Equality of opportunity and the distribution of long-run income in Sweden

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Outline

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- extends work by Björklund, Jäntti, and Roemer (2012) to examine both men and women

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- in this presentation: examine empirically the role of circumstances in inequality of long-run income for both men and women

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  - address measurement error (only partly done)

Circumstances

6 background characteristics

- parental income quartile group (income of both bio parents when son was 13-17; 4 groups)

Combining all background charateristics yields
$4 \times 3 \times 2 \times 3 \times 4 \times 4 = 1152$ distinct types.

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- non-cognitive skill [NC] quartile groups (military enlistment cog. test; 4 groups)

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- is the remaining variation in the outcome *really* due to “effort”? (e.g., luck, inherited preferences for leisure)

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- measure the importance of a particular factor by comparing inequality of income when that factor is allowed to affect income, and when not (using estimated regression coefficients)
- decompose inequality into importance of circumstances and remainder (“effort”)

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- We take effort to be the the residual of a regression of ln Y on $\mathbf{X}^t$:

$$\ln Y_i^t = \mu + \sum_j \mathbf{X}'_{ji}\beta_j + \epsilon_i^t, \tag{1}$$

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- our empirical work horse is

$$\begin{aligned} \ln Y_i^t &= \mu + \sum_j \mathbf{X}'_{ji}\beta_j + \epsilon_i^t - \underbrace{\epsilon_i^t/k\sigma_t}_{u_i} + \underbrace{\epsilon_i^t/k\sigma_t}_{u_i} \\ &= \mu + \sum_j \mathbf{X}'_{ji}\beta_j + \widetilde{\epsilon}_i^t + u_i, \end{aligned} \tag{2}$$

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- the difference in inequality before and after a factor's contribution has been replaced measures its importance

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- with $6 + 2{=}8$ factors, there are $2^8 = 256$ possible combinations of factors that can be allowed to vary
- the contribution to inequality of a factor depends on the exact sequence in which factors are eliminated

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- locate all sets that do not contain factor A (have eliminated variation due to it) and compare inequality for that set with same set that also includes A
- yields an exact (additive) decomposition of inequality measures

Regression results

- Regression results – part 1
- Regression results – part 2

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  - evidence from young Swedes that brother-brother higher than brother-sister correlations (Grönqvist, Öckert, and Vlachos, 2010)

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3. include IQ and NC based on brothers' characteristics and adjust for bias in $\widehat{\beta}$ (based on men)

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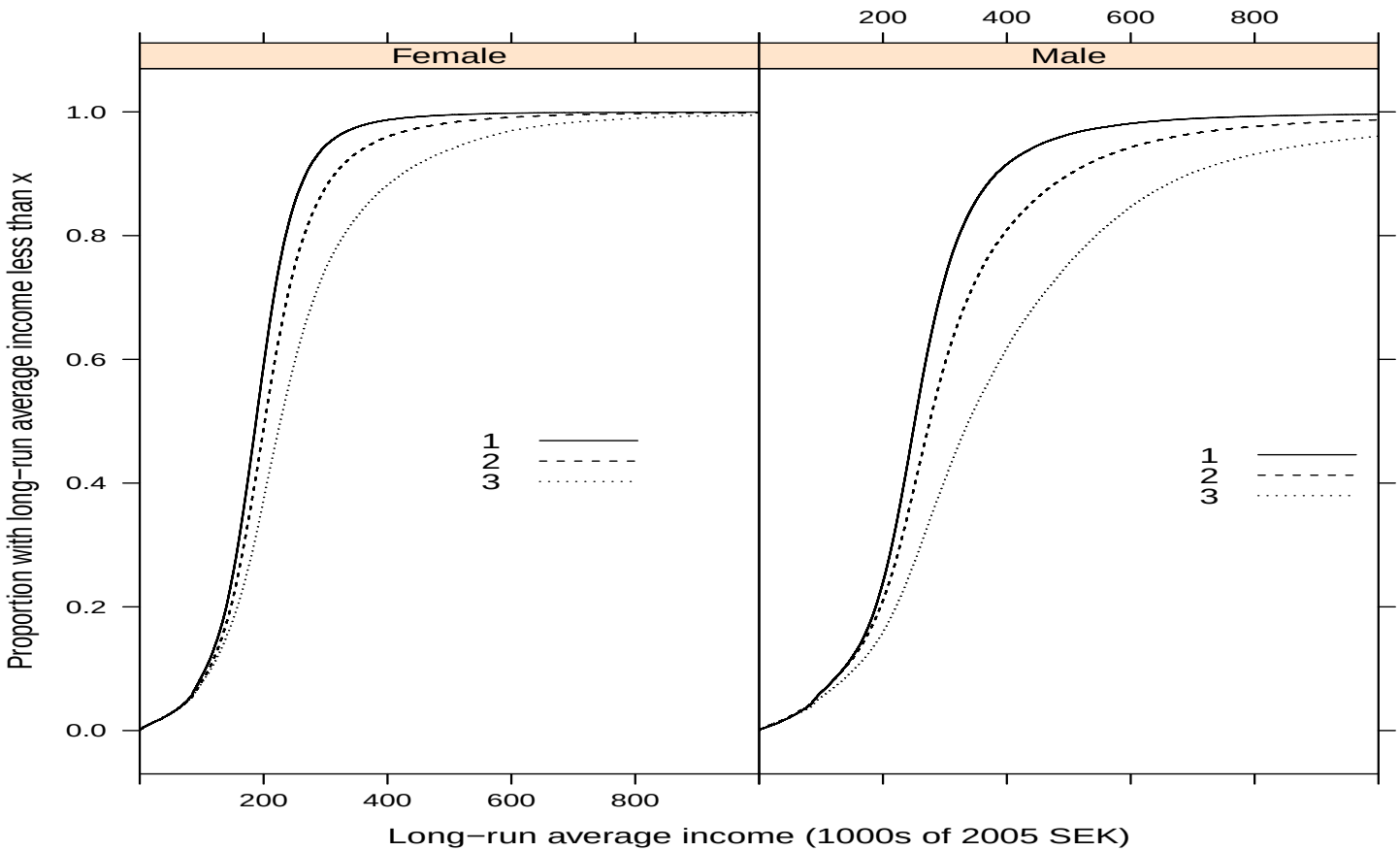

Back to Conditional Distributions

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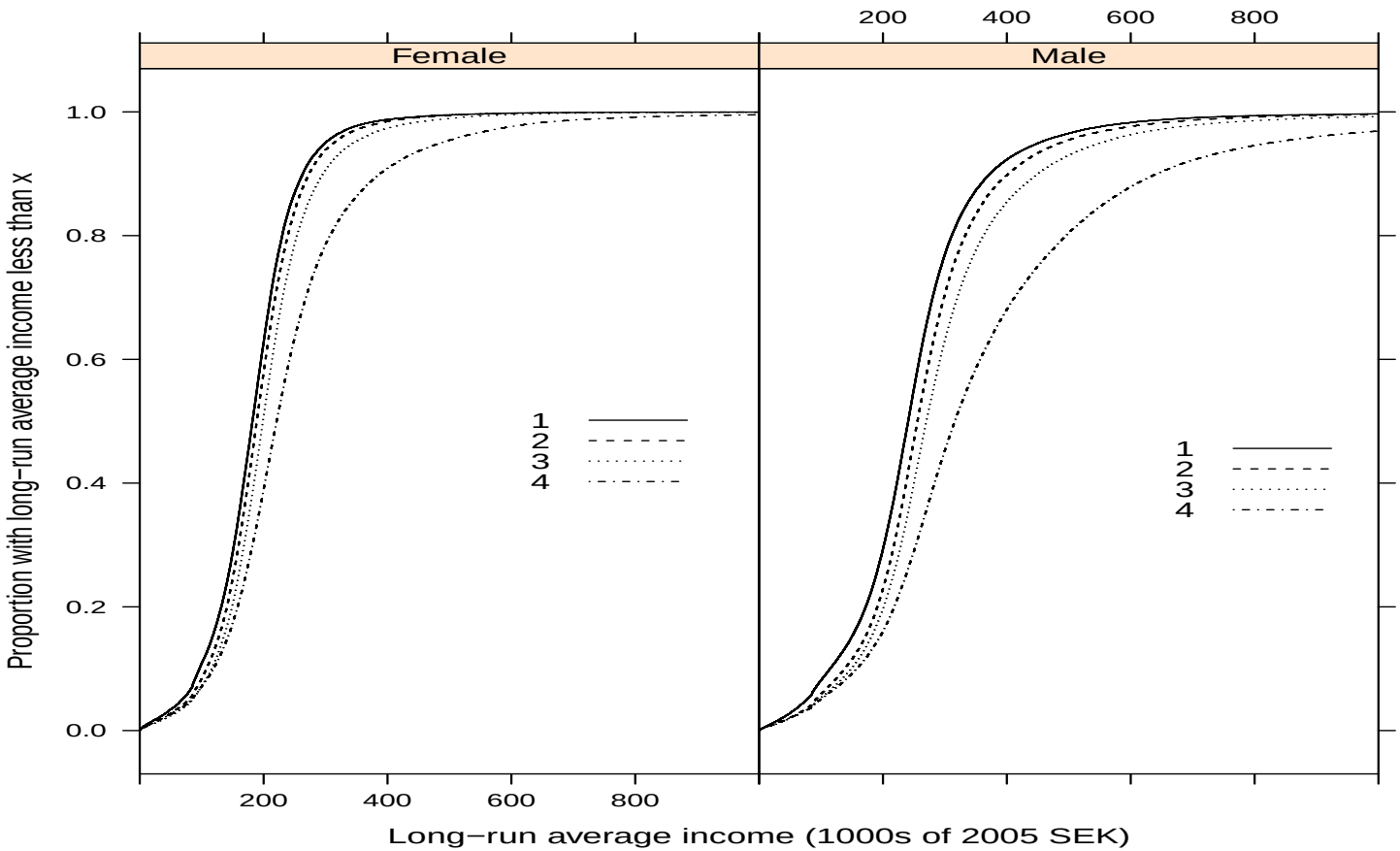

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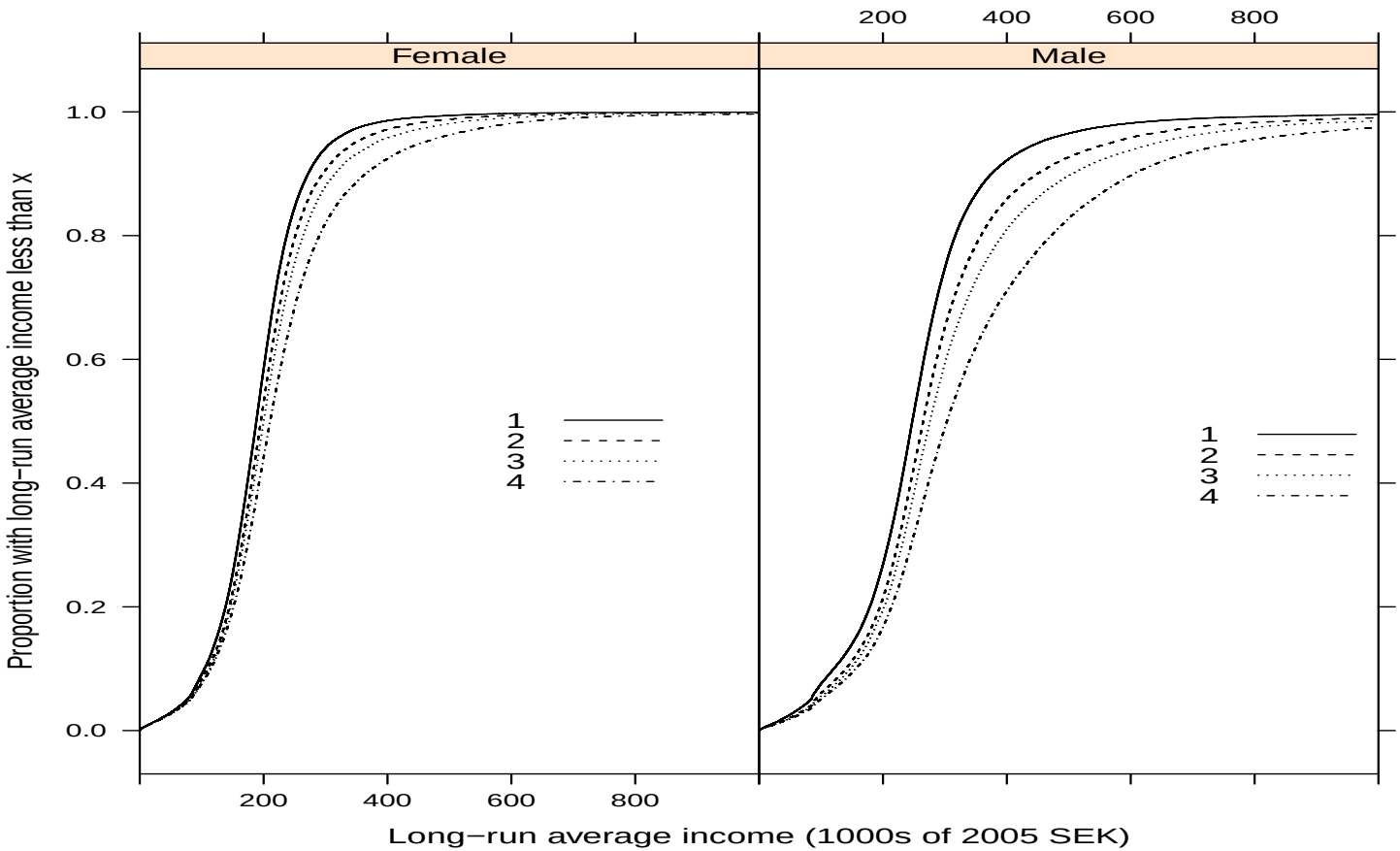
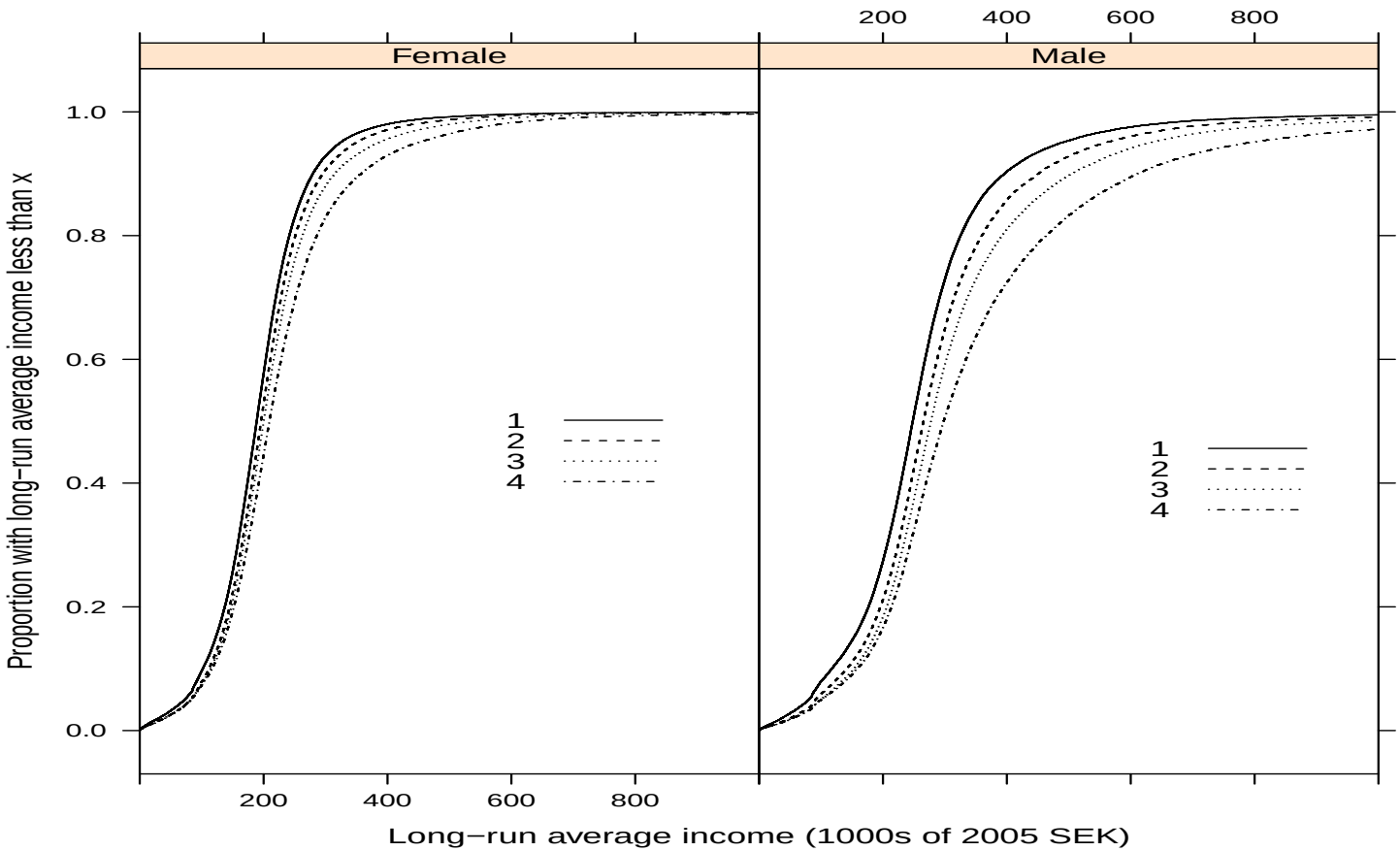
Income distribution (CDF) among example types ($G^t(e)$): by level of brothers' IQ



Back to Conditional Distributions

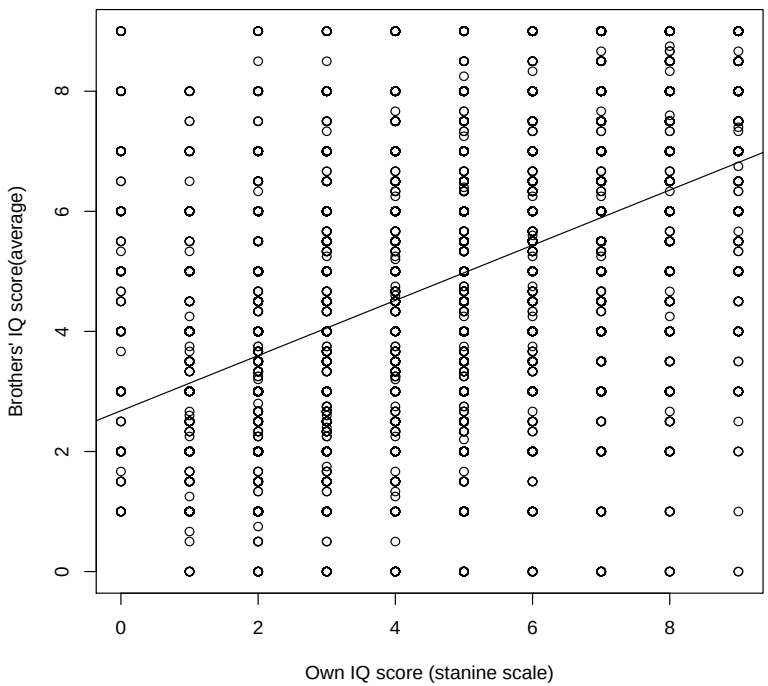
Income distribution (CDF) among example types ($G^t(e)$): by level of brothers' NC



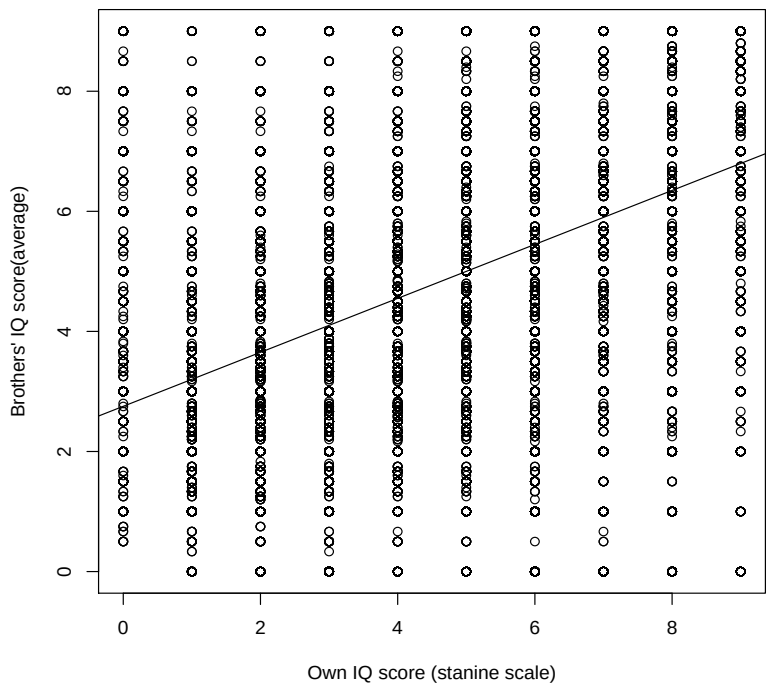
▸ Back to Conditional Distributions

Own and brothers' IQ and NC score among Swedish men

A. IQ score



B. Non-cognitive ability



Contribution of circumstances to overall inequality of long-run average income for men

Own (Panel A) and brother's characteristics (Panel B) – heterogeneous effort controlled using smoothed residual variance

	Own char				Brothers' char			
	Gini	GE(0)	GE(1)	CV2	Gini	GE(0)	GE(1)	CV2
Index value								
ineqest	0.297	0.189	0.215	1.454	0.297	0.189	0.215	1.454
Relative contributions								
ParentInc	6.4	3.3	3.9	2.8	7.8	3.8	4.5	3.2
ParentEduc	1.7	1.0	1.3	0.9	3.4	1.8	2.3	1.8
Sib	0.6	0.0	0.0	0.3	0.7	0.1	0.1	0.5
Family	1.0	0.2	0.1	−0.4	1.2	0.2	0.2	−0.5
IQ	9.3	5.0	5.6	5.5	4.0	1.8	2.2	3.2
NC	8.3	4.4	5.0	4.5	4.1	1.8	2.2	2.5
Type heterogeneity	6.4	3.7	7.9	15.5	5.9	3.3	7.3	16.1
Residual	66.3	82.3	76.1	71.0	72.9	87.1	81.3	73.4

▸ Back to Type inequality contributions

Contribution of circumstances to overall inequality of long-run average income using brothers' characteristics, correcting for coefficient attenuation bias

	Men				Women			
	Gini	GE(0)	GE(1)	CV2	Gini	GE(0)	GE(1)	CV2
Index value								
ineqest	0.303	0.197	0.226	1.754	0.240	0.136	0.122	0.476
Relative contributions								
ParentInc	6.2	3.2	3.7	3.3	5.3	2.1	3.0	4.0
ParentEduc	1.7	1.0	1.2	0.9	0.8	0.3	0.5	0.6
Sib	0.5	0.0	0.0	0.3	0.3	0.1	0.1	0.1
Family	0.9	0.2	0.1	−0.2	0.2	0.0	0.0	0.0
IQB	8.8	4.6	5.1	6.0	7.5	3.1	4.2	4.8
NCB	7.9	4.0	4.4	4.3	6.8	2.7	3.6	4.6
Type heterogeneity	5.1	2.9	6.5	14.8	4.1	1.0	3.1	8.6
Residual	69.0	84.1	78.9	70.6	75.0	90.7	85.5	77.2

▸ Back to Type inequality contributions

Contribution of circumstances to overall inequality of long-run average income using brothers' characteristics, correcting for coefficient attenuation bias

	Gini	GE(0)	GE(1)	CV2
Index value				
ineqest	0.296	0.186	0.204	1.450
Relative contributions				
gender	13.1	7.7	8.5	8.1
ParentInc	4.9	2.6	3.3	3.4
ParentEduc	2.5	1.4	1.8	1.1
Sib	0.8	0.2	0.2	0.3
Family	1.6	0.5	0.4	0.0
IQB	5.2	2.6	3.0	3.4
NCB	4.1	1.7	1.8	1.9
Type heterogeneity	4.9	3.1	7.3	19.7
Residual	62.9	80.1	73.5	62.1

Back to Type inequality contributions

Contribution of circumstances to overall inequality of long-run average income using brothers' characteristics

	Men				Women			
	Gini	GE(0)	GE(1)	CV2	Gini	GE(0)	GE(1)	CV2
Index value								
ineqest	0.303	0.197	0.226	1.754	0.240	0.136	0.122	0.476
Relative contributions								
ParentInc	7.7	3.8	4.5	4.1	7.2	2.6	3.8	5.0
ParentEduc	3.3	1.8	2.2	1.8	2.6	1.0	1.5	1.8
Sib	0.8	0.1	0.1	0.4	0.4	0.1	0.1	0.1
Family	1.4	0.3	0.2	−0.2	0.6	0.1	0.1	0.0
IQB	4.0	1.8	2.2	2.9	1.9	0.6	0.9	1.3
NCB	4.3	1.9	2.2	2.5	2.5	0.8	1.2	1.9
Type heterogeneity	5.3	2.9	6.5	15.3	4.4	1.0	3.0	8.5
Residual	73.4	87.5	82.1	73.3	80.3	93.9	89.4	81.4

▸ Back to Type inequality contributions

Contribution of circumstances to overall inequality of long-run average income using brothers' characteristics

	Gini	GE(0)	GE(1)	CV2
Index value				
ineqest	0.296	0.186	0.204	1.450
Relative contributions				
gender	14.3	8.2	8.9	8.3
ParentInc	6.0	3.0	3.8	3.7
ParentEduc	2.4	1.3	1.7	1.6
Sib	0.5	0.1	0.1	0.2
Family	0.9	0.2	0.2	−0.1
IQB	2.4	1.1	1.4	1.9
NCB	2.9	1.2	1.6	1.9
Type heterogeneity	5.3	3.3	7.6	19.7
Residual	65.3	81.7	74.8	62.8

▸ Back to Type inequality contributions

Contribution of circumstances to overall inequality of long-run average income (not including IQ or NC)

	Men				Women			
	Gini	GE(0)	GE(1)	CV2	Gini	GE(0)	GE(1)	CV2
Index value								
ineqest	0.303	0.197	0.226	1.754	0.240	0.136	0.122	0.476
Relative contributions								
ParentInc	9.6	4.5	5.4	4.6	8.4	2.9	4.3	5.9
ParentEduc	5.5	2.7	3.3	2.3	3.9	1.4	2.0	2.2
Sib	1.2	0.1	0.2	0.9	0.7	0.1	0.2	0.3
Family	1.9	0.3	0.2	−0.7	1.0	0.1	0.1	−0.1
Type heterogeneity	4.4	2.7	4.5	−1.4	3.4	1.4	3.0	6.3
Residual	77.5	89.7	86.4	94.4	82.7	94.1	90.4	85.3

▸ Back to Type inequality contributions

Contribution of circumstances to overall inequality of long-run average income (not including IQ or NC)

	Gini	GE(0)	GE(1)	CV2
Index value				
ineqest	0.296	0.186	0.204	1.450
Relative contributions				
gender	14.7	8.2	9.1	8.9
ParentInc	7.3	3.4	4.4	4.4
ParentEduc	3.9	1.9	2.5	2.2
Sib	0.8	0.1	0.1	0.4
Family	1.2	0.2	0.2	−0.2
Type heterogeneity	4.3	3.2	6.5	14.7
Residual	67.9	82.9	77.2	69.6

▸ Back to Type inequality contributions

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