

From Income to Consumption: Partial Insurance and the Transmission of Inequality

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Table, Figures and References are at the end of the lecture slides.

With thanks to coauthors: Orazio Attanasio, Erich Battistin, Andrew Leicester, Arthur Lewbel, Hamish Low, Luigi Pistaferri and Ian Preston; and to David Johnson, Alissa Goodman, Jim Heckman, Greg Kaplan, Nicola Pavoni, Jean-Marc Robin, and Gianluca Violante for helpful discussions.

Inequality in Income and Consumption: Overview

- ▶ Inequality has many linked dimensions: wages, incomes and consumption
- ▶ Mediated by multiple insurance mechanisms
- ▶ Use the time series evolution of the distribution of income and consumption to identify:
 - short-run uncertainty and permanent inequality
 - the sources of insurance to income shocks
- ▶ The manner and scope for insurance is dependent upon the **durability** of shocks
- ▶ The objective is to understand the transmission between earnings, income and consumption inequality
- ▶ **Figure: 1a - f** overall inequality; UK, US, China, Japan, Australia.

This lecture is an attempt to reconcile three important literatures:

- ▶ the examination of inequality over time via consumption and income
 - e.g. studies from the BLS, Johnson and Smeeding (2005) and at IFS, Goodman and Oldfield (2004); early work in the US by Cutler and Katz (1992) and Dynarski and Gruber (1997), and in the UK by Blundell and Preston (1991) - **Table I**
- ▶ econometric work on the panel data decomposition of income processes
 - e.g. MaCurdy(1982), Gottshalk and Moffitt (1995), Meghir and Pistaferri (2004)
- ▶ the work on intertemporal consumption and insurance, especially on 'excess' insurance and excess sensitivity
 - e.g. Hall and Mishkin (1982), Campbell and Deaton (1989), Cochrane (1991), Attanasio and Davis (1996), Blundell, Pistaferri and Preston (2005), Krueger and Perri (2006)

Insurance to Transitory and Permanent Shocks

- ▶ *multiple mechanisms*
 - adjustments in assets
 - informal contracts and gifts
 - individual and household labour supplies
 - social insurance, transfers and taxation
 - durable replacement
- ▶ *measuring the welfare cost of risk*
 - CARA preferences and risk aversion
 - within cohort comparisons

▶ Insurance to Transitory and Permanent Shocks

- exploit household panel data on income and consumption
- identify separate impact of permanent and transitory innovations to income
- separate by cohort, by stage of the life-cycle and by education group
- consider the impact of low wealth holdings
- examine the importance of labour supply within the household
- examine the importance of durables:
 - ▷ BLS (2005) note that, including durables consumption inequality rises by more than 70% of income inequality rather than around 60% over the 78 to 92 period

Some resilient features of the distribution of consumption

▶ Log normal distribution of equivalised consumption and income by cohort and time:

- **Figure 2a-d, US; Figure 3a-c, UK.**

- -> relationship between Gini and variance of log under log normality. Under lognormality the Lorenz ordering is a complete ordering coinciding with the ordering by the variance of logs (and therefore also by the Gini).

▶ Gibrat's law over the life-cycle for consumption rather than income?

- Extend the Deaton-Paxson *JPE* result on the variances of log consumption over the life-cycle

▶ **Figure 4a-d**

▶ will return to panel data features of log consumption, but first log income->

Some resilient features of the dynamic process for income and earnings

For each household i , consider a permanent-transitory income decomposition:

$$\log Y_{i,a,t} = Z'_{i,a,t}\varphi + P_{i,a,t} + v_{i,a,t} \quad (1)$$

where a and t index age and time respectively, Y is real income, and Z is a set of characteristics, observable and known by consumers, a emphasizes the key importance of cohort effects in the evolution of income over the life-cycle.

• Equation (1) decomposes innovations to log income into a permanent component $P_{i,t}$ which follows a martingale process:

$$P_{it} = P_{i,t-1} + \zeta_{it} \quad (2)$$

and a transitory or mean-reverting component, $v_{i,t}$ which follows an MA(q) process

$$v_{it} = \sum_{j=0}^q \theta_j \varepsilon_{i,t-j} \text{ with } \theta_0 \equiv 1. \quad (3)$$

It follows that

$$\Delta y_{it} = \zeta_{it} + \Delta v_{it}, \text{ where } y_{it} = \log Y_{it} - Z'_{it}\varphi. \quad (4)$$

• this latent factor structure aligns well with the autocovariance structure of the PSID, the BHPS and the ECFP

- allows for general fixed effects and initial conditions.

- regular deconvolution arguments lead to identification of variances and complete distributions, e.g. Bonhomme and Robin (2006)

- we will allow the variances of the permanent and transitory factors to vary nonparametrically with cohort, education and time.

- **Tables II a, b and c** present the autocovariance structure of the PSID, the BHPS and the ECFP, relate to MaCurdy (1982), Meghir and Pistaferri (2004); note important alternative income models by Baker (2003), Guvenen (2005), Haider (2001).

The Evolution of the Consumption Distribution: The Self-Insurance model

At time t each individual i of age a maximises the conditional expectation of a time separable, differentiable utility function:

$$\max_C E_t \sum_{j=0}^{T-a} u(C_{i,a+j,t+j}, Z_{i,a+j,t+j})$$

where $Z_{i,a+j,t+j}$ incorporates taste shifters and discount rate heterogeneity.

- Individuals can self-insure using a simple credit market, consumption and income are linked through the intertemporal budget constraint

$$A_{i,a+j+1,t+j+1} = (1 + r_{t+j}) A_{i,a+j,t+j} + Y_{i,a+j,t+j} - C_{i,a+j,t+j}$$
$$A_{i,T,t+T-a} = 0$$

with $A_{i,a,t}$ given.

- The retirement age is set at R , and the end of the life-cycle at age T .

The Self-Insurance model specification

With CRRA preferences

$$u(C_{i,a+j,t+j}, Z_{i,a+j,t+j}) \equiv \frac{1}{(1 + \delta)^j} \frac{C_{i,a+j,t+j}^\beta - 1}{\beta} e^{Z'_{i,a+j,t+j} \vartheta}$$

the Euler equation becomes

$$C_{i,a-1,t-1}^{\beta-1} = E_{a-1,t-1} \frac{1 + r_{t-1}}{1 + \delta} e^{\Delta Z'_{i,a,t} \vartheta} C_{i,a,t}^{\beta-1}$$

and approximately

$$\Delta \log C_{i,a,t} \simeq \Delta Z'_{i,a,t} \vartheta + \eta_{i,a,t} + \Omega_{i,a,t}$$

- $\eta_{i,a,t}$ is a consumption shock with $E_{a-1,t-1} \eta_{i,a,t} = 0$
- $\Omega_{i,a,t}$ captures any slope in the consumption path due to the interest rate, impatience or precautionary savings.

- Up to order $\mathcal{O}(\|\nu_t\|^2)$, where $\nu_t = (\zeta_t, \varepsilon_t)'$, this can be expressed as:

$$\Delta \ln C_{it} \cong \Gamma_{bt} + \Delta Z'_{it} \varphi^c + \xi_{it} + \pi_{bt} \zeta_{it} + \alpha_{bt} \pi_{bt} \varepsilon_{it}$$

where α_{bt} is an annuitisation factor for a finite horizon and π_{bt} measures the degree to which 'permanent' shocks are insurable with precautionary savings in a finite horizon model.

- This will provide the key panel data moments that link the evolution of distribution of consumption to the evolution of income
- CLT implies that log consumption is approximately normal and the variance generally does increase with age - as in the figures.
- For second order moments the approximation errors is $\mathcal{O}(\|\nu_t\|^3)$ and below I give some results on this approximation using a simulated economy

First, consider [information, welfare measurement and additional insurance](#).

Information and the income process

It may be that the consumer cannot separately identify transitory ε_{it} from permanent ζ_{it} income shocks. For a consumer who simply observed the income innovation ϵ_{it} in $y_{it} = y_{i,t-1} + \epsilon_{it} - \theta_t \epsilon_{i,t-1}$ we have consumption innovation:

$$\eta_{it} = \rho_t (1 - \theta_{t+1}) \epsilon_{it} + \frac{r}{1+r} \theta_{t+1} \epsilon_{it} \quad (5)$$

where $\rho_t = 1 - (1+r)^{-(R-t+1)}$. The evolution of θ_t is directly related to the evolution of the variances of the transitory and permanent innovations to income.

- The permanent effects component in this decomposition can be thought of as capturing news about both current and *past* permanent effects since

$$E\left(\sum_{j=0} \zeta_{i,t-j} \mid \epsilon_{it}, \epsilon_{i,t-1}, \dots\right) - E\left(\sum_{j=0} \zeta_{i,t-j} \mid \epsilon_{i,t-1}, \dots\right) = (1 - \theta_{t+1}) \epsilon_{it}.$$

- This represents the best prediction of the permanent/ transitory split

When Does Consumption Inequality Measure Welfare Inequality?

Suppose individual i , reaching adulthood in year b_i has lifetime income Y_i . The real interest rate in year s is r_s and is assumed to be the same for all individuals.

- The individual seeks to maximise an increasing and quasiconcave lifetime welfare function $U_i = U(\mathbf{C}_i)$, with $\mathbf{C}_i \equiv (C_{i0}, C_{i1}, \dots, C_{iT})$

- Hicksian demands are $C_{it} = C_t(U_i, \mathbf{p}_i)$ where $\mathbf{p}_i \equiv (p_{i0}, p_{i1}, \dots, p_{iT})$ and $p_{it} \equiv \prod_{s=0}^t (1 + r_{s+b_i})^{-1}$.

PROPOSITION 1 *Comparisons within cohorts at same age:* $C_{it} \geq C_{jt}$ implies $U_i \geq U_j$ whenever individuals i and j share the same year of birth if and only if consumption in all periods is a normal good.

The Welfare Cost of Income Risk

Define \tilde{Y}_i as that certain present discounted value of lifetime income which would allow the individual to achieve the same expected utility. The consumption stream $\tilde{\mathbf{C}}_i = \tilde{\mathbf{C}}(EU_i)$ that would be chosen given \tilde{Y}_i satisfies

$$\sum_t u_t(\tilde{C}_{it}) \equiv E\left(\sum_t u_t(C_{it})\right) = EU_i.$$

PROPOSITION 2 *Comparisons across individuals facing different income risk:* $C_{it} \geq C_{jt}$ implies $EU_i \geq EU_j$ whenever individuals i and j share the same year of birth if and only if $\mathbf{C}_i = \tilde{\mathbf{C}}(EU_i)$ whatever the distribution of future income. This is so if and only if $u_t(C_{it}) = -\alpha_t \exp(-\beta_t C_{it})$ $\alpha_t, \beta_t > 0, t > 0$.

- This holds exactly iff CARA. The sufficiency part is a special case of a more general result that decreasing absolute risk aversion (DARA) implies $C_{i0} < \tilde{C}_{i0}$, ie that there is excess precautionary saving if higher incomes decrease risk aversion.

The Evolution of the Consumption Distribution: The Partial Insurance model

- ▶ The stochastic Euler equation is consistent with many stochastic processes for consumption. It does not say anything about the variance of consumption.
- ▶ In the full information perfect market model with separable preferences the variance of consumption is zero. In comparison with the self-insurance model the intertemporal budget constraint based on a single asset is violated.
- ▶ Partial insurance allows some additional insurance. For example, Attanasio and Pavoni (2005) consider an economy with moral hazard and hidden asset accumulation - individuals now have hidden access to a simple credit market. They show that, depending on the cost of shirking and the persistence of the income shock, some partial insurance is possible. A linear insurance rule can be obtained as an 'exact' solution in a dynamic Mirrlees model with CRRA utility.

The introduction of two 'transmission parameters':

To capture the possibility of 'excess insurance' and also 'excess sensitivity', we define:

- ϕ_{bt} the degree to which permanent shocks ζ_{it} for individual i in birth cohort b in period t are 'insured'
- ψ_{bt} the degree to which transitory shocks ε_{it} are 'insured'
- in fact $1 - \phi_{bt}$ and $1 - \psi_{bt}$ are the fractions insured

implying:

$$\Delta c_{it} \cong \Gamma_{bt} + \xi_{it} + \phi_{bt}\zeta_{it} + \psi_{bt}\varepsilon_{it}$$

where $\Delta c_{it} = \Delta \ln C_{it} - \Delta Z'_{it} \varphi^c$.

In this notation ϕ_{bt} and ψ_{bt} subsume π_{bt} and α_{bt} from the self-insurance model.

The key panel data moments

- The panel data moments for **log income** are

$$\text{cov}(\Delta y_{a,t}, \Delta y_{a+s,t+s}) = \begin{cases} \text{var}(\zeta_{a,t}) + \text{var}(\Delta v_{a,t}) & \text{for } s = 0 \\ \text{cov}(\Delta v_{a,t}, \Delta v_{a+s,t+s}) & \text{for } s \neq 0 \end{cases} \quad (6)$$

- The covariance term $\text{cov}(\Delta v_{a,t}, \Delta v_{a+s,t+s})$ depends on the serial correlation properties of v . If v is an $MA(q)$ serially correlated process, then $\text{cov}(\Delta v_{a,t}, \Delta v_{a+s,t+s})$ is zero whenever $|s| > q + 1$.
- Allowing for an $MA(q)$ process, for example, adds $q - 1$ extra parameter (the $q - 1$ MA coefficients) but also $q - 1$ extra moments, so that identification is unaffected.

- The panel data moments for **log consumption** are

$$\text{cov}(\Delta c_{a,t}, \Delta c_{a+s,t+s}) = \phi_{b,t}^2 \text{var}(\zeta_{a,t}) + \psi_{b,t}^2 \text{var}(\varepsilon_{a,t}) + \text{var}(\xi_{a,t}) \quad (7)$$

for $s = 0$ and zero otherwise.

- The covariance between income growth and consumption growth is:

$$\text{cov}(\Delta c_{a,t}, \Delta y_{a+s,t+s}) = \begin{cases} \phi_{b,t} \text{var}(\zeta_{a,t}) + \psi_{b,t} \text{var}(\varepsilon_{a,t}) \\ \psi_{b,t} \text{cov}(\varepsilon_{a,t}, \Delta v_{a+s,t+s}) \end{cases} \quad (8)$$

for $s = 0$, and $s > 0$ respectively.

- If v is serially uncorrelated ($v_{i,a,t} = \varepsilon_{i,a,t}$), then $\text{cov}(\Delta c_{a,t}, \Delta y_{a+s,t+s}) = -\psi_{b,t} \text{var}(\varepsilon_{a,t})$ for $s = 1$ and 0 otherwise.

- A simple summary the panel data moments:

$$\text{var}(\Delta y_t) = \text{var}(\zeta_t) + \text{var}(\varepsilon_t) + \text{var}(\varepsilon_{t-1})$$

$$\text{cov}(\Delta y_t, \Delta y_{t-1}) = -\text{var}(\varepsilon_{t-1})$$

$$\text{cov}(\Delta y_{t+1}, \Delta y_t) = -\text{var}(\varepsilon_t)$$

$$\text{var}(\Delta c_t) = \phi_t^2 \text{var}(\zeta_t) + \psi_t^2 \text{var}(\varepsilon_t)$$

$$\text{cov}(\Delta c_t, \Delta y_t) = \phi_t \text{var}(\zeta_t) + \psi_t \text{var}(\varepsilon_t)$$

$$\text{cov}(\Delta c_t, \Delta y_{t+1}) = -\psi_t \text{var}(\varepsilon_t)$$

- Under **additional** assumptions, Blundell and Preston (1998) turn these into identifying moments for repeated cross-section data.

Note that there is a degree of overidentification

- For example,

$$\phi_t = \frac{\text{var}(\Delta c_t)}{\text{cov}(\Delta y_t, \Delta c_t)}$$

and

$$\phi_t = \frac{\text{cov}(\Delta c_t, \Delta y_t)}{\text{cov}(\Delta y_t, \Delta y_{t-1} + \Delta y_t + \Delta y_{t+1})}$$

- Thus ϕ_t is generally overidentified (note measurement error case)

- In estimation use optimal weighted moment estimator and allow for MA(1) in the transitory component.

Assessing the identification strategy

- To judge the ability of this model to identify the underlying parameters and processes, Blundell, Low and Preston (2004) simulate a stochastic dynamic economy.
- In the base case the subjective discount rate $\delta = 0.02$, also allow δ to take values 0.04 and 0.01. Also a mixed population with half at 0.02 and a quarter each at 0.04 and 0.01.
- In such cases the permanent variance follows a two-state, first-order Markov process with the transition probability between alternative variances, $\sigma_{\zeta,L}^2$ and $\sigma_{\zeta,H}^2$
- For each experiment, BLP simulate consumption, earnings and asset paths for 50,000 individuals. To obtain estimates of the variance for each period, a random cross sectional samples of 2000 individuals for each of 20 periods is drawn

See Figure 5.

THE US PSID/CEX DATA

◀ PSID 1968-1996: (main sample 1978-1992)

- Construct all the possible panels of $2 \leq \text{length} \leq 15$ years
- Sample selection: male head aged 30-62, no SEO/Latino subsamples
- Total family income and food at home are dated 1978-1992.

◀ CEX 1980-1998: (main sample 1980-1992)

- Focus on 5-quarters respondents only (annual expenditure measures)
- Sample selection similar to the PSID
- Eliminate those with zero income/expenditure

A comparison of both data sources is in Blundell, Pistaferri and Preston (2004)

- Note also the source for the UK BHPS and Spanish ECFP panel data.

Using a structural demand relationship to link consumption data in the CEX with the Income panel data in the PSID

- Food consumption, income and total expenditure in CEX, but a repeated cross-section
- Food consumption and income in the PSID panel.
 - ▷ Plus lots of demographic and other matching information in each year.
- Inverse structural demand equation acts as an ‘imputation’ equation - **Table III.**
- Implications for consumption and income inequality - **Figure 6**
- Covariance structure of consumption and income - **Table IV**

Partial Insurance and the other ‘structural’ parameters

- “excess smoothness” or “excess insurance” relative to self-insurance

Table Va:

- College-no college comparison
- Younger versus older cohorts

Figures 7a,b: show implications for variances of permanent and transitory shocks

- Within cohort and education analysis changes the balance between the distribution of permanent and transitory shocks but not the value of the transmission parameters.

- Younger in the sample also display less insurance: $\hat{\phi}$ is .87 (.11)
- Strongly reject constancy of ϕ and ψ when food in PSID is used
- **Table Vb** Results for the Spanish and the British data.

Partial Insurance and Family Labour Supply

Total income Y_t is the sum of two sources, Y_{1t} and $Y_{2t} \equiv W_t h_t$

- Assume the labour supplied by the primary earner to be fixed. Income processes

$$\Delta \ln Y_{1t} = \gamma_{1t} + \Delta u_{1t} + v_{1t}$$

$$\Delta \ln W_t = \gamma_{2t} + \Delta u_{2t} + v_{2t}$$

- Household decisions to be taken to maximise a household utility function

$$\sum_k (1 + \delta)^{-k} [U(C_{t+k}) - V(h_{t+k})].$$

$$\Delta \ln C_{t+k} \simeq \sigma_{t+k} \Delta \ln \lambda_{t+k}$$

$$\Delta \ln h_{t+k} \simeq -\rho_{t+k} [\Delta \ln \lambda_{t+k} + \Delta \ln W_{t+k}]$$

with $\sigma_t \equiv U'_t / C_t U''_t < 0$, $\rho_t \equiv -V'_t / h_t V''_t > 0$.

The key panel data moments become:

$$\begin{aligned} Var(\Delta c_t) &\simeq \beta^2 \phi^2 s^2 Var(v_{1t}) + \beta^2 \phi^2 (1 - \rho)^2 (1 - s)^2 Var(v_{2t}) \\ &\quad + 2\beta^2 \phi^2 (1 - \rho) s (1 - s) Cov(v_{1t}, v_{2t}) \end{aligned}$$

$$Var(\Delta y_{1t}) \simeq Var(v_{1t}) + \Delta Var(u_{1t})$$

$$\begin{aligned} Var(\Delta y_{2t}) &\simeq (1 - \psi)^2 Var(u_{2t}) - \beta^2 \rho^2 s^2 Var(v_{1t}) \\ &\quad + \beta^2 \phi^2 (1 - \rho)^2 Var(v_{2t}) - 2\beta^2 \phi \rho (1 - \rho) s Cov(v_{1t}, v_{2t}) \end{aligned}$$

$$Var(\Delta w_t) \simeq Var(v_{2t}) + \Delta Var(u_{2t})$$

where

- $\beta = 1 / (\phi + \rho(1 - s))$.

- s_t is the ratio of the mean value of the primary earner's earnings to that of the household \bar{Y}_{1t} / \bar{Y}_t

- When the labour supply elasticity $\rho > 0$ then the secondary worker provides insurance for shocks to y_1

- **Figure 8:** shows interesting implications for the variance of transitory shocks to household income

reconciles the **Gottshalk and Moffitt results** and relates to recent references:

- Attanasio, Berloffa, Blundell and Preston (2002, EJ), 'From Earnings Inequality to Consumption Inequality'

- Attanasio, Sanchez-Marcos and Low (2005, JEEA), 'Female labor Supply as an Insurance Against Idiosyncratic Risk'

- Heathcote, Storesletten and Violante (2006), 'Consumption and Labour Supply with Partial Insurance'

- (• All references on webpage)

Partial Insurance: Family Transfers and Taxes

Table VI:

- **Tax system and transfers** provide some insurance to permanent shocks

- ▷ food stamps for low income households studied in Blundell and Pistaferri (2003), 'Income volatility and household consumption: The impact of food assistance programs', special conference issue of JHR,

- ▷ also contains the Meyer and Sullivan paper, 'Measuring the Well-Being of the Poor Using Income and Consumption'

Partial Insurance: Wealth and Durables

- Excess sensitivity among low wealth households: select (30%) initial low wealth.

also consider

- Impact of durable purchases as a smoothing mechanism?

BLS and IFS studies have noted the increased variance when durable purchases are included.

Table VII

- Excess sensitivity among low wealth households
- For poor households at least - absence of simple credit market
 - Excess sensitivity among low wealth households - even more impressive use of durables among low wealth households: - Browning, and Crossley (2003), “Shocks, stocks and socks: Consumption smoothing and the replacement of durables”

Summary

◀ Objective to understand the relationship between income and consumption inequality

◀ Reconcile the results in three literatures:

- inequality over time in consumption, income and earnings
- econometric work on panel data income and earnings processes
- the work on intertemporal consumption and insurance, especially on ‘excess’

insurance and excess sensitivity

◀ Important role for two transmission parameters that identify generalisations of the self-insurance model

◀ Identify the contribution of both transitory and permanent shocks

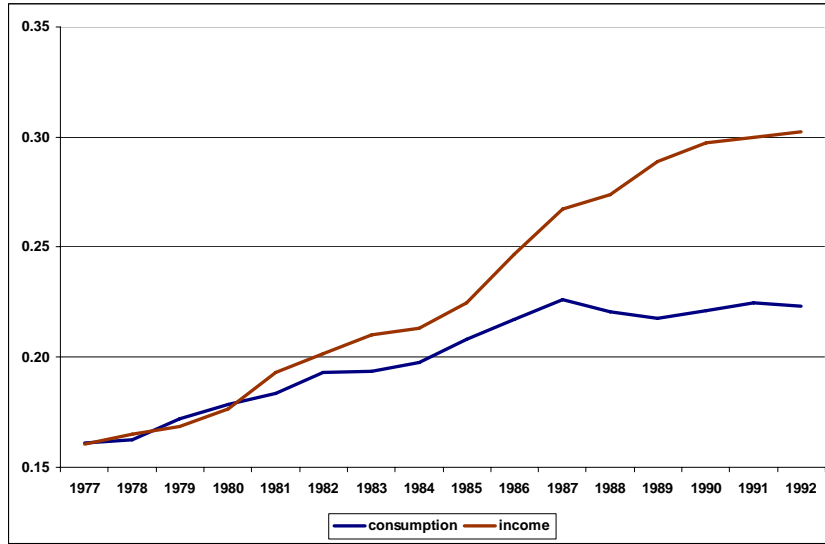
What has been found?

- ◀ Distinctive and resilient features in the dynamics of income and consumption distributions
- ◀ The relationship between consumption and income inequality over the 1980s can be explained by the dramatic change in the mix of permanent and transitory income shocks over this period.
- ◀ A predominance of uninsured permanent shocks in early 1980s in US and UK, and early 1990s in Spain - other countries?
- ◀ Liquidity distortions among lower wealth groups
- ◀ Durable purchases as insurance to transitory shocks among lower wealth groups
- ◀ Evidence of 'secondary worker' labour supply as insurance to primary workers transitory earnings shocks in early 1980s - Gottshalk and Moffitt.

What of future research?

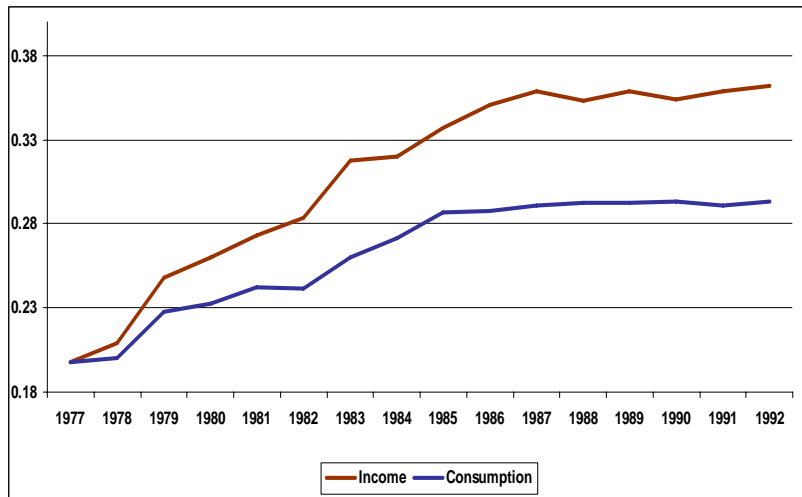
- ◀ Within household insurance: Heathcote, Storesletten and Violante (2006), Lise and Seitz (2005)
- ◀ Differential persistence across the distribution: optimal welfare results for low wealth/low human capital groups: optimal earned income tax-credits.
- ◀ Understanding the mechanism and market incentives for excess insurance - Krueger and Perri (2006) and Attanasio and Pavoni (2006).
- ◀ Advance information and/or predictable life-cycle income trends - Cuhna, Heckman and Navarro (2005), see also Primiceri and van Rens (2006).
- ◀ Alternative panel data income processes e.g. Guvenen (2005).
- ◀ The specific use of credit and durables - Davis, Kubler and Willen (2005), Browning and Crossley (2004)

Figure 1a: Consumption and Income Inequality in the UK



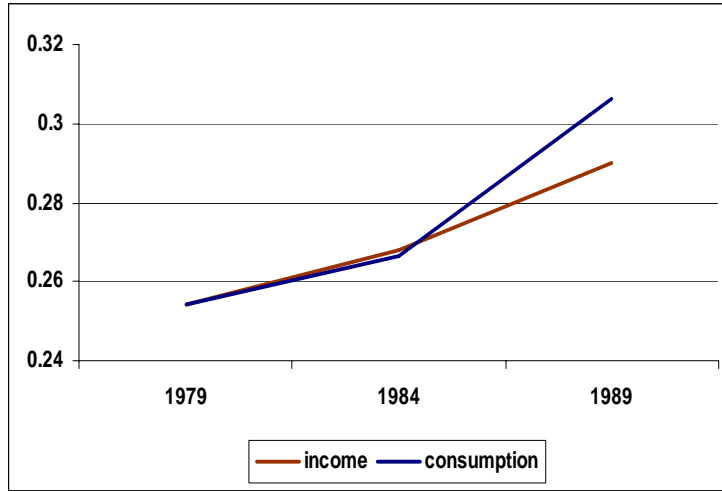
Authors calculations.
Variance of log equivalised, cons rebased at 1977, smoothed.

Figure 1b: Consumption and Income Inequality in the US



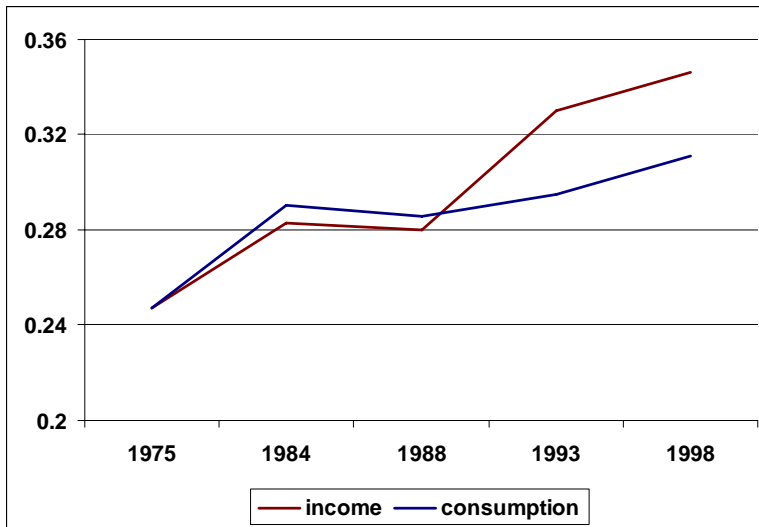
Source: Blundell, Pistaferri and Preston (2004) : CEX/PSID
Variance of log equivalised, cons rebased at 1977, smoothed

Figure 1c: Consumption and Income Inequality in Japan



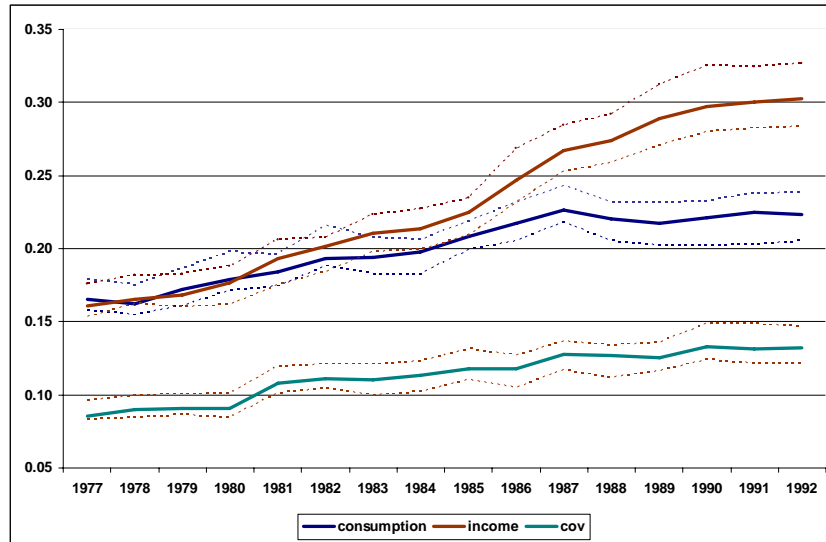
Source: Othake and Saito (1998); NSFIE
Var (log) with cons rebased at 1979

Figure 1d: Consumption and Income Inequality in Australia



Source: HES; Barrett, and Crossley and Worswick (2000)
Variance of log equivalised (OECD), cons rebased at 1975

Figure 1e: Consumption and Income Inequality in the UK



(variance of log equivalised, cons rebased at 1978)

Table I: Consumption and Income Inequality 1978-1992

UK			
Goodman and Oldfield (IFS, 2004)	1978	1986	1992
Income Gini	.23	.29	.33
Consumption Gini	.20	.24	.26
US			
Johnson and Smeeding (BLS, 2005)	1981	1985	1990
Income Gini	.34	.39	.41
Consumption Gini	.25	.28	.29

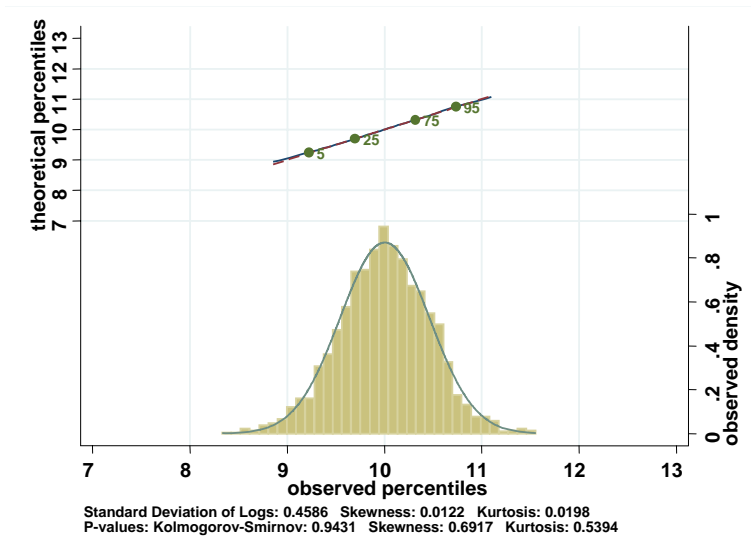
Both studies bring the figures up to 2001.

Relate to:

- Atkinson (1997): UK income Gini rises 10 points late 70s to early 90s.
- Cutler and Katz (1992): US consumption Gini 65% of income inequality, 80->88.
- Gottschalk and Moffitt (1994): 1980s transitory shocks account for 50% inequality growth

Note: In comparison with the Gini, a small transfer between two individuals a fixed income distance apart lower in the distribution will have a higher effect on the variance of logs.

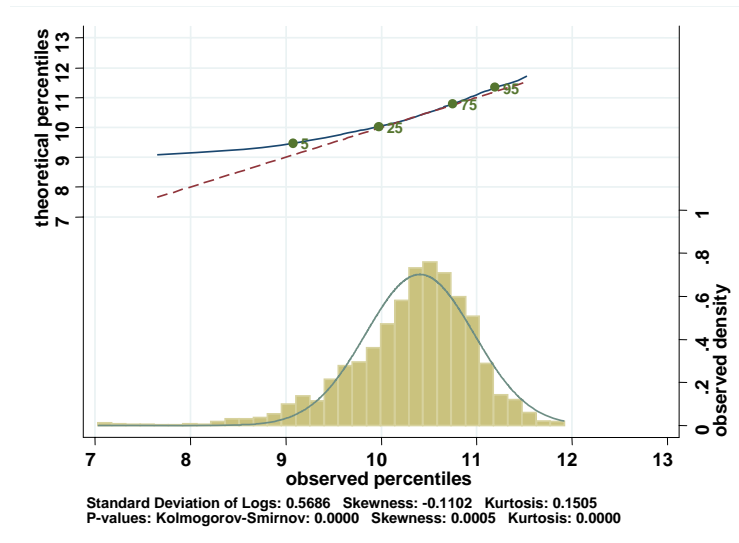
Figure 2a: The distribution of log consumption: US CEX



COHORT 1950-59 Age 31-35

Source: Battistin, Blundell and Lewbel (2005)

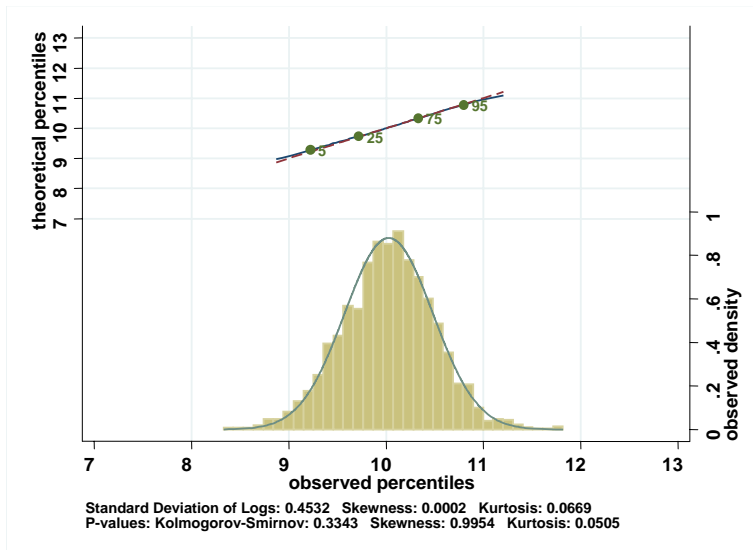
Figure 2b: The distribution of log income: US CEX



Age 31-35, income

Source: Battistin, Blundell and Lewbel (2005)

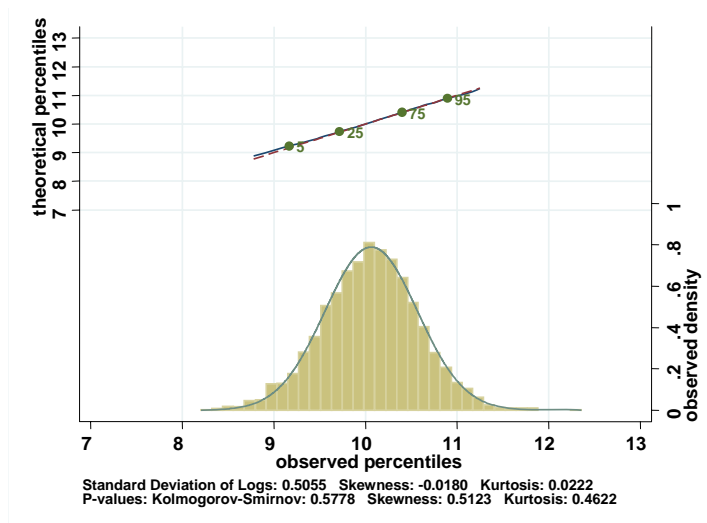
Figure 2c: The distribution of log consumption: US CEX



COHORT 1950-59 Age 36-40

Source: Battistin, Blundell and Lewbel (2005)

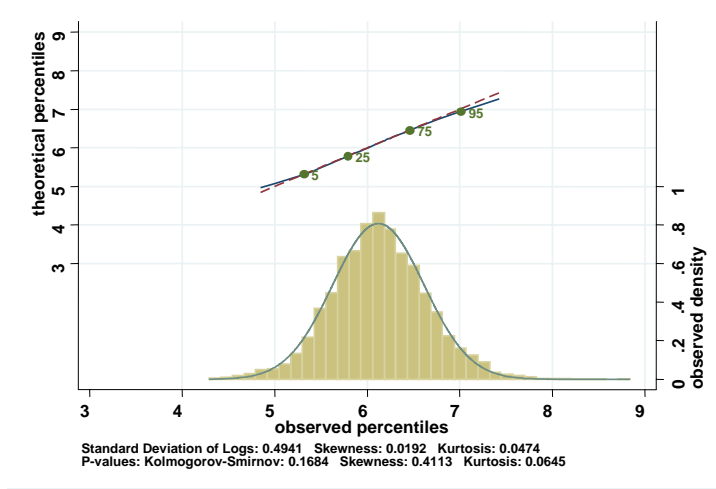
Figure 2d: The distribution of log consumption: US CEX



COHORT 1950-59 age 41-45

Source: Battistin, Blundell and Lewbel (2005)

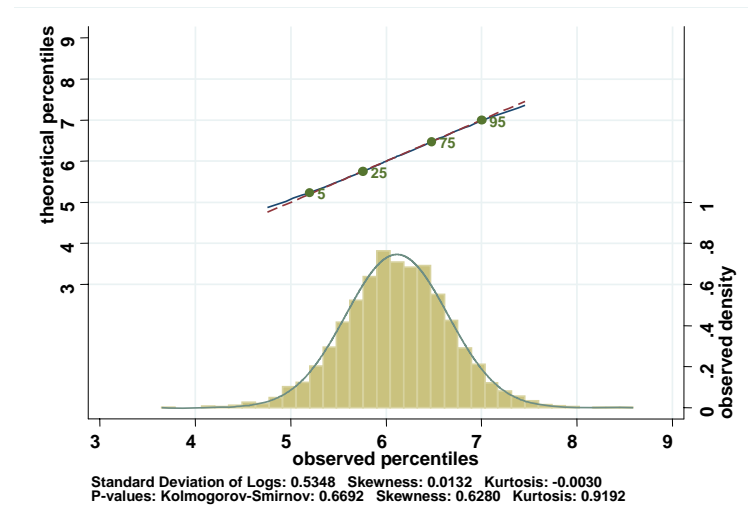
Figure 3a: The distribution of log consumption: UK FES



COHORT 1940-49, AGE 41-45

Source: Battistin, Blundell and Lewbel (2005)

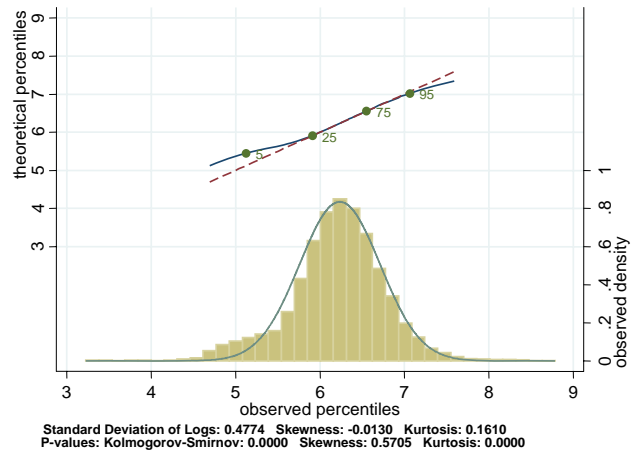
Figure 3b: The distribution of log consumption: UK FES



COHORT 1940-49, AGE 51-55

Source: Battistin, Blundell and Lewbel (2005)

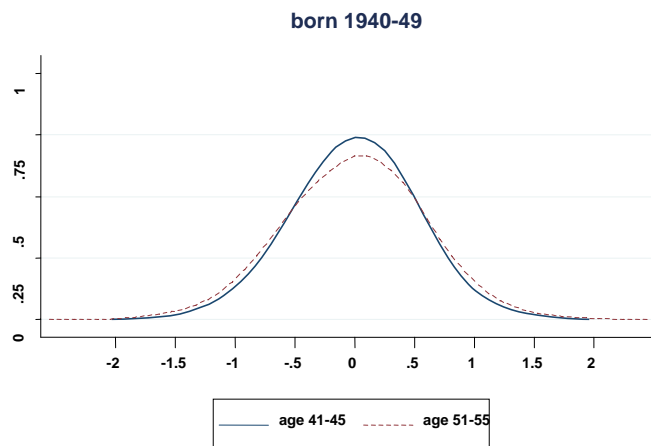
Figure 3c: The distribution of log income: UK FES



COHORT 1940-49, AGE 41-45

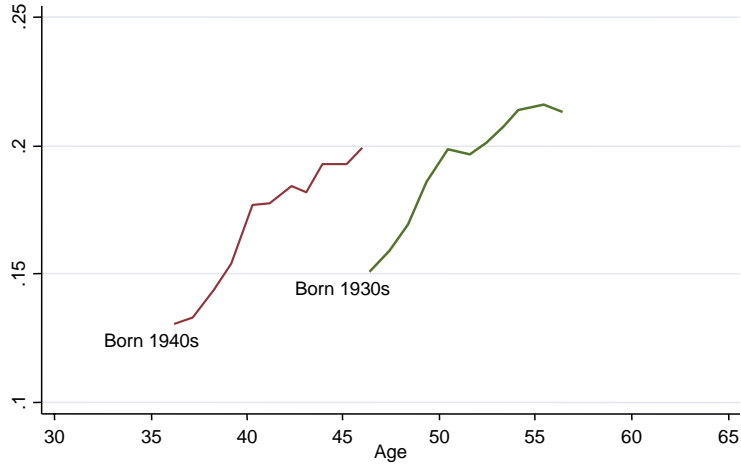
Source: Battistin, Blundell and Lewbel

Figure 4a: The cohort evolution of log consumption distribution: US CEX



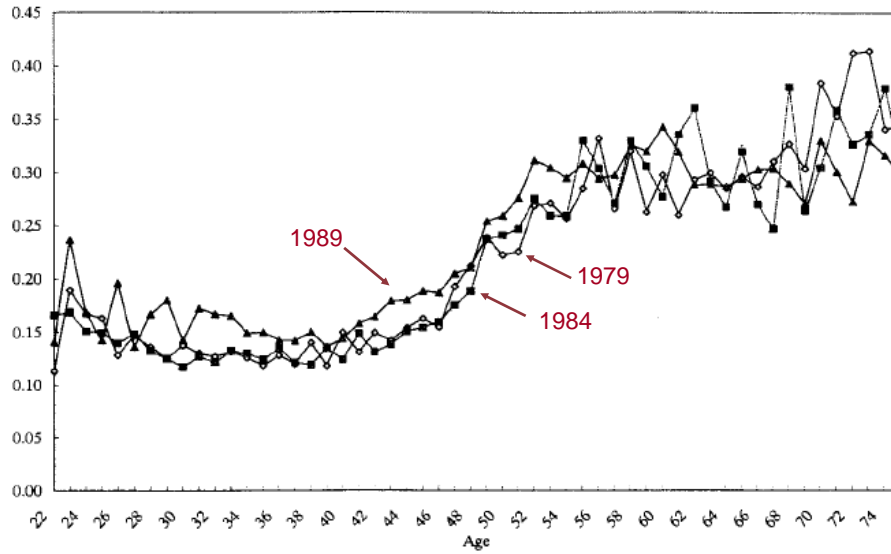
Source: Battistin, Blundell and Lewbel

Figure 4b: Cohort Consumption Inequality in the US by Cohort



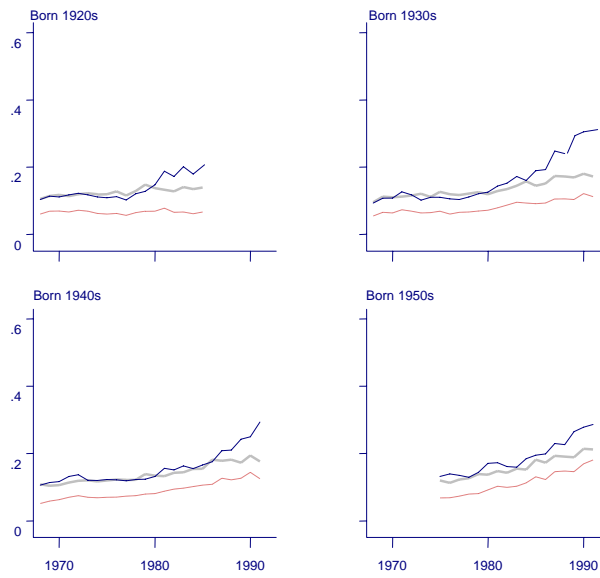
Source: Blundell, Pistaferri and Preston (2005)
Variance of log equivalised, PSID

Figure 4c: Consumption Inequality over the Life-Cycle in Japan



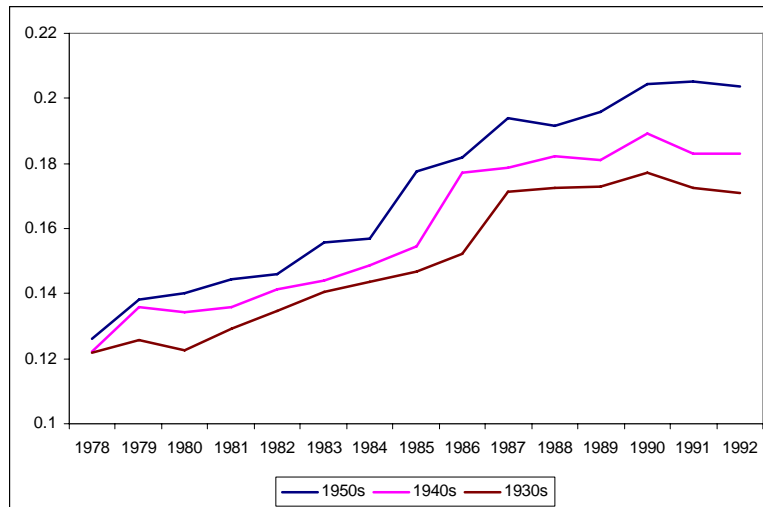
Source: Othake and Saito (1998)
Var (log); NSFIE

Figure 4d: Cohort Inequality in the UK



Blundell and Preston (1998)

Figure 4e: Cohort Consumption Inequality in the UK



(variance of log equivalised)

Table IIa: The Covariance Structure of Income - PSID

Year	var(Δy_t)	cov($\Delta y_{t+1}, \Delta y_t$)	cov($\Delta y_{t+2}, \Delta y_t$)
1980	0.0830	-0.0224	-0.0019
	(0.0088)	(0.0041)	(0.0030)
1981	0.0813	-0.0291	-0.0038
	(0.0090)	(0.0049)	(0.0035)
1985	0.0927	-0.0321	-0.0012
	(0.0069)	(0.0053)	(0.0042)
1986	0.1153	-0.0440	-0.0078
	(0.0120)	(0.0094)	(0.0061)
1987	0.1185	-0.0402	0.0014
	(0.0115)	(0.0052)	(0.0046)
1992	0.1196	NA	NA
	(0.0079)		

Source: Blundell, Pistaferri and Preston (2005)
 Variance of log equivalised, PSID

Table IIb: The Covariance Structure of Income - BHPS

Year	var(Δy_t)	cov($\Delta y_{t+1}, \Delta y_t$)	cov($\Delta y_{t+2}, \Delta y_t$)
1996	0.0685	-0.0205	0.0019
	(.0049)	(.0034)	(.0029)
1997	0.0832	-0.0219	-0.0029
	(.0070)	(.0036)	(.0036)
1998	0.0802	-0.0235	-0.0008
	(.0063)	(.0036)	(.0032)
1999	0.0844	-0.0179	-0.0006
	(.0074)	(.0041)	(.0040)

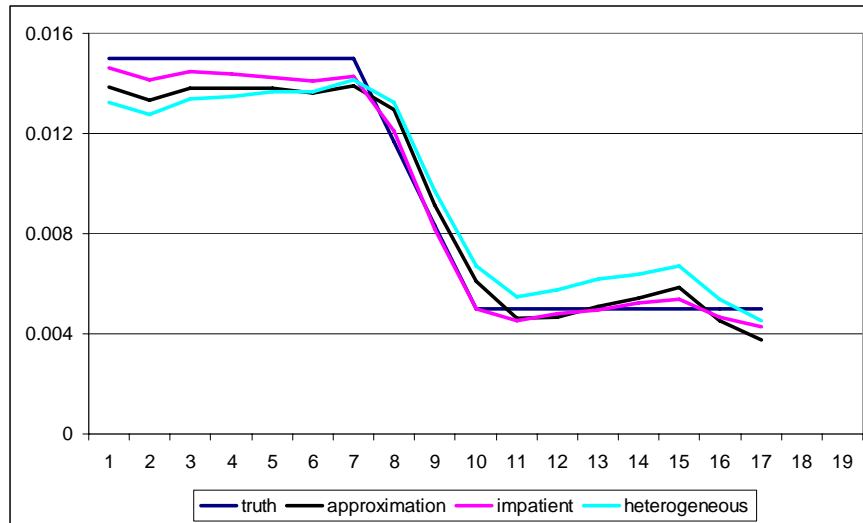
Source: Etheridge (2006)
 Variance of log equivalised, BHPS

Table IIc: The Covariance Structure of Income - ECFP

Year	var(Δy_t)	cov($\Delta y_{t+1}, \Delta y_t$)	cov($\Delta y_{t+2}, \Delta y_t$)
1986	0.0890 (0.0088)	-0.0387 (0.0041)	0.0041 (0.0030)
1988	0.09123 (0.0090)	-0.0411 (0.0049)	0.0103 (0.0035)
1990	0.0817 (0.0069)	-0.0370 (0.0053)	0.0092 (0.0042)
1992	0.0851 (0.0120)	-0.0380 (0.0094)	0.0101 (0.0061)
1995	0.0895 (0.0115)	-0.0411 (0.0052)	0.0090 (0.0046)

Source: Casado García, Labeaga and Preston (2005)
Variance of log equivalised, ECFP

Figure 5: A Simulated Economy, permanent shock variance estimates



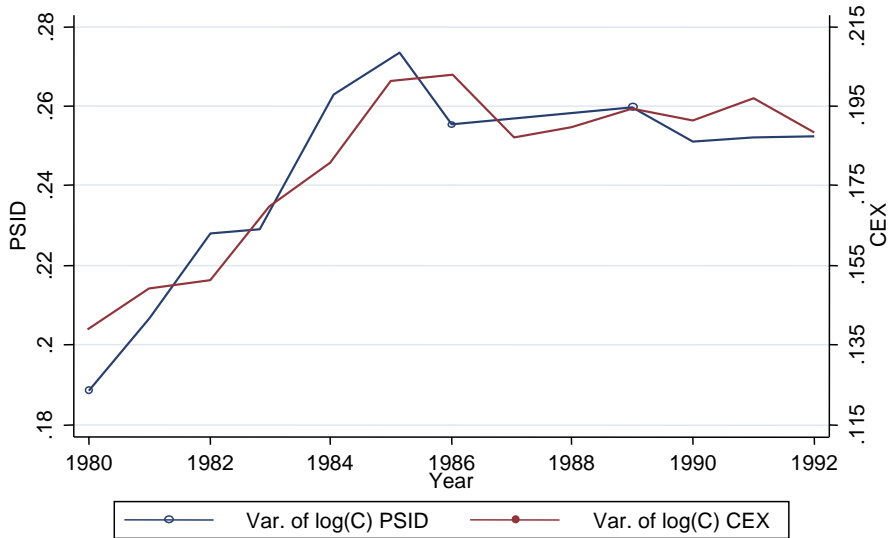
Source: Blundell, Low and Preston (2004)

Table III: The Demand For Food

Variable	Estimate	Variable	Estimate	Variable	Estimate
Inc	0.8503 (0.1511) [0.012]	Inc * 1992	0.0037 (0.0056) [0.083]	Family size	0.0272 (0.0090)
Inc *High School dropout	0.0730 (0.0718) [0.050]	Inc *One child	0.0202 (0.0336) [0.150]	ln p_{food}	-0.9784 (0.2160)
Inc *High School graduate	0.0827 (0.0890) [0.027]	Inc *Two children	-0.0250 (0.0383) [0.120]	ln $p_{transports}$	5.5376 (8.0500)
High school dropout	-0.7030 (0.6741)	Inc *Three children+	0.0087 (0.0340) [0.197]	ln $p_{fuel+utils}$	-0.6670 (4.7351)
High school graduate	-0.8458 (0.8298)	Age	0.0122 (0.0085)	White	0.0769 (0.0129)
		Age ²	-0.0001 (0.0001)	Constant	-0.6404 (0.9266)
OID test				20.92 (d.f. 18; χ^2 p-value 28%)	
Test that income elasticity does not vary over time				27.69 (d.f. 12; χ^2 p-value 0.6%)	

Source: Blundell, Pistaferri and Preston (2004)

Figure 6: Variance of log C in the PSID and in the CEX



Source: Blundell, Pistaferri and Preston (2004)

Table IVa: The Covariance Structure of Consumption

Year	$\text{var}(\Delta c_t)$	$\text{cov}(\Delta c_{t+1}, \Delta c_t)$	$\text{cov}(\Delta c_{t+2}, \Delta c_t)$
1980	0.1319 (0.0111)	-0.0599 (0.0092)	0.0021 (0.0057)
1981	0.1231 (0.0121)	-0.0576 (0.0077)	0.0030 (0.0045)
1982	0.1316 (0.0106)	-0.0624 (0.0085)	0.0004 (0.0052)
1983	0.1476 (0.0140)	-0.0676 (0.0074)	-0.0017 (0.0063)
1984	0.1656 (0.0136)	-0.0781 (0.0125)	-0.0129 (0.0087)
1985	0.1816 (0.0221)	-0.0866 (0.0192)	NA
1990	0.1676 (0.0206)	-0.0601 (0.0060)	-0.0062 (0.0065)
1991	0.1520 (0.0104)	-0.0649 (0.0088)	NA

Source: Blundell, Pistaferri and Preston (2005)
Variance of log equivalised, PSID and CEX

Table IVb: The Covariance of Consumption and Income

Year	$\text{cov}(\Delta y_t, \Delta c_t)$	$\text{cov}(\Delta y_t, \Delta c_{t+1})$	$\text{cov}(\Delta y_{t+1}, \Delta c_t)$
1981	0.0104 (0.0037)	-0.0054 (0.0036)	-0.0051 (0.0033)
1982	0.0165 (0.0038)	-0.0015 (0.0041)	-0.0056 (0.0033)
1983	0.0212 (0.0045)	-0.0057 (0.0043)	-0.0078 (0.0048)
1984	0.0226 (0.0050)	-0.0107 (0.0045)	-0.0055 (0.0045)
1985	0.0181 (0.0064)	-0.0034 (0.0064)	-0.0023 (0.0056)
1986	0.0166 (0.0049)	NA	0.0001 (0.0053)
Test $\text{cov}(\Delta y_{t+1}, \Delta c_t) = 0$ for all t			p-value 0.3305
Test $\text{cov}(\Delta y_{t+2}, \Delta c_t) = 0$ for all t			p-value 0.6058

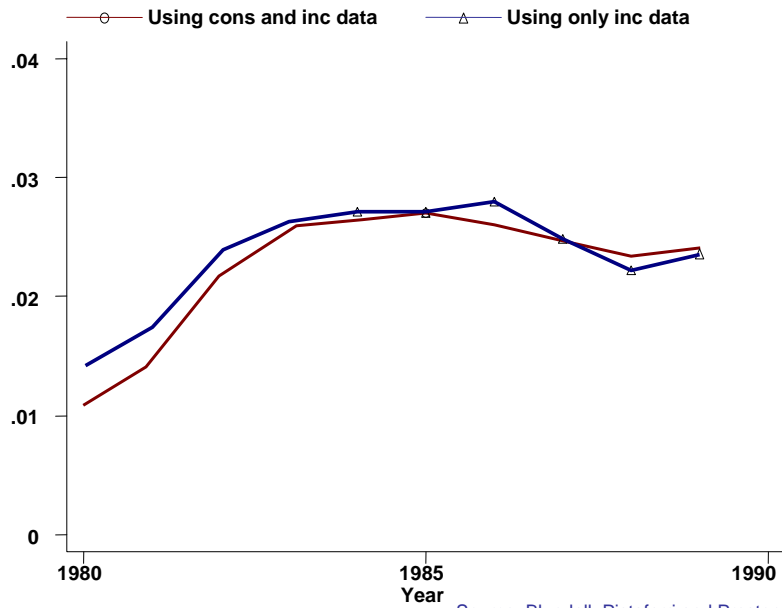
Source: Blundell, Pistaferri and Preston (2005)

Table Va: Structural Estimates: College and Cohort Decomposition: PSID/CEX

		Whole sample	No College	Born 1940s	Born 1930s
σ_{ζ}^2	1980	0.0076 (.0036)	0.0052 (.0044)	0.0065 (.0040)	0.0072 (.0072)
	1982	0.0206 (.0052)	0.0156 (.0065)	0.0208 (.00632)	0.0197 (.0100)
	1986	0.0252 (.0077)	0.0244 (.0094)	0.0219 (.0114)	0.0181 (.0066)
σ_{ε}^2	1980	0.0318 (.0043)	0.0332 (.0057)	0.0282 (.0059)	0.0282 (.0066)
	1984	0.0351 (.0042)	0.0402 (.0063)	0.0218 (.0048)	0.0311 (.0117)
	1986	0.0444 (.0103)	0.0446 (.0081)	0.0542 (.0247)	0.0442 (.0186)
ϕ		0.6167 (.1118)	0.8211 (.2232)	0.7445 (.2124)	0.5626 (.2535)
ψ		0.0550 (.0358)	0.0969 (.0417)	0.0845 (.0457)	0.0215 (.0592)
p-value, equal ϕ		33%	81%	16%	45%
p-value, equal ψ		58%	46%	43%	14%

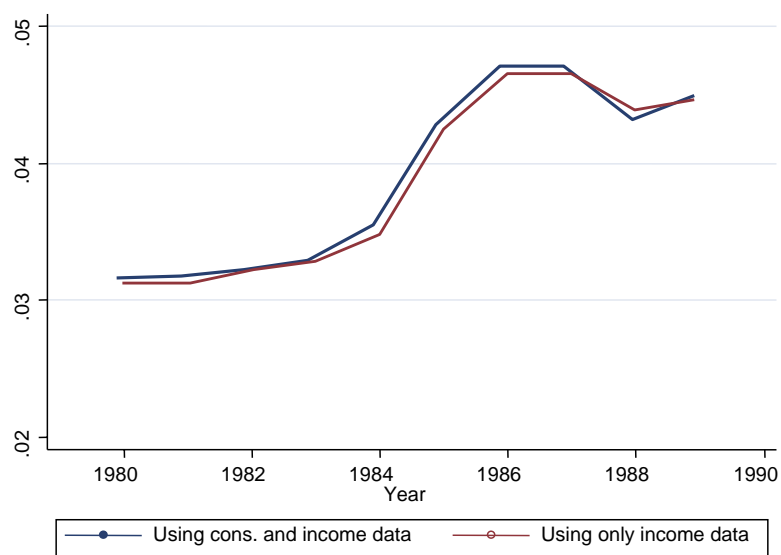
Source: Blundell, Pistaferri and Preston (2005)

Figure 7a: Variance of permanent shocks



Source: Blundell, Pistaferri and Preston (2005)

Figure 7b: Variance of transitory shocks



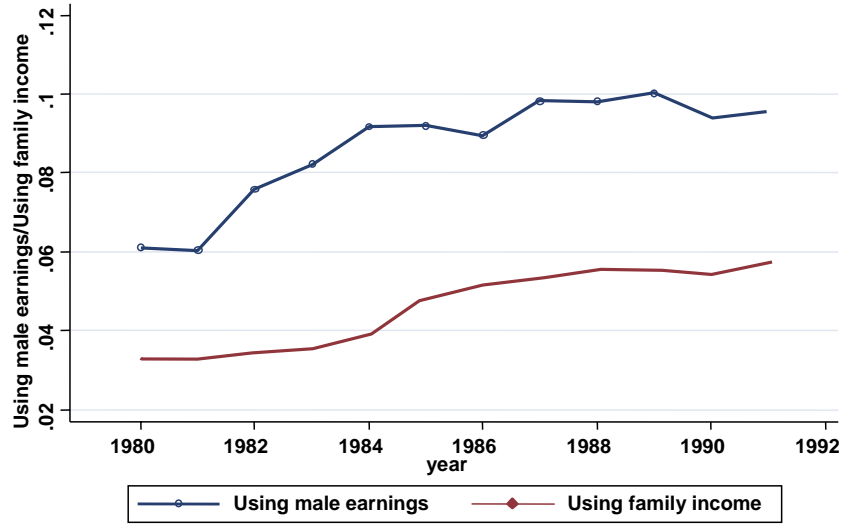
Source: Blundell, Pistaferri and Preston (2005)

Table Vb: Structural Estimates: Cohort Decomposition: ECFP

	Year	Cohort		
		1965-1955	1955-1945	1945-1935
σ_{ξ}^2	1987	0.021	0.013	0.011
	1991	0.045	0.037	0.023
	1995	0.054	0.039	0.031
σ_{ε}^2	1987	0.013	0.019	0.009
	1991	0.033	0.024	0.020
	1995	0.049	0.043	0.042
θ		0.101	0.097	0.198
σ_{ξ}^2		0.016	0.012	0.011
ϕ		0.981	0.923	0.851
ψ		0.221	0.137	0.097
P-value test of equal ϕ		17%	41%	61%
P-value test of equal ψ		22%	29%	16%

Source: Casado-García, Labeaga and Preston (2005)

Figure 8: Variance of transitory shocks for male earnings and for family income



Source: Blundell, Pistaferri and Preston (2005)

Table VI: Structural Estimates: Family Transfers, Taxes and Earnings

	Baseline	Excluding help from relatives	Earnings rather than Net Income
ϕ	0.6167 (0.1118)	0.6531 (0.1187)	0.4368 (0.0977)
ψ	0.0550 (0.0358)	0.0532 (0.0359)	0.0574 (0.0286)

Source: Blundell, Pistaferri and Preston (2005)

Table VII: Structural Estimates: Wealth and Durables

	Non. dur. Low wealth	Inc. dur. Low wealth
ϕ	0.9589 (0.3696)	0.8800 (0.3131)
ψ	0.2800 (0.0896)	0.4159 (0.1153)

Source: Blundell, Pistaferri and Preston (2005)

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