Intergenerational Transmission of Family Influence

S. M. Sadegh Eshaghnia and James J. Heckman
University of Chicago

Rasmus Landersø
Rockwool Foundation

Rafeh Qureshi
University of Wisconsin

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DEPARTMENT OF
ECONOMICS
THE UNIVERSITY OF CHICAGO

THE ROCKWOOL FOUNDATION
Copenhagen, Denmark

CENTER FOR THE ECONOMICS
OF HUMAN DEVELOPMENT
The University of Chicago

Department of Economics
UNIVERSITY OF WISCONSIN–MADISON

Conventional Approach to Measuring the Intergenerational Transmission of Family Influence

- IGE (intergenerational elasticity).
- Childhood is a single period stage of three-stage overlapping generations model followed by adulthood and retirement.
- Ignores uncertainty.
- Abstracts 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.
- Implicitly invokes stationarity across generations or limited nonstationarity.

Our Approach

- Also recognize powerful role of parental influence.
- Multiple periods within each stage of the life cycle.
- Recognize critical and sensitive periods for effective investment.
- Income realized over lifetimes is not the income and welfare **expected** 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.
- **We pick 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: main drivers of changes in life-cycle patterns of family formation.

What We Do

Contributions

1. Recognize importance of early years in shaping child development.
2. Fundamental nonstationarity of life cycles across cohorts.
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. Surprisingly, the predictive power does not vary with the age of the child at which the life cycle measures are computed (but it does for snapshot measures).

8. Traditional proxy measures only weakly correlated with true lifetime measures.
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 play a huge 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.**

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.

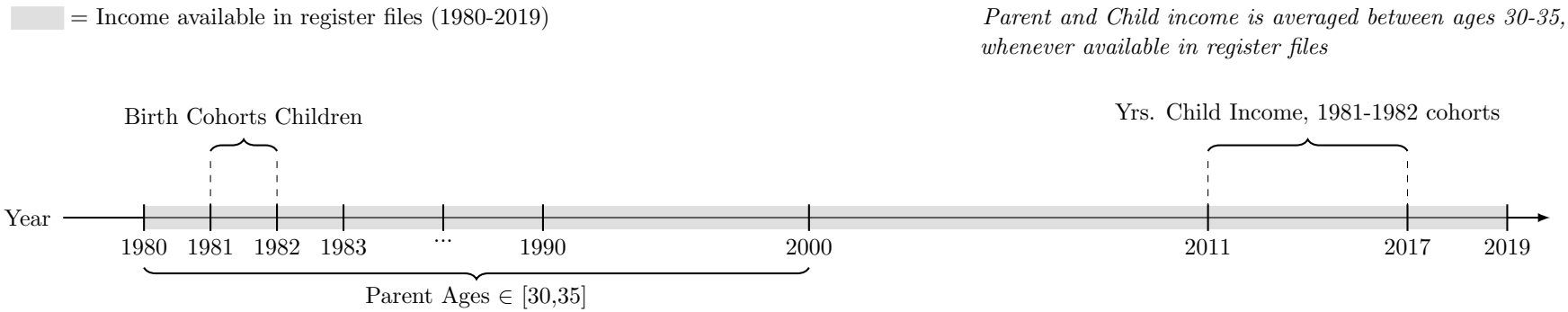
- Measures that predict important lifetime outcomes of children, like their participation in education and crime.
- Distinguish ***ex post*** and ***ex ante*** (realized vs. anticipated).

- ***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.

Figure 1: Data Availability and Our Sample of Parents and Children



Measures of Lifetime Resources

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

	Variable
(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
(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

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

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

$$\mathrm{LW}_{i,t} = \mathbb{E}_{i,t}\left[\sum_{\tau=1}^{T-t} s_{i,t+\tau} y_{i,t+\tau} \middle| \mathcal{I}_{i,t}\right]. \tag{2}$$

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

- Accounts for uncertainty and credit constraints.

- Household Euler Equation:

$$\mathbb{E}_{i,t}\left[\beta\frac{U_c(c_{i,t+1})}{U_c(c_{i,t})}(1+r_{i,t+1})(1+\underbrace{\lambda_{i,t}}_{\substack{\text{Lagrange}\\ \text{multiplier}\\ \text{on borrowing}\\ \text{constraint}}})\right]=1. \tag{3}$$

- CRRA utility function:

$$U(c_{i,t})=\frac{c_{i,t}^{1-\rho}-1}{1-\rho}.$$

Identifying and Estimating Information Sets

- Cunha and Heckman (2016).
- Use information that predicts outcomes each period.

Example of How We Select Information Sets

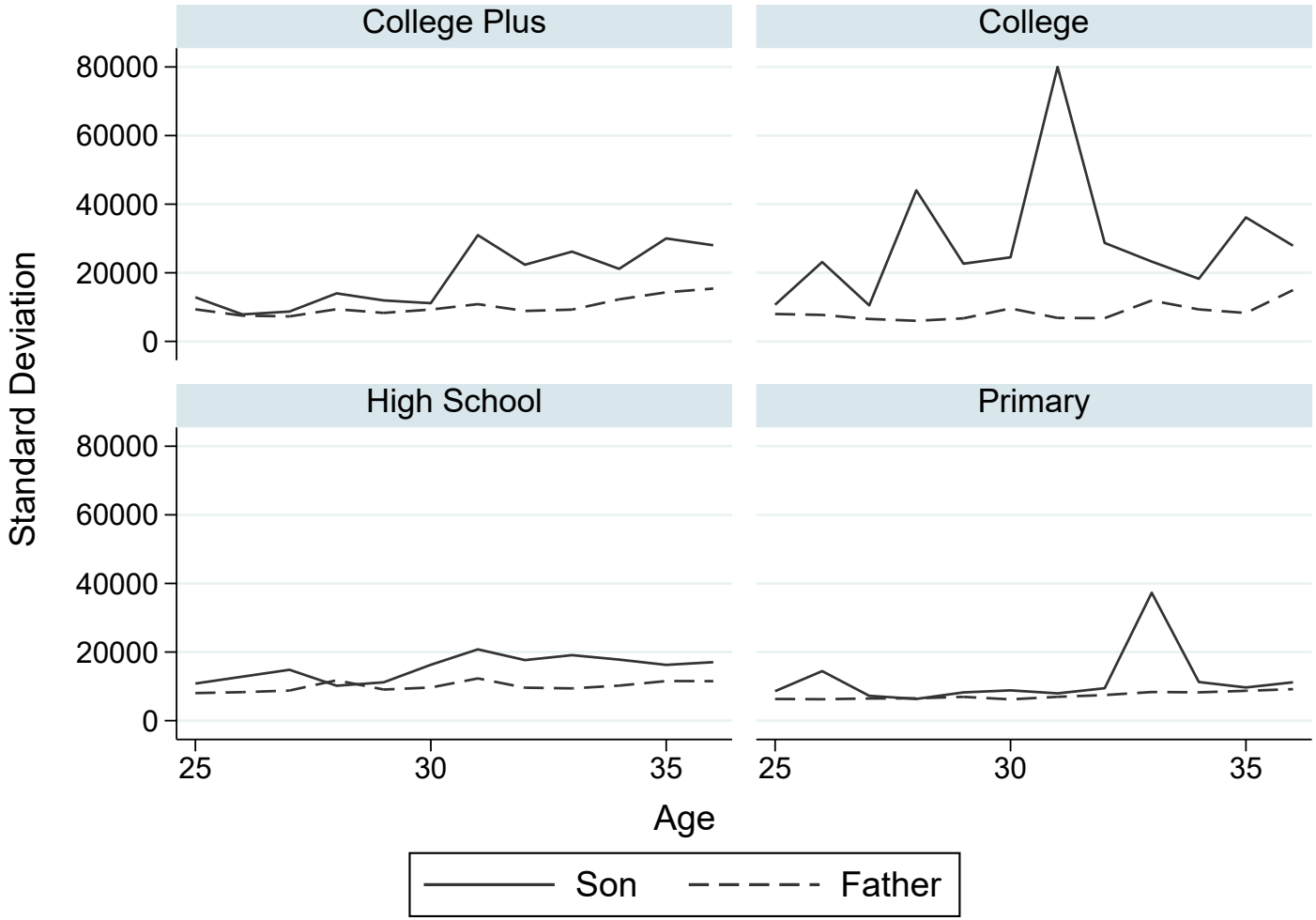
- Y_t = outcome at t.
- $\mathcal{I}_t$ = relevant information known and acted on at t.
- W_t = not known and/or acted on at t.

$$Y_t = \mathcal{I}_t \beta + W_t \Gamma + U_t$$
$$U_t \perp\!\!\!\perp (\mathcal{I}_t, W_t)$$

- Test: $\mathcal{I}_t$ properly specified if $\beta \neq 0, \Gamma = 0$.
- $U_{t+j} = Y_{t+j} - E(Y_{t+j} \mid \mathcal{I}_t), \quad j > 0$.
- Correct information set: U_{t+j} not predicted by $\mathcal{I}_t$.
- New information arrives later.

Link to Test Results

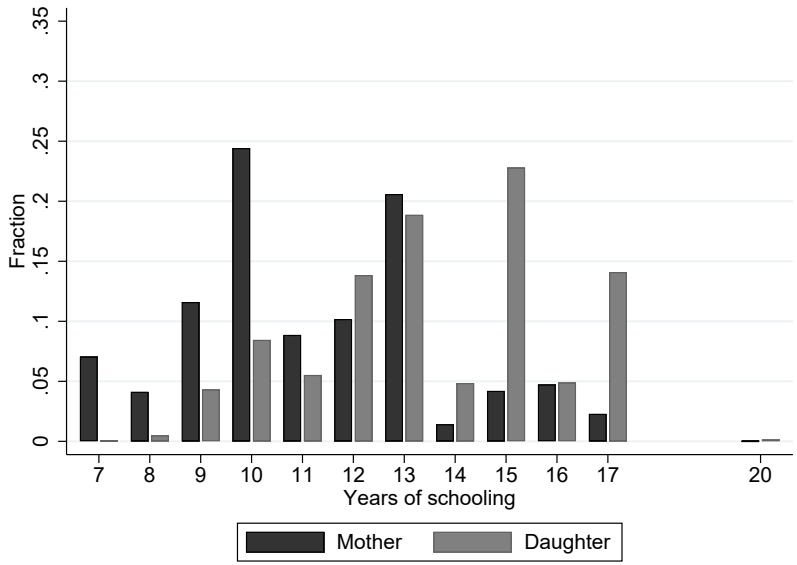
Figure 2: Uncertainty by Age and Education Level



Nonstationarity across Cohorts

Figure 3: Distributions of Years of Schooling for Parents and Children

(a) Females



(b) Males

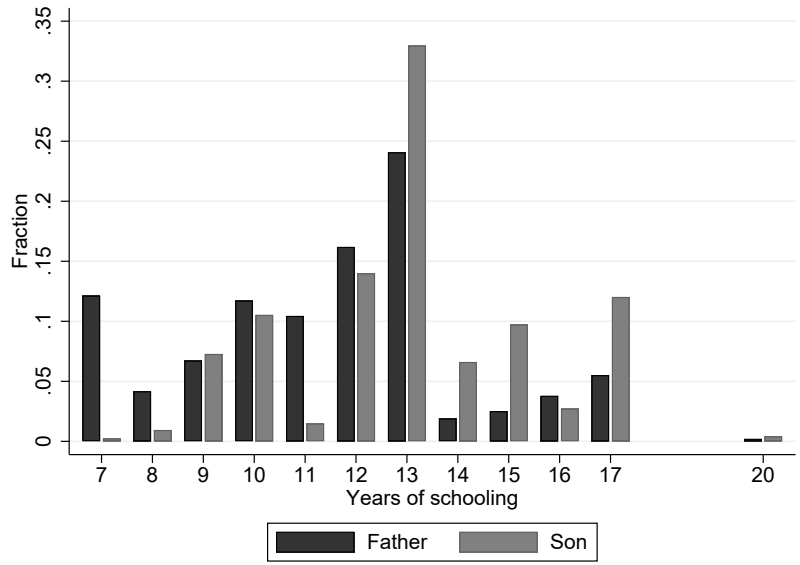
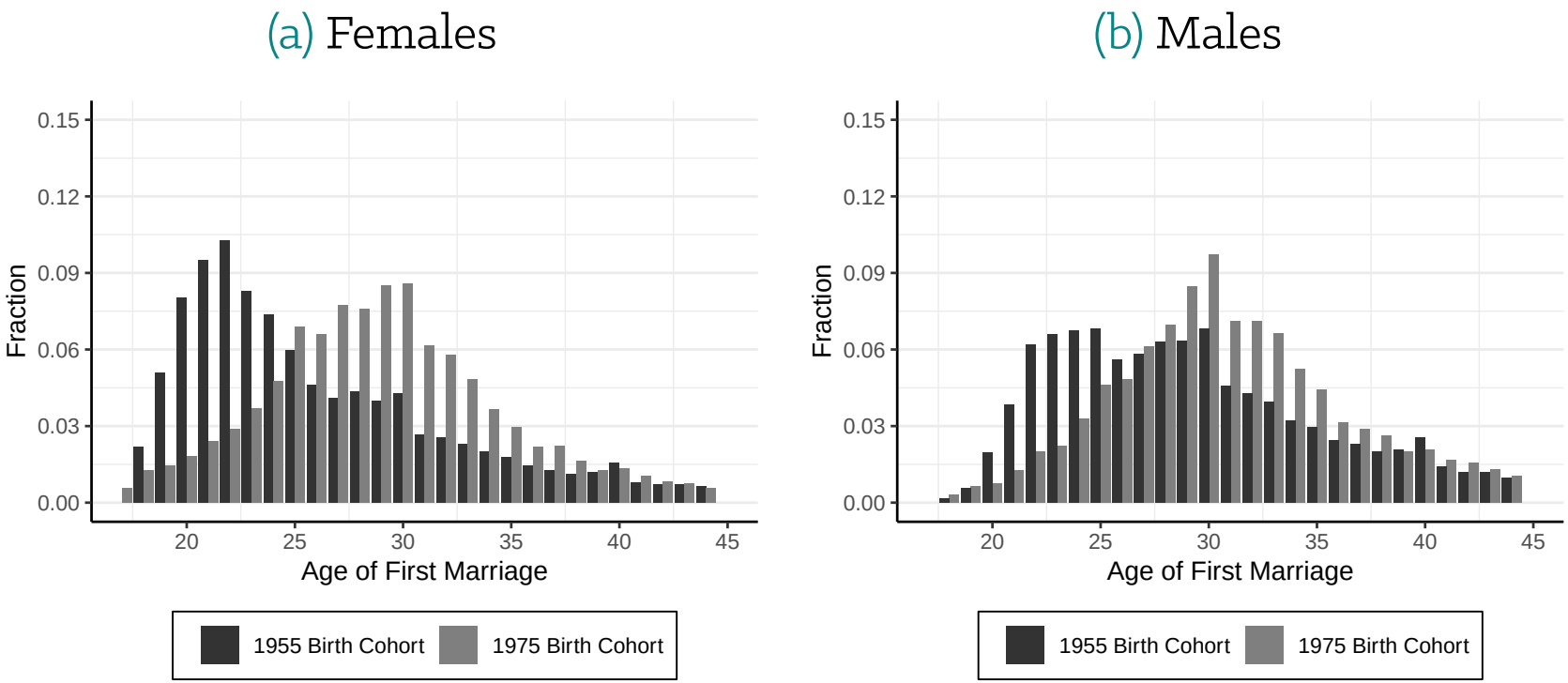


Figure 4: Timing of Key Life Events across Generations



Link to Nonstationary Life Cycles

Figure 5: Income across Cohorts

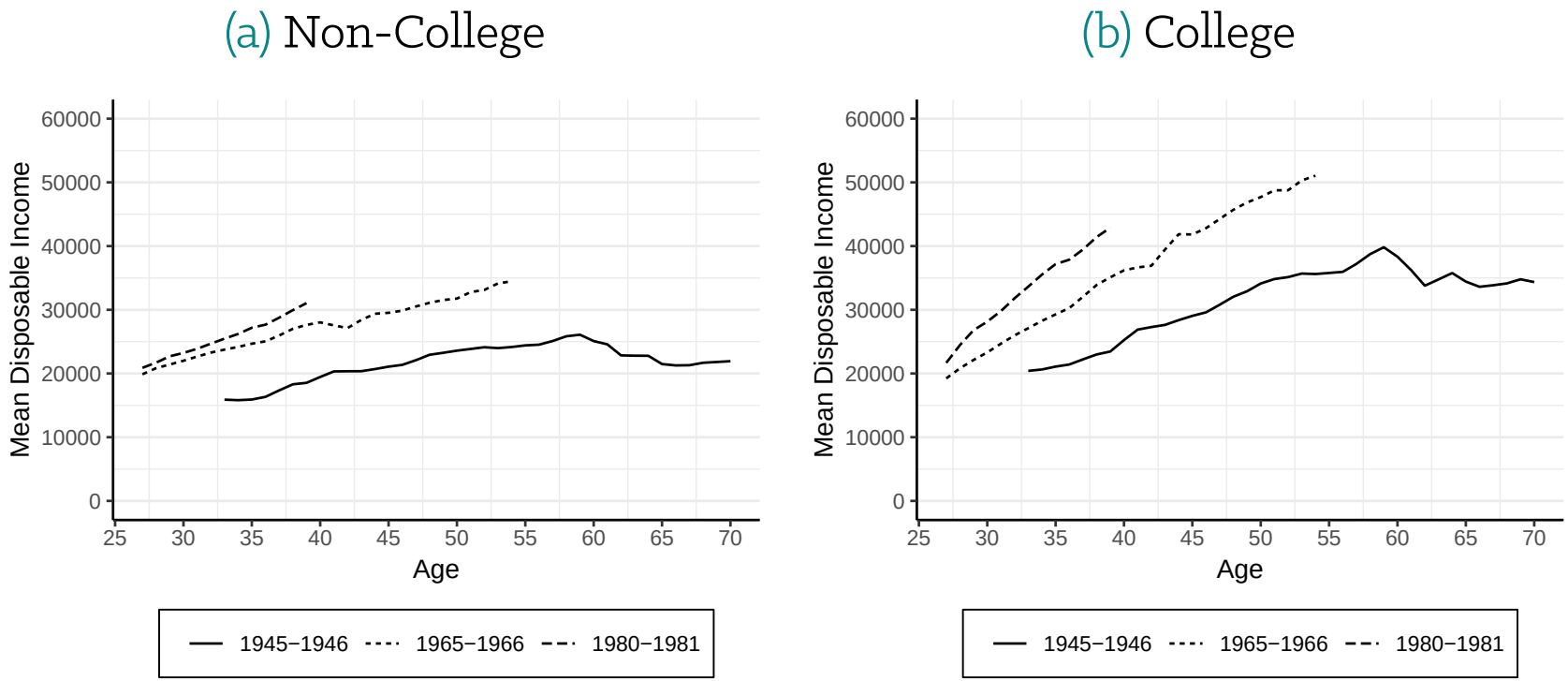
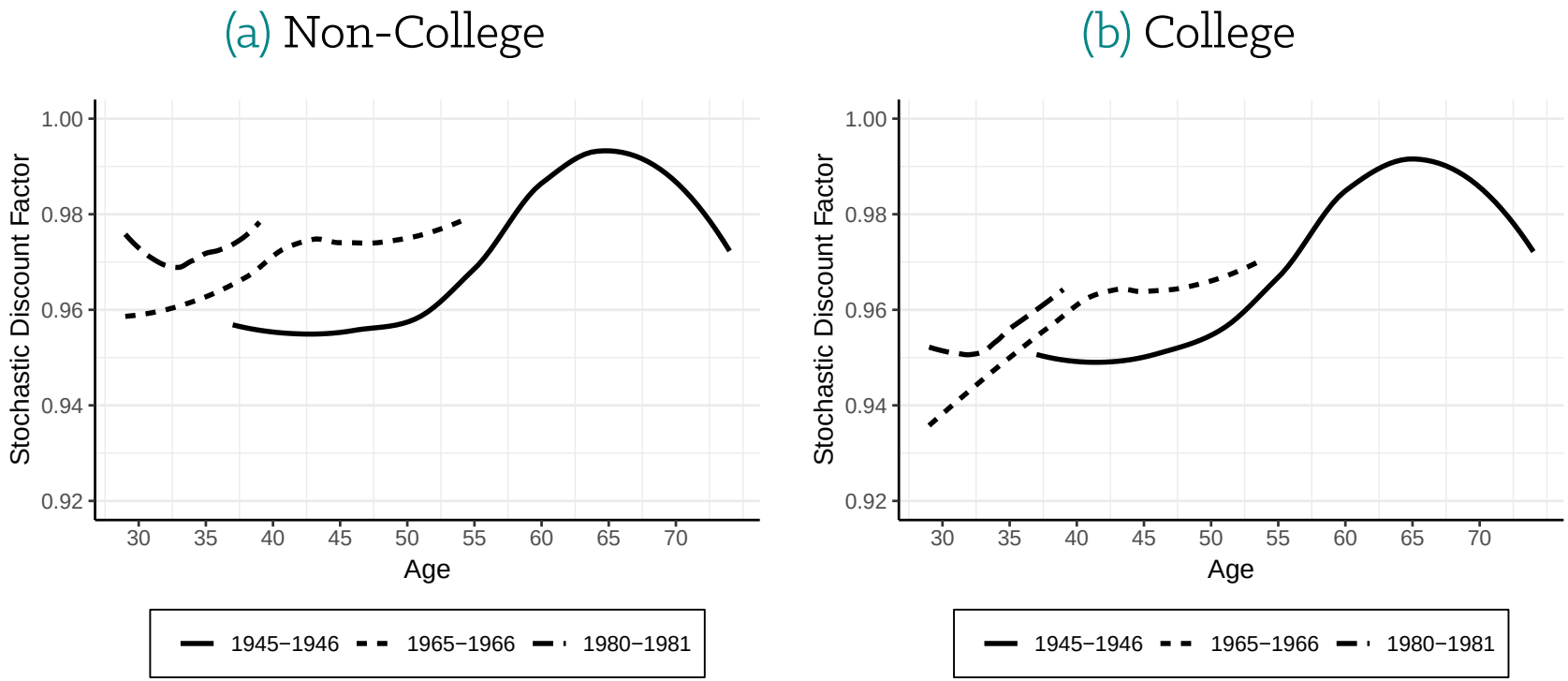


Figure 6: SDF across Cohorts



Link: By Age

Comparing Measures

Table 2: 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 2: 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

Best Predictors of Important Child Outcomes

Figure 7: Parents' Resources and Children's Outcomes

(a) Mathematics Problem Solving

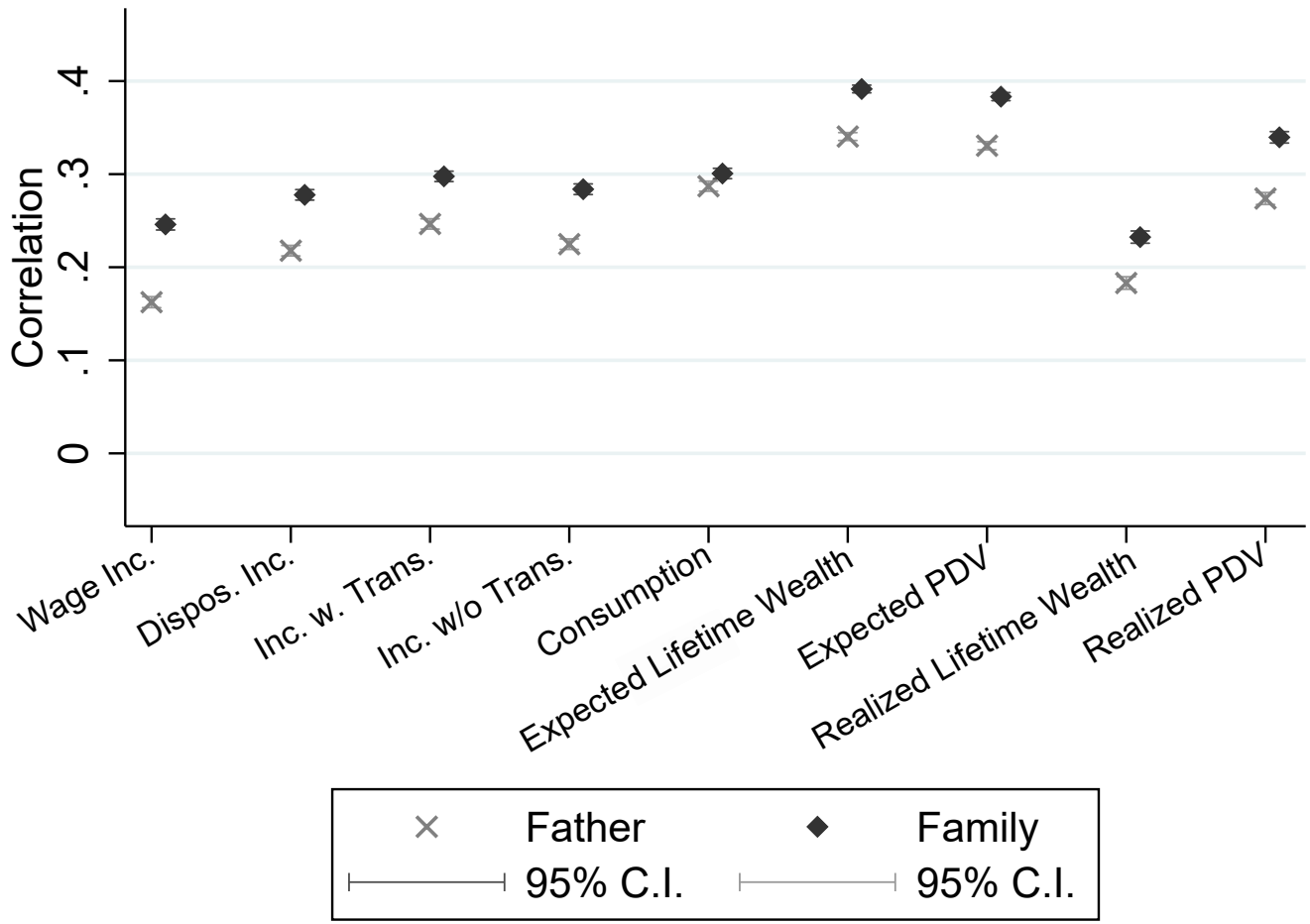


Figure 7: Parents' Resources and Children's Outcomes, Cont'd

(b) College Attainment

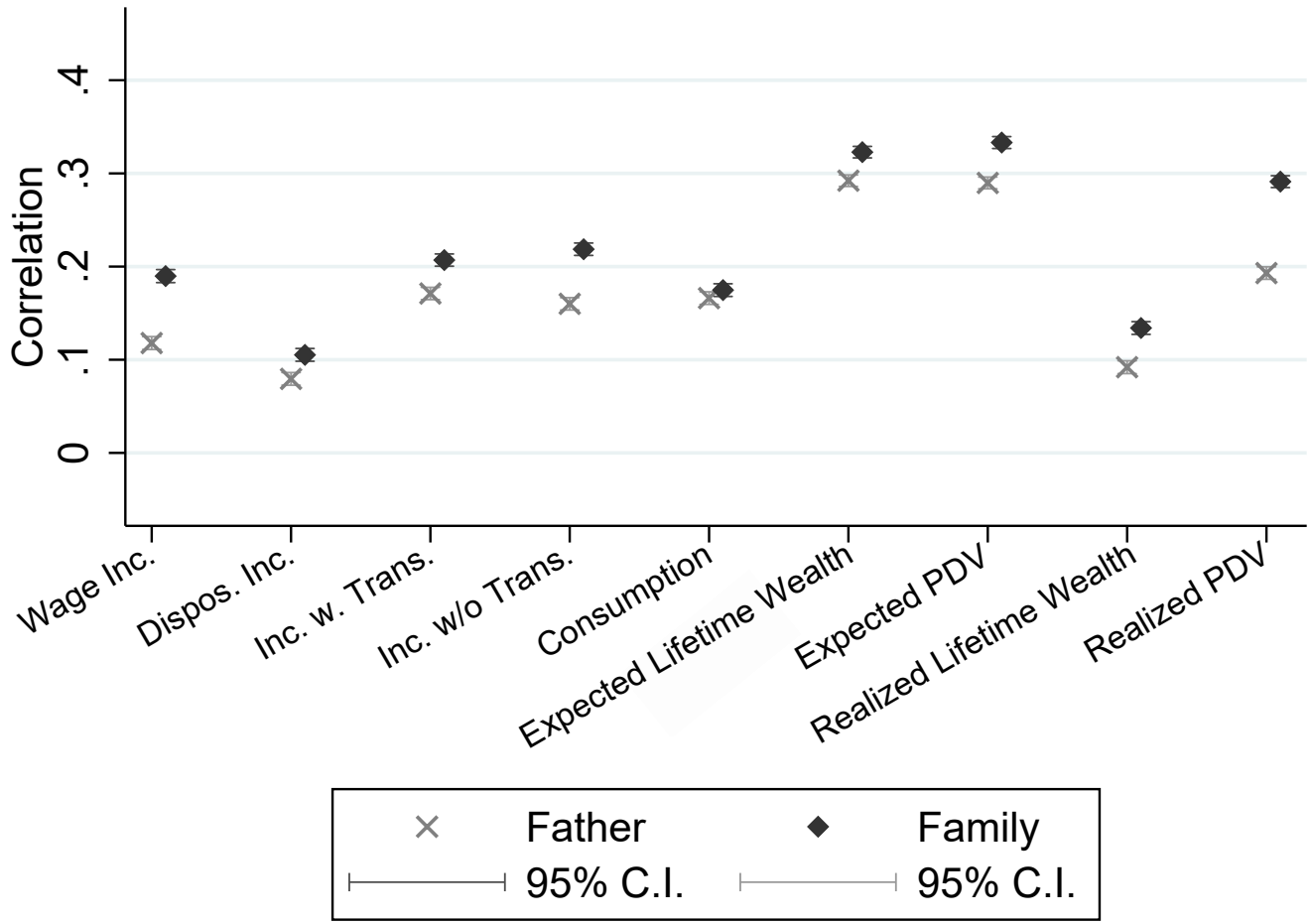
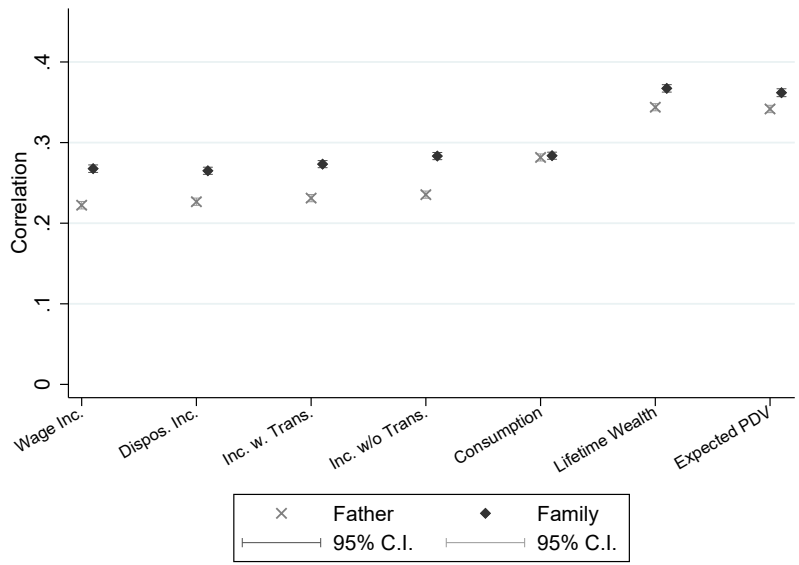


Figure 8: Parental Resources Measured at Ages 0–4 and Child Outcomes

(a) Mathematics Problem Solving



(b) Danish Reading

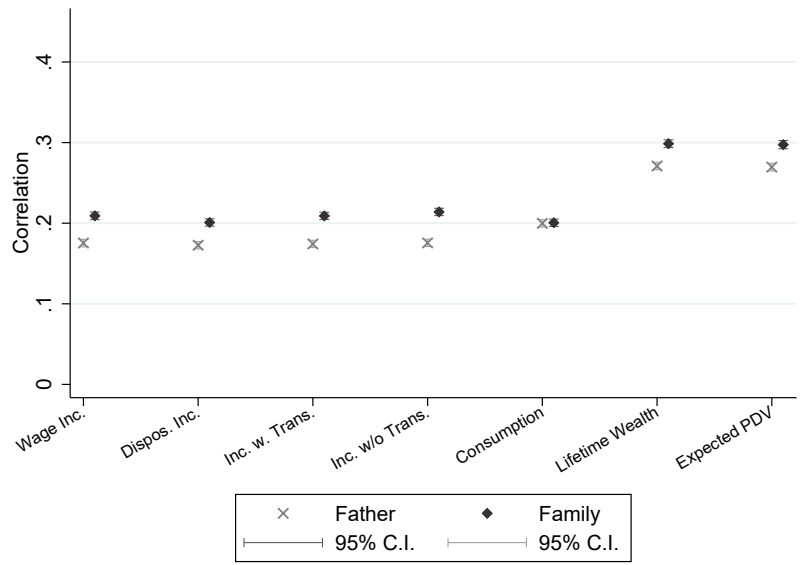
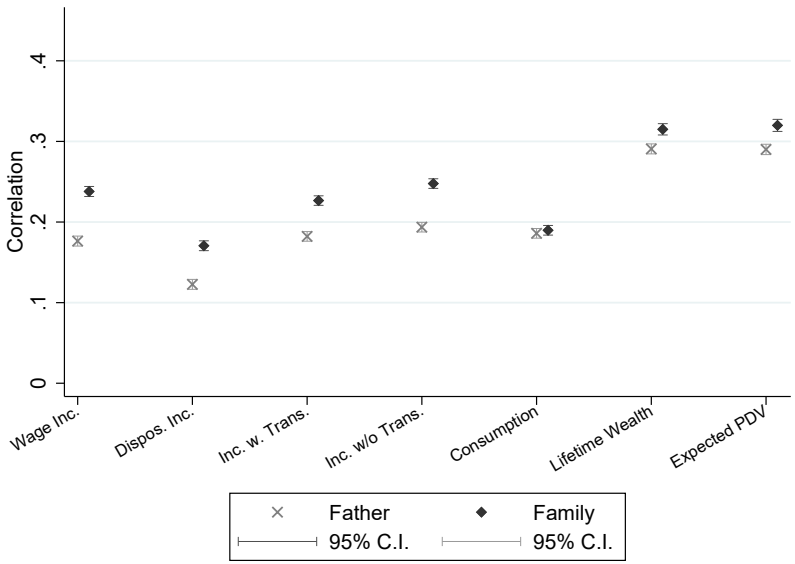


Figure 8: Parental Resources Measured at Ages 0–4 and Child Outcomes, Cont'd

(c) College Attainment



(d) Years of Schooling

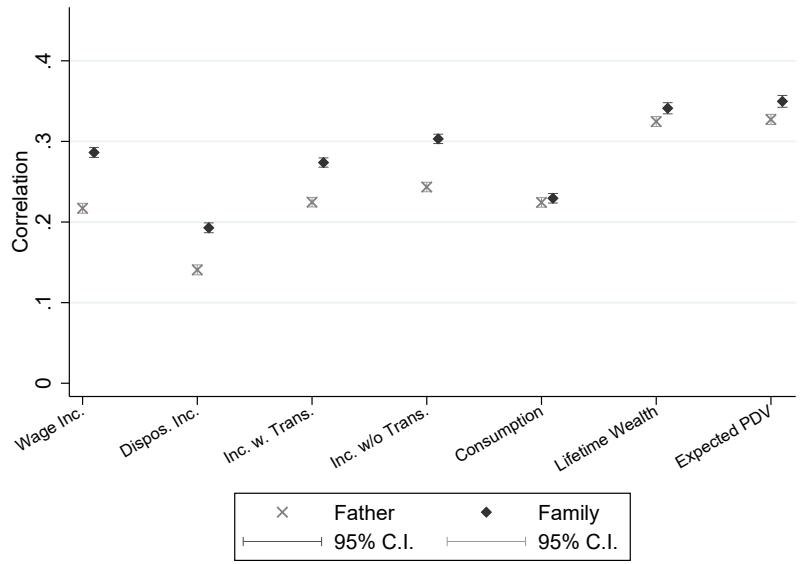
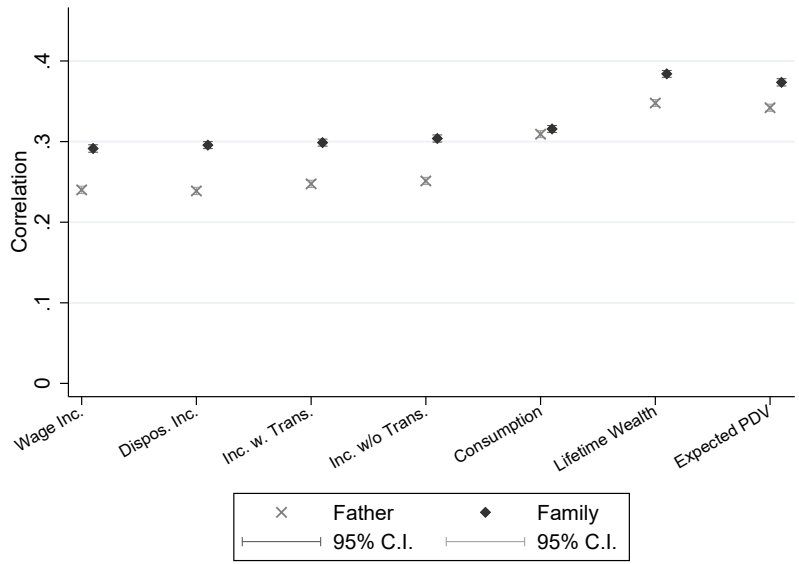


Figure 9: Parental Resources Measured at Ages 5–9 and Child Outcomes

(a) Mathematics Problem Solving



(b) Danish Reading

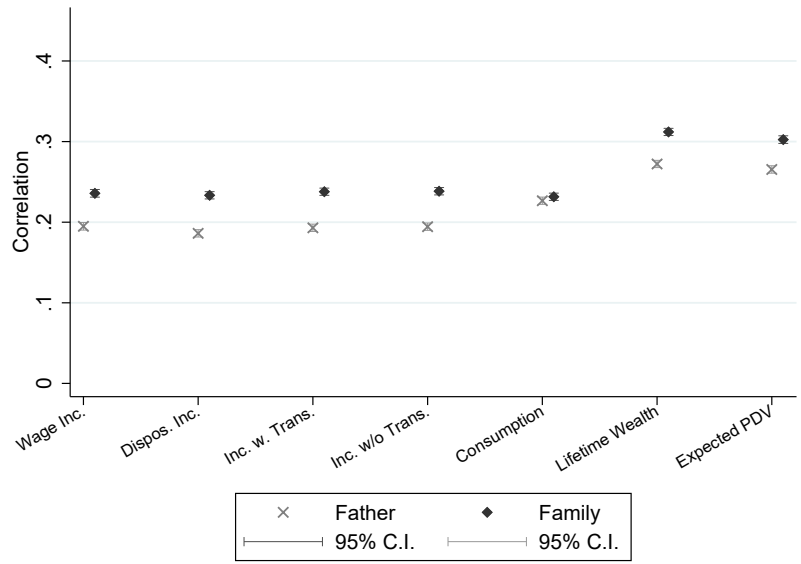
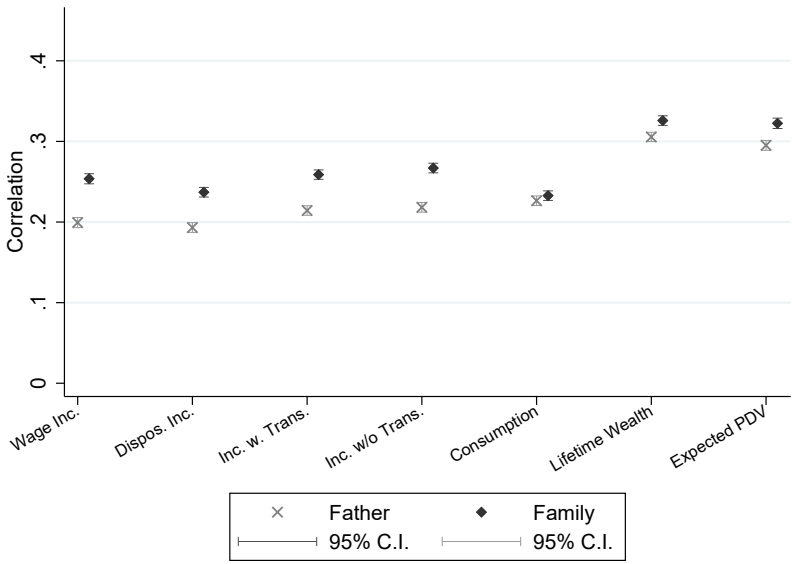


Figure 9: Parental Resources Measured at Ages 5–9 and Child Outcomes, Cont'd

(c) College Attainment



(d) Years of Schooling

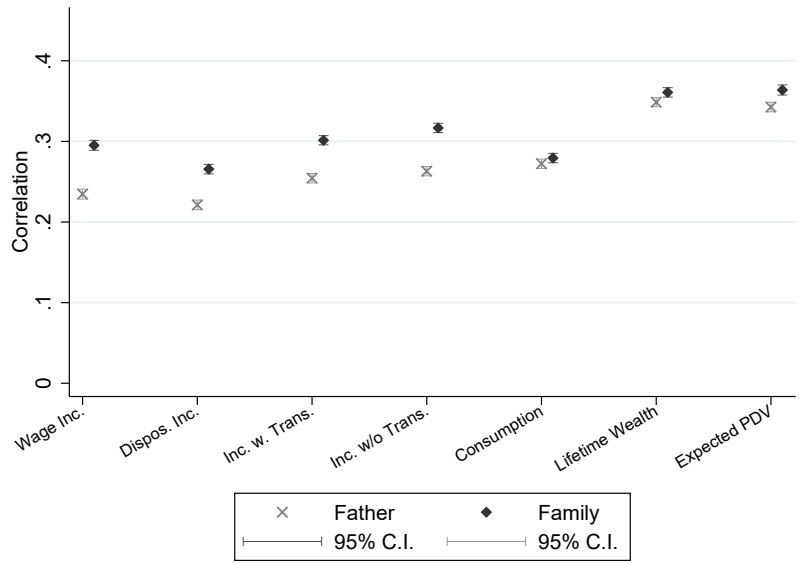
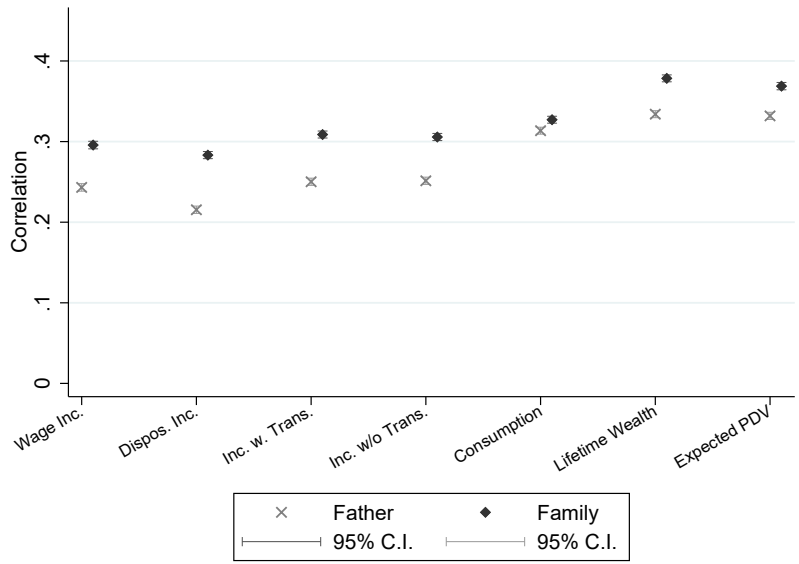


Figure 10: Parental Resources Measured at Ages 10–14 and Child Outcomes

(a) Mathematics Problem Solving



(b) Danish Reading

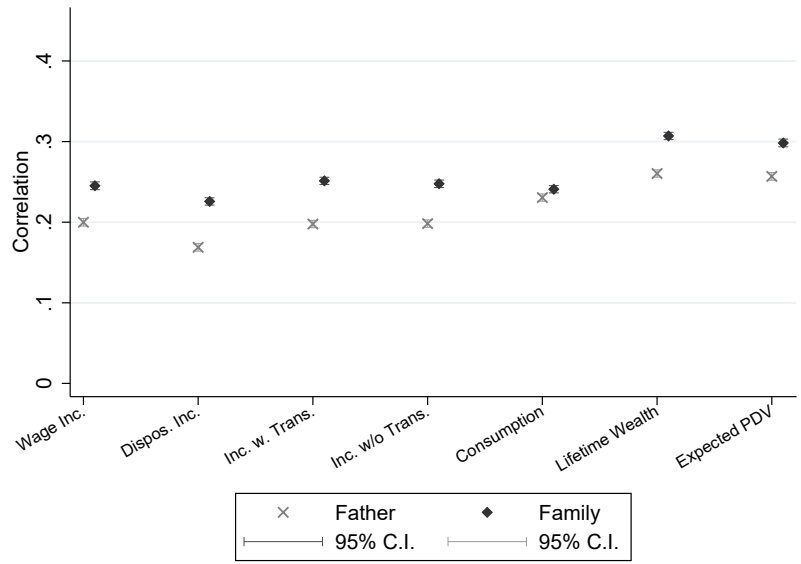
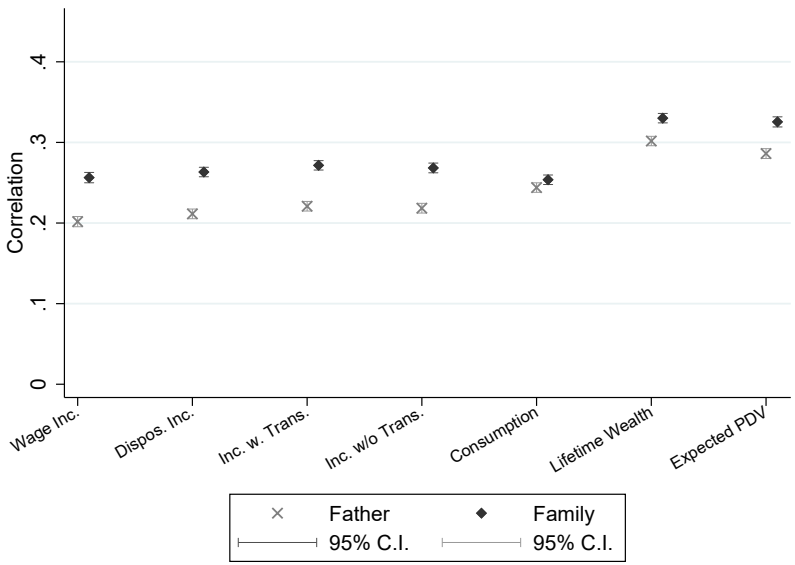
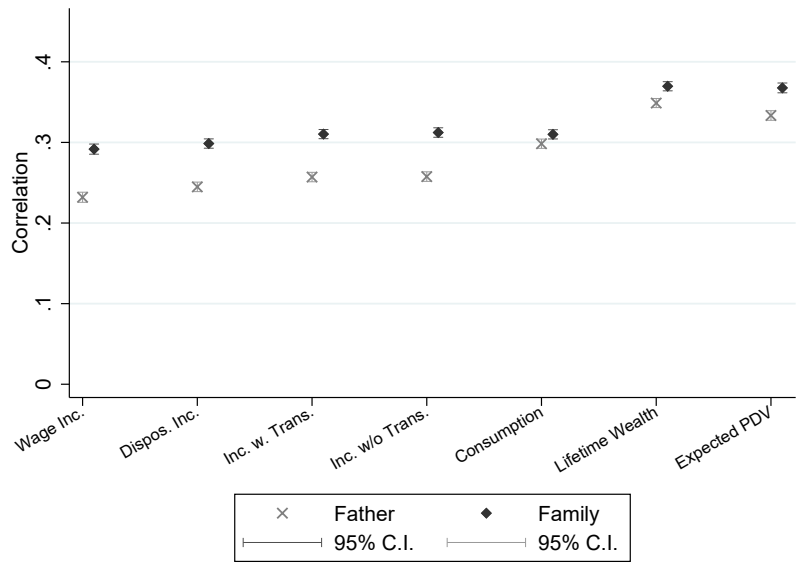


Figure 10: Parental Resources Measured at Ages 10–14 and Child Outcomes, Cont'd

(c) College Attainment



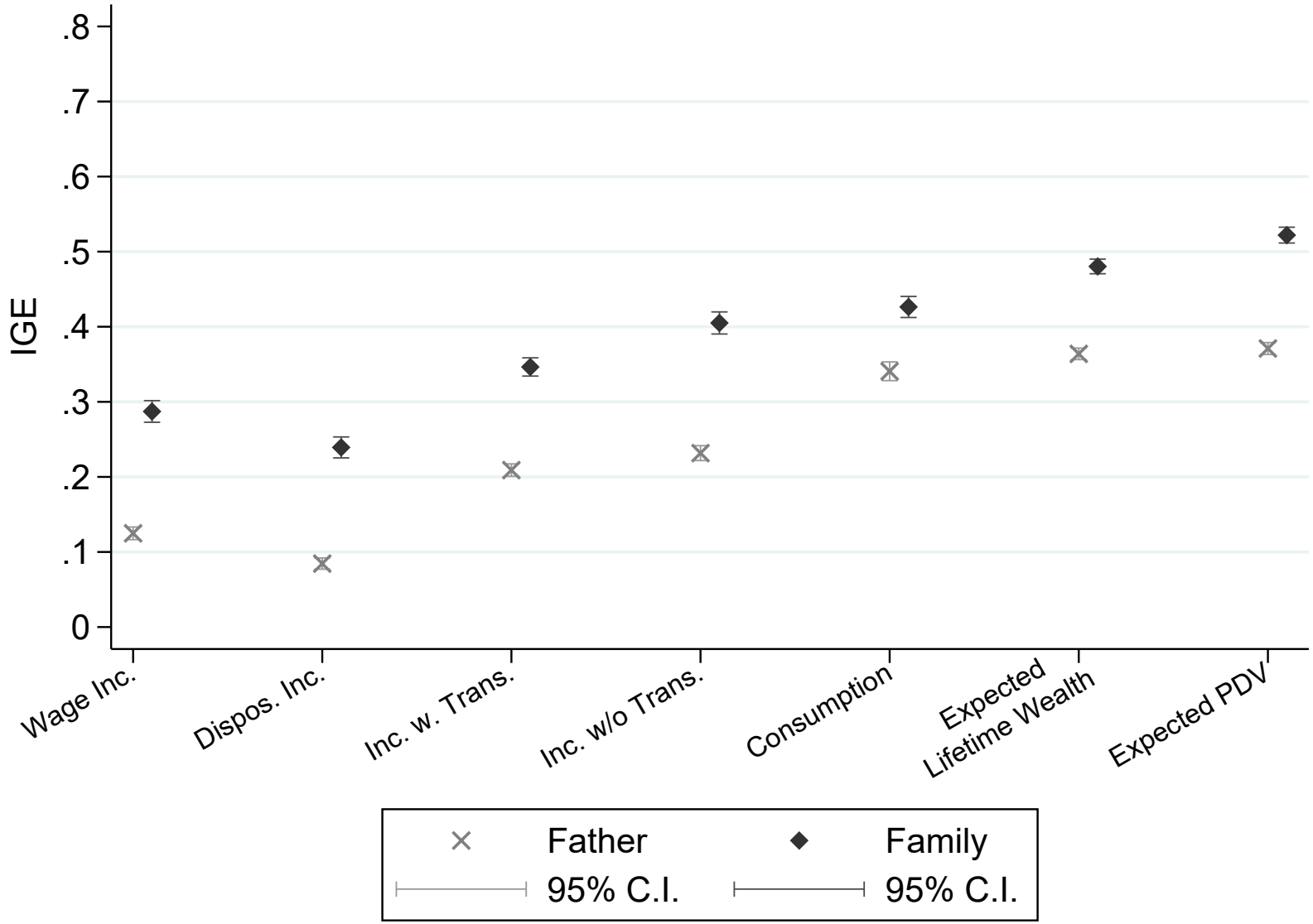
(d) Years of Schooling



Link to Education, Crime, Fertility

Intergenerational Elasticities

Figure 11: Log-Log IGE Estimates



Link to Rank-Rank Version

Link to Additional Log-Log IGE Estimates

Intergenerational Correlations and Cross-Sectional Inequality

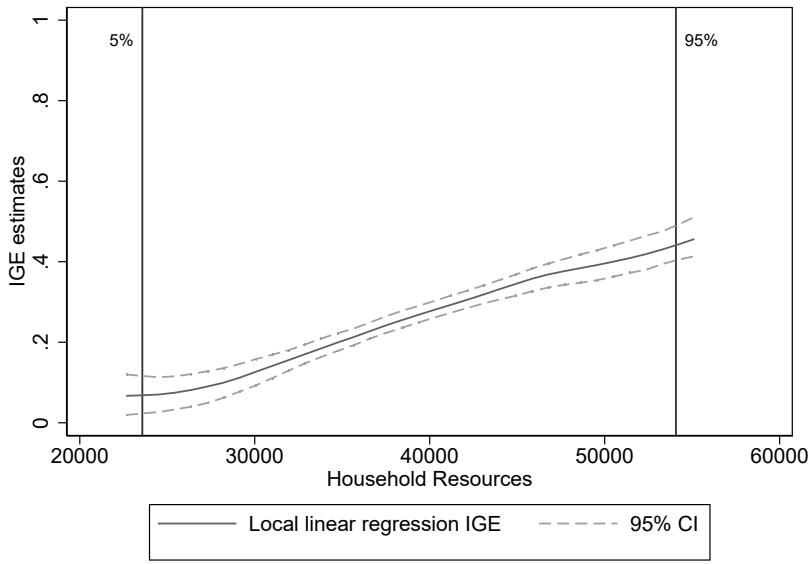
Table 3: IGE Estimates (Ages 30–35 of Parents and Children)

	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	$0.371^{***} = 0.310 \frac{0.279}{0.233}$	$0.522^{***} = 0.341 \frac{0.277}{0.181}$

Non-Linear IGEs

Figure 12: Local-Linear IGEs for Lifetime Measures

(a) Disposable Income



(b) Household Consumption

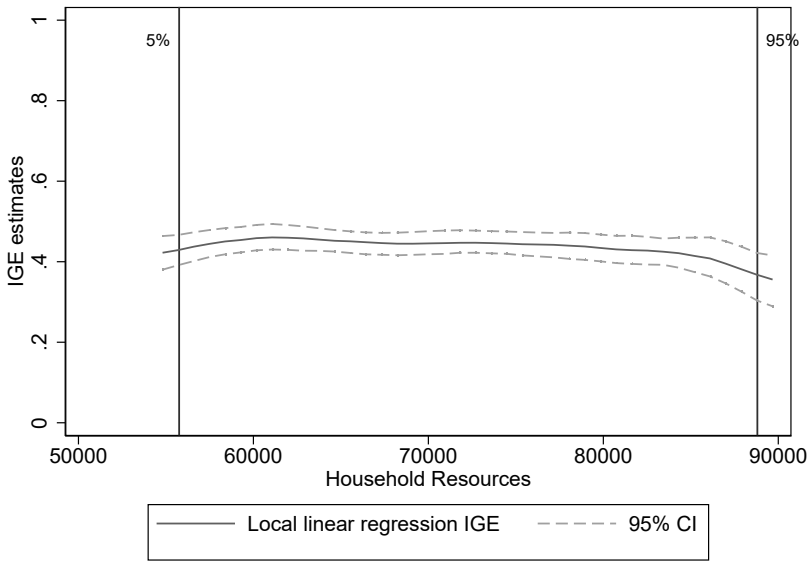
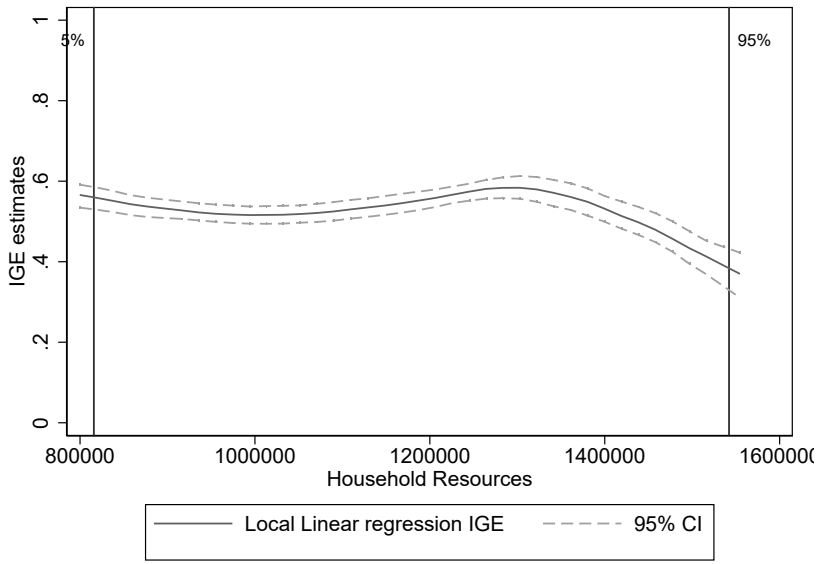
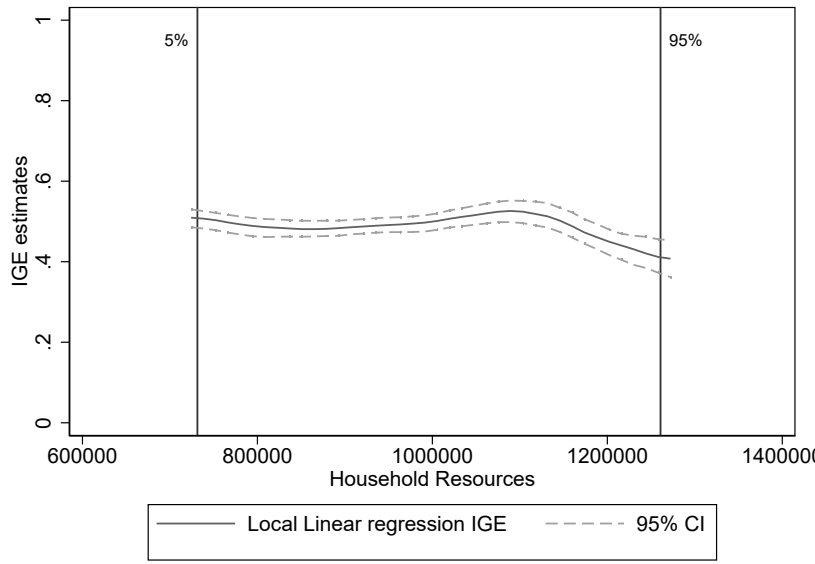


Figure 12: Local-Linear IGEs for Lifetime Measures, Cont'd

(c) Expected PDV



(d) Expected Lifetime Wealth



Link to Realized Values

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

- Regression specification:

$$y_{i,t}^k = \lambda^k + (\beta^k)' \mathbf{X}_{i,t}^k + \mu_i^k + \epsilon_{i,t}^k. \tag{4}$$

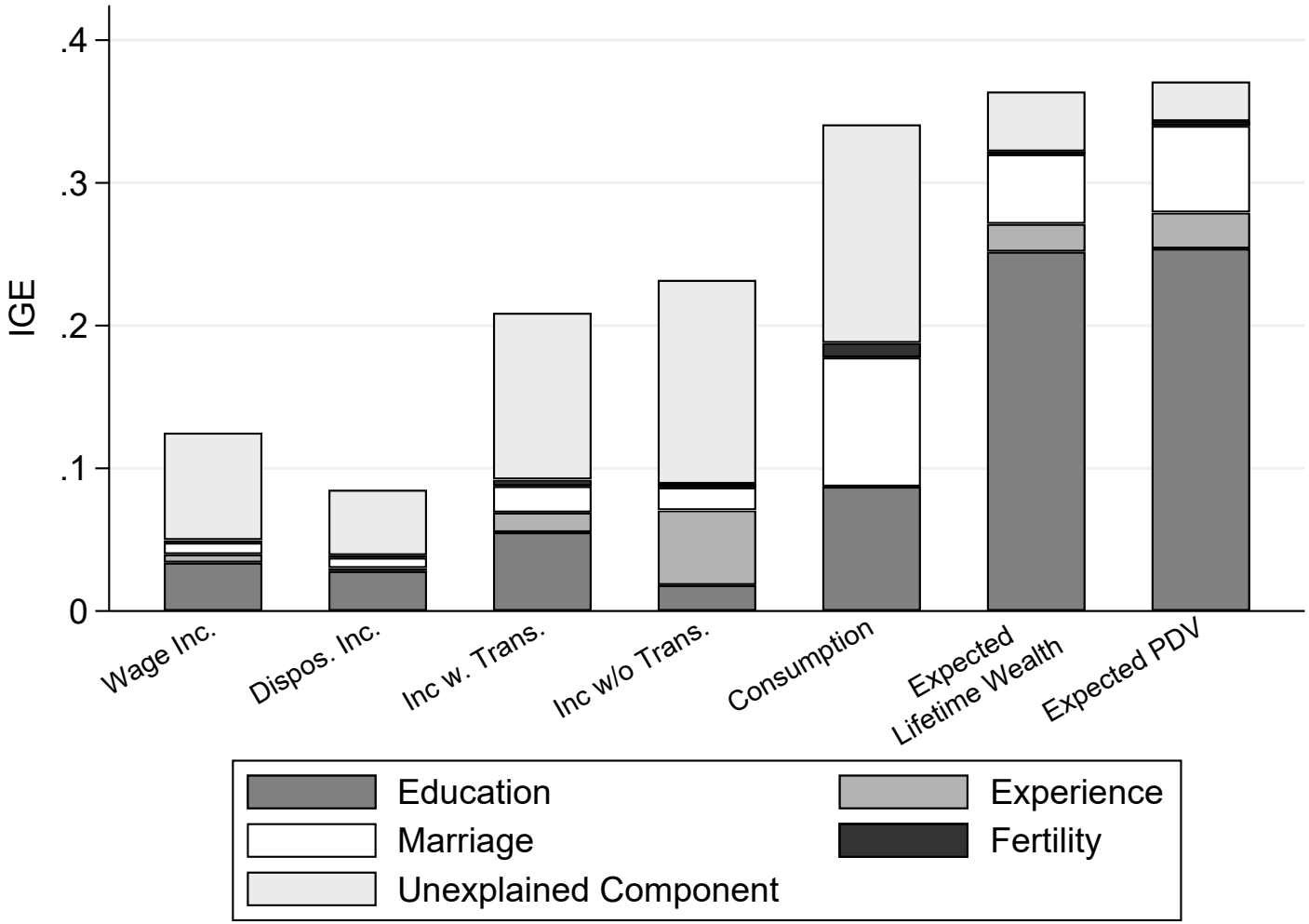
- $k \in \{p, c\}$.
- Average log-income ages 30 to 35:

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

- Decompose intergenerational covariance of log-income into components:

$$\text{Cov}(\overline{y}_i^c, \overline{y}_i^p) = \text{Cov}\left((\beta^c)' \overline{\mathbf{X}}_i^c, \overline{y}_i^p\right) + \text{Cov}(\mu_i^c, \overline{y}_i^p). \tag{5}$$

Figure 13: Decomposition of IGEs



Link to Covariance Share

Absolute Upward Mobility

Figure 14: Absolute Mobility

(a) Traditional Measures

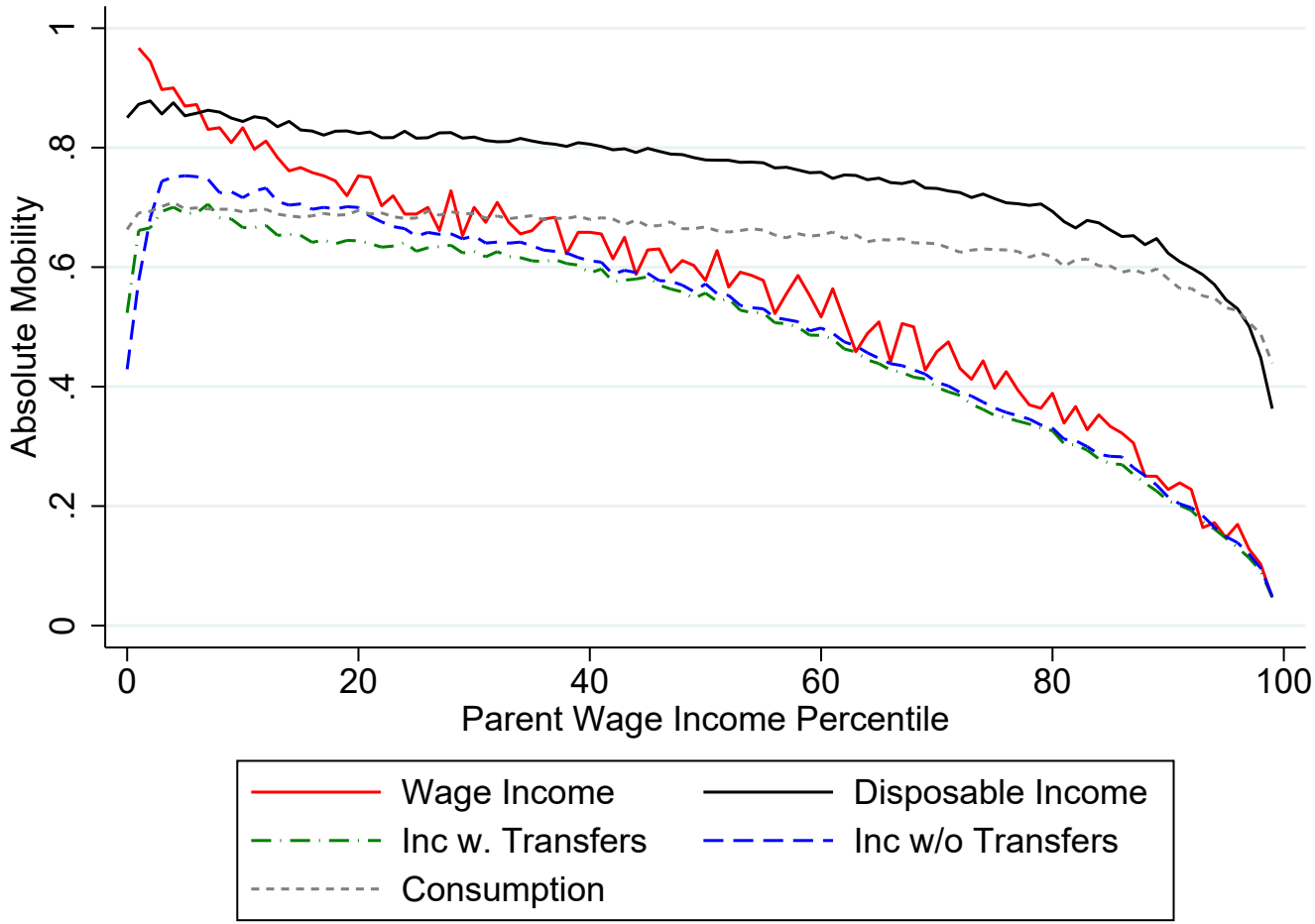


Figure 14: Absolute Mobility, Cont'd

(b) Lifetime Measures

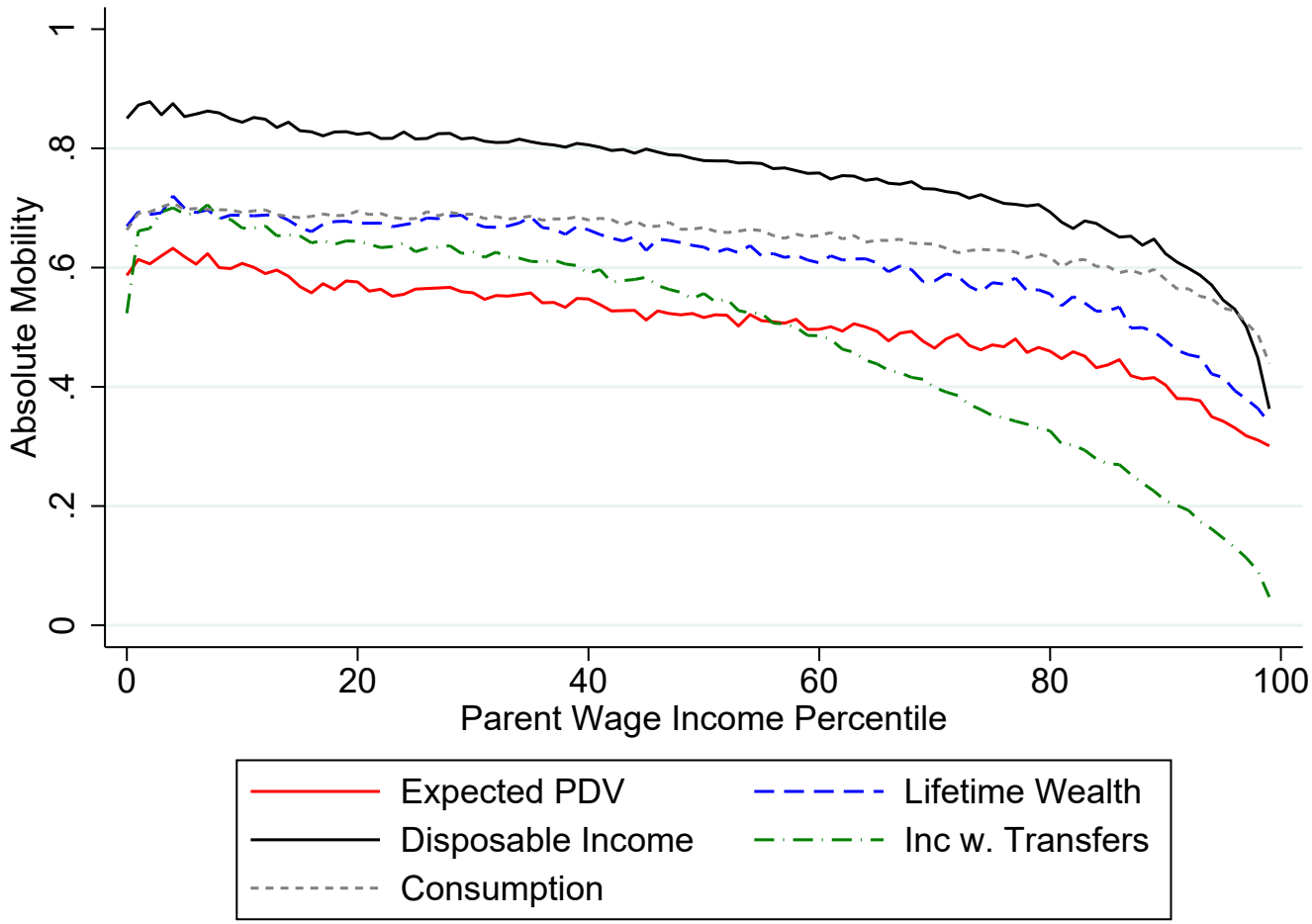


Figure 15: Absolute Mobility of Disposable Income

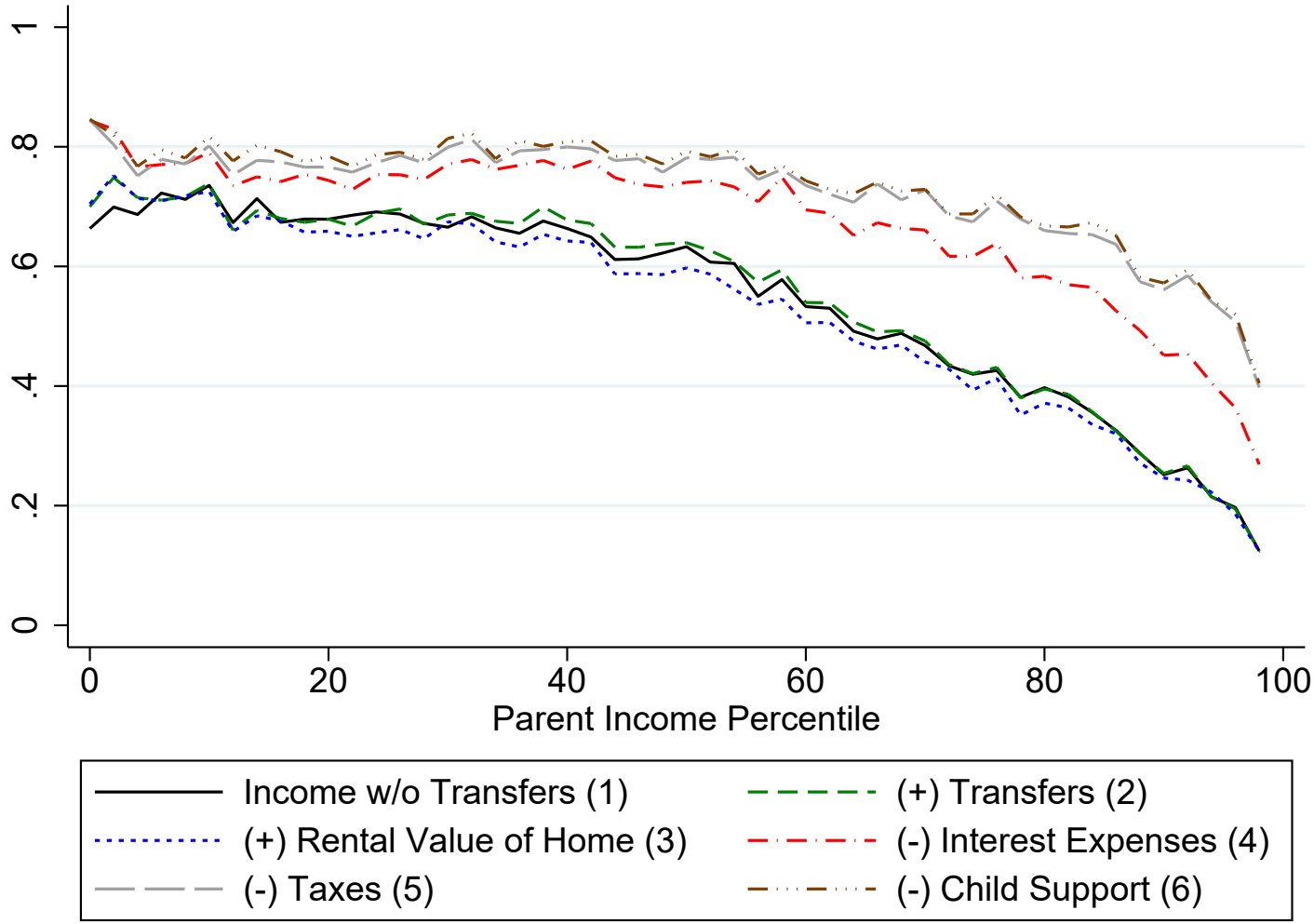
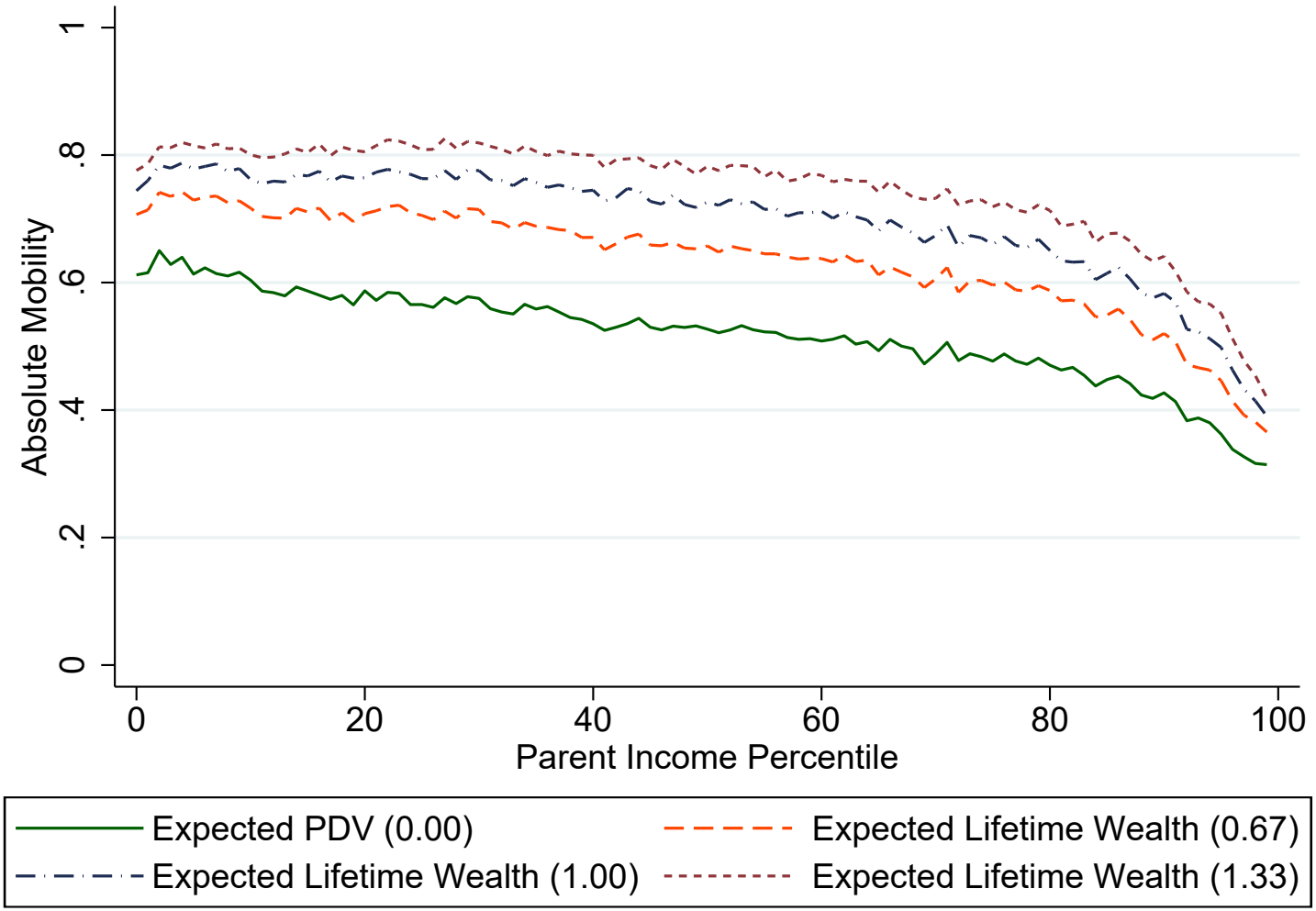
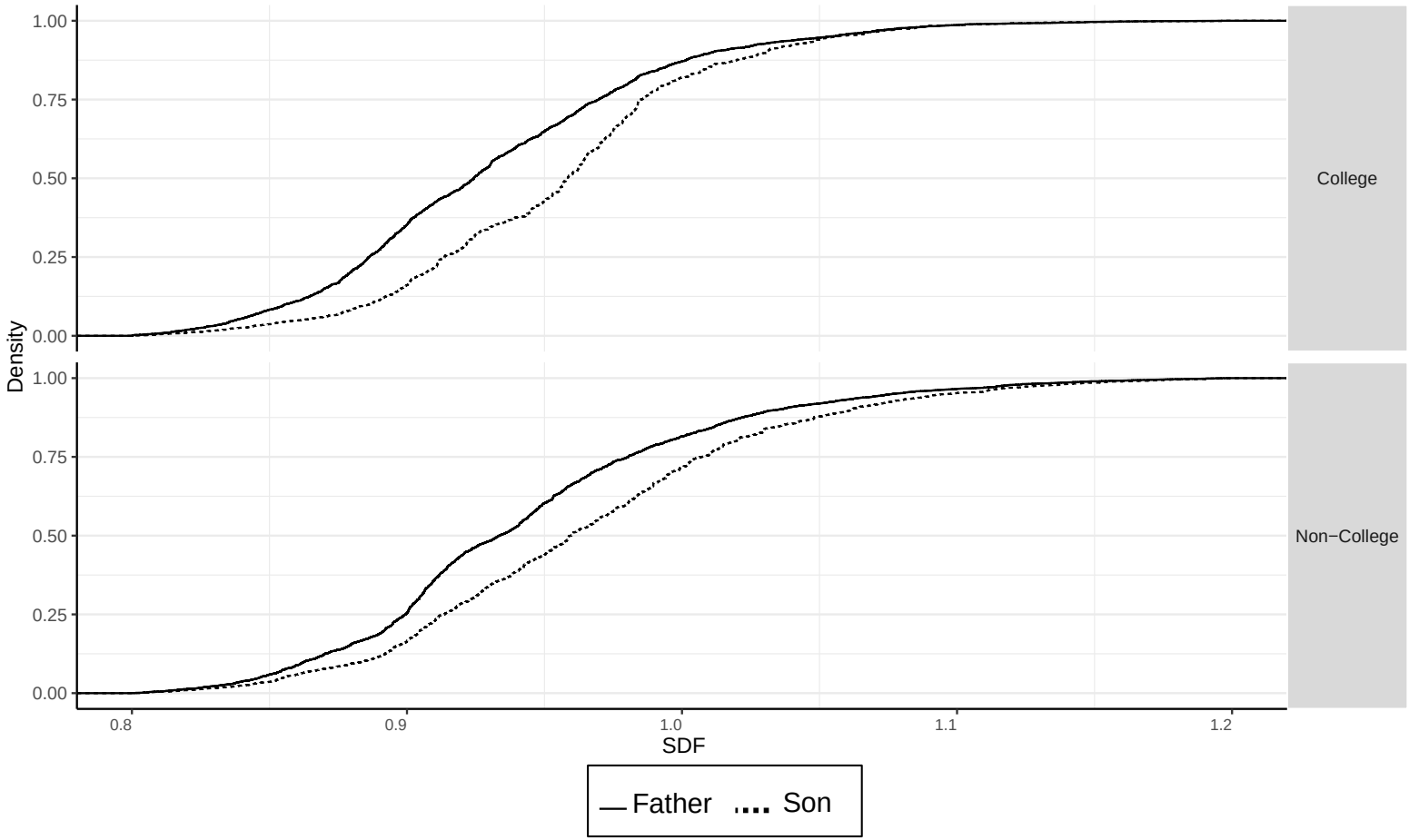


Figure 16: Father-Son Absolute Mobility in Lifetime Wealth: Accounting for Risk Aversion



Changes in Welfare across Generations

Figure 17: Distribution of $\beta U_c(c_{i,t+1})/U_c(c_{i,t})$



Summary and Conclusions

Contributions

1. Recognize importance of early years in shaping child development.
2. Fundamental nonstationarity of life cycles across cohorts.
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. Surprisingly, the predictive power does not vary with the age of the child at which the life cycle measures are computed (but it does for snapshot measures).

8. Traditional proxy measures only weakly correlated with true lifetime measures.
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 play a huge 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.**

Thank You

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CENTER FOR THE ECONOMICS
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UNIVERSITY OF WISCONSIN–MADISON

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Appendix: Additional Slides

Table 4: Specification Tests ($\mathcal{Z}^j$ 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 4: Specification Tests ($\mathcal{Z}^j$ Is the Candidate Proxy for Information Set)

		(3)	(4)
Panel A: Full Population			
		$y_{50} - \mathbb{E}(y_{50} \mid \mathcal{Z}_{30}^2)$	$y_{50} - \mathbb{E}(y_{50} \mid \mathcal{Z}_{30}^3)$
Consumption (Age 30)	β_{OLS}	0.23	0.03
	T-stat	(4.55)	(0.72)
Panel B: Main Sample, Child Outcomes			
		$y_{30} - \mathbb{E}(y_{30} \mid \mathcal{Z}_{29}^2)$	$y_{30} - \mathbb{E}(y_{30} \mid \mathcal{Z}_{29}^3)$
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)

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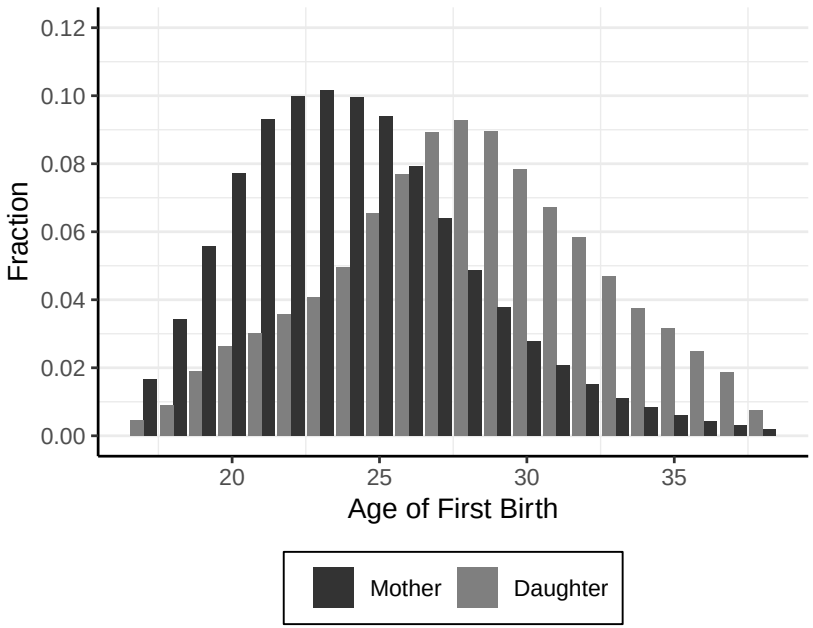
Figure 0: Timing of Key Life Events across Generations, Cont'd

(c) Females



(d) Males

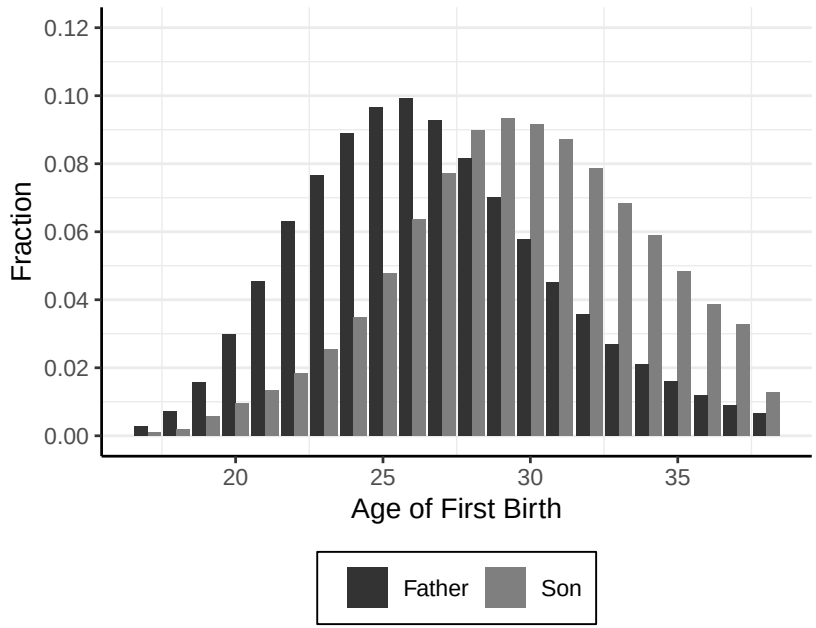
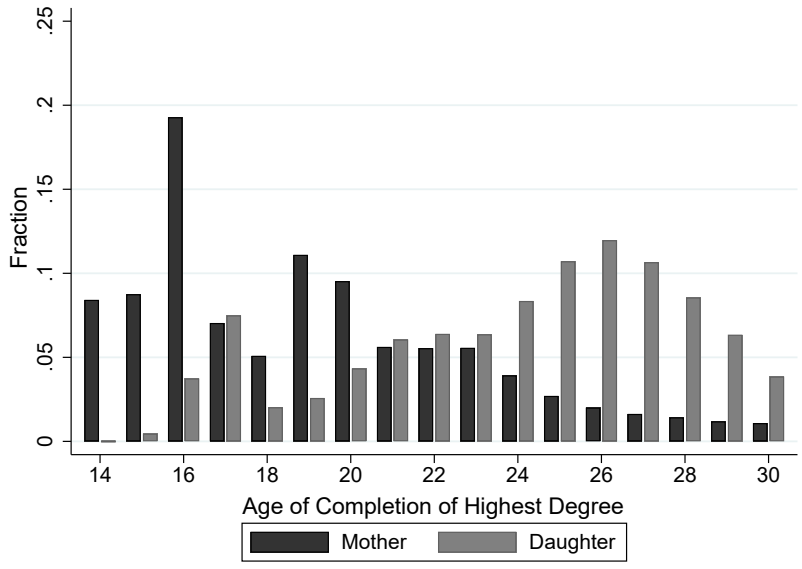


Figure 0: Timing of Key Life Events across Generations, Cont'd

(e) Females



(f) Males

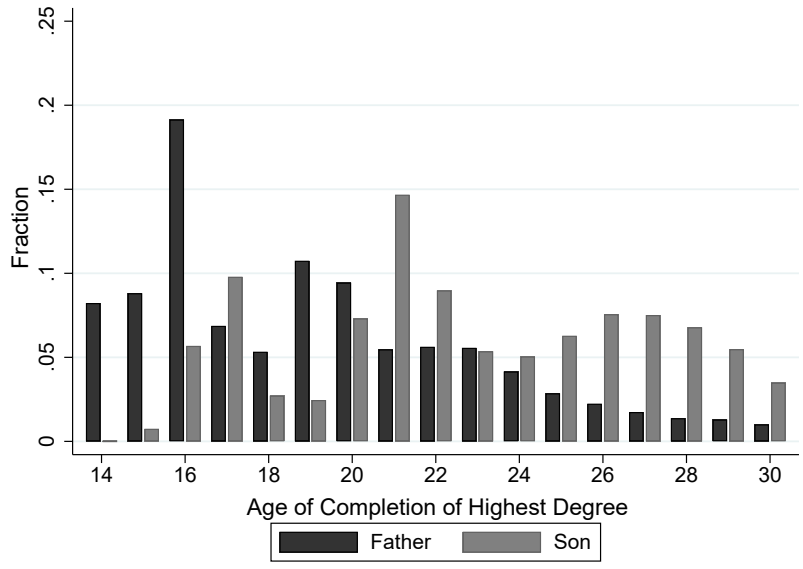


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Figure 0: Parents' Resources and Children's Outcomes, Cont'd

(c) Danish Reading

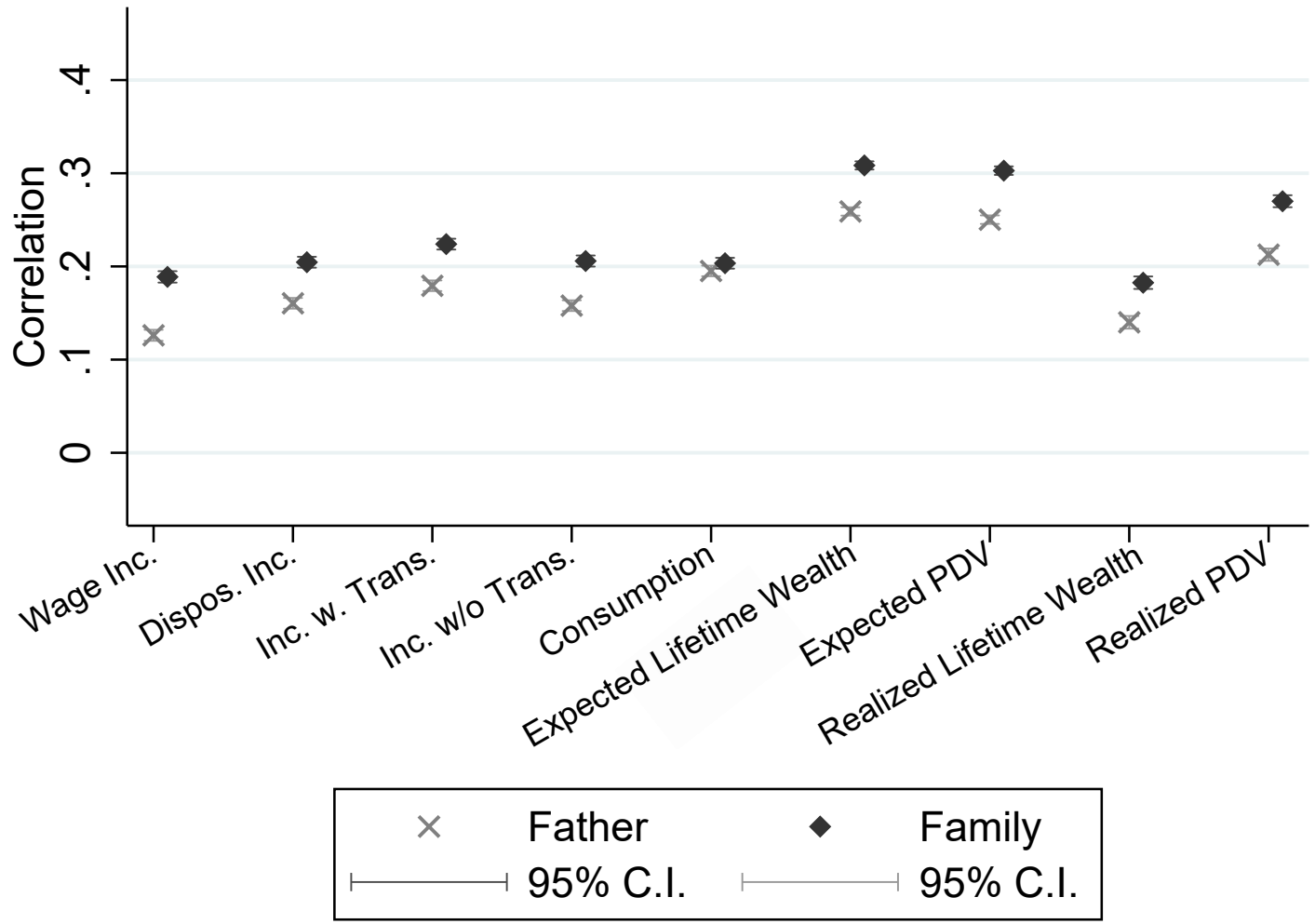

Figure 0: Parents' Resources and Children's Outcomes, Cont'd

(d) Years of Education

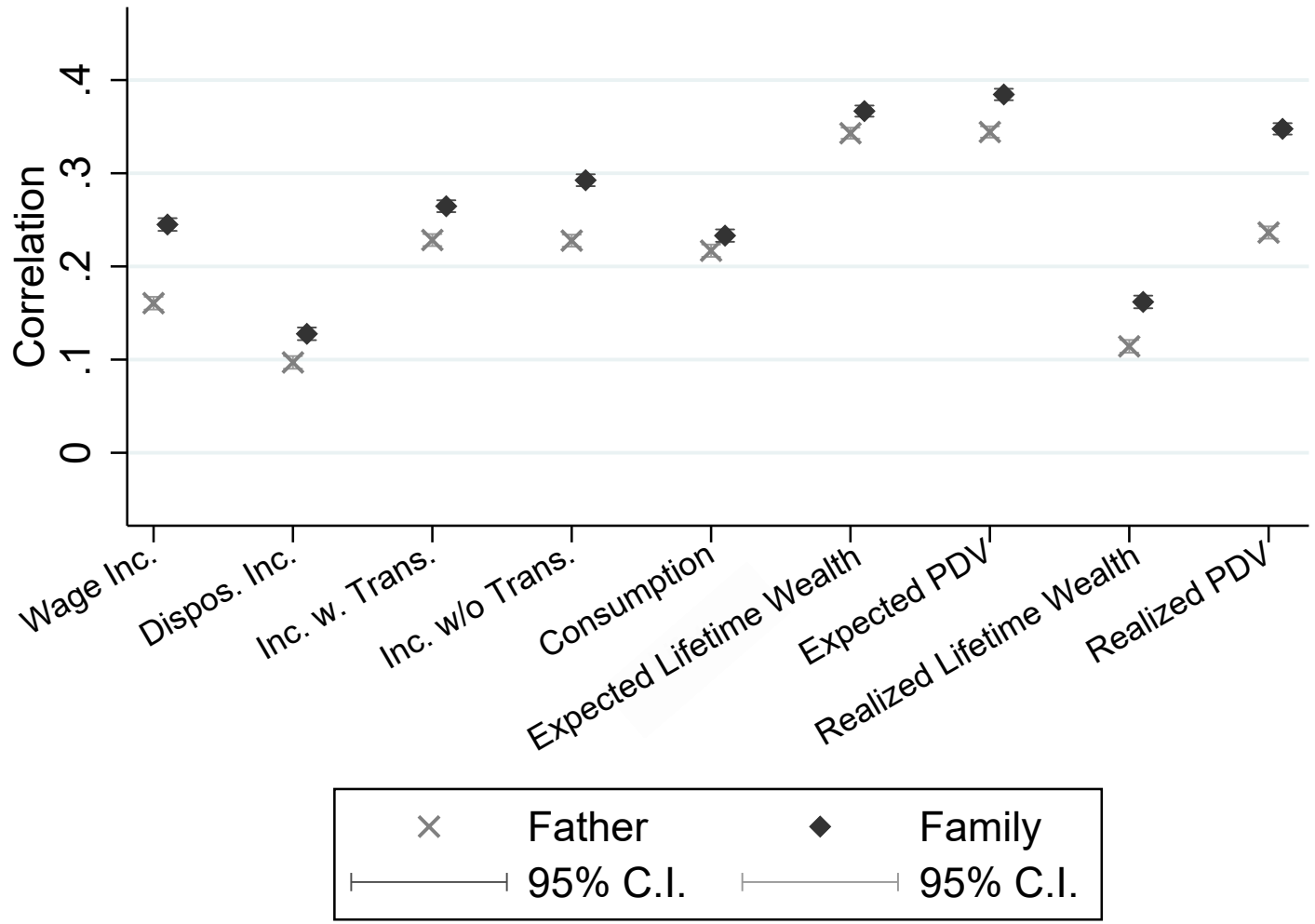

Figure 0: Parents' Resources and Children's Outcomes, Cont'd

(e) Criminal Behavior (Reversed)

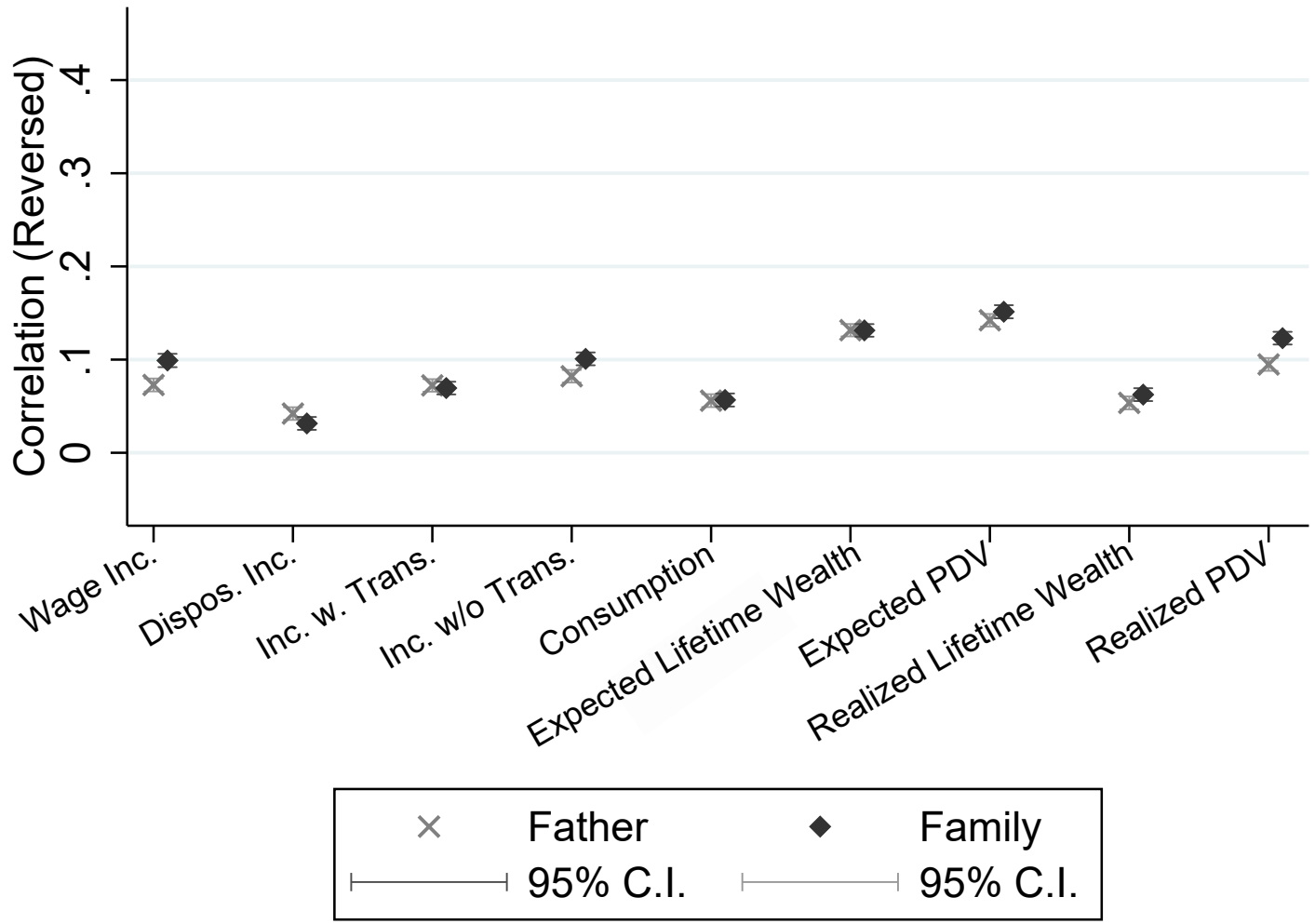

Figure 0: Parents' Resources and Children's Outcomes, Cont'd

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

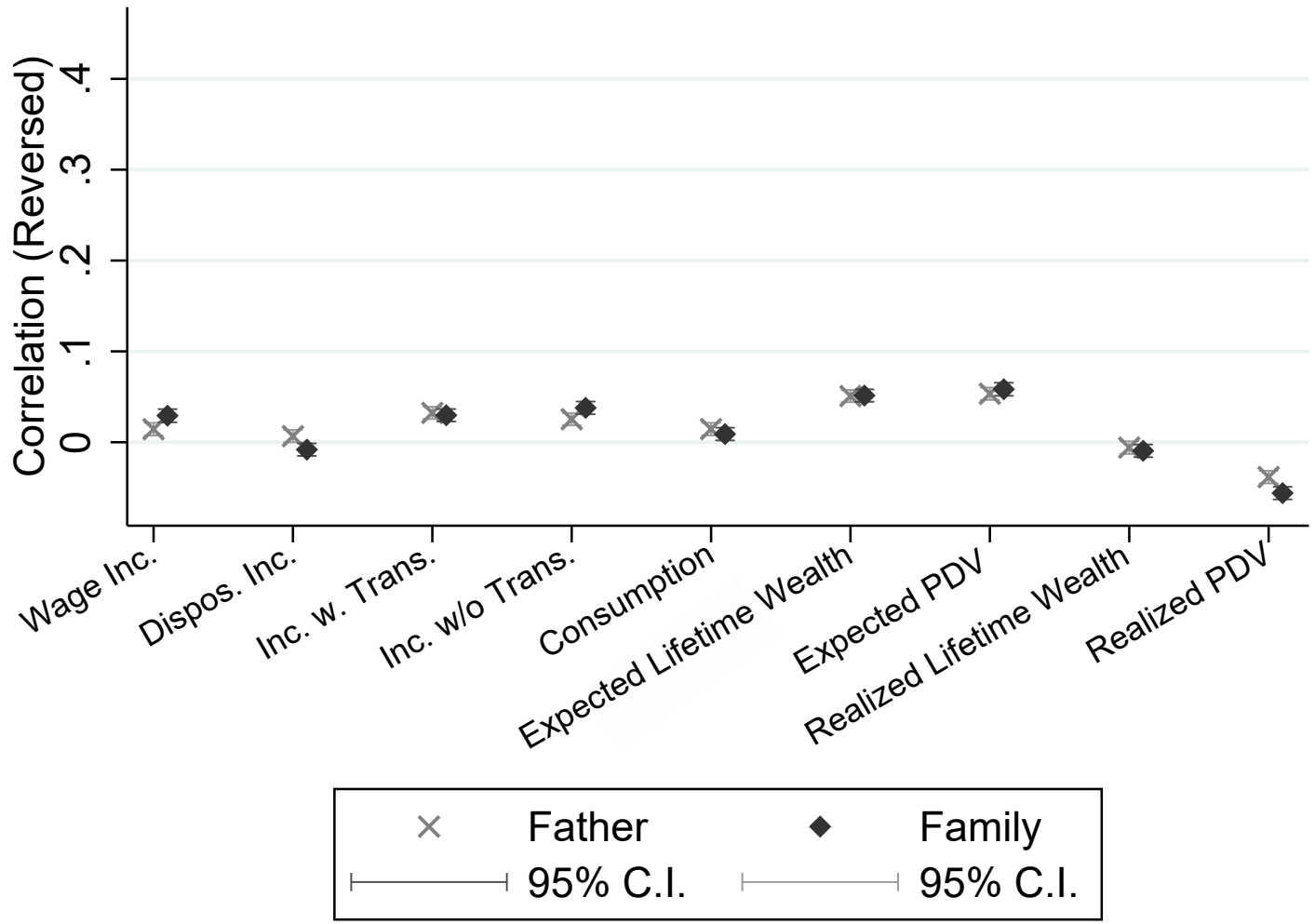

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Figure 0: Local-Linear IGEs for Lifetime Measures, Cont'd

(e) Realized PDV

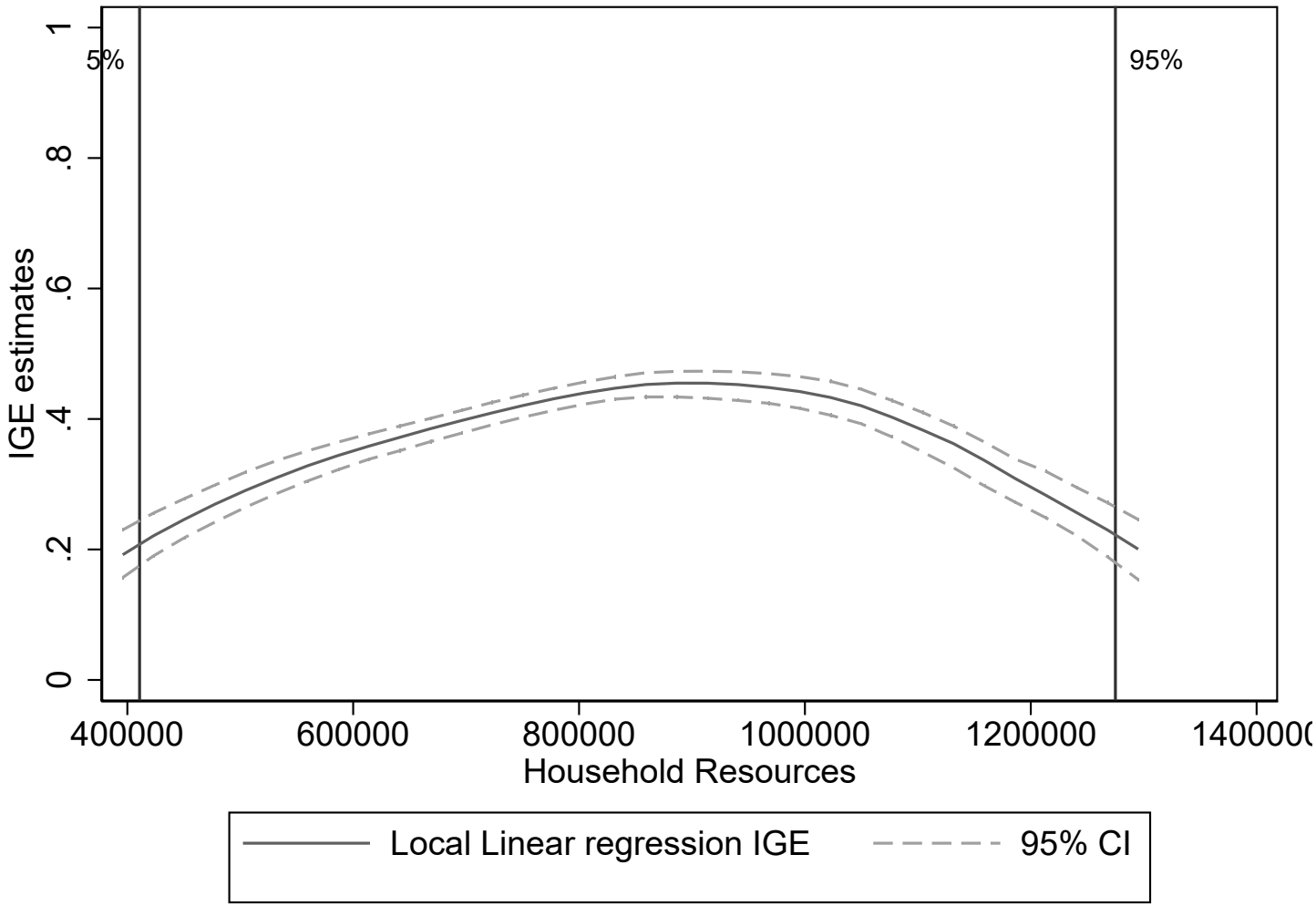

Figure 0: Local-Linear IGEs for Lifetime Measures, Cont'd

(f) Realized Lifetime Wealth

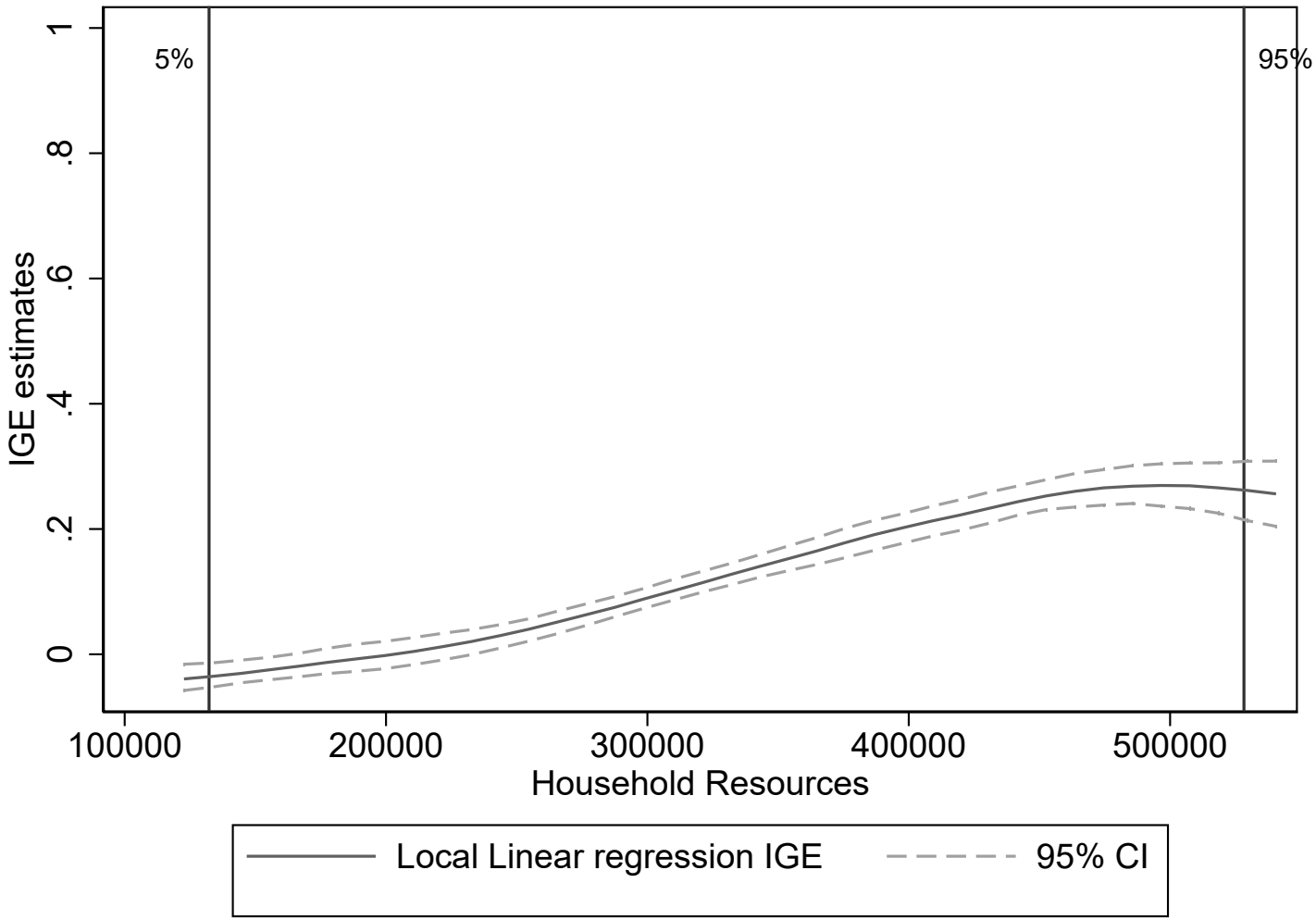

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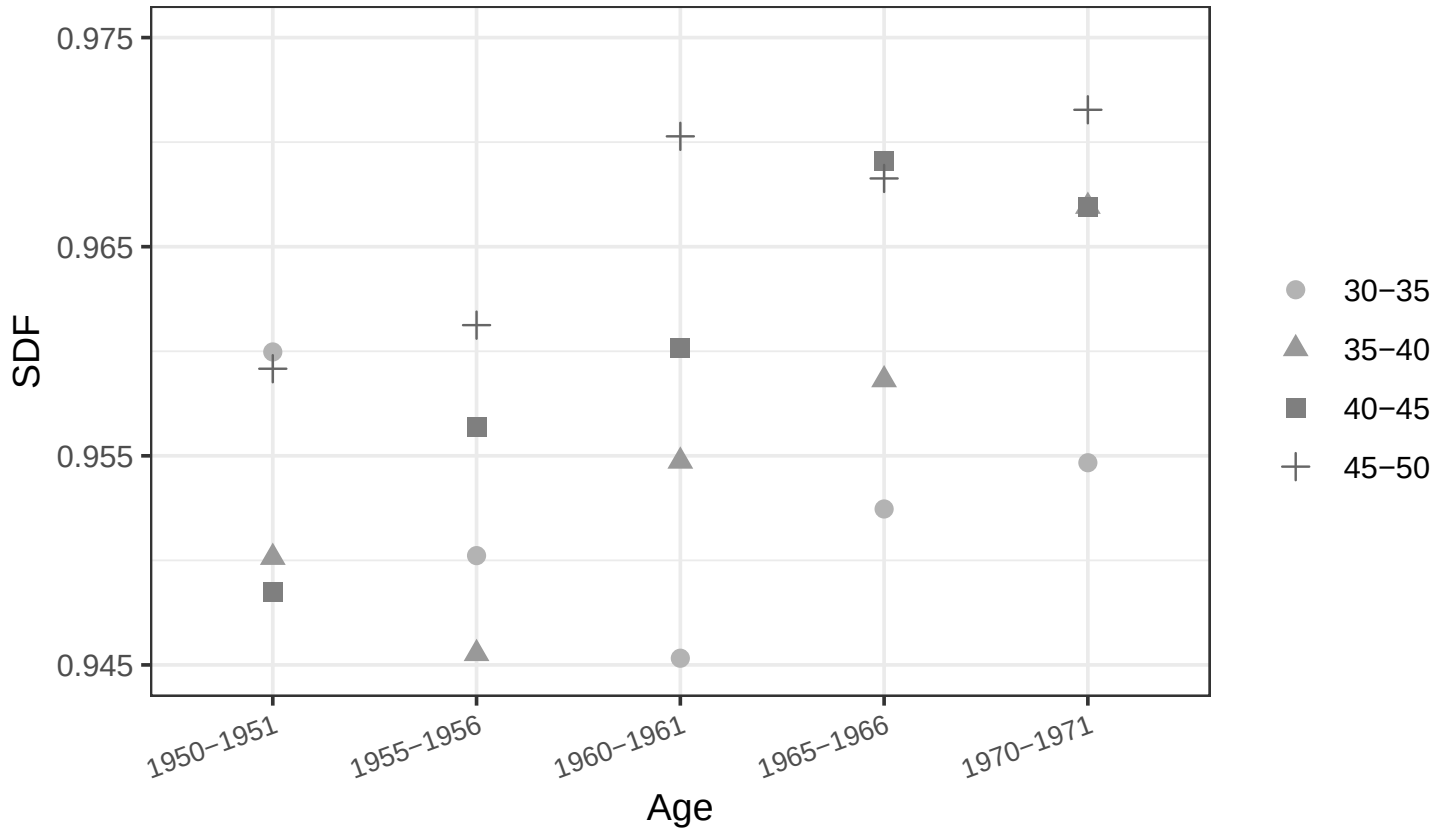
Figure 26: SDF at Different Ages by Birth Cohort



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Rank-Rank Version

Figure 27: Rank-Rank Estimates of IGE

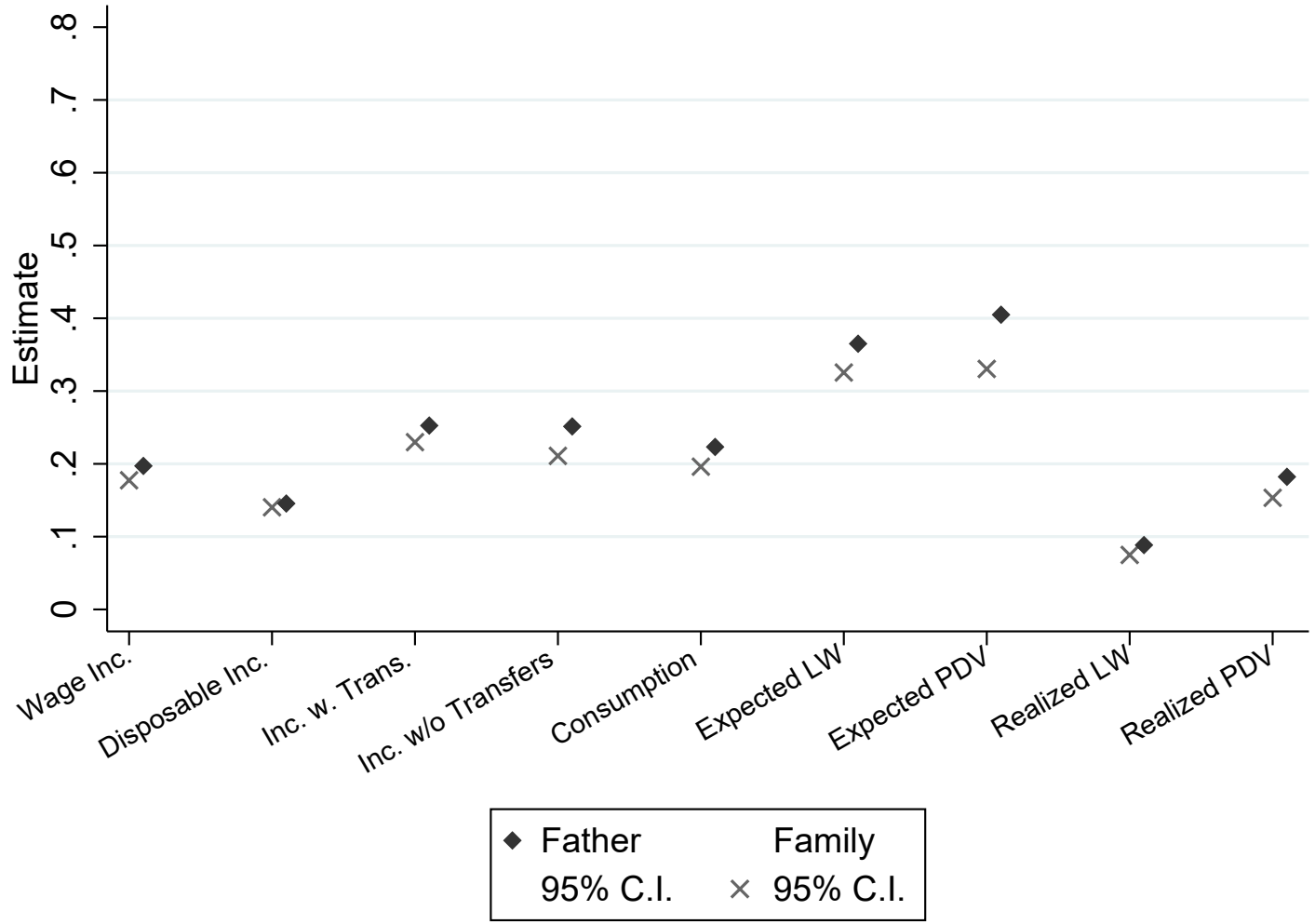

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Figure 28: Log-Log IGE Estimates

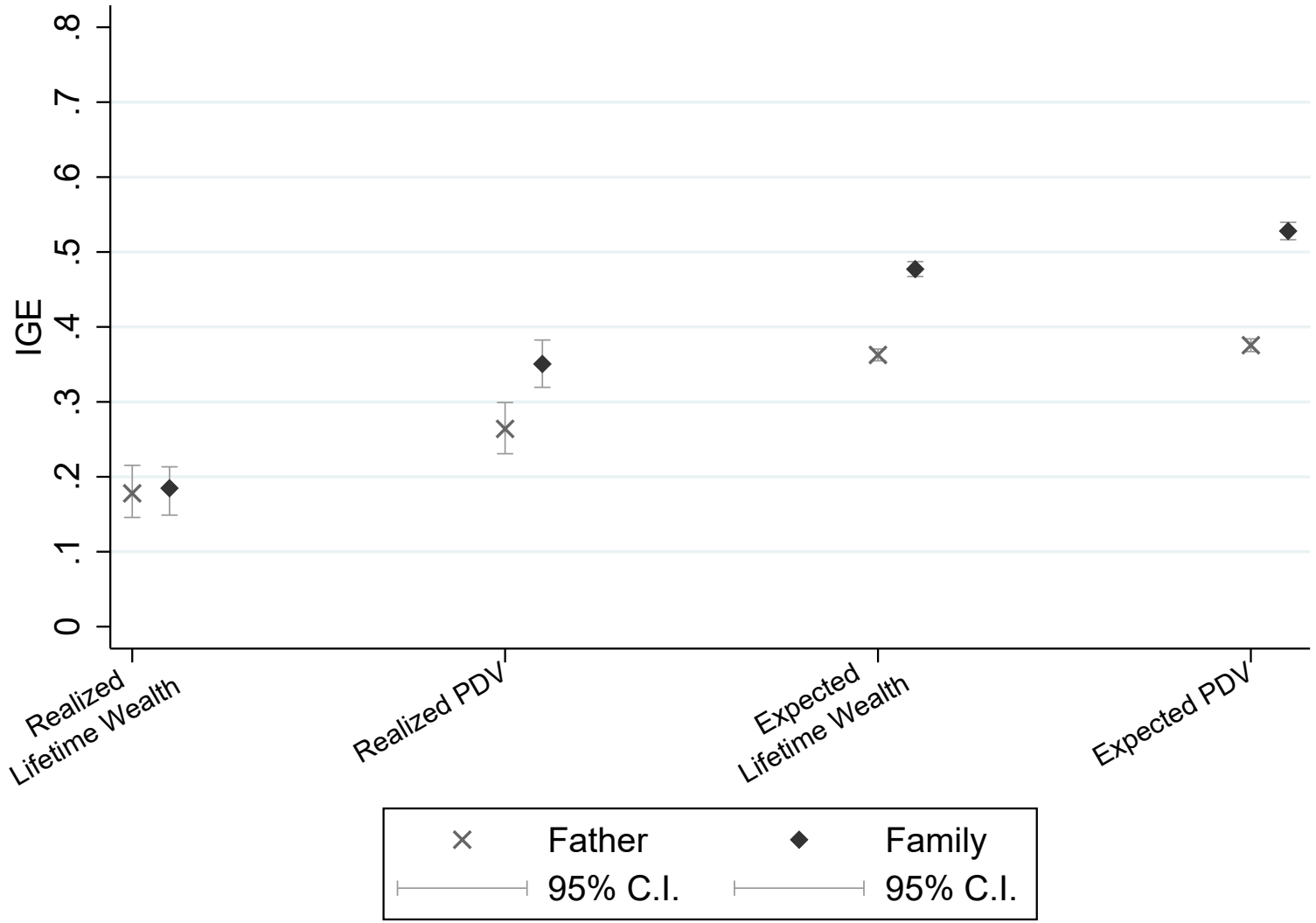

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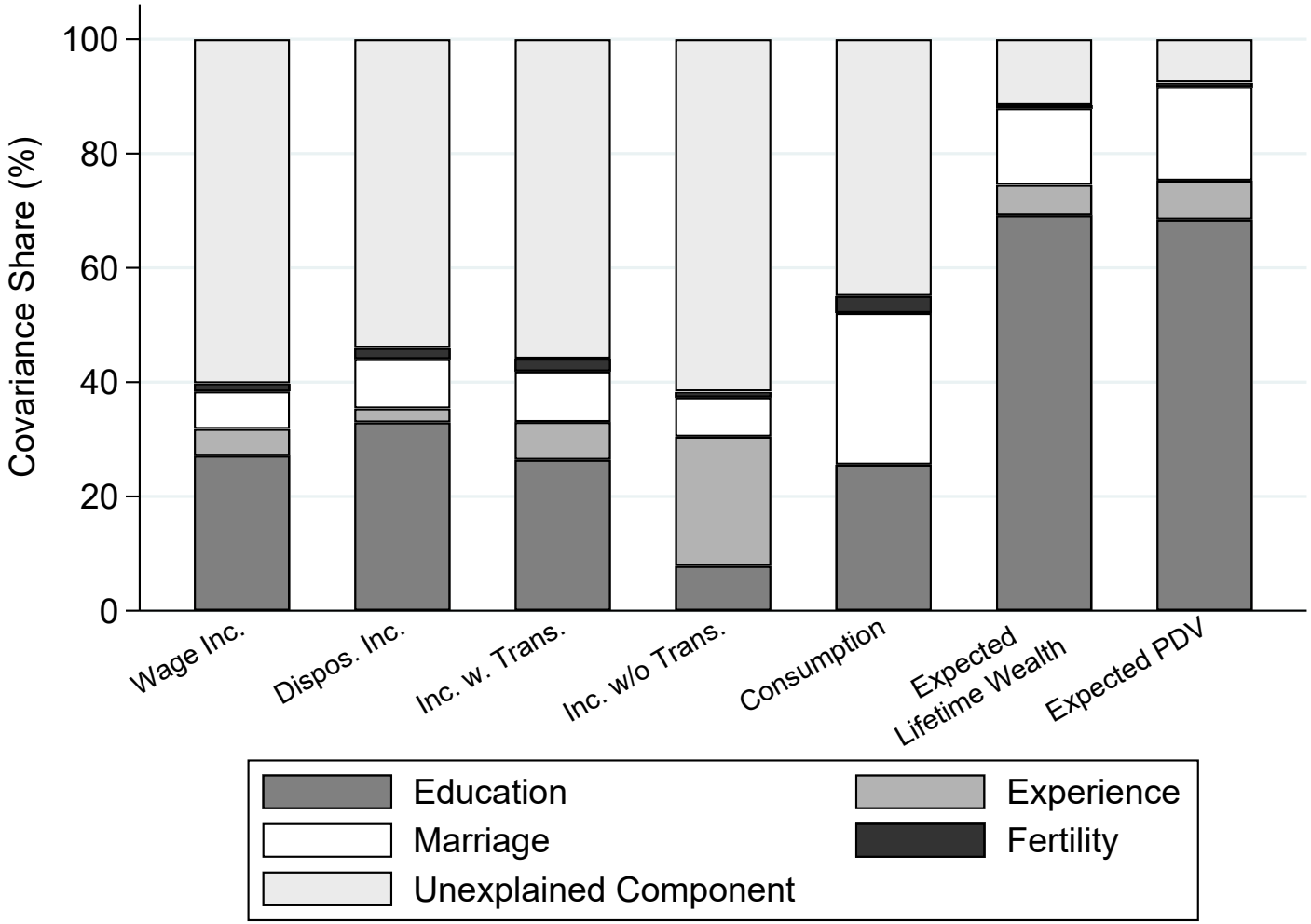
Figure 0: Decomposition of Covariances



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