Consumption & Income Inequality across Generations

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Cross-Sectional Inequality across Generations

- **Effect of parental heterogeneity on life-cycle inequality among children**
  - Two drivers of long-term impacts of parents:
    1. Inequality in the cross-section of parents
    2. Intergenerational pass-through from parent to child
- **Contrast to importance of idiosyncratic (child-specific) drivers of inequality**

Cross-Sectional Inequality across Generations

- **What do parents pass on to their children?**
  - Earning ability/potential
    - Innate traits, education, labour market information
  - Access to other income
    - Marital preferences and spousal earnings, inter-vivos transfers, etc.
  - Attitudes towards consumption expenditures
    - Propensity to save, preferences for expenditures/risk, etc.

- **Impact on different measures of inequality: earnings, other income, consumption**

Roadmap

- Step 1: Data and Descriptive evidence
  - Reduced-form estimate of persistence across generations in consumption, earnings
- Step 2: Model joint evolution of Earnings, Other Income, Consumption.
  - intergenerational persistence
  - permanent income and expenditure inequality
- Step 3: Implications:
  - Importance of parental factors for cross-sectional inequality
  - Estimate insurance across and within generations
  - Pathways and extensions (but not mechanisms ..)

Large literature on different aspects, earnings IGE

Data

Data

- **Source**: PSID. Follows adult lives of parents and their children.
  Long panels for children born in 1950s, 1960s, 1970s.

- **Period**: Annual 1967 through 1995; Biennial 1996 through 2014.

- **Sample**:
  - Male children born between 1952 & 1989
  - Age between 25 and 65 years
  - At least 5 years of married observations

- **Key Variables**:
  1. Earnings: Labour earnings of male household head
  2. Other Income: Primarily spousal labour earnings, also transfer income (public & private) of head and wife
  3. Consumption: Adult equivalent family expenditure

Panel Data on Consumption Expenditures

- **Measuring Consumption Expenditures**
  - More detailed consumption data starts in 1998 Expenditure Categories
  - Baseline: food consumption data (full sample, since 1967)
  - Also impute consumption data adopting PSID-to-PSID Imputation (Attanasio & Pistaferri, 2014)
    - Estimate demand system after 1998 Imputation Regression
    - Invert system to impute total expenditures back to 1967 Quality of Fit
  - Robustness on several different subsamples and time periods.

Some Reduced-Form Evidence

Intergenerational Elasticity (Lee and Solon, 2009)

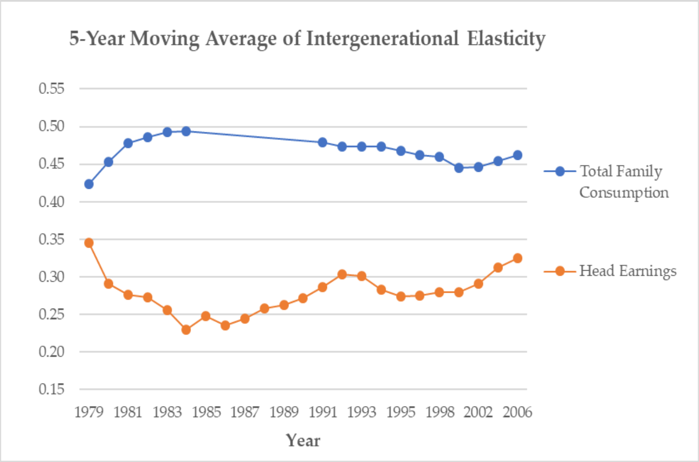
- Considering processes for earnings, consumption, income independently

$$y_{fht} = \mu D_t + \beta_t x_{fh}^p + \gamma a_{fh}^p + \delta a_{fht}^k + \theta z_{fht} + \epsilon_{fht}$$

- D_t: Year t dummies
- x_{fh}^p: Average parental variable when cohort h child is 15-17 years
- a_{fh}^p: Quartic of average parental age when cohort h child is 15-17 years
- a_{fht}^k: Quartic of child age in year t normalized around age 40, $(t - h - 40)$
- z_{fht}: Interaction between x_{fh}^p and a_{fht}^k

Intergenerational Elasticity: Estimates

Heterogeneity: Mobility Matrix



- Time series of intergenerational elasticity estimates (for 40-year-old child)
- No significant time trend

Model

Model Framework

- Process for earnings and other income
- Connection between generations, allowing cross-effects between outcomes
- Consumption problem
- Baseline connections to estimate

Income Processes: Earnings & Other Income

- Parent (p)

$$\textbf{Head Earnings:}\ e^p_{f,t} = \bar{e}^p_f + \mathcal{E}^p_{f,t} + \varepsilon^p_{f,t} \text{ where } \mathcal{E}^p_{f,t} = \alpha^p_e \mathcal{E}^p_{f,t-1} + \epsilon^p_{f,t}$$

$$\textbf{Other Income:}\ n^p_{f,t} = \bar{n}^p_f + \Theta^p_{f,t} + \vartheta^p_{f,t} \text{ where } \Theta^p_{f,t} = \alpha^p_n \Theta^p_{f,t-1} + \theta^p_{f,t}$$

- Child (k)

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- Intergenerational Persistence: Elasticities in Fixed Effects

$$\bar{e}^k_f = \gamma\, \bar{e}^p_f + \rho_e\, \bar{n}^p_f + \breve{e}^k_f$$

$$\bar{n}^k_f = \rho\, \bar{n}^p_f + \gamma_n\, \bar{e}^p_f + \breve{n}^k_f$$

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Life-Cycle Consumption Problem

- Dynamic consumption plan; same for each generation.
- Maximise lifetime utility:

$$\max_{\{C_{f,k}\}_{k=t}^{T}} \quad \mathbb{E}_t \quad \sum_{j=0}^{T-t} \beta^j u(C_{f,t+j})$$

$$s.t.$$

$$A_{f,t+1} = (1+r)\left(A_{f,t} + E_{f,t} + N_{f,t} - C_{f,t}\right)$$

- Can include:
  - Explicit about parental motives, e.g., paternalism
  - Consumption transfers versus investment in human capital
  - Timing of parental resources, e.g., credit constraints

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Consumption Process

- $C_{f,t} \approx \frac{r}{1+r}\left[A_{f,t} + \sum_{j=0}^{T}\left(\frac{1}{1+r}\right)^{j}\mathbb{E}_t\left(E_{f,t+j} + N_{f,t+j}\right)\right]$
- In logs: $c_{f,t} \approx q_{f,t} + \bar{e}_f + \bar{n}_f + \frac{r}{1+r-\alpha_e}\mathcal{E}_{f,t} + \frac{r}{1+r-\alpha_n}\Theta_{f,t} + \frac{r}{1+r}\left(\varepsilon_{f,t} + \vartheta_{f,t}\right)$
- Assume $q^{g}_{f,t} = \bar{q}^{g}_{f} + \Phi^{g}_{f,t} + \varphi^{g}_{f,t}$ where $\Phi^{g}_{f,t} = \alpha^{g}_{q}\Phi^{g}_{f,t-1} + \phi^{g}_{f,t}$ for $g \in \{p, k\}$
- $\bar{q}^{k}_{f}$ Consumption fixed effect
- **Intergenerational Persistence**: $\bar{q}^{k}_{f} = \lambda\bar{q}^{p}_{f} + \breve{q}^{k}_{f}$

Consumption Process

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$q_{f,t}$ (unobserved) — What does it measure?

- Annuitised value of non-earned resources, e.g., rental income, non-labour part of business income
- Higher order preference terms, e.g., prudence and other saving motives
- Consumption-shifters, e.g., taste in particular commodities, etc.
- Outflows: transfers to others and income and wealth taxes
- Measurement error in consumption

Baseline Connections

Head Earnings:

$$
\begin{aligned}
e^p_{f,t} &= \bar{e}^p_f + \varepsilon^p_{f,t} \\
e^k_{f,t} &= \gamma \bar{e}^p_f + \rho_e \bar{n}^p_f + \breve{e}^k_f + \varepsilon^k_{f,t}
\end{aligned}
$$

Other Income:

$$
\begin{aligned}
n^p_{f,t} &= \bar{n}^p_f + \vartheta^p_{f,t} \\
n^k_{f,t} &= \rho \bar{n}^p_f + \gamma_n \bar{e}^p_f + \breve{n}^k_f + \vartheta^k_{f,t}
\end{aligned}
$$

Consumption:

$$
c^p_{f,t} = \overbrace{\bar{q}^p_f + \varphi^p_{f,t}}^{q^p_{f,t}} + \overbrace{\bar{e}^p_f + \frac{r}{1+r}\varepsilon^p_{f,t}}^{e^p_{f,t}} + \overbrace{\bar{n}^p_f + \frac{r}{1+r}\vartheta^p_{f,t}}^{n^p_{f,t}}
$$

$$
c^k_{f,t} = \overbrace{\lambda \bar{q}^p_f + \varphi^k_{f,t}}^{q^k_{f,t}} + \overbrace{(\gamma + \gamma_n)\,\bar{e}^p_f + \breve{e}^k_f + \frac{r}{1+r}\varepsilon^k_{f,t}}^{e^k_{f,t}} + \overbrace{(\rho + \rho_e)\,\bar{n}^p_f + \breve{n}^k_f + \frac{r}{1+r}\vartheta^k_{f,t}}^{n^k_{f,t}}
$$

Parameters of Interest

- **Intergenerational Elasticities**
  - Parental earnings on child earnings: γ
  - Parental other income on child other income: ρ
  - Parental earnings on child other income: γ_n
  - Parental other income on child earnings: ρ_e
  - Parental consumption-shifters on child consumption-shifters: λ
- **Variance and Covariances**
  - Variances (Permanent fixed effects): $\sigma^2_{\bar{e}^p}$, $\sigma^2_{\breve{e}^k}$, $\sigma^2_{\bar{n}^p}$, $\sigma^2_{\breve{n}^k}$, $\sigma^2_{\bar{q}^p}$, $\sigma^2_{\breve{q}^k}$
  - Covariances (Permanent fixed effects): $\sigma_{\bar{e}^p,\bar{q}^p}$, $\sigma_{\breve{e}^k,\breve{q}^k}$, $\sigma_{\bar{n}^p,\bar{q}^p}$, $\sigma_{\breve{n}^k,\breve{q}^k}$, $\sigma_{\bar{e}^p,\bar{n}^p}$, $\sigma_{\breve{e}^k,\breve{n}^k}$
- **Additional parameters in extensions:**
  - Transitory shocks: $\sigma^2_{\varepsilon^p}$, $\sigma^2_{\varepsilon^k}$, $\sigma^2_{\vartheta^p}$, $\sigma^2_{\vartheta^k}$, $\sigma^2_{\varphi^p}$, $\sigma^2_{\varphi^k}$
  - Innovation to AR(1) shocks: $\sigma^2_{\epsilon^p}$, $\sigma^2_{\epsilon^k}$, $\sigma^2_{\theta^p}$, $\sigma^2_{\theta^k}$, $\sigma^2_{\phi^p}$, $\sigma^2_{\phi^k}$
  - AR(1) parameters: α^p_e, α^k_e, α^p_n, α^k_n, α^p_q, α^k_q

Estimation

Empirical Steps

1. Regress log variables on year & cohort dummies; **use residual variation**
2. Minimize distance between empirical and theoretical moments **(GMM)**
   - Equally weighted moments
   - Bootstrap standard errors
3. **Over-identification**
   - Cross-Section Variation: 21 moment restrictions & 17 parameters
   - Panel Variation: 48 moment conditions & 25 parameters

Raw Moments

Table: Cross-Sectional Variances

Variable	**Parent**	**Child**
Head Earnings	0.291	0.249
Other Income	0.807	0.535
Consumption	0.097	0.114
Parent-Child Pairs	761	761

Moment Conditions: Examples using Cross-section Variation

(a) **Variances**

$$Var\left(\bar{e}_f^k\right) = \gamma^2\sigma^2_{\bar{e}^p} + \rho_e^2\sigma^2_{\bar{n}^p} + 2\gamma\rho_e\sigma_{\bar{e}^p,\bar{n}^p} + \sigma^2_{\breve{e}^k}$$

$$Var\left(\bar{c}_f^p\right) = \sigma^2_{\bar{q}^p} + \sigma^2_{\bar{e}^p} + \sigma^2_{\bar{n}^p} + 2\left(\sigma_{\bar{e}^p,\bar{q}^p} + \sigma_{\bar{n}^p,\bar{q}^p} + \sigma_{\bar{e}^p,\bar{n}^p}\right)$$

(b) **Covariances**

$$Cov\left(\bar{e}_f^p, \bar{e}_f^k\right) = \gamma\sigma^2_{\bar{e}^p} + \rho_e\sigma_{\bar{e}^p,\bar{n}^p}$$

$$Cov\left(\bar{e}_f^k, \bar{n}_f^k\right) = \left(\gamma\rho + \gamma_n\rho_e\right)\sigma_{\bar{e}^p,\bar{n}^p} + \gamma\gamma_n\sigma^2_{\bar{e}^p} + \rho\rho_e\sigma^2_{\bar{n}^p} + \sigma_{\breve{e}^k,\breve{n}^k}$$

(c) **If using panel dimension, then also non-contemporaneous Covariances**

Estimates: Intergenerational Persistence

Variables	Parameters	Estimates (1)
Earnings	γ	0.229 (0.028)
Other Income	ρ	0.099 (0.027)
$\bar{e}_f^p$ on $\bar{n}_f^k$	γ_n	0.208 (0.035)
$\bar{n}_f^p$ on $\bar{e}_f^k$	ρ_e	0.055 (0.019)
Consumption Shifters	λ	0.153 (0.037)
No. of Parent-Child Pairs	N	761

Note: Bootstrap standard errors with 100 repetitions are reported in parentheses. The average age for parents is 47 years, while that for children is 37 years in the sample.

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Variance Covariance Fit of Moments

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Variance | Covariance | Fit of Moments

Implications: Role of Parents

Parental Impact on Variance of Child Outcomes

- **Earnings**

$$\underbrace{Var\left(\bar{e}_f^k\right)}_{\mathbf{0.249}} = \underbrace{\gamma^2\sigma^2_{\bar{e}^p} + \rho_e^2\sigma^2_{\bar{n}^p} + 2\gamma\rho_e\sigma_{\bar{e}^p,\bar{n}^p}}_{\textit{Parental contribution}: \ \mathbf{7.9\%}} + \sigma^2_{\breve{e}^k}$$

- **Other Income**

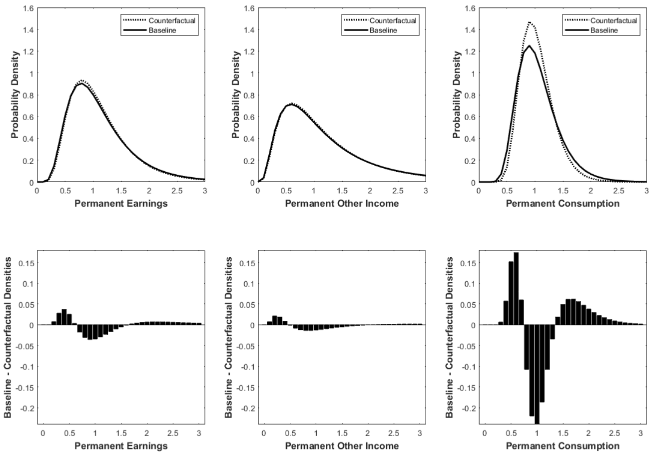
$$\underbrace{Var\left(\bar{n}_f^k\right)}_{\mathbf{0.535}} = \underbrace{\rho^2\sigma^2_{\bar{n}^p} + \gamma_n^2\sigma^2_{\bar{e}^p} + 2\rho\gamma_n\sigma_{\bar{e}^p,\bar{n}^p}}_{\textit{Parental contribution}: \ \mathbf{4.4\%}} + \sigma^2_{\breve{n}^k}$$

- **Consumption**

$$\begin{aligned}\underbrace{Var\left(\bar{c}_f^k\right)}_{\mathbf{0.114}} &= \lambda^2\sigma^2_{\bar{q}^p} + \left(\gamma+\gamma_n\right)^2\sigma^2_{\bar{e}^p} + \left(\rho+\rho_e\right)^2\sigma^2_{\bar{n}^p} \\ &+ \underbrace{2\left[\left(\gamma+\gamma_n\right)\lambda\sigma_{\bar{e}^p,\bar{q}^p} + \left(\rho+\rho_e\right)\lambda\sigma_{\bar{n}^p,\bar{q}^p} + \left(\rho+\rho_e\right)\left(\gamma+\gamma_n\right)\sigma_{\bar{e}^p,\bar{n}^p}\right]}_{\textit{Parental contribution}: \ \mathbf{30.1\%}} \\ &+ \sigma^2_{\breve{q}^k} + \sigma^2_{\breve{e}^k} + \sigma^2_{\breve{n}^k} + 2\left(\sigma_{\breve{e}^k,\breve{q}^k} + \sigma_{\breve{n}^k,\breve{q}^k} + \sigma_{\breve{e}^k,\breve{n}^k}\right)\end{aligned}$$

Decomposition: Marital Selection

Family Background & Inequality



- Experiment with much larger pass-through parameters: contributions increase but muted even at, eg. $\gamma = 0.5$

Implications for Consumption Insurance within Families

- Take estimates of the variance of idiosyncratic (permanent) income for the younger generation
- How does this variance map into consumption variance of the younger generation
- Two concepts of insurance:
  1. Within family (across generation) insurance
  2. Overall insurance

- Change in variance of consumption across generations:

$$\mu = \left[\frac{Var\left(\bar{c}_f^k\right) - Var\left(\bar{c}_f^p\right)}{Var\left(\breve{y}_f^k\right)} \right]^{0.5}$$

- $\mu = 1$: changes in consumption inequality across generations track idiosyncratic income inequality

- Intergenerational counterpart to measures in Blundell, Pistaferri, Preston (2008), Blundell, Low, Preston (2013)

- Difference in consumption between parents and children within a family, related to the variance of child's idiosyncratic income

$$\mu_F = \left[\frac{Var\left(\bar{c}_f^k - \bar{c}_f^p\right)}{Var\left(\breve{y}_f^k\right)} \right]^{0.5}$$

- For family f: $\bar{c}_f^k - \bar{c}_f^p = \mu_F * \breve{y}_f^k$
- μ_F : extent of within-family consumption deviations

Consumption Insurance Measures by Parental Income Quartile

	All	Q-1	Q-2	Q-3	Q-4
$\mu = \left[\frac{Var\left(\bar{c}_f^k\right) - Var\left(\bar{c}_f^p\right)}{Var\left(\breve{y}_f^k\right)} \right]^{0.5}$	0.33	0.21	0.60	0.53	0.39
$\mu_F = \left[\frac{Var\left(\bar{c}_f^k - \bar{c}_f^p\right)}{Var\left(\breve{y}_f^k\right)} \right]^{0.5}$	0.93	1.01	1.05	0.84	0.82

- Overall loading much lower than family loading:
- Overall insurance substantial; insurance from family is limited
- Overall insurance lowest for poorest and richest quartiles
- Family insurance: highest for richest quartile

Pathways and Extensions

Pathways and Extensions

- Warm-glow from parental transfers to children: Specification Importance
  No additional importance of parents captured through motives behind transfers.

- Liquidity Constraints:
  Various methods of identifying credit-constrained households indicates effect of such constraints is negligible for our results.

- Permanent Income as Random Walk: Details
  Allowing for persistence across generations through permanent shocks (growth rates) rejected

Pathways and Extensions

- Restricting cross-effects ($\gamma_n = \rho_e = 0$):
  Parental importance increases for earnings inequality.
  Decreases for consumption inequality.

- Different cohorts of children: Importance
  No statistical evidence of changes across cohorts

- Random matching between parents and children: Estimates Importance
  Placebo test validates our findings.

Conclusion

1. Importance of joint modelling of evolution of consumption, earnings and other income
2. Idiosyncratic shocks dominate in explaining inequality compared to the parental channel
3. Within-family insurance small part of overall consumption insurance. Largest for the richest quartile.

Appendix

Consumption Expenditure Categories Back

Consumption: 11 categories observed in different PSID-waves

(A1.) food (1968-2015 except 1973, 1988 and 1989)
(A2.) housing (1968-2015 except 1978, 1988 and 1989)

(B1.) child-care (1970-1972, 1976, 1977, 1979, 1988-2015)

(C1.) education (1999-2015)
(C2.) transportation (1999-2015)
(C3.) healthcare (1999-2015)

(D1.) recreation and entertainment (2005-2015)
(D2.) trips and vacation (2005-2015)
(D3.) clothing and apparel (2005-2015)
(D4.) home repairs and maintenance (2005-2015)
(D5.) household furnishings and equipment (2005-2015)

Consumption Imputation (Attanasio & Pistaferri, 2014) Back

Step 1:

$$ln\left(N_{it}\right) = Z_{it}'\omega + p_t'\pi + g(F_{it};\lambda) + u_{it}$$

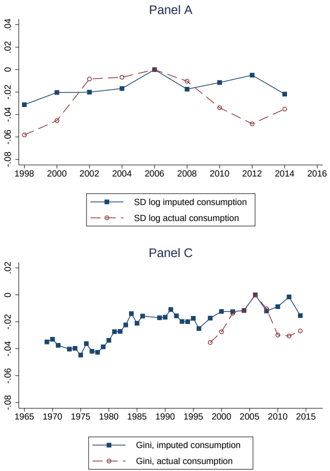
Step 2:

$$\hat{C}_{it} = F_{it} + exp\left\{Z_{it}'\hat{\omega} + p_t'\hat{\pi} + g\left(F_{it};\hat{\lambda}\right)\right\}$$

Notations:

- $\hat{\boldsymbol{C}}_{i,t}$: Imputed total consumption
- $\boldsymbol{N}_{i,t}$: Total consumption net of food expenditure
- $\boldsymbol{Z}_{i,t}$: Set of socio-economic controls List
- $\boldsymbol{p}_t$: Relative prices — overall CPI, and CPI for food at home, food away from home and rent
- $\boldsymbol{g(.)}$: A polynomial function
- $\boldsymbol{F}_{i,t}$: Total food expenditure
- $\boldsymbol{u}_{i,t}$: Error term

Goodness of Imputation Back



List of controls, $Z_{i,t}$

Back to regression Back to main

1. Age Dummies
2. Education Dummies
3. Marital Status Dummies
4. Race Dummy
5. State of Residence Dummies
6. Employment Status Dummy
7. Self-Employment Dummy
8. Hours worked by household head
9. Homeownership Dummy
10. Disability Dummies
11. Family Size Dummies
12. Number of children in the household
13. Household Income (allows for non-homothetic preferences)

Intergenerational Mobility: Matrices Definition Back

Earnings

Child \ Parent	$Q_{p,1}$	$Q_{p,2}$	$Q_{p,3}$	$Q_{p,4}$
$Q_{c,1}$	45.98	27.88	17.29	9.56
$Q_{c,2}$	25.41	29.64	27.17	15.93
$Q_{c,3}$	19.75	24.80	30.44	23.10
$Q_{c,4}$	8.86	17.69	25.10	51.41

Consumption

Child \ Parent	$Q_{p,1}$	$Q_{p,2}$	$Q_{p,3}$	$Q_{p,4}$
$Q_{c,1}$	53.02	27.79	9.75	4.95
$Q_{c,2}$	26.53	32.04	25.65	13.65
$Q_{c,3}$	16.28	26.51	35.40	23.55
$Q_{c,4}$	4.17	13.67	29.20	57.84

Mobility Matrix

A cell $c_{i,j}$ in a mobility matrix at the intersection of the i^{th} row and the j^{th} column $\forall i, j = 1(1)4$ is given by

$$c_{i,j} = Prob\left[child \in Q_{k,i} \middle| parent \in Q_{p,j}\right] \times 100$$

where $Q_{k,i}$ denotes the i^{th} quartile of the child distribution and $Q_{p,j}$ denotes the j^{th} quartile of the parental distribution. Back Back to Main

Alternative Model (Blundell, Pistaferri & Preston, 2008) Back

Parents

- $e^p_{f,t} = \bar{e}^p_f + \mathcal{E}^p_{f,t} + \varepsilon^p_{f,t}$; where $\varepsilon^p_{f,t} \overset{iid}{\sim} \left(0, \sigma^2_{\varepsilon^p}\right)$
- $\mathcal{E}^p_{f,t} = \mathcal{E}^p_{f,t-1} + \epsilon^p_{f,t}$; where $\epsilon^p_{f,t} \overset{iid}{\sim} \left(0, \sigma^2_{\epsilon^p}\right)$
- $\Delta e^p_{f,t} = \epsilon^p_{f,t} + \Delta\varepsilon^p_{f,t}$
- $\Delta n^p_{f,t} = \theta^p_{f,t} + \Delta\vartheta^p_{f,t}$
- $\Delta c^p_{f,t} = \omega_{e^p}\epsilon^p_{f,t} + \omega_{n^p}\theta^p_{f,t} + \psi_{e^p}\varepsilon^p_{f,t} + \psi_{n^p}\vartheta^p_{f,t} + \xi^p_{f,t}$

Children

- $e^k_{f,t} = \bar{e}^k_f + \mathcal{E}^k_{f,t} + \varepsilon^k_{f,t}$; where $\varepsilon^k_{f,t} \overset{iid}{\sim} \left(0, \sigma^2_{\varepsilon^k}\right)$
- $\mathcal{E}^k_{f,t} = \mathcal{E}^k_{f,t-1} + \epsilon^k_{f,t}$; where $\epsilon^k_{f,t} \overset{iid}{\sim} \left(0, \sigma^2_{\epsilon^k}\right)$
- $\Delta e^k_{f,t} = \gamma_\Delta \epsilon^p_{f,t} + \breve{\epsilon}^k_{f,t} + \Delta\varepsilon^k_{f,t}$; Estimate of $\gamma_\Delta = 0.242$ (0.16)
- $\Delta n^k_{f,t} = \rho_\Delta \theta^p_{f,t} + \breve{\theta}^k_{f,t} + \Delta\vartheta^k_{f,t}$; Estimate of $\rho_\Delta = 0.097$ (0.07)
- $\Delta c^k_{f,t} = \omega_{e^k}\left(\gamma_\Delta \epsilon^p_{f,t} + \breve{\epsilon}^k_{f,t}\right) + \omega_{n^k}\left(\rho_\Delta \theta^k_{f,t} + \breve{\theta}^k_{f,t}\right) + \psi_{e^k}\varepsilon^k_{f,t} + \psi_{n^k}\vartheta^k_{f,t} + \lambda_\Delta \xi^p_{f,t} + \breve{\xi}^k_{f,t}$
  Estimate of $\lambda_\Delta = 0.007$ (0.05)

Alternative Model (Blundell, Pistaferri & Preston, 2008) Back

Parents

- $e^p_{f,t} = \bar{e}^p_f + \mathcal{E}^p_{f,t} + \varepsilon^p_{f,t}$; where $\varepsilon^p_{f,t} \overset{iid}{\sim} \left(0, \sigma^2_{\varepsilon^p}\right)$
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- $\Delta c^p_{f,t} = \omega_{e^p}\epsilon^p_{f,t} + \omega_{n^p}\theta^p_{f,t} + \psi_{e^p}\varepsilon^p_{f,t} + \psi_{n^p}\vartheta^p_{f,t} + \xi^p_{f,t}$

Children

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Alternative Model (Blundell, Pistaferri & Preston, 2008) Back

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Children

- $e^k_{f,t} = \bar{e}^k_f + \mathcal{E}^k_{f,t} + \varepsilon^k_{f,t}$; where $\varepsilon^k_{f,t} \overset{iid}{\sim} \left(0, \sigma^2_{\varepsilon^k}\right)$
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  Estimate of $\lambda_\Delta = 0.007$ (0.05)

Alternative Model (Blundell, Pistaferri & Preston, 2008) Back

Parents

- $e^p_{f,t} = \bar{e}^p_f + \mathcal{E}^p_{f,t} + \varepsilon^p_{f,t}$; where $\varepsilon^p_{f,t} \overset{iid}{\sim} \left(0, \sigma^2_{\varepsilon^p}\right)$
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- $\Delta c^p_{f,t} = \omega_{e^p}\epsilon^p_{f,t} + \omega_{n^p}\theta^p_{f,t} + \psi_{e^p}\varepsilon^p_{f,t} + \psi_{n^p}\vartheta^p_{f,t} + \xi^p_{f,t}$

Children

- $e^k_{f,t} = \bar{e}^k_f + \mathcal{E}^k_{f,t} + \varepsilon^k_{f,t}$; where $\varepsilon^k_{f,t} \overset{iid}{\sim} \left(0, \sigma^2_{\varepsilon^k}\right)$
- $\mathcal{E}^k_{f,t} = \mathcal{E}^k_{f,t-1} + \epsilon^k_{f,t}$; where $\epsilon^k_{f,t} \overset{iid}{\sim} \left(0, \sigma^2_{\epsilon^k}\right)$
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  Estimate of $\lambda_\Delta = 0.007$ (0.05)

Estimates: Variance

Back

Explanation	Parameters	Estimates (1)
Parental Outcomes: Variances		
Permanent Earnings	$\sigma^2_{\bar{e}^p}$	0.296 (0.020)
Permanent Other Income	$\sigma^2_{\bar{n}^p}$	0.805 (0.058)
Permanent Consumption Shifters	$\sigma^2_{\bar{q}^p}$	1.027 (0.064)
Child Idiosyncratic Shocks: Variances		
Permanent Earnings	$\sigma^2_{\breve{e}^k}$	0.229 (0.014)
Permanent Other Income	$\sigma^2_{\breve{n}^k}$	0.511 (0.041)
Permanent Consumption Shifters	$\sigma^2_{\breve{q}^k}$	0.733 (0.058)

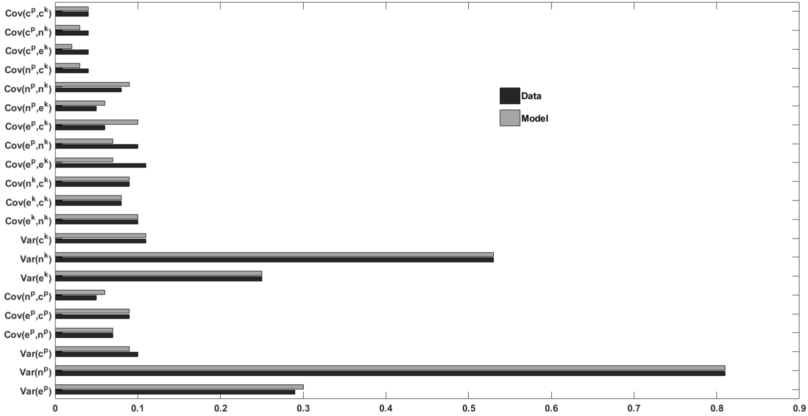
Note: Bootstrap standard errors with 100 repetitions are reported in parentheses.

Estimates: Covariance Back

Explanation	Parameters	Estimates (1)
Parental Outcomes: Covariances		
Consumption Shifters & Earnings	$\sigma_{\bar{e}^p, \bar{q}^p}$	-0.270 (0.026)
Consumption Shifters & Other Income	$\sigma_{\bar{n}^p, \bar{q}^p}$	-0.816 (0.060)
Earnings and Other Income	$\sigma_{\bar{e}^p, \bar{n}^p}$	0.069 (0.017)
Child Idiosyncratic Shocks: Covariances		
Consumption Shifters & Earnings	$\sigma_{\breve{e}^k, \breve{q}^k}$	-0.250 (0.024)
Consumption Shifters & Other Income	$\sigma_{\breve{n}^k, \breve{q}^k}$	-0.523 (0.046)
Earnings & Other Income	$\sigma_{\breve{e}^k, \breve{n}^k}$	0.076 (0.017)

Note: Bootstrap standard errors with 100 repetitions are reported in parentheses.

Fit of Moments Back



Effect of Income Tax

Back

Variables	Pre-tax	Case A	Case B	Case C
	(1)	(2)	(3)	(4)
Head Earnings	8.0%	4.2%	7.0%	8.9%
	[4.4%, 11.6%]	[1.5%, 6.9%]	[4.0%, 10.1%]	[4.7%, 13.1%]
Other Income	4.2%	4.3%	3.4%	2.0%
	[1.4%, 7.1%]	[1.3%, 7.4%]	[0.7%, 6.1%]	[-0.7%, 4.7%]
Consumption	29.4%	22.3%	25.6%	17.4%
	[20.3%, 38.4%]	[14.6%, 29.9%]	[17.4%, 33.8%]	[8.9%, 25.8%]
No. of Parent-Child Pairs	755	755	755	700

Note: The sample size in columns (1) through (3) is smaller by 6 parent-child pairs from our baseline sample because of non-availability of tax data for those households. Case C leads to negative other income for some families, and they are dropped from the analysis. This leads to the loss of 55 parent-child pairs in column (4). Numbers in parentheses are 95% confidence intervals, calculated using bootstrap standard errors with 100 repetitions.

Role of Marital Selection Back

Variable	Role of Parents under Alternative Models			
	Baseline I 761 Pairs (1)	**Baseline II** 459 Pairs (2)	**Model B** 459 Pairs (3)	**Model C** 459 Pairs (4)
Head Earnings	7.9%	10.6%	14.6%	5.7%
	[3.5%, 12.4%]	[4.8%, 16.4%]	[8.6%, 20.6%]	[1.1%, 10.4%]
Wife Earnings	-	-	8.1%	3.8%
			[2.7%, 13.4%]	[0.9%, 6.7%]
Transfer Income	-	-	-	0.4%
				[-0.8%, 1.5%]
Wife Earnings + Transfer Income	4.4%	3.5%	-	-
	[1.4% 7.4%]	[0.1%, 6.8%]		
Consumption	30.1%	24.6%	22.8%	34.8%
	[19.7%, 40.5%]	[14.0%, 35.2%]	[12.6%, 33.0%]	[18.1%, 51.5%]

Note: Models differ in the definition of *other income*. Baseline model uses the sum of wife earnings and transfer income as the measure of other income. Model B uses wife earnings only, while Model C uses three separate income processes for head earnings, wife earnings and transfer income. All models use food expenditure as the measure of consumption, and use only cross-sectional variation from time-averaged variables. 95% confidence intervals are reported in parentheses.

Parental Importance in Child Inequality by Child Birth-Cohort

Back

Variables	**All Cohorts** (1)	**1952-1966 Cohort** (2)	**1967-1981 Cohort** (3)
Earnings	7.9%	8.0%	8.3%
	[3.5%, 12.4%]	[3.2%, 12.7%]	[3.0%, 13.6%]
Other Income	4.4%	3.2%	8.3%
	[1.4%, 7.4%]	[0.2%, 6.2%]	[0.5%, 16.1%]
Consumption	30.1%	33.6%	23.9%
	[19.7%, 40.5%]	[21.2%, 46.6%]	[14.6%, 33.2%]
No. of Parent-Child Pairs	761	467	294

Robustness Checks: Intergenerational Persistence Back

Parameters	Baseline (1)	Random Match (2)	$\gamma_n = \rho_e = 0$ (3)	Imputed Consumption (4)	All Marital Status (5)
Earnings: γ	0.229	-0.018	0.340	0.256	0.217
	(0.028)	(0.028)	(0.027)	(0.024)	(0.029)
Other Income: ρ	0.099	-0.039	0.120	0.096	0.103
	(0.027)	(0.025)	(0.028)	(0.028)	(0.035)
$\bar{e}_f^p$ on $\bar{n}_f^k$: γ_n	0.208	-0.007	0	0.237	0.239
	(0.035)	(0.035)		(0.031)	(0.039)
$\bar{n}_f^p$ on $\bar{e}_f^k$: ρ_e	0.055	-0.015	0	0.052	0.058
	(0.019)	(0.023)		(0.015)	(0.015)
Consumption Shifters: λ	0.153	-0.048	0.108	0.127	0.170
	(0.037)	(0.034)	(0.029)	(0.033)	(0.042)
No. of Parent-Child Pairs: N	761	761	761	761	1038

Note: Bootstrap standard errors with 100 repetitions are reported in parentheses.

Robustness Checks: Intergenerational Persistence Back

Table: Robustness: Importance of Parental Heterogeneity for Child Inequality

Variables	**Baseline** (1)	**Random Match** (2)	$\gamma_n = \rho_e = 0$ (3)	**Imputed Consumption** (4)	**All Marital Status** (5)
Earnings	7.9%	0.1%	13.5%	9.3%	6.4%
	[3.5% 12.4%]	[-0.8% 1.0%]	[9.4% 17.6%]	[6.0% 12.6%]	[3.4% 9.4%]
Other Income	4.4%	0.2%	2.2%	5.0%	2.5%
	[1.4% 7.4%]	[-0.4% 0.9%]	[0.2% 4.1%]	[2.2% 7.8%]	[0.9% 4.2%]
Consumption	30.1%	0.2%	19.6%	47.6%	26.1%
	[19.7% 40.5%]	[-0.9% 1.3%]	[13.5% 25.7%]	[35.4% 59.8%]	[17.2% 35.0%]
No. of Parent-Child Pairs	761	761	761	761	1038

Note: All numbers are in percentage terms. 95% confidence intervals are reported in parentheses.

Optimal Parental Transfers: Specification Back

$$\max_{\{C_{f,s},\mathcal{T}_{f,s}\}_{s=t}^{T}} \quad \mathbb{E}_t \quad \sum_{j=0}^{T-t} \beta^j \left[\frac{C_{f,t+j}^{1-\sigma}}{1-\sigma} + \mu_1 . \frac{\mathcal{T}_{f,t+j}^{1-\mu_2}}{1-\mu_2} \right]$$

$$s.t.$$

$$A_{f,t+1} = (1+r)\left(A_{f,t} + E_{f,t} + N_{f,t} - C_{f,t} - \mathcal{T}_{f,t}\right)$$

- $\mathcal{T}_{f,t}^{-\mu_2} = C_{f,t}^{-\sigma}/\mu_1$ implies *consumption is a sufficient statistic for transfers.*
- Transfers affect child earnings through human capital investment (λ_e) and child other income through inter-vivos transfers (λ_n)

$$\begin{aligned}
\bar{e}_f^k &= (\gamma+\lambda_e)\,\bar{e}_f^p + (\rho_e+\lambda_e)\,\bar{n}_f^p + \lambda_e \bar{q}_f^p + \breve{e}_f^k \\
\bar{n}_f^k &= (\rho+\lambda_n)\,\bar{n}_f^p + (\gamma_n+\lambda_n)\,\bar{e}_f^p + \lambda_n \bar{q}_f^p + \breve{n}_f^k \\
\bar{c}_f^k &= (\lambda+\lambda_e+\lambda_n)\,\bar{q}_f^p + (\gamma+\gamma_n+\lambda_e+\lambda_n)\,\bar{e}_f^p + (\rho+\rho_e+\lambda_e+\lambda_n)\,\bar{n}_f^p \\
&+ \breve{q}_f^k + \breve{e}_f^k + \breve{n}_f^k
\end{aligned}$$

Optimal Parental Transfers: Specification Back

$$\max_{\{C_{f,s},\mathcal{T}_{f,s}\}_{s=t}^{T}} \quad \mathbb{E}_t \quad \sum_{j=0}^{T-t} \beta^j \left[\frac{C_{f,t+j}^{1-\sigma}}{1-\sigma} + \mu_1 \cdot \frac{\mathcal{T}_{f,t+j}^{1-\mu_2}}{1-\mu_2} \right]$$

$$s.t.$$

$$A_{f,t+1} = (1+r)\left(A_{f,t} + E_{f,t} + N_{f,t} - C_{f,t} - \mathcal{T}_{f,t}\right)$$

- $\mathcal{T}_{f,t}^{-\mu_2} = C_{f,t}^{-\sigma}/\mu_1$ implies *consumption is a sufficient statistic for transfers.*
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\bar{e}_f^k &= (\gamma + \lambda_e)\,\bar{e}_f^p + (\rho_e + \lambda_e)\,\bar{n}_f^p + \lambda_e \bar{q}_f^p + \breve{e}_f^k \\
\bar{n}_f^k &= (\rho + \lambda_n)\,\bar{n}_f^p + (\gamma_n + \lambda_n)\,\bar{e}_f^p + \lambda_n \bar{q}_f^p + \breve{n}_f^k \\
\bar{c}_f^k &= (\lambda + \lambda_e + \lambda_n)\,\bar{q}_f^p + (\gamma + \gamma_n + \lambda_e + \lambda_n)\,\bar{e}_f^p + (\rho + \rho_e + \lambda_e + \lambda_n)\,\bar{n}_f^p \\
&+ \breve{q}_f^k + \breve{e}_f^k + \breve{n}_f^k
\end{aligned}$$

Optimal Parental Transfers: Specification

Back

$$\max_{\{C_{f,s},\mathcal{T}_{f,s}\}_{s=t}^{T}} \quad \mathbb{E}_t \quad \sum_{j=0}^{T-t} \beta^j \left[\frac{C_{f,t+j}^{1-\sigma}}{1-\sigma} + \mu_1 \cdot \frac{\mathcal{T}_{f,t+j}^{1-\mu_2}}{1-\mu_2} \right]$$

$$s.t.$$

$$A_{f,t+1} = (1+r)\left(A_{f,t} + E_{f,t} + N_{f,t} - C_{f,t} - \mathcal{T}_{f,t}\right)$$

- $\mathcal{T}_{f,t}^{-\mu_2} = C_{f,t}^{-\sigma}/\mu_1$ implies *consumption is a sufficient statistic for transfers.*
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$$\begin{aligned}
\bar{e}_f^k &= (\gamma + \lambda_e)\,\bar{e}_f^p + (\rho_e + \lambda_e)\,\bar{n}_f^p + \lambda_e \bar{q}_f^p + \breve{e}_f^k \\
\bar{n}_f^k &= (\rho + \lambda_n)\,\bar{n}_f^p + (\gamma_n + \lambda_n)\,\bar{e}_f^p + \lambda_n \bar{q}_f^p + \breve{n}_f^k \\
\bar{c}_f^k &= (\lambda + \lambda_e + \lambda_n)\,\bar{q}_f^p + (\gamma + \gamma_n + \lambda_e + \lambda_n)\,\bar{e}_f^p + (\rho + \rho_e + \lambda_e + \lambda_n)\,\bar{n}_f^p \\
&+ \breve{q}_f^k + \breve{e}_f^k + \breve{n}_f^k
\end{aligned}$$

Optimal Parental Transfers: Specification Back

$$
\begin{aligned}
\max_{\{C_{f,s},\mathcal{T}_{f,s}\}_{s=t}^{T}} \quad & \mathbb{E}_t \quad \sum_{j=0}^{T-t} \beta^j \left[\frac{C_{f,t+j}^{1-\sigma}}{1-\sigma} + \mu_1 \cdot \frac{\mathcal{T}_{f,t+j}^{1-\mu_2}}{1-\mu_2} \right] \\
s.t. \quad & \\
A_{f,t+1} \quad = \quad & (1+r)\left(A_{f,t} + E_{f,t} + N_{f,t} - C_{f,t} - \mathcal{T}_{f,t}\right)
\end{aligned}
$$

- $\mathcal{T}_{f,t}^{-\mu_2} = C_{f,t}^{-\sigma}/\mu_1$ implies *consumption is a sufficient statistic for transfers.*
- Transfers affect child earnings through human capital investment (λ_e) and child other income through inter-vivos transfers (λ_n)

$$
\begin{aligned}
\bar{e}_f^k &= (\gamma + \lambda_e)\,\bar{e}_f^p + (\rho_e + \lambda_e)\,\bar{n}_f^p + \lambda_e \bar{q}_f^p + \breve{e}_f^k \\
\bar{n}_f^k &= (\rho + \lambda_n)\,\bar{n}_f^p + (\gamma_n + \lambda_n)\,\bar{e}_f^p + \lambda_n \bar{q}_f^p + \breve{n}_f^k \\
\bar{c}_f^k &= (\lambda + \lambda_e + \lambda_n)\,\bar{q}_f^p + (\gamma + \gamma_n + \lambda_e + \lambda_n)\,\bar{e}_f^p + (\rho + \rho_e + \lambda_e + \lambda_n)\,\bar{n}_f^p \\
&+ \breve{q}_f^k + \breve{e}_f^k + \breve{n}_f^k
\end{aligned}
$$

Optimal Parental Transfers: Specification Back

Variables	Baseline Model (1)	Optimal Transfers (2)
Earnings	7.9%	7.8%
	[3.5%, 12.4%]	[4.3%, 11.3%]
Other Income	4.4%	4.3%
	[1.4%, 7.4%]	[1.6%, 7.0%]
Consumption	30.1%	32.4%
	[19.7%, 40.5%]	[23.7%, 41.3%]