Intergenerational Transmission of Family Welfare

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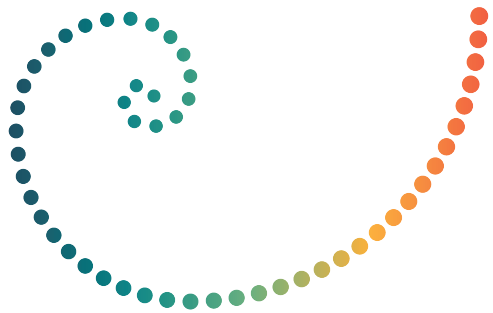

CENTER FOR THE ECONOMICS
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Background: Traditional Framework for IGE

- Models of ***intergenerational*** family influence and the formation of child human capital.
- How markets, parental preferences, and child biological endowments operate to produce differences in adult capabilities (skills to function).
- OLG Model
  1. One-parent model – one-child model
  2. One period of childhood skill formulation
  3. Scalar measure of: "ability" or "human capital"
  4. Role of the parent is through active **monetary** investment and through bequests and loans.

- Intergenerational correlation (ρ): an alternative to β

$$\rho = (\sigma_0/\sigma_1)\beta \tag{1}$$

- σ is the standard deviation of log earnings.
- Factors out the cross-sectional dispersion of log earnings in the two generations.
- β can be higher in one society than in another simply because the variance of log earnings in the child's generation is higher in that society.

Issues in Estimating the Intergenerational Elasticity of Earnings

- Y: a measure of permanent earnings.
- Few data sets have information that allows the calculation of lifetime earnings for both fathers and sons.
- Issues raised in traditional literature
  a. Classical measurement error
  b. Alignment error (ages of father and son). This assumes stationarity across cohorts.
  c. How to measure "luck" in anticipated shocks?
  d. Policy environment (aggregate and micro) rarely studied.

Models in This Tradition

- Ignore uncertainty
- Abstract from timing considerations within stages of the life cycle
- Focus: Realized lifetime incomes or welfare across generations, but uses snapshots of life cycles in practice due to data limitations
- Most invoke stationarity across generations
- Focus on income transfer and investment as the major form of parental influence, not home environment per se

- Focuses on income transfer and monetary investment as the major form of parental influence
- One parent–one child families – family structure considerations ignored
- Limited attention to credit constraints (cash in advance, etc.)
- Ignore policy changes (micro and macro)

Our Approach

- Recognize powerful role of parental influence: parental education, family structure, family environment, and educational decisions.
- Multiple periods within each stage of the life cycle.
- Income realized over lifetimes is not the income and welfare **expected and acted on** at each period of the life cycle.
  - Information revealed within each stage.
  - Agents risk averse.
  - Credit constraints restrict the smooth transfer of income over the life cycle.
- Income expectations that govern child investment decisions not the same as the realizations of those expectations.

- A continuum of possible IGEs pairing different stages of parent and child life cycles.
- E.g., how parents equip their children as parents.
- **We model family environments and their changes over generations to measure a variety of IGEs of life-cycle measures that are most predictive of important childhood outcomes.**

Life-Cycle Decision-Specific IGEs

- Account for fundamental nonstationarities of economic and social environments.
- Intergenerational changes in the patterns of educational attainment and lifecycle patterns of family formation.

What We Do in This Paper

1. Summarize our previous work, "The Transmission of Family Influence" – Forthcoming, ***Econometrica***.
2. New work on impact of agent preferences and information updating

Contributions

1. Account for fundamental nonstationarity of life cycles across cohorts. Important in explaining patterns of intergenerational mobility.
2. Build and estimate a life-cycle model accounting for uncertainty, credit constraints, and micro and macro policy innovations.
3. Measure role of uncertainty, education, and general policy (***ex ante*** vs. ***ex post***).
4. Determine the features of family lives at each age of the child that give rise to successful child lives.
5. IGE depends on family structure, age of coupling, policy, and aggregate economic environments.

6. Age-specific life-cycle measures of social mobility that are most predictive of child outcomes.

7. Traditional proxy measures for lifetime resources used in the literature only weakly correlated with lifetime measures.
8. Traditional measures much weaker predictors of child outcomes. Our lifecycle measures are far more predictive.
9. Life-cycle relative mobility $<$ Proxy relative mobility (currently used proxies overstate relative mobility).
10. Life-cycle absolute mobility $>$ Proxy absolute mobility.
11. Reforms in credit markets and in labor markets play a large role in explaining IGE.
12. **Even in a generous welfare state with substantial social benefits and social insurance and redistribution through taxes and transfers, there is strong dependence in lifetime resource and welfare across generations.**

Rest of Talk

- Develop two frameworks for measuring lifecycle IGEs: expected PV and lifetime approximate expected value functions
- Compare IGEs based on a variety of measures used to measure "permanent income" or "lifetime wealth."
- Evidence on uncertainty facing agents and its implications of multiple sources.
- Evidence on nonstationarity and its importance
- Best predictors of adult outcomes of children
- Compare IGEs (relative mobility) based on different measures used in the lifetime

Rest of Talk

- IGEs by family structure and IGEs that equalize family income by parents obligations to children from past and current families.
- Mediators-role of IGE
- Nonlinearity of IGE
- Decomposing IGE into major components
- Absolute mobility under different measures

Two Measures of Lifetime Resources and Well-Being

1. **Present Discounted Value of Future Income** (PDV)
2. **Lifetime Wealth**: approximates lifetime value function and accounts for both uncertainty and liquidity constraints (approximate value functions)

- Measures that predict important lifetime outcomes of children, like their participation in education and crime.
- Distinguish ***ex post*** and ***ex ante*** (realized vs. anticipated) welfare.

- ***Expected*** income and expected well-being at different ages measure resources available for consumption and child investment at those ages.
- Measure of decision-relevant and age-specific welfare.

Our Data

- Micro and full population register data (1980–2022 in current paper).
- Danish natives

Link to Data Availability

Measures of Lifetime Resources: Traditional and Ours

Table 1: Definitions of Welfare and Income Indicators Used in This Paper and the Literature

		Variable
Traditional Snapshot Measures	(1)	Wage Income
	(2)	Income with Transfers
	(3)	Income without Transfers
	(4)	Disposable Income
	(5)	Family Measures (Husband and Wife or Cohabitants)
	(6)	Equivalized Family Measures
	(7)	Household Consumption
	(8)	Survey Imputed Consumption
	(9)	Survey Imputed Consumption with Equivalence Scale
Lifetime Measures	(10)	Expected Present Discounted Value
	(11)	Realized Present Discounted Value
	(12)	Expected Lifetime Wealth
	(13)	Realized Lifetime Wealth
	(14)	Equivalized Lifetime Measures

New Measures of Life-Cycle Resources and Welfare

T = Lifetime Cap

$$\text{PDV}_{i,t} = \mathbb{E}_{i,t}\left[\sum_{\tau=1}^{T-t} \beta^{\tau} y_{i,t+\tau} \,\middle|\, \underbrace{\mathcal{I}_{i,t}}_{\substack{\text{Information set for individual } i \\ \text{in period } t}}\right] \tag{2}$$

- **Approximate value function (Huggett and Kaplan, 2016).**
- Expected lifetime wealth at period t:

$$\mathrm{LW}_{i,t} = \mathbb{E}_{i,t}\left[\sum_{\tau=1}^{T-t} s_{i,t+\tau} y_{i,t+\tau} \middle| \mathcal{I}_{i,t}\right]. \tag{3}$$

$$s_{i,t+1} = \mathbb{E}_{i,t}\left[\beta \frac{U_c(c_{i,t+1})}{U_c(c_{i,t})} \mid \mathcal{I}_{i,t}\right].$$

- Accounts for uncertainty and credit constraints.
- $\mathcal{I}_{it}$ includes demographics, family structure, policy, etc.

- Household Euler Equation:

$$\mathbb{E}_{i,t}\left[\beta\frac{U_c(c_{i,t+1})}{U_c(c_{i,t})}(1+r_{i,t+1})(1+\underbrace{\lambda_{i,t}}_{\substack{\text{Lagrange multiplier on borrowing constraint}}})|\mathcal{I}_{it}\right]=1. \tag{4}$$

- CRRA utility function:

$$U(c_{i,t})=\frac{c_{i,t}^{1-\rho}-1}{1-\rho}\underbrace{b(X_{i,t})}_{\substack{\text{Demographic effects, family structure, home environments}}}$$

- Full blown estimation of the value function is messy.
- We offer an alternative approach.
- We construct agent information sets using data on capital and labor income and labor supply and family structure.
- Estimate SDF to form approximate value function.

Identifying and Estimating Information Sets

- Cunha and Heckman (2016); Cunha et al., (2005); Navarro and Zhou (2017).
- Use information that predicts outcomes each period.

Example of How To Select Information Sets

- C_t = outcome at t.
- I_t = relevant information known and acted on at t.
- W_t = not known and/or acted on at t.

$$C_t = I_t\beta + W_t\Gamma + U_t$$
$$U_t \perp\!\!\!\perp (I_t, W_t)$$

- Test: I_t properly specified if $\beta \neq 0, \Gamma = 0$.
- $U_{t+j} = C_{t+j} - E(C_{t+j} \mid I_t), \quad j > 0$ (due to innovations in information).

- Correct information set has the property that: U_{t+j} not predicted by I_t.
- New information arrives after t.
- These are instruments for $C_{t+j}, j > 0$ in equations based on estimates using data t.
- They affect future C_{t+j} but are uncorrelated with U_t.
- The IGE is based on sequences of future C_{t+j}, e.g., PV; value function.
- Sequential IV to correct for endogeneity of baseline C_t in regression of C_{t+1} on C_t (innovations are instruments for $C_{t+j}, j \geq 1$).

Determining Information Sets

- $\mathcal{I}_{it}$ is information set; variables characterising it are I_t
- Agents forecast future $C_{t+j}, j > 0$.
- Information comes in many forms
  1. Macroshocks and imposition of laws and regulations affecting choices
  2. Shocks to income, labor supply, assets
  3. Demographic shocks (births, deaths, divorce)

Examples

$$C_t = g(I_t)$$
$$C_{t+1} = g(I_{t+1}) \qquad C_{t+1} - C_t = g(I_{t+1}) - g(I_t)$$

- Updated Information can be:
  1. Demography
  2. Policy innovations
  3. Family structure: death, marriage
  4. Labor market shocks, layoffs

- $\mathcal{I}_{i,t+1} - \mathcal{I}_t$ = change in information sets
- Measure of uncertainty

Consider Earnings Shocks

- $\ln Y_{it} = g(X_{it}) + \phi_i + A(L)\varepsilon_{it}.$
- $\ln Y_{it} = \tilde{g}(X_{it}) + \phi_i t + \tilde{A}(L)\tilde{\varepsilon}_{it}.$
- $\ln Y_{it} = \tilde{\tilde{g}}(X_{it}) + \sum_{j=0}^{t} U_{t-j} + \tilde{\tilde{A}}(L)\tilde{\tilde{\varepsilon}}_{it}.$
- Can use general ARMA shocks (MaCurdy, 1982).
- More general vector shocks – unemployment, illness, macro shocks
- Conventional practice: **Assume one of these forms and count ε_{it} as innovations.**
- Valid?

Conventional Approach Assumes

- $\phi_i, \sum_{j=0}^{t} U_{i,t-j}$, known
- $\varepsilon, \tilde{\varepsilon}, \tilde{\tilde{\varepsilon}}$ shocks, unknown
- Measures of goodness of fit tells us nothing information sets, unless we know them already.

Table 2: Specification Tests Example is the Candidate Proxy for Information Set)

		(1)	(2)
Panel A: Full Population			
		y_{50}	$y_{50} - \mathbb{E}(y_{50} \mid \mathcal{Z}^1_{30})$
Consumption (Age 30)	β_{OLS}	0.35	0.25
	T-stat	(37.50)	(4.88)
Panel B: Main Sample, Child Outcomes			
		y_{30}	$y_{30} - \mathbb{E}(y_{30} \mid \mathcal{Z}^1_{29})$
Disposable Income (Age 30)	β_{OLS}	0.10	0.07
	T-stat	(14.75)	(10.89)
Wage Income (Age 30)	β_{OLS}	0.18	0.10
	T-stat	(31.49)	(19.10)
College Attainment	β_{OLS}	0.32	0.15
	T-stat	(11.91)	(5.53)
Years of Schooling	β_{OLS}	2.04	1.23
	T-stat	(15.28)	(9.02)

Continues

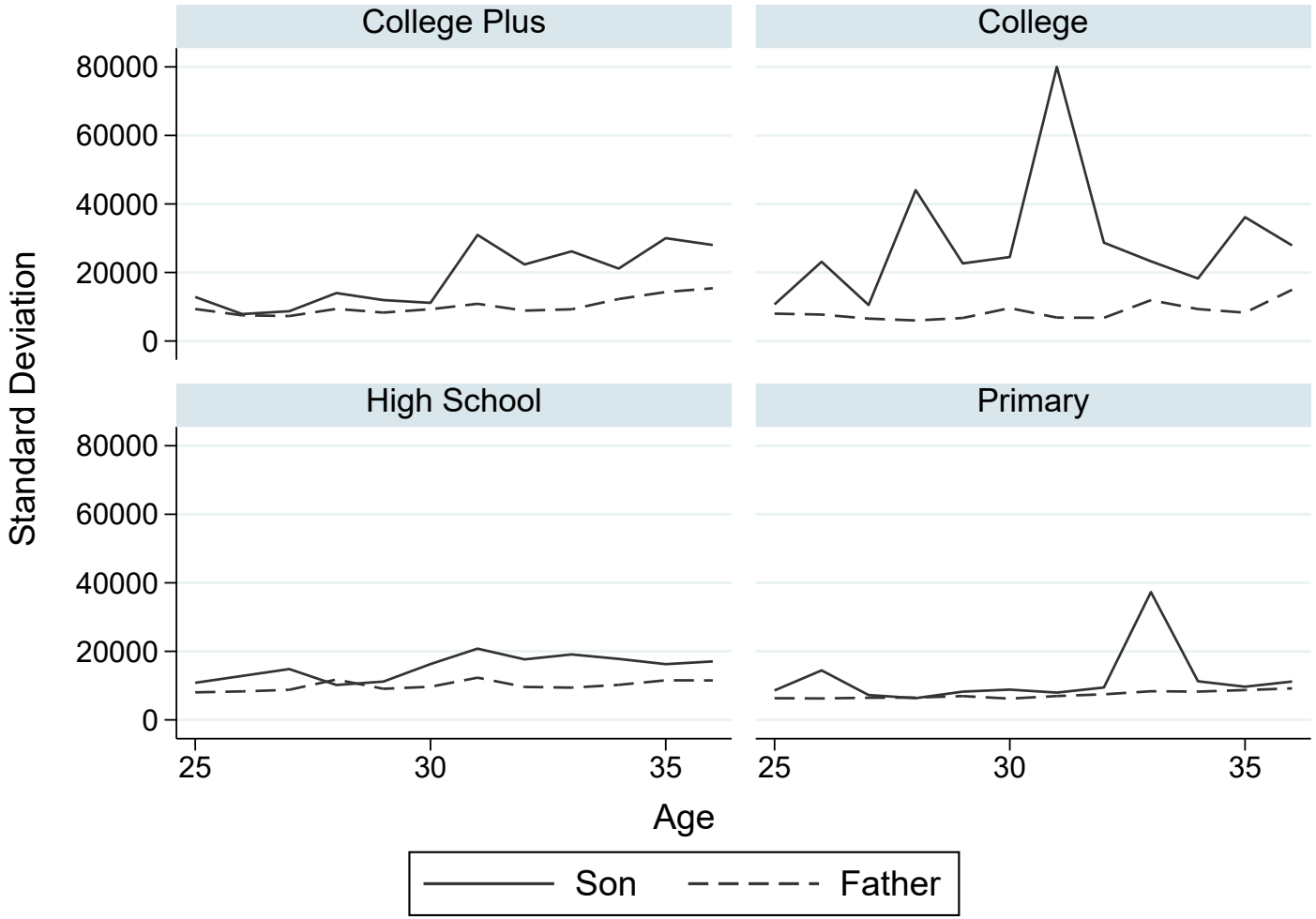
Table 2: Specification Tests ($\mathcal{Z}^j$ Is the Candidate Proxy for Information Set)

		(3)	(4)
Panel A: Full Population			
		$y_{50} - \mathbb{E}(y_{50} \mid \mathcal{Z}^2_{30})$	$y_{50} - \mathbb{E}(y_{50} \mid \mathcal{Z}^3_{30})$
Consumption (Age 30)	β_{OLS}	0.23	0.03
	T-stat	(4.55)	(0.72)
Panel B: Main Sample, Child Outcomes			
		$y_{30} - \mathbb{E}(y_{30} \mid \mathcal{Z}^2_{29})$	$y_{30} - \mathbb{E}(y_{30} \mid \mathcal{Z}^3_{29})$
Disposable Income (Age 30)	β_{OLS}	0.05	-0.00
	T-stat	(8.84)	(-0.12)
Wage Income (Age 30)	β_{OLS}	0.07	0.01
	T-stat	(13.60)	(1.57)
College Attainment	β_{OLS}	0.06	-0.04
	T-stat	(2.27)	(-0.80)
Years of Schooling	β_{OLS}	0.49	-0.09
	T-stat	(3.60)	(-0.39)

Table 2: Specification Tests ($\mathcal{Z}^j$ Is the Candidate Proxy for Information Set): Notes

Notes: This table reports sufficiency tests using the tests described above from Cunha & Heckman (2005). Panel A shows the regression associations between disposable income at age 50 with own consumption at age 30 (for all individuals born in 1951), and Panel B reports regression associations between parental income at age 30 with various child outcomes (disposable income, wage income, college attainment, and years of schooling). Column (1) reports the associations using disposable income. Columns (2)–(4) report the associations using disposable income residualized with respect to different information sets ($\mathcal{Z}^k_{30}$). $\mathcal{Z}^1_{30}$ includes information on gender and educational attainment, $\mathcal{Z}^2_{30}$ adds cohabitation and homeownership status to the information set, and $\mathcal{Z}^3_{30}$ is our final information set, which includes information on gender, education level (primary school, high school, college, and university), employment status, cohabitation, number of children, quartiles for mean income level, quartiles for mean consumption level, quartiles for mean consumption growth, quartiles for standard deviation of consumption, and homeownership status. We report t-statistics for the null hypothesis that the OLS coefficient is zero in parenthesis.

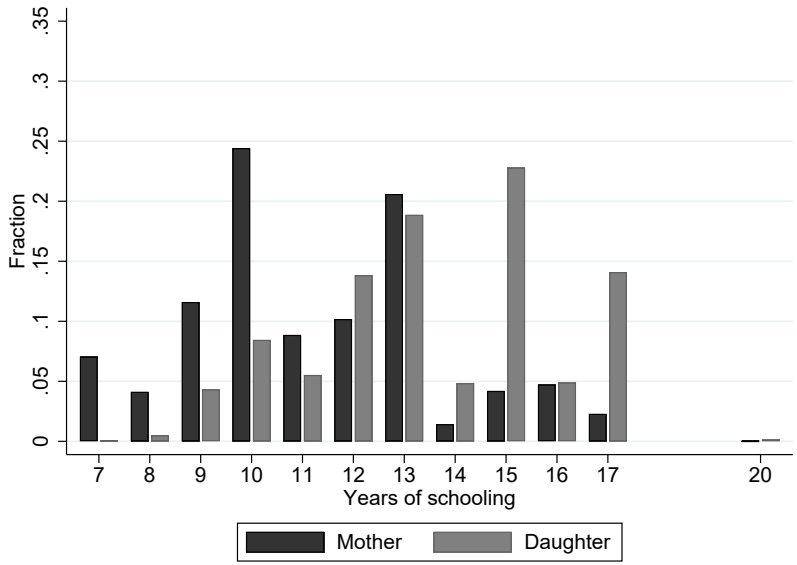
Figure 1: Uncertainty in Earnings by Age and Education Level



Nonstationarity across Cohorts

Figure 2: Distributions of Years of Schooling for Parents and Children

(a) Females



(b) Males

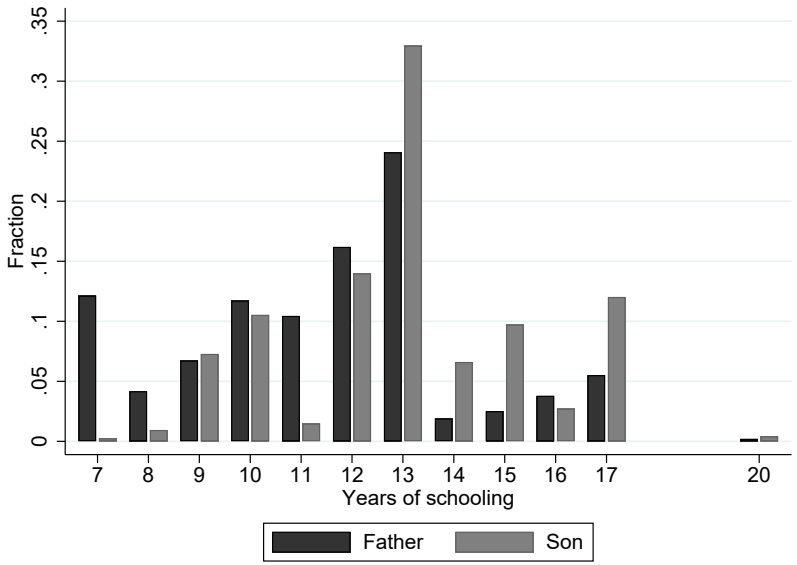


Figure 3: Timing of Key Life Events across Generations

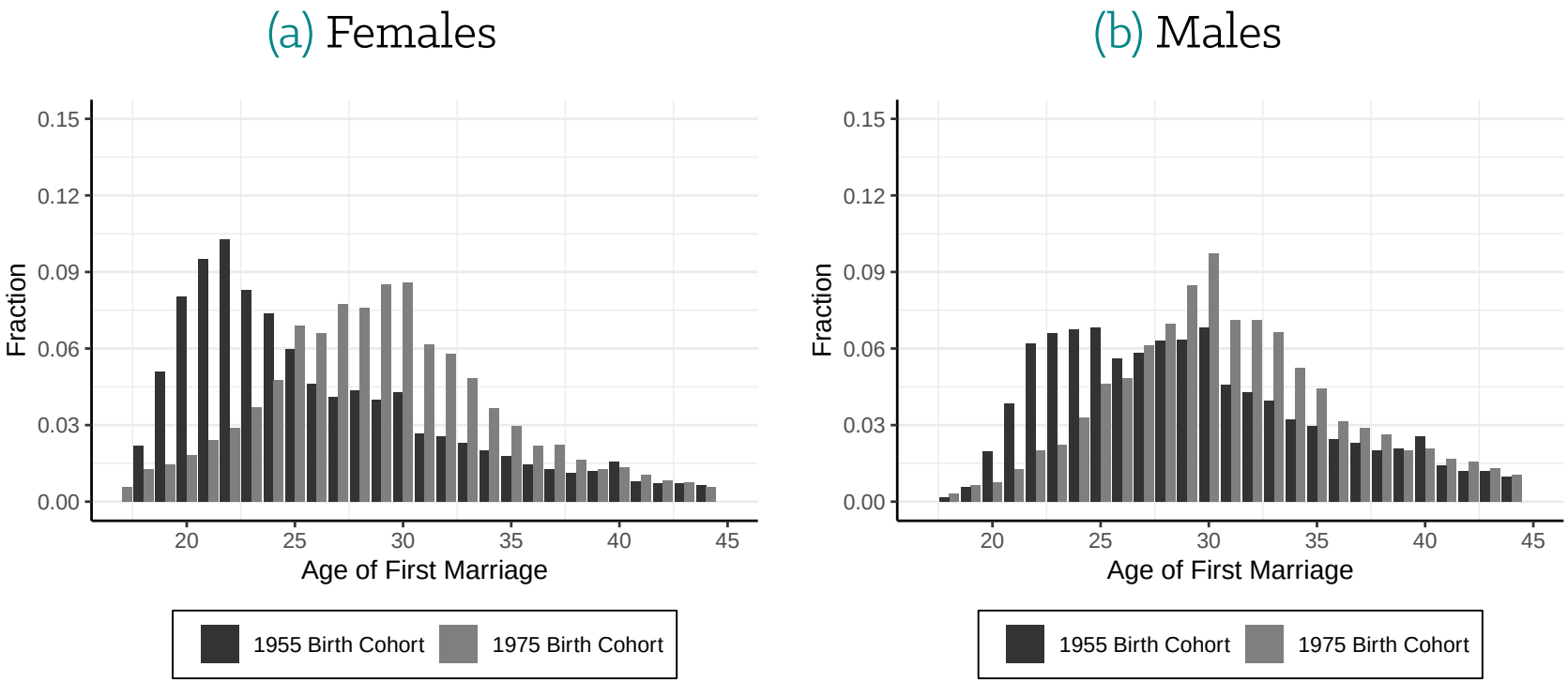
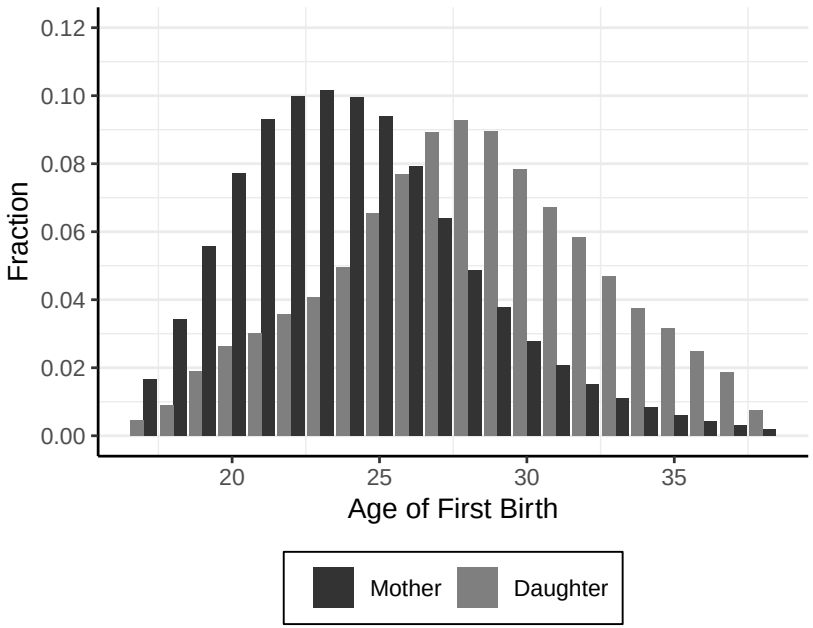


Figure 3: Timing of Key Life Events across Generations, Cont'd

(c) Females



(d) Males

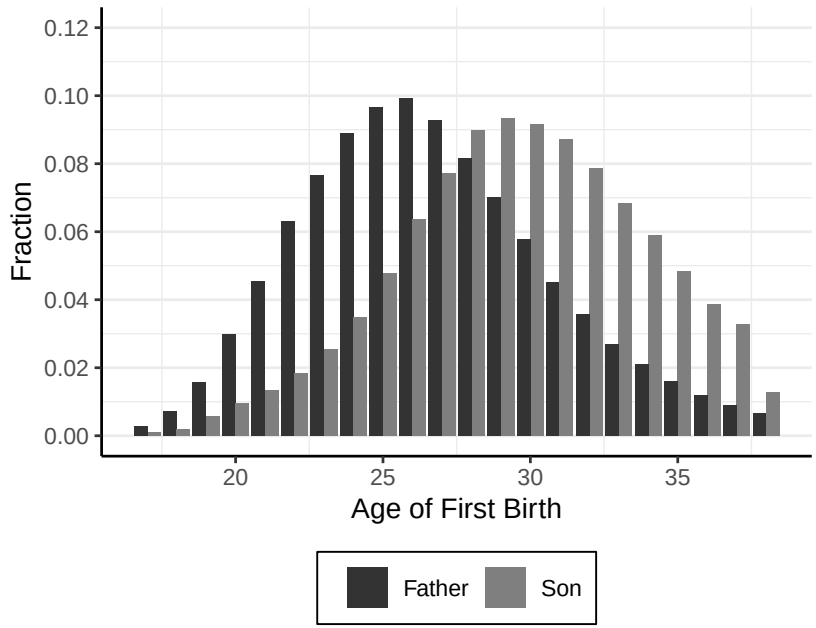
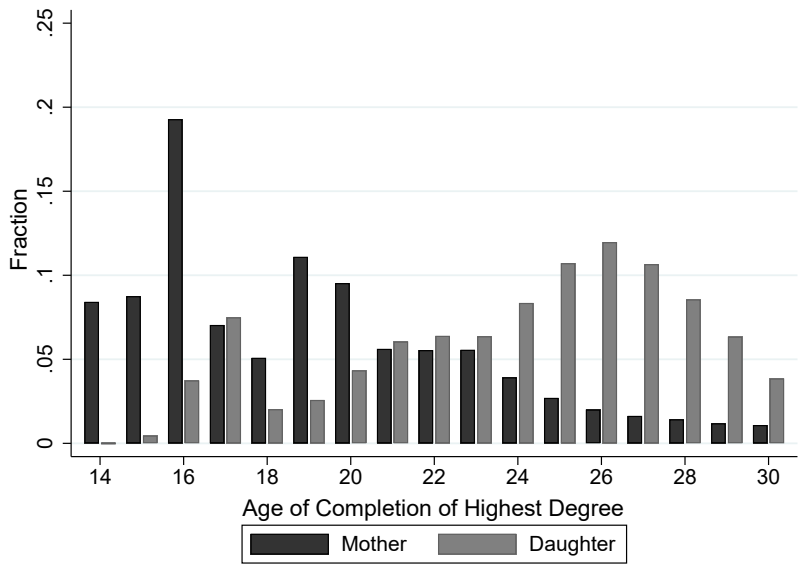


Figure 3: Timing of Key Life Events across Generations, Cont'd

(e) Females



(f) Males

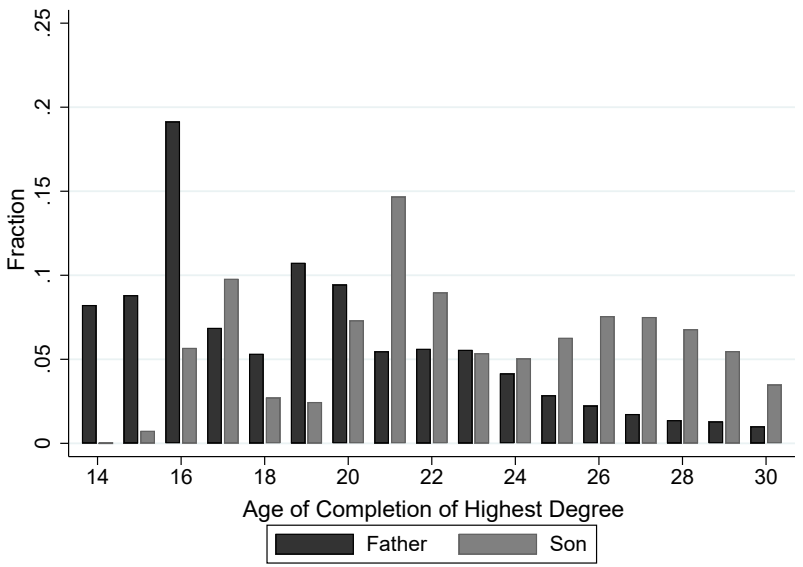


Figure 6: Income across Cohorts

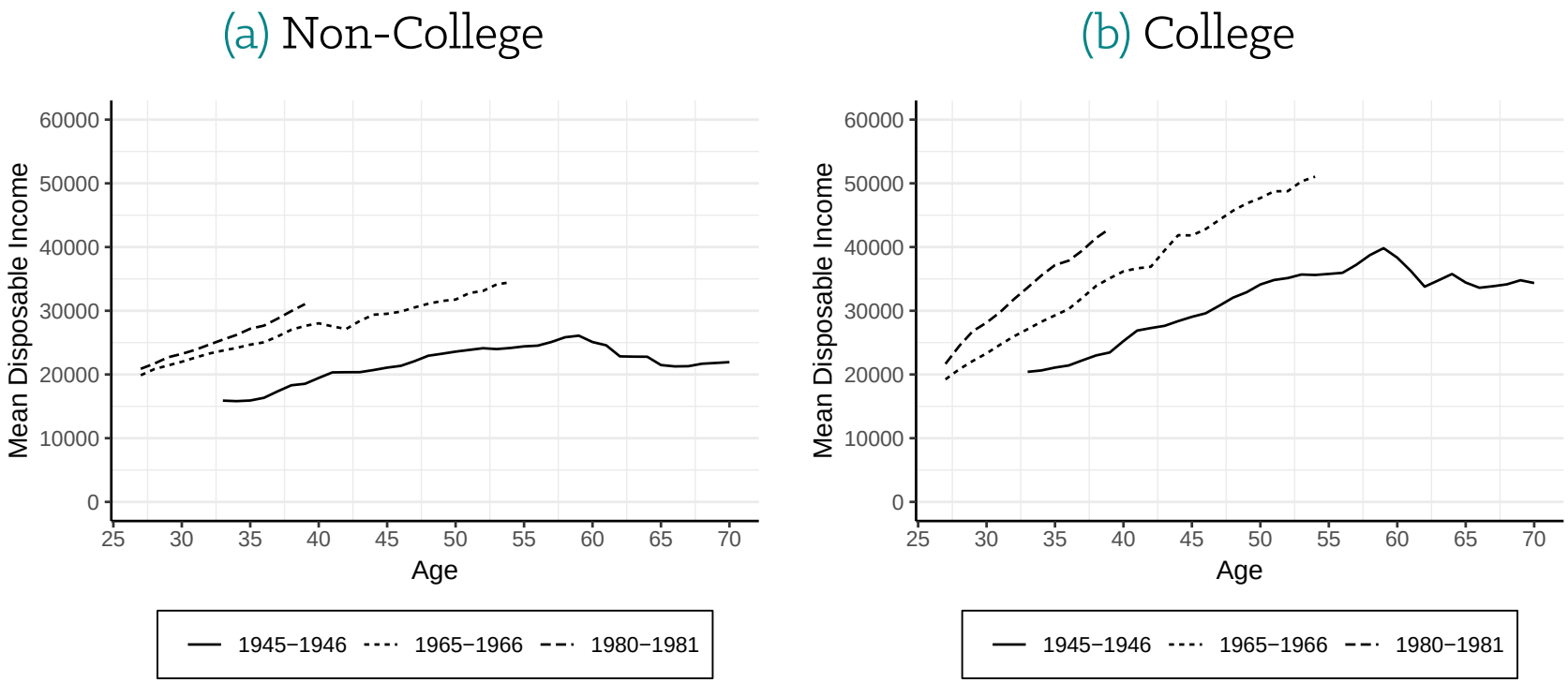
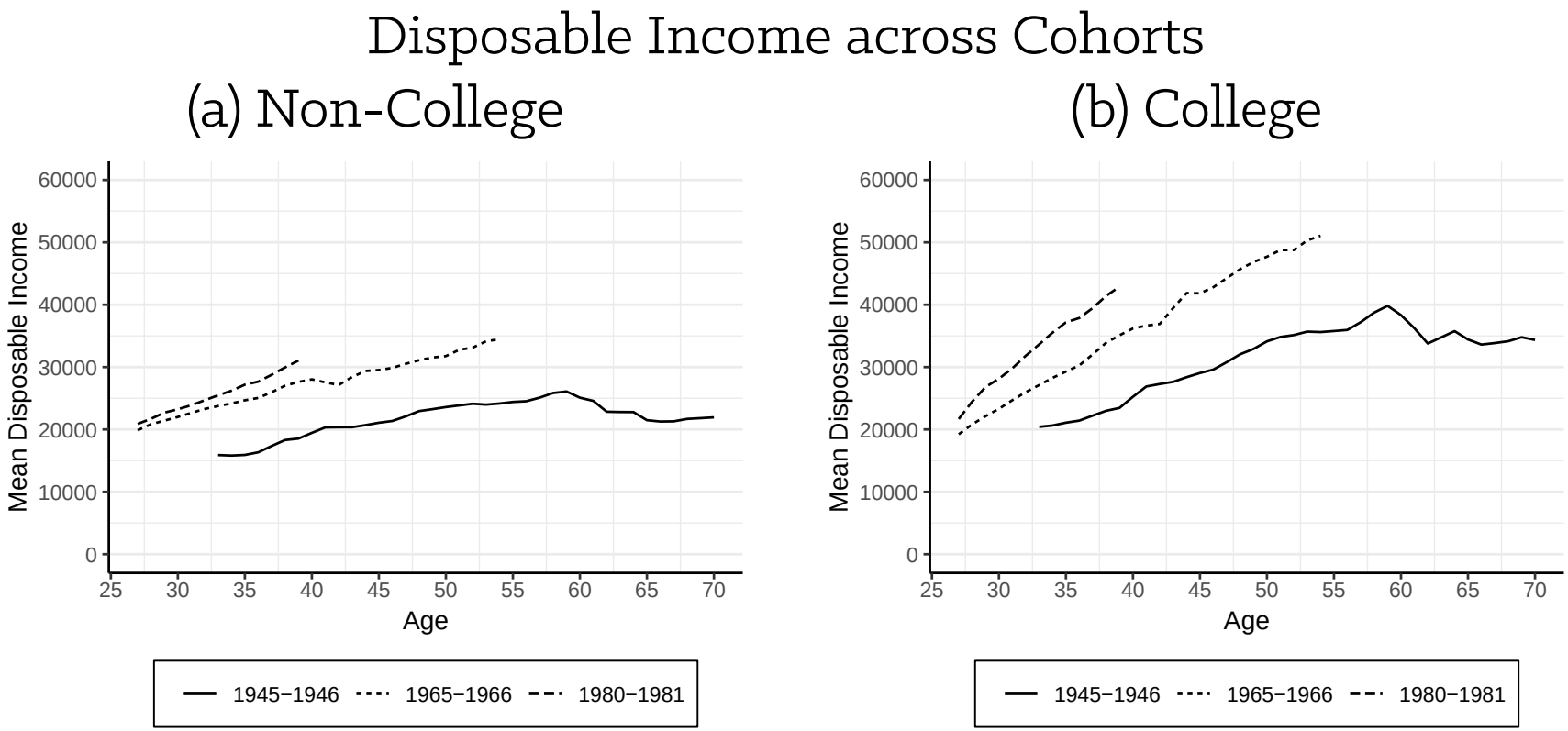


Figure 7: Disposable Income and Expected PDVI across Cohorts



Notes: Figs. (a) and (b) show disposable income for the 1945, 1965, and 1981 birth cohorts, respectively, for non-college and college educated individuals. Figs. (c) and (d) similarly show the expected PDVI for the 1945–46, 1965–66, and 1981–82. Incomes are reported in 2010 USD.

Link: By Age

Comparing Conventional Measures of Wellbeing with Lifetime Measures

Table 3: Correlations of Income and Welfare Measures

	Wage Income	Income without Transfers	Income with Transfers	Disposable Income
Income without Transfers	0.55	–	0.98	0.42
Income with Transfers	0.50	0.98	–	0.42
Disposable Income	0.55	0.42	0.42	–
Household Consumption	0.45	0.63	0.61	0.38
Realized Lifetime Wealth	0.39	0.30	0.30	0.49
Realized PDV	0.37	0.43	0.42	0.37
Expected Lifetime Wealth	0.48	0.51	0.48	0.36
Expected PDV	0.45	0.45	0.42	0.35

Continues

Table 3: Correlations of Income and Welfare Measures, Cont'd

	Household Consumption	Realized Lifetime Wealth	Realized PDV	Expected Lifetime Wealth
Income without Transfers	0.63	0.30	0.43	0.51
Income with Transfers	0.61	0.30	0.42	0.48
Disposable Income	0.38	0.49	0.37	0.36
Household Consumption	–	0.38	0.37	0.39
Realized Lifetime Wealth	0.38	–	0.64	0.35
Realized PDV	0.37	0.64	–	0.42
Expected Lifetime Wealth	0.39	0.35	0.42	–
Expected PDV	0.38	0.30	0.39	0.96

Predictors of Important Child Outcomes

Figure 8: Parents' Resources and Children's Outcomes

(a) Mathematics Problem Solving

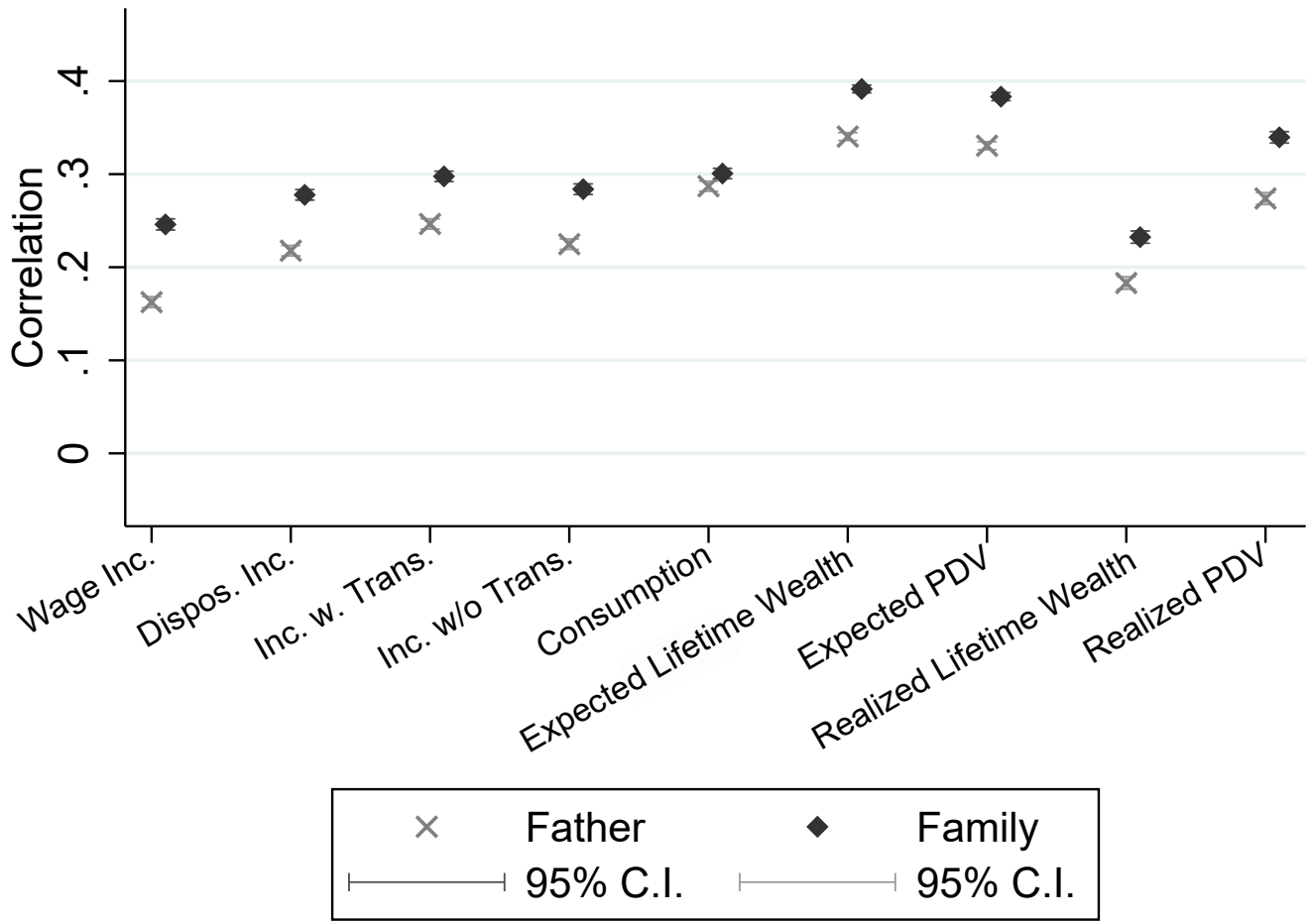


Figure 8: Parents' Resources and Children's Outcomes, Cont'd

(b) College Attainment

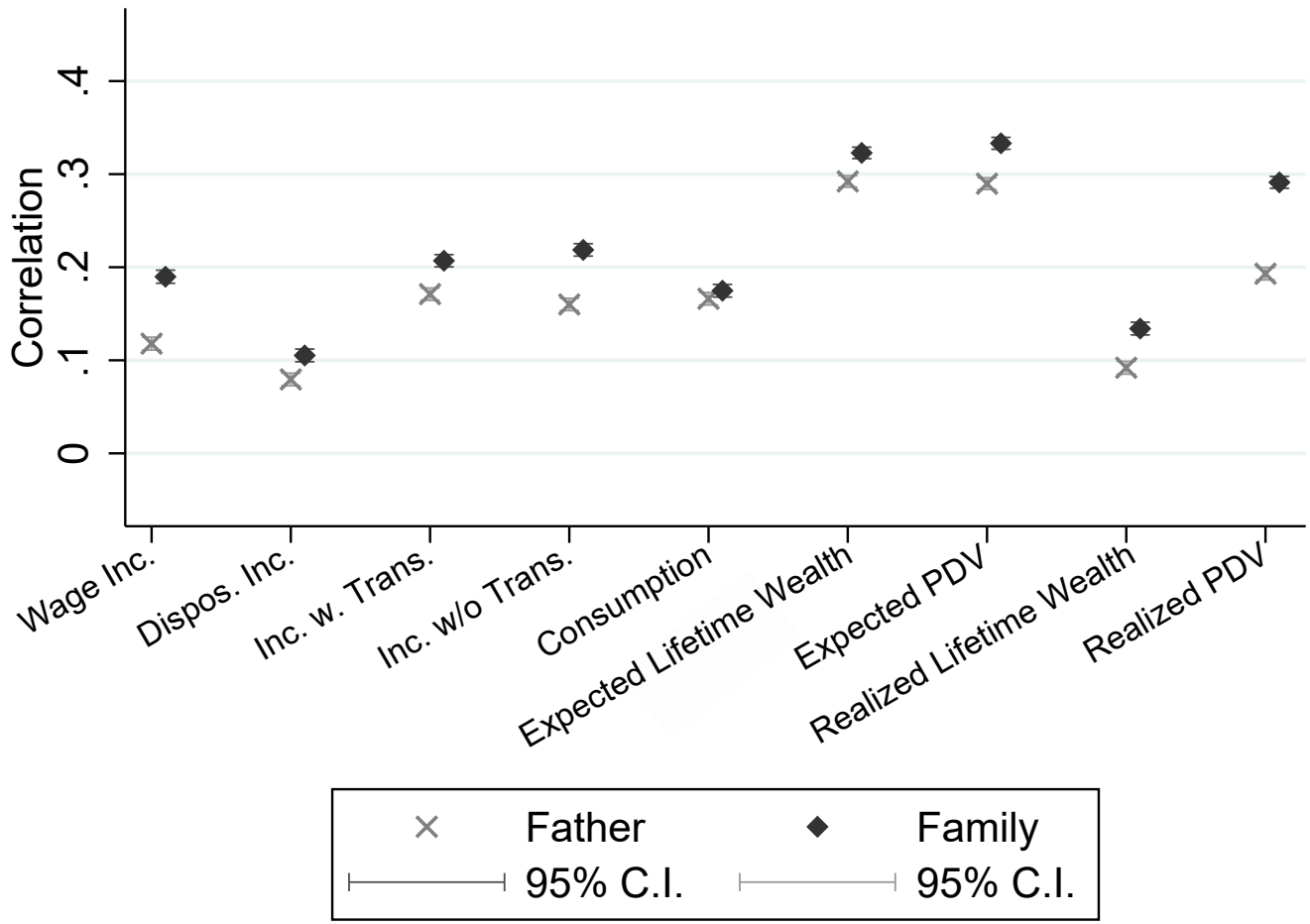
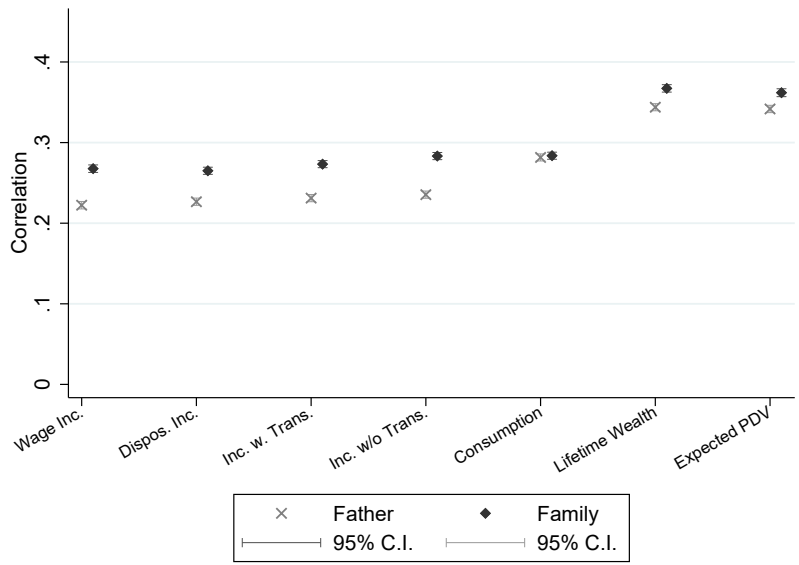


Figure 9: Parental Resources Measured at Ages 0–4 and Child Outcomes

(a) Mathematics Problem Solving



(b) Danish Reading

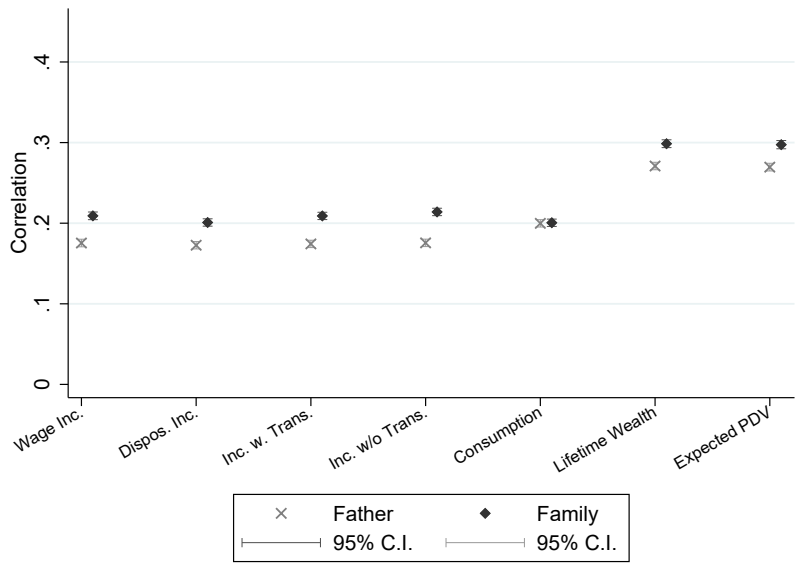
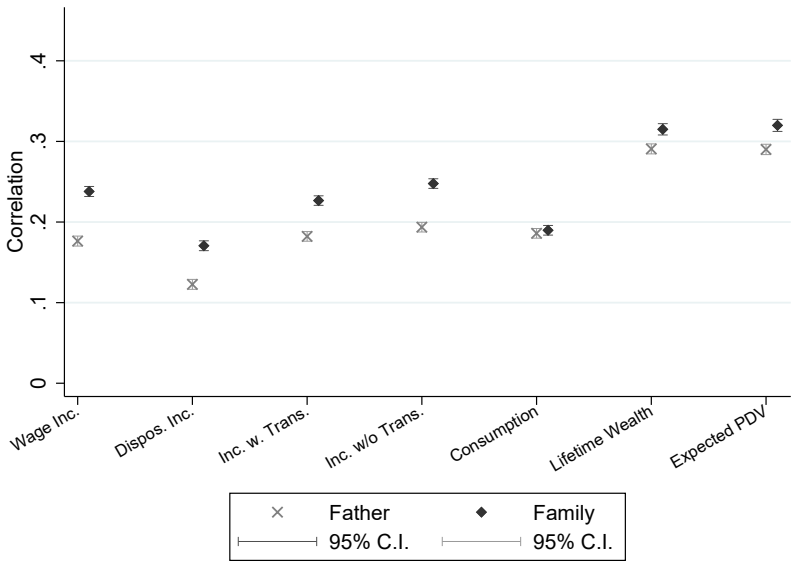


Figure 9: Parental Resources Measured at Ages 0–4 and Child Outcomes, Cont'd

(c) College Attainment



(d) Years of Schooling

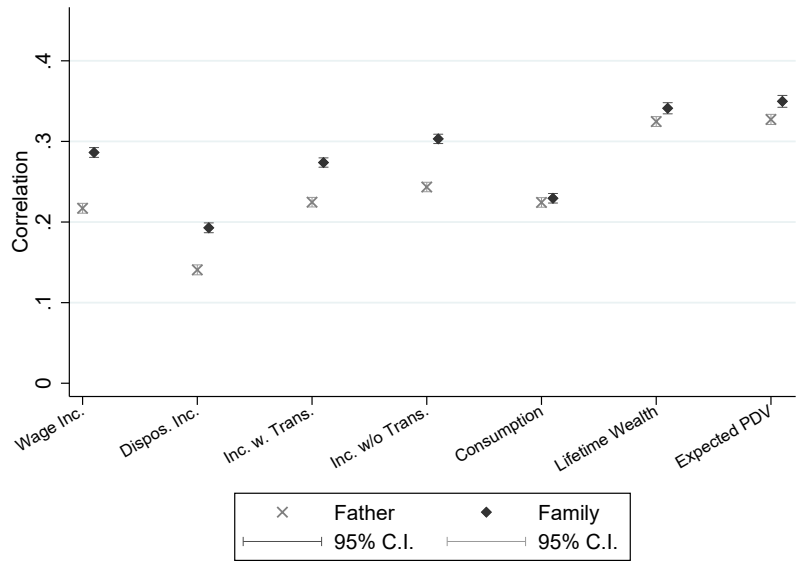
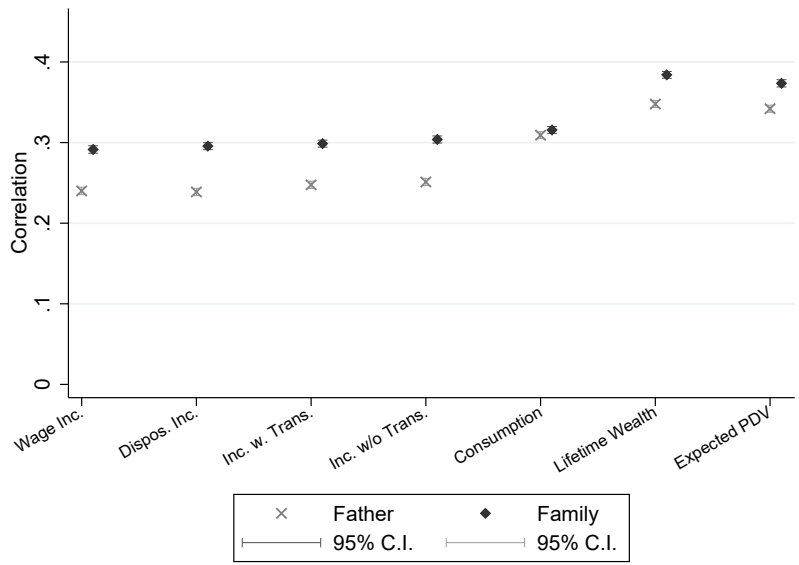


Figure 10: Parental Resources Measured at Ages 5–9 and Child Outcomes

(a) Mathematics Problem Solving



(b) Danish Reading

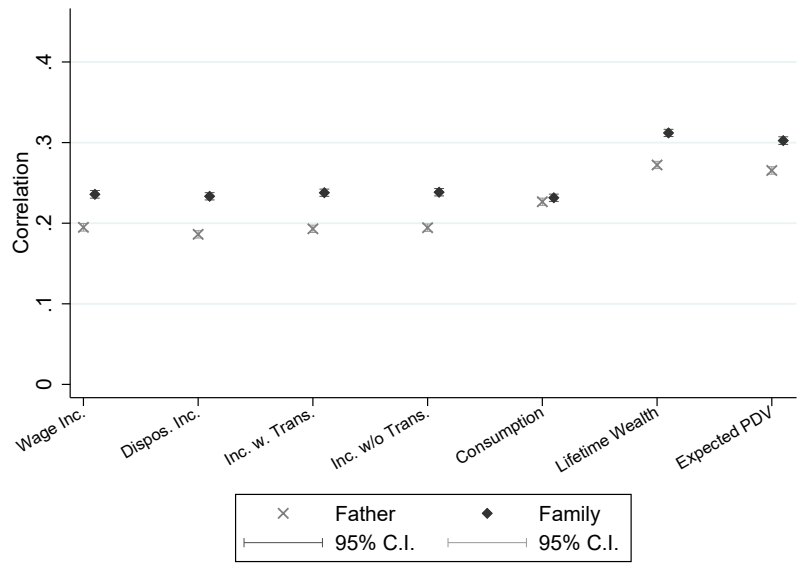
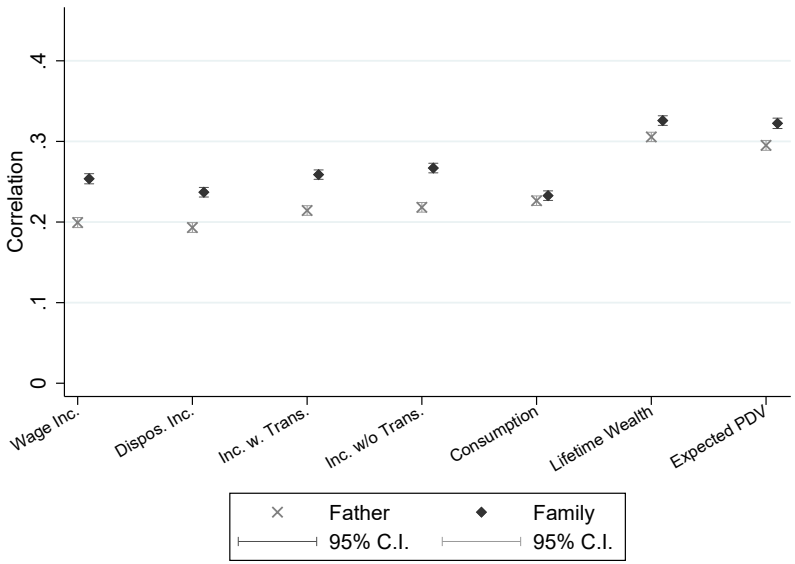


Figure 10: Parental Resources Measured at Ages 5–9 and Child Outcomes, Cont'd

(c) College Attainment



(d) Years of Schooling

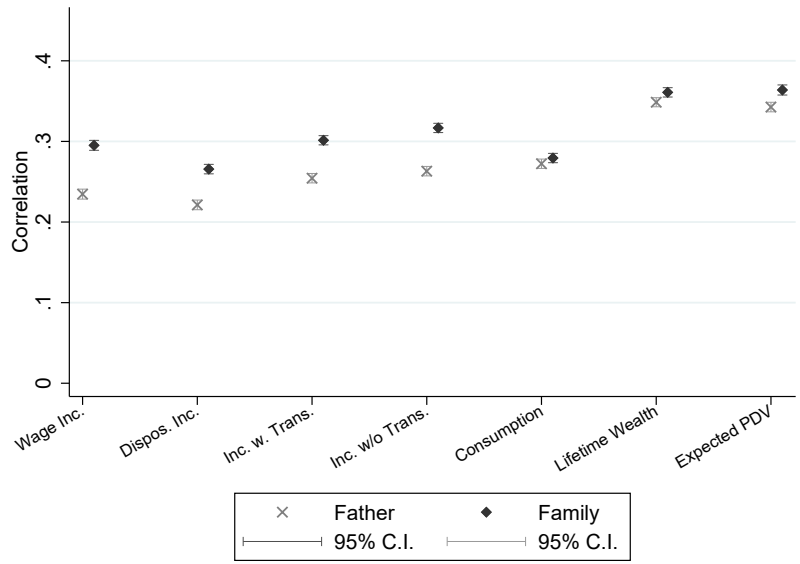
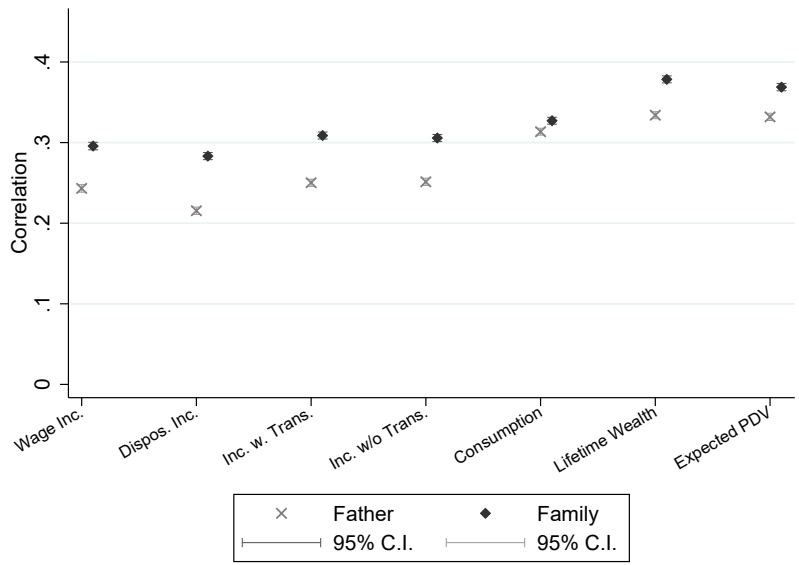


Figure 11: Parental Resources Measured at Ages 10–14 and Child Outcomes

(a) Mathematics Problem Solving



(b) Danish Reading

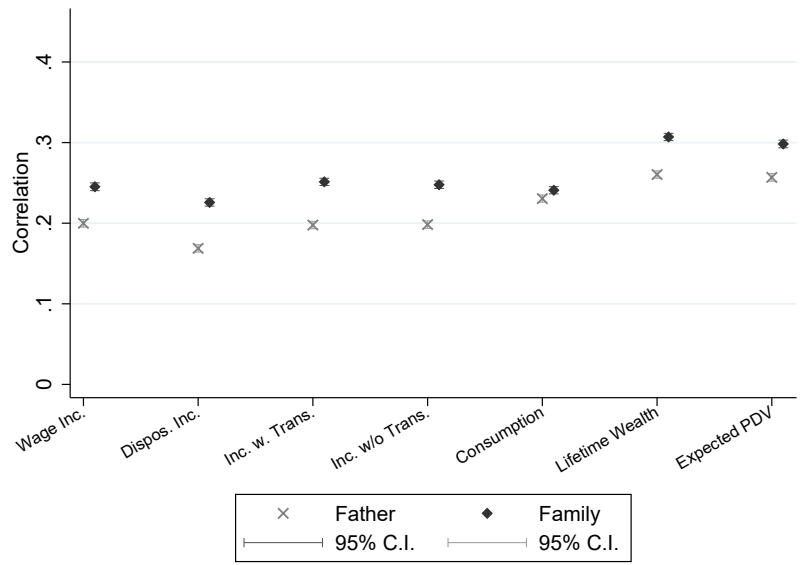
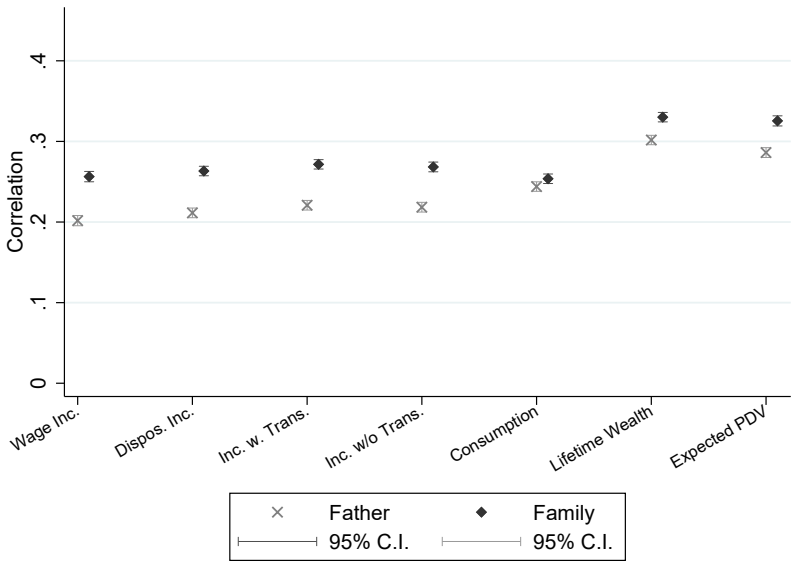
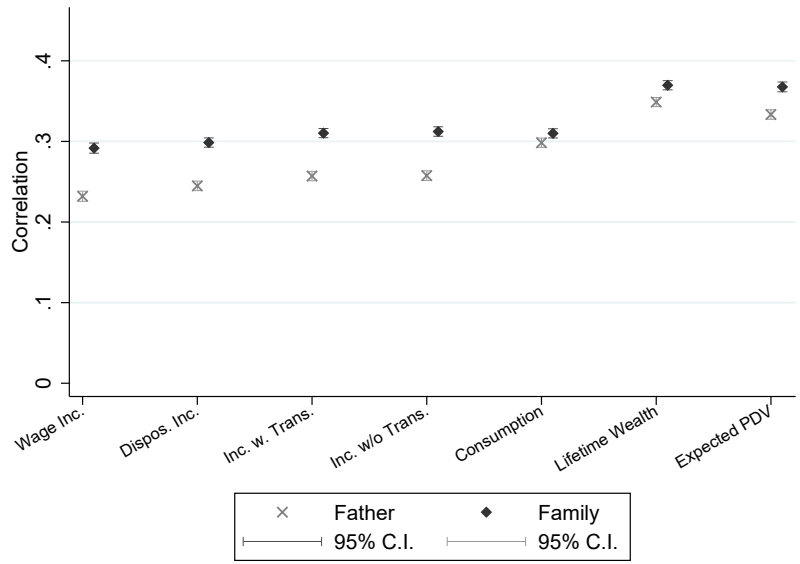


Figure 11: Parental Resources Measured at Ages 10–14 and Child Outcomes, Cont'd

(c) College Attainment



(d) Years of Schooling

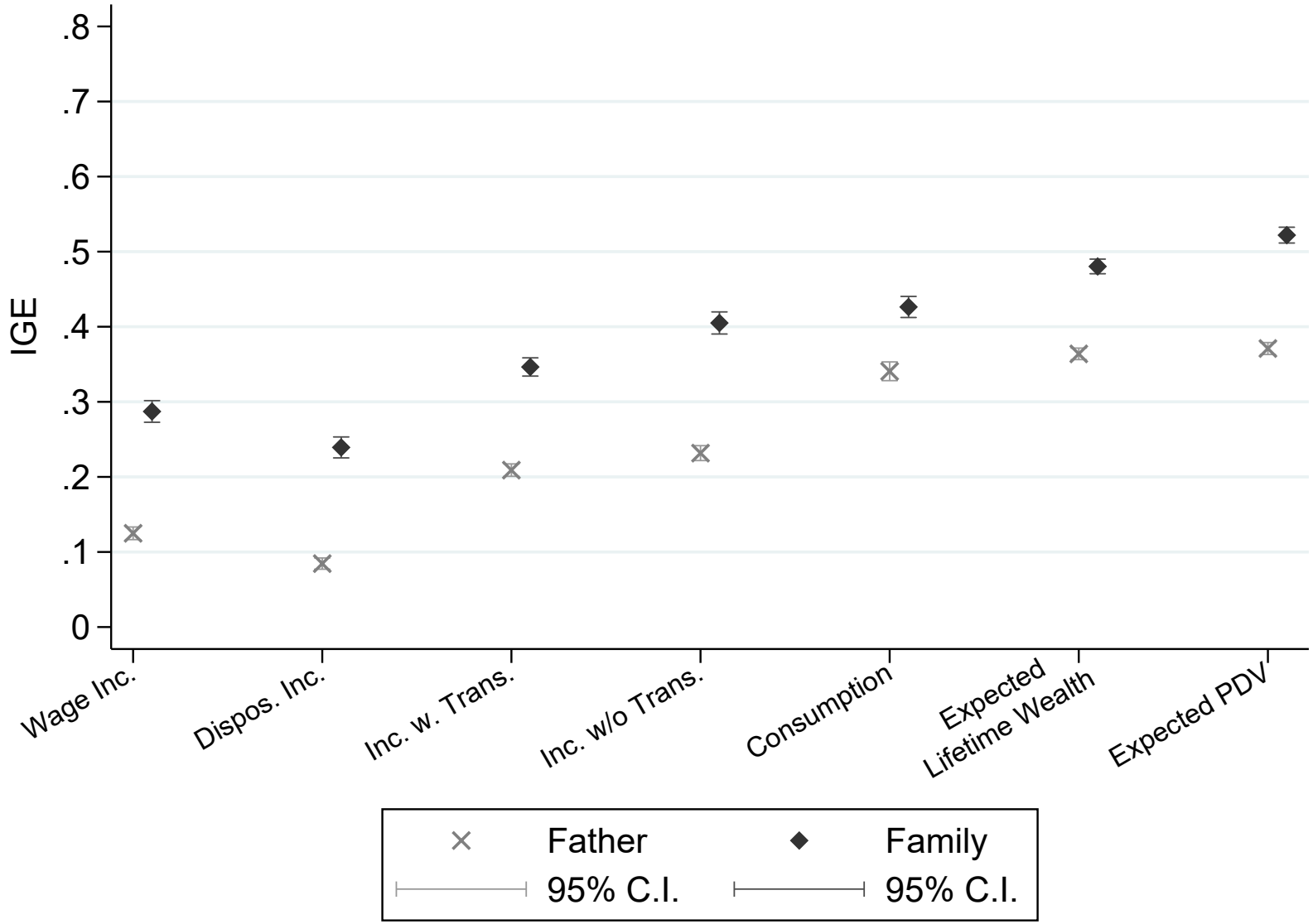


Link to Education, Crime, Fertility

Intergenerational Elasticities

(Initially ignore family structure. We will return to it later.)

Figure 12: Log-Log IGE Estimates



Link to Rank-Rank Version

Link to Additional Log-Log IGE Estimates

Intergenerational Correlations and Cross-Sectional Inequality

Table 4: IGE Estimates (Ages 30–35 of Parents and Children)

	Father-Child IGE $\hat{\beta} = \rho_{\text{child,father}} \frac{sd(\text{child})}{sd(\text{father})}$	**Family-Child IGE** $\hat{\beta} = \rho_{\text{child,family}} \frac{sd(\text{child})}{sd(\text{family})}$
Traditional Measures		
Wage Income	$0.125^{***} = 0.107 \frac{0.930}{0.798}$	$0.287^{***} = 0.148 \frac{0.913}{0.471}$
Disposable Income	$0.085^{***} = 0.078 \frac{0.438}{0.402}$	$0.239^{***} = 0.118 \frac{0.434}{0.215}$
Income with Transfers	$0.209^{***} = 0.170 \frac{0.477}{0.387}$	$0.346^{***} = 0.193 \frac{0.475}{0.264}$
Income without Transfers	$0.232^{***} = 0.162 \frac{0.894}{0.623}$	$0.405^{***} = 0.194 \frac{0.879}{0.420}$
Household Consumption	$0.341^{***} = 0.188 \frac{0.279}{0.154}$	$0.426^{***} = 0.210 \frac{0.279}{0.138}$
Lifetime Measures		
Realized Lifetime Wealth	$0.178^{***} = 0.087 \frac{0.550}{0.258}$	$0.185^{***} = 0.087 \frac{0.550}{0.260}$
Realized PDV	$0.264^{***} = 0.119 \frac{0.603}{0.272}$	$0.351^{***} = 0.156 \frac{0.608}{0.270}$
Expected Lifetime Wealth	$0.364^{***} = 0.305 \frac{0.237}{0.199}$	$0.480^{***} = 0.323 \frac{0.236}{0.158}$
Expected PDV	$0.371^{***} = 0.310 \frac{0.279}{0.233}$	$0.522^{***} = 0.341 \frac{0.277}{0.181}$

Impact of Resource Measures on Child Outcomes

- Consider impacts on a vector of child outcomes – not just income.

Figure 13: Correlations between parents' resources and children's environment

(a) Proxies of parents' investments at age 7 of the child

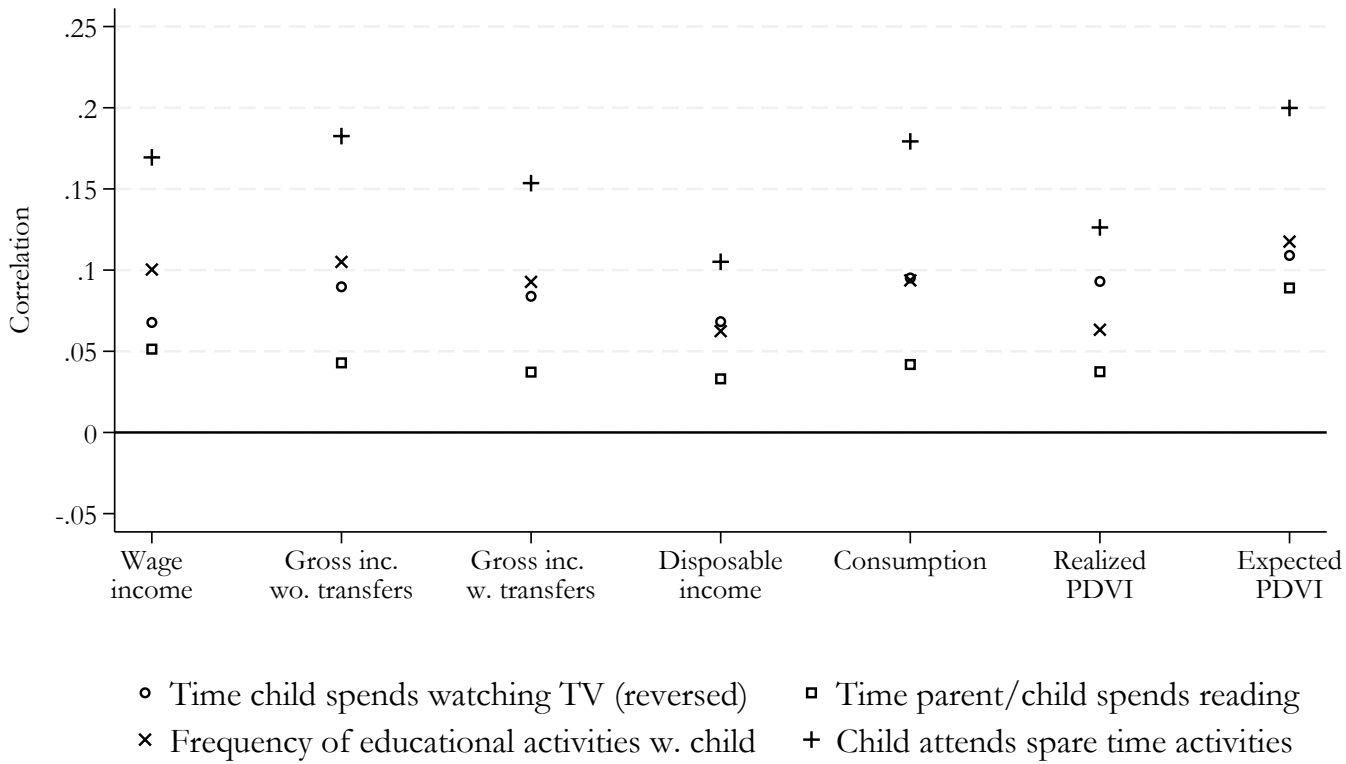


Figure 13: Correlations between parents' resources and children's environment, cont'd

(b) Expectations of child's educational attainment at age 11, 15 of the child

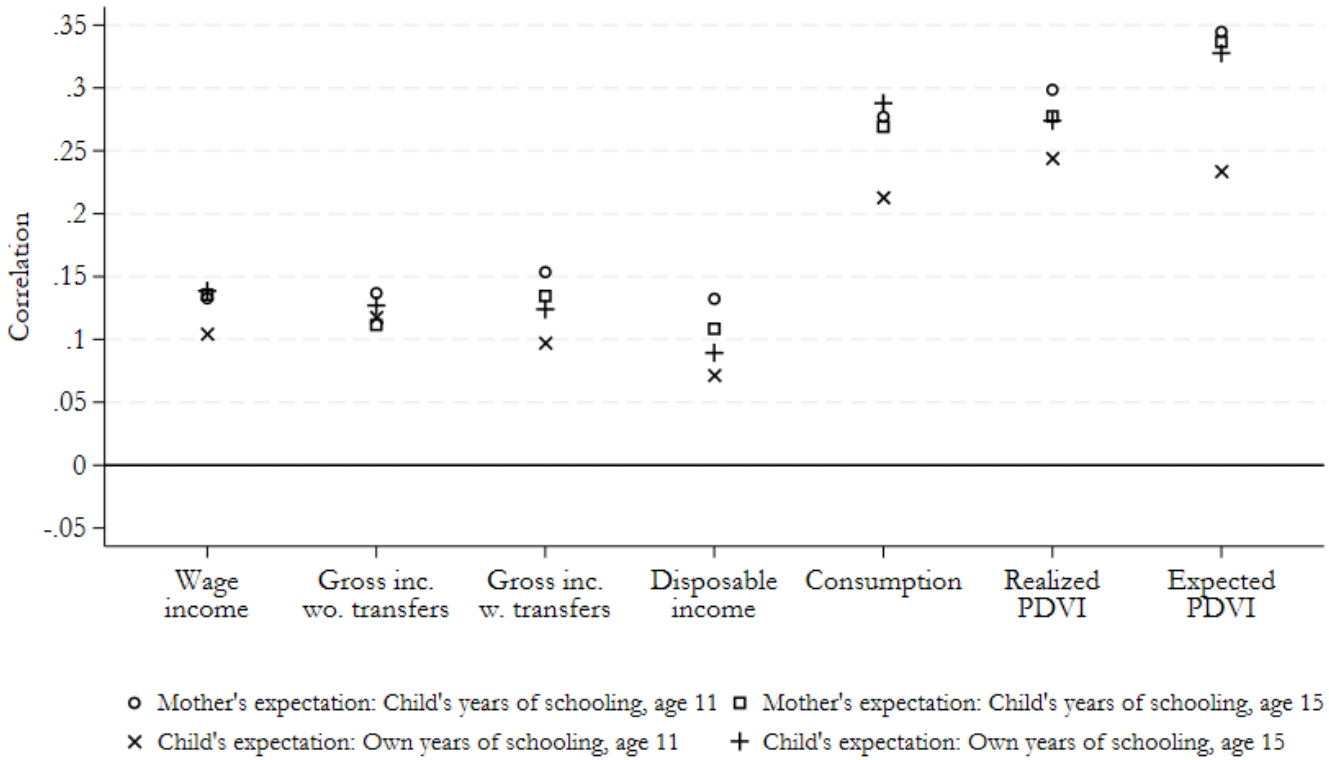
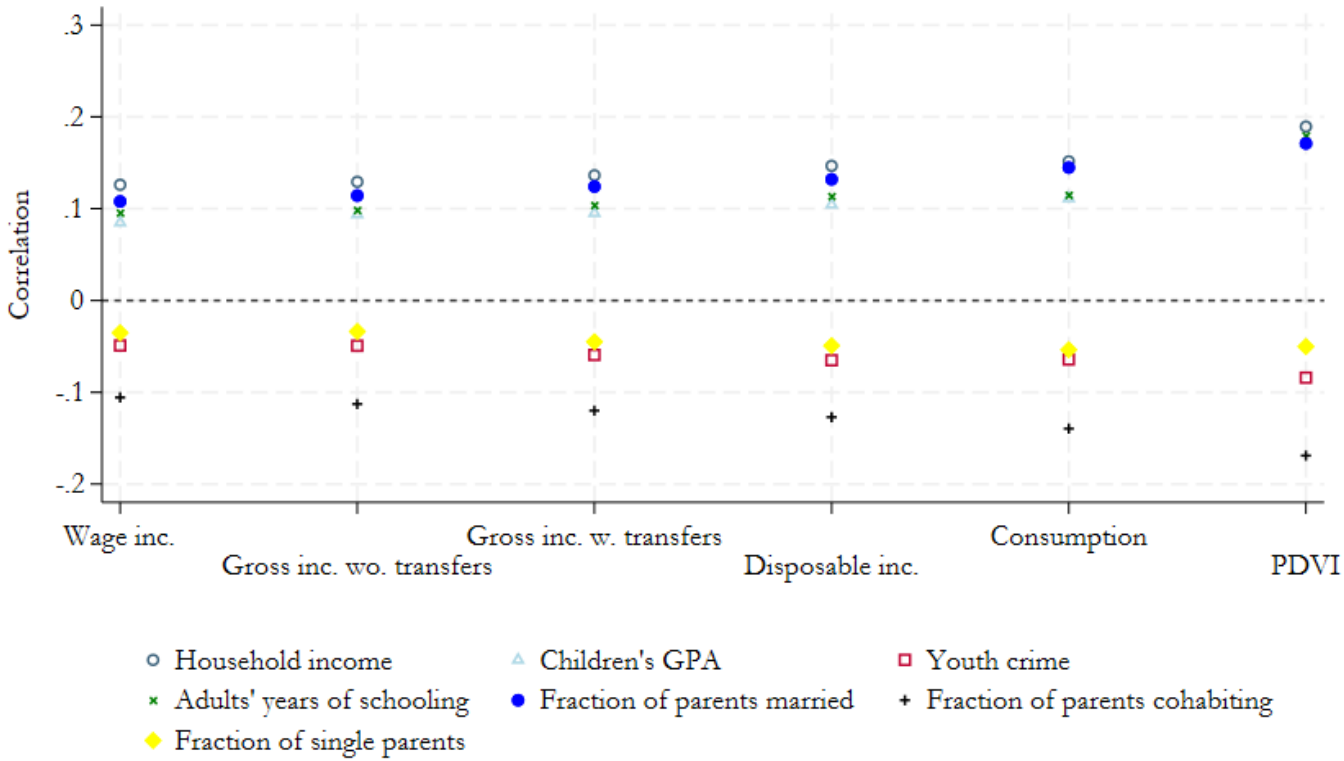


Figure 13: Correlations between parents' resources and children's environment, cont'd

(c) Average neighborhood characteristics



Interaction of Resources and Family Structure at Different Stages of Childhood

- We first investigate how children's outcomes, conditional on parents' expected PDVI at a given age range, depend on earlier expected PDVI.
- Do parents' expected PDVI at a given point in time sufficiently capture parents' influence or do updates in expectations earlier in the child's life (and parents' decisions made there) play a separate role?
- We trace the evolution of transmission by conditioning children's outcomes on parents' resources at age windows 0–4, 5–9, and 10–14 while sequentially controlling for earlier parental expected PDVI.
- This isolates periods when new information arrives and investment decisions adjust.

Table 5: Estimates for Children's log Years of Schooling and Parents' Resources

	(1)	(2)	(3)	(4)	(5)	(6)
	Child's Completed Education		Mother's Expectations		Child's Expectations	
(A) Expected PDVI						
$ln(y^P_{0-4})$	0.296^{***}	0.162^{***}				
	(0.003)	(0.006)				
$ln(y^P_{5-9})$	0.301^{***}	0.197^{***}	0.253^{***}	0.204^{***}	0.129^{***}	0.105^{***}
	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)
$ln(y^P_{10-14})$	0.278^{***}	0.167^{***}	0.170^{***}	0.147^{***}	0.137^{***}	0.122^{***}
	(0.003)	(0.004)	(0.009)	(0.009)	(0.008)	(0.008)
(B) Disposable Income						
$ln(y^P_{0-4})$	0.082^{***}	0.032^{***}				
	(0.002)	(0.002)				
$ln(y^P_{5-9})$	0.128^{***}	0.068^{***}	0.045^{***}	0.031^{***}	0.022^{***}	0.016^{***}
	(0.002)	(0.002)	(0.005)	(0.005)	(0.004)	(0.004)
$ln(y^P_{10-14})$	0.161^{***}	0.098^{***}	0.018^{***}	0.015^{***}	0.013^{***}	0.010^{***}
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Control						
Parents' educ.		X				
Child skills				X		X

IGEs by Family Type

Figure 14: IGEs of Expected PDVI and Children's Predicted log-Expected PDVI by Family Structure Throughout Childhood.

(a) IGEs by Family Type

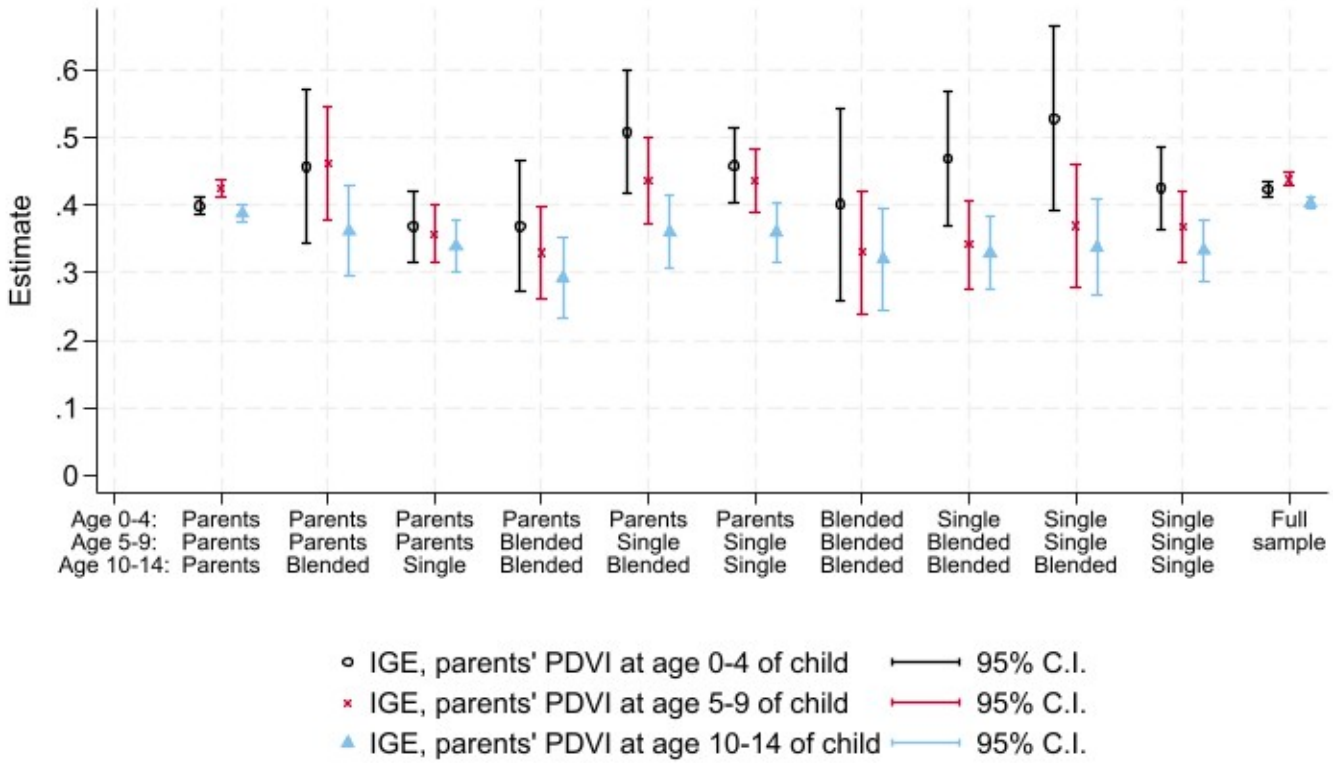
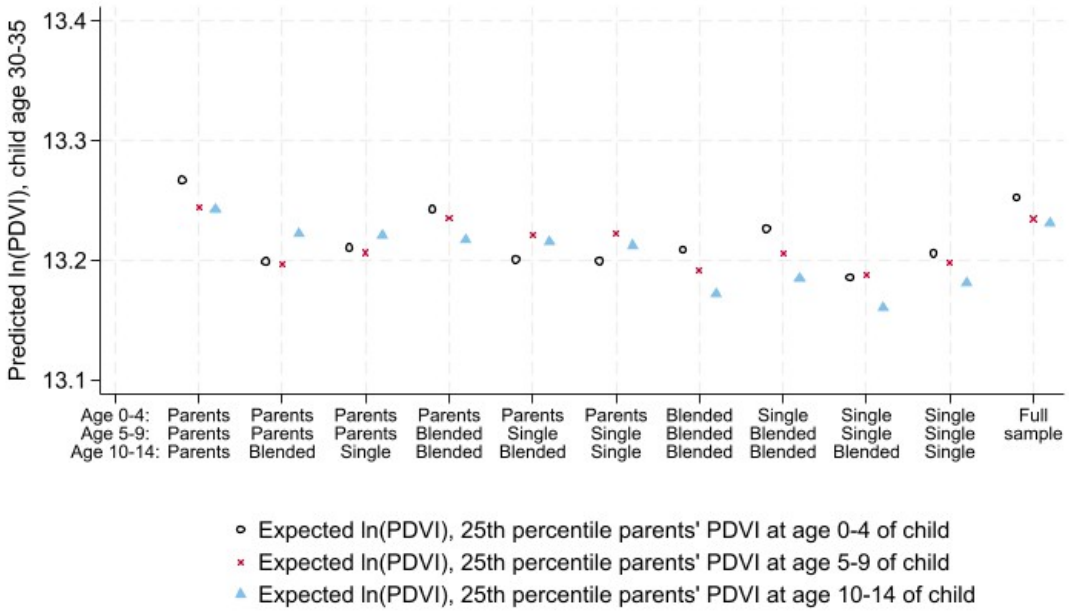


Figure 14: IGEs of Expected PDVI and Children's Predicted log-Expected PDVI by Family Structure Throughout Childhood, Cont'd.

(b) Child's Predicted log-Expected PDVI at the 25th Percentile of Parents' Expected PDVI



Age	0–4	5–9	10–14
IGEs	0.02	<0.01	<0.01
Predicted levels	<0.01	<0.01	<0.01

Accounting for Resources Available to Child in Different Family Types

- An extensive literature in family economics has documented that resources available to children depend not only on parents' income but also on how resources are allocated to other members of the household, which depends on the number of siblings and their ages.
- Several different equivalence scales have been devised to account for this.

- We employ a standard equivalization to the sum of parents' resources $y_{i,a}^{P,eq}$ with explicit focus on children and allowing parents to differ in the number of children, $\#C_a^M$, $\#C_a^F$, they have to provide for (e.g., due to children from previous relationships) at a given age a of the focal child in question:

$$y_{i,a}^{P,eq} = y_{i,a}^{M} / \sqrt{\#C_a^M} + y_{i,a}^{F} / \sqrt{\#C_a^F}$$

with the resulting IGE being estimated as:
$ln(y_i^C) = \alpha^{eq} + \beta_{IGE}^{eq} ln(y_{i,a}^{P,eq}) + \varepsilon_{i,a}.$

- We operationalize the household structure channel by estimating the influence of resident vs. non-resident and step-parents' resources.
- These estimates also rationalize why family-level resources produce larger IGE estimates.

- We estimate influences of the non-resident parent for children growing up in a single-parent household, γ_1^{NR-P}, and the non-resident parent and the step-parent, γ_2^{NR-P}, γ^{S-P}, in blended families at each age ranges a 0–4, 5–9, and 10–14, which maximizes the predictive power of parents' resources for children's expected PDVI:

$$y_{i,a}^{P,eq/w} = y_{i,a}^{M} / \sqrt{\#C_a^M} + y_{i,a}^{F} / \sqrt{\#C_a^F} \text{ (nuclear families)}$$

$$y_{i,a}^{P,eq/w} = y_{i,a}^{R-P} / \sqrt{\#C_a^{R-P}} + \gamma_{1,a}^{NR-P} y_{i,a}^{NR-P} / \sqrt{\#C_a^{NR-P}} \text{ (single-parent families)}$$

$$y_{i,a}^{P,eq/w} = y_{i,a}^{R-P} / \sqrt{\#C_a^{R-P}} + \gamma_{2,a}^{NR-P} y_{i,a}^{NR-P} / \sqrt{\#C_a^{NR-P}} + \gamma_t^{S-P} y_{i,t}^{S-P} / \sqrt{\#C_a^{S-P}}$$

(blended families)

where y^M, y^F, y^{R-P}, y^{NR-P}, and y^{S-P} refer to resources (equivalized with the number of children the adult has) of the child's mother and father in nuclear families, and resident, non-resident, and step-parent in non-nuclear families. The resulting IGEs are estimated as:

$$ln(y_i^C) = \alpha^{eq/w} + \beta_{IGE}^{eq/w} ln(y_{i,a}^{P,eq/w}) + \varepsilon_{i,a}.$$

Table 6: Influences of Household Resources on Children

Age range a		0–4	5–9	10–14
Expected PDVI				
Non-resident parent in single-parent families	$\gamma_{1,a}^{NR-P}$	0.3	0.3	0.6
Non-resident parent in blended families	$\gamma_{2,a}^{NR-P}$	0.9	0.9	0.9
Step-parent in blended families	γ_{a}^{S-P}	0.1	0.1	0.2
Disposable Income				
Non-resident parent in single-parent families	$\gamma_{1,a}^{NR-P}$	0.1	0.1	0.2
Non-resident parent in blended families	$\gamma_{2,a}^{NR-P}$	0.3	0.6	0.8
Step-parent in blended families	γ_{a}^{S-P}	0.5	0.6	0.2

Figure 15: IGEs of PDVI by Family Type and Equivalization of Resources

(a) IGE of Expected PDVI

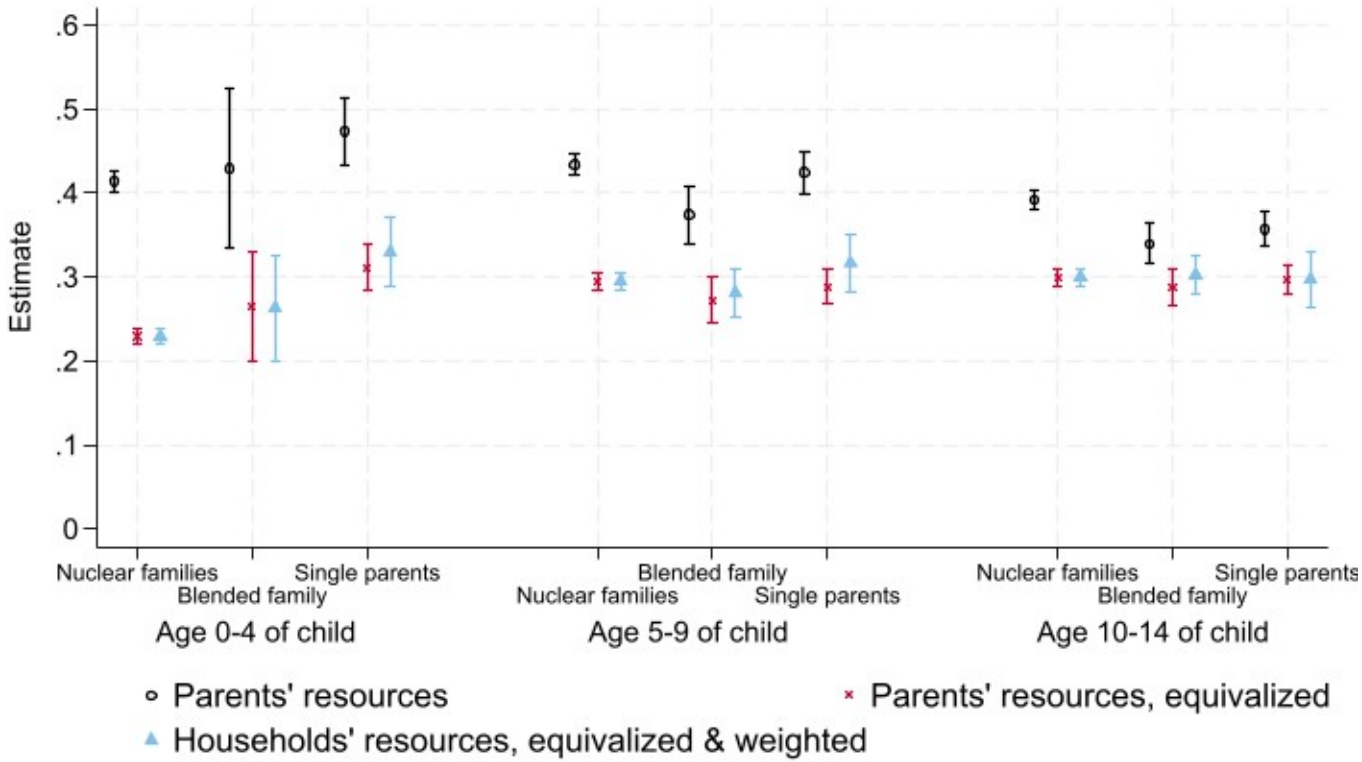


Figure 15: IGEs of PDVI by Family Type and Equivalization of Resources, Cont'd

(b) IGE of disposable income

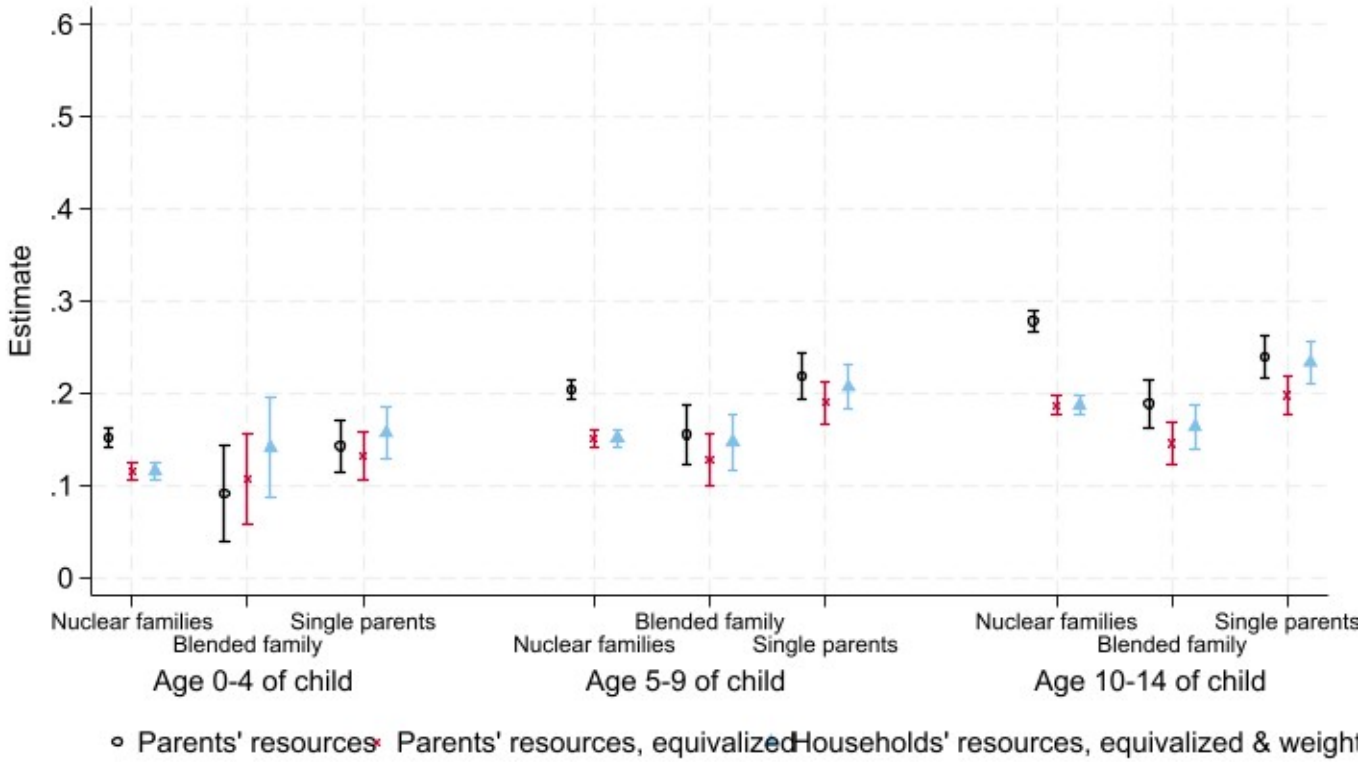


Figure 15: IGEs of PDVI by Family Type and Equivalization of Resources, Cont'd

(c) IGE of Expected PDVI controlling for parents' education

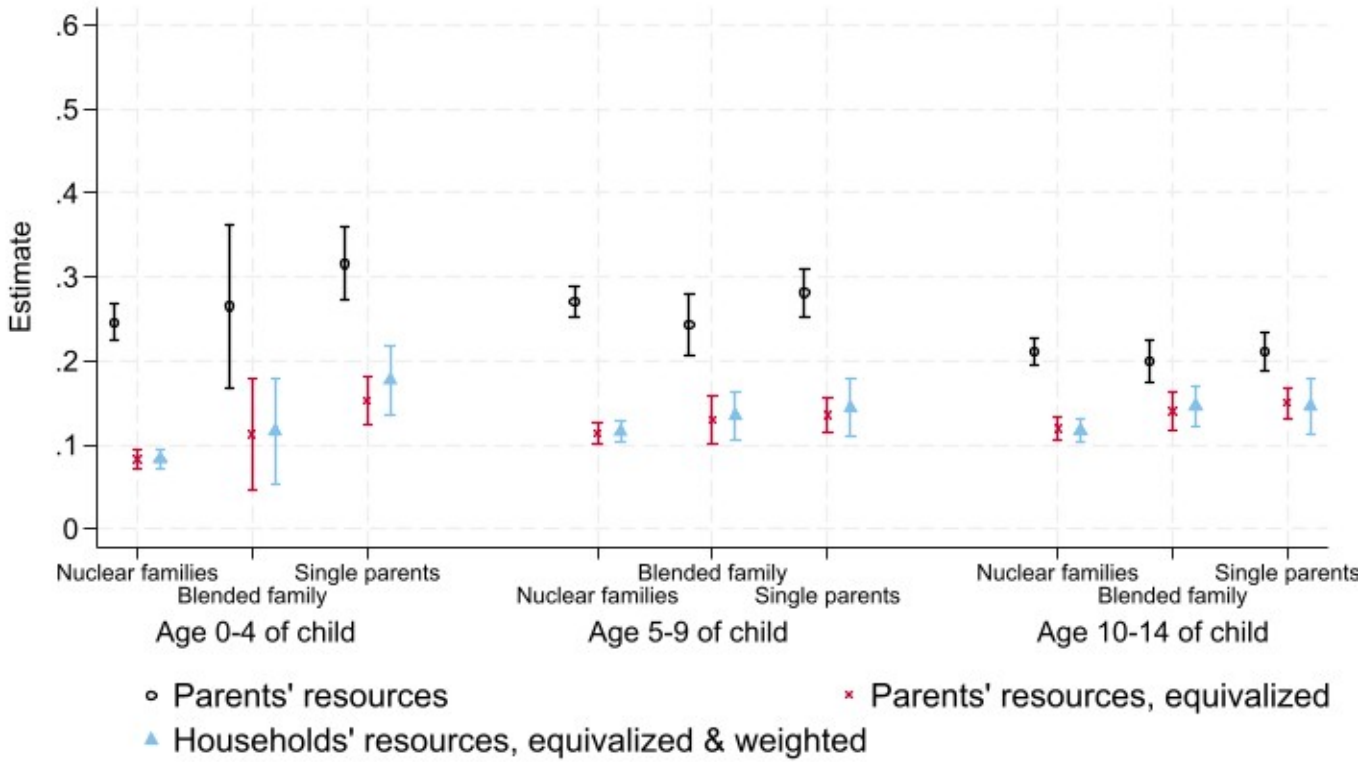
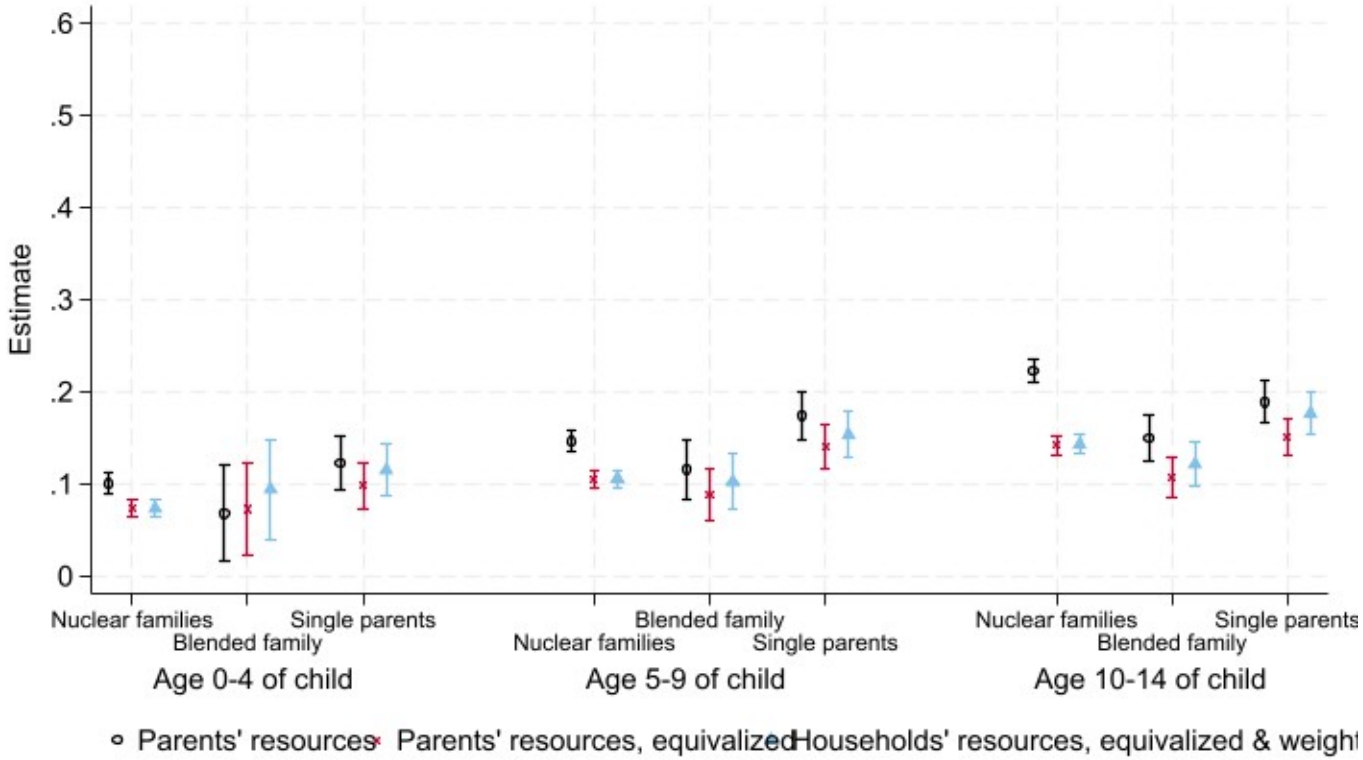


Figure 15: IGEs of PDVI by Family Type and Equivalization of Resources, Cont'd

(d) IGE of disposable income controlling for parents' education



- The role of parental resources may differ not only across family types but also in their dependence on current and past resources.
- Table 7 shows estimates of children's log-expected PDVI and log-years of schooling on parents' log-expected PDVI at ages 10–14, conditional on parents' log-expected PDVI at ages 5–9, separately by family type.

Table 7: IGE by Child Age and Family Type Controlling for Resources at Earlier Ages

	Sum of parents' resources, not equivalized, $y^P_{i,a}$			Equivalized with number of children, $y^{P,eq}$			Equivalized with number of children and using optimal weights for non-resident and step-parents, $y^{P,eq/w}$		
Family type:	Nuclear family	Blended family	Single-parent family	Nuclear family	Blended family	Single-parent family	Nuclear family	Blended family	Single-parent family
(A) Child's log-PDVI									
$ln(y^P_{10-14})$	0.023	0.152	0.211	0.168	0.207	0.172	0.168	0.289	0.309
	(0.029)	(0.036)	(0.064)	(0.011)	(0.028)	(0.038)	(0.011)	(0.021)	(0.025)
$ln(y^P_{5-9})$	0.411	0.202	0.193	0.153	0.065	0.166	0.153	-0.013	-0.007
	(0.031)	(0.042)	(0.072)	(0.011)	(0.029)	(0.042)	(0.011)	(0.017)	(0.022)
(B) Child's log-years of schooling									
$ln(y^P_{10-14})$	-0.054	0.089	0.143	0.097	0.131	0.136	0.097	0.207	0.221
	(0.010)	(0.023)	(0.040)	(0.006)	(0.018)	(0.023)	(0.006)	(0.013)	(0.015)
$ln(y^P_{5-9})$	0.341	0.175	0.153	0.121	0.082	0.108	0.121	0.007	-0.001
	(0.018)	(0.027)	(0.044)	(0.006)	(0.018)	(0.026)	(0.006)	(0.011)	(0.014)

Figure 16: IGEs of Expected PDVI of Parents on Expected PDVI of Children, by Family Type and Equivalization of Resources, Controlling for Family Characteristics.

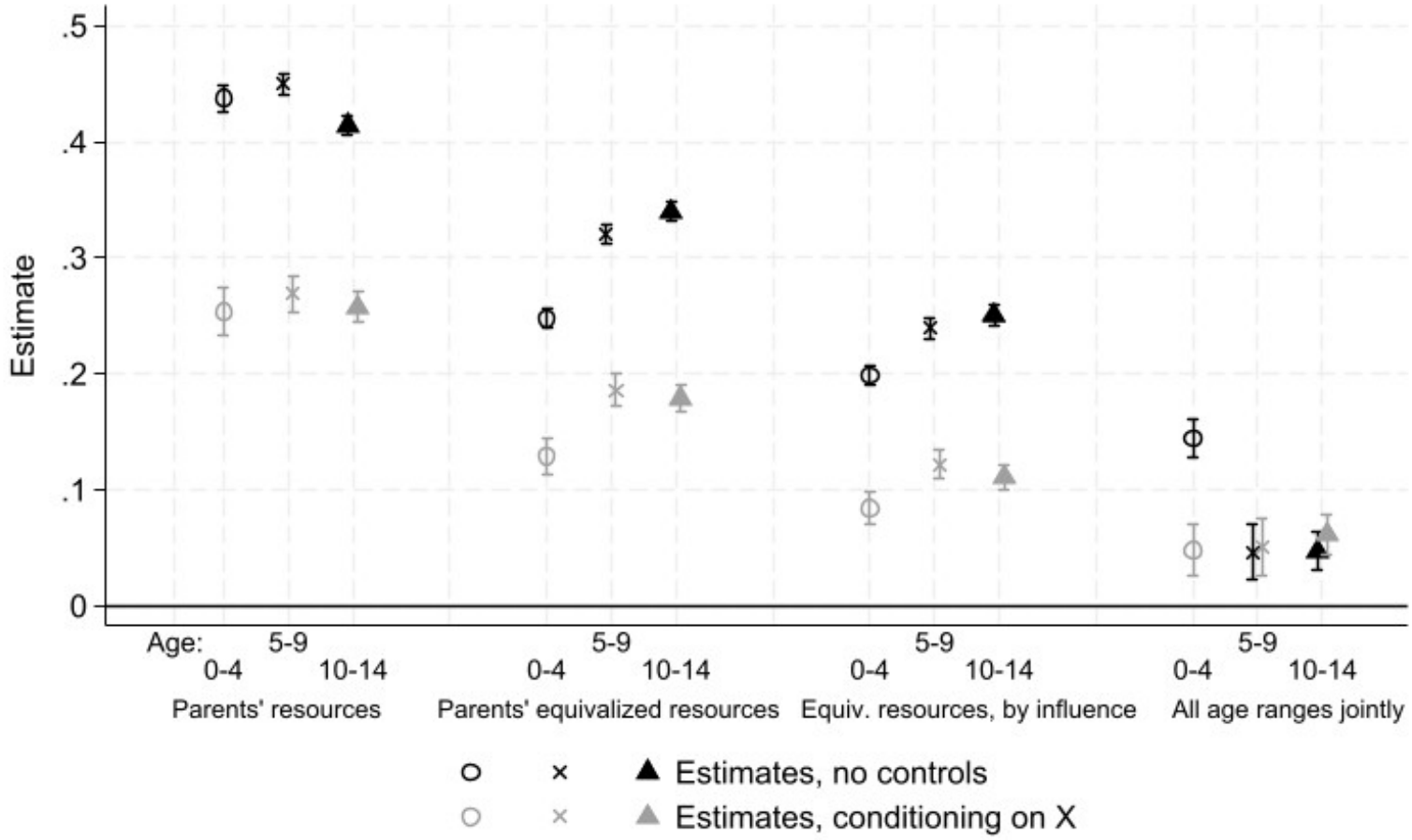


Figure 17: Interactions Between IGEs of Expected PDVI and Background Characteristics

(a) Single Parent Relative to Nuclear & Stable Family

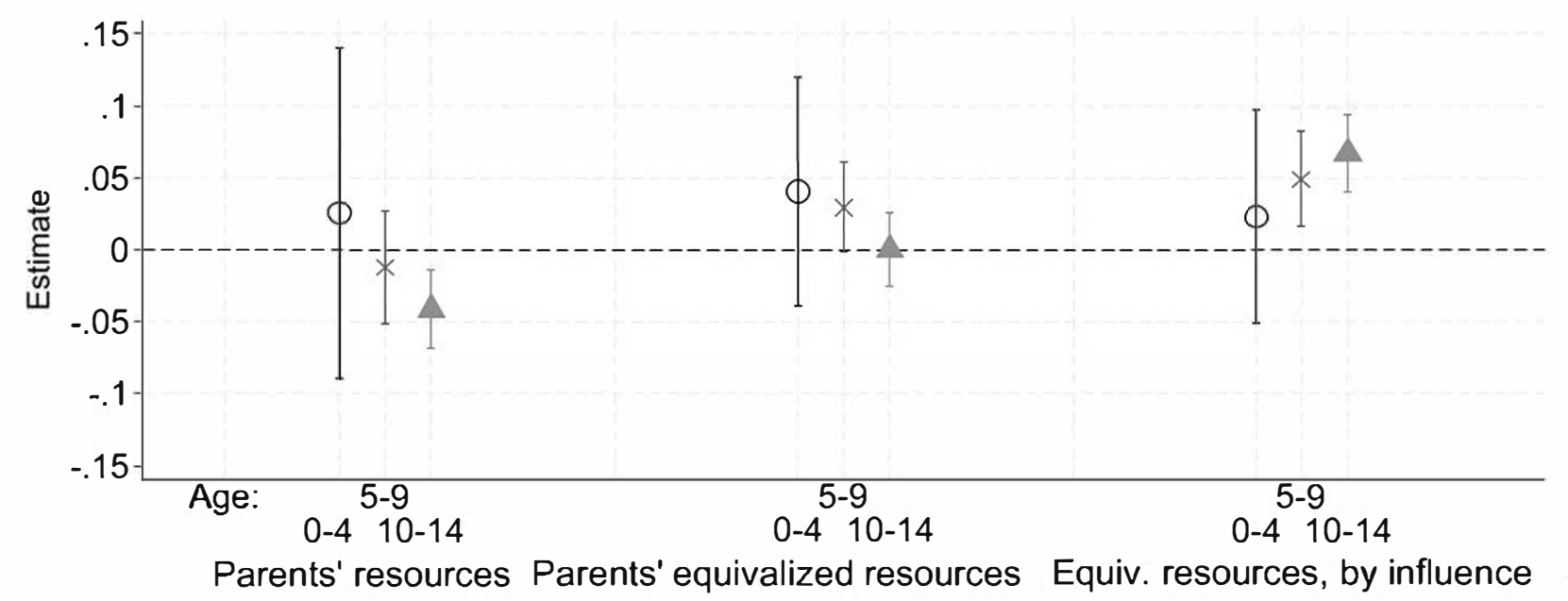


Figure 17: Interactions Between IGEs of Expected PDVI and Background Characteristics, Cont'd

(b) Blended Family Relative to Nuclear & Stable Family

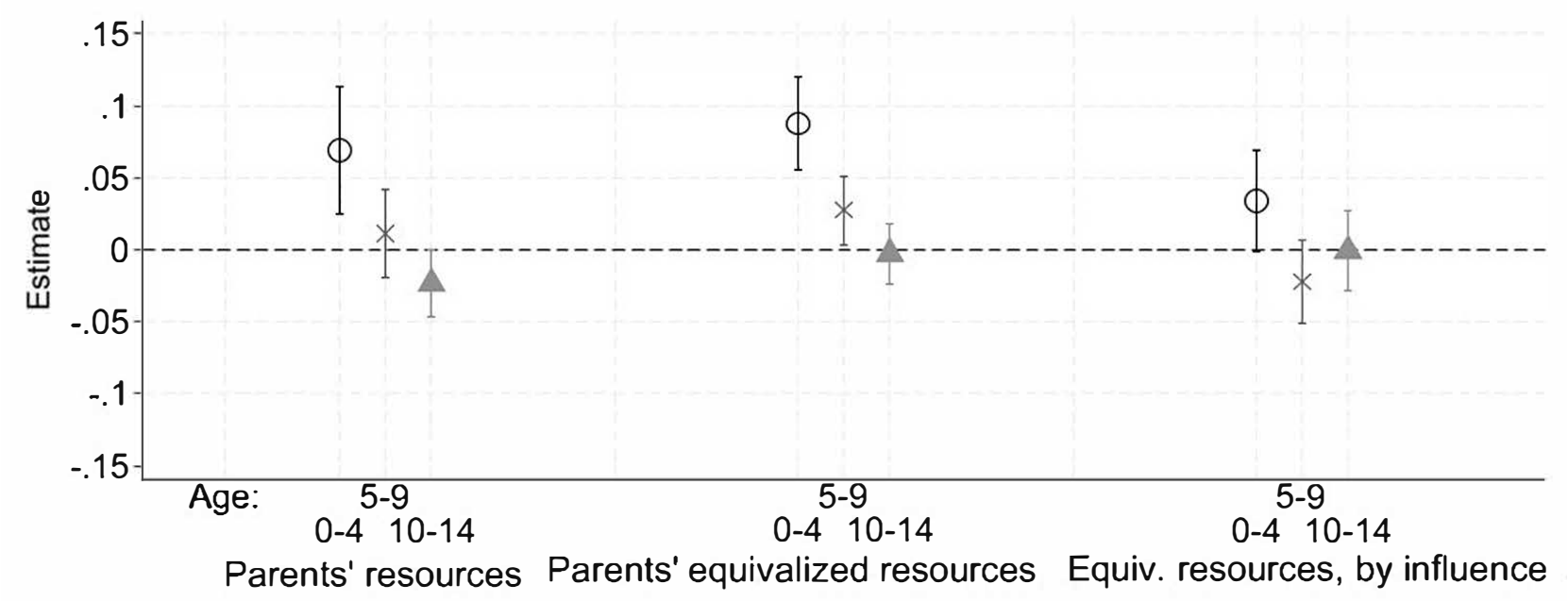


Figure 17: Interactions Between IGEs of Expected PDVI and Background Characteristics, Cont'd

(c) Nuclear Family Separating Later Relative to Nuclear & Stable Family

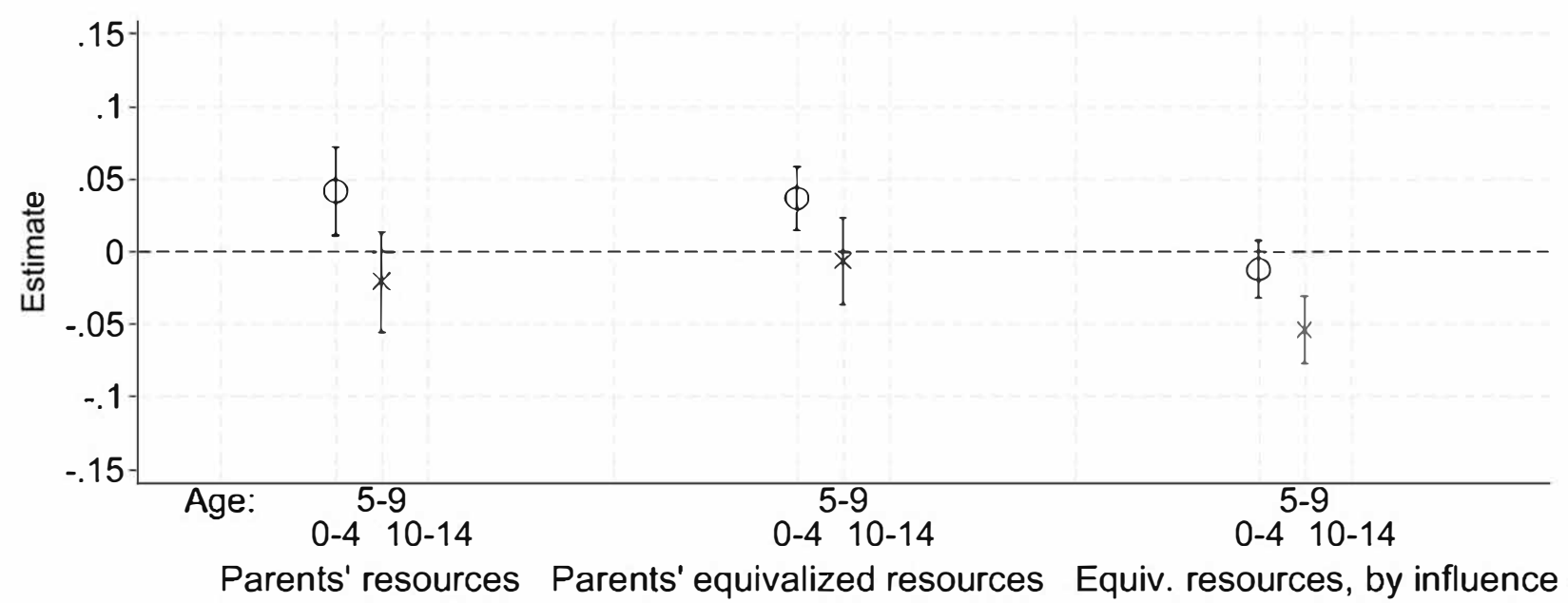


Figure 17: Interactions Between IGEs of Expected PDVI and Background Characteristics, Cont'd

(d) Interaction, Parents' Years of Schooling

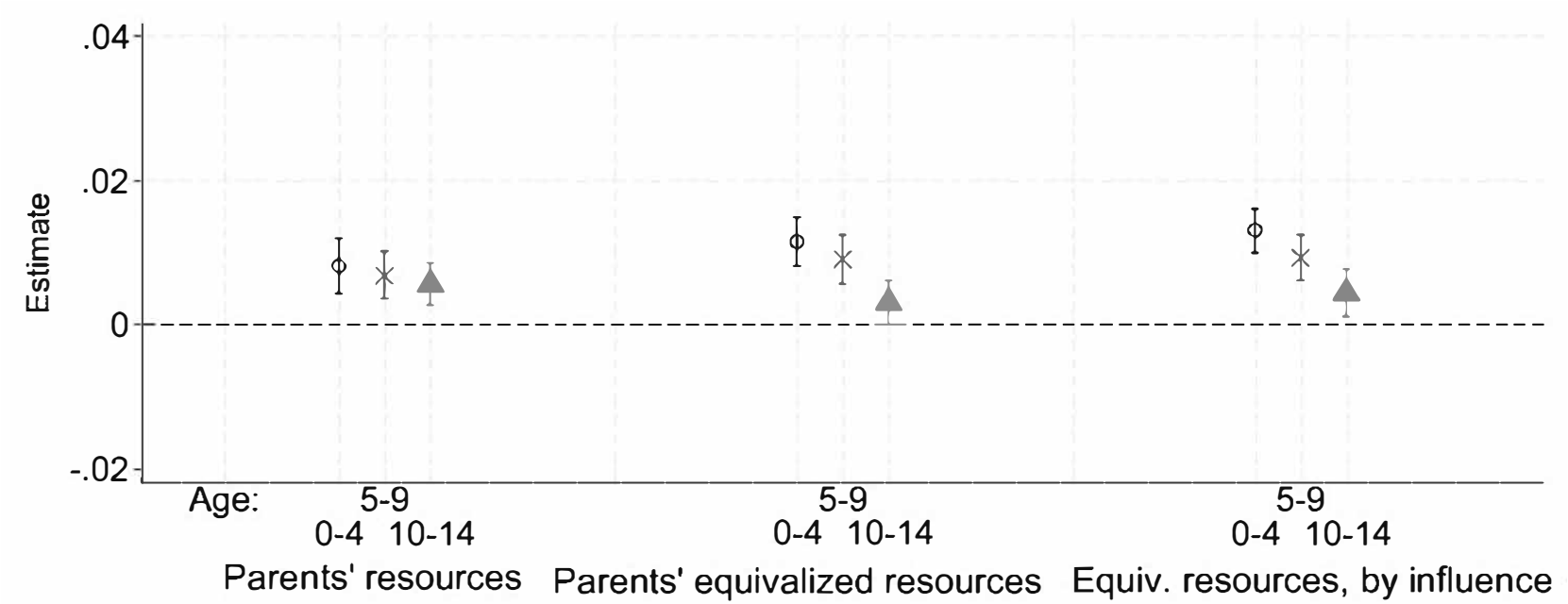


Figure 17: Interactions Between IGEs of Expected PDVI and Background Characteristics, Cont'd

(e) Interaction, Mother's Age at 1st Child

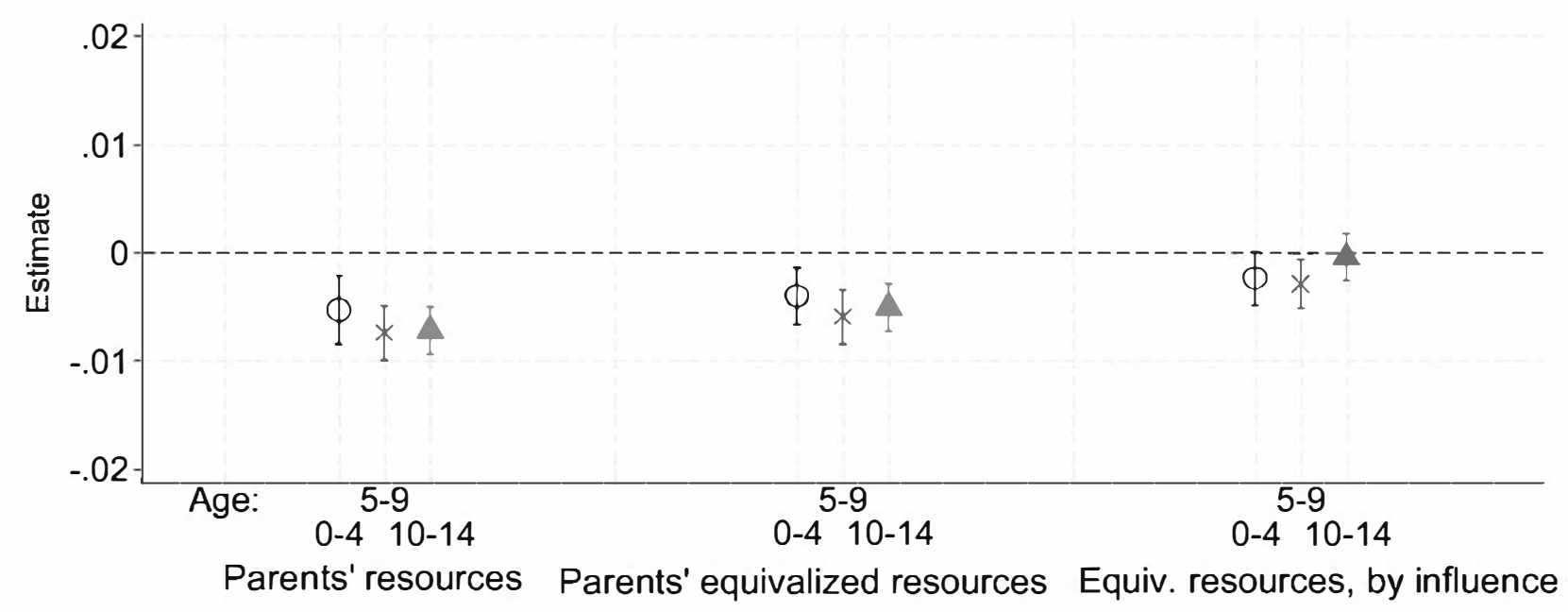


Figure 17: Interactions Between IGEs of Expected PDVI and Background Characteristics, Cont'd

(f) Interaction, Number of Siblings

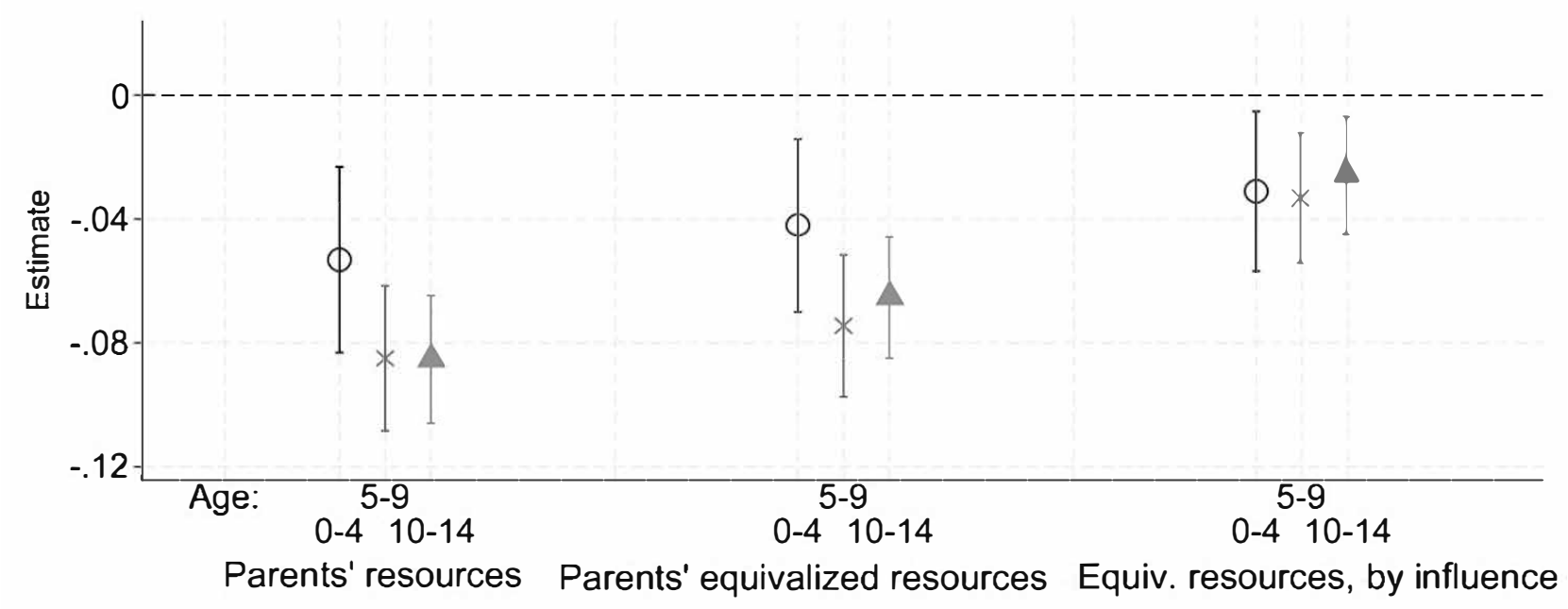


Figure 17: Interactions Between IGEs of Expected PDVI and Background Characteristics, Cont'd

(g) Younger Sibling Relative to 1st-Born

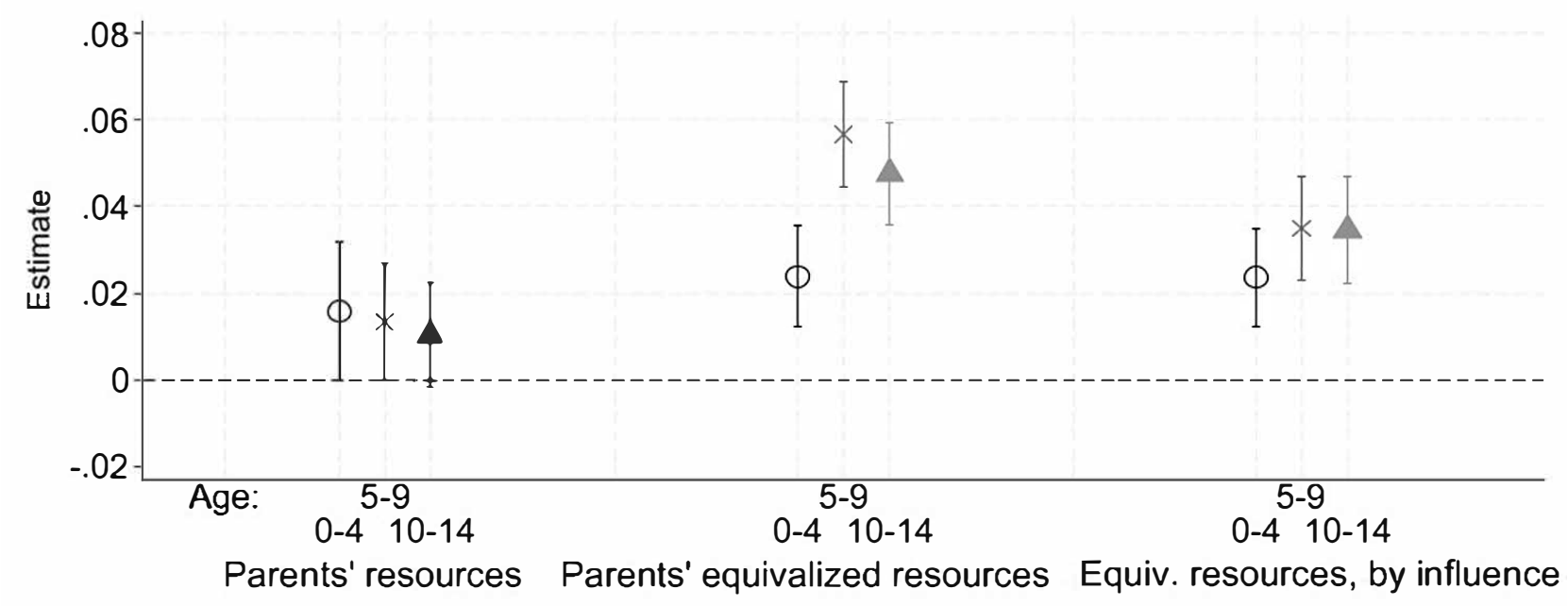
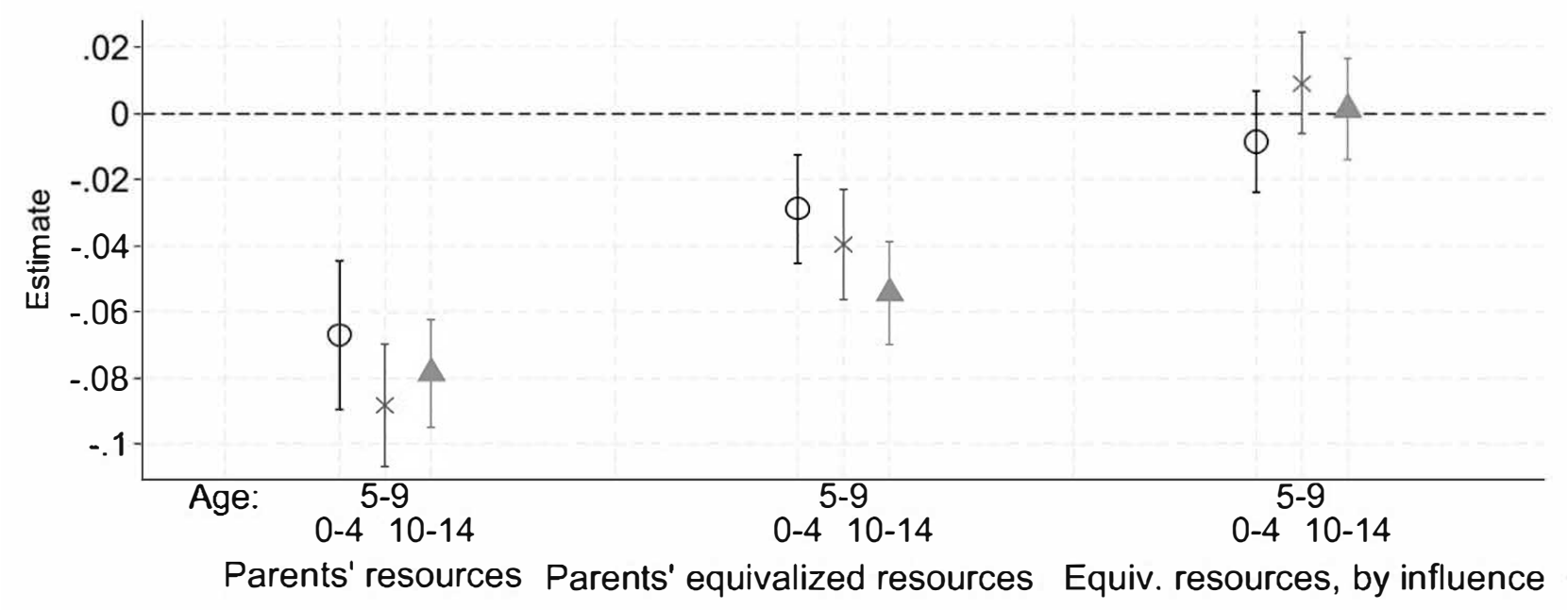


Figure 17: Interactions Between IGEs of Expected PDVI and Background Characteristics, Cont'd

(h) Female Relative to Male

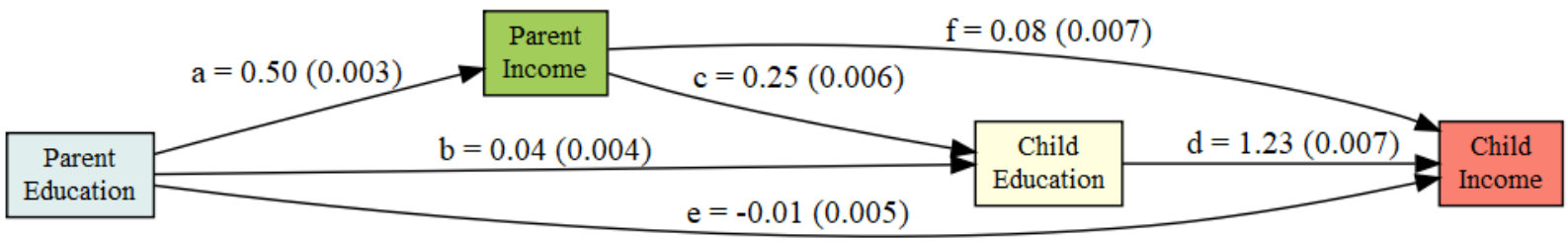


Mediation Analysis

- Parents' education plays a key role in mediating the transmission of resources.
- However, parents' education also varies strongly across family types, which begs the question of whether differences in the transmission of resources across family types merely reflect underlying differences across parental education.

Figure 18: Mediation of IGE Estimates by Age when Parents' Resources are Measured

(a) Mediation graph, Expected PDVI, Ages 0–4



- The IGE for children's and parents' resources is $\frac{dY_c}{dY_p} = \frac{dY_c}{dY_p}|\boldsymbol{ED_c} + \frac{dED_c}{dY_p} \times \frac{dY_c}{dED'_c}$ (which corresponds to links f +c×d) and the IGE for children's resources and parents' education is: $\frac{dY_c}{dED_p} = \frac{dY_c}{dED_p}|\boldsymbol{Y_p}, \boldsymbol{ED_c} + \frac{dY_p}{dED_p} \times \left(\frac{dY_c}{dY_p}|\boldsymbol{ED_c} + \frac{dED_c}{dY_p} \times \frac{dY_c}{dED_c} + \frac{dED_c}{dED_p} \times \frac{dY_c}{dED_c}\right)$

  (which corresponds to links $\boldsymbol{e} + \boldsymbol{a} \times (\boldsymbol{f} + \boldsymbol{c} \times \boldsymbol{d}) + \boldsymbol{b} \times \boldsymbol{d}$).
- All variables are measured in logs.

Figure 18: Mediation of IGE Estimates by Age when Parents' Resources are Measured, cont'd.

(b) Decomposition of IGEs, Disposable Income

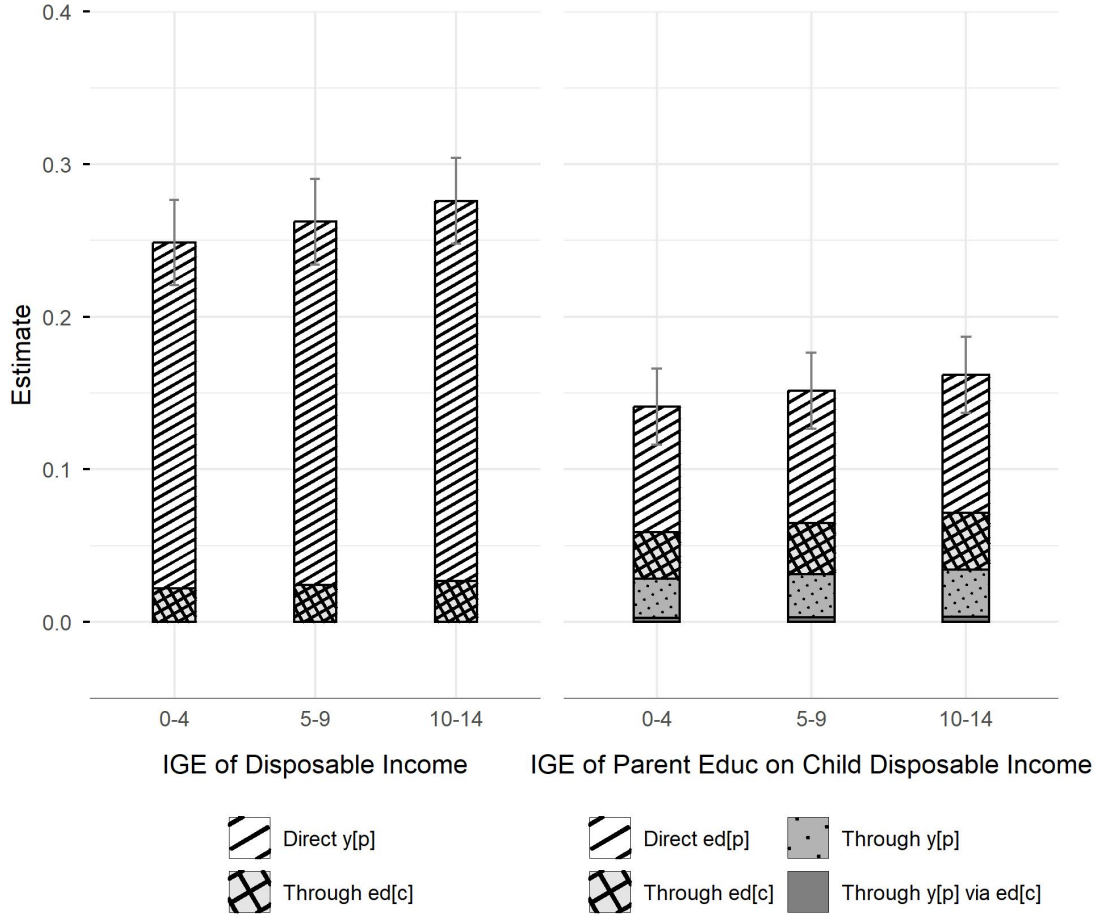
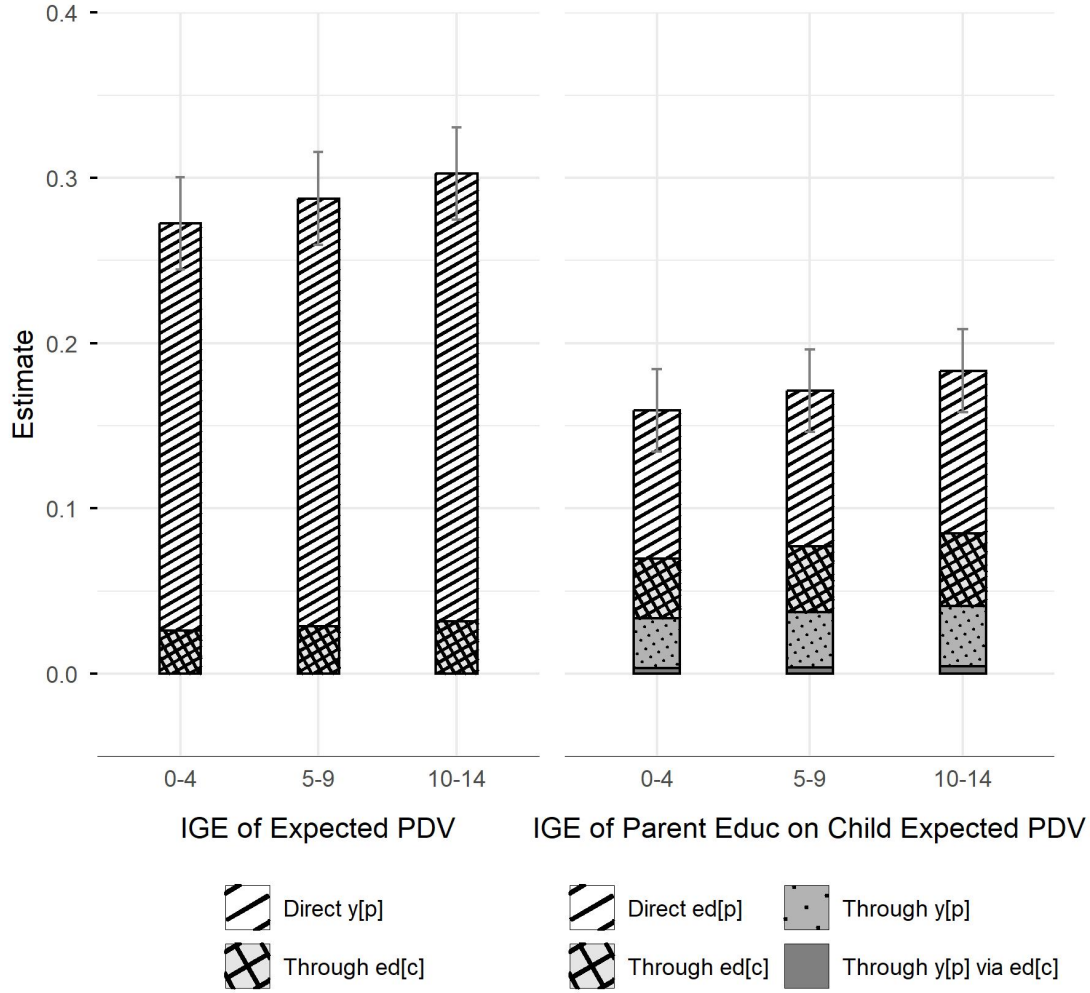


Figure 19: Mediation of IGE Estimates by Age when Parents' Resources are Measured, cont'd.

(c) Decomposition of IGEs, Expected PDVI



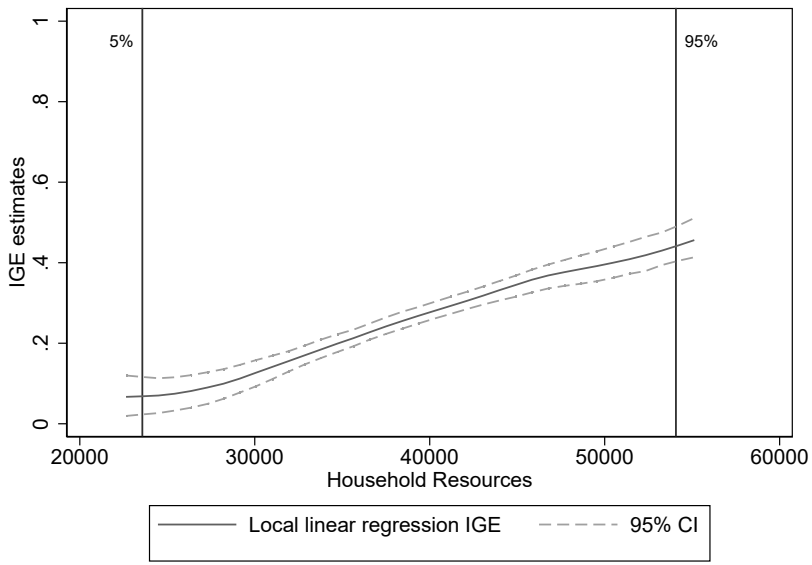
Link to PDV & Disposable Income Figures

Non-Linear IGEs

- Accounting for nonlinearity matters.

Figure 20: Local-Linear IGEs for Lifetime Measures

(a) Disposable Income



(b) Household Consumption

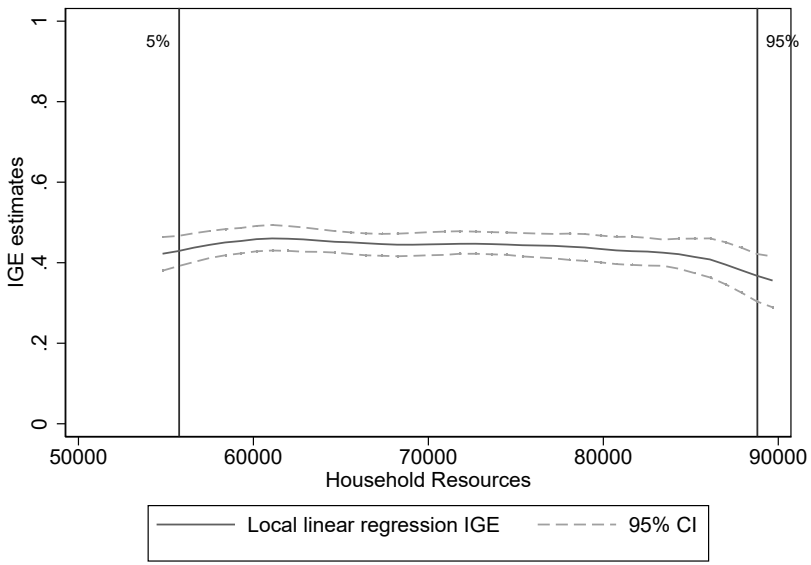
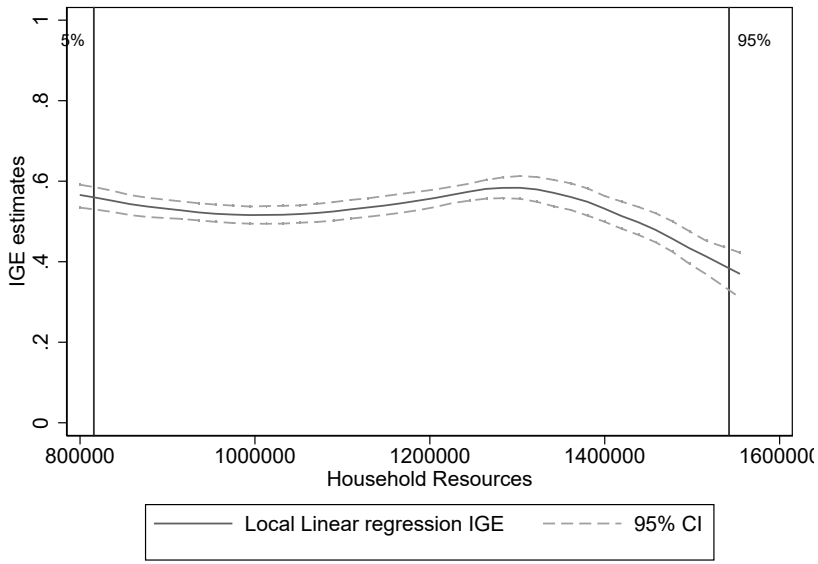
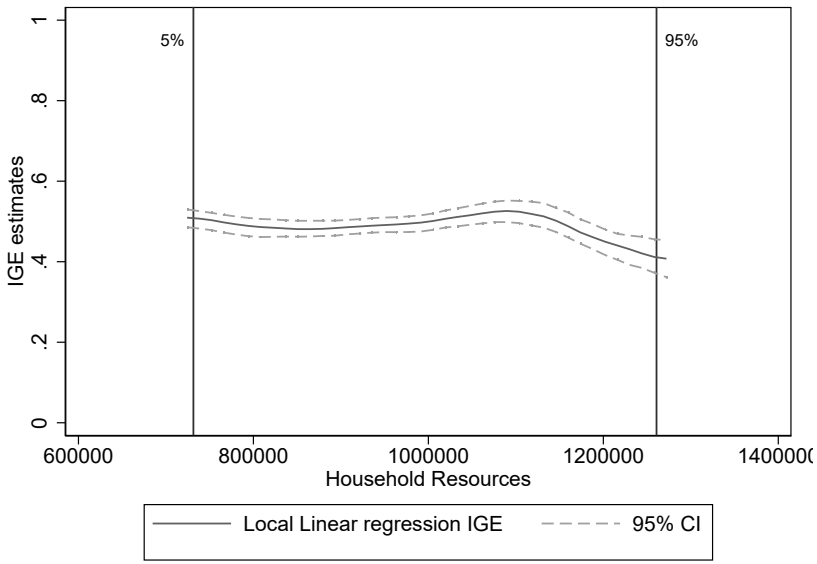


Figure 20: Local-Linear IGEs for Lifetime Measures, Cont'd

(c) Expected PDV



(d) Expected Lifetime Wealth



Link to Realized Values

Link to Decomposing IGEs

Absolute Upward Mobility

Figure 21: Absolute Mobility

(a) Traditional Measures

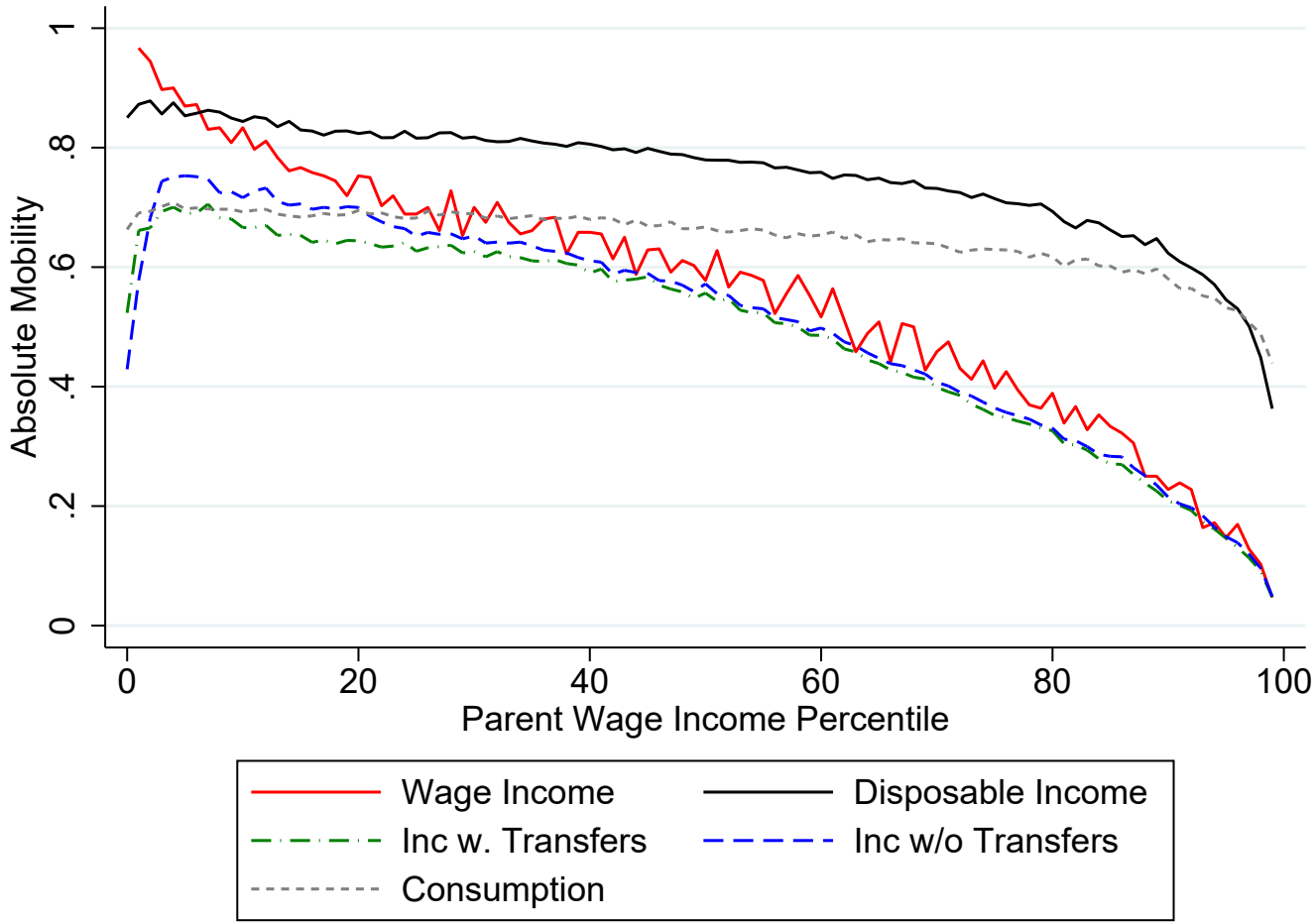


Figure 21: Absolute Mobility, Cont'd

(b) Lifetime Measures

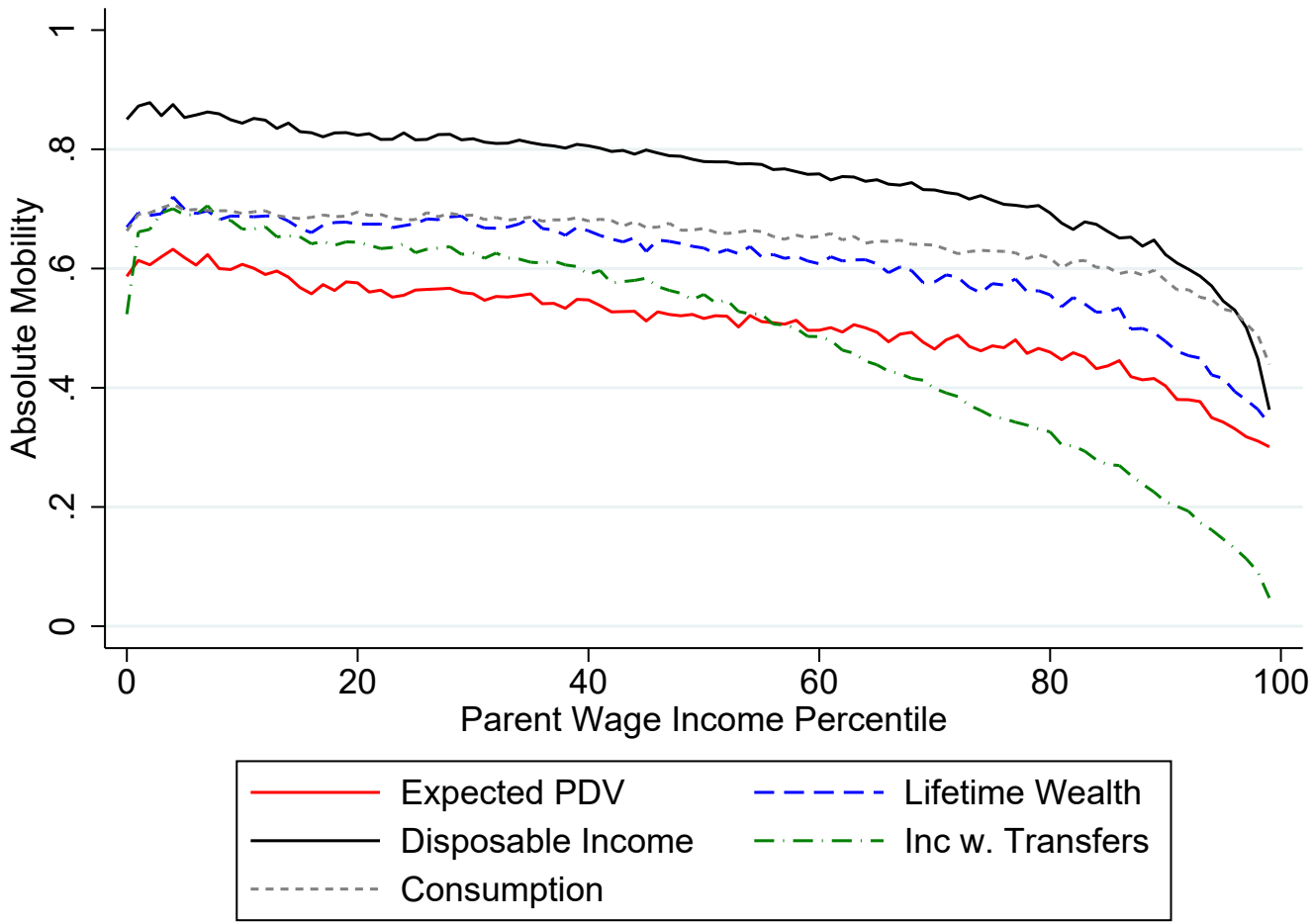


Figure 22: Absolute Mobility of Disposable Income

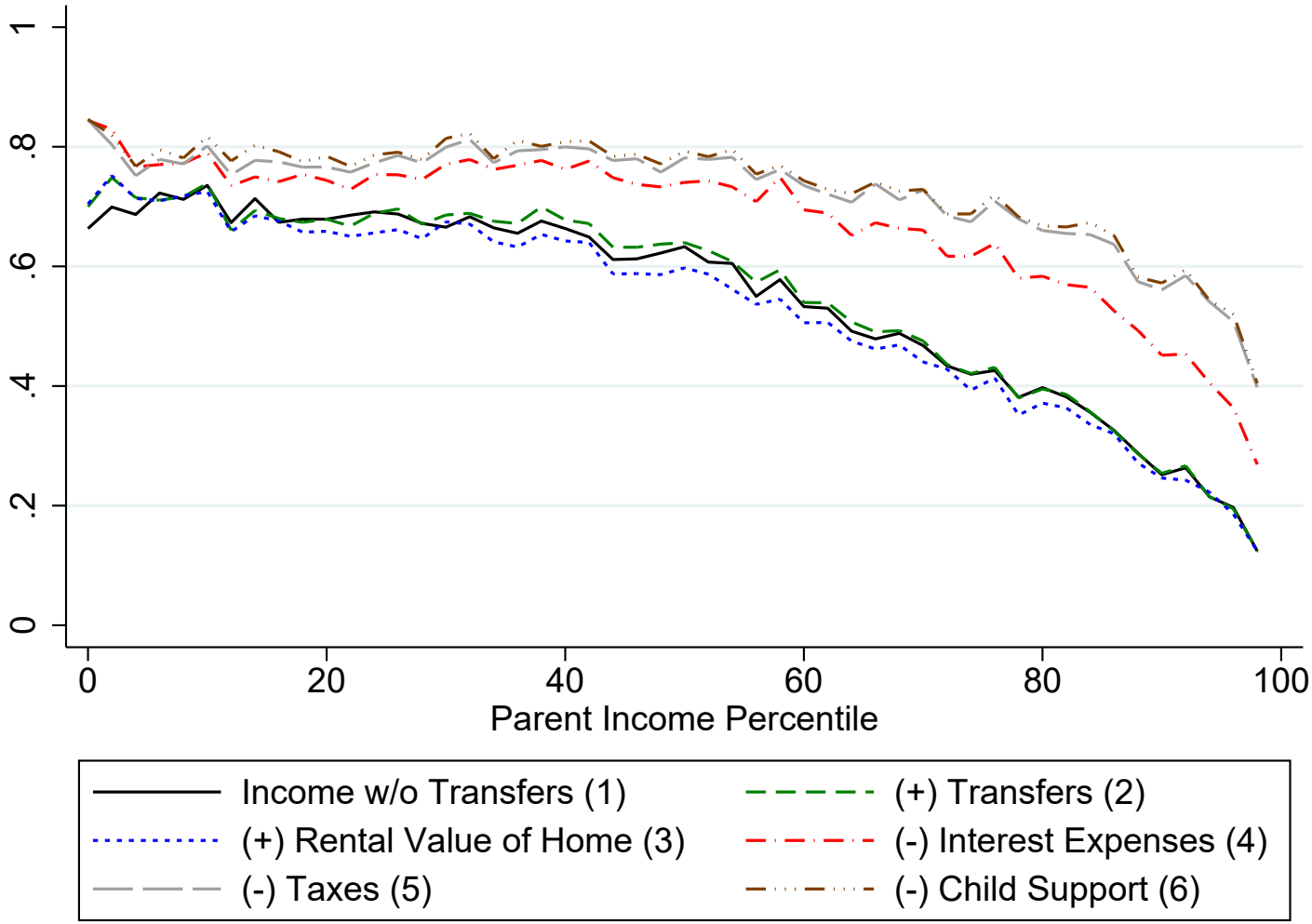
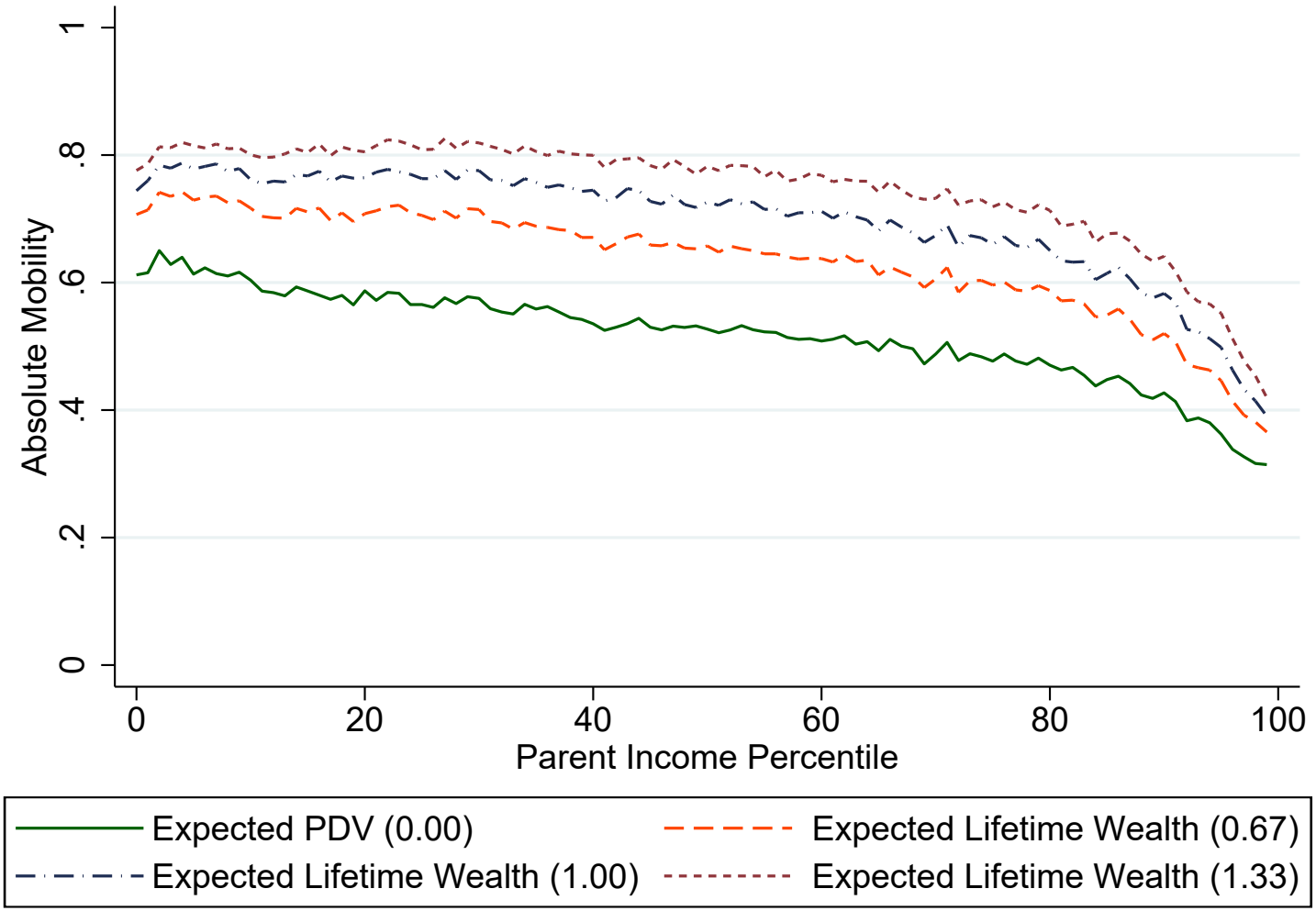
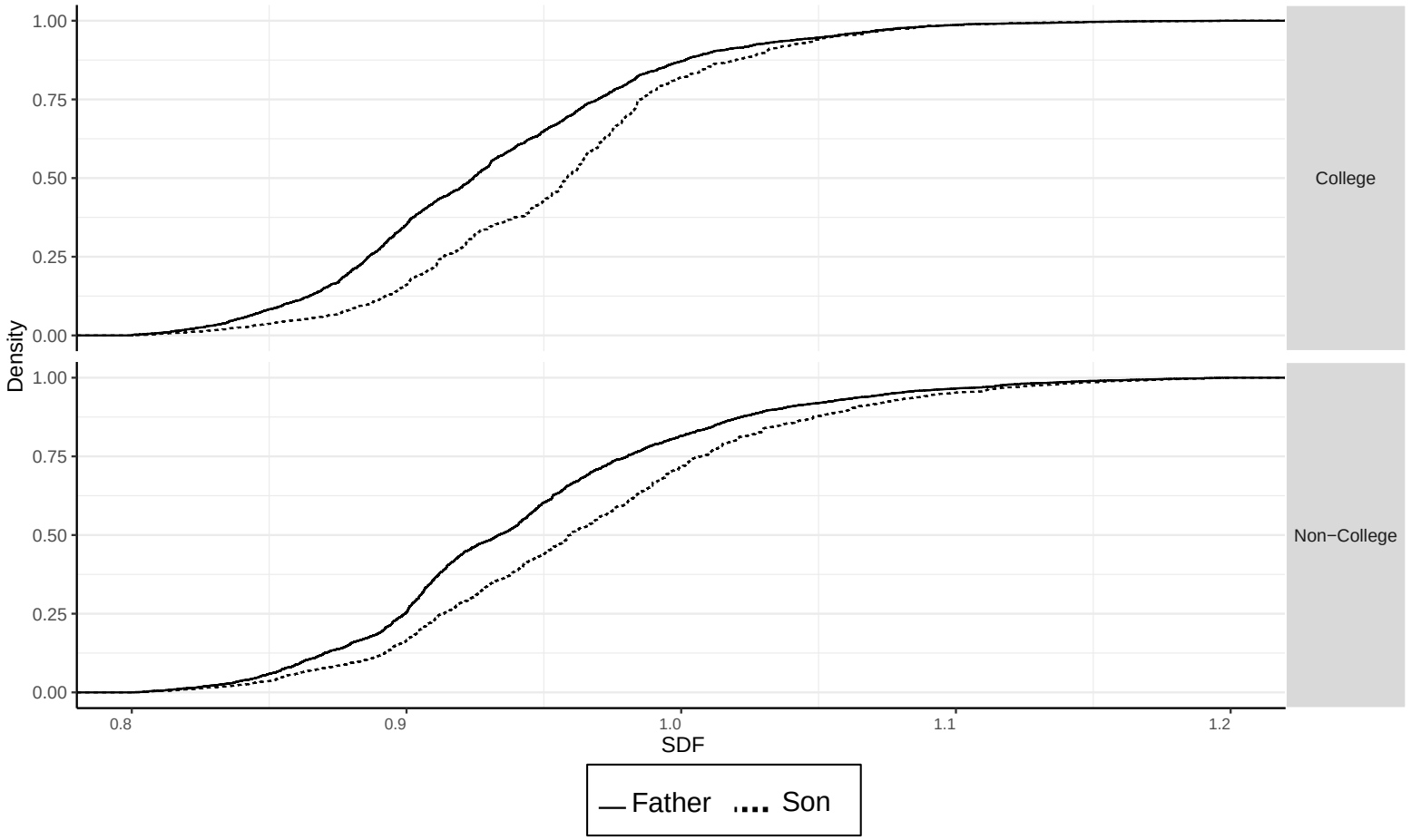


Figure 23: Father-Son Absolute Mobility in Lifetime Wealth: Accounting for Risk Aversion in Lifetime Wealth



Changes in Welfare across Generations

Figure 24: Distribution of $\beta U_c(c_{i,t+1})/U_c(c_{i,t})$



Welfare Increasing

($U_c(c_{i,t+1})$ ↓ as wealth *uparrow*)

- SDF is a measure of welfare of decision maker (analogous to Frisch's use of the marginal utility of income as a measure of welfare).
- SDF $\downarrow$ as welfare goes up.

Summary and Conclusions

Contributions

1. Recognize importance of early years in shaping child development.
2. Fundamental nonstationarity of life cycles across cohorts (alignment issue a red herring).
3. Build and estimate a life-cycle model accounting for uncertainty and credit constraints.
4. Measure role of uncertainty, education, and policy (***ex ante*** vs. ***ex post***).
5. Determine best predictors of successful childhoods.
6. Age-specific life-cycle measures of social mobility that are most predictive of child outcomes.

7. Traditional proxy measures only weakly correlated with true lifetime measures.
8. Life-cycle relative mobility $<$ Proxy relative mobility (currently used proxies overstate relative mobility).
9. Life-cycle absolute mobility $>$ Proxy absolute mobility.
10. Reforms in credit markets play a substantial role in explaining IGE.
11. **Even in a generous welfare state with substantial social benefits and social insurance and redistribution through taxes and transfers, there is strong dependence in lifetime resource and welfare across generations.**

Thank You

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Appendix: Additional Slides

Figure 8: Parents' Resources and Children's Outcomes, Cont'd

(c) Danish Reading

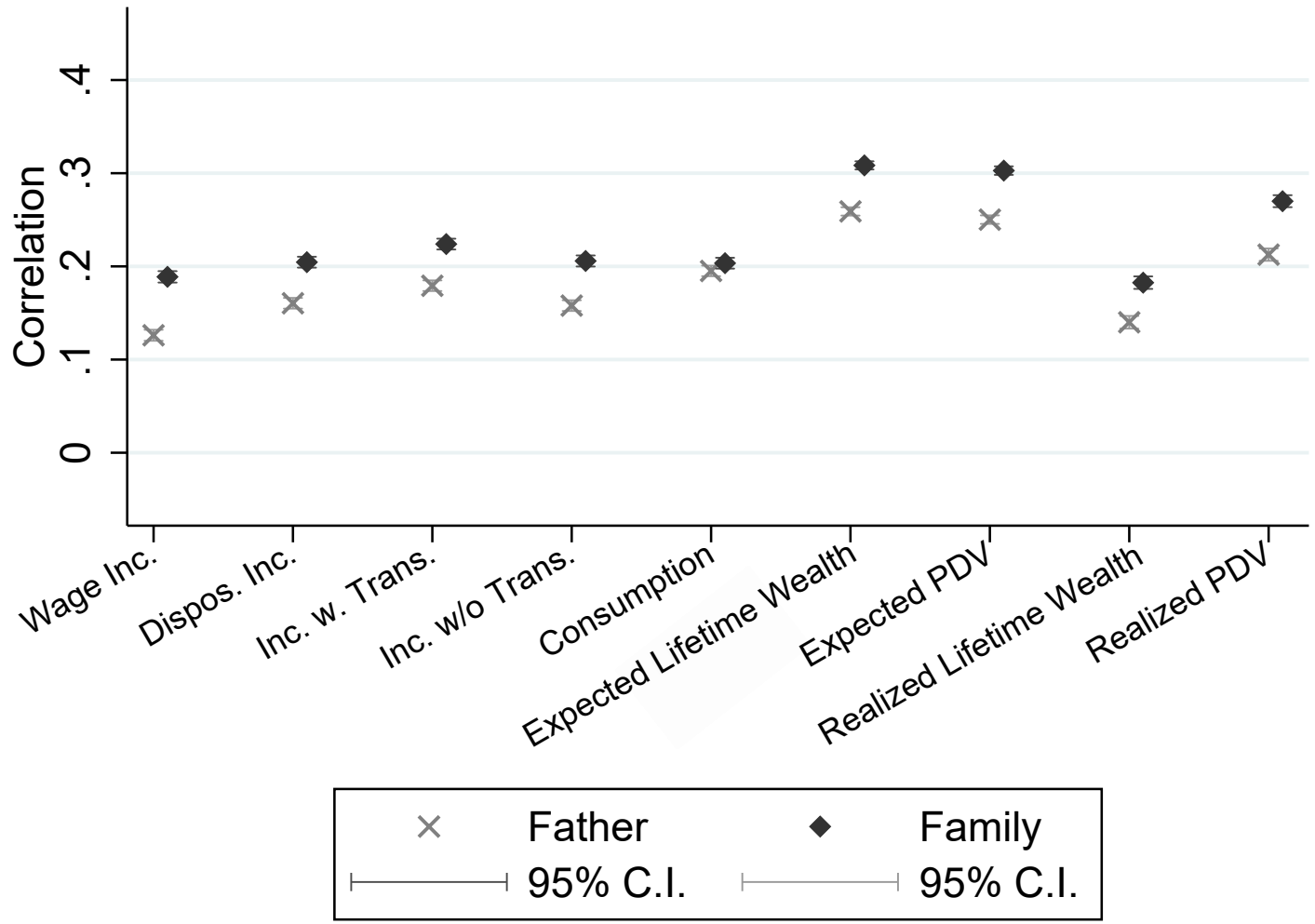

Figure 8: Parents' Resources and Children's Outcomes, Cont'd

(d) Years of Education

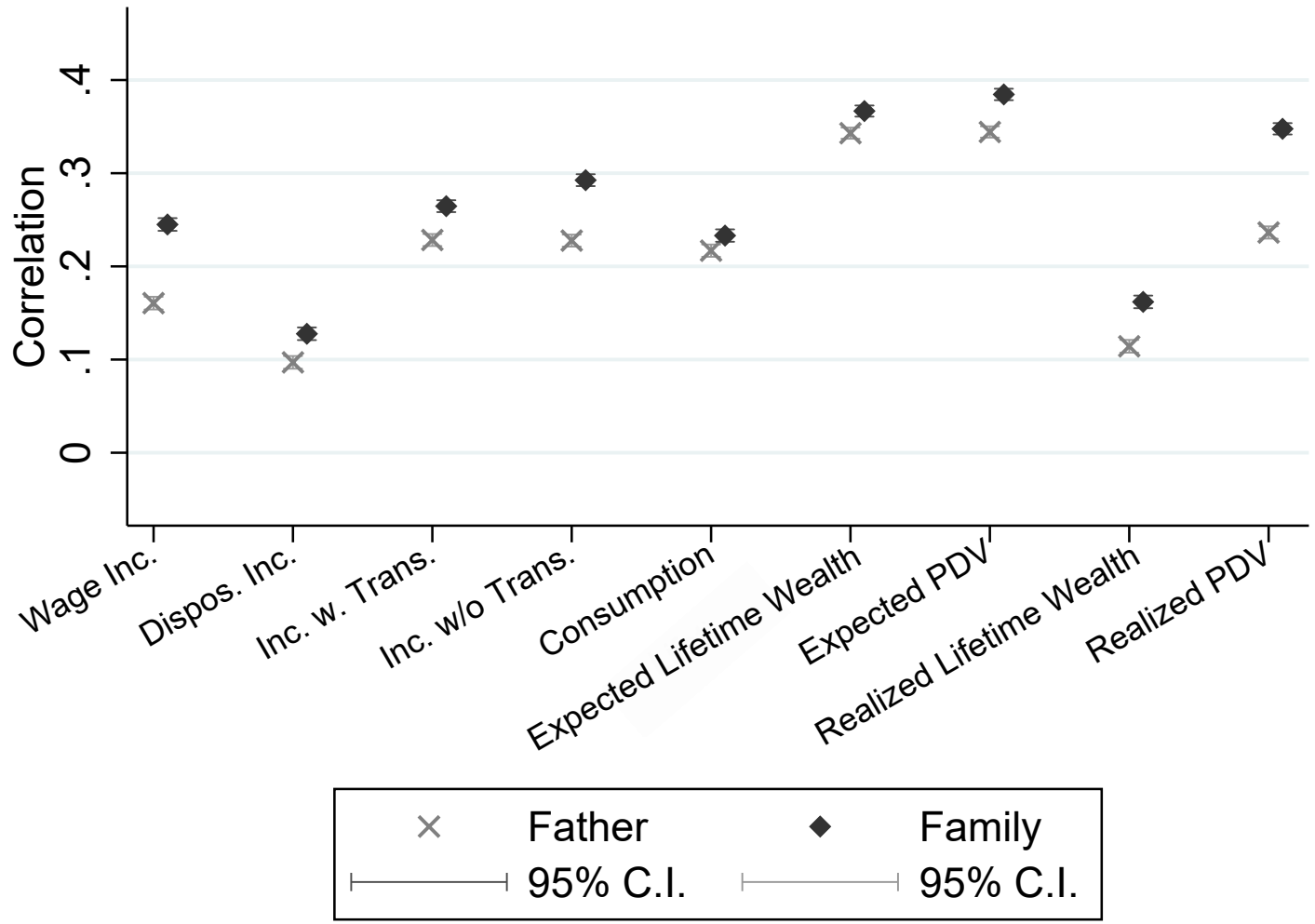

Figure 8: Parents' Resources and Children's Outcomes, Cont'd

(e) Criminal Behavior (Reversed)

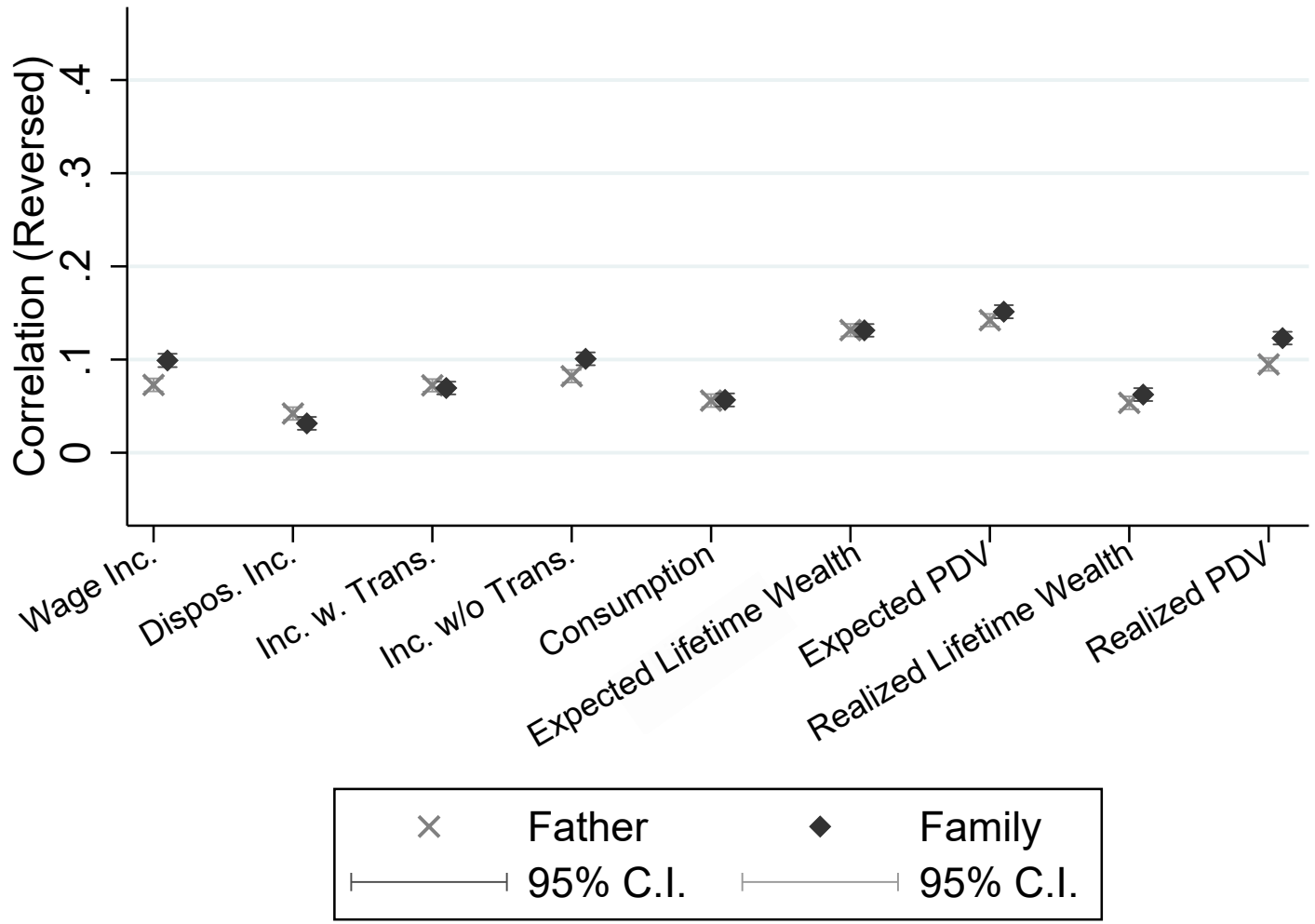

Figure 8: Parents' Resources and Children's Outcomes, Cont'd

(f) Having a Child by Age 20 (Reversed)

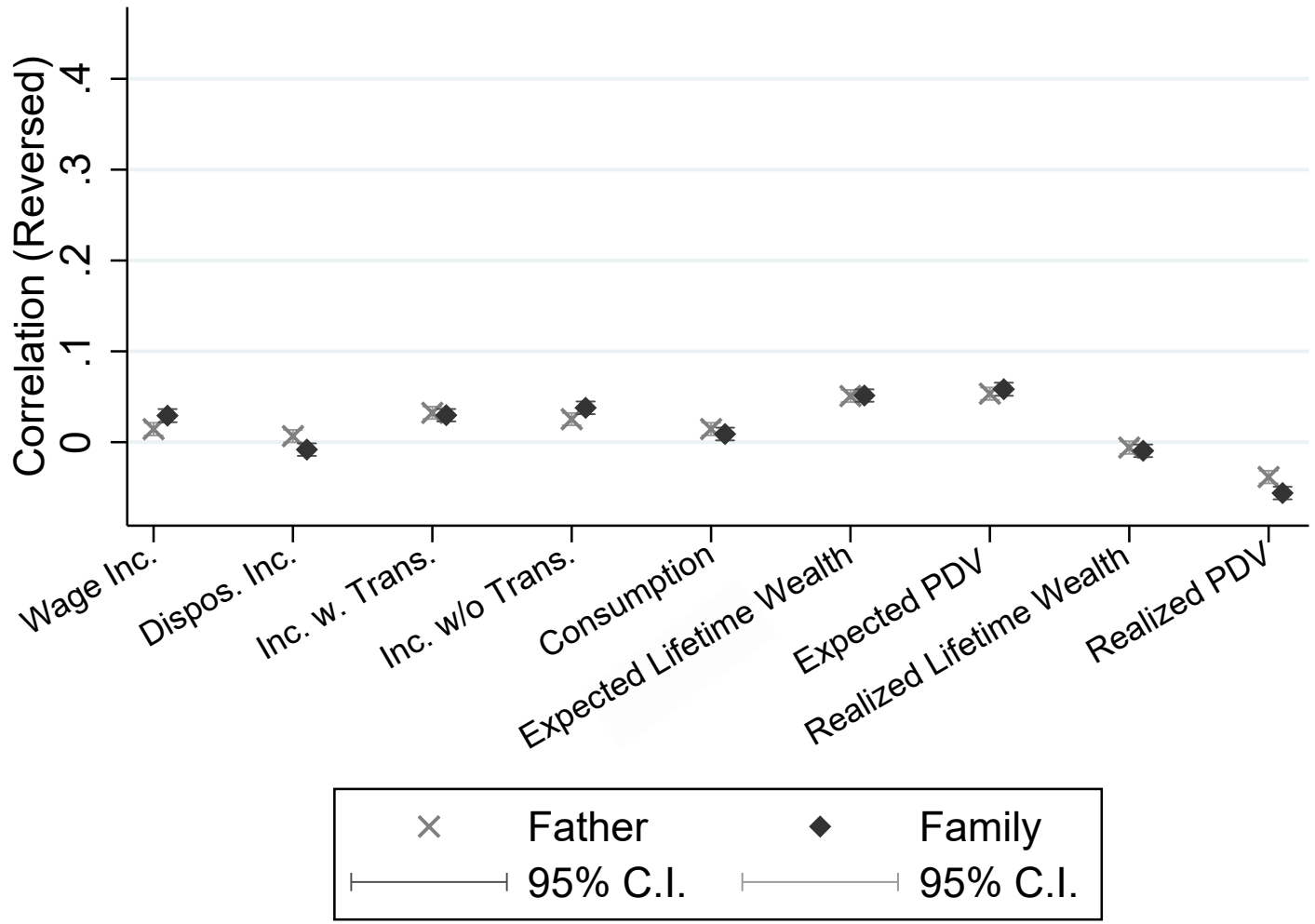

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Figure 20: Local-Linear IGEs for Lifetime Measures, Cont'd

(e) Realized PDV

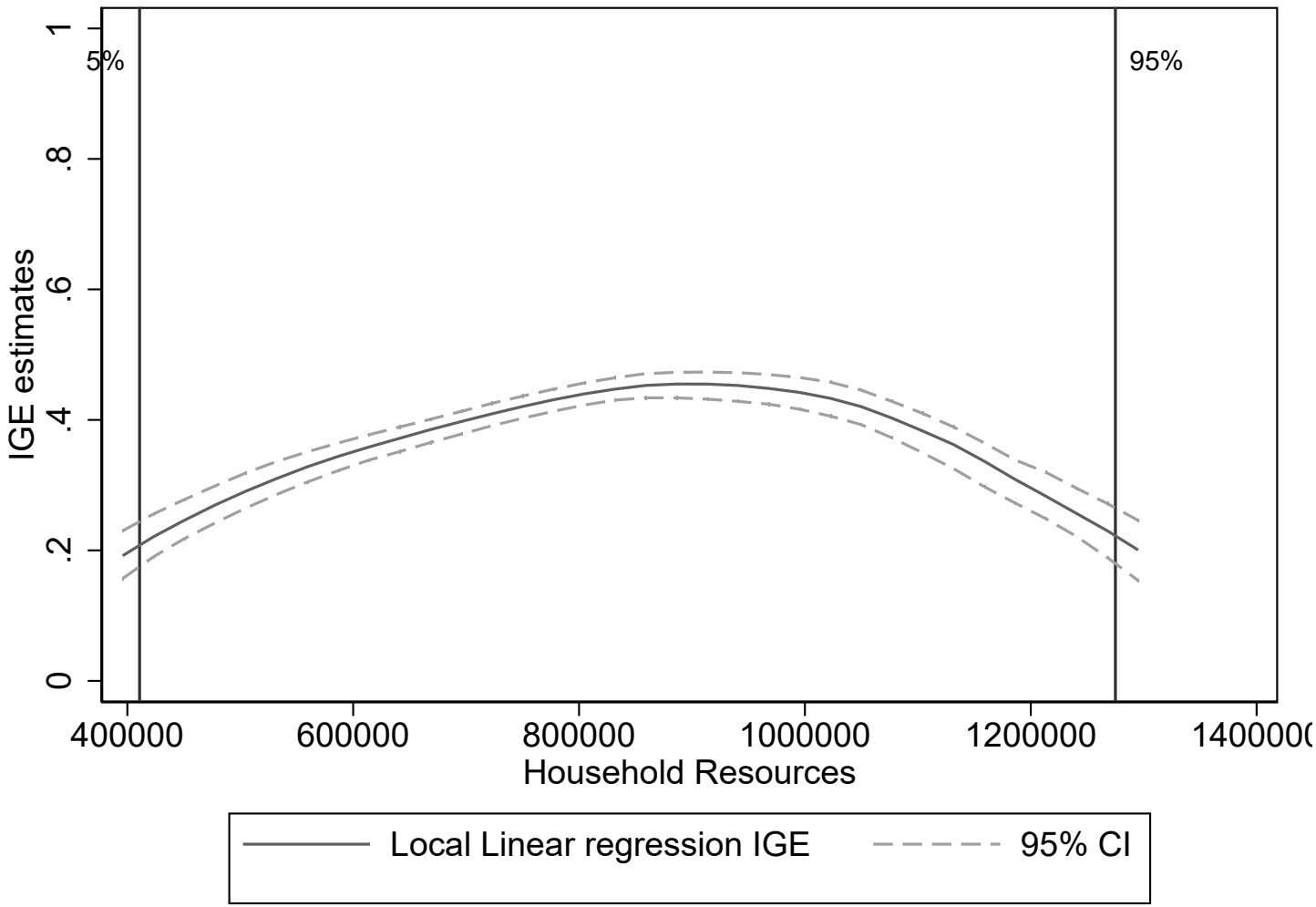

Figure 20: Local-Linear IGEs for Lifetime Measures, Cont'd

(f) Realized Lifetime Wealth

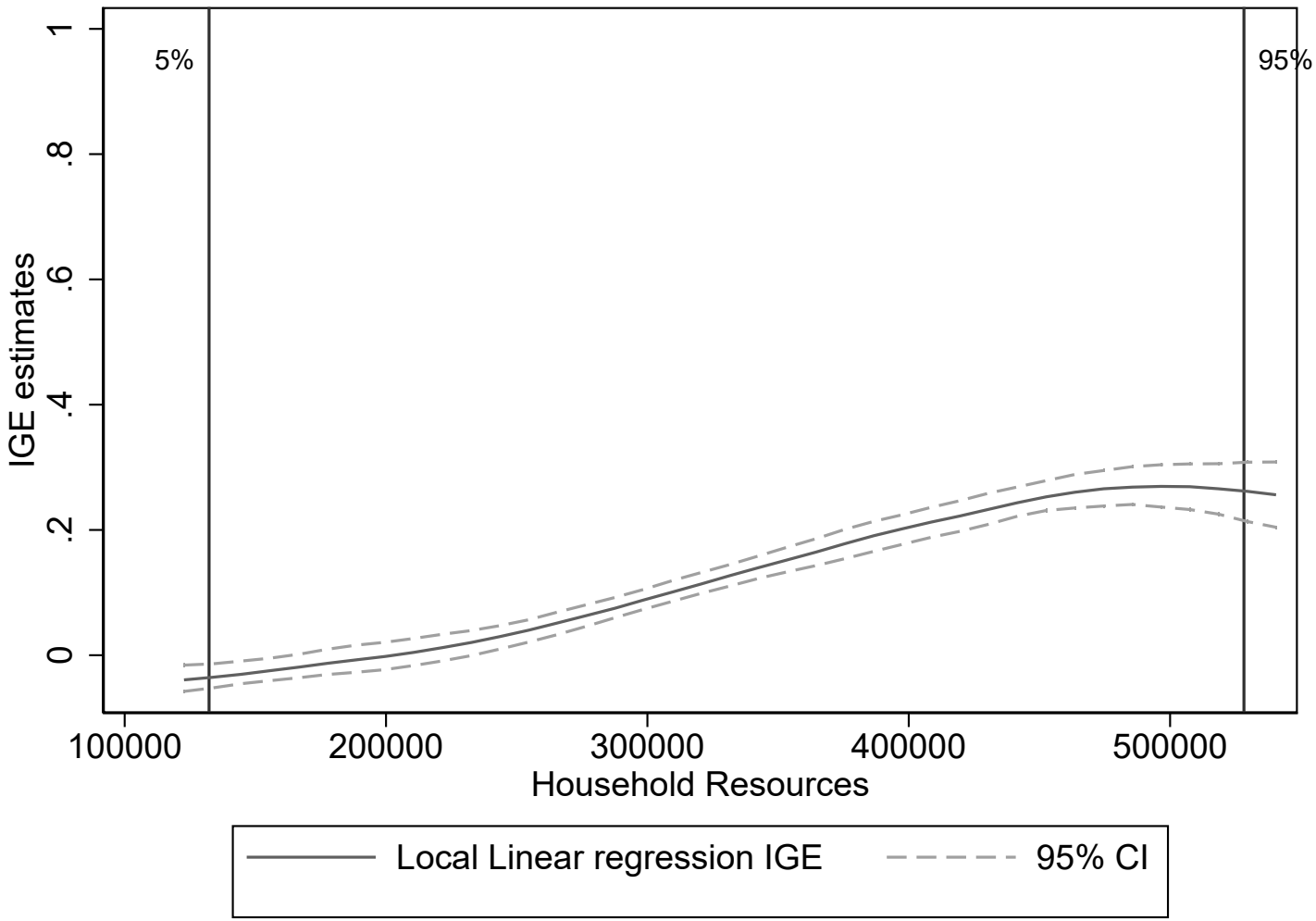

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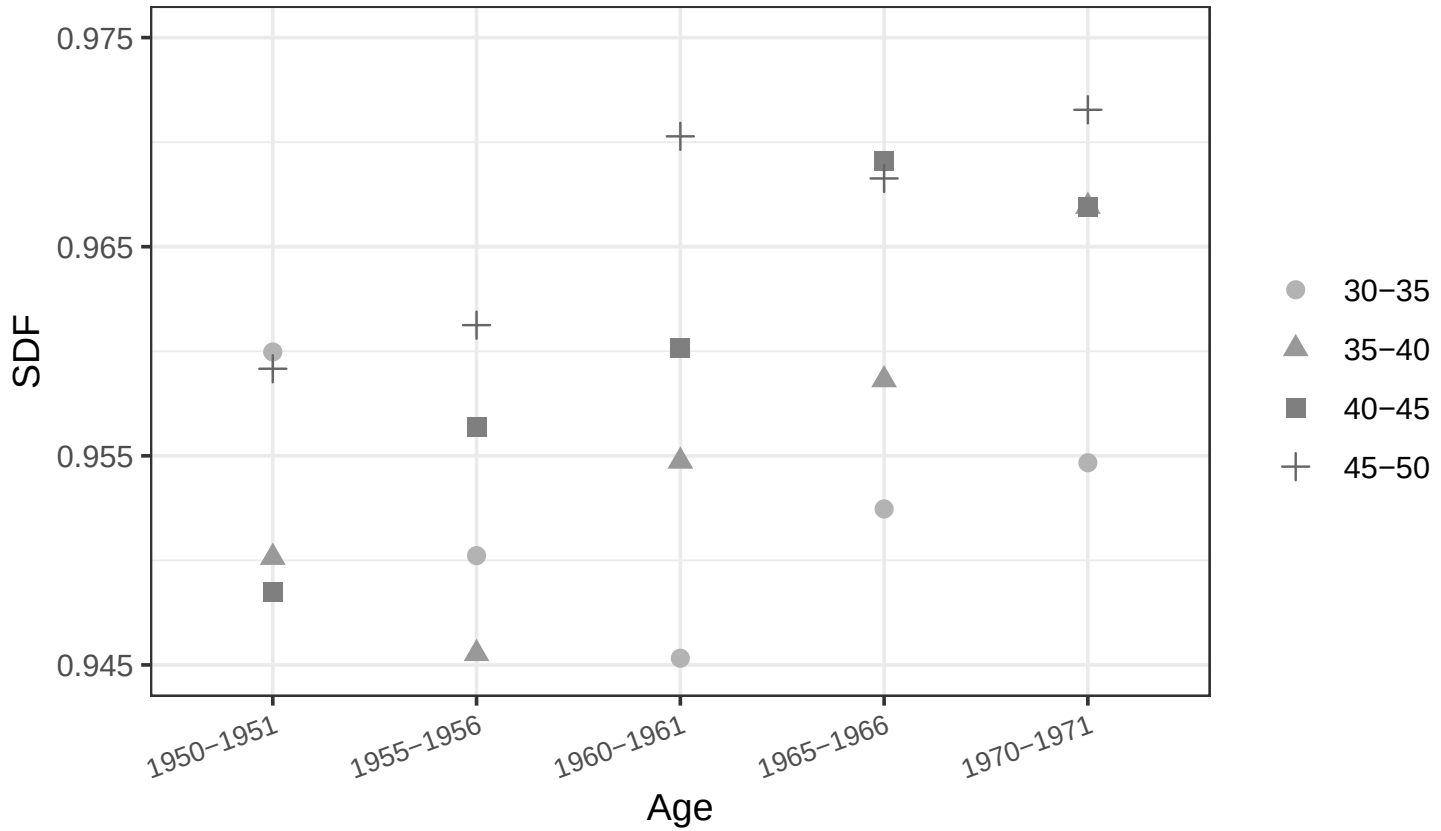
Figure 31: SDF at Different Ages by Birth Cohort



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Rank-Rank Version

Figure 32: Rank-Rank Estimates of IGE

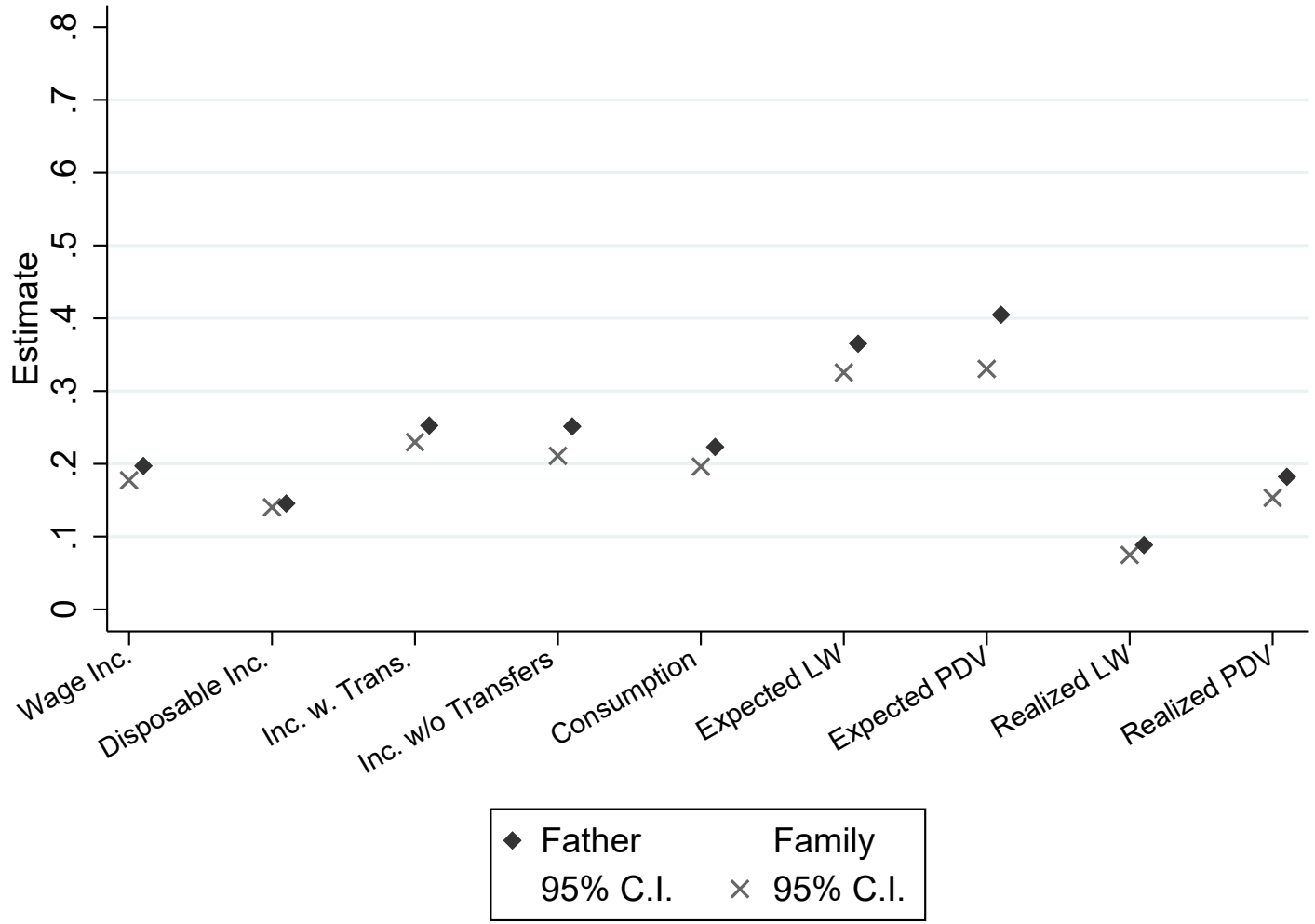

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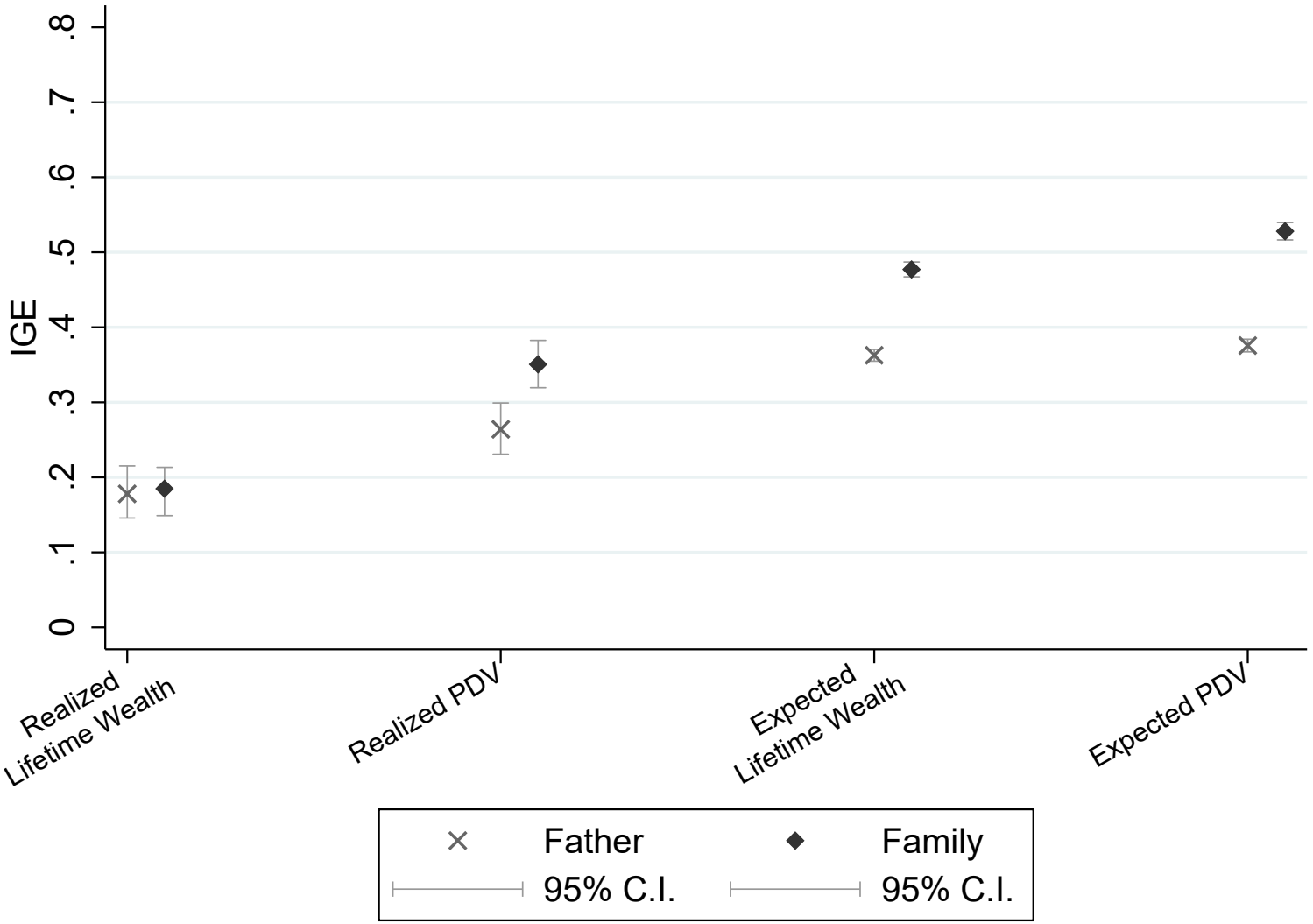
Figure 33: Log-Log IGE Estimates



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Decomposing IGEs: The Crucial Role of Change in Educational Attainment across Cohorts

- Regression specification:

$$y_{i,t}^k = \lambda^k + (\beta^k)' \mathbf{X}_{i,t}^k + \mu_i^k + \epsilon_{i,t}^k. \tag{5}$$

- $k \in \{p, c\}$.
- Average log-income ages 30 to 35:

$$\overline{y}_i^k = \lambda^k + (\beta^k)' \overline{\mathbf{X}}_i^k + \mu_i^k + \overline{\epsilon}_i^k.$$

- Decompose intergenerational covariance of log-income into components:

$$\mathrm{Cov}(\overline{y}_i^c, \overline{y}_i^p) = \mathrm{Cov}\left((\beta^c)' \overline{\mathbf{X}}_i^c, \overline{y}_i^p\right) + \mathrm{Cov}(\mu_i^c, \overline{y}_i^p). \tag{6}$$

Figure 34: Decomposition of IGEs

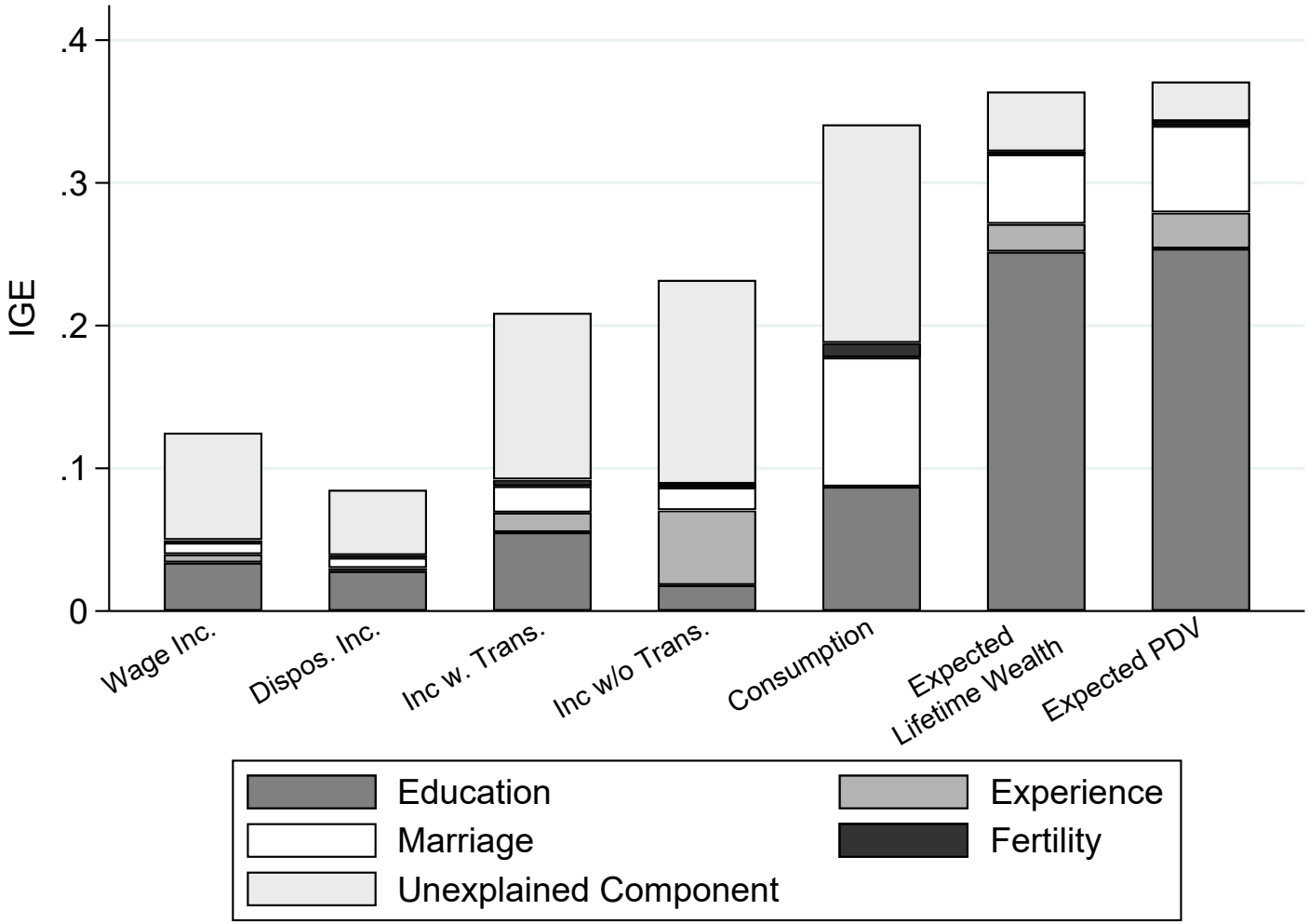

Figure 35: Decomposition of Covariances

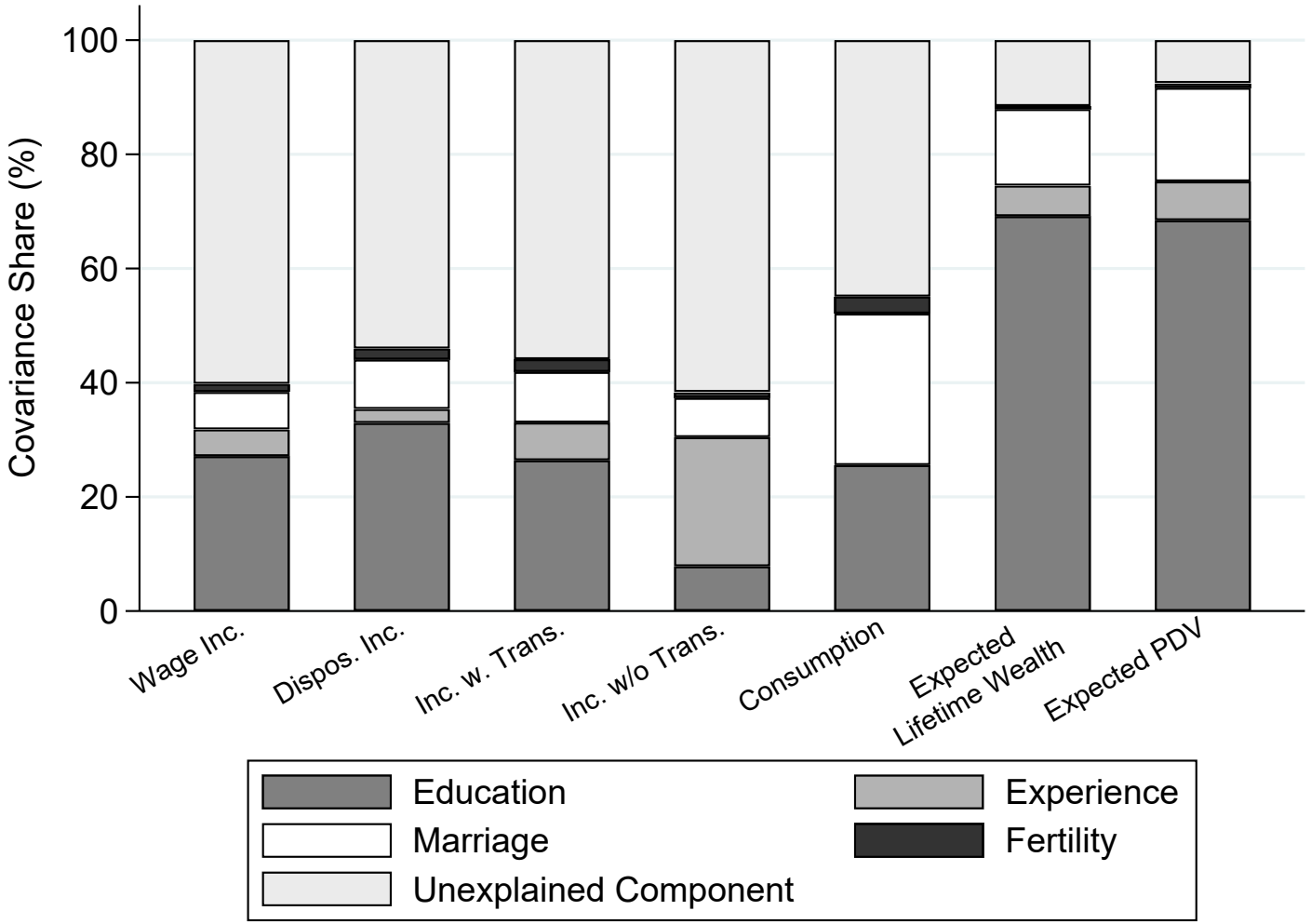

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Figure 36: Data Availability and Our Sample of Parents and Children

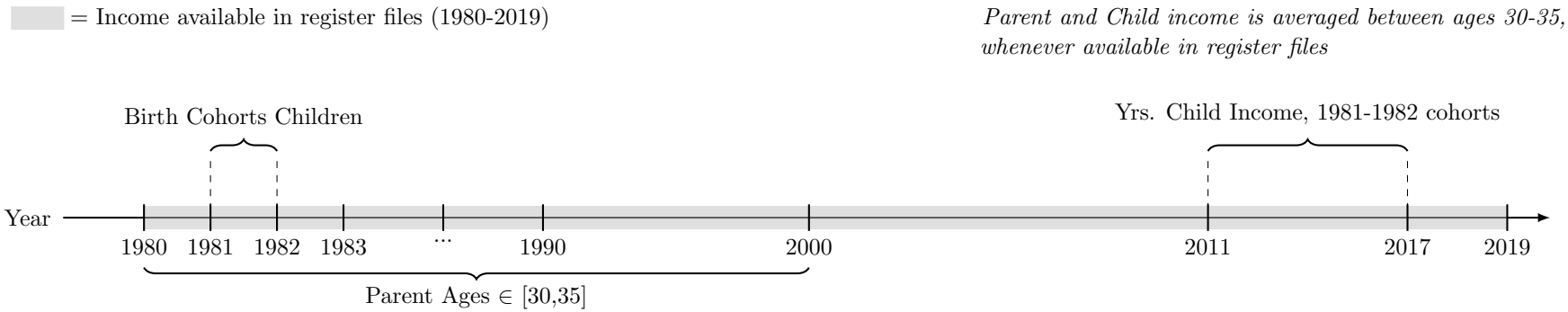

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Figure 37: PDV Ages 0-4

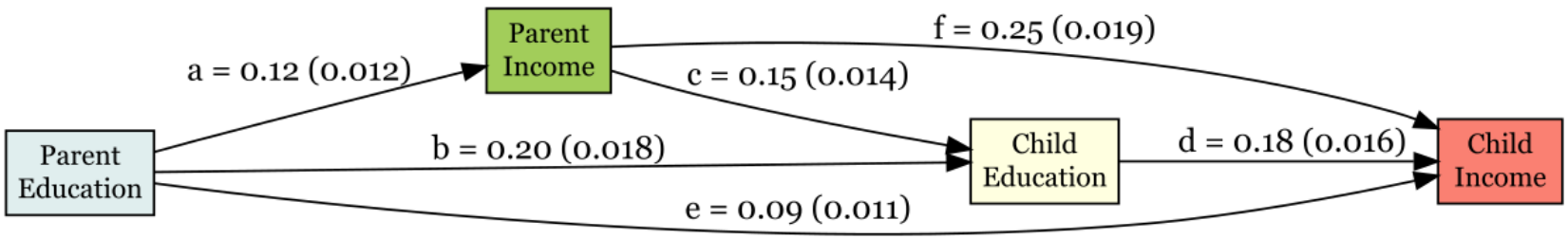


Figure 38: PDV Ages 5-9

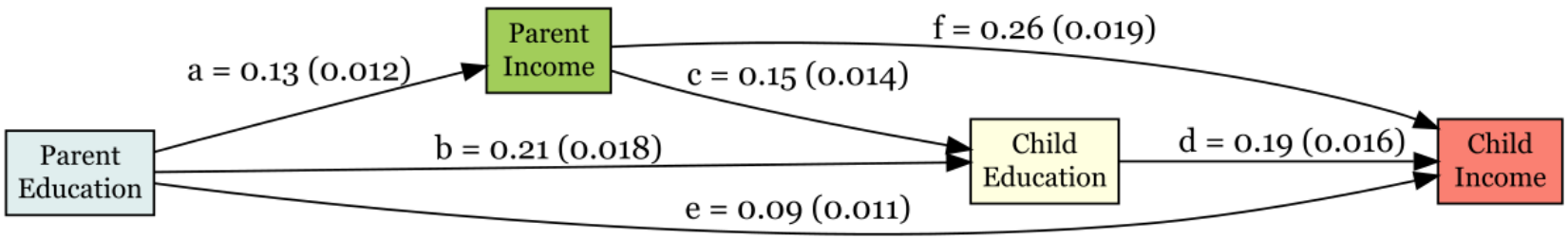


Figure 39: PDV Ages 10-14

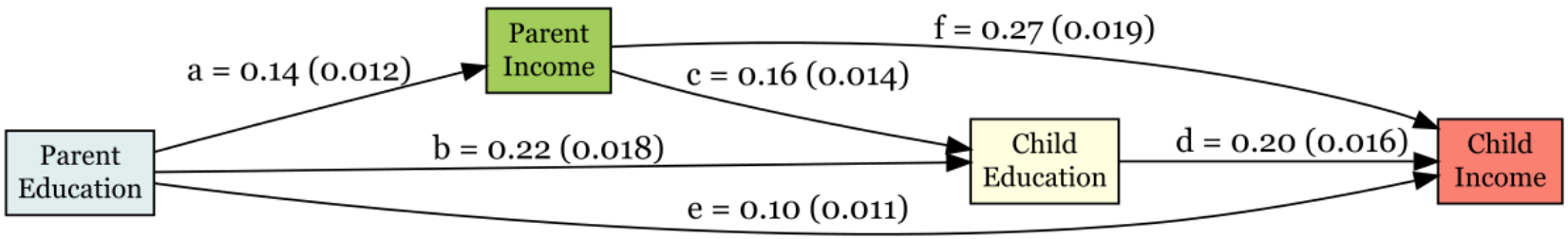


Figure 40: Disposable Income 0-4

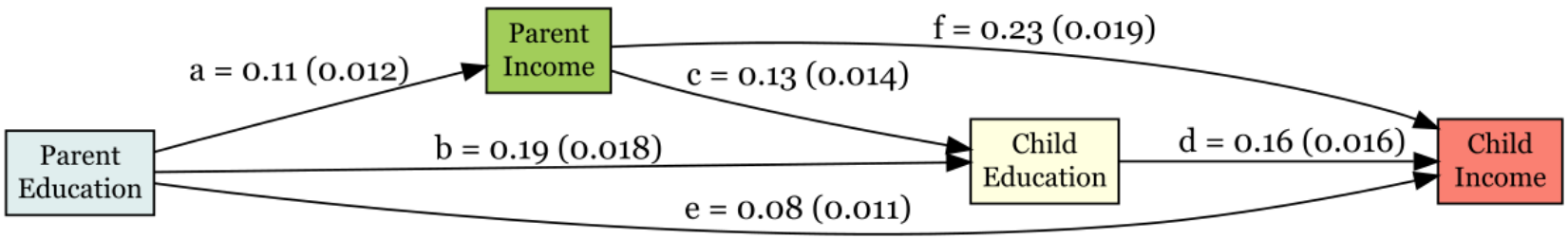


Figure 41: Disposable Income 5-9

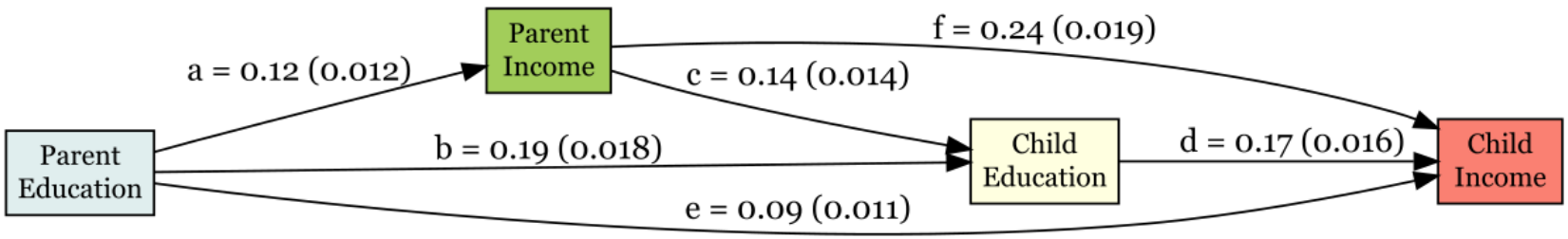
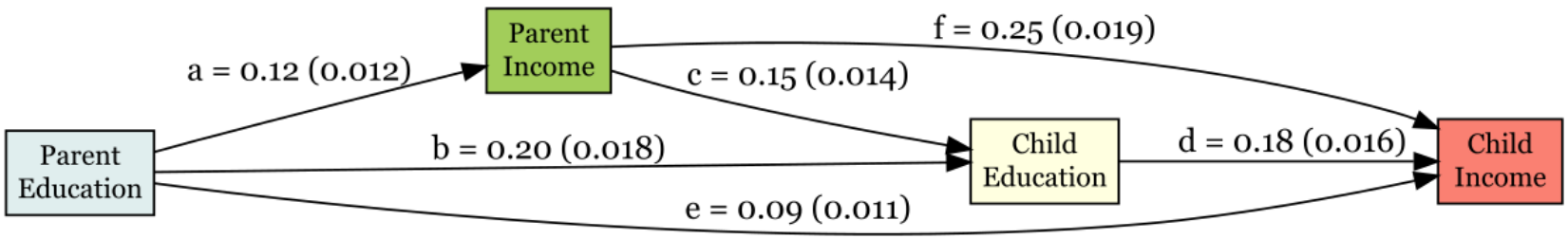


Figure 42: Disposable Income 10-14



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