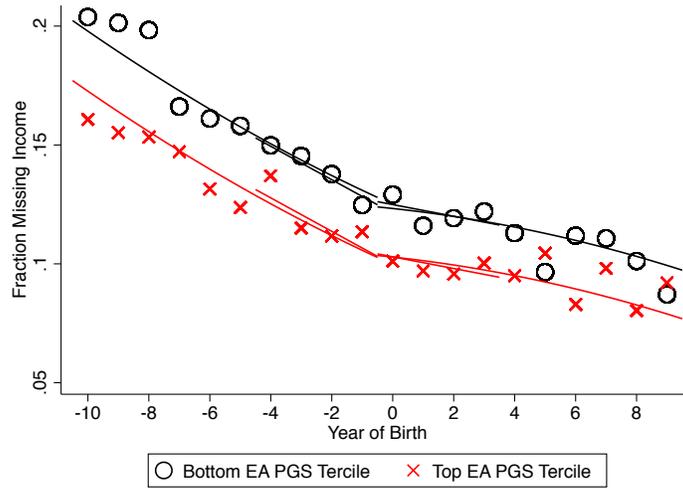
**Appendix Figure E3: Fraction Missing Wages, By EA PGS, Family Size, and Neighborhood SES**



*Notes:* The figures show fraction missing wages by year of birth, separately for those in the bottom tertile (black circles) and in the top tertile (red crosses) of the following distributions: EA PGS (top panel); family size (middle panel); and neighborhood SES (bottom panel). Year of birth runs

from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear cohort trends for a 4-year bandwidth and quadratic cohort trends for a 10-year bandwidth. For a given proxy, all three terciles share the same cohort trends. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 54,471$  (EA PGS with 4-year bandwidth); 143,924 (EA PGS with 10-year bandwidth); 58,472 (family size with 4-year bandwidth); 153,312 (family size with 10-year bandwidth); 56,231 (neighborhood SES with 4-year bandwidth); and 148,674 (neighborhood SES with 10-year bandwidth).

**Appendix Figure E4: Fraction Missing Income, By EA PGS, Family Size, and Neighborhood SES**



*Notes:* The figures show fraction missing income by year of birth, separately for those in the bottom tercile (black circles) and in the top tercile (red crosses) of the following distributions: EA PGS (top panel); family size (middle panel); and neighborhood SES (bottom panel). Year of birth runs from September 1 of a given year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear cohort trends for a 4-year bandwidth and quadratic cohort trends for a 10-year bandwidth. For a given proxy, all three terciles share the same cohort trends. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 54,471$  (EA PGS with 4-year bandwidth); 143,924 (EA PGS with 10-year bandwidth); 58,472 (family size with 4-year bandwidth); 153,312 (family size with 10-year bandwidth); 56,231 (neighborhood SES with 4-year bandwidth); and 148,674 (neighborhood SES with 10-year bandwidth).

**Appendix Table E2: Missing Wages,  
By EA PGS, Family Size, and Neighborhood SES**

<b>Top Panel: Discrete</b>	<b>1 if Missing Wages</b>							
	<i>4-Year Bandwidth</i>				<i>10-Year Bandwidth</i>			
Top PGS * Post	0.009			0.009	0.003			0.003
	[0.010]			[0.010]	[0.006]			[0.006]
Top Family * Post		-0.002		-0.001		-0.013		-0.012
		[0.009]		[0.009]		[0.006]		[0.006]
Top Neighborhood * Post			0.006	0.006			0.008	0.008
			[0.010]	[0.010]			[0.006]	[0.006]
Mid PGS * Post	0.003			0.003	0.003			0.003
	[0.010]			[0.010]	[0.006]			[0.006]
Mid Family * Post		-0.006		-0.005		-0.010		-0.009
		[0.010]		[0.010]		[0.006]		[0.006]
Mid Neighborhood * Post			-0.008	-0.009			-0.005	-0.006
			[0.010]	[0.010]			[0.006]	[0.006]
Post	-0.007	0.001	-0.001	-0.004	-0.012	-0.001	-0.010	-0.007
	[0.009]	[0.009]	[0.009]	[0.012]	[0.008]	[0.008]	[0.008]	[0.009]
<b>Bottom Panel: Continuous</b>								
PGS * Post	0.005			0.005	0.003			0.003
	[0.004]			[0.004]	[0.003]			[0.003]
Family * Post		-0.009		-0.008		-0.011		-0.010
		[0.004]		[0.004]		[0.003]		[0.003]
Neighborhood * Post			0.003	0.003			0.006	0.007
			[0.004]	[0.004]			[0.003]	[0.003]
Post	-0.003	-0.001	-0.001	-0.003	-0.010	-0.009	-0.009	-0.011
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
Observations	59,329	59,329	59,329	59,329	155,716	155,716	155,716	155,716

*Notes:* The dependent variable is an indicator for missing wages. PGS is the polygenic score for educational attainment. Post is an indicator for being born on or after September 1, 1957. In the top panel, Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. In the bottom panel, PGS, Family, and Neighborhood are all standardized to have mean zero and standard deviation of 1. The first four columns include linear trends in exact date of birth while the last four include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. In the top panel, we omit the coefficients on Top PGS, Top Family, Top Neighborhood, Mid PGS, Mid Family, and Mid Neighborhood. In the bottom panel, we omit the coefficients on PGS, Family, and Neighborhood.

**Appendix Table E3: Missing Income,  
By EA PGS, Family Size, and Neighborhood SES**

		1 if Missing Income							
<b>Top Panel: Discrete</b>		<i>4-Year Bandwidth</i>				<i>10-Year Bandwidth</i>			
Top PGS * Post	-0.000 [0.008]			-0.000 [0.008]		0.005 [0.005]			0.004 [0.005]
Top Family * Post		-0.006 [0.007]		-0.005 [0.007]			-0.008 [0.005]		-0.006 [0.005]
Top Neighborhood * Post			0.005 [0.008]	0.006 [0.008]				0.005 [0.005]	0.006 [0.005]
Mid PGS * Post	-0.000 [0.008]			-0.000 [0.008]		0.005 [0.005]			0.005 [0.005]
Mid Family * Post		-0.013 [0.008]		-0.012 [0.008]			-0.007 [0.005]		-0.005 [0.005]
Mid Neighborhood * Post			0.007 [0.008]	0.008 [0.008]				0.003 [0.005]	0.004 [0.005]
Post	0.001 [0.008]	0.007 [0.007]	-0.003 [0.008]	0.001 [0.010]	-0.002 [0.006]	0.005 [0.006]	-0.003 [0.006]	-0.002 [0.006]	-0.002 [0.007]
<b>Bottom Panel: Continuous</b>									
PGS * Post	-0.001 [0.003]			-0.001 [0.003]		0.001 [0.002]			0.001 [0.002]
Family * Post		-0.006 [0.003]		-0.005 [0.003]			-0.005 [0.002]		-0.004 [0.002]
Neighborhood * Post			0.003 [0.003]	0.003 [0.003]				0.003 [0.002]	0.003 [0.002]
Post	0.001 [0.006]	0.001 [0.006]	0.001 [0.006]	0.001 [0.006]	0.002 [0.005]	0.000 [0.006]	0.000 [0.006]	0.001 [0.006]	0.001 [0.006]
Observations	59,329	59,329	59,329	59,329	155,716	155,716	155,716	155,716	155,716

*Notes:* The dependent variable is an indicator for missing household income. PGS is the polygenic score for educational attainment. Post is an indicator for being born on or after September 1, 1957. In the top panel, Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. In the bottom panel, PGS, Family, and Neighborhood are all standardized to have mean zero and standard deviation of 1. The first four columns include linear trends in exact date of birth while the last four include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. In the top panel, we omit the coefficients on Top PGS, Top Family, Top Neighborhood, Mid PGS, Mid Family, and Mid Neighborhood. In the bottom panel, we omit the coefficients on PGS, Family, and Neighborhood.

## APPENDIX F

This table shows the reduced-form estimates corresponding to Table 2 in the paper.

**Appendix Table F1: Effect of the 1972 ROSLA on Log Wages,  
by EA PGS, Family Size, and Neighborhood SES**

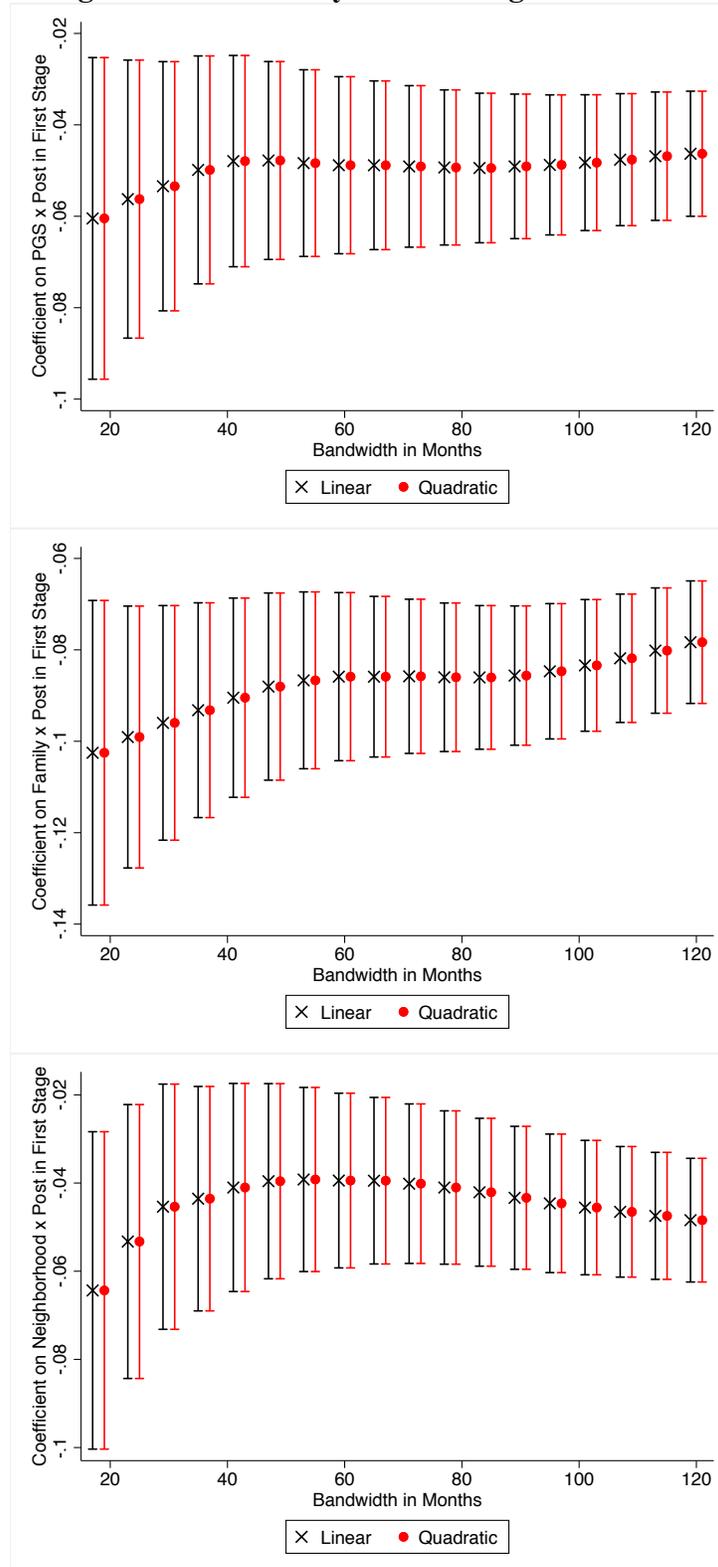
<b>Top Panel: Discrete</b>	<b>Log Wages</b>							
	<i>4-Year Bandwidth</i>				<i>10-Year Bandwidth</i>			
Top PGS * Post	0.015		0.015		0.016		0.016	
	[0.010]		[0.010]		[0.006]		[0.006]	
Top Family * Post		-0.002		-0.004		0.006		0.005
		[0.009]		[0.009]		[0.006]		[0.006]
Top Neighborhood * Post			0.012	0.010			0.010	0.009
			[0.010]	[0.010]			[0.006]	[0.006]
Mid PGS * Post	-0.009			-0.008	0.002			0.002
	[0.010]			[0.009]	[0.006]			[0.006]
Mid Family * Post		0.015		0.013		0.006		0.005
		[0.010]		[0.010]		[0.006]		[0.006]
Mid Neighborhood * Post			-0.002	-0.004			-0.001	-0.001
			[0.009]	[0.009]			[0.006]	[0.006]
Post	0.015	0.012	0.014	0.012	0.011	0.012	0.014	0.006
	[0.009]	[0.008]	[0.009]	[0.011]	[0.007]	[0.007]	[0.007]	[0.009]
<b>Bottom Panel: Continuous</b>								
PGS * Post	0.005		0.004		0.006		0.006	
	[0.004]		[0.004]		[0.002]		[0.002]	
Family * Post		0.005		0.004		0.006		0.005
		[0.004]		[0.004]		[0.003]		[0.003]
Neighborhood * Post			0.005	0.004			0.005	0.004
			[0.004]	[0.004]			[0.003]	[0.003]
Post	0.017	0.015	0.017	0.017	0.017	0.016	0.017	0.016
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
Observations	46,308	46,308	46,308	46,308	114,025	114,025	114,025	114,025

*Notes:* The dependent variable is log wages. PGS is the polygenic score for educational attainment. Post is an indicator for being born on or after September 1, 1957. In the top panel, Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. In the bottom panel, PGS, Family, and Neighborhood are all standardized to have mean zero and standard deviation of 1. The first four columns include linear trends in exact date of birth while the last four include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. In the top panel, we omit the coefficients on Top PGS, Top Family, Top Neighborhood, Mid PGS, Mid Family, and Mid Neighborhood. In the bottom panel, we omit the coefficients on PGS, Family, and Neighborhood.

## **APPENDIX G**

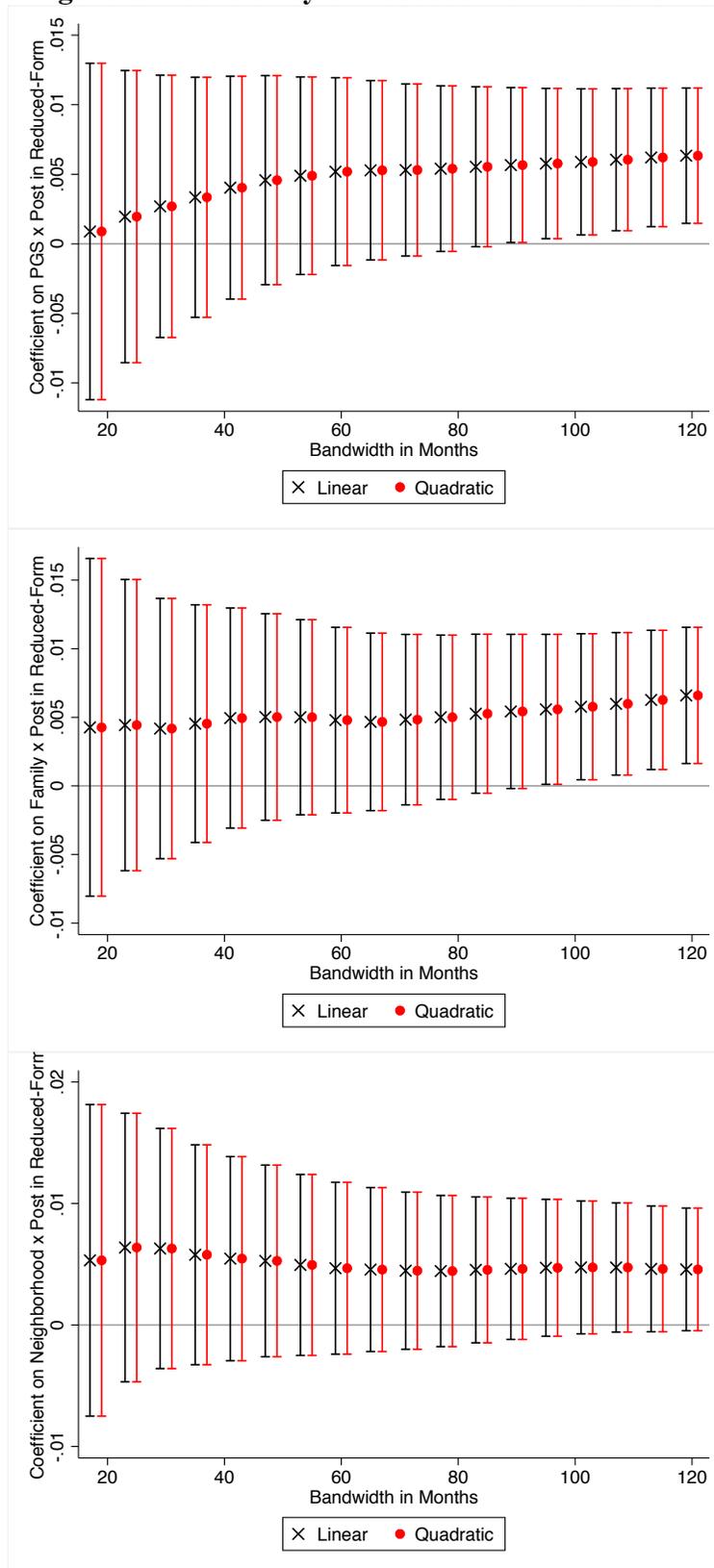
This Appendix shows the sensitivity of the first-stage estimates and of the reduced-form estimates to the bandwidth choices.

## Appendix Figure G1: Sensitivity of First Stage to Bandwidth Choice



*Notes:* The figure investigates how the first stage estimates (from continuous specification) vary with the bandwidth size (in months). It shows the coefficient on the interaction of the indicator for being born after September 1, 1957 with the EA PGS (top panel), family size (middle panel), and neighborhood SES (bottom panel). Black Xs show estimates using linear trends. Red circles show estimates using quadratic trends.  $N$  varies from 17,783 (18-month bandwidth) to 114,025 (120-month bandwidth).

**Appendix Figure G2: Sensitivity of Reduced-Form to Bandwidth Choice**

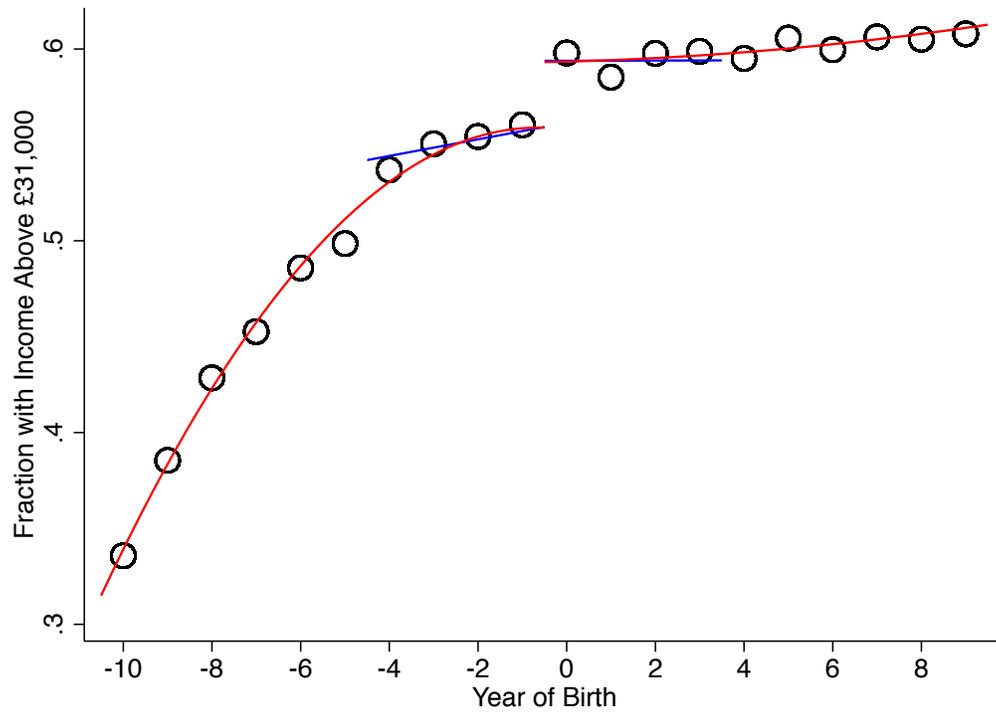
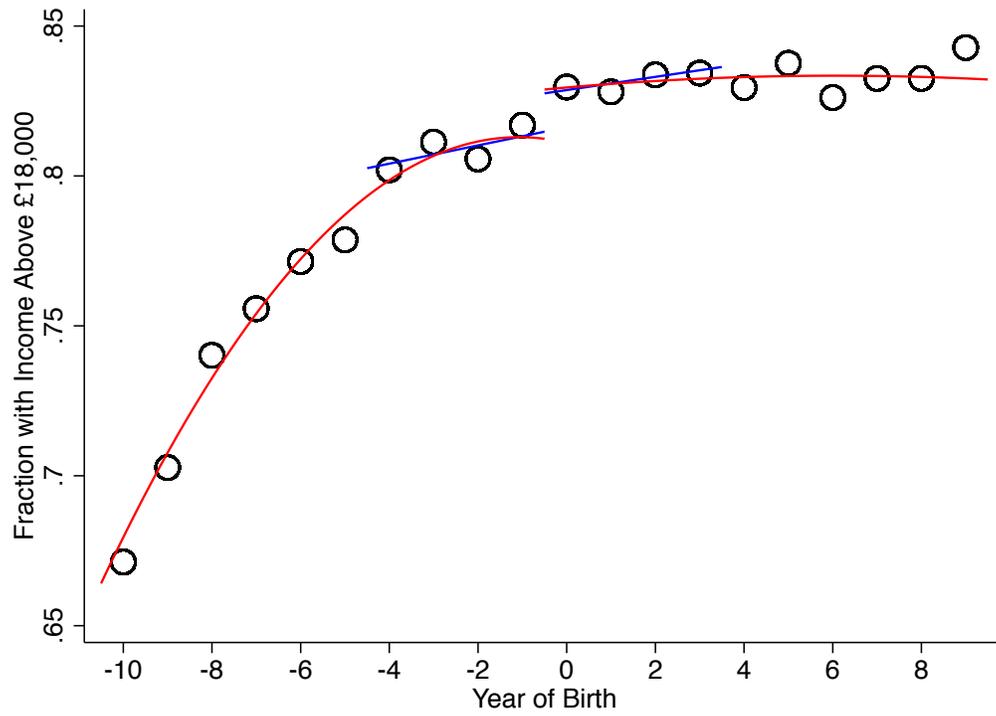


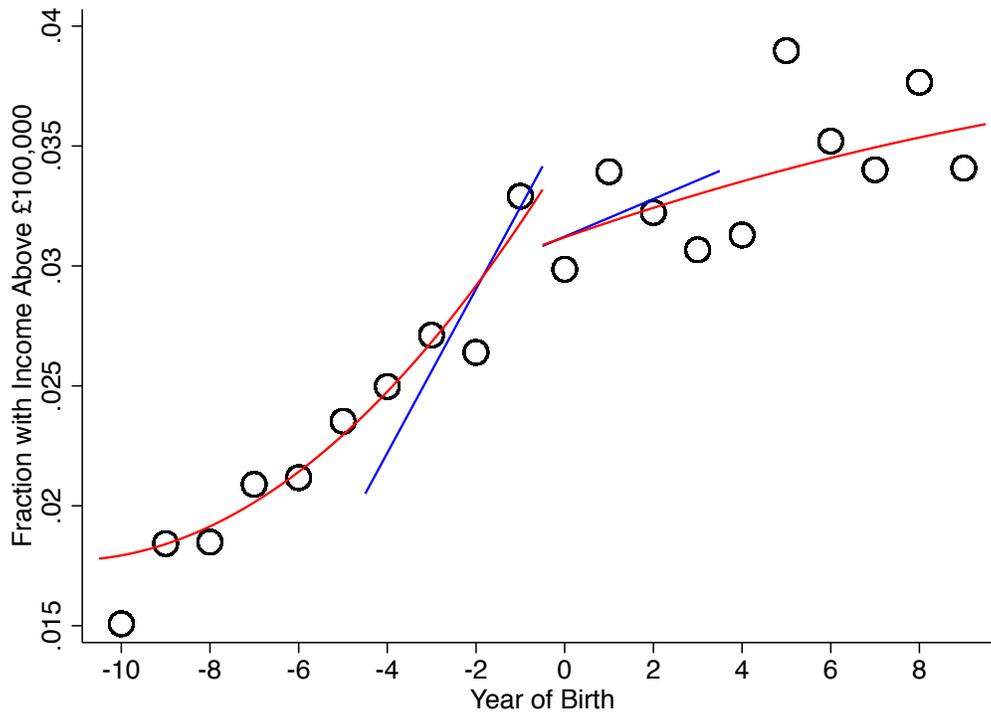
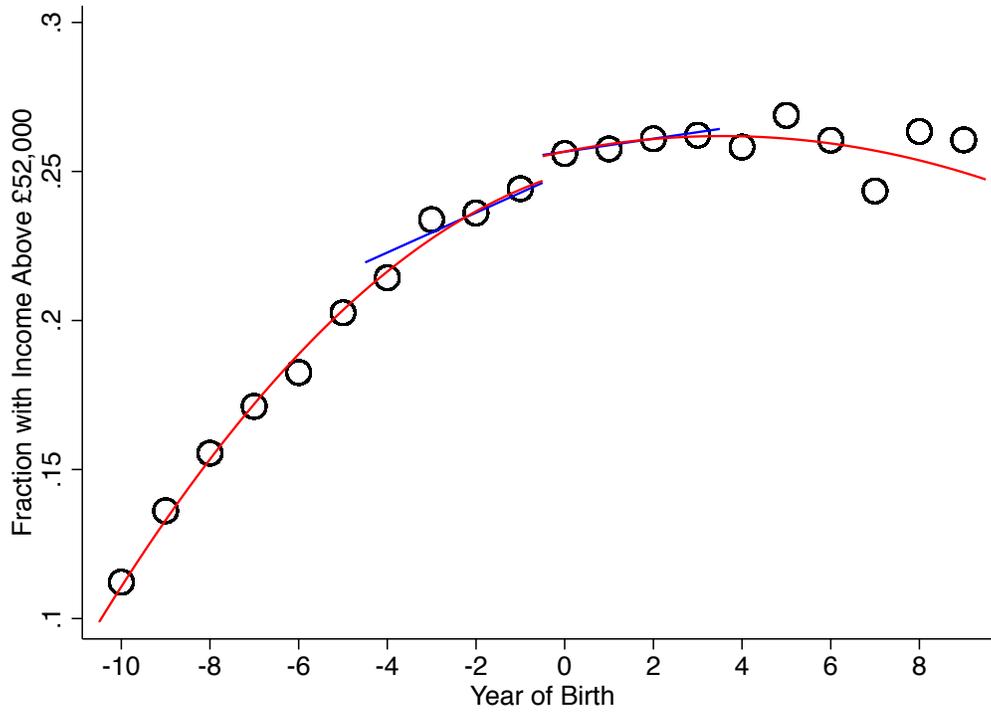
*Notes:* The figure investigates how the reduced-form estimates (from continuous specification) vary with the bandwidth size (in months). It shows the coefficient on the interaction of the indicator for being born after September 1, 1957 with the EA PGS (top panel), family size (middle panel), and neighborhood SES (bottom panel). Black Xs show estimates using linear trends. Red circles show estimates using quadratic trends.  $N$  varies from 17,783 (18-month bandwidth) to 114,025 (120-month bandwidth).

## **APPENDIX H**

This Appendix shows estimates of the reduced-form effects of the 1972 ROSLA on income. Appendix Table H2 shows 2SLS estimates of the effect of an additional year of schooling on the fraction with an annual household income of £31,000.

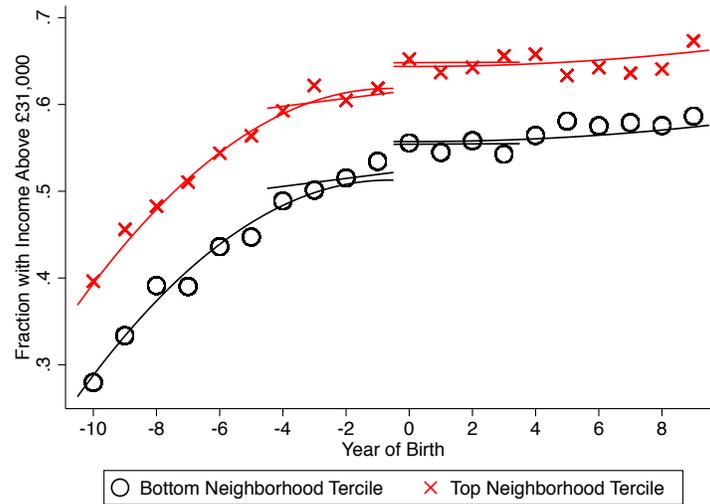
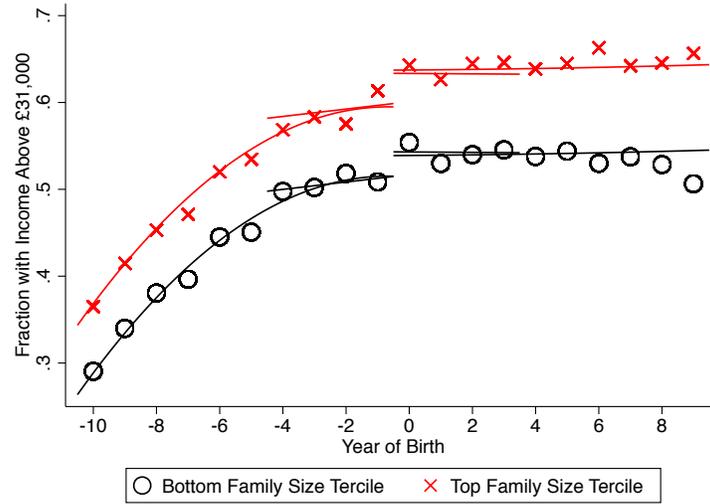
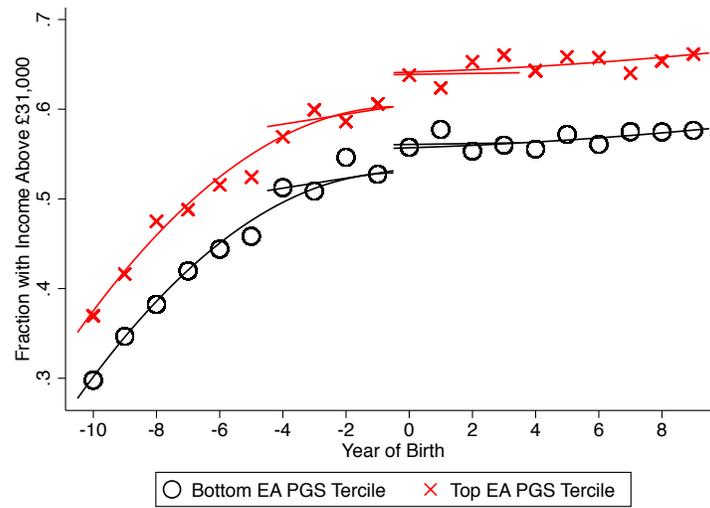
Appendix Figure H1: Effect of the 1972 ROSLA on Household Income





Notes: The figures show fraction with an annual household income above £18,000, £31,000, £52,000, and £100,000 by year of birth. Year of birth runs from September 1 of a given year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear trends for a 4-year bandwidth (blue lines) and quadratic trends for a 10-year bandwidth (red curves). We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 51,499$  (4-year bandwidth) and  $133,086$  (10-year bandwidth).

**Appendix Figure H2: Effect of 1972 ROSLA on Fraction with Income Above £31,000**



*Notes:* The figures show average log wages by year of birth, separately for those in the bottom tercile (black circles) and in the top tercile (red crosses) of the following distributions: EA PGS (top panel); family size (middle panel); and neighborhood SES (bottom panel). Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born before Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear cohort trends for a 4-year bandwidth and quadratic cohort trends for a 10-year bandwidth. For a given proxy, all three terciles share the same cohort trends. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 47,874$  (EA PGS with 4-year bandwidth); 124,549 (EA PGS with 10-year bandwidth); 50,761 (family size with 4-year bandwidth); 131,045 (family size with 10-year bandwidth); 48,919 (neighborhood SES with 4-year bandwidth); and 127,278 (neighborhood SES with 10-year bandwidth).

**Appendix Table H1: Effect of the 1972 ROSLA on Fraction with Income Above £31,000, by EA PGS, Family Size, and Neighborhood SES**

		<b>1 if Annual Household Income Above £31,000</b>							
<b>Top Panel: Discrete</b>		<i>4-Year Bandwidth</i>				<i>10-Year Bandwidth</i>			
Top PGS * Post	0.007 [0.013]			0.007 [0.013]		0.011 [0.008]			0.012 [0.008]
Top Family * Post		0.006 [0.012]		0.005 [0.012]			0.019 [0.007]		0.016 [0.007]
Top Neighborhood * Post			0.002 [0.013]	0.000 [0.013]			-0.019 [0.008]		-0.021 [0.008]
Mid PGS * Post	0.010 [0.013]			0.009 [0.013]		0.009 [0.008]			0.010 [0.008]
Mid Family * Post		0.019 [0.013]		0.018 [0.013]			0.019 [0.008]		0.017 [0.008]
Mid Neighborhood * Post			0.001 [0.013]	0.001 [0.013]			-0.013 [0.008]		-0.012 [0.008]
Post	0.030 [0.012]	0.027 [0.011]	0.034 [0.012]	0.024 [0.015]	0.030 [0.010]	0.023 [0.010]	0.045 [0.010]	0.030 [0.012]	
<b>Bottom Panel: Continuous</b>									
PGS * Post	0.001 [0.005]			0.001 [0.005]		0.003 [0.003]			0.004 [0.003]
Family * Post		0.009 [0.005]		0.008 [0.005]			0.012 [0.003]		0.011 [0.003]
Neighborhood * Post			0.001 [0.005]	0.000 [0.005]			-0.006 [0.003]		-0.007 [0.003]
Post	0.035 [0.010]	0.034 [0.009]	0.035 [0.010]	0.035 [0.009]	0.036 [0.009]	0.034 [0.009]	0.035 [0.009]	0.036 [0.009]	
Observations	51,499	51,499	51,499	51,499	133,086	133,086	133,086	133,086	

*Notes:* The dependent variable is an indicator variable for having an annual household income of £31,000 or more. PGS is the polygenic score for educational attainment. Post is an indicator for being born on or after September 1, 1957. In the top panel, Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. In the bottom panel, PGS, Family, and Neighborhood are all standardized to have mean zero and standard deviation of 1. The first four columns include linear trends in exact date of birth while the last four include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. In the top panel, we omit the coefficients on Top PGS, Top Family, Top Neighborhood, Mid PGS, Mid Family, and Mid Neighborhood. In the bottom panel, we omit the coefficients on PGS, Family, and Neighborhood.

**Appendix Table H2: Effect of an Additional Year of Schooling on Fraction with Income Above £31,000, by EA PGS, Family Size, and Neighborhood SES**

<b>1 if Annual Household Income Above £31,000</b>								
<b>Top Panel: Discrete</b>	<i>4-Year Bandwidth</i>				<i>10-Year Bandwidth</i>			
Top PGS * SLA	0.073			0.077	0.062			0.067
	[0.046]			[0.047]	[0.023]			[0.023]
Top Family * SLA		0.079		0.078		0.100		0.096
		[0.043]		[0.045]		[0.024]		[0.025]
Top Neighborhood * SLA			0.028	0.011			-0.024	-0.032
			[0.040]	[0.041]			[0.022]	[0.022]
Mid PGS * SLA	0.042			0.036	0.036			0.035
	[0.036]			[0.036]	[0.020]			[0.020]
Mid Family * SLA		0.102		0.105		0.080		0.078
		[0.042]		[0.044]		[0.023]		[0.023]
Mid Neighborhood * SLA			0.010	0.004			-0.022	-0.020
			[0.037]	[0.037]			[0.019]	[0.020]
SLA	0.078	0.064	0.092	0.032	0.078	0.053	0.114	0.047
	[0.030]	[0.026]	[0.033]	[0.034]	[0.024]	[0.021]	[0.025]	[0.022]
<b>Bottom Panel: Continuous</b>								
PGS * SLA	0.024			0.021	0.024			0.024
	[0.016]			[0.017]	[0.009]			[0.009]
Family * SLA		0.045		0.044		0.041		0.039
		[0.015]		[0.015]		[0.008]		[0.008]
Neighborhood * SLA			0.014	0.009			-0.005	-0.008
			[0.017]	[0.017]			[0.010]	[0.010]
SLA	0.114	0.117	0.106	0.124	0.110	0.108	0.099	0.116
	[0.030]	[0.031]	[0.029]	[0.033]	[0.026]	[0.026]	[0.025]	[0.027]
Observations	51,499	51,499	51,499	51,499	133,086	133,086	133,086	133,086

*Notes:* The dependent variable is an indicator variable for having an annual household income of £31,000 or more. SLA is school-leaving age. PGS is the polygenic score for educational attainment. In the top panel, Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. In the bottom panel, PGS, Family, and Neighborhood are all standardized to have mean zero and standard deviation of 1. The first four columns include linear trends in exact date of birth while the last four include quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. In the top panel, we omit the coefficients on Top PGS, Top Family, Top Neighborhood, Mid PGS, Mid Family, and Mid Neighborhood. In the bottom panel, we omit the coefficients on PGS, Family, and Neighborhood.

## APPENDIX I

In this Appendix, we first derive the econometric model used in Section 4.D. We then proceed to show reduced-form results corresponding to the results shown in Table 3 of the paper. Finally, we show that the results in Table 3 are robust to alternative specifications.

### *Econometric Model*

Data on parental PGIs are available for just about 10% of our sample. This Appendix explains how it is possible to gain statistical power by using our entire sample, including those participants for whom we do not have parental PGIs, to obtain more precise estimates of the parameters of interest.

Let  $M_i = 1$  be an indicator for the rest of our sample for whom these data are not available. We start from an expanded model which allows this latter subsample to have different coefficients:

$$\begin{aligned} Y_i = & \theta_0 + \phi_0 M_i + \\ & + \theta_1 Post_i + \phi_1 (M_i \times Post_i) + \\ & + \theta_2 PGI_i + \phi_2 (M_i \times PGI_i) + \\ & + \theta_3 (PGI_i \times Post_i) + \phi_3 (M_i \times PGI_i \times Post_i) + \\ & + \theta_4 Parental PGI_i + \phi_4 (M_i \times Parental PGI_i) + \\ & + \theta_5 (Parental PGI_i \times Post_i) + \phi_5 (M_i \times Parental PGI_i \times Post_i) + \\ & + m(DoB_i) + \xi_i. \end{aligned} \tag{11}$$

where  $PGI_i$  is the EA PGI of participant  $i$  and  $Parental PGI_i$  is the EA PGI of participant  $i$ 's parents. Note that we impose that the two subsamples have the same birth cohort trends. In the other analyses in the paper, we also assume that advantaged and disadvantaged children share the same birth cohort trends.

Next, we rewrite the PGI of parents as:

$$Parental\ PGI_i = \begin{cases} Parental\ PGI_i & \text{if } M_i = 0 \\ PGI_i + Parental\ PGI_i^{NT*} & \text{if } M_i = 1 \end{cases} \quad (12)$$

where  $Parental\ PGI_i^{NT*}$  is the EA PGI of participant  $i$ 's parents we would obtain if we used only the alleles that were not transmitted from participant  $i$ 's parents to participant  $i$ . This relationship between the parental PGI, the child's PGI, and the non-transmitted component of the parental PGI holds mechanically and does not require any assumptions. The asterisk superscript is a reminder that we do not observe this term in the data.

Rearranging terms after substituting (I2) into (I1) yields:

$$\begin{aligned} Y_i = & \theta_0 + \phi_0 M_i + \\ & + \theta_1 Post_i + \phi_1 (M_i \times Post_i) + \\ & + \theta_2 PGI_i + \phi_2 (M_i \times PGI_i) + \\ & + \theta_3 (PGI_i \times Post_i) + \phi_3 (M_i \times PGI_i \times Post_i) + \\ & + \theta_4 [(1 - M_i) \times Parental\ PGI_i] + \\ & + (\theta_4 + \phi_4) (M_i \times PGI_i) + \\ & + \theta_5 ((1 - M_i) \times Parental\ PGI_i \times Post_i) + \\ & + (\theta_5 + \phi_5) (M_i \times PGI_i \times Post_i) + \\ & + (\theta_4 + \phi_4) (M_i \times Parental\ PGI_i^{NT*}) + (\theta_5 + \phi_5) (M_i \times Parental\ PGI_i^{NT*} \times Post_i) \\ & + m(DoB_i) + \xi_i. \end{aligned} \quad (13)$$

To gain statistical power, we assume that, both and before the ROSLA, the direct and indirect genetic effects are the same for those for whom we observe the parental PGI and for those for whom we do not. That is, we assume that  $\phi_2 = \phi_3 = \phi_4 = \phi_5 = 0$ . If we combine terms, this assumption further simplifies (I3) to:

$$\begin{aligned}
Y_i = & \theta_0 + \phi_0 M_i + \\
& + \theta_1 Post_i + \phi_1 (M_i \times Post_i) + \\
& + \theta_2 PGI_i + \theta_3 (PGI_i \times Post_i) + \\
& + \theta_4 \{[(1 - M_i) \times Parental PGI_i] + (M_i \times PGI_i)\} + \\
& + \theta_5 Post_i \times \{[(1 - M_i) \times Parental PGI_i] + (M_i \times PGI_i)\} + \\
& + m(DoB_i) + \chi_i,
\end{aligned} \tag{14}$$

where

$$\chi_i = \xi_i + \theta_4 (M_i \times Parental PGI_i^{NT*}) + \theta_5 (M_i \times Parental PGI_i^{NT*} \times Post_i).$$

Remember that  $Parental PGI_i^{NT*}$  is the EA PGI constructed from the alleles that were not transmitted from participant  $i$ 's parents to participant  $i$ . For this reason, if we assume no assortative mating,  $Parental PGI_i^{NT*}$  is orthogonal to  $PGI_i$ . This allows us to get unbiased estimates of  $\theta_2$ ,  $\theta_3$ ,  $\theta_4$ , and  $\theta_5$  by running (I4). In other words, leaving the terms  $\theta_4 (M_i \times Parental PGI_i^{NT*})$  and  $\theta_5 (M_i \times Parental PGI_i^{NT*} \times Post_i)$  in the error term does not bias the estimates of these parameters.

This table shows the corresponding first-stage estimates for Table 3 in the paper.

**Appendix Table I1: First-Stage of Table 3 in the Paper**

	School-Leaving Age				School-Leaving Age			
	4-Year Bandwidth				10-Year Bandwidth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PGI * Post			-0.048	-0.020			-0.048	-0.014
			[0.011]	[0.046]			[0.007]	[0.029]
Parental PGI * Post				-0.028				-0.034
				[0.044]				[0.027]
PGI	0.170	0.065	0.193	0.075	0.175	0.070	0.197	0.075
	[0.006]	[0.023]	[0.008]	[0.035]	[0.004]	[0.014]	[0.005]	[0.021]
Parental PGI		0.105		0.119		0.105		0.122
		[0.022]		[0.034]		[0.014]		[0.021]
Post	0.306	0.306	0.306	0.323	0.328	0.328	0.328	0.366
	[0.020]	[0.020]	[0.020]	[0.037]	[0.019]	[0.019]	[0.019]	[0.027]
Observations	46,308	46,308	46,308	46,308	114,025	114,025	114,025	114,025

*Notes:* The 4-year bandwidth estimates include linear trends. The 10-year bandwidth include quadratic trends. Robust standard errors.

This table shows the corresponding reduced-form estimates for Table 3 in the paper.

**Appendix Table I2: Reduced-Form of Table 3 in the Paper**

	Log Wages				Log Wages			
	<i>4-Year Bandwidth</i>				<i>10-Year Bandwidth</i>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PGI * Post			0.005	-0.043			0.006	-0.006
			[0.004]	[0.017]			[0.002]	[0.011]
Parental PGI * Post				0.048				0.012
				[0.016]				[0.010]
PGI	0.032	0.008	0.030	0.028	0.033	0.018	0.030	0.021
	[0.002]	[0.008]	[0.003]	[0.011]	[0.001]	[0.005]	[0.002]	[0.007]
Parental PGI		0.024		0.001		0.015		0.009
		[0.008]		[0.011]		[0.005]		[0.007]
Post	0.016	0.016	0.017	0.009	0.016	0.016	0.017	0.013
	[0.007]	[0.007]	[0.007]	[0.013]	[0.007]	[0.007]	[0.007]	[0.010]
Observations	46,308	46,308	46,308	46,308	114,025	114,025	114,025	114,025

*Notes:* The 4-year bandwidth estimates include linear trends. The 10-year bandwidth include quadratic trends. Robust standard errors.

This table shows that the results shown in Table 3 of the paper are reasonably robust to alternative specifications. The column “Full Sample” reproduces the results shown in Table 3. The column “Sample with Parental PGI” restricts the sample to those study participants for whom parental PGI data were available, relaxing the assumption that  $\phi_2 = \phi_3 = \phi_4 = \phi_5 = 0$ . The column “Siblings Fixed Effects” presents results from a regression with family fixed effects. This particular approach yields very different estimates. Notice, however, that the sample size is considerably smaller and that the standard errors are also larger. Finally, the column “Within-Sibs Diff. as IV” uses the deviation of one’s PGI from the average PGI among the individual and her siblings, which is random, to instrument for one’s PGI.

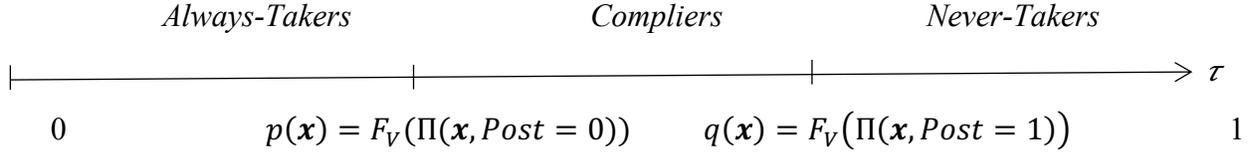
**Appendix Table I3: Sensitivity of Table 3 Results in the Paper**

	Log Wages							
	4-Year Bandwidth				10-Year Bandwidth			
	Full Sample	Sample w/ Parental PGI	Siblings Fixed Effects	Within-Sibs Diff. as IV	Full Sample	Sample w/ Parental PGI	Siblings Fixed Effects	Within-Sibs Diff. as IV
PGI * SLA	-0.137 [0.060]	-0.229 [0.080]	0.206 [0.327]	-0.243 [0.111]	-0.011 [0.026]	-0.034 [0.033]	0.026 [0.038]	-0.092 [0.047]
Parental PGI * SLA	0.155 [0.060]	0.173 [0.063]			0.032 [0.026]	0.031 [0.027]		
PGI	0.189 [0.081]	0.314 [0.109]	-0.263 [0.455]	0.335 [0.150]	0.031 [0.035]	0.066 [0.044]	0.004 [0.049]	0.140 [0.062]
Parental PGI	-0.187 [0.082]	-0.208 [0.088]			-0.032 [0.035]	-0.026 [0.038]		
SLA	0.040 [0.044]	0.020 [0.092]	0.258 [0.419]	-0.090 [0.118]	0.038 [0.027]	-0.001 [0.064]	0.054 [0.067]	-0.014 [0.071]
Observations	46,308	4,684	1,262	4,470	114,025	12,045	4,944	10,508

*Notes:* The 4-year bandwidth estimates include linear trends. The 10-year bandwidth include quadratic trends. Robust standard errors.

## APPENDIX J

Section 5 in the paper introduces the MTE framework. Here we discuss how  $\lambda_0(\mathbf{x})$  and  $\lambda_1(\mathbf{x})$  can be identified. First, notice how always-takers, compliers, and never-takers can be characterized by the following:



where  $p(\mathbf{x})$  is the fraction of always-takers;  $q(\mathbf{x}) - p(\mathbf{x})$  is the fraction of compliers; and  $1 - q(\mathbf{x})$  is the fraction of never-takers.

Second, notice how:

$$MTE(\mathbf{x}, u) = E[Y_1 | \mathbf{X} = \mathbf{x}, U = u] - E[Y_0 | \mathbf{X} = \mathbf{x}, U = u]$$

Appendix Figure J1 illustrates how the two functions on the right-hand side are identified. The top panel shows the identification for the top tercile of the distribution of the EA PGI. The bottom panel shows the identification for the bottom tercile. In each panel, the intercept and the slope of the function  $E[Y_1 | \mathbf{X} = \mathbf{x}, U = u]$  – *the red line* – are identified by the following two means:  $E[Y_1 | \mathbf{X} = \mathbf{x}, U \leq p(\mathbf{x})]$  and  $E[Y_1 | \mathbf{X} = \mathbf{x}, p(\mathbf{x}) < U \leq q(\mathbf{x})]$ , i.e., the means of  $Y_1$  among always-takers and among compliers (red Xs). Similarly, the intercept and the slope of the function  $E[Y_0 | \mathbf{X} = \mathbf{x}, U = u]$  – *the black line* – are identified by the following two means:  $E[Y_0 | \mathbf{X} = \mathbf{x}, p(\mathbf{x}) < U \leq q(\mathbf{x})]$  and  $E[Y_0 | \mathbf{X} = \mathbf{x}, U > q(\mathbf{x})]$ , i.e., the means of  $Y_0$  among compliers and among never-takers (black circles).

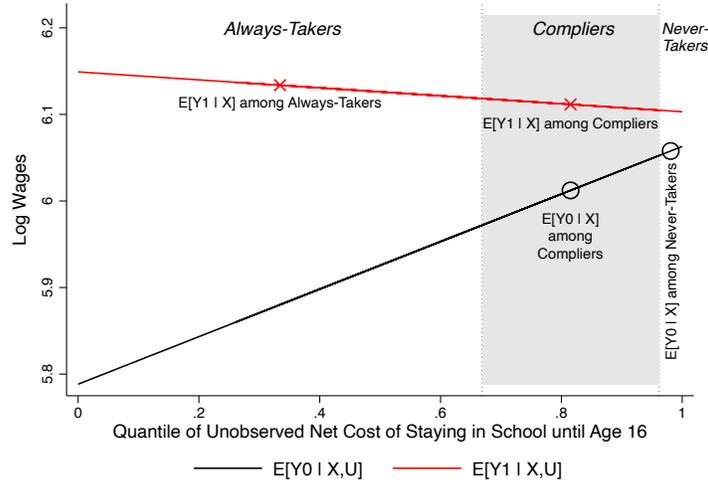
These four means can be calculated as follows. Individuals who stayed in school until age 16 before the ROSLA must be always-takers and we can calculate their mean wage as  $E[Y_1 | \mathbf{X} = \mathbf{x}, U \leq p(\mathbf{x})] = E[Y | \mathbf{X} = \mathbf{x}, SLA = 16, Post = 0]$ , where  $Y$  is the observed log wage. Individuals who dropped before age 16 even after the ROSLA must be never-takers and we can calculate their mean wage as  $E[Y_0 | \mathbf{X} = \mathbf{x}, U > q(\mathbf{x})] = E[Y | \mathbf{X} = \mathbf{x}, SLA < 16, Post = 1]$ . Finally, note that the post-ROSLA mean wage among stayers,  $E[Y | \mathbf{X} = \mathbf{x}, SLA = 16, Post = 1]$ , is a weighted average of  $E[Y_1 | \mathbf{X} = \mathbf{x}, U \leq p(\mathbf{x})] = E[Y | \mathbf{X} = \mathbf{x}, SLA = 16, Post = 0]$  and

$E[Y_1 | \mathbf{X} = \mathbf{x}, p(\mathbf{x}) < U \leq q(\mathbf{x})]$ . We can therefore use the first two moments and the fraction of compliers,  $q - p$ , which is known, to calculate the latter moment,  $E[Y_1 | \mathbf{X} = \mathbf{x}, p(\mathbf{x}) < U \leq q(\mathbf{x})]$ . Similarly, the pre-ROSLA mean wage among dropouts,  $E[Y | \mathbf{X} = \mathbf{x}, SLA < 16, Post = 0]$ , is a weighted average of  $E[Y_0 | \mathbf{X} = \mathbf{x}, U > q(\mathbf{x})] = E[Y | \mathbf{X} = \mathbf{x}, SLA < 16, Post = 1]$  and  $E[Y_0 | \mathbf{X} = \mathbf{x}, p(\mathbf{x}) < U \leq q(\mathbf{x})]$ . We can use the first two moments and the fraction of compliers to back out the latter moment,  $E[Y_0 | \mathbf{X} = \mathbf{x}, p(\mathbf{x}) < U \leq q(\mathbf{x})]$ .

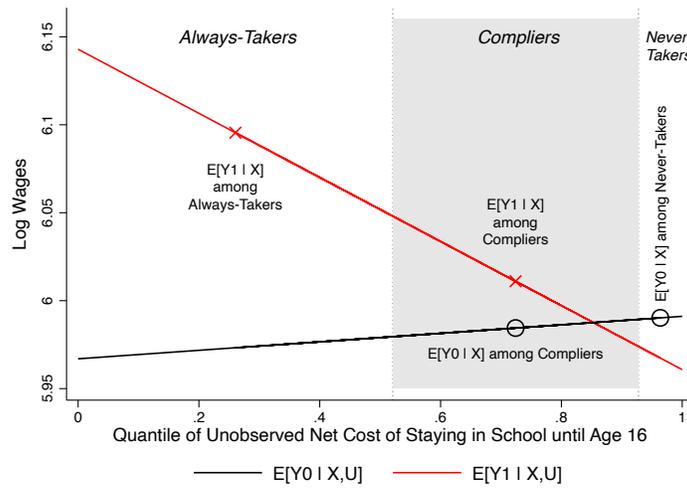
The slope of the MTE function is equal to the slope of the red line minus the slope of the black line. In both panels, the red line is negative sloped and the black line is positive sloped such that the resulting MTE function is negative sloped. The shaded areas show the compliers in the bottom and top terciles.

## Appendix Figure J1: Potential Wages of Stayers and Dropouts, by Tercile of the EA PGI Distribution

*Top Panel: Top Tercile of Distribution of EA PGI*



*Bottom Panel: Bottom Tercile of Distribution of EA PGI*



*Notes:* The figure illustrates how  $E[Y_1 | \mathbf{X} = \mathbf{x}, U = u]$  and  $E[Y_0 | \mathbf{X} = \mathbf{x}, U = u]$  and consequently MTE are identified. The top panel shows identification for the top tercile of the EA PGI distribution. The bottom panel shows identification for the bottom tercile of the EA PGI distribution. The red lines show  $E[Y_1 | \mathbf{X} = \mathbf{x}, U = u]$ , which is identified by the averages of  $Y_1$  among always-takers and among compliers shown by the red Xs. The black lines show  $E[Y_0 | \mathbf{X} = \mathbf{x}, U = u]$ , which is identified by the averages of  $Y_0$  among compliers and among never-takers shown by the black circles. The MTE is identified by the difference between the red line and the black line.

**Appendix Table J1: Return to Staying in School until Age 16,  
Holding the Unobserved (Net) Cost Constant**

	EA PGI		Family Size		Neighborhood SES	
	<i>LATE</i>	<i>Adjusted</i>	<i>LATE</i>	<i>Adjusted</i>	<i>LATE</i>	<i>Adjusted</i>
		<i>LATE</i>		<i>LATE</i>		<i>LATE</i>
<b>Top Panel: Discrete 4-Year Bandwidth</b>						
Top	0.132 (0.038)	0.136 (0.038)	0.052 (0.039)	0.056 (0.039)	0.084 (0.036)	0.084 (0.036)
Mid	-0.001 (0.032)	-0.002 (0.032)	0.111 (0.037)	0.112 (0.038)	0.038 (0.029)	0.038 (0.029)
Bottom (comparison to Top)	0.049 (0.025)	0.039 (0.026)	0.017 (0.024)	0.013 (0.026)	0.045 (0.027)	0.042 (0.028)
Bottom (comparison to Mid)	–	0.043 (0.026)	–	0.015 (0.025)	–	0.044 (0.027)
Top – Bottom	0.083 (0.036)	0.096 (0.037)	0.035 (0.034)	0.043 (0.036)	0.040 (0.033)	0.042 (0.033)
Mid – Bottom	-0.049 (0.030)	-0.045 (0.031)	0.094 (0.033)	0.097 (0.034)	-0.006 (0.029)	-0.006 (0.029)
Observations	27,735	27,735	29,541	29,541	28,636	28,636
<b>Bottom Panel: Discrete 10-Year Bandwidth</b>						
Top	0.099 (0.031)	0.105 (0.031)	0.076 (0.033)	0.080 (0.033)	0.079 (0.031)	0.079 (0.031)
Mid	0.028 (0.026)	0.030 (0.026)	0.066 (0.028)	0.068 (0.028)	0.030 (0.025)	0.030 (0.025)
Bottom (comparison to Top)	0.027 (0.022)	0.011 (0.023)	0.007 (0.022)	-0.008 (0.022)	0.029 (0.023)	0.019 (0.023)
Bottom (comparison to Mid)	–	0.018 (0.022)	–	-0.003 (0.022)	–	0.026 (0.023)
Top – Bottom	0.073 (0.024)	0.094 (0.024)	0.068 (0.023)	0.088 (0.024)	0.051 (0.023)	0.060 (0.024)
Mid – Bottom	0.002 (0.019)	0.011 (0.020)	0.058 (0.022)	0.070 (0.023)	0.001 (0.020)	0.003 (0.020)
Observations	70,708	70,708	74,892	74,892	73,126	73,126

*Notes:* This table investigate the hypothesis that the LATE estimates of returns to schooling may vary with early-life advantages because compliers with different early-life advantages have different unobservables. The odd columns report LATE estimates of the return to staying in school until age 16. The even columns report comparable ATET estimates that hold the set of compliers fixed. The three different set of columns compare the returns across terciles of the distribution of one of the three proxies for early-life advantage. The sample is restricted to participants who stayed in school until age 16 or who dropped out at a younger age. Bootstrapped standard errors between parentheses (500 simulation draws).

The estimates shown in the table above rely on the assumption that there at least some never-takers. The parameters of the MTE function are not identified if all individuals complied with the ROSLA and stayed in school until age 16. In what follows we show that – even if there are no never-takers – it is possible to put a bound on the slope of the bottom tercile’s MTE. The estimated bounds permit us to rule out that the top-difference in returns to schooling estimated are driven solely by differences in the unobservables of compliers in the bottom and top terciles of the distributions of the proxies for early-life advantages.

If there are no never-takers, the difference in LATE between the top and bottom terciles is:

$$LATE(top) - LATE(bottom) = MTE\left(top, \frac{1 + p(top)}{2}\right) - MTE\left(bottom, \frac{1 + p(bottom)}{2}\right)$$

At the same time, the top-bottom difference in adjusted LATEs is:

$$\begin{aligned} \text{Adjusted } LATE(top) - \text{Adjusted } LATE(bottom) &= \\ &= MTE\left(top, \frac{1 + p(top)}{2}\right) - MTE\left(bottom, \frac{1 + p(top)}{2}\right) \end{aligned}$$

because  $p^* = p(top)$ .

This difference can be rewritten as:

$$\begin{aligned} &\text{Adjusted } LATE(top) - \text{Adjusted } LATE(bottom) = \\ &= LATE(top) - LATE(bottom) + \\ &\quad + MTE\left(bottom, \frac{1 + p(bottom)}{2}\right) - MTE\left(bottom, \frac{1 + p(top)}{2}\right) \\ &= LATE(top) - LATE(bottom) - \lambda_1(bottom) \frac{p(top) - p(bottom)}{2} \end{aligned}$$

where  $\lambda_1(bottom)$  is the slope of the bottom tercile’s MTE function.

We can therefore calculate how large  $\lambda_1(bottom)$  would have to be in order for the top-bottom difference in LATE to be solely driven by the difference in unobservables between compliers in the bottom and top terciles:

$$\lambda_1(\text{bottom}) = 2 \frac{LATE(\text{top}) - LATE(\text{bottom})}{p(\text{top}) - p(\text{bottom})}$$

The table below shows corresponding estimates of  $\lambda_1(\text{bottom})$ .

**Appendix Table J2: Estimates for the Slope of the Bottom Tercile's MTE**

EA PGI		Family Size		Neighborhood SES	
<i>4-Year</i>	<i>10-Year</i>	<i>4-Year</i>	<i>10-Year</i>	<i>4-Year</i>	<i>10-Year</i>
1.177	1.003	0.394	0.789	1.211	1.258

*Notes:* The table shows a lower bound of how large the slope of the MTE of the bottom tercile would have to be in order for the top-bottom difference in the LATE estimates to be driven solely by the differences in unobservables between the compliers in the bottom and top terciles of the distribution of a given proxy for early-advantage.

Take for example the case of the EA PGI with a 10-year bandwidth.  $\lambda_1(\text{bottom})$  would have to be equal to approximately 1. This would imply, for example, that the average *complier* had a return to staying in school until age 16 that is 50 percentage points *larger* than the return of the average *always-taker*<sup>1</sup>. We find it highly implausible that compliers would have dropped out before age 16 in the absence of the ROSLA if their returns to staying in school were so much larger.

<sup>1</sup> The average complier has an unobserved net cost of staying in school until age 16 equal to (% of always-takers + % of compliers/2). The average always-taker has an unobserved net cost of staying in school until age 16 equal to (% of always-takers/2). Thus, the difference in the unobserved net cost between the average complier and the average always-takers is (% of always-takers/2 + % of compliers/2), which is equal to 0.5 because % of always-takers + % of compliers is equal to 1.

As an alternative approach to the MTE estimation, we tried to see what would happen if we allow the returns to schooling to vary with other predetermined characteristics, such as gender or country of birth. The table below shows that this has very little effect on our estimates.

**Appendix Table J3: Allowing Returns to School to Vary with Other Predetermined Characteristics (4-Year Bandwidth)**

	Log Wages							
EA PGI * SLA	0.020	0.020	0.019	0.020	0.019	0.021	0.019	0.019
	[0.012]	[0.011]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]
Family * SLA	0.020	0.016	0.020	0.021	0.018	0.019	0.019	0.012
	[0.011]	[0.010]	[0.011]	[0.011]	[0.011]	[0.010]	[0.011]	[0.011]
Neighborhood * SLA	0.023	0.021	0.024	0.023	0.021	0.021	0.019	0.014
	[0.015]	[0.013]	[0.015]	[0.015]	[0.015]	[0.014]	[0.015]	[0.015]
Male * SLA		-0.056						-0.078
		[0.024]						[0.030]
Scotland * SLA			-0.040					0.014
			[0.040]					[0.065]
Wales * SLA			-0.018					0.066
			[0.075]					[0.074]
BMI PGI * SLA				-0.005				-0.005
				[0.013]				[0.012]
Month of Birth * SLA					0.024			0.026
					[0.013]			[0.013]
Leg Length * SLA						-0.003		0.014
						[0.012]		[0.014]
Latitude Birthplace * SLA							0.002	0.008
							[0.016]	[0.019]
Longitude Birthplace * SLA							0.030	0.039
							[0.016]	[0.019]
SLA	0.071	0.090	0.075	0.069	0.066	0.071	0.072	0.090
	[0.027]	[0.024]	[0.027]	[0.027]	[0.027]	[0.026]	[0.027]	[0.027]

*Notes:* The dependent variable is log wages. EA PGI is the polygenic index for educational attainment. SLA is school-leaving age, which is instrumented using the indicator for being born after September 1, 1957. All continuous predetermined, continuous variables were standardized. The regressions include linear trends in exact date of birth which are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. We omit the coefficients on the non-interacted predetermined variables. The sample is restricted to participants born between September 1, 1953 and August 31, 1961.  $N = 46,308$ .

**Appendix Table J4: Allowing Returns to School to Vary  
with Other Predetermined Characteristics (10-Year Bandwidth)**

	Log Wages							
EA PGI * SLA	0.022	0.018	0.022	0.023	0.022	0.020	0.022	0.018
	[0.007]	[0.006]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.006]
Family * SLA	0.019	0.019	0.019	0.019	0.019	0.020	0.019	0.017
	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]
Neighborhood * SLA	0.019	0.018	0.020	0.019	0.019	0.020	0.017	0.015
	[0.008]	[0.007]	[0.009]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]
Male * SLA		-0.030						-0.058
		[0.014]						[0.016]
Scotland * SLA			-0.020					-0.003
			[0.023]					[0.033]
Wales * SLA			-0.013					0.014
			[0.035]					[0.036]
BMI PGI * SLA				-0.004				-0.006
				[0.007]				[0.006]
Month of Birth * SLA					0.014			0.014
					[0.006]			[0.006]
Leg Length * SLA						0.005		0.020
						[0.007]		[0.008]
Latitude Birthplace * SLA							-0.003	-0.002
							[0.008]	[0.010]
Longitude Birthplace * SLA							0.011	0.012
							[0.009]	[0.010]
SLA	0.061	0.071	0.063	0.061	0.059	0.062	0.061	0.083
	[0.022]	[0.018]	[0.022]	[0.022]	[0.022]	[0.021]	[0.022]	[0.019]

*Notes:* The dependent variable is log wages. EA PGI is the polygenic index for educational attainment. SLA is school-leaving age, which is instrumented using the indicator for being born after September 1, 1957. All continuous predetermined, continuous variables were standardized. The regressions include quadratic trends in exact date of birth which are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. We omit the coefficients on the non-interacted predetermined variables. The sample is restricted to participants born between September 1, 1947 and August 31, 1967.  $N = 114,025$ .

## APPENDIX K

**Appendix Figure K1: Map with Locations of UK Biobank 22 Assessment Centers**

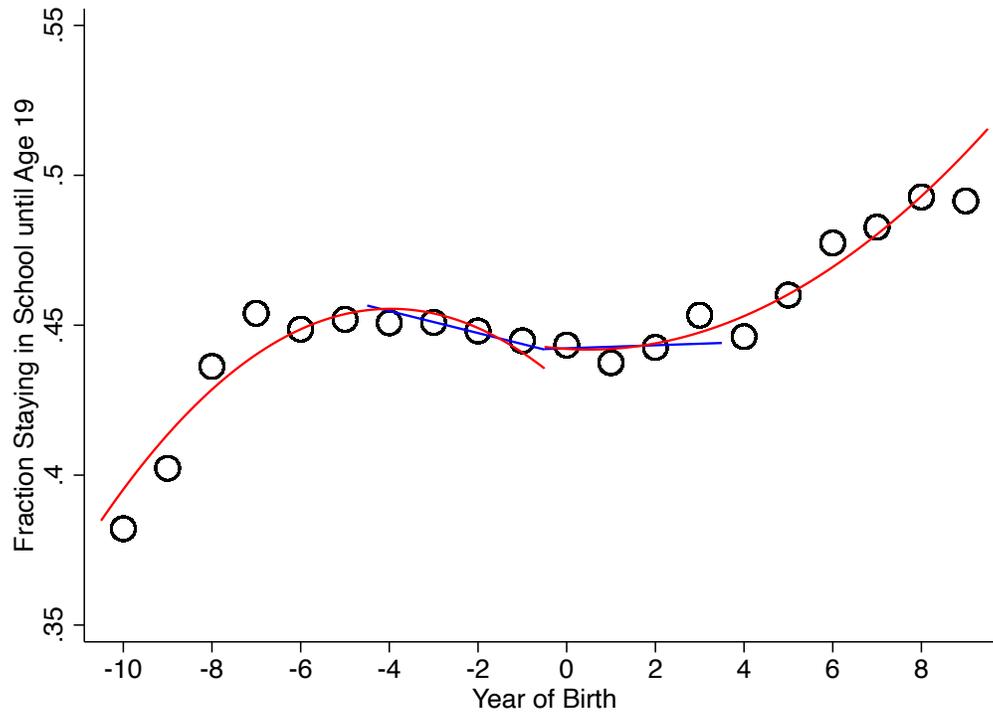


*Notes:* The figure shows the location of the 22 assessment centers (as well as the location of the pilot study).

## APPENDIX L

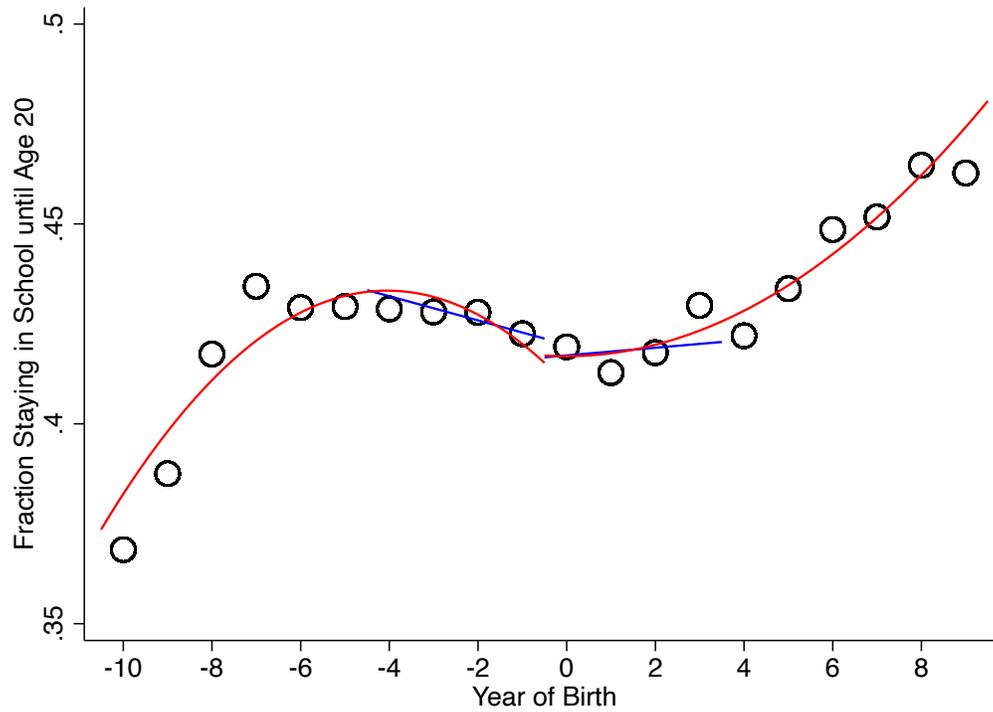
This Appendix shows that the ROSLA 1972 did not induce students to stay in school past age 18.

**Appendix Figure L1: Fraction Staying in School Until Age 19 by Year of Birth**



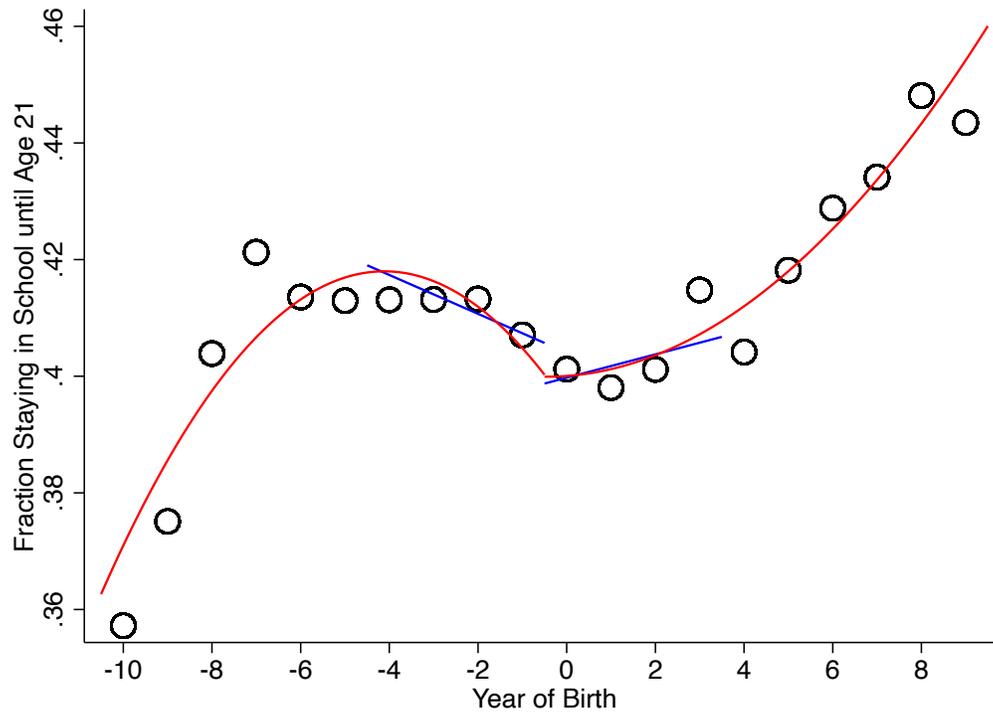
*Notes:* The figure shows the fraction of study participants who stayed in school until *at least* age 19 by year of birth. Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born after Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear trends for a 4-year bandwidth and quadratic trends for a 10-year bandwidth. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 107,194$  (4-year bandwidth) and 280,284 (10-year bandwidth).

**Appendix Figure L2: Fraction Staying in School Until Age 20 by Year of Birth**



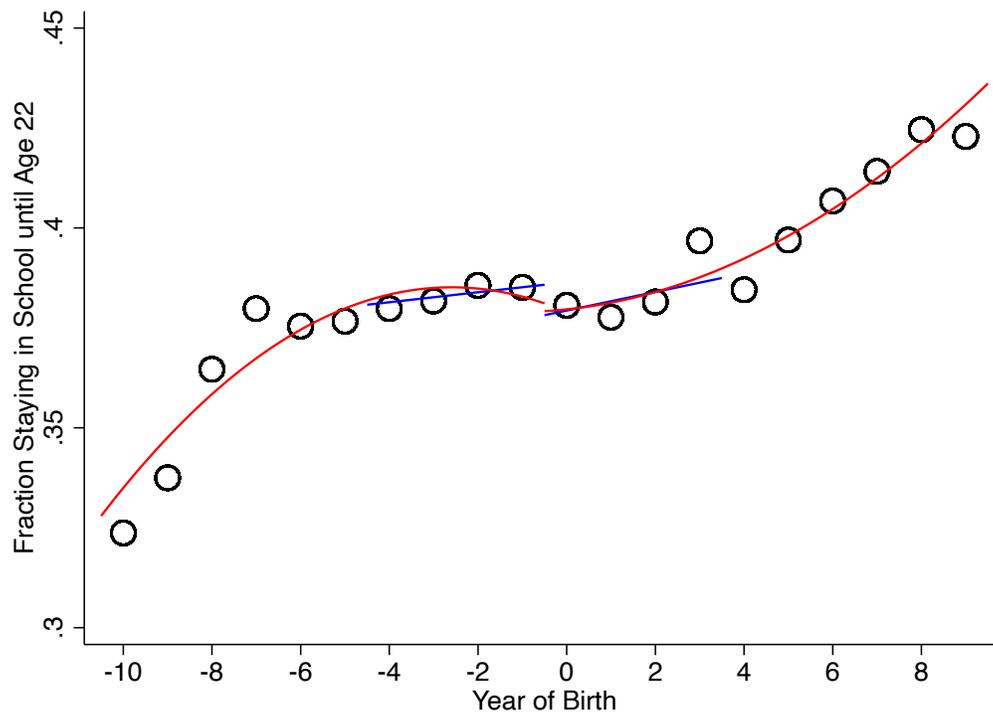
*Notes:* The figure shows the fraction of study participants who stayed in school until *at least* age 20 by year of birth. Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born after Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear trends for a 4-year bandwidth and quadratic trends for a 10-year bandwidth. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 107,194$  (4-year bandwidth) and  $280,284$  (10-year bandwidth).

**Appendix Figure L3: Fraction Staying in School Until Age 21 by Year of Birth**



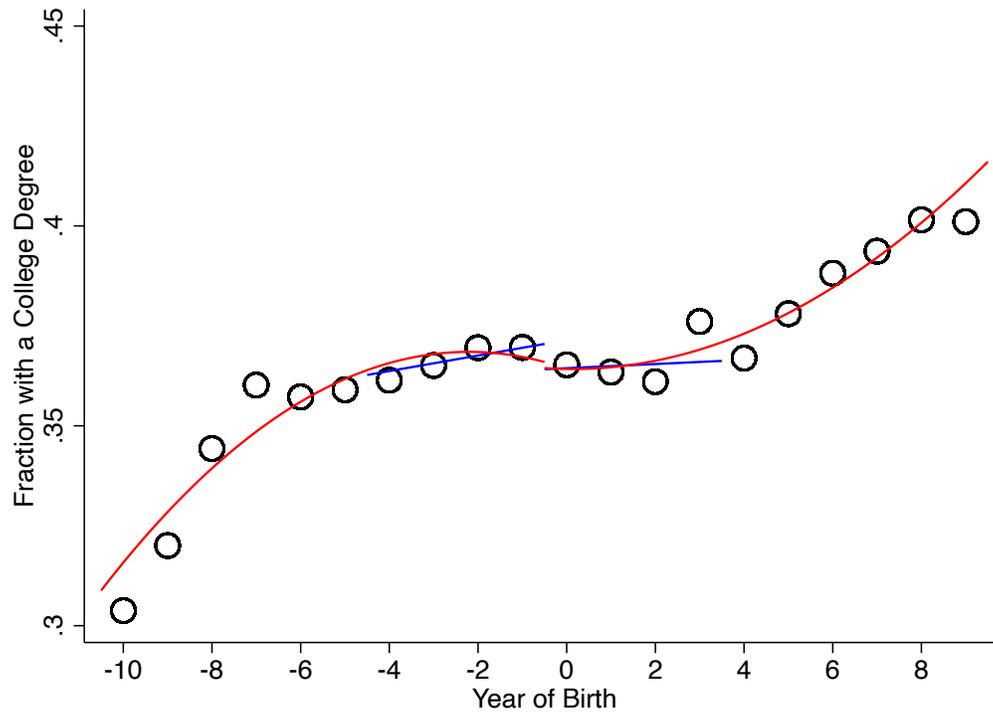
*Notes:* The figure shows the fraction of study participants who stayed in school until *at least* age 21 by year of birth. Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born after Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear trends for a 4-year bandwidth and quadratic trends for a 10-year bandwidth. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 107,194$  (4-year bandwidth) and  $280,284$  (10-year bandwidth).

**Appendix Figure L4: Fraction Staying in School Until Age 22 by Year of Birth**



*Notes:* The figure shows the fraction of study participants who stayed in school until *at least* age 22 by year of birth. Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born after Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear trends for a 4-year bandwidth and quadratic trends for a 10-year bandwidth. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 107,194$  (4-year bandwidth) and 280,284 (10-year bandwidth).

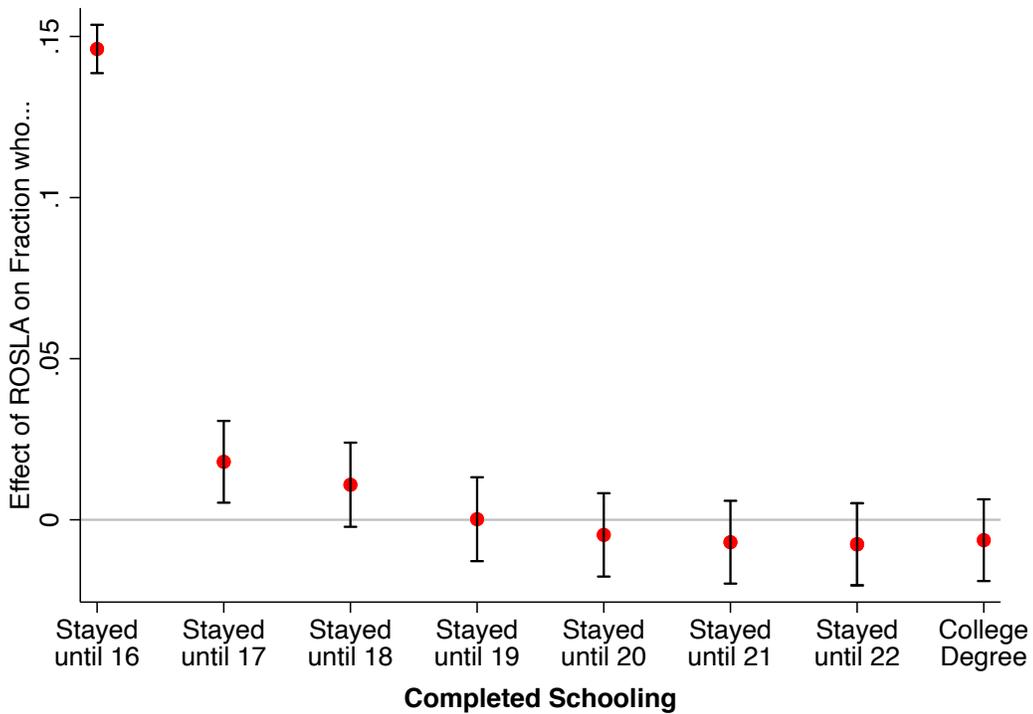
**Appendix Figure L5: Fraction with a College Degree by Year of Birth**



*Notes:* The figure shows the fraction of study participants with a college degree by year of birth. Year of birth runs from September 1 of a given a year to August 31 of the following year. Those born in Year 0 were born between September 1, 1957 and August 31, 1958. Cohorts born after Year 0 had to stay in school until age 16 while cohorts born before could leave at age 15. The figure shows linear trends for a 4-year bandwidth and quadratic trends for a 10-year bandwidth. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 106,220$  (4-year bandwidth) and  $277,658$  (10-year bandwidth).

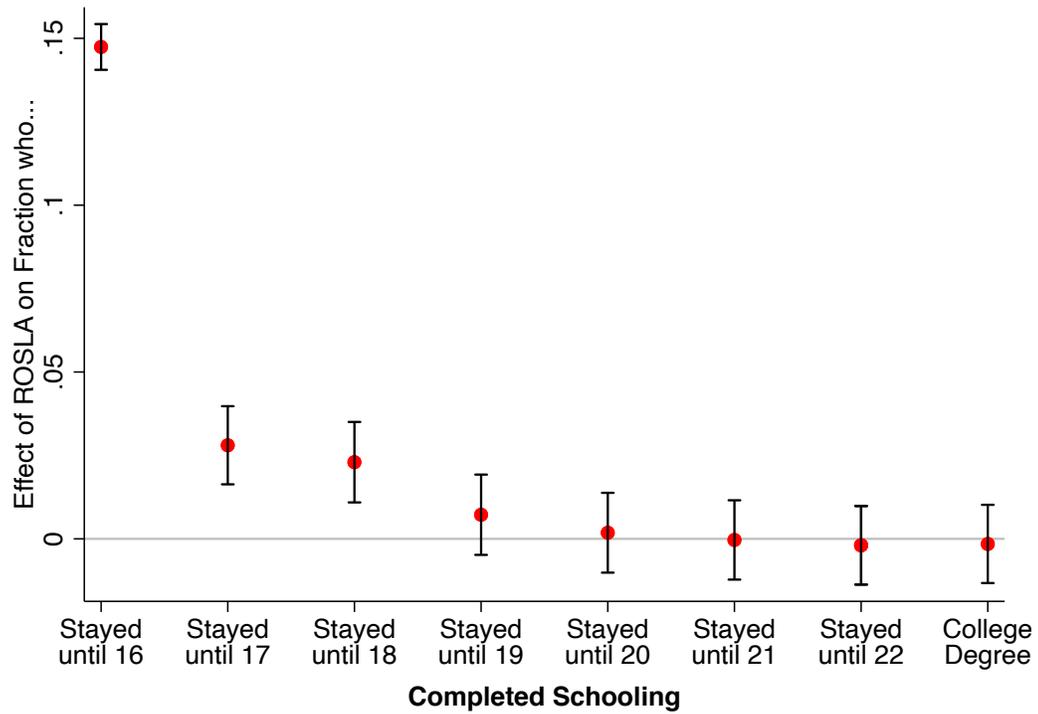
The next two figures, Appendix Figure L6 (for 4-year bandwidth) and Appendix Figure L7 (for 10-year bandwidth), gathers in just one graph the estimates of the effects on different school-leaving ages and on college graduation. They confirm that the ROSLA did not cause people to stay past age 18. The estimates of the effects on staying until ages 16, 17, and 18 in these two figures are different from the estimates shown in Figure 5 in the paper and in Appendix Table B1 because the latter two exclude individuals who stayed in school past age 18 (while Appendix Figure L6 and Appendix Figure L7 do not).

**Appendix Figure L6: Effect of ROSLA on Completed Schooling (4-Year Bandwidth)**



*Notes:* The figure shows estimates of the effects of the ROSLA on different levels of schooling using a 4-year bandwidth. The circles show the point estimates. The brackets show 95% confidence intervals. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 107,194$  for school-leaving age and  $106,220$  for college degree.

**Appendix Figure L7: Effect of ROSLA on Completed Schooling (10-Year Bandwidth)**



*Notes:* The figure shows estimates of the effects of the ROSLA on different levels of schooling using a 4-year bandwidth. The circles show the point estimates. The brackets show 95% confidence intervals. We use triangular kernel weights that give greater weight to study participants born closer to September 1, 1957.  $N = 280,284$  for school-leaving age and 277,658 for college degree.

**Appendix Table L1: Effect of the 1972 ROSLA on Fraction Staying in School until Age 19**

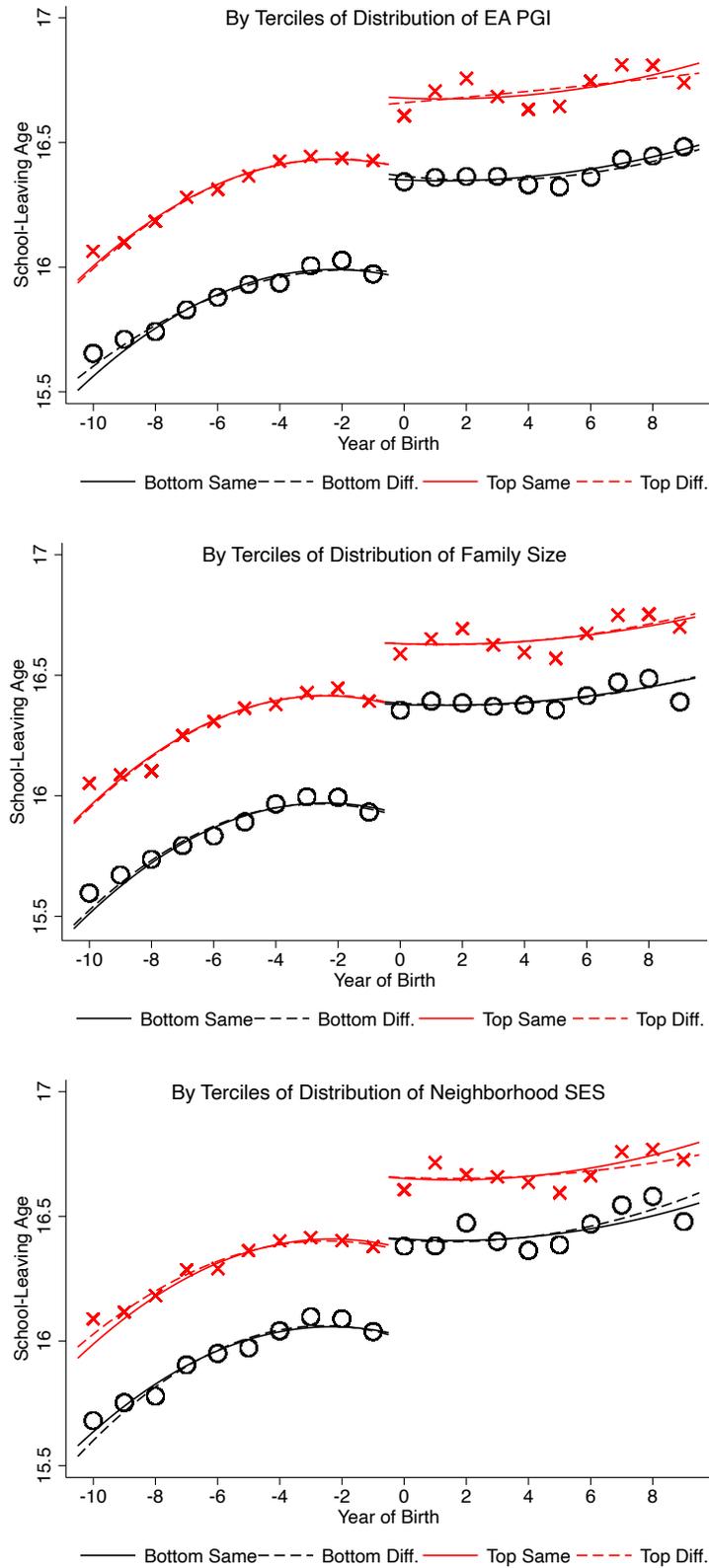
	<b>1 if Stayed in School until Age...</b>				<i>Graduated</i>
	<i>19</i>	<i>20</i>	<i>21</i>	<i>22</i>	<i>College</i>
<b>Top Panel: 4-Year Bandwidth</b>					
Post	1.76E-04 [0.007]	-0.005 [0.007]	-0.007 [0.007]	-0.008 [0.006]	-0.006 [0.006]
Observations	107,194	107,194	107,194	107,194	106,220
<b>Bottom Panel: 10-Year Bandwidth</b>					
Post	0.007 [0.006]	0.002 [0.006]	-3.22E-04 [0.006]	-0.002 [0.006]	-0.002 [0.006]
Observations	280,284	280,284	280,284	280,284	277,658

Notes: Post is an indicator for being born on or after September 1, 1957. The specification using a 4-year bandwidth includes linear trends in exact date of birth while the specification using a 10-year bandwidth includes quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. College degree has a different number of observations from the other dependent variables because it is based on a separate question about qualifications. Robust standard errors between brackets.

## **APPENDIX M**

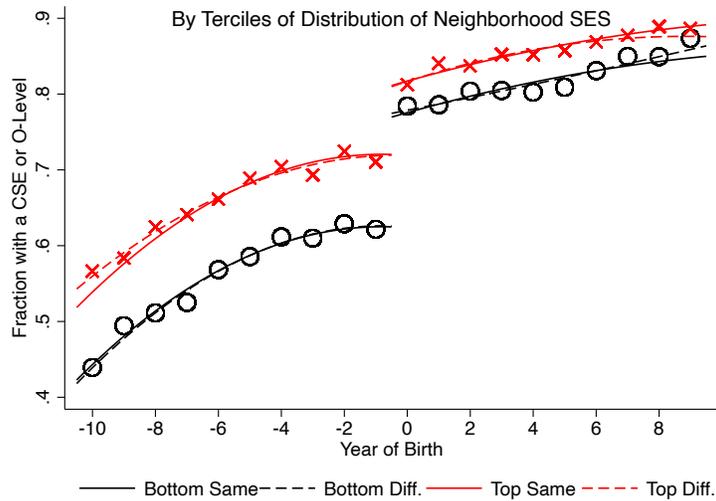
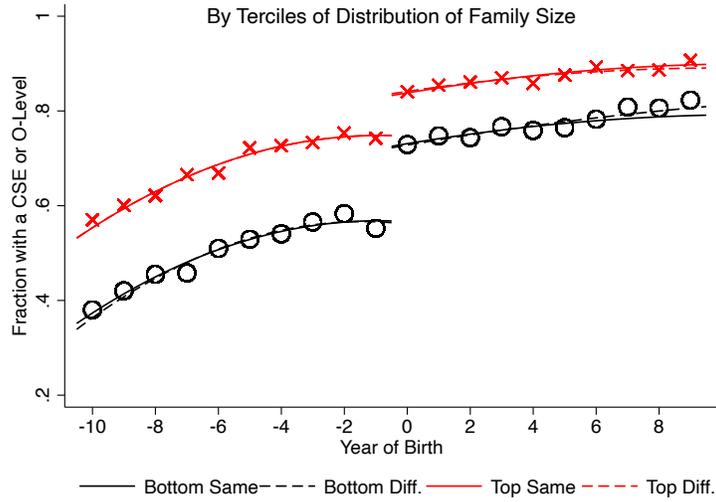
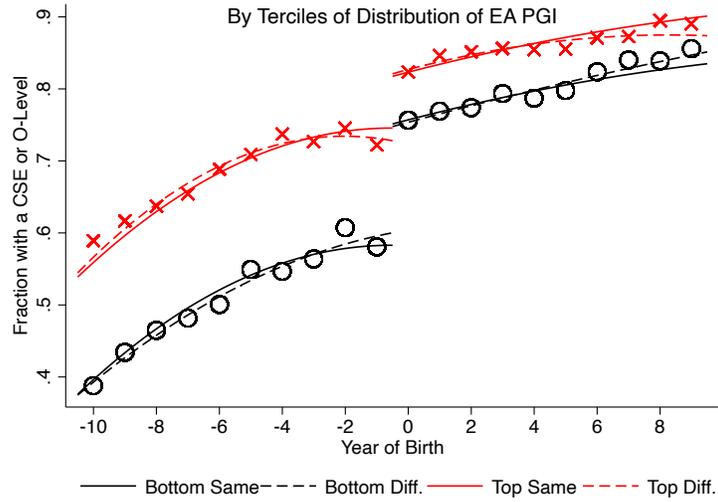
To maximize statistical power, the analyses in the paper assume that the birth cohort trends were invariant to early-life advantages. We relax this assumption in this section, allowing the top, middle, and bottom terciles of the distribution of a given proxy to have different birth cohort trends.

**Appendix Figure M1: Different Birth Cohort Trends for School-Leaving Age for Bottom and Top Terciles (10-Year Bandwidth)**



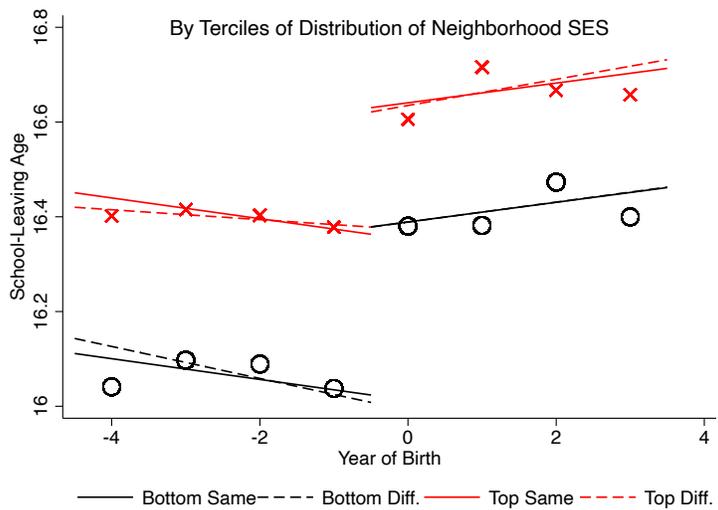
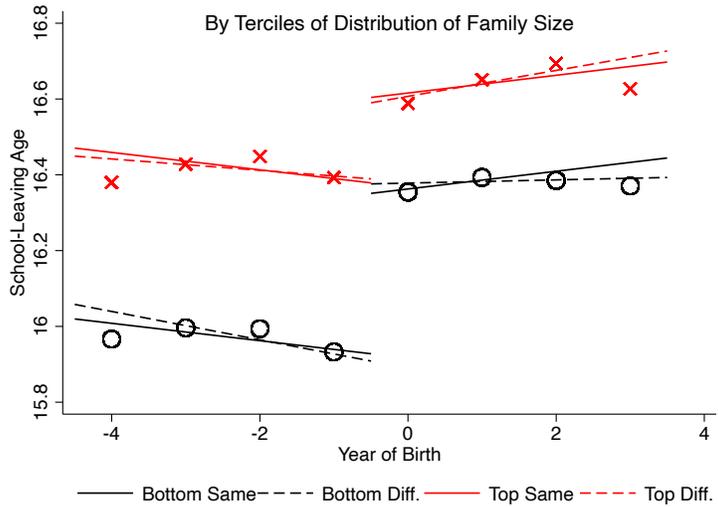
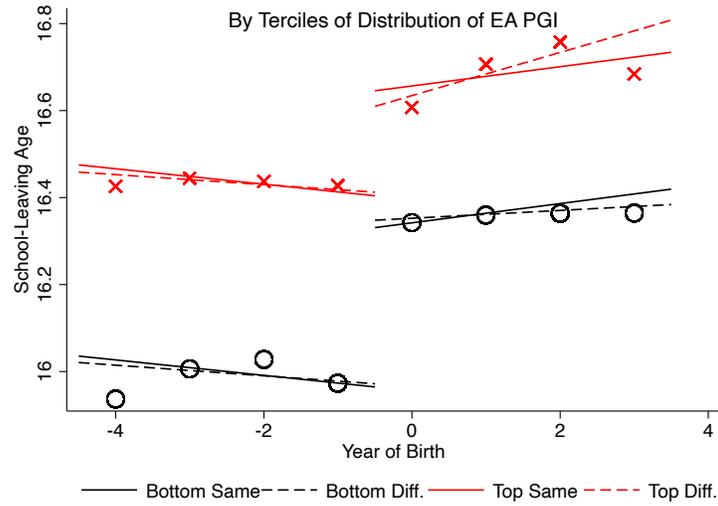
*Notes:* The figure assesses the sensitivity of the results to the assumption that the birth cohort trends were invariant to early-life advantages. The solid curves show 10-year birth cohort quadratic trends for school-leaving age under this assumption. The dashed curves show comparable trends when the top and bottom terciles are allowed to have distinct birth cohort trends (the middle tercile also has its own birth cohort trend; it is not shown for ease of exposition).  $N = 105,693$  (EA PGI);  $112,395$  (family size); and  $109,177$  (neighborhood SES).

**Appendix Figure M2: Different Birth Cohort Trends for Fraction with a CSE or O-Level for Bottom and Top Terciles (10-Year Bandwidth)**



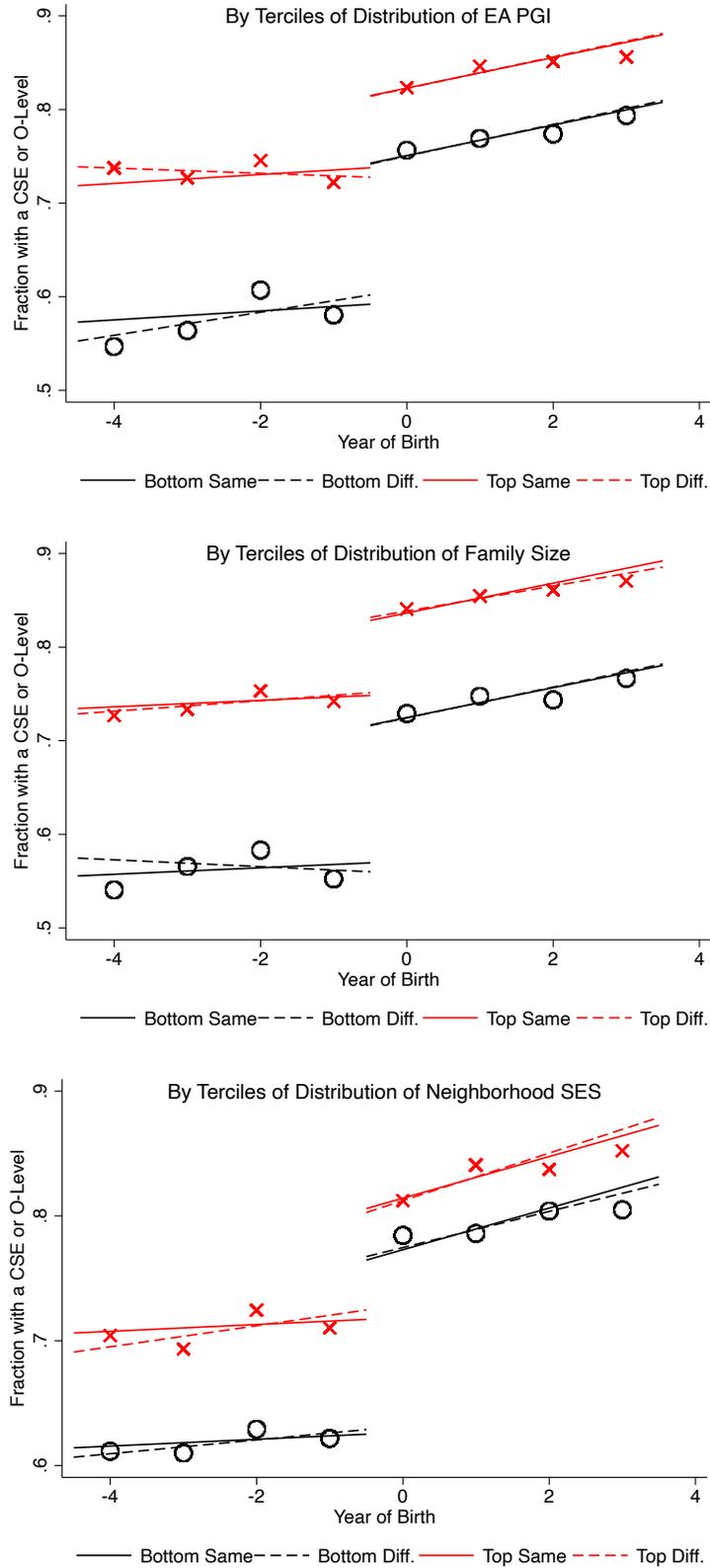
*Notes:* The figure assesses the sensitivity of the results to the assumption that the birth cohort trends were invariant to early-life advantages. The solid curves show 10-year birth cohort quadratic trends for fraction with a CSE or O-Level under this assumption. The dashed curves show comparable trends when the top and bottom terciles are allowed to have distinct birth cohort trends (the middle tercile also has its own birth cohort trend; it is not shown for ease of exposition).  $N = 105,608$  (EA PGI); 110,909 (family size); and 107,842 (neighborhood SES).

**Appendix Figure M3: Different Birth Cohort Trends for School-Leaving Age for Bottom and Top Terciles (4-Year Bandwidth)**



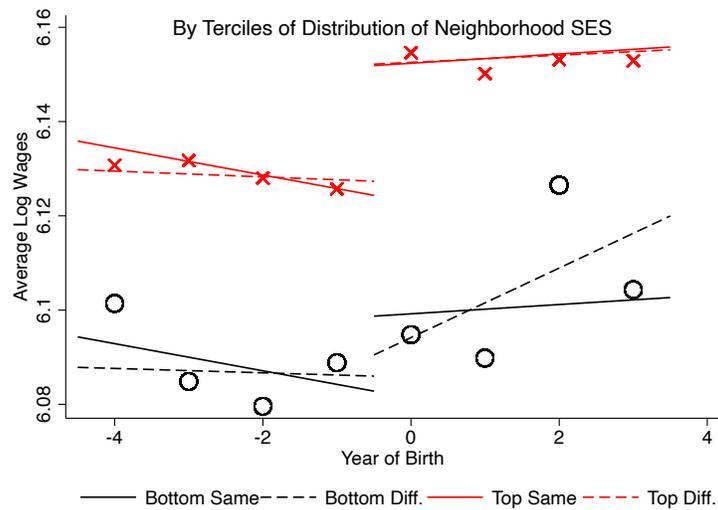
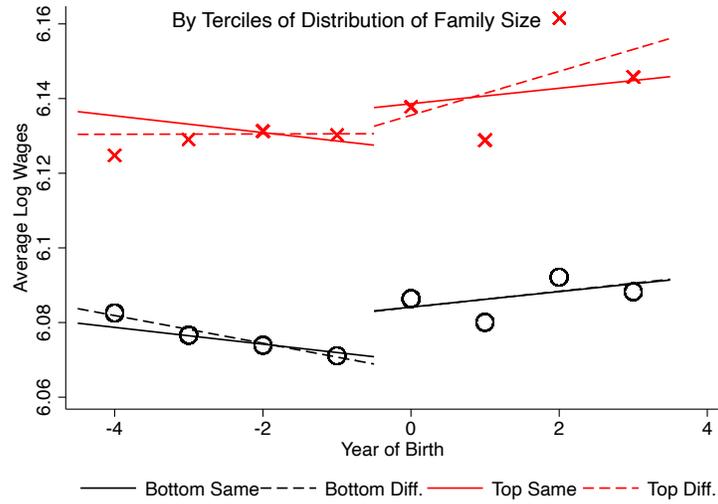
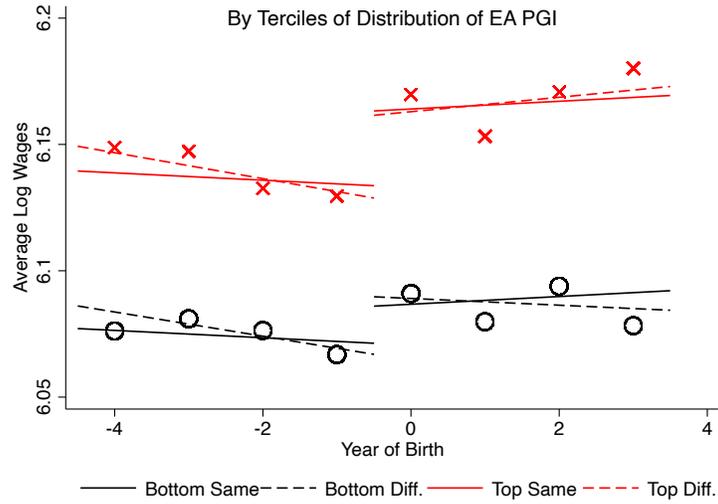
*Notes:* The figure assesses the sensitivity of the results to the assumption that the birth cohort trends were invariant to early-life advantages. The solid curves show 4-year birth cohort linear trends for school-leaving age under this assumption. The dashed curves show comparable trends when the top and bottom terciles are allowed to have distinct birth cohort trends (the middle tercile also has its own birth cohort trend; it is not shown for ease of exposition).  $N = 42,731$  (EA PGI); 45,701 (family size); 44,043 (neighborhood SES).

**Appendix Figure M4: Different Birth Cohort Trends for Fraction with a CSE or O-Level for Bottom and Top Terciles (4-Year Bandwidth)**



*Notes:* The figure assesses the sensitivity of the results to the assumption that the birth cohort trends were invariant to early-life advantages. The solid curves show 4-year birth cohort linear trends for fraction with a CSE or O-Level under this assumption. The dashed curves show comparable trends when the top and bottom terciles are allowed to have distinct birth cohort trends (the middle tercile also has its own birth cohort trend; it is not shown for ease of exposition).  $N = 42,731$  (EA PGI); 45,701 (family size); 44,043 (neighborhood SES).

**Appendix Figure M5: Different Birth Cohort Trends for Log Wages for Bottom and Top Terciles (4-Year Bandwidth)**



*Notes:* The figure assesses the sensitivity of the results to the assumption that the birth cohort trends were invariant to early-life advantages. The solid curves show 4-year birth cohort linear trends for log wages under this assumption. The dashed curves show comparable trends when the top and bottom terciles are allowed to have distinct birth cohort trends (the middle tercile also has its own birth cohort trend; it is not shown for ease of exposition).  $N = 42,701$  (EA PGI); 45,131 (family size); and 43,548 (neighborhood SES).

**Appendix Table M1: Effect of the 1972 ROSLA on School-Leaving Age,  
by EA PGI, Family Size, and Neighborhood SES**

	School-Leaving Age					
<b>Top Panel: Discrete 4-Year Bandwidth</b>						
Top PGI * Post	-0.125 [0.027]	-0.182 [0.049]				
Top Family * Post			-0.198 [0.025]	-0.259 [0.046]		
Top Neighborhood * Post					-0.088 [0.028]	-0.119 [0.051]
Mid PGI * Post	-0.065 [0.027]	-0.044 [0.049]				
Mid Family * Post			-0.157 [0.027]	-0.225 [0.051]		
Mid Neighborhood * Post					-0.037 [0.026]	-0.035 [0.046]
Post	0.368 [0.025]	0.379 [0.032]	0.421 [0.023]	0.460 [0.030]	0.353 [0.025]	0.362 [0.033]
Differential Trends by Tercile?	N	Y	N	Y	N	Y
P-value Joint Test of Differential Trends		0.097		0.153		0.748
Observations	46,308	46,308	46,308	46,308	46,308	46,308
<b>Bottom Panel: Discrete 10-Year Bandwidth</b>						
Top PGI * Post	-0.113 [0.017]	-0.152 [0.045]				
Top Family * Post			-0.192 [0.016]	-0.210 [0.043]		
Top Neighborhood * Post					-0.108 [0.017]	-0.099 [0.047]
Mid PGI * Post	-0.060 [0.017]	-0.047 [0.045]				
Mid Family * Post			-0.147 [0.018]	-0.180 [0.047]		
Mid Neighborhood * Post					-0.031 [0.017]	-0.052 [0.043]
Post	0.386 [0.021]	0.393 [0.029]	0.438 [0.020]	0.453 [0.029]	0.379 [0.021]	0.383 [0.030]
Differential Trends by Tercile?	N	Y	N	Y	N	Y
P-value Joint Test of Differential Trends		0.579		0.961		0.186
Observations	114,025	114,025	114,025	114,025	114,025	114,025

*Notes:* The table assesses the sensitivity of the results to the assumption that the birth cohort trends were invariant to early-life advantages. The odd columns show results that assume that the bottom, middle, and top terciles share the same birth cohort trends. The even columns allow these terciles to have different trends. The dependent variable is school-leaving age. PGI is the polygenic index for educational attainment. Post is an indicator for being born on or after September 1, 1957. Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. The top panel includes linear trends in exact date of birth

while the bottom panel includes quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. The coefficients on Top PGI, Top Family, Top Neighborhood, Mid PGI, Mid Family, and Mid Neighborhood are omitted.

**Appendix Table M2: Effect of the 1972 ROSLA on Having a CSE or O-Level,  
by EA PGS, Family Size, and Neighborhood SES**

	1 if Have CSE or O-Level					
<b>Top Panel: Discrete 4-Year Bandwidth</b>						
Top PGI * Post	-0.074	-0.057				
	[0.012]	[0.022]				
Top Family * Post			-0.067	-0.073		
			[0.011]	[0.021]		
Top Neighborhood * Post					-0.051	-0.059
					[0.012]	[0.022]
Mid PGI * Post	-0.041	-0.032				
	[0.012]	[0.022]				
Mid Family * Post			-0.035	-0.055		
			[0.012]	[0.023]		
Mid Neighborhood * Post					-0.026	-0.012
					[0.012]	[0.022]
Post	0.151	0.143	0.146	0.153	0.139	0.137
	[0.012]	[0.016]	[0.011]	[0.016]	[0.012]	[0.016]
Differential Trends by Tercile?	N	Y	N	Y	N	Y
P-value Joint Test of Differential Trends		0.663		0.469		0.404
Observations	45,727	45,727	45,727	45,727	45,727	45,727
<b>Bottom Panel: Discrete 10-Year Bandwidth</b>						
Top PGI * Post	-0.097	-0.062				
	[0.008]	[0.020]				
Top Family * Post			-0.073	-0.067		
			[0.007]	[0.019]		
Top Neighborhood * Post					-0.054	-0.060
					[0.007]	[0.020]
Mid PGI * Post	-0.050	-0.036				
	[0.008]	[0.021]				
Mid Family * Post			-0.039	-0.042		
			[0.008]	[0.022]		
Mid Neighborhood * Post					-0.020	-0.029
					[0.008]	[0.021]
Post	0.170	0.155	0.157	0.156	0.146	0.150
	[0.010]	[0.014]	[0.009]	[0.014]	[0.010]	[0.014]
Differential Trends by Tercile?	N	Y	N	Y	N	Y
P-value Joint Test of Differential Trends		0.065		0.725		0.397
Observations	112,510	112,510	112,510	112,510	112,510	112,510

*Notes:* The table assesses the sensitivity of the results to the assumption that the birth cohort trends were invariant to early-life advantages. The odd columns show results that assume that the bottom, middle, and top terciles share the same birth cohort trends. The even columns allow these terciles to have different trends. The dependent variable is an indicator for having a CSE or an O-Level. PGI is the polygenic index for educational attainment. Post is an indicator for being born on or after September 1, 1957. Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. The top panel includes linear

trends in exact date of birth while the bottom panel includes quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. The coefficients on Top PGI, Top Family, Top Neighborhood, Mid PGI, Mid Family, and Mid Neighborhood are omitted.

**Appendix Table M3: Effect of the 1972 ROSLA on Log Wages,  
by EA PGS, Family Size, and Neighborhood SES**

	Log Wages					
<b>Top Panel: Discrete 4-Year Bandwidth</b>						
Top PGI * Post	0.015 [0.010]	0.012 [0.017]				
Top Family * Post			-0.002 [0.009]	-0.012 [0.016]		
Top Neighborhood * Post					0.012 [0.010]	0.024 [0.018]
Mid PGI * Post	-0.009 [0.010]	-0.026 [0.017]				
Mid Family * Post			0.015 [0.010]	0.022 [0.018]		
Mid Neighborhood * Post					-0.002 [0.009]	0.027 [0.017]
Post	0.015 [0.009]	0.021 [0.012]	0.012 [0.008]	0.014 [0.011]	0.014 [0.009]	0.001 [0.012]
Differential Trends by Tercile?	N	Y	N	Y	N	Y
P-value Joint Test of Differential Trends		0.377		0.699		0.138
Observations	46,308	46,308	46,308	46,308	46,308	46,308
<b>Bottom Panel: Discrete 10-Year Bandwidth</b>						
Top PGI * Post	0.016 [0.006]	0.019 [0.016]				
Top Family * Post			0.006 [0.006]	-0.010 [0.015]		
Top Neighborhood * Post					0.010 [0.006]	0.023 [0.016]
Mid PGI * Post	0.002 [0.006]	-0.017 [0.016]				
Mid Family * Post			0.006 [0.006]	0.029 [0.017]		
Mid Neighborhood * Post					-0.001 [0.006]	0.012 [0.016]
Post	0.011 [0.007]	0.016 [0.011]	0.012 [0.007]	0.012 [0.011]	0.014 [0.007]	0.006 [0.011]
Differential Trends by Tercile?	N	Y	N	Y	N	Y
P-value Joint Test of Differential Trends		0.178		0.184		0.638
Observations	114,025	114,025	114,025	114,025	114,025	114,025

*Notes:* The table assesses the sensitivity of the results to the assumption that the birth cohort trends were invariant to early-life advantages. The odd columns show results that assume that the bottom, middle, and top terciles share the same birth cohort trends. The even columns allow these terciles to have different trends. The dependent variable is log wages. PGI is the polygenic index for educational attainment. Post is an indicator for being born on or after September 1, 1957. Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. The top panel includes linear trends in exact date of birth while the

bottom panel includes quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. The coefficients on Top PGI, Top Family, Top Neighborhood, Mid PGI, Mid Family, and Mid Neighborhood are omitted.

**Appendix Table M4: Effect of an Additional Year of Schooling on Log Wages,  
by EA PGI, Family Size, and Neighborhood SES**

	Log Wages					
<b>Top Panel: Discrete 4-Year Bandwidth</b>						
Top PGI * SLA	0.082 [0.035]	0.111 [0.074]				
Top Family * SLA			0.018 [0.034]	-0.021 [0.064]		
Top Neighborhood * SLA					0.057 [0.033]	0.101 [0.063]
Mid PGI * SLA	-0.019 [0.028]	-0.072 [0.049]				
Mid Family * SLA			0.076 [0.034]	0.121 [0.068]		
Mid Neighborhood * SLA					-0.002 [0.028]	0.083 [0.050]
SLA	0.043 [0.024]	0.055 [0.030]	0.031 [0.020]	0.031 [0.024]	0.040 [0.025]	0.001 [0.033]
Differential Trends by Tercile?	N	Y	N	Y	N	Y
P-value Joint Test of Differential Trends		0.308		0.601		0.115
Observations	46,308	46,308	46,308	46,308	46,308	46,308
<b>Bottom Panel: Discrete 10-Year Bandwidth</b>						
Top PGI * SLA	0.061 [0.018]	0.103 [0.057]				
Top Family * SLA			0.040 [0.019]	-0.020 [0.050]		
Top Neighborhood * SLA					0.044 [0.018]	0.086 [0.051]
Mid PGI * SLA	0.009 [0.015]	-0.043 [0.044]				
Mid Family * SLA			0.032 [0.018]	0.124 [0.055]		
Mid Neighborhood * SLA					0.001 [0.015]	0.037 [0.045]
SLA	0.033 [0.019]	0.041 [0.027]	0.031 [0.017]	0.027 [0.023]	0.037 [0.019]	0.015 [0.029]
Differential Trends by Tercile?	N	Y	N	Y	N	Y
P-value Joint Test of Differential Trends		0.135		0.127		0.409
Observations	114,025	114,025	114,025	114,025	114,025	114,025

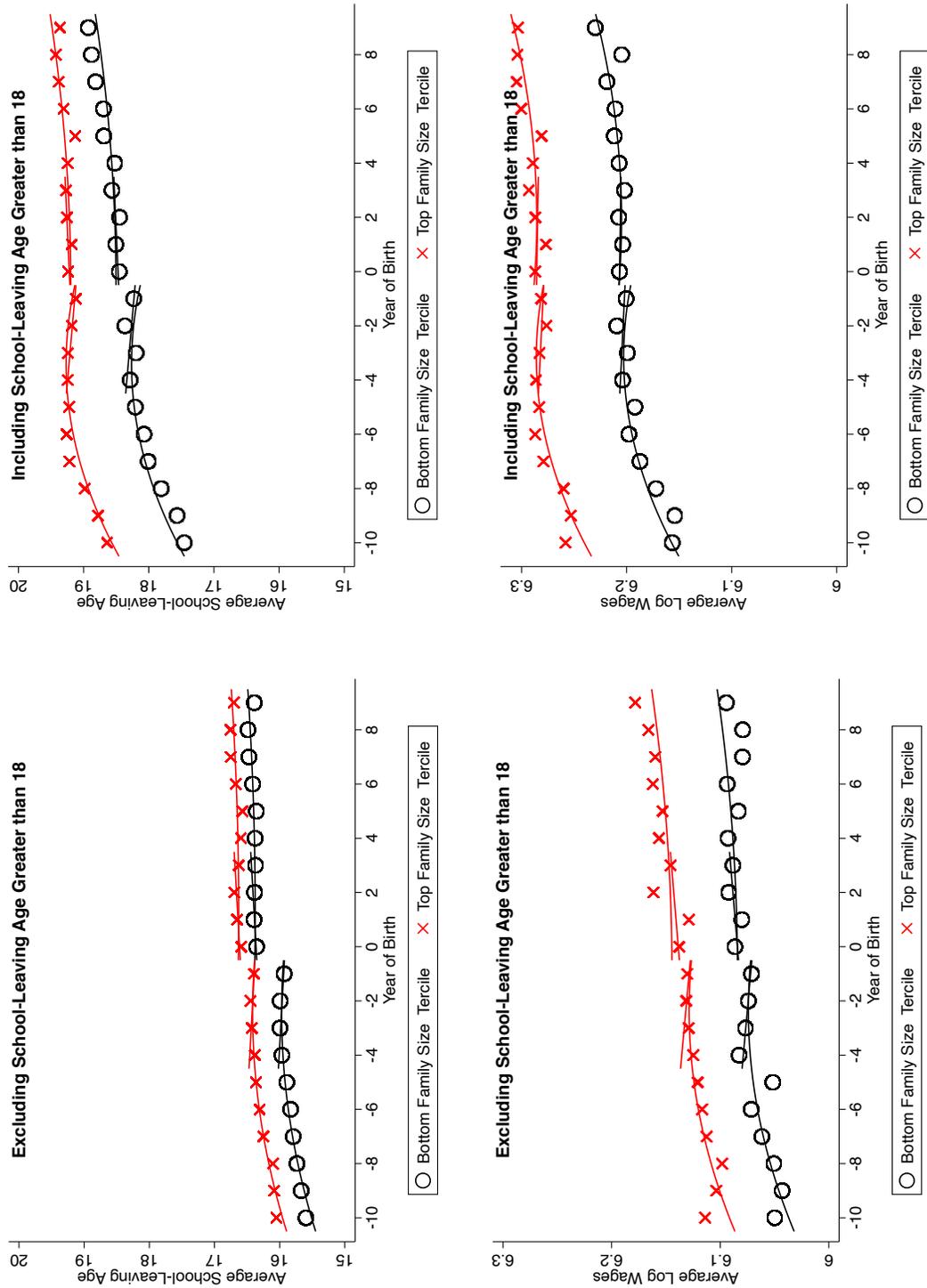
*Notes:* The table assesses the sensitivity of the results to the assumption that the birth cohort trends were invariant to early-life advantages. The odd columns show results that assume that the bottom, middle, and top terciles share the same birth cohort trends. The even columns allow these terciles to have different trends. The dependent variable is log wages. PGI is the polygenic index for educational attainment. SLA is school-leaving age, which is instrumented using the indicator for being born after September 1, 1957. Top and Mid are indicators for being in the top or middle terciles of the distribution of a given proxy. The top panel includes

linear trends in exact date of birth while the bottom panel includes quadratic trends. In both cases, trends are allowed to be different before and after September 1, 1957. Robust standard errors between brackets. The coefficients on Top PGI, Top Family, Top Neighborhood, Mid PGI, Mid Family, and Mid Neighborhood are omitted.

## **APPENDIX N**

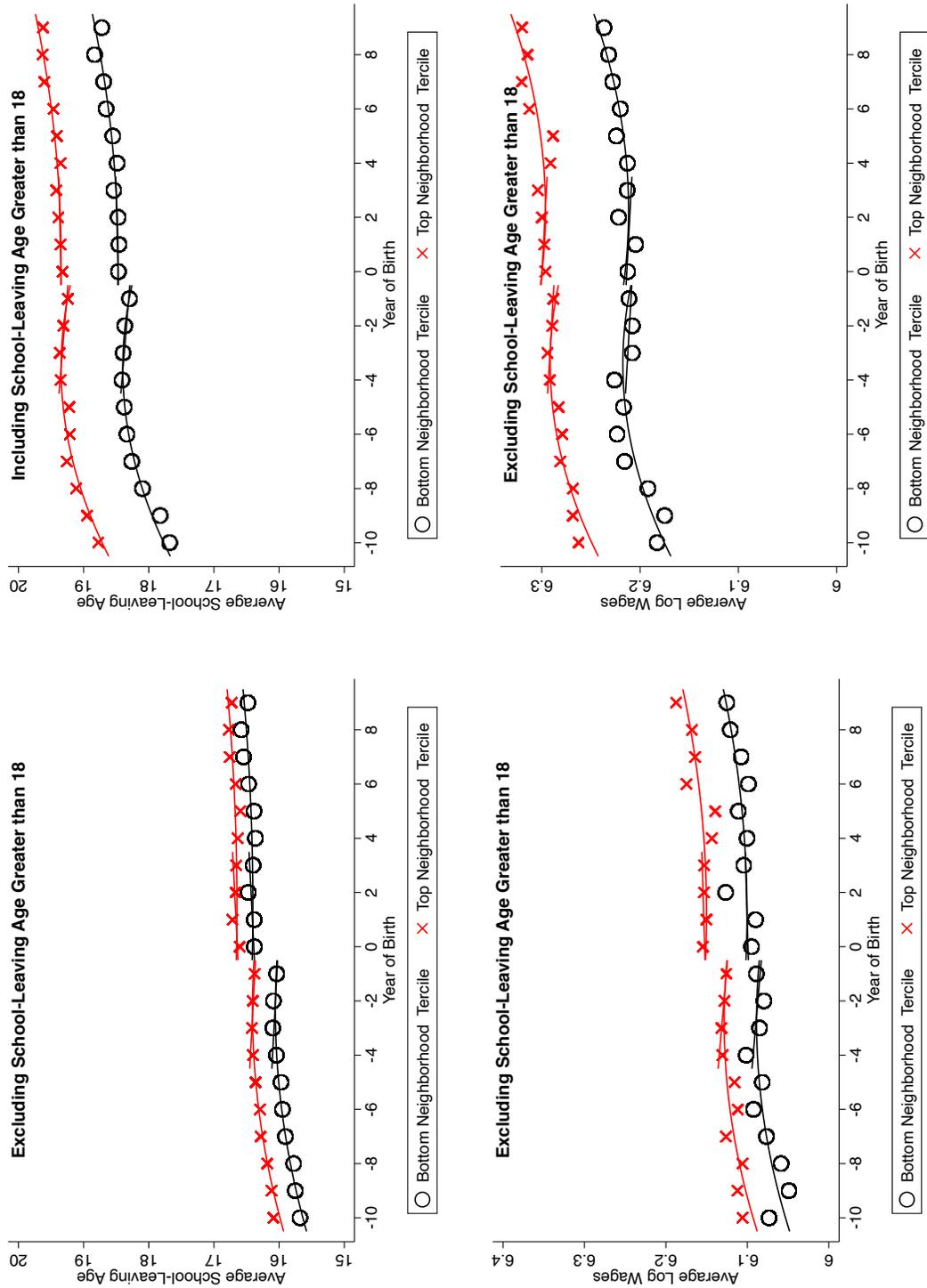
Figure 11 in the paper assessed the sensitivity of the results by EA PGI to excluding individuals who stayed in school past age 18. This Appendix shows similar figures for family size and neighborhood SES.

**Appendix Figure N1: Including UKB Participants who Stayed in School Past Age 18**



Notes: The figure assesses the sensitivity to excluding individuals who stayed in school past age 18. The left column shows results for our main sample, which excludes these individuals. The right column shows results for the full sample, which includes those who stayed in school past age 18. The top row shows average school-leaving age by year of birth, separately for the bottom and top terciles of the family size distribution. The bottom row shows average log wages by year of birth.  $N = 45,701$  (excluding SLA > 18 with 4-year bandwidth);  $112,395$  (excluding SLA > 18 with 10-year bandwidth);  $85,308$  (including SLA > 18 with 4-year bandwidth); and  $209,338$  (including SLA > 18 with 10-year bandwidth). Wages are imputed based on one's occupation.

**Appendix Figure N2: Including UKB Participants who Stayed in School Past Age 18**



Notes: The figure assesses the sensitivity to excluding individuals who stayed in school past age 18. The left column shows results for our main sample, which excludes these individuals. The right column shows results for the full sample, which includes those who stayed in school past age 18. The top row shows average school-leaving age by year of birth, separately for the bottom and top tertiles of the neighborhood SES distribution. The bottom row shows average log wages by year of birth.  $N = 44,043$  (excluding SLA > 18 with 4-year bandwidth); 109,177 (excluding SLA > 18 with 10-year bandwidth); 81,454 (including SLA > 18 with 4-year bandwidth); and 201,340 (including SLA > 18 with 10-year bandwidth). Wages are imputed based on one's occupation.