Consumption and Income Inequality Across Generations

By Giovanni Gallipoli, Hamish Low, and Aruni Mitra
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James J. Heckman

THE UNIVERSITY OF CHICAGO

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1. Introduction

- Parents influence their children's life-cycle outcomes in many ways.
- Economists often quantify these influences using measures of intergenerational persistence along dimensions of heterogeneity such as earnings, wealth, or consumption.
- The various channels of family influence are inter-related as parents can affect their children's outcomes in complex ways: through choices about education, through transmission of ability and preferences, by providing income-enhancing opportunities, as well as through inter-vivos and bequest transfers affecting wealth and consumption.
- Further, these mechanisms may be substitutes: investing in a child's education to increase their earnings potential may imply less transfers of wealth.
- Several studies have looked at either income or consumption in isolation, mostly focusing on the estimation of intergenerational pass-through parameters. In this paper we pursue a different approach and develop a parsimonious model of the joint persistence of expenditures, earnings and other income.

- Rather than focusing on persistence alone, our focus is on understanding the importance of different aspects of family heterogeneity, compared to idiosyncratic life-cycle events, for the evolution of income and consumption inequality.

- Our work has two main objectives: first, to estimate the diverse ways parental influences shape children's economic outcomes in a unified framework; second, to quantify how much of the inequality observed in a particular generation can be attributed to parental factors.

- To assess the importance of parental heterogeneity, we model intergenerationally linked households that make consumption and saving choices in an environment where persistent shocks shape permanent income.

- In the baseline model, the distribution of endogenous expenditures is characterized alongside a standard income process.

- The intergenerational linkages stem from intra-family persistence of earned income as well as from savings and transfer decisions.

- Specically, we allow parents to influence outcomes of children in three ways: through earned income, through other sources of income such as transfers, and through consumption.

- An advantage of this approach is that we can assess the influence of parental heterogeneity on inequality in the next generation and contrast the importance of family background with the impact of idiosyncratic variation which is independent of parents.

- The extent to which inequality among parents is passed through to inequality among children depends on intergenerational elasticities; however, the relative importance of family factors for inequality among children also depends on the magnitude of idiosyncratic (family-independent) variation.

- Hence, a decomposition of observed inequality requires estimates of intergenerational pass-through parameters, estimates of inequality among parents and estimates of idiosyncratic sources of heterogeneity.

- To this purpose we use a method-of-moments approach, which delivers estimates of the parameters determining each of these elements.

- Our model can help reconcile the somewhat puzzling observation that intergenerational persistence is fairly stable (Hertz, 2007; Lee and Solon, 2009), while inequality within generations is growing (Heathcote, Perri, and Violante, 2010; Attanasio and Pistaferri, 2016).

- Mechanically, a negative association between economic inequality and mobility arises in the model with stronger intergenerational pass-through channels, which in turn induce greater income dispersion in the childrens' generation.

- Such an association would be consistent with the empirical observation that more unequal societies exhibit lower earnings mobility across generations, a relationship often dubbed the `Great Gatsby' curve (see Krueger, 2012; Corak, 2013; Rauh, 2017).

- However, our estimates of intergenerational persistence are not large enough to support this explanation of increased inequality.

- The observed negative correlation between inequality and intergenerational mobility does not imply that a decline in mobility is either necessary or sufficient for the rise in inequality.

2. Framework of Intergenerational Inequality

- We develop an estimable consumption model of heterogeneous and intergenerationally linked households.
- The model features multiple parent-child linkages and is designed to examine the joint behaviour of earnings, other income and expenditures.
- To motivate these linkages, we begin by establishing stylized facts about the evolution of intrafamily persistence in the U.S. over recent decades.
- In Appendix A we report reduced-form estimates of the intergenerational pass-through of earnings and consumption since 1990, obtained using the method popularized by Lee and Solon (2009) in their analysis of the gender-specific evolution of earnings persistence.
- Like those authors, we find little evidence of changes in the intergenerational elasticity of labour earnings over time, with similar patterns holding for expenditures.

- To corroborate this evidence, we also compute mobility matrices and intergenerational flows across quartiles of the distributions of earnings and expenditures.

- This analysis, also shown in Appendix A, emphasizes that persistence is more intense at the tails of the distribution and that the inter-generational pass-through was remarkably stable over the past decades.

- These findings are consistent with evidence in Chetty, Hendren, Kline, Saez, and Turner (2014), who examine large administrative U.S. earning records and conclude that measures of "...intergenerational mobility have remained extremely stable for the 1971-1993 birth cohorts."

- For these reasons we maintain the assumption of stationarity in the baseline analysis.

- However, among the robustness checks of Section 6, we explore potential cross-cohort differences in the cross-generation pass-through parameters and the variances of the idiosyncratic risk processes.

2.1 Baseline Model

Earnings and Other Income

- In year t the parent in family f has earnings $e_{f,t}^{p}$ consisting of an individual fixed effect, $e_{f,t}^{-p}$, and an independent mean-zero transitory shock, $\varsigma_{f,t}^{p}$, with variance $\sigma_{f,t}^{p}$.

- Similarly, the process for other income, $n_{f,t}^{p}$, comprises a fixed effect, $n_{f,t}^{-p}$, and a transitory mean-zero component, $u_{f,t}^{p}$ with variance $\sigma_{u,p}^{2}$,

$$e_{f,t}^{p} = \bar{e}_{f}^{p} + \zeta_{f,t}^{p} \quad (1)$$

$$n_{f,t}^{p} = \bar{n}_{f}^{p} + u_{f,t}^{p}. \quad (2)$$

- Thus, for the children of family f this structure results in the following income components:

$$e_{f,t}^{k} = \underbrace{\gamma\bar{e}_{f}^{p} + \theta\bar{n}_{f}^{p} + \delta_{f}^{k}}_{\bar{e}_{f}^{k}} + \zeta_{f,t}^{k} \quad (3)$$

$$n_{f,t}^{k} = \underbrace{\rho\bar{n}_{f}^{p} + \lambda\bar{e}_{f}^{p} + \varepsilon_{f}^{k}}_{\bar{n}_{f}^{k}} + u_{f,t}^{k} \quad (4)$$

Consumption

- With the income processes in place, we set-up the dynamic life-cycle problem that delivers consumption policy rules.

- When a household makes consumption decisions, it has knowledge of its own permanent income but does not know the value of future income shocks.

- The consumption problem of a member of family f, written in levels, is given by:

$$\begin{aligned} \max_{\{C_{f,\tau}\}_{\tau=t}^{T}} \quad & \mathbb{E}_t \quad \sum_{j=0}^{T-t} \beta^j u(C_{f,t+j}) \\ & s.t. \\ A_{f,t+1} \quad & = \quad (1+r)\left(A_{f,t} + E_{f,t} + N_{f,t} - C_{f,t}\right), \end{aligned} \tag{5}$$

where is the discount factor, r is the real interest rate, $A_{f,t}$ is assets at the start of the period, $E_{f,t}$ is the value of the male household head's labour earnings, and $N_{f,t}$ is the value of other household income, which is defined as a sum of spousal earnings and total transfer income of the husband and wife.

- The optimization problem in equation (5) yields consumption $C_{f,t}$ for any individual as the annuity value of total lifetime resources.

- Then, the approximate log-consumption process for a parent can be represented as,

$$c_{f,t}^{p} = q_{f,t}^{p} + \bar{e}_{f}^{p} + \bar{n}_{f}^{p} + \alpha(r)\left(u_{f,t}^{p} + \zeta_{f,t}^{p}\right).$$

- The term (r) is an annuitization factor which tends to $r/(1+r)$ as the time horizon becomes larger.

- The variable $q_{f,t}^{p}$ denotes an idiosyncratic consumption shifter, subsuming unobserved income from savings and possible heterogeneity in preferences over the timing of consumption.

- Like other consumption shifters, $q_{f,t}^{p}$ comprises both a permanent and a transitory component so that $q_{f,t}^{p} = q_{f}^{-p} + v_{f,t}^{p}$.

- Combining these processes, the log-consumption of the parent can be written as:

$$c_{f,t}^{p} = \bar{q}_{f}^{p} + \bar{e}_{f}^{p} + \bar{n}_{f}^{p} + v_{f,t}^{p} + \alpha(r)\left(u_{f,t}^{p} + \zeta_{f,t}^{p}\right) \tag{6}$$

and analogously for the child.

Parents influence the consumption of their children through family persistence in both earnings and other income, as described in (3) and (4).

- Substituting the intra-family transmission mechanisms into the log-consumption process for children, we obtain:

$$\begin{aligned} c_{f,t}^{k} &= \phi\bar{q}_{f}^{p} + (\gamma + \lambda)\,\bar{e}_{f}^{p} + (\rho + \theta)\,\bar{n}_{f}^{p} \\ &+ \varepsilon_{f}^{k} + \psi_{f}^{k} + \delta_{f}^{k} + v_{f,t}^{k} + \alpha(r)\left(u_{f,t}^{k} + \zeta_{f,t}^{k}\right). \end{aligned} \tag{7}$$

2.2 Cross-sectional Dispersion and Intergenerational Smoothing

Breaking down inequality

- Equations (1) through (4), and (6) and (7) specify the complete set of conditions that characterize intergenerational dependence in this economy, linking earned income, other income and consumption across generations.

- These relationships characterise inequality among parents and children and highlight how family heterogeneity translates into inequality.

- Equations (1), (2) and (6) describe the processes (in levels) for parents and can be mapped into cross-sectional variances:

$$\begin{aligned}
\text{Var}\left(e_f^p\right) &= \sigma^2_{\bar{e}^p} && (8)\\
\text{Var}\left(n_f^p\right) &= \sigma^2_{\bar{n}^p} && (9)\\
\text{Var}\left(c_f^p\right) &= \sigma^2_{\bar{q}^p} + \sigma^2_{\bar{e}^p} + \sigma^2_{\bar{n}^p} + 2\left(\sigma_{\bar{q}^p,\bar{e}^p} + \sigma_{\bar{q}^p,\bar{n}^p} + \sigma_{\bar{e}^p,\bar{n}^p}\right). && (10)
\end{aligned}$$

- Similarly, equations (3), (4) and (7) describe the key processes (in levels) for children and how inequality among children depends on inequality among parents:

$$\text{Var}\left(e_f^k\right) = \gamma^2\sigma^2_{\bar{e}^P} + \theta^2\sigma^2_{\bar{n}^P} + 2\gamma\theta\sigma_{\bar{e}^P,\bar{n}^P} + \sigma^2_{\delta^k} \tag{11}$$

$$\text{Var}\left(n_f^k\right) = \rho^2\sigma^2_{\bar{n}^P} + \lambda^2\sigma^2_{\bar{e}^P} + 2\rho\lambda\sigma_{\bar{e}^P,\bar{n}^P} + \sigma^2_{\varepsilon^k} \tag{12}$$

$$\begin{aligned}\text{Var}\left(c_f^k\right) = {} & \phi^2\sigma^2_{\bar{q}^P} + (\gamma+\lambda)^2\sigma^2_{\bar{e}^P} + (\rho+\theta)^2\sigma^2_{\bar{n}^P} \\ & +2\left[(\gamma+\lambda)\phi\sigma_{\bar{q}^P,\bar{e}^P} + (\rho+\theta)\phi\sigma_{\bar{q}^P,\bar{n}^P} + (\rho+\theta)(\gamma+\lambda)\sigma_{\bar{e}^P,\bar{n}^P}\right] \\ & +\sigma^2_{\varepsilon^k} + \sigma^2_{\psi^k} + \sigma^2_{\delta^k} + 2\left[\sigma_{\psi^k,\varepsilon^k} + \sigma_{\psi^k,\delta^k} + \sigma_{\delta^k,\varepsilon^k}\right].\end{aligned} \tag{13}$$

- Earnings inequality among children responds to: (i) the magnitude of earnings inequality among parents (σ^2_{e-p}); and (ii), the intensity of the intergenerational pass-through (γ).

- It follows that the pass-through parameter alone is not sufficient to determine the role of parental influences on inequality in subsequent generations.

3. Identification and Estimation

3.1 Identification

- Identification proceeds in three steps.
- First, we use cross-sectional moments for parents and identify variances and covariances between their sources of income and consumption.
- Second, given these estimates and inter-generational covariances, we recover parent-child persistence parameters.
- Lastly, information from the previous two steps is used alongside second moments from the cross-section of children to identify the forces driving inequality among children.
- In what follows we overview how specific moments identify key elements of the model.

(a) Cross-sectional variation among parents. To identify the variance-covariance structure in the parents' cross-section we rely on (8), (9) and on the relationship:

$$\text{Cov}\left(e_f^p, n_f^p\right) = \sigma_{\bar{e}^p,\bar{n}^p}. \tag{14}$$

These equations deliver $\sigma^2_{\bar{e}^p}$, $\sigma^2_{\bar{n}^p}$ and $\sigma_{\bar{e}^p,\bar{n}^p}$. Then, the covariances $\sigma_{\bar{q}^p,\bar{e}^p}$ and $\sigma_{\bar{q}^p,\bar{n}^p}$ are identified from:

$$\begin{aligned} \text{Cov}\left(e_f^p, c_f^p\right) &= \sigma^2_{\bar{e}^p} + \sigma_{\bar{q}^p,\bar{e}^p} + \sigma_{\bar{e}^p,\bar{n}^p} &(15)\\ \text{Cov}\left(n_f^p, c_f^p\right) &= \sigma^2_{\bar{n}^p} + \sigma_{\bar{q}^p,\bar{n}^p} + \sigma_{\bar{e}^p,\bar{n}^p}. &(16) \end{aligned}$$

Finally, equation (10) can be used to recover the dispersion of consumption shifters $\sigma^2_{\bar{q}^p}$.

(b) Intergenerational persistence. The intergenerational elasticity parameters $(\gamma, \theta, \rho, \lambda, \phi)$ are identified using within-family covariation. From equation (14) we recover $\sigma_{\bar{e}^p,\bar{n}^p}$ and through (8) we identify $\sigma^2_{\bar{e}^p}$; it follows that equations (17) and (20) jointly identify the intergenerational earnings pass-through γ and θ. Similarly, the pass-through parameters for other income, ρ and λ, are identified from (18) and (19). This leaves the persistence of consumption shifters ϕ to be identified from (21). Appendix B reports further details about the identification of pass-through parameters, including a discussion of the over-identifying restrictions.

$$\begin{aligned}
\text{Cov}\left(e^p_f, e^k_f\right) &= \gamma\sigma^2_{\bar{e}^p} + \theta\sigma_{\bar{e}^p,\bar{n}^p} && (17)\\
\text{Cov}\left(n^p_f, n^k_f\right) &= \rho\sigma^2_{\bar{n}^p} + \lambda\sigma_{\bar{e}^p,\bar{n}^p} && (18)\\
\text{Cov}\left(e^p_f, n^k_f\right) &= \rho\sigma_{\bar{e}^p,\bar{n}^p} + \lambda\sigma^2_{\bar{e}^p} && (19)\\
\text{Cov}\left(n^p_f, e^k_f\right) &= \gamma\sigma_{\bar{e}^p,\bar{n}^p} + \theta\sigma^2_{\bar{n}^p} && (20)\\
\text{Cov}\left(c^p_f, c^k_f\right) &= \phi\left(\sigma^2_{\bar{q}^p} + \sigma_{\bar{q}^p,\bar{e}^p} + \sigma_{\bar{q}^p,\bar{n}^p}\right) + (\gamma+\lambda)\left(\sigma^2_{\bar{e}^p} + \sigma_{\bar{q}^p,\bar{e}^p} + \sigma_{\bar{e}^p,\bar{n}^p}\right)\\
&\quad + (\rho+\theta)\left(\sigma^2_{\bar{n}^p} + \sigma_{\bar{q}^p,\bar{n}^p} + \sigma_{\bar{e}^p,\bar{n}^p}\right) && (21)
\end{aligned}$$

(c) Cross-sectional variation among children. Finally, we employ estimates from the previous steps to identify the parameters for the cross-sectional distribution of children. The variances of idiosyncratic permanent shocks, $\sigma^2_{\delta^k}$ and $\sigma^2_{\varepsilon^k}$, are identified from (11) and (12), respectively. Identification of the remaining child-specific parameters follows from combining the covariances of income, earnings and consumption among children (see Appendix B.1) as well as from the variance of consumption expenditures in equation (13).

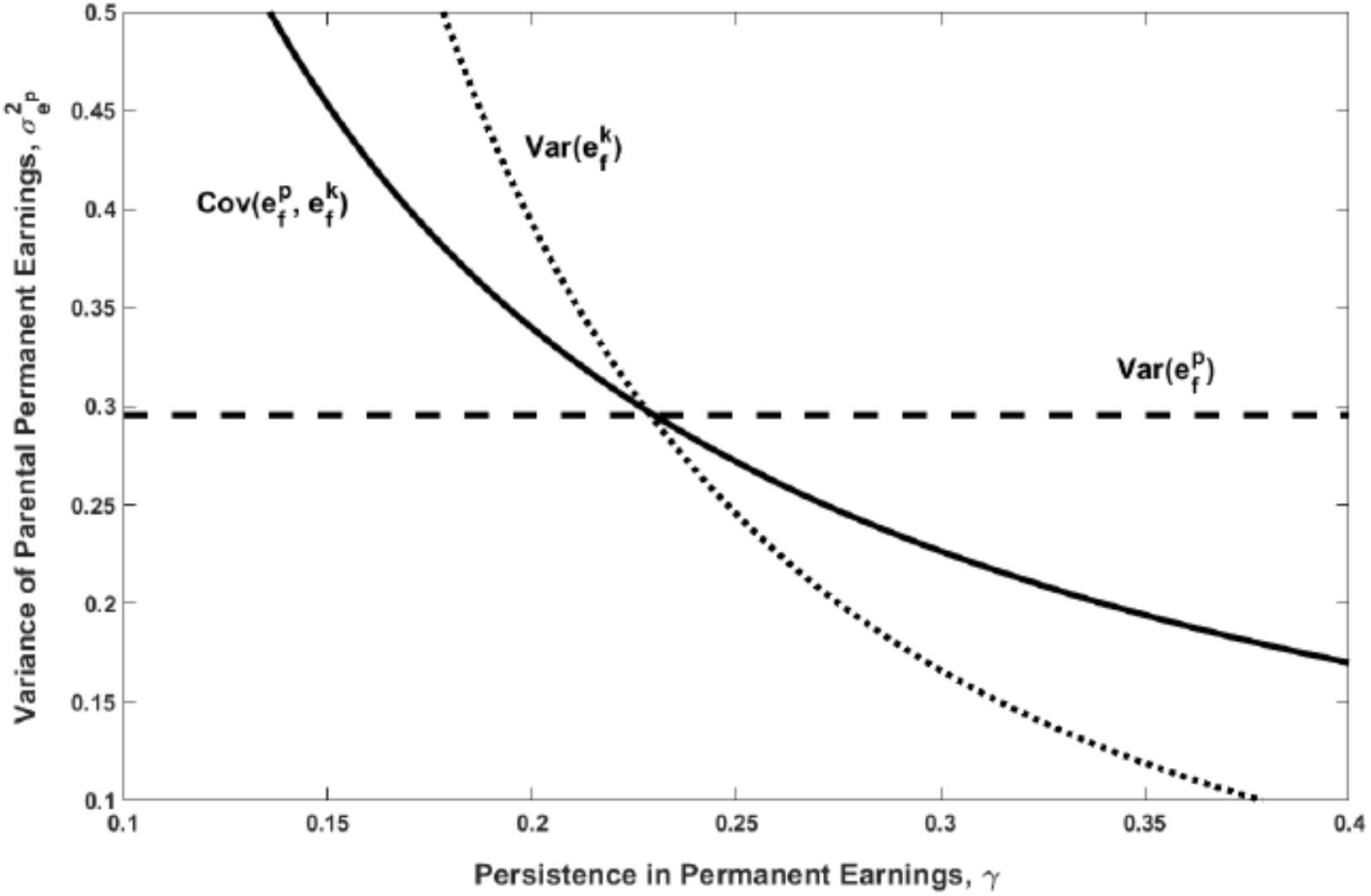
Identification: A graphical example

- One insight of the identification argument is that we can use elements of the covariance structure to jointly harness information about cross-sectional inequality and covariation of permanent income across generations.

- To illustrate how this works in practice, it helps to consider the relationships in Figure 1 where the y-axis measures the parental permanent earnings variance, σ^2_{e-p}, and the x-axis represents the intergenerational earnings persistence, γ.

- To identify this pair of parameters we only use three empirical moments: $Var\left(e_f^p\right), Cov(e_f^p, e_f^k)$ and $Var(e_f^k)$.

Figure 1: Identification of Persistence and Dispersion Parameters



3.2 Estimation

3.3 Data

- We use data from the Panel Study of Income Dynamics (PSID).
- This dataset is often used in the analysis of intergenerational persistence of economic outcomes because the offspring of original sample members become part of the survey sample when they establish independent households.
- We focus on the nationally representative sample of the PSID (from the Survey Research Centre, SRC) between 1967 and 2014, and exclude samples from the Survey of Economic Opportunity (SEO), immigrant and Latino sub-populations.
- To reduce noise due to weak labour market attachment and variation in marital status, we sample married households with a male head and at least 5 years of observations.
- We also restrict the sample to families with non-negative labour earnings and total income, that work no more than 5,840 hours in a year, and with wages at least half of the federal minimum wage.

4. Results

4.1 Baseline Results

- Table 1 reports the variances of earnings, other income and consumption expenditures for parents and children.

Table 1: Variances

Variable	Parent	Child
Earnings	0.291	0.248
Other Income	0.808	0.534
Consumption	0.097	0.114

- Table 2 reports estimates of intergenerational persistence parameters.

- The elasticity is highest for earnings, with the pass-through estimated at 0.23; in contrast, the elasticity for other household income, γ , is 0.10 and that for consumption, ρ, is 0.15.

Table 2: Estimates: Intergenerational Elasticities

Variables	Parameters	Estimates (1)
Earnings	γ	0.230
		(0.027)
Other Income	ρ	0.100
		(0.023)
$\bar{e}_f^p$ on $\bar{n}_f^k$	λ	0.206
		(0.032)
$\bar{n}_f^p$ on $\bar{e}_f^k$	θ	0.055
		(0.019)
Consumption Shifters	ϕ	0.154
		(0.032)
No. of Parent-Child Pairs	N	760

- All estimates of variances and covariances for the permanent components of earnings, other income and consumption are reported in **Table 3**.

- The importance of jointly estimating income and consumption processes becomes apparent when examining these estimates.

Table 3: Estimates: Variances and Covariances of Idiosyncratic Components

	Parameters	Estimates (1)
Parental Outcomes: Variances		
Permanent Earnings	$\sigma^2_{\bar{e}P}$	0.295
		(0.021)
Permanent Other Income	$\sigma^2_{\bar{n}P}$	0.806
		(0.06)
Permanent Consumption Shifters	$\sigma^2_{\bar{q}P}$	1.031
		(0.065)
Child Idiosyncratic Heterogeneity: Variances		
Permanent Earnings	$\sigma^2_{\delta k}$	0.228
		(0.011)
Permanent Other Income	$\sigma^2_{\varepsilon k}$	0.511
		(0.043)
Permanent Consumption Shifters	$\sigma^2_{\psi k}$	0.730
		(0.056)

Table 3: Estimates: Variances and Covariances of Idiosyncratic Components, Cont'd

	Parameters	Estimates (1)
Parental Outcomes: Covariances		
Consumption Shifters & Earnings	$\sigma_{\bar{q}^P,\bar{e}^P}$	-0.271
		(0.024)
Consumption Shifters & Other Income	$\sigma_{\bar{q}^P,\bar{n}^P}$	-0.818
		(0.061)
Earnings and Other Income	$\sigma_{\bar{e}^P,\bar{n}^P}$	0.070
		(0.013)
Child Idiosyncratic Heterogeneity: Covariances		
Consumption Shifters & Earnings	σ_{ψ^k,δ^k}	-0.247
		(0.018)
Consumption Shifters & Other Income	$\sigma_{\psi^k,\varepsilon^k}$	-0.522
		(0.048)
Earnings & Other Income	$\sigma_{\delta^k,\varepsilon^k}$	0.075
		(0.013)
No. of Parent-Child Pairs	N	760

4.2 Role of Parental Heterogeneity

- **Table 4** summarizes the impact of parental heterogeneity on the variance of children outcomes.

Table 4: Breaking Up Child Inequality: Parental versus Idiosyncratic Heterogeneity

Variables	Child Variance	Variance due to Parents	Idiosyncratic Variance
	(1)	(2)	(3)
Earnings	0.248	0.020 (8.1%)	0.228 (91.9%)
Other Income	0.534	0.024 (4.4%)	0.510 (95.6%)
Consumption	0.114	0.034 (29.8%)	0.080 (70.2%)

- In **Table 5**, we report estimates of intergenerational pass-through elasticities under these different definitions, including our baseline specification for comparison in column 3.

- We then report in **Table 6** the implications for decomposing inequality into inherited and idiosyncratic sources.

- Table 6 considers the implications for inequality of breaking down other income into spousal earnings and transfer income.

Table 5: Components of Other Income: Intergenerational Elasticity Estimates

	Parameters	Just Transfers (1)	Spouse Earnings (2)	Other Income (3)
Earnings	γ	0.239	0.275	0.254
		(0.050)	(0.027)	(0.032)
Other Income	ρ	0.031	0.142	0.097
		(0.046)	(0.036)	(0.033)
$\bar{e}_f^p$ on $\bar{n}_f^k$	λ	0.107	0.232	0.184
		(0.073)	(0.033)	(0.045)
$\bar{n}_f^p$ on $\bar{e}_f^k$	θ	-0.007	0.144	0.086
		(0.017)	(0.033)	(0.027)
Consumption Shifters	ϕ	0.007	0.372	0.217
		(0.047)	(0.047)	(0.047)
No. of Parent-Child Pairs	N	459	459	459

Table 6: Parental versus Idiosyncratic Heterogeneity: Role of Marital Selection

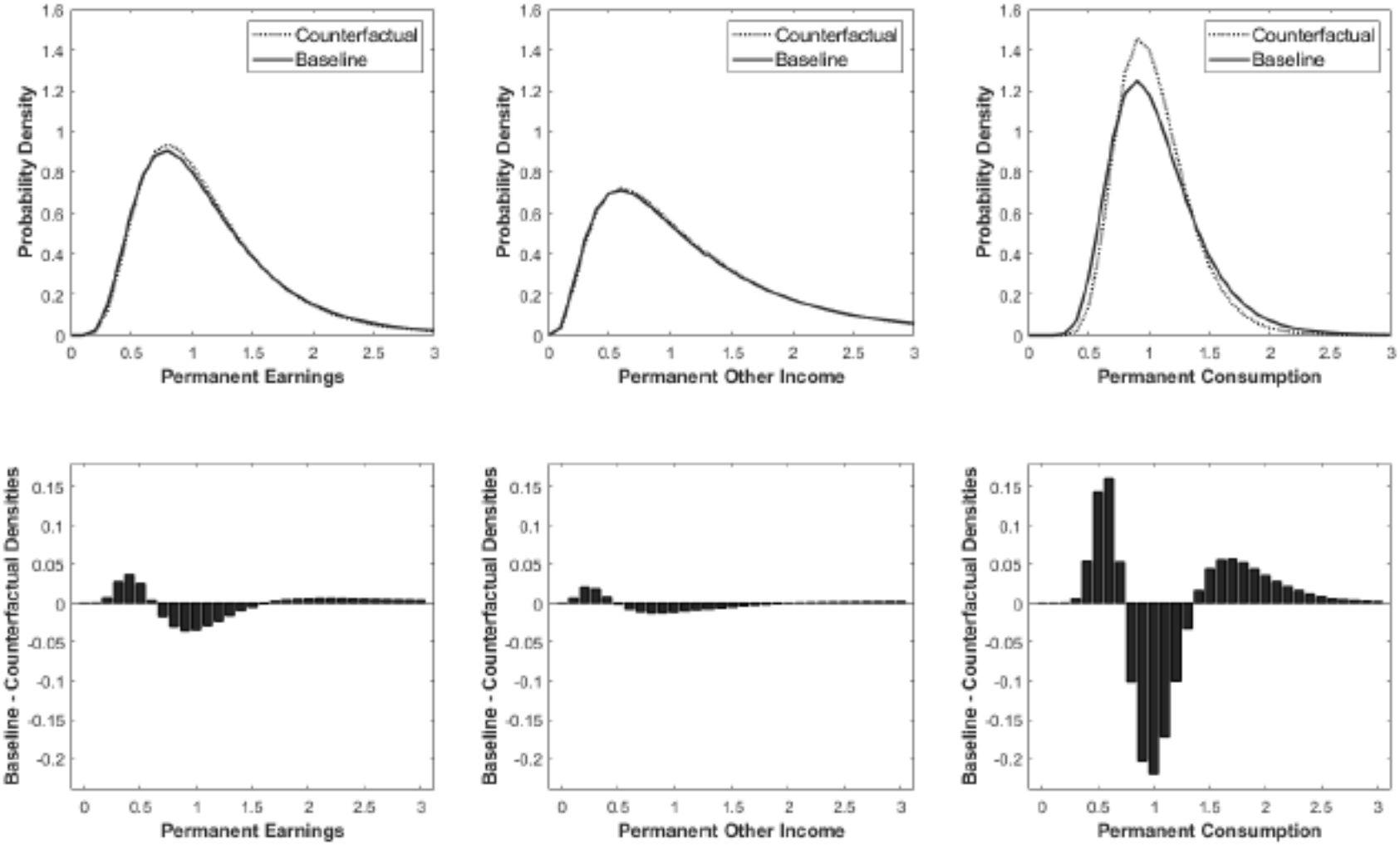
Variable	Child Variance	Variance due to Parents	Idiosyncratic Variance
	(1)	(2)	(3)
Panel A: Other Income = Wife Earnings			
Earnings	0.229	0.033 (14.6%)	0.196 (85.4%)
Wife Earnings	0.322	0.026 (8.1%)	0.296 (91.9%)
Consumption	0.113	0.025 (22.5%)	0.088 (77.5%)
Panel B: Other Income = Transfers			
Earnings	0.229	0.016 (7.1%)	0.213 (92.9%)
Transfers	1.068	0.005 (0.4%)	1.063 (99.6%)
Consumption	0.113	0.034 (30.3%)	0.079 (69.7%)
Panel C: Other Income = Wife Earnings + Transfers			
Earnings	0.229	0.024 (10.7%)	0.205 (89.3%)
Other Income	0.457	0.016 (3.5%)	0.441 (96.5%)
Consumption	0.113	0.027 (24.2%)	0.086 (75.8%)

4.3 Counterfactual Cross-Sectional Distributions

- The absence of intergenerational transmission is equivalent to a setting with randomly matched parent-child pairs.

- A simple way of gauging the impact of family background in this setting is to plot the observed and counterfactual cross-sectional distribution of each outcome in the children's generation (top panels of **Figure 2**) and their local differences, (as measured by the histograms in the bottom panels of **Figure 2**).

Figure 2: Baseline versus Counterfactual Probability Density Functions



5. The Evolution of Inequality across Generations

- A vector representation of the model.

- Earnings, other income and consumption shifters evolve through generations of family f according to the following vector autoregressive process:

$$\begin{bmatrix} \bar{e}_f^{k_t} \\ \bar{n}_f^{k_t} \\ \bar{q}_f^{k_t} \end{bmatrix} = \begin{bmatrix} \gamma & \theta & 0 \\ \lambda & \rho & 0 \\ 0 & 0 & \phi \end{bmatrix} \cdot \begin{bmatrix} \bar{e}_f^{k_t-1} \\ \bar{n}_f^{k_t-1} \\ \bar{q}_f^{k_t-1} \end{bmatrix} + \begin{bmatrix} \delta_f^{k_t} \\ \varepsilon_f^{k_t} \\ \psi_f^{k_t} \end{bmatrix} .$$

- Current versus long-term inequality.

- Comparing steady-state variances with those observed in data, we see that for earnings and consumption the inequality in the parents' generation is the lowest (see column 1 of **Table 7**), followed by that in the children's generation (column 2 of **Table 7**).

Table 7: Steady-state Inequality versus Current Inequality

Variable	Parental Variance	Child Variance	Steady-state Variance
	(1)	(2)	(3)
Earnings	0.199	0.251	0.255
Other Income	0.845	0.669	0.676
Consumption	0.097	0.118	0.127

Note: Estimates based on sample of 336 unique parent-child pairs. Age restricted between 30 and 40 years.

- **Table 8** shows that for counterfactually high values of γ, earnings inequality in the children generation (column 4) can be substantially different from long-run model outcomes (column 5).

- Moreover, a trade-off between inter-generational persistence, γ (column 1) and idiosyncratic heterogeneity, $\sigma^2_{\delta^k}$ (column 2) is evident when explaining the total child variance (column 4).

Table 8: The Importance of Parents: Varying Persistence γ

γ	$\widehat{\sigma^2_{\delta^k}}$	$\widehat{Var(e^p)}$	$\widehat{Var(e^k)}$	$\widehat{Var(e^*)}$	$\frac{\gamma^2 \widehat{Var(e^p)}}{\widehat{Var(e^k)}}$
(1)	(2)	(3)	(4)	(5)	(6)
0.10	0.248	0.202	0.251	0.251	1.3%
0.21	**0.241**	**0.199**	**0.251**	**0.255**	**4.0%**
0.30	0.232	0.193	0.251	0.255	7.4%
0.40	0.221	0.182	0.251	0.263	12.2%
0.50	0.207	0.169	0.251	0.277	17.4%
0.60	0.194	0.155	0.251	0.303	22.8%
0.70	0.181	0.141	0.251	0.354	28.1%
0.80	0.168	0.128	0.251	0.467	33.1%
0.90	0.156	0.116	0.251	0.822	37.8%

Note: Bold values refer to a specification with γ unconstrained and estimated as part of the optimization. The age range for both children and parents is between 30 and 40 years. Estimation is based on 336 unique parent-child pairs for children born in the 1960s and 1970s.

6. Robustness and Extensions

6.1 Estimates by Child Birth-Cohort

- **Table 9** shows the cross-sectional variances of economic outcomes for the parents and kids for different child-birth cohorts.

- **Table 10** presents estimates of intergenerational pass-through parameters by children's decade of birth. The results are qualitatively similar to the baseline ones.

Table 9: Variances by Child-Cohort (Age: 30-40 years)

Variable	Generation	All Cohorts	1960s Cohort	1970s Cohort
		(1)	(2)	(3)
Earnings	Parent	0.199	0.172	0.225
	Child	0.251	0.243	0.259
Other Income	Parent	0.845	0.945	0.752
	Child	0.669	0.568	0.770
Consumption	Parent	0.097	0.112	0.081
	Child	0.118	0.100	0.135

Note: The age range for both children and parents is between 30 and 40 years. Estimation is based on 166 unique parent-child pairs for children born in the 1960s and 170 such pairs for the 1970s cohort.

Table 10: Intergenerational Elasticity Estimates by Child Cohort (Age: 30-40)

	Parameters	All Cohorts	1960s Cohort	1970s Cohort
		(1)	(2)	(3)
Earnings	γ	0.209	0.251	0.191
		(0.069)	(0.087)	(0.106)
Other Income	ρ	0.041	-0.006	0.099
		(0.058)	(0.068)	(0.093)
$\bar{e}_f^p$ on $\bar{n}_f^k$	λ	0.217	0.202	0.244
		(0.079)	(0.131)	(0.12)
$\bar{n}_f^p$ on $\bar{e}_f^k$	θ	0.040	0.009	0.079
		(0.032)	(0.046)	(0.038)
Consumption Shifters	ϕ	0.075	-0.029	0.200
		(0.075)	(0.09)	(0.124)
No. of Parent-Child Pairs	N	336	166	170

6.2 Restricting Cross-Effects between Income Sources

- Column 2 in Table 11 reports elasticity estimates under these restrictions.
- The point estimates of the parameters change significantly, overstating the importance of parents for earnings inequality among children.

Table 11: Robustness: Intergenerational Elasticity Estimates

Parameters	Baseline	$\lambda = \theta = 0$	Random Match	Imputation	Panel Data
	(1)	(2)	(3)	(4)	(5)
Earnings: γ	0.230	0.340	-0.018	0.257	0.294
	(0.029)	(0.02)	(0.028)	(0.029)	(0.041)
Other Income: ρ	0.100	0.121	-0.039	0.096	0.095
	(0.029)	(0.029)	(0.025)	(0.028)	(0.045)
$\bar{e}_f^p$ on $n_{f,t}^k$: λ	0.206	0	-0.007	0.236	0.107
	(0.038)	(0)	(0.035)	(0.033)	(0.060)
$\bar{n}_f^p$ on $e_{f,t}^k$: θ	0.055	0	-0.015	0.052	0.066
	(0.017)	(0)	(0.023)	(0.015)	(0.035)
Consumption Shifters: ϕ	0.154	0.109	-0.048	0.127	0.153
	(0.034)	(0.032)	(0.034)	(0.033)	(0.046)
No. of Parent-Child Pairs: N	760	760	760	760	760

Note: Bootstrap standard errors (100 repetitions) in parentheses. Year and cohort effects have been removed.

6.3 Placebo Test: Random Matching of Parents and Children

- To account for this possibility we perform a placebo test using a sample in which parents and children are randomly matched.

- Estimates based on this sample imply no role of parental heterogeneity for inequality in the children's generation, as seen in column 3 of **Table 12.**

Table 12: Robustness: Importance of Parental Heterogeneity for Child Inequality

Variables	Baseline	$\lambda = \theta = 0$	Random Match	Imputation	Panel Data
	(1)	(2)	(3)	(4)	(5)
Earnings	8.0	13.5	0.1	9.4	12.3
Other Income	4.4	2.2	0.2	5.0	2.1
Consumption	29.9	19.5	0.2	47.4	22.8

Note: All numbers are percentages (%) and are based on parameter estimates in Table 11 and Table 27 of Appendix E.

6.4 Alternative Measures of Expenditure

6.5 Using Panel Variation

6.6 A Model of Intergenerational Persistence in Growth Rates

7. Conclusion