Full online appendix

Closing or Reproducing the Gender Gap? Parental Transmission, Social Norms and Education Choice

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Tables

Table A.1: Intergenerational correlations in gender-stereotypical education choice: Baseline (full regression output

	(1)			(2)		
Outcome: Fraction female in education programme (standardised)	Sons, baseline			Daughters, baseline		
	Coef.		SE	Coef.		SE
Frac female, mother's educ (*standardised*)	-0.003		(0.003)	0.050	***	(0.004)
Frac female, father's educ (*standardised*)	0.092	***	(0.004)	0.017	***	(0.003)
High school GPA	-0.073	***	(0.007)	-0.309	***	(0.008)
Born in second quarter	-0.014	*	(0.008)	-0.006		(0.006)
— third quarter	-0.006		(0.008)	-0.016	**	(0.007)
— fourth quarter	0.003		(0.009)	-0.019	**	(0.009)
Low birthweight (< 2500 g)	0.078	***	(0.018)	0.040	**	(0.015)
Firstborn	-0.021		(0.013)	-0.049	***	(0.012)
Multiple born	-0.019		(0.022)	-0.000		(0.025)
No. of siblings (by mother)	-0.022	***	(0.005)	0.003		(0.004)
No. of older sisters	0.049	***	(0.011)	0.031	***	(0.010)
No. of older brothers	0.080	***	(0.011)	0.033	***	(0.008)
Mother's logearnings	-0.007		(0.005)	-0.020	***	(0.003)
Mother, zero earnings	-0.074		(0.057)	-0.212	***	(0.041)
Mother, negative earnings	0.229		(0.337)	-0.290		(0.415)
Mother works < 30 hrs/week	-0.028	***	(0.009)	0.014	**	(0.005)
Mother, unobserved working hours	-0.044	***	(0.014)	-0.029	**	(0.011)
Mother's age	-0.030	***	(0.001)	-0.004		(0.002)
Mother's education:						
—None	0.030		(0.043)	-0.003		(0.033)
—Vocational	-0.024		(0.014)	-0.082	***	(0.012)
—Higher	0.055	***	(0.016)	-0.117	***	(0.013)
Separated parents	0.061	***	(0.008)	0.029	***	(0.007)
Father's logearnings	-0.030	***	(0.005)	-0.027	***	(0.003)
Father, zero earnings	-0.352	***	(0.050)	-0.295	***	(0.034)
Father, negative earnings	-0.213		(0.187)	-0.159		(0.144)
Father works < 30 hrs/week	0.033		(0.039)	-0.072	***	(0.016)
Father, unobserved working hours	-0.081	***	(0.017)	-0.059	***	(0.012)
Father's age	-0.045	***	(0.003)	-0.008	***	(0.001)
Father's education:						
—None	-0.101	*	(0.050)	0.008		(0.040)
—Vocational	0.039	***	(0.009)	0.033	***	(0.007)
—Higher	-0.000		(0.013)	-0.102	***	(0.013)
Mother died before BA	0.008		(0.052)	0.127	***	(0.023)
Father died before BA	0.100	***	(0.033)	0.057	***	(0.013)
Constant	4.164	***	(0.208)	3.605	***	(0.163)
Mean dependent variable	0.000			0.000		
Observations	86,297			140,745		
R-squared	0.067			0.121		
Birth year & region FE	YES			YES		

Notes. Estimates obtained by OLS regression. Samples include individuals of Danish ancestry with at least a BA at age 28; excluded categories are born in the first quarter, mother/father working ≥ 30 hrs/week and mother/father having basic education level. Missing indicators are omitted. Fractions of females in children's as well as parents' education are standardised to zero mean and unit variance for sons and daughters separately. Standard errors corrected for clustering within birth year in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table A.2: Intergenerational correlations in gender-stereotypical education choice: sensitivity checks

Dependent variable: *Fraction female (std.)*	(1) Sons, covariates at age 5	(2) Daughters, covariates at age 5	(3) Sons, first choice BA	(4) Daughters, first choice BA
Frac female, mother's educ	-0.001	0.042***	0.002	0.043***
	(0.004)	(0.003)	(0.003)	(0.004)
Frac female, father's educ	0.096***	0.016***	0.081***	0.017***
	(0.004)	(0.005)	(0.004)	(0.003)
High school GPA	-0.077***	-0.305***	-0.069***	-0.300***
	(0.009)	(0.007)	(0.011)	(0.007)
Mean dependent variable	0. 000	0. 000	0.000	0. 000
Observations	67,913	113,004	106,098	163,714
R-squared	0.056	0.119	0.045	0.112
Birth year & region indicators	YES	YES	YES	YES
Covariates	YES	YES	YES	YES

Notes. Estimates obtained by OLS regression. Columns (1)-(2) measure covariates at age 5 and thus covers cohorts born in 1975–1986. Columns (2) and (4) use the fraction of females in first choice of enrolment if that was a BA program as outcome variables. Fractions of females in children's as well as parents' education are standardised to zero mean and unit variance for sons and daughters separately. Selected variables are shown, see Table 3 for a full list of included covariates. Standard errors corrected for clustering within birth year in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A.3: The relationship between parental gender-stereotypical education choice and child latent outcomes: Gender and birth-order gaps in birthweight

	Estimation sample		
	(1) Matched siblings FE	(2) Matched brothers FE	(3) Matched sisters FE
Female	-139.469***		
	(6.470)		
Firstborn		-70.727***	-77.672***
		(18.345)	(12.835)
Frac female, mother's educ	-9.849	1.700	0.169
	(14.049)	(27.684)	(24.792)
Frac female, father's educ	-41.774*	-69.834	-0.333
	(24.143)	(47.963)	(38.802)
Interactions			
Female $\times FFMom$	-1.255		
	(5.251)		
Female $\times FFDad$	-0.136		
	(5.060)		
Firstborn $\times FFMom$		2.899	-5.407
		(8.336)	(5.990)
Firstborn $\times FFDad$		-5.023	0.362
		(8.559)	(6.285)
Mean dependent variable	3357.888	3412.518	3301.853
Observations	76,265	15,318	28,656
R-squared	0.199	0.212	0.195
Birth year & region FE	YES	YES	YES
Covariates	YES	YES	YES
Number of groups	40,298	8,329	15,405

Notes. Estimates obtained by FE regression. Fractions of females in parents' education are standardised to zero mean and unit variance. Standard errors corrected for clustering within families in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table A.4: Source country characteristics as determinants for female-dominated education choice, second-generation immigrants born in 1975–1986.

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fraction female (std.)	All	Sons	Sons	Sons	Daughters	Daughters	Daughters
Female	0.989***						
	(0.033)						
High school GPA	-0.117***			0.026			-0.245***
	(0.016)			(0.038)			(0.017)
Source country proxies (father), age 15							
Fertility rate, total (births per woman)	-0.017	-0.024	-0.002	-0.002	0.010	-0.017	-0.016
	(0.016)	(0.017)	(0.024)	(0.024)	(0.021)	(0.022)	(0.022)
Male to female LFP rate ratio	0.045	0.036	0.038	0.043	0.094**	0.089*	0.054
	(0.026)	(0.063)	(0.058)	(0.059)	(0.041)	(0.046)	(0.050)
Mean dependent variable	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	2,955	1,143	1,143	1,143	1,812	1,812	1,812
R-squared	0.294	0.077	0.108	0.108	0.058	0.093	0.144
Birth year FE	YES	YES	YES	YES	YES	YES	YES
Covariates	YES	NO	YES	YES	NO	YES	YES
Region FE	NO	NO	NO	NO	NO	NO	NO

Notes. Source country information is available from 1990 onwards and can be matched to 201 Statistics Denmark country codes, see https://data.worldbank.org/indicator/ and http://www.ilo.org/global/statistics-and-databases. Ninety percent of the second-generation immigrants have both parents originating from the same country, thus, multicollinearity prevents us from including source country measures for both mothers and fathers. Male to female LFP rate ratio is defined as male labor force participation rate for 35-44-year olds divided by female labor force participation rate for the same age group. An increase in either source country measure means originating from countries with more traditional gender roles. See table for included covariates; region FE are excluded due to the small sample size. Fractions of females in children's education are standardised to zero mean and unit variance in samples. Cluster-robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A.5: Non-linearities in the relationship between relative earnings and female-dominated education choice

	(1) Sons	(2) Sons	(3) Sons	(4) Daughters	(5) Daughters	(6) Daughters
HHshareMom	0.105**			0.048		
	(0.042)			(0.031)		
1[*HHshareMom* > 0.5]		0.011			-0.013*	
		(0.010)			(0.007)	
1[0 < *HHshareMom* ≤ 0.1]			-0.061			-0.139***
			(0.036)			(0.029)
1[0.1 < *HHshareMom* ≤ 0.2]			-0.079***			-0.059***
			(0.020)			(0.019)
1[0.2 < *HHshareMom* ≤ 0.3]			-0.045***			-0.038***
			(0.013)			(0.010)
1[0.3 < *HHshareMom* ≤ 0.4]			-0.029**			-0.013
			(0.010)			(0.008)
1[0.4 < *HHshareMom* ≤ 0.5]			*Omitted category*			*Omitted category*
1[0.5 < *HHshareMom* ≤ 0.6]			0.003			-0.012
			(0.013)			(0.009)
1[0.6 < *HHshareMom* ≤ 0.7]			-0.016			-0.039*
			(0.032)			(0.022)
1[0.7 < *HHshareMom* ≤ 0.8]			-0.000			-0.052**
			(0.033)			(0.019)
1[0.8 < *HHshareMom* ≤ 0.9]			-0.090**			-0.031
			(0.038)			(0.018)
1[0.9 < *HHshareMom* ≤ 1]			-0.146***			-0.146***
			(0.044)			(0.029)
Observations	85,152	85,152	85,152	138,692	138,692	138,692
Mean dep. variable	0.001	0.001	0.001	-0.001	-0.001	-0.001
R-squared	0.086	0.086	0.086	0.132	0.132	0.132
Birth year & region indicators	YES	YES	YES	YES	YES	YES
Parental education indicators	YES	YES	YES	YES	YES	YES
Covariates	YES	YES	YES	YES	YES	YES

Notes. Estimates obtained by OLS regression. Fractions of females in children's education are standardised to zero mean and unit variance for daughters and sons. Selected variables are shown, see Table 3 in the paper for a full list of included covariates. Cluster-robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A.6: Determinants of gender-stereotypical education choice: Sibling rivalry and the role of sibling sex composition

	Sons		Daughters	
	(1) 2+ families The presence of same-sex siblings	(2) 2+ families The presence of sisters	(3) 2+ families The presence of same-sex siblings	(4) 2+ families The presence of brothers
Frac female, mother's educ	-0.005	0.004	0.053***	0.047***
	(0.005)	(0.005)	(0.005)	(0.006)
Frac female, father's educ	0.099***	0.089***	0.019***	0.012*
	(0.006)	(0.006)	(0.003)	(0.006)
Having any brothers	0.011			0.016**
	(0.011)			(0.007)
Having older brothers	0.071***			
	(0.012)			
Having any sisters		-0.011	-0.008	
		(0.011)	(0.006)	
Having older sisters			0.037**	
			(0.013)	
Sibling interactions				
Any brothers × $FFMom$	0.009			0.004
	(0.006)			(0.006)
Any brothers × $FFDad$	0.006			0.007
	(0.006)			(0.007)
Any older brothers × $FFMom$	-0.009			
	(0.006)			
Any older brothers × $FFDad$	-0.028***			
	(0.009)			
Any sisters × $FFMom$		-0.011*	0.003	
		(0.006)	(0.008)	
Any sisters × $FFDad$		0.008	-0.003	
		(0.008)	(0.005)	
Any older sisters × $FFMom$			-0.016**	
			(0.006)	
Any older sisters × $FFDad$			-0.002	
			(0.007)	
Mean dependent variable	-0.005	-0.005	0.006	0.006
Observations	79,139	79,139	129,218	129,218
R-squared	0.069	0.069	0.122	0.122
Birth year & region FE	YES	YES	YES	YES
Covariates	YES	YES	YES	YES

Notes. Estimates obtained by OLS regression. Fractions of females in children's and parents' education are standardised to zero mean and unit variance for sons and daughters separately. Column headers denote samples: 2+ families include estimation sample children with at least one sibling. Selected variables are shown; see Table 3 for a full list of included covariates. Cluster-robust standard errors by birth year in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A.7: Parents' gender-stereotypical education choice and fertility patterns

VARIABLES	(1) All Prob of boys	(2) All Prob of boys	(3) All Firstborn is boy	(4) All Firstborn is boy	(5) First-girl families Prob of 2nd child	(6) First-girl families Prob of 2nd child	(7) First and second-girl families Prob of 3rd child	(8) First and second-girl families Prob of 3rd child
Frac female, mother's educ	0.004***	0.000	0.001	0.001	0.012***	-0.000	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)
Frac female, father's educ	-0.001	-0.002**	-0.001	-0.001	-0.007***	-0.006***	0.009***	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Mother's age at first birth		-0.014***		-0.010**		-0.009***		-0.012***
		(0.004)		(0.004)		(0.001)		(0.002)
Mother: no educ		0.000		-0.007		0.018*		0.049**
		(0.006)		(0.007)		(0.009)		(0.019)
Mother: vocational educ		0.005*		0.001		0.022***		-0.019***
		(0.002)		(0.002)		(0.004)		(0.007)
Mother: higher educ		0.019***		0.001		0.054***		0.048***
		(0.004)		(0.002)		(0.006)		(0.009)
Father's age at first birth		0.002		-0.001		0.005		0.010***
		(0.002)		(0.001)		(0.004)		(0.003)
Father: no educ		-0.002		0.004		-0.000		-0.014
		(0.005)		(0.007)		(0.006)		(0.013)
Father: vocational educ		-0.004*		-0.001		0.007		-0.041***
		(0.002)		(0.002)		(0.004)		(0.006)
Father: higher educ		0.013***		0.000		0.041***		0.007
		(0.003)		(0.003)		(0.003)		(0.006)
Mother died		-0.006		0.017***		-0.094***		-0.010
		(0.004)		(0.004)		(0.005)		(0.010)
Father died		0.001		0.019***		-0.076***		-0.010
		(0.003)		(0.003)		(0.004)		(0.009)
Constant	0.645***	1.180***	0.537***	1.045***	0.412***	0.559***	0.039	0.128
	(0.020)	(0.203)	(0.024)	(0.191)	(0.032)	(0.182)	(0.029)	(0.157)
Observations	377,867	377,867	377,867	377,867	184,819	184,819	54,397	54,397
R-squared	0.031	0.032	0.001	0.001	0.308	0.314	0.092	0.101
Birth year & region FE	YES	YES	YES	YES	YES	YES	YES	YES
Covariates	NO	YES	NO	YES	NO	YES	NO	YES

Notes. Estimates obtained by OLS regression. Fractions of females in parents' education are standardised to zero mean and unit variance. Column headers denote samples and outcomes. Selected variables are shown; see Table 3 for a full list of included covariates. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A.8: Estimates of linear probability models of selection into various family types at age 15

	(1) Boys only mom	(2) Boys mom w. new	(3) Boys only dad	(4) Boys dad w. new	(5) Girls only mom	(6) Girls mom w. new	(7) Girls only dad	(8) Girls dad w. new
Frac female, mother's educ	-0.003**	-0.001	-0.002***	-0.001	-0.002**	-0.002**	-0.001	-0.001**
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
Frac female, father's educ	0.006***	0.006***	0.002***	0.001	0.004***	0.005***	0.000	0.001**
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Born in 2nd quarter	-0.000	-0.001	-0.002	-0.001	-0.006**	-0.003	-0.001	-0.001*
	(0.003)	(0.004)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
–3rd quarter	0.002	-0.004	-0.002*	-0.001	-0.001	-0.003	-0.002*	-0.001**
	(0.003)	(0.003)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
–4th quarter	0.003	-0.004*	-0.002	-0.004***	-0.002	-0.006***	-0.001	-0.002*
	(0.003)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.001)
Birthweight ≤ 2500 g	0.012**	0.004	-0.000	0.001	0.016**	0.001	-0.000	-0.001
	(0.005)	(0.005)	(0.002)	(0.003)	(0.007)	(0.003)	(0.002)	(0.001)
Covariates measured at age 5								
No. of siblings	-0.034***	-0.030***	-0.003**	-0.007***	-0.032***	-0.031***	-0.003***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.000)	(0.001)
Mother's age	0.038***	-0.035***	0.000	-0.000	0.007***	-0.001	0.000	0.000***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Father's age	-0.032***	0.005***	0.001***	-0.000	-0.013**	-0.006	0.002***	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.005)	(0.006)	(0.000)	(0.000)
Mother's educ: Vocational	-0.022***	-0.006***	-0.005***	-0.003***	-0.035***	-0.008***	-0.004***	-0.002***
	(0.003)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Mother's educ: Higher	-0.011***	0.000	-0.003	-0.001	-0.023***	0.002	-0.003*	-0.002***
	(0.003)	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)	(0.001)	(0.001)
Father's educ: Vocational	-0.025***	-0.010***	-0.002	0.001	-0.027***	-0.012***	-0.001	0.000
	(0.005)	(0.002)	(0.001)	(0.001)	(0.005)	(0.002)	(0.001)	(0.001)
Father's educ: Higher	-0.028***	-0.014***	-0.000	0.004***	-0.028***	-0.017***	0.000	0.003**
	(0.005)	(0.002)	(0.001)	(0.001)	(0.003)	(0.003)	(0.001)	(0.001)
Observations	63,525	63,525	63,525	63,525	106,003	106,003	106,003	106,003
R-squared	0.031	0.041	0.013	0.014	0.035	0.047	0.008	0.010
Birth year & region FE	YES	YES	YES	YES	YES	YES	YES	YES

Notes. Outcome variables are indicators for family type as denoted by columns headers. Fractions of females in mothers' and fathers' education (obtained at child's age 5) are standardized to zero mean and unit variance for sons and daughters, respectively. Missing indicators omitted from table. Cluster-robust standard errors by birth year in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table A.9: Intergenerational correlations in gender-stereotypical education choice: accounting for compulsory school and compulsory school by cohort characteristics

Dependent variable: *Fraction female (std.)*	(1) Sons, school FE	(2) Daughters, school FE	(3) Sons, school by cohort FE	(4) Daughters, school by cohort FE
Frac female, mother's educ	-0.002	0.049***	-0.000	0.048***
	(0.004)	(0.003)	(0.004)	(0.003)
Frac female, father's educ	0.089***	0.015***	0.091***	0.016***
	(0.004)	(0.003)	(0.004)	(0.003)
High school GPA	-0.073***	-0.309***	-0.070***	-0.309***
	(0.005)	(0.003)	(0.005)	(0.003)
Mean dependent variable	0.000	0.001	0.000	0.001
Observations	85,903	140,063	85,903	140,063
R-squared				
Birth year & region indicators	YES	YES	YES	YES
School FE	YES	YES		
School by cohort FE			YES	YES
No. of groups	1,805	1,844	21,712	24,104
Covariates	YES	YES	YES	YES

Notes. Estimates obtained by FE regression. Fractions of females in children's as well as parents' education are standardised to zero mean and unit variance for sons and daughters separately. Selected variables are shown, see Table 3 for a full list of included covariates. Cluster-robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A.10: Mean share of female graduates in completed BA by same-sex parent's education choice

	(1)	(2)	(3)	(4)
	Share of female graduates in education of the same-sex parent (%):			
	0–25	25–50	50–75	75–100
Sons' education	0.403	0.443	0.437	0.463
—*Standardised within sons*	-0.096	0.071	0.046	0.155
Daughters' education	0.633	0.720	0.699	0.716
—*Standardised within daughters*	-0.379	0.057	-0.054	0.032

Notes. The table presents the mean share of female graduates in the education of sons and daughters by the share of females in the father's education for sons and mother's education for daughters. Number of observations are shown in Figure A.3

Figures

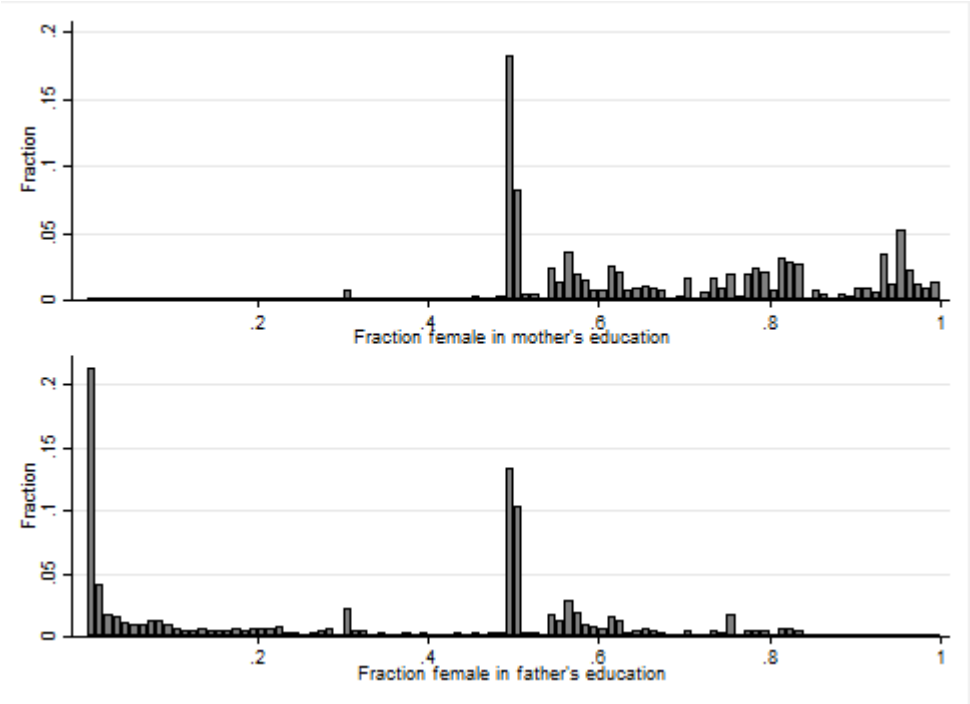

Figure A.1: Distribution of parents' female-dominated education choice in BA sample.
Fraction female in mother's (upper) and father's (lower panel) education is measured as the share of female graduates in their choice of education at age 30.

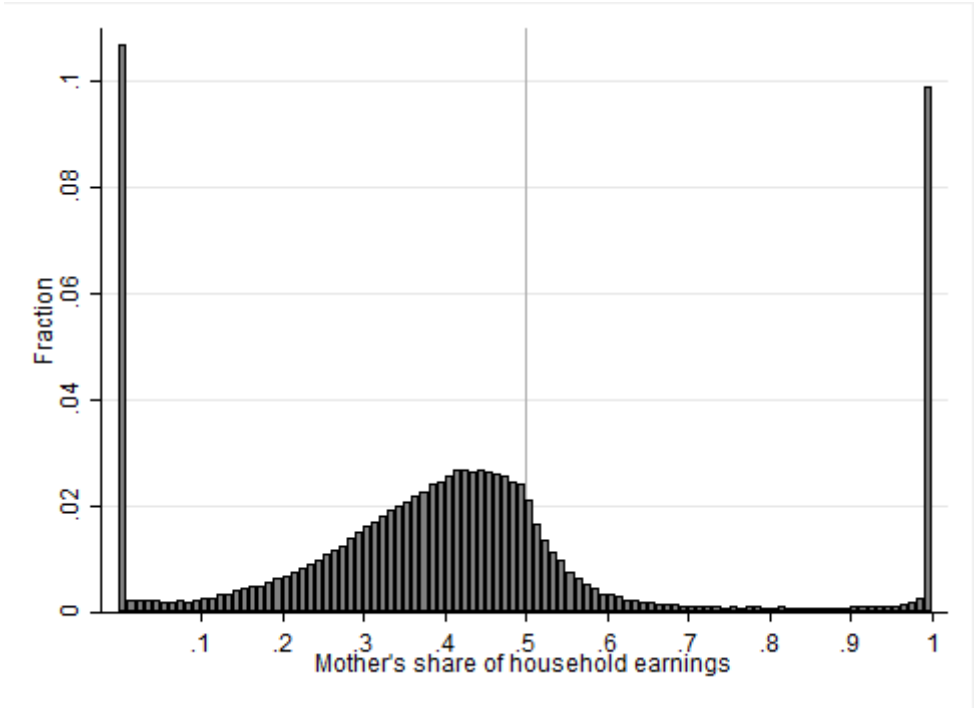

Figure A.2: Distribution of mother's share of household earnings in estimation sample.
Household earnings are defined as the sum mother's and father's earnings without conditioning on a joint household. Thirty-one strictly negative earnings observations for parents are excluded, while observations with zero total household earnings are set to zero (3% of the sample). The roughly equal shares of mothers and fathers who are sole earners conceal underlying differences in labour market behaviour: fathers are to a larger extent self-employed (74%) and to a lesser extent out of the labour force (15%) when mothers are sole earners than vice versa. The corresponding shares for mothers when fathers are sole earners are 17% self-employed and 50% out of the labour force; in addition 6% work as 'supporting spouses'.

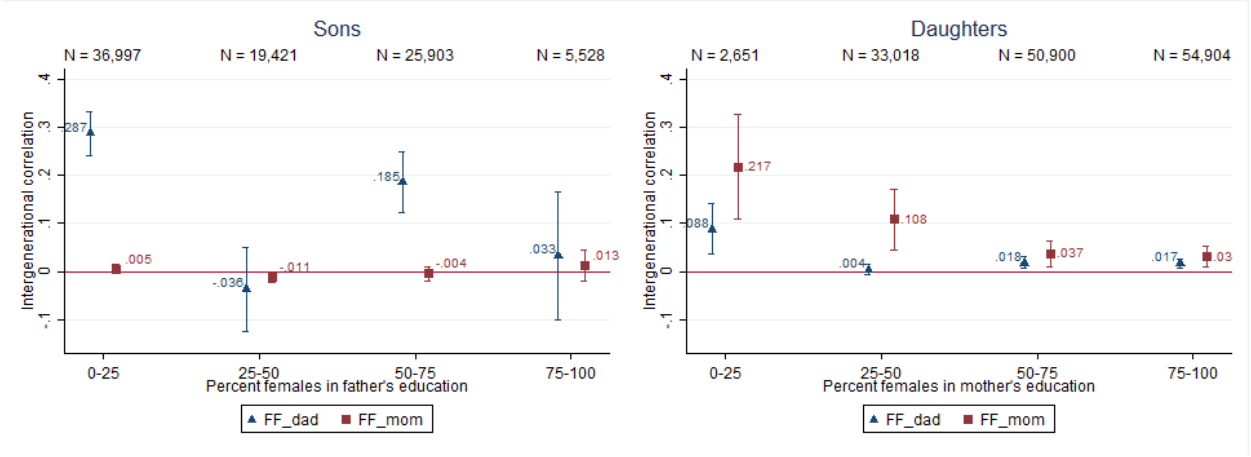

Figure A.3: Nonlinearities of the intergenerational correlation coefficients in female-dominated choice of education for sons (left) and daughters (right).

Estimates obtained by OLS regressions. Samples are based on the fraction of females in the education of the same-sex parent, sample sizes are denoted at the top. Table A.10 summarizes all subsample means of the dependent variable, fractions of females in children's and parents' education are standardised to zero mean and unit variance for sons and daughters separately.