

Online Appendix. Supplementary tables and figures

Table A1: Distribution of older siblings' exit exam grades (grade 9)

| Grades | | Math | Danish (Written) | Danish (Grammar) | Danish (Oral) |
|--------------|----|--------|------------------|------------------|---------------|
| 12 | A | 0.082 | 0.047 | 0.051 | 0.155 |
| 10 | B | 0.203 | 0.153 | 0.132 | 0.193 |
| 7 | C | 0.387 | 0.405 | 0.404 | 0.337 |
| 04 | D | 0.177 | 0.254 | 0.225 | 0.184 |
| 02 | E | 0.100 | 0.119 | 0.139 | 0.103 |
| 00 | Fx | 0.051 | 0.022 | 0.049 | 0.029 |
| -3 | F | 0.000 | 0.001 | 0.000 | 0.000 |
| Observations | | 50,086 | 50,086 | 50,086 | 50,086 |

Note: Table shows the distribution of older siblings' exit exam grades at the end of grade 9. The table is based on the population of children born from 1986 to 2000.

Table A2: Summary characteristics

| | All | Old-for-grade =0 | Old-for-grade =1 | December | January | Compliers |
|--|-------------------|---------------------|---------------------|-------------------|-------------------|--------------------------|
| Old-for-grade | 0.725 (0.446) | 0.000 - | 1.000 - | 0.577 (0.494) | 0.871 (0.335) | - |
| January=1 | 0.504 (0.500) | 0.236 (0.425) | 0.605 (0.489) | 0.000 - | 1.000 - | - |
| Covariates | | | | | | |
| Birthweight<2000g | 0.042 (0.200) | 0.031 (0.173) | 0.046 (0.209) | 0.043 (0.203) | 0.040 (0.197) | 0.056 ^B |
| Boy | 0.510 (0.500) | 0.349 (0.477) | 0.571 (0.495) | 0.510 (0.500) | 0.510 (0.500) | 0.379 ^{A,C,D,E} |
| Parents married/cohab. year before birth | 0.769 (0.422) | 0.771 (0.420) | 0.768 (0.422) | 0.769 (0.421) | 0.768 (0.422) | 0.768 |
| Mother's age at birth | 28.940 (4.857) | 29.070 (4.899) | 28.890 (4.841) | 28.916 (4.889) | 28.963 (4.825) | 28.880 |
| Father's age at birth | 31.598 (5.715) | 31.835 (5.870) | 31.510 (5.653) | 31.570 (5.755) | 31.626 (5.675) | 31.765 |
| # Older siblings | 1.109 (0.777) | 1.137 (0.796) | 1.098 (0.770) | 1.106 (0.784) | 1.111 (0.770) | 1.175 ^C |
| No siblings | 0.183 (0.387) | 0.178 (0.383) | 0.185 (0.388) | 0.186 (0.389) | 0.180 (0.384) | 0.179 |
| 1 sibling | 0.581 (0.493) | 0.569 (0.495) | 0.585 (0.493) | 0.579 (0.494) | 0.583 (0.493) | 0.538 ^{A,C,D,E} |
| 2 siblings | 0.191 (0.393) | 0.203 (0.402) | 0.187 (0.390) | 0.190 (0.392) | 0.193 (0.395) | 0.225 ^{A,C,D,E} |
| 3 siblings | 0.037 (0.188) | 0.040 (0.196) | 0.035 (0.184) | 0.037 (0.188) | 0.036 (0.187) | 0.045 |
| 4 or more siblings | 0.008 (0.089) | 0.009 (0.097) | 0.007 (0.086) | 0.008 (0.091) | 0.008 (0.087) | 0.013 |
| Outcome variables, before school start | | | | | | |
| Parents married/cohab., child age 3 | 0.841 (0.366) | 0.842 (0.364) | 0.840 (0.367) | 0.835 (0.371) | 0.846 (0.361) | 0.869 ^D |
| Father employed, child age 3 | 0.854 (0.353) | 0.848 (0.359) | 0.857 (0.351) | 0.851 (0.356) | 0.857 (0.350) | 0.862 |
| Mother employed, child age 3 | 0.721 (0.448) | 0.721 (0.449) | 0.722 (0.448) | 0.715 (0.451) | 0.727 (0.445) | 0.742 |
| Observations | 132,039 | 36,252 | 95,787 | 65,554 | 66,485 | |

Note: Table shows results from averages and (standard deviation) for population of children born in December or January from December 1986 to January 2000, by old-for-grade and month of birth. The final column shows average characteristics of the compliers (those whose treatment status is determined by the cutoff) estimated using observations close to the cutoff as where α is the fraction of always-takers, β is the fraction of never-takers, γ is the fraction of compliers (assuming monotonicity), D is old-for-grade (0/1), and Z is the cutoff (0/1). Standard errors are estimated from 100 bootstraps. Significant differences at a 10% level: ^A: average characteristics of full sample and compliers. ^B: average characteristics of children with old-for-grade = 0 and compliers. ^C: average characteristics of children with old-for-grade = 1 and compliers. ^D: average characteristics of children born in December and compliers. ^E: average characteristics of children born in January and compliers.

Table A3: Balancing test: Regression of instrument on family characteristics

| | (1) | (2) | (3) | (4) |
|--|-------------------|-------------------|-------------------|-------------------|
| Birth weight<2000g | 0.001 (0.009) | 0.001 (0.009) | 0.001 (0.009) | 0.001 (0.009) |
| Boy | 0.001 (0.001) | 0.001 (0.001) | 0.001 (0.001) | 0.001 (0.001) |
| Boy*Birthweight<2000g | 0.005 (0.013) | 0.005 (0.013) | 0.005 (0.013) | 0.005 (0.013) |
| # Older siblings | -0.001 (0.002) | -0.001 (0.002) | -0.001 (0.002) | -0.001 (0.002) |
| Parents married/cohab. year before birth | 0.000 (0.002) | 0.000 (0.002) | -0.002 (0.003) | -0.002 (0.003) |
| Mother's age at birth | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| Father's age at birth | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| Mother higher than high school | | | 0.002 (0.002) | 0.002 (0.002) |
| Mother's wage earnings age 5 | | | 0.000 (0.000) | 0.000 (0.000) |
| Mother's employment age 5 | | | 0.001 (0.002) | 0.001 (0.002) |
| Parents married / cohab age 5 | | | 0.002 (0.003) | 0.002 (0.003) |
| Observations | 132,039 | 132,039 | 132,039 | 132,039 |
| F-statistic | 1.00 | 0.84 | 1.17 | 1.03 |
| P-value | 0.43 | 0.55 | 0.30 | 0.41 |
| Distance to cutoff | X | X | X | X |
| Child characteristics at birth | X | X | X | X |
| Parental characteristics, at/before child birth | X | X | X | X |
| Cohort fixed effects | | X | | X |
| Additional parental characteristics, child age 5 | | | X | X |

Note: Results estimated using our main estimation sample.

Table A4: ‘Effects’ of being old-for-grade on fertility before and after birth of focal child

| Fertility: | OLS | 2SLS | 2SLS |
|-------------------------------------|---------------------|--------------------|--------------------|
| 9 years before birth of focal child | -0.000 (0.001) | 0.004 (0.005) | 0.003 (0.005) |
| 8 years before birth of focal child | -0.001 (0.001) | -0.012* (0.006) | -0.013* (0.006) |
| 7 years before birth of focal child | 0.000 (0.001) | 0.001 (0.006) | -0.001 (0.006) |
| 6 years before birth of focal child | -0.002* (0.001) | 0.002 (0.007) | 0.000 (0.007) |
| 5 years before birth of focal child | -0.000 (0.001) | 0.003 (0.008) | 0.001 (0.008) |
| 4 years before birth of focal child | -0.001 (0.001) | -0.001 (0.009) | -0.003 (0.009) |
| 3 years before birth of focal child | -0.002 (0.001) | -0.010 (0.011) | -0.011 (0.011) |
| 2 years before birth of focal child | -0.005** (0.001) | 0.018 (0.012) | 0.018 (0.012) |
| 1 year before birth of focal child | -0.003** (0.001) | 0.008 (0.009) | 0.008 (0.009) |
| Birth of focal child | - | - | - |
| 1 year after birth of focal child | 0.000 (0.001) | -0.015 (0.010) | -0.014 (0.010) |
| 2 years after birth of focal child | 0.001 (0.002) | -0.022+ (0.013) | -0.019 (0.013) |
| 3 years after birth of focal child | 0.001 (0.001) | 0.013 (0.012) | 0.016 (0.012) |
| 4 years after birth of focal child | -0.002+ (0.001) | 0.003 (0.010) | 0.005 (0.010) |
| 5 years after birth of focal child | -0.003** (0.001) | 0.005 (0.008) | 0.006 (0.008) |
| 6 years after birth of focal child | -0.000 (0.001) | 0.010 (0.007) | 0.011 (0.007) |
| 7 years after birth of focal child | -0.001+ (0.001) | 0.002 (0.006) | 0.003 (0.006) |
| 8 years after birth of focal child | -0.000 (0.001) | -0.009 (0.006) | -0.008 (0.006) |
| 9 years after birth of focal child | -0.000 (0.001) | -0.001 (0.005) | -0.000 (0.005) |
| Distance to cutoff | | X | X |
| Covariates | X | | X |
| Observations | 132,039 | 132,039 | 132,039 |

Note: Table shows the estimated effects of being old-for-grade based on OLS and 2SLS regressions on fertility before and after birth of the focal child. Cutoff dummy (January = 1) used as instrument. Conditioning set includes distance to cutoff, cohort fixed effects and background characteristics (see Table 2). Standard errors in parentheses +p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.

Table A5: Effects of being old-for-grade on parental outcomes by focal child's age

| Age | Parents married / cohabiting | | Maternal employment | | Observations |
|--------------------|------------------------------|--------------------|----------------------|-------------------|--------------|
| | OLS | 2SLS | OLS | 2SLS | |
| 3 | 0.001 (0.002) | 0.005 (0.018) | -0.001 (0.003) | -0.001 (0.021) | 132039 |
| 4 | -0.003 (0.002) | 0.018 (0.019) | 0.005+ (0.003) | -0.005 (0.021) | 132039 |
| 5 | -0.007** (0.002) | 0.017 (0.020) | 0.001 (0.002) | 0.017 (0.021) | 132039 |
| 6 | -0.011*** (0.002) | 0.005 (0.021) | 0.005* (0.002) | 0.005 (0.021) | 132039 |
| 7 | -0.012*** (0.003) | 0.033 (0.022) | 0.004 (0.002) | 0.046* (0.020) | 132039 |
| 8 | -0.011*** (0.003) | 0.034 (0.022) | 0.001 (0.002) | 0.039+ (0.020) | 132039 |
| 9 | -0.011*** (0.003) | 0.035 (0.023) | 0.002 (0.002) | 0.027 (0.020) | 132039 |
| 10 | -0.012*** (0.003) | 0.035 (0.024) | -0.004+ (0.002) | 0.023 (0.020) | 132039 |
| 11 | -0.011*** (0.003) | 0.038 (0.024) | -0.007** (0.002) | 0.021 (0.019) | 132039 |
| 12 | -0.010*** (0.003) | 0.038 (0.024) | -0.007** (0.002) | 0.033+ (0.019) | 132039 |
| 13 | -0.011*** (0.003) | 0.037 (0.025) | -0.010*** (0.002) | 0.021 (0.019) | 132039 |
| 14 | -0.010*** (0.003) | 0.035 (0.025) | -0.007** (0.002) | 0.012 (0.019) | 132039 |
| 15 | -0.006* (0.003) | 0.071** (0.026) | -0.008** (0.002) | 0.026 (0.020) | 122595 |
| 16 | -0.004 (0.003) | 0.079** (0.027) | -0.006** (0.002) | 0.021 (0.021) | 113036 |
| 17 | -0.002 (0.003) | 0.078** (0.028) | -0.007* (0.003) | -0.016 (0.021) | 103487 |
| 18 | -0.002 (0.003) | 0.067* (0.028) | -0.006* (0.003) | -0.005 (0.022) | 93388 |
| 19 | -0.001 (0.004) | 0.061* (0.029) | -0.007* (0.003) | -0.002 (0.023) | 83509 |
| 20 | -0.000 (0.004) | 0.054+ (0.031) | -0.008* (0.003) | -0.012 (0.025) | 73021 |
| 21 | -0.002 (0.004) | 0.024 (0.033) | | | 63259 |
| 22 | -0.002 (0.005) | 0.028 (0.040) | | | 53246 |
| Distance to cutoff | | X | | X | |
| Covariates | X | X | X | X | |

Note: Table shows the estimation results presented in Figures 4A and 5A along with the corresponding OLS estimates. Standard errors in parentheses +p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.

Table A6: Effects of being old-for-grade on parental outcomes by focal child's grade

| Grade | Parents married / cohabiting | | Maternal employment | | Observations |
|--------------------|------------------------------|-------------------|----------------------|--------------------|--------------|
| | OLS | 2SLS | OLS | 2SLS | |
| 0 | -0.027*** (0.002) | -0.008 (0.021) | 0.019*** (0.002) | 0.035+ (0.021) | 132039 |
| 1 | -0.029*** (0.003) | 0.006 (0.022) | 0.018*** (0.002) | 0.047* (0.021) | 132039 |
| 2 | -0.032*** (0.003) | 0.012 (0.022) | 0.015*** (0.002) | 0.057** (0.020) | 132039 |
| 3 | -0.029*** (0.003) | 0.020 (0.023) | 0.011*** (0.002) | 0.041* (0.020) | 132039 |
| 4 | -0.029*** (0.003) | 0.013 (0.023) | 0.010*** (0.002) | 0.045* (0.020) | 132039 |
| 5 | -0.028*** (0.003) | 0.021 (0.024) | 0.000 (0.002) | 0.040* (0.020) | 132039 |
| 6 | -0.026*** (0.003) | 0.022 (0.024) | -0.003 (0.002) | 0.031 (0.019) | 132039 |
| 7 | -0.025*** (0.003) | 0.024 (0.024) | -0.008*** (0.002) | 0.013 (0.019) | 132039 |
| 8 | -0.026*** (0.003) | 0.023 (0.025) | -0.010*** (0.002) | 0.017 (0.019) | 132039 |
| 9 | -0.022*** (0.003) | 0.044+ (0.026) | -0.009*** (0.002) | 0.017 (0.020) | 122595 |
| 10 | -0.019*** (0.003) | 0.063* (0.027) | -0.009*** (0.002) | 0.020 (0.021) | 113036 |
| 11 | -0.017*** (0.003) | 0.066* (0.028) | -0.011*** (0.003) | -0.007 (0.021) | 103487 |
| 12 | -0.015*** (0.003) | 0.061* (0.028) | -0.009*** (0.003) | -0.012 (0.022) | 93388 |
| 13 | -0.013*** (0.004) | 0.057+ (0.029) | -0.013*** (0.003) | -0.015 (0.023) | 83509 |
| 14 | -0.011** (0.004) | 0.038 (0.031) | -0.015*** (0.003) | -0.023 (0.025) | 73021 |
| 15 | -0.012** (0.004) | 0.016 (0.033) | | | 63259 |
| Distance to cutoff | | X | | X | |
| Covariates | X | X | X | X | |

Note: Table shows the estimation results presented in Figures 4C and 5C along with the corresponding OLS estimates. Standard errors in parentheses +p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.

Table A7: Effects of being old-for-grade probability that older sibling receives a given grade or above, by distance in focal child's and sibling's age

| Math | 1-3y | 4-6y | 7-9y | Danish essay | 1-3y | 4-6y | 7-9y |
|--------------------|-------------------|-------------------|--------------------|--------------|-------------------|-------------------|-------------------|
| A | 0.025 (0.030) | -0.001 (0.045) | -0.029 (0.061) | A | -0.019 (0.023) | 0.012 (0.034) | -0.000 (0.056) |
| B or higher | -0.017 (0.047) | -0.058 (0.076) | 0.245* (0.121) | B or higher | 0.012 (0.042) | -0.052 (0.068) | 0.078 (0.108) |
| C or higher | 0.060 (0.047) | 0.018 (0.084) | 0.505** (0.172) | C or higher | 0.086+ (0.049) | 0.038 (0.086) | -0.038 (0.152) |
| D or higher | 0.029 (0.035) | -0.049 (0.066) | 0.258+ (0.138) | D or higher | 0.036 (0.034) | -0.023 (0.063) | 0.104 (0.120) |
| E or higher | -0.027 (0.021) | 0.008 (0.042) | 0.137 (0.094) | E or higher | 0.009 (0.014) | 0.024 (0.028) | 0.034 (0.058) |
| Danish grammar | 1-3y | 4-6y | 7-9y | Danish oral | 1-3y | 4-6y | 7-9y |
| A | 0.001 (0.024) | -0.031 (0.035) | -0.034 (0.058) | A | 0.044 (0.038) | 0.060 (0.062) | -0.048 (0.101) |
| B or higher | 0.057 (0.041) | 0.057 (0.065) | 0.107 (0.110) | B or higher | 0.033 (0.048) | -0.005 (0.083) | 0.054 (0.142) |
| C or higher | 0.035 (0.049) | 0.072 (0.088) | 0.424* (0.169) | C or higher | 0.028 (0.047) | -0.114 (0.084) | -0.058 (0.151) |
| D or higher | 0.005 (0.038) | 0.089 (0.072) | 0.341* (0.145) | D or higher | -0.001 (0.034) | -0.054 (0.062) | 0.007 (0.116) |
| E or higher | -0.016 (0.021) | 0.036 (0.042) | 0.082 (0.087) | E or higher | 0.007 (0.016) | -0.042 (0.032) | -0.029 (0.061) |
| Distance to cutoff | X | X | X | | X | X | X |
| Covariates | X | X | X | | X | X | X |

Note: Table shows the estimated effects of being old-for-grade based on 2SLS regressions on the probability that older siblings receive a given grade or higher at the exam at the end of grade 9. Cutoff dummy (January = 1) used as instrument. Conditioning set includes distance to cutoff, cohort fixed effects and background characteristics (see Table 2). Standard errors in parentheses +p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.

Table A8: Effects of being old-for-grade on older siblings' grades by distance in focal child's and sibling's age and gender

| Age difference | Older sisters | | | | Older brothers | | | |
|-------------------------------------|----------------------|-------------------|-------------------|--------------|----------------------|--------------------|--------------------|--------------|
| | OLS | 2SLS | 2SLS | Observations | OLS | 2SLS | 2SLS | Observations |
| Math, standard deviations | | | | | | | | |
| 1-3 years | -0.107*** (0.018) | -0.046 (0.148) | -0.118 (0.139) | 15612 | -0.108*** (0.017) | 0.269+ (0.145) | 0.236+ (0.143) | 15893 |
| 4-6 years | -0.169*** (0.027) | -0.069 (0.280) | -0.257 (0.270) | 6903 | -0.089*** (0.026) | 0.018 (0.239) | 0.006 (0.226) | 7121 |
| 7-9 years | -0.138** (0.047) | 0.598 (0.632) | 0.707 (0.556) | 2273 | -0.128** (0.049) | 1.412** (0.503) | 1.266** (0.471) | 2284 |
| Danish essay, standard deviations | | | | | | | | |
| 1-3 years | -0.047** (0.017) | -0.106 (0.140) | -0.160 (0.134) | 15612 | -0.084*** (0.017) | 0.431** (0.147) | 0.400** (0.146) | 15893 |
| 4-6 years | -0.094*** (0.026) | 0.226 (0.269) | 0.087 (0.261) | 6903 | -0.065* (0.026) | -0.056 (0.237) | -0.058 (0.227) | 7121 |
| 7-9 years | -0.113* (0.046) | -0.092 (0.574) | 0.036 (0.508) | 2273 | -0.127** (0.047) | 0.326 (0.412) | 0.208 (0.396) | 2284 |
| Danish grammar, standard deviations | | | | | | | | |
| 1-3 years | -0.099*** (0.017) | -0.078 (0.143) | -0.138 (0.136) | 15612 | -0.104*** (0.017) | 0.330* (0.146) | 0.301* (0.145) | 15893 |
| 4-6 years | -0.129*** (0.026) | 0.539+ (0.283) | 0.386 (0.271) | 6903 | -0.114*** (0.026) | 0.031 (0.239) | 0.012 (0.229) | 7121 |
| 7-9 years | -0.148** (0.047) | 0.961 (0.653) | 0.956+ (0.573) | 2273 | -0.136** (0.047) | 0.801+ (0.439) | 0.675 (0.417) | 2284 |
| Distance to cutoff | X | X | X | | X | X | X | |
| Covariates | X | | X | | X | | X | |

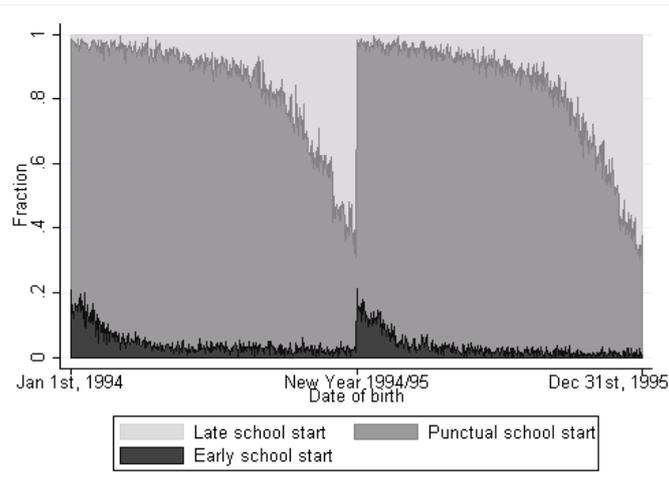
Note: Table shows the estimated effects of being old-for-grade based on OLS and 2SLS regressions of older siblings' grades at the end of grade 9. Numerical grading scale is standardized (mean 0, SD 1). Cutoff dummy (January = 1) used as instrument. Conditioning set includes distance to cutoff, cohort fixed effects and background characteristics (see Table 2). Standard errors in parentheses +p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.

Table A9: Effects of being old-for-grade on older siblings' grades by distance in focal child's and sibling's age

| | Age difference | OLS | 2SLS | 2SLS | Observations | OLS | 2SLS | 2SLS | Observations | OLS | 2SLS | 2SLS | Observations | | |
|-------------------------------------|----------------|--------------------------|------------------|------------------|--------------|----------------------|--------------------------|-------------------|--------------|----------------------|-------------------|--------------------------|--------------|--|--|
| Sample: | | Max 3 years age distance | | | | | Max 6 years age distance | | | | | Max 9 years age distance | | | |
| Math, standard deviations | 1-3 years | -0.106*** (0.013) | 0.130 (0.108) | 0.068 (0.104) | 29342 | -0.115*** (0.015) | 0.093 (0.136) | 0.022 (0.130) | 21235 | -0.127*** (0.020) | 0.200 (0.199) | 0.132 (0.186) | 12203 | | |
| | 4-6 years | | | | | -0.129*** (0.020) | -0.024 (0.216) | -0.126 (0.204) | 12244 | -0.140*** (0.027) | 0.188 (0.299) | 0.019 (0.287) | 7038 | | |
| | 7-9 years | | | | | | | | | -0.151*** (0.039) | 1.079* (0.439) | 1.096** (0.416) | 3556 | | |
| Danish essay, standard deviations | 1-3 years | -0.067*** (0.013) | 0.112 (0.109) | 0.090 (0.102) | 29342 | -0.064*** (0.015) | 0.066 (0.137) | 0.073 (0.128) | 21235 | -0.066*** (0.020) | 0.148 (0.200) | 0.196 (0.185) | 12203 | | |
| | 4-6 years | | | | | -0.077*** (0.020) | 0.139 (0.217) | 0.028 (0.201) | 12244 | -0.084** (0.026) | 0.053 (0.294) | -0.060 (0.280) | 7038 | | |
| | 7-9 years | | | | | | | | | -0.127*** (0.037) | 0.089 (0.384) | 0.179 (0.358) | 3556 | | |
| Danish grammar, standard deviations | 1-3 years | -0.098*** (0.013) | 0.054 (0.108) | 0.025 (0.103) | 29342 | -0.101*** (0.015) | 0.015 (0.136) | 0.006 (0.129) | 21235 | -0.109*** (0.020) | 0.144 (0.198) | 0.165 (0.185) | 12203 | | |
| | 4-6 years | | | | | -0.115*** (0.020) | 0.293 (0.218) | 0.183 (0.205) | 12244 | -0.126*** (0.026) | 0.356 (0.300) | 0.233 (0.287) | 7038 | | |
| | 7-9 years | | | | | | | | | -0.138*** (0.038) | 0.588 (0.405) | 0.641+ (0.383) | 3556 | | |
| Danish oral, standard deviations | 1-3 years | -0.081*** (0.012) | 0.097 (0.103) | 0.076 (0.099) | 29342 | -0.082*** (0.015) | 0.094 (0.137) | 0.094 (0.130) | 21235 | -0.094*** (0.020) | 0.123 (0.198) | 0.159 (0.185) | 12203 | | |
| | 4-6 years | | | | | -0.098*** (0.020) | -0.018 (0.215) | -0.115 (0.204) | 12244 | -0.085** (0.027) | -0.160 (0.295) | -0.265 (0.286) | 7038 | | |
| | 7-9 years | | | | | | | | | -0.108** (0.038) | 0.056 (0.382) | 0.120 (0.365) | 3556 | | |
| Focal child cohorts | | 1990/91-1999/00 | | | | 1993/94-1999/00 | | | | 1996/97-1999/00 | | | | | |
| Distance to cutoff | | X | X | X | | X | X | X | | X | X | X | | | |
| Covariates | | X | | X | | X | | X | | X | | X | | | |

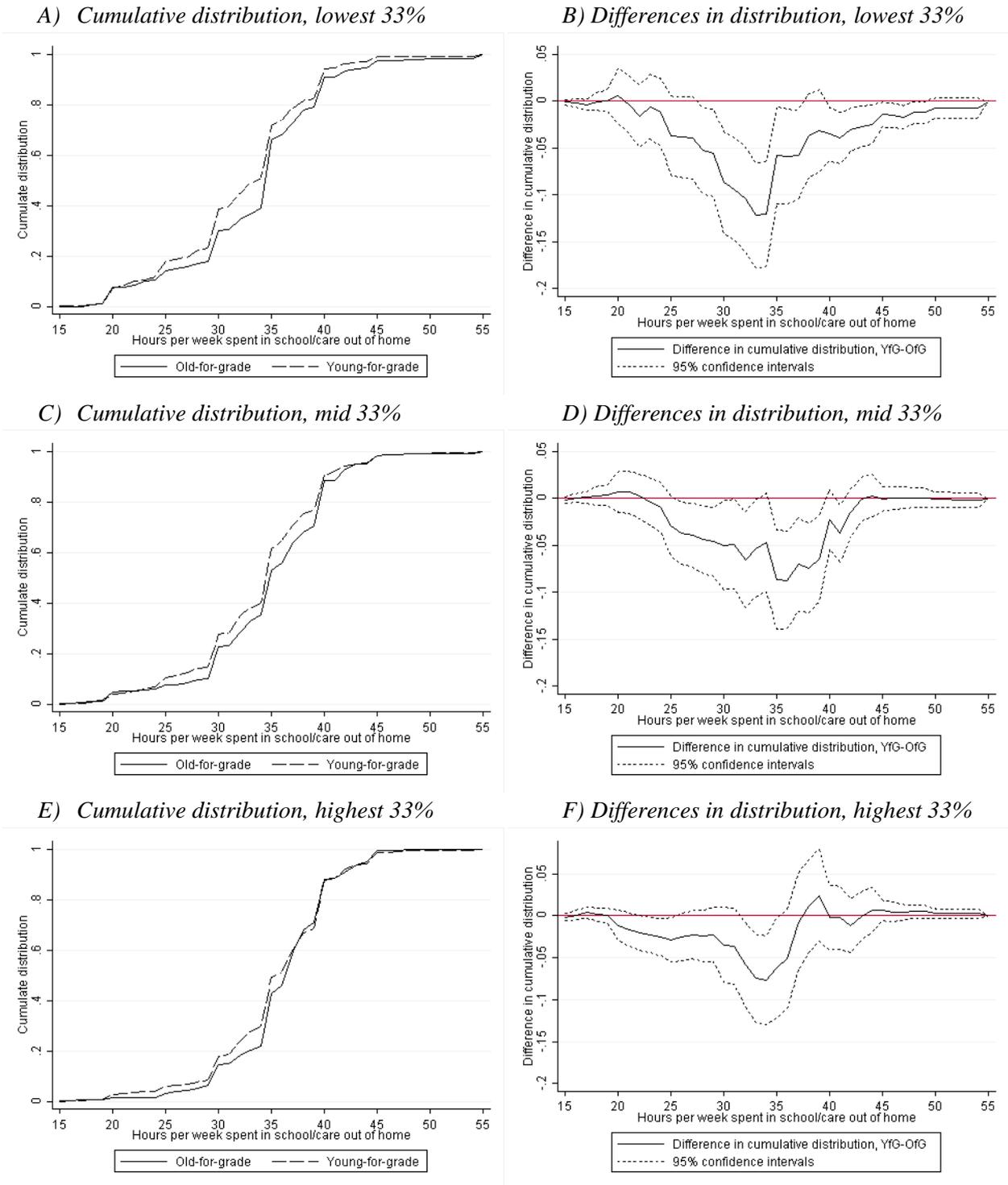
Note: Table shows the estimated effects of being old-for-grade based on OLS and 2SLS regressions on older siblings' grades at the end of 9th grade. Numerical grading scale is standardized (mean 0, SD 1). Cutoff dummy (January = 1) used as instrument. Conditioning set includes distance to cutoff, cohort fixed effects and background characteristics (see Table 2). Standard errors in parentheses +p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.

Figure A1: Fraction punctual, early and late school start



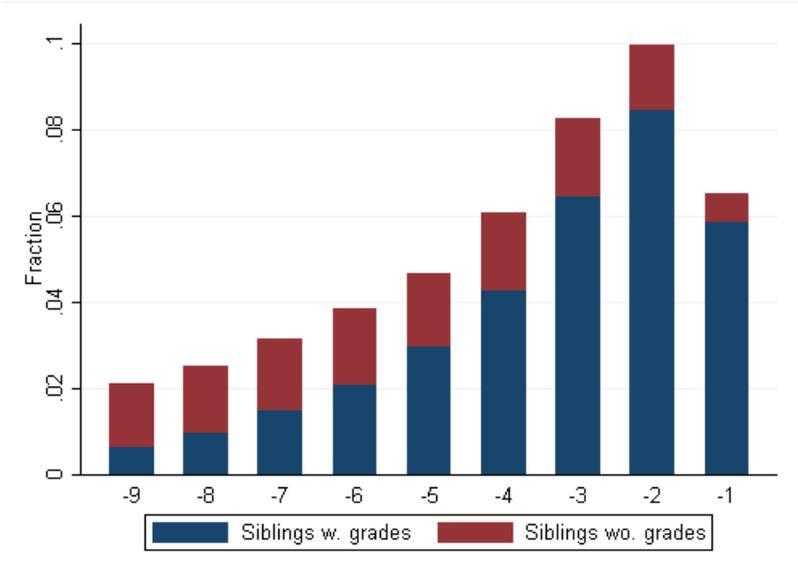
Note: Figure shows the school starting pattern of the full population of children born between January 1 1994 and January 1 1995. “Early school start” refers to school start the calendar year the child turns 6, “punctual school start” refers to school start the calendar year the child turns 7, and “late school start” refers to school start the calendar year the child turns 8.

Figure A2: Time spent in school or care out of home by school starting age by mother's wage earnings the year before



Note: Results estimated using mothers' reports of time children are taken to and picked up from daycare (or other care arrangement) and school from the Danish Longitudinal Study of Children measured when children were 7 years old in combination with information on parents' income from full population register data.

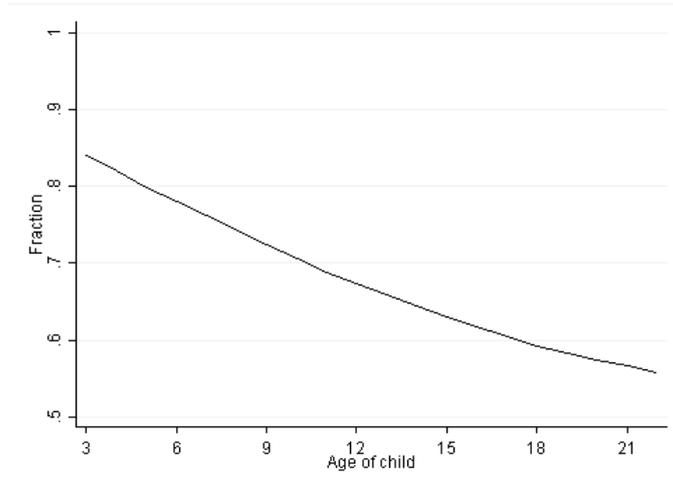
Figure A3: Distribution of distance in time between age of focal child and older sibling



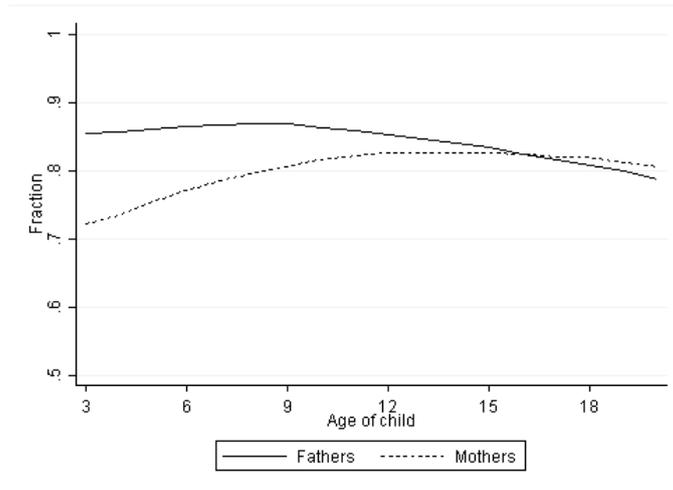
Note: Figure shows histogram of focal child’s age minus siblings’ age in the sample of children born in December 1986–1999 and January 1987–2000. The figure indicates the fraction of siblings for whom we have support for grades for older siblings (grades are available from 2002–2014).

Figure A4: Parents' outcomes by focal child's age

A) Parents married or cohabiting



B) Parental employment by focal child's age

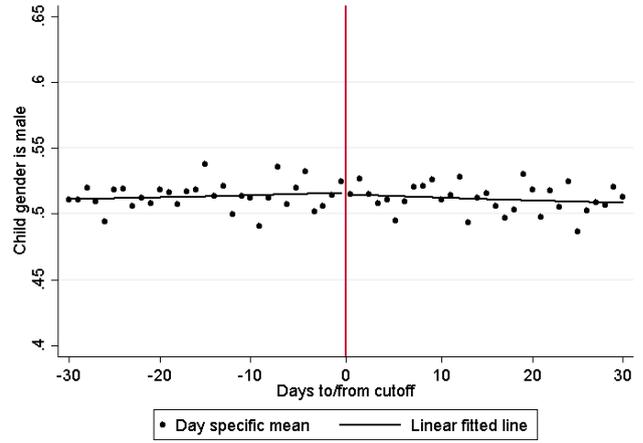
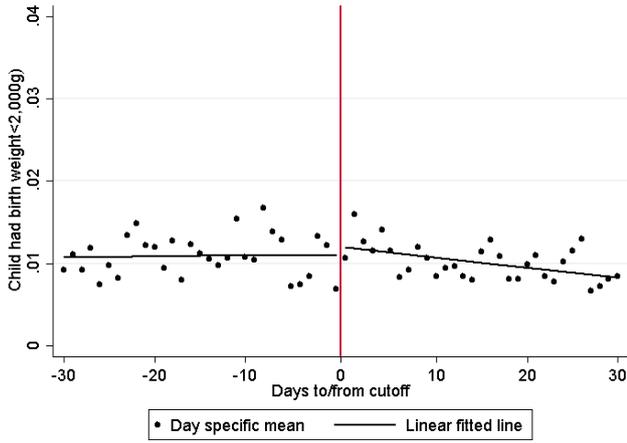


Note: Figure A shows the fraction of parents married or cohabiting at a given age of the focal child. The figure is based on the population of children born from 1986 to 2000. Figure B shows the fraction of parents working in November, by age of the focal child. The figure is based on the population of children born from 1986 to 2000.

Figure A5: Balancing of selected covariates

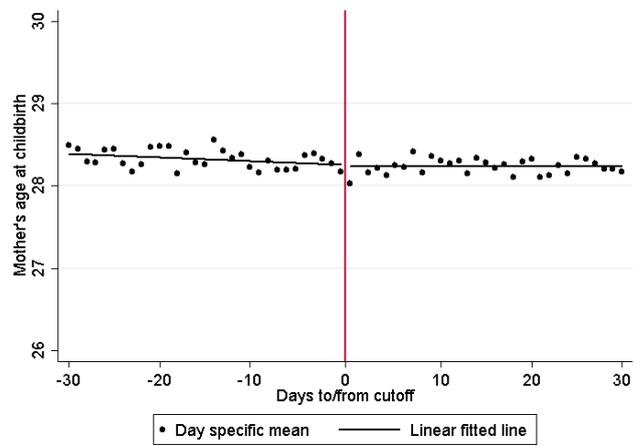
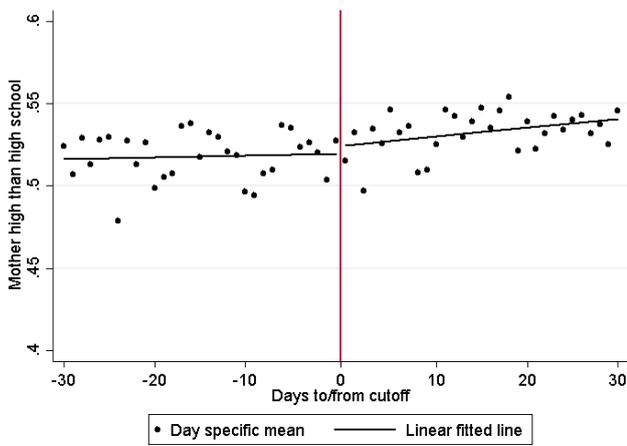
A) Child has low birth weight

B) Child is male



C) Mother has high school or higher education

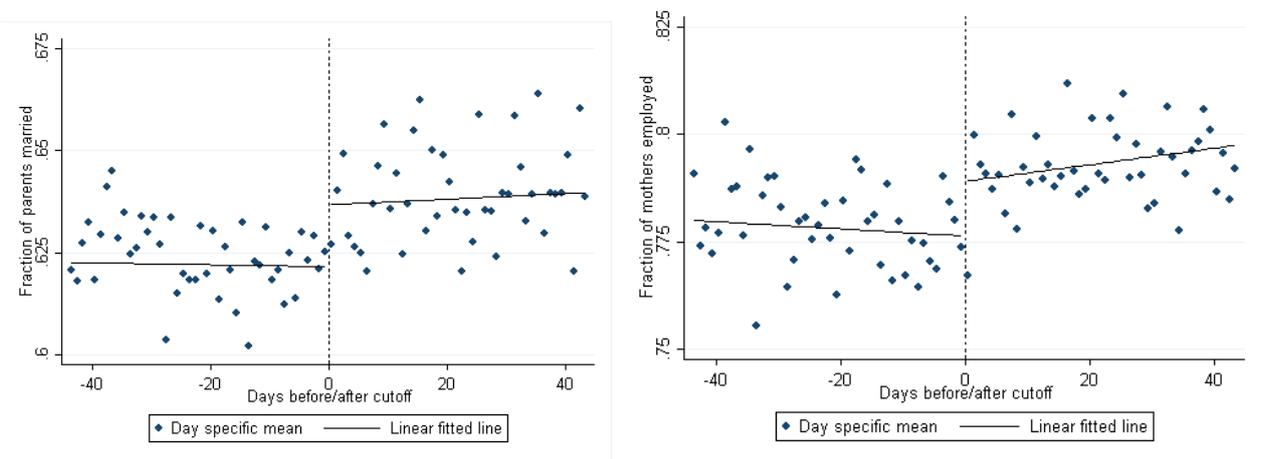
D) Mother's age at childbirth



Note: Results estimated using our main estimation sample.

Figure A6: Reduced forms

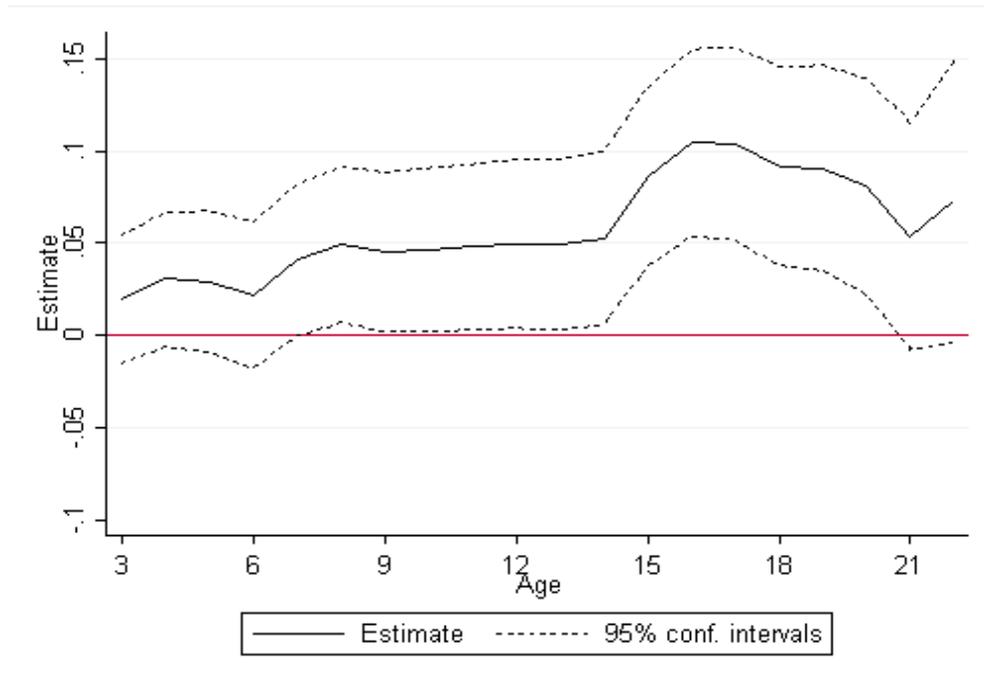
A) *Parents married or cohabiting at child age 15* B) *Maternal employment at child age 7*



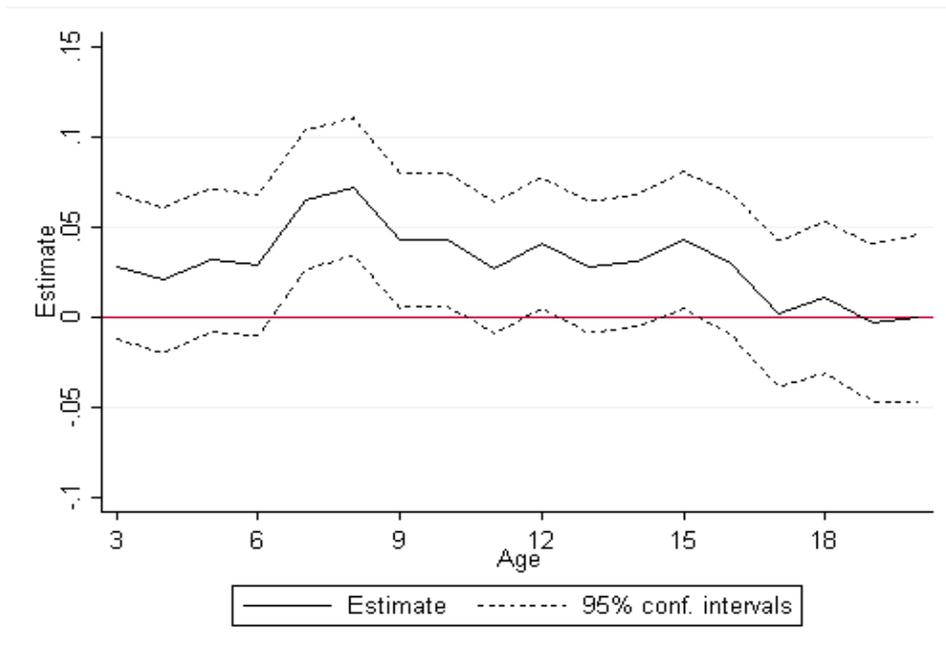
Note: Figure A shows the fraction of parents married or cohabiting at child age 15 by date of birth around New Year (marked by the vertical line) and Figure B shows the fraction of mothers employed at child age 7 by date of birth around New Year (marked by the vertical line).

Figure A7: Estimation results with extended bandwidth

A) Parents married or cohabiting by focal child age



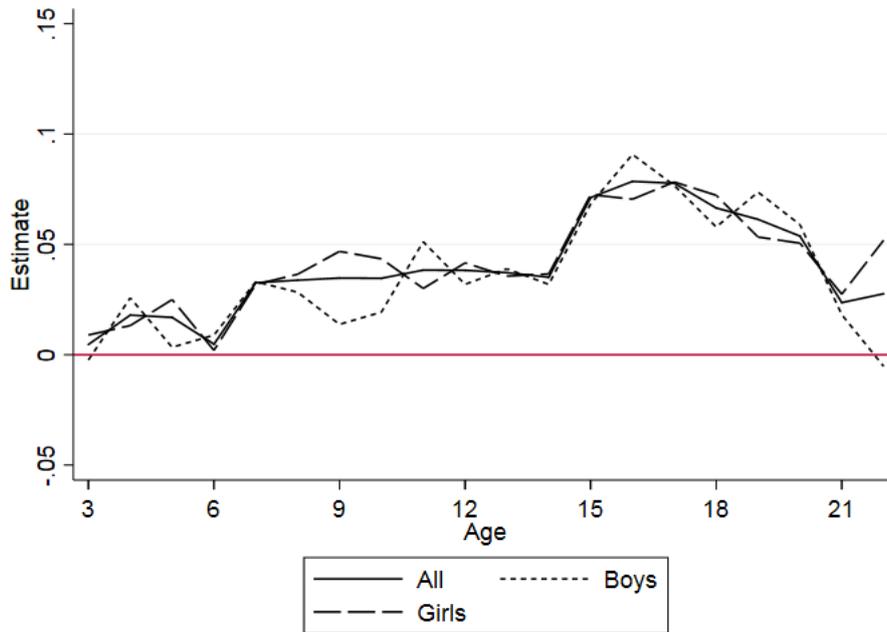
B) Maternal employment by focal child age



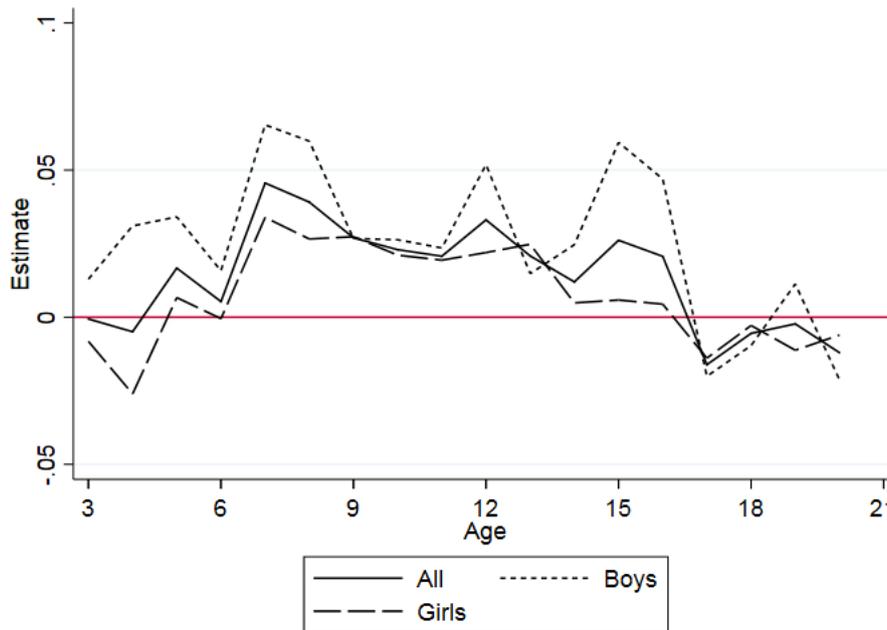
Note: Figure shows the estimated effects of being old-for-grade based on 2SLS regressions on A) fraction of parents who are married or cohabiting, and B) on mother's employment at a given child age. Cutoff dummy (January = 1) used as instrument. Conditioning set includes distance to cutoff, cohort fixed effects and background characteristics (see Table 2). Dashed lines indicate 95% confidence interval. Bandwidth ± 45 days.

Figure A8: Effect of being old-for-grade on parental outcomes by gender

A) Parents married or cohabiting



B) Maternal employment

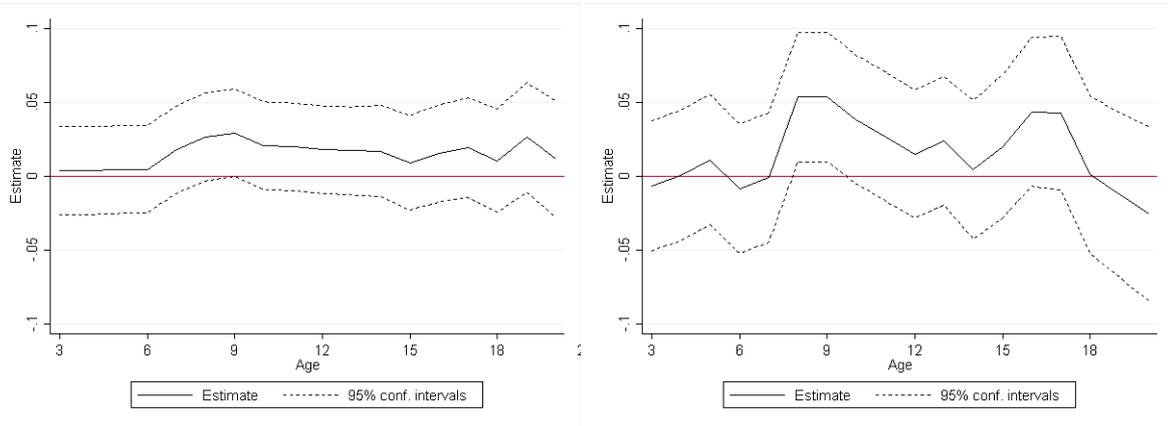


Note: Figure shows the estimated effects of being old-for-grade based on 2SLS regressions on A) fraction of parents who are married or cohabiting, and B) on mother's employment at a given child age. Cutoff dummy (January = 1) used as instrument. Conditioning set includes distance to cutoff, cohort fixed effects and background characteristics (see Table 2).

Figure A9: Estimation results: Mothers' labor earnings percentile by focal child age

A) Average labor earnings percentile

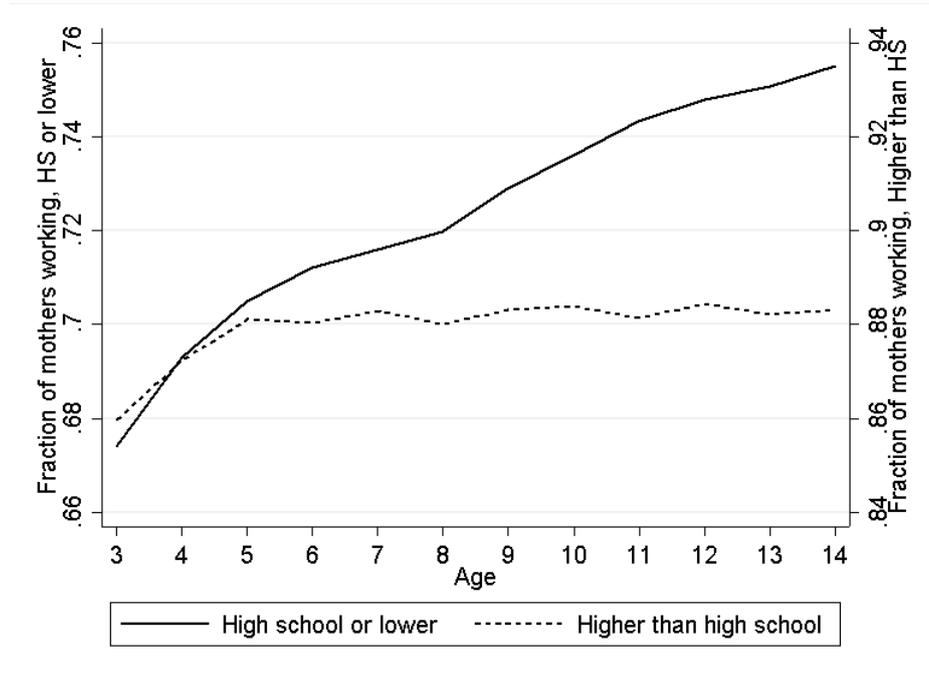
B) Probability of being above the lowest quartile



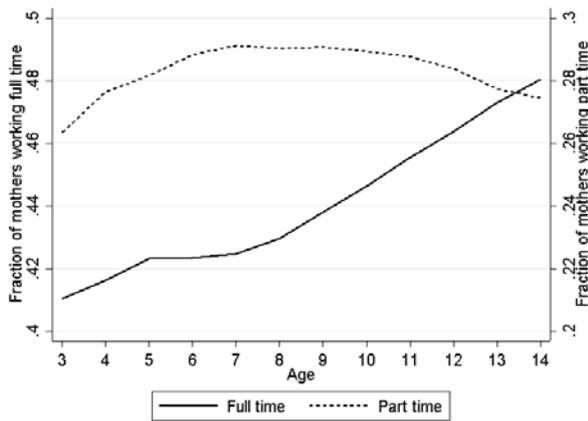
Note: Figure shows the estimated effects of being old-for-grade based on 2SLS regressions on A) mothers' labor earnings percentile (in the female labor earnings distribution) and B) the probability that mothers' do not fall in the lowest quartile of the distribution at a given age. Cutoff dummy (January = 1) used as instrument. Conditioning set includes distance to cutoff, cohort fixed effects and background characteristics (see Table 2). Dashed lines indicate 95% confidence intervals.

Figure A10: Maternal employment by mother's education and age of child

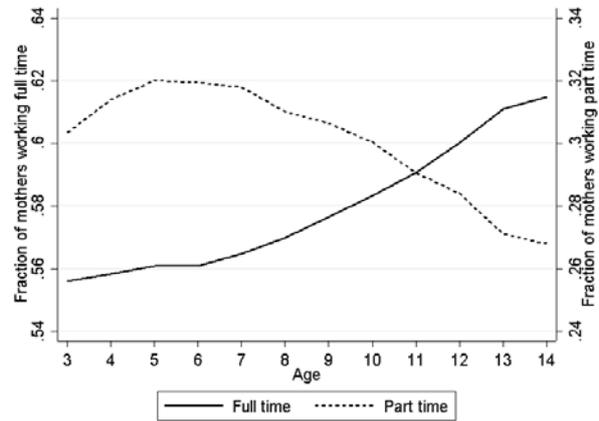
A) *Maternal employment by mother's education*



B) *Full- or part-time, high school or lower*



C) *Full- or part-time, higher than high school*



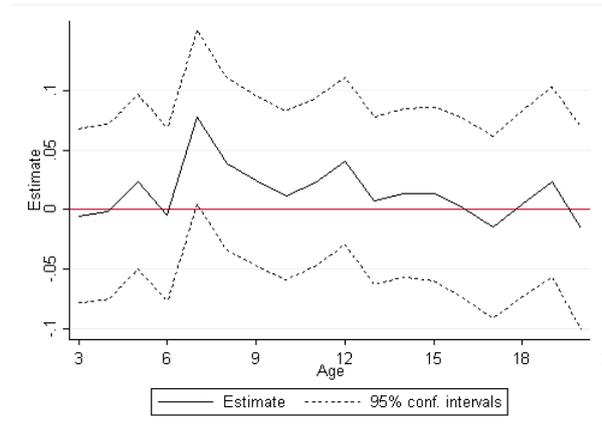
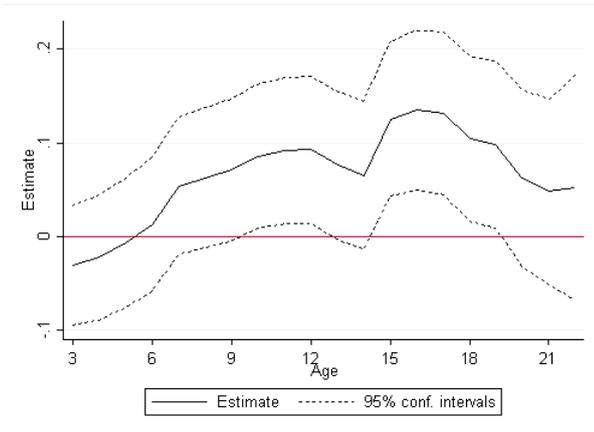
Note: The figure is constructed using monthly data from October (i.e. right after the start of an academic year) in the years 2008-2010, across children's age and mother's education.

Figure A11: Effects of being old-for-grade on parents' relationship status and maternal employment rates by mothers' education and focal child age

High school or lower

A) Parents married or cohabiting

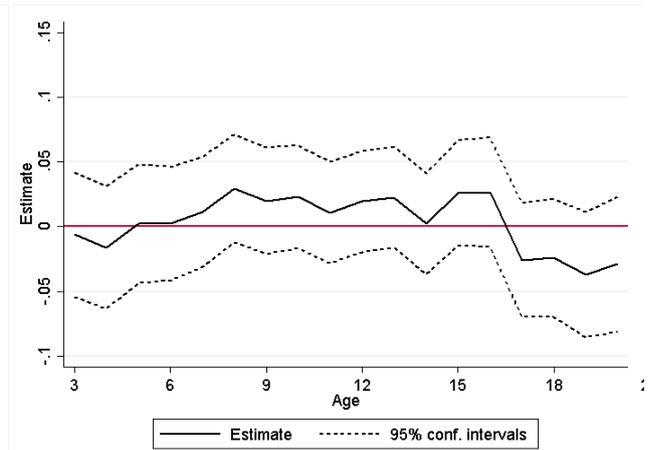
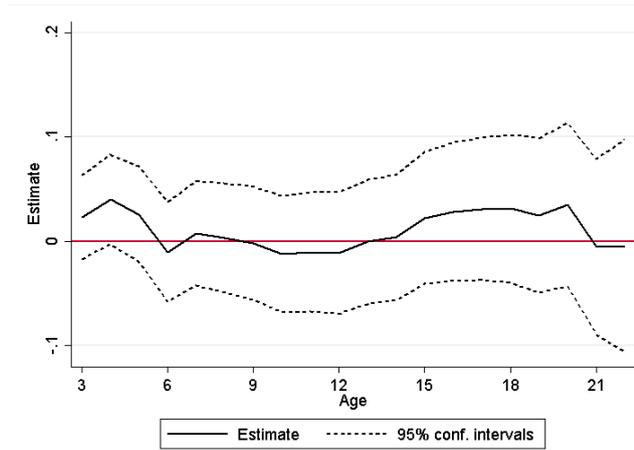
B) Maternal employment



Higher than high school

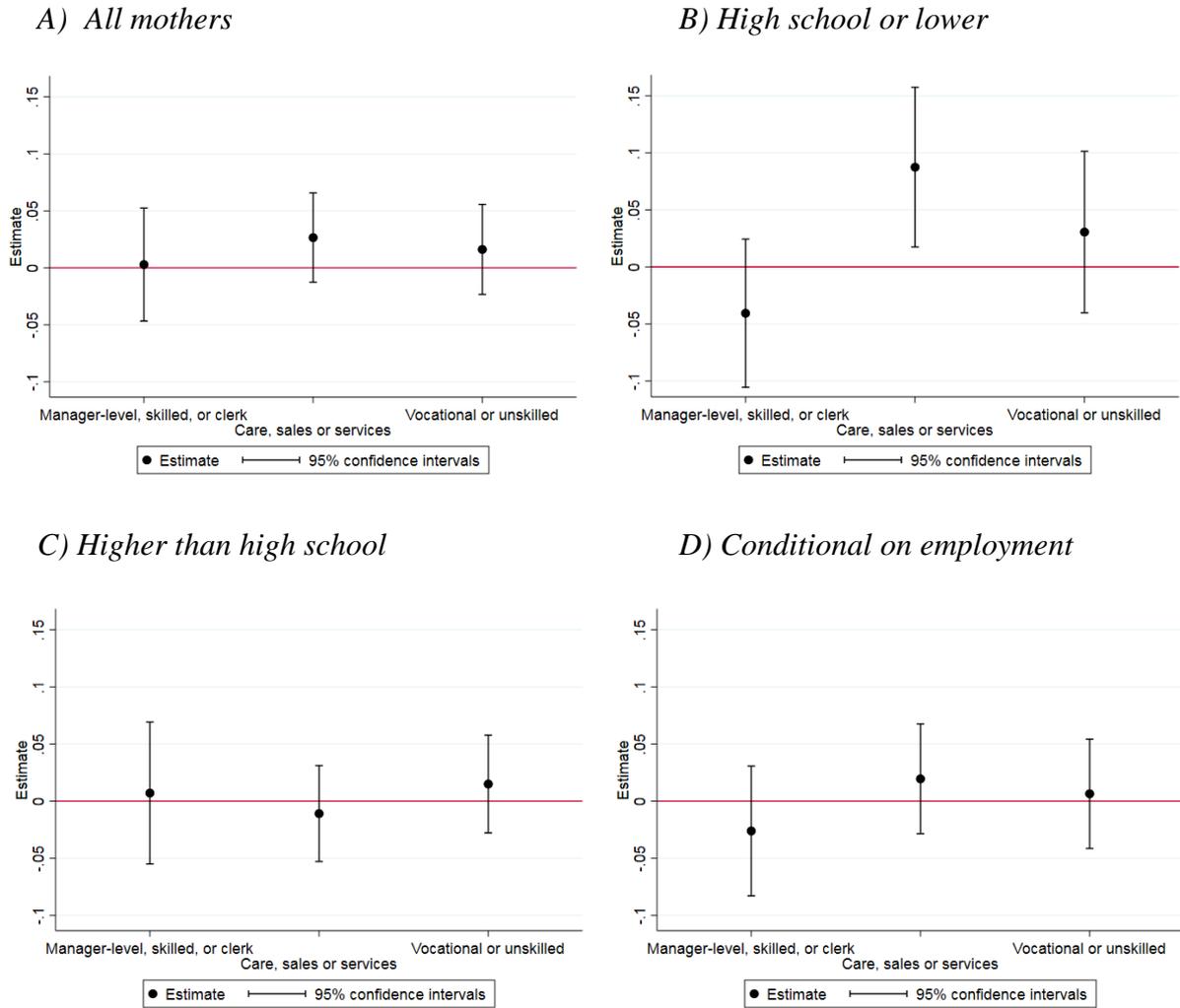
C) Parents married or cohabiting

D) Maternal employment



Note: Figure shows the estimated effects of being old-for-grade based on 2SLS regressions on A) probability that parents are married or cohabiting and B) mother's employment at a given child age for mothers with 12 years of completed schooling or less. Cutoff dummy (January = 1) used as instrument. Conditioning set includes distance to cutoff, cohort fixed effects and background characteristics (see Table 2). Dashed lines indicate 95% confidence intervals.

Figure A12: Effect of being old-for-grade on mothers' job type at age 7 of child

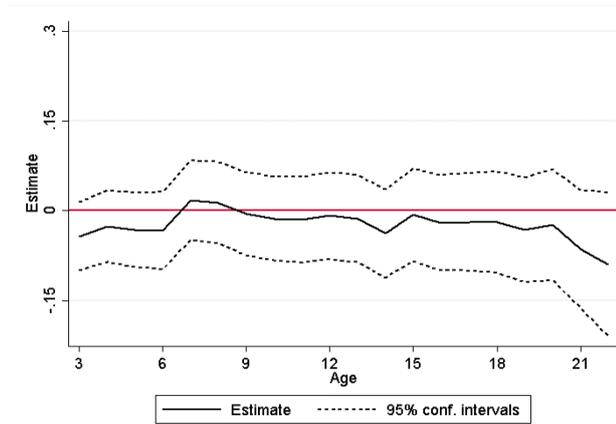


Note: Figure shows the estimated effects separated by job type according to ISCO (International Classification of Occupations) codes. A) shows the effects for all mothers, B) shows the effects for mothers with a high school degree or lower education, C) shows the effects for mothers with an education beyond high school, D) shows the effects conditional on employment (i.e. intensive margin adjustments).

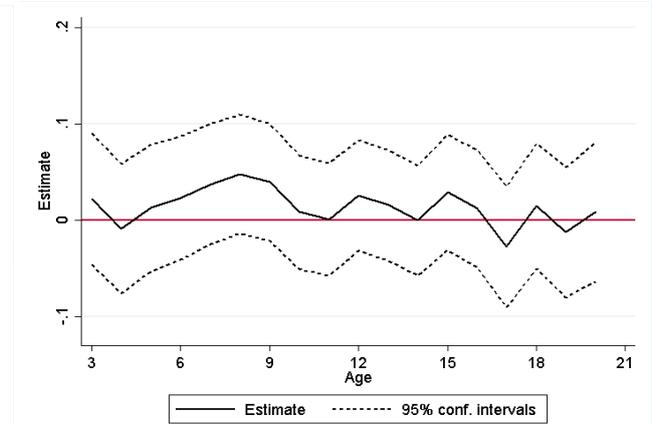
Figure A13: Effect of being old-for-grade on parental outcomes for first born and later-born children

Child is first born

A) Parents married or cohabiting

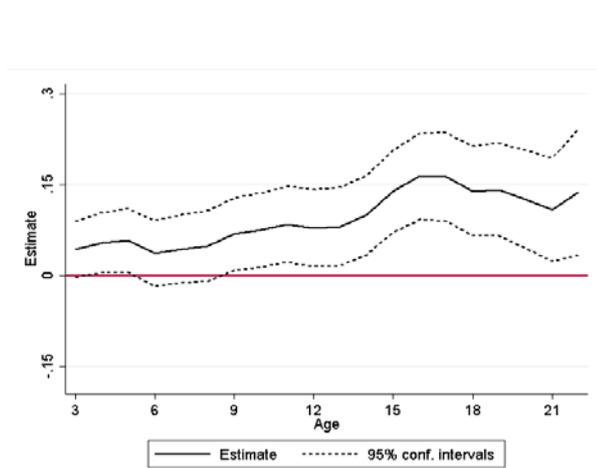


B) Maternal employment

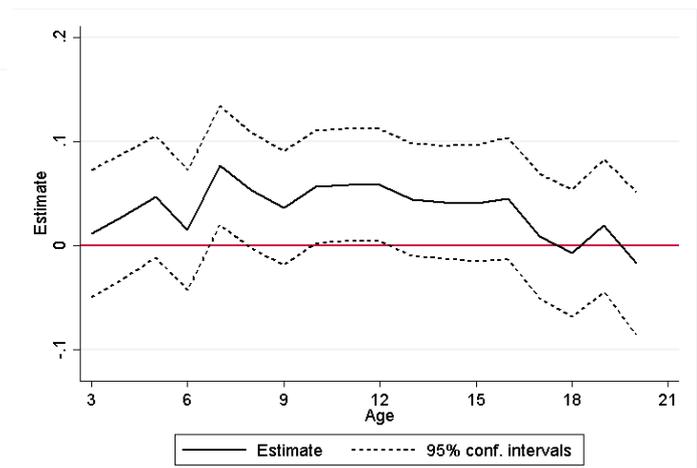


Child is not first born

C) Parents married or cohabiting



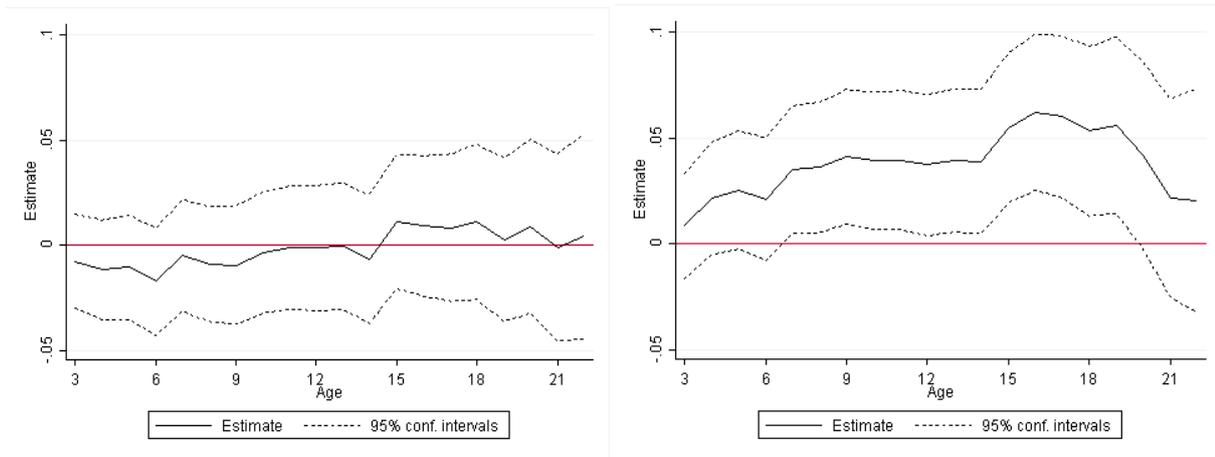
D) Maternal employment



Note: Figure shows the estimated effects by birth order of child. Top figures reflect results for older siblings, whereas bottom figures reflect results for siblings with at least one older sibling. Figures A and C show results of being old-for-grade on the probability of parents being married or cohabiting, whereas Figures B and D show results for maternal employment

Figure A14: Selection bias as measured for the outcome parents married or cohabiting

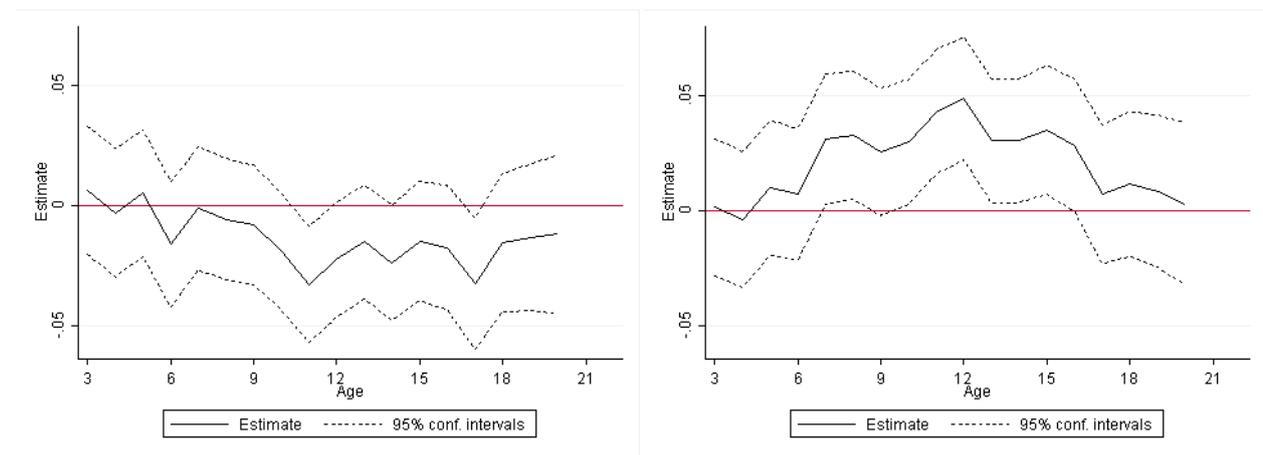
B_0 (never-takers compared to compliers) B_1 (compliers compared to always-takers)



Note: Figure shows test for the conditional independence assumption ATET (left) and ATEN (right).

Figure A15: Selection bias as measured for the outcome maternal employment rates

B_0 (never-takers compared to compliers) B_1 (compliers compared to always-takers)



Note: Figure shows test for the conditional independence assumption ATET (left) and ATEN (right).