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

Richard Blundell

University College London
and
Institute for Fiscal Studies

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

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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:

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

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

$$A_{i,a+j+1,t+j+1} = \left(1 + r_{t+j}\right) A_{i,a+j,t+j} + Y_{i,a+j,t+j} - C_{i,a+j,t+j}$$

$$A_{i,T,t+T-a} = 0$$

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

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

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

$$E(\sum_{j=0}\zeta_{i,t-j}|\epsilon_{it}, \epsilon_{i,t-1}, ...) - E(\sum_{j=0}\zeta_{i,t-j}|\epsilon_{i,t-1}, ...) = (1-\theta_{t+1})\varepsilon_{it}.$$

- 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 $\mathbf{C}_i \equiv (C_{i0}, C_{i1}, ..., C_{iT})$

• Hicksian demands are $C_{it} = C_t(U_i, \mathbf{p}_i)$ where $\mathbf{p}_i \equiv (p_{i0}, p_{i1}, ..., p_{iT})$ 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 $\widetilde{Y}_i$ as that certain present discounted value of lifetime income which would allow the individual to achieve the same expected utility. The consumption stream $\widetilde{\mathbf{C}}_i = \widetilde{\mathbf{C}}(EU_i)$ that would be chosen given $\widetilde{Y}_i$ satisfies

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

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 $\mathbf{C}_i = \widetilde{\mathbf{C}}(EU_i)$ whatever the distribution of future income. This is so if and only if $u_t(C_{it}) = -\alpha_t \exp(-\beta_t C_{it}) \qquad \alpha_t, \beta_t > 0, t > 0.$

• This holds exactly iff CARA. The sufficiency part is a special case of a more general result that decreasing absolute risk aversion (DARA) implies $C_{i0} < \widetilde{C}_{i0}$, 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'

  - infact $1-\phi_{bt}$ 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

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

- The covariance term $\text{cov}\left(\Delta v_{a,t}, \Delta v_{a+s,t+s}\right)$ depends on the serial correlation properties of v. If v is an $MA(q)$ serially correlated process, then $\text{cov}\left(\Delta v_{a,t}, \Delta v_{a+s,t+s}\right)$ 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

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

for $s = 0$ and zero otherwise.

- The covariance between income growth and consumption growth is:

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

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

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

- A simple summary the panel data moments:

$$\begin{aligned}
\text{var}\left(\Delta y_t\right) &= \text{var}\left(\zeta_t\right) + \text{var}\left(\varepsilon_t\right) + \text{var}\left(\varepsilon_{t-1}\right) \\
\text{cov}\left(\Delta y_t, \Delta y_{,t-1}\right) &= -\text{var}\left(\varepsilon_{t-1}\right) \\
\text{cov}\left(\Delta y_{t+1}, \Delta y_t\right) &= -\text{var}\left(\varepsilon_t\right) \\
\text{var}\left(\Delta c_t\right) &= \phi_t^2 \text{var}\left(\zeta_t\right) + \psi_t^2 \text{var}\left(\varepsilon_t\right) \\
\text{cov}\left(\Delta c_t, \Delta y_t\right) &= \phi_t \text{var}\left(\zeta_t\right) + \psi_t \text{var}\left(\varepsilon_t\right) \\
\text{cov}\left(\Delta c_t, \Delta y_{t+1}\right) &= -\psi_t \text{var}\left(\varepsilon_t\right)
\end{aligned}$$

.

- 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,

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

and

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

.

  - 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, $\sigma^2_{\zeta,L}$ and $\sigma^2_{\zeta,H}$

- 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 $\leq$ 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: $\widehat{\phi}$ 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

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

$$\begin{aligned}\Delta \ln C_{t+k} &\simeq \sigma_{t+k}\Delta \ln \lambda_{t+k} \\ \Delta \ln h_{t+k} &\simeq -\rho_{t+k}[\Delta \ln \lambda_{t+k} + \Delta \ln W_{t+k}]\end{aligned}$$

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:

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

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 $\overline{Y}_{1t}/\overline{Y}_t$

• 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.

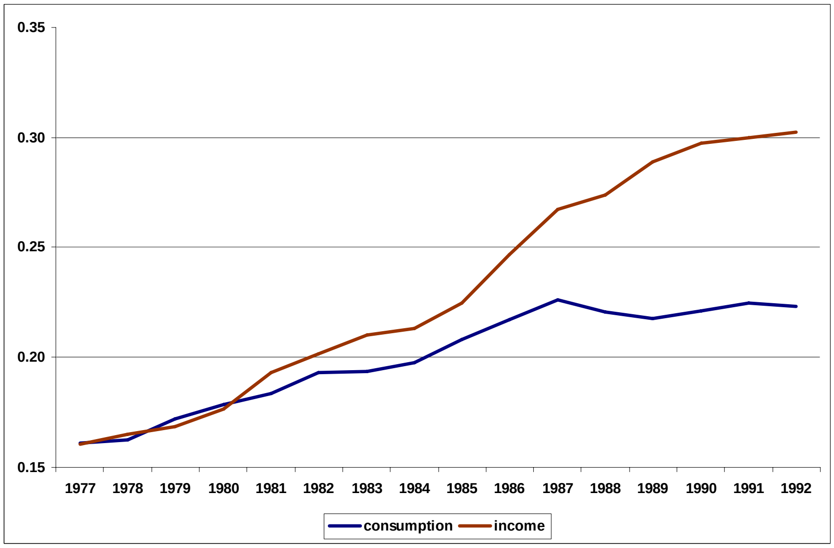
◄ Understanding the mechanism and market incentives for excess insurance - Krueger and Perri (2006) and Attanasio and Pavoni (2006).

◄ 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).

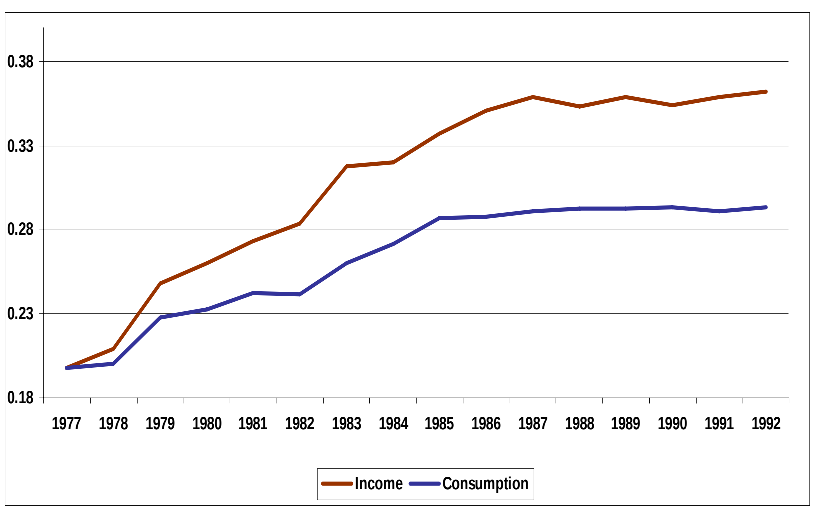
◄ The specific use of credit and durables - Davis, Kubler and Willen (2005), Browning and Crossley (2004)

Figure 1a: Consumption and Income Inequality in the UK



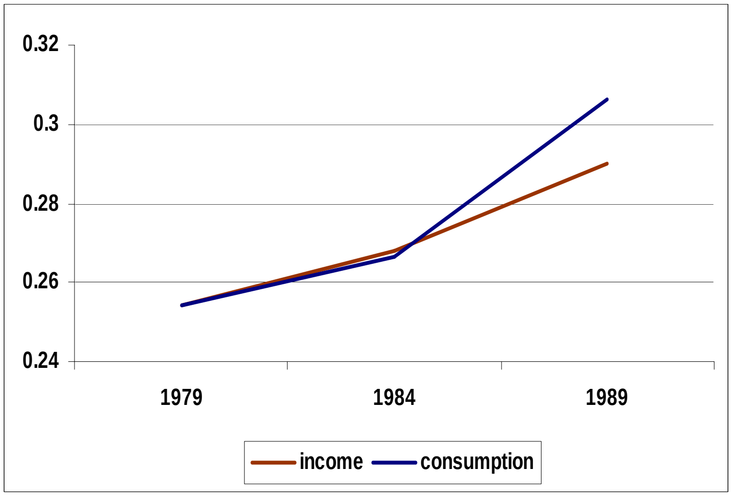
Authors calculations.
Variance of log equivalised, cons rebased at 1977, smoothed.

Figure 1b: Consumption and Income Inequality in the US



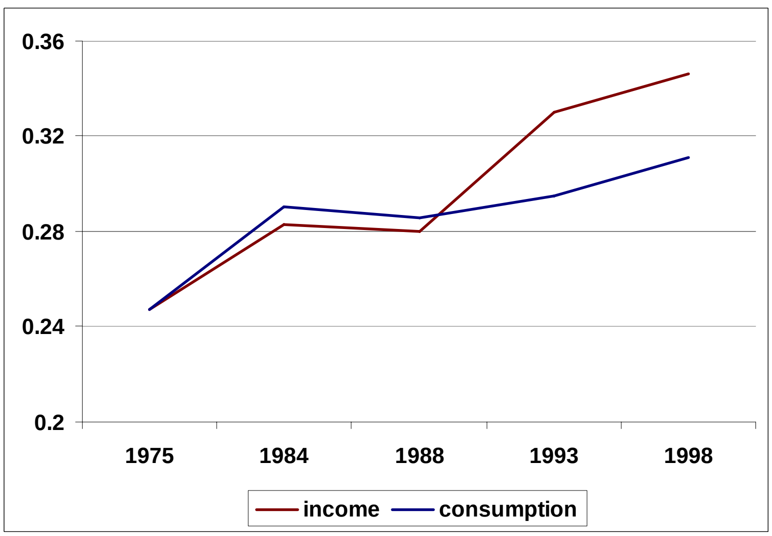
Source: Blundell, Pistaferri and Preston (2004) : CEX/PSID
Variance of log equivalised, cons rebased at 1977, smoothed

Figure 1c: Consumption and Income Inequality in Japan



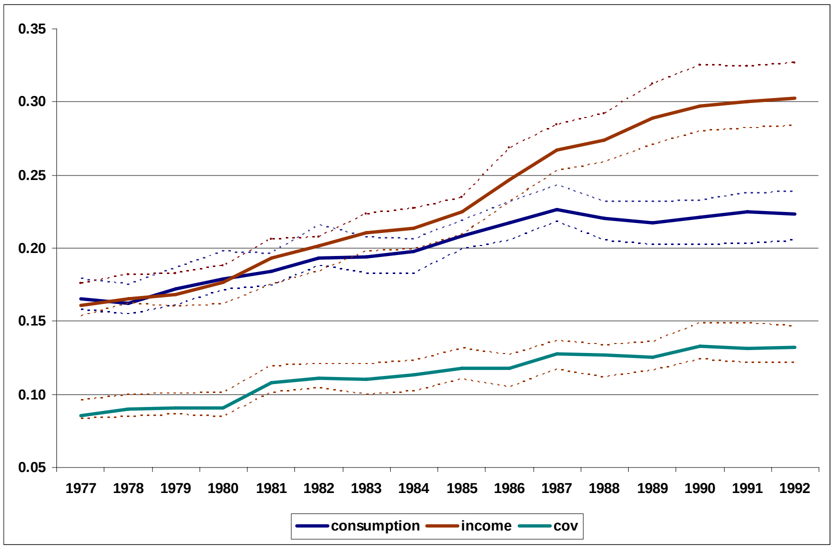
Source: Othake and Saito (1998); NSFIE
Var (log) with cons rebased at 1979

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:

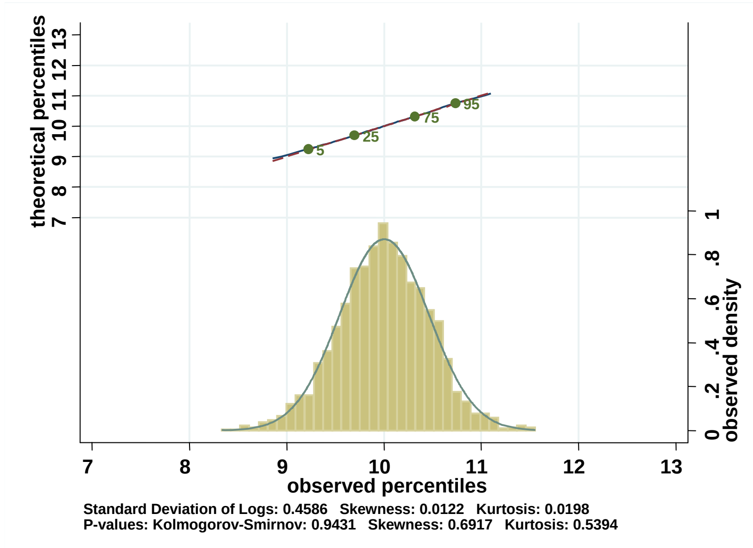
• Atkinson (1997): UK income Gini rises 10 points late 70s to early 90s.

• 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.

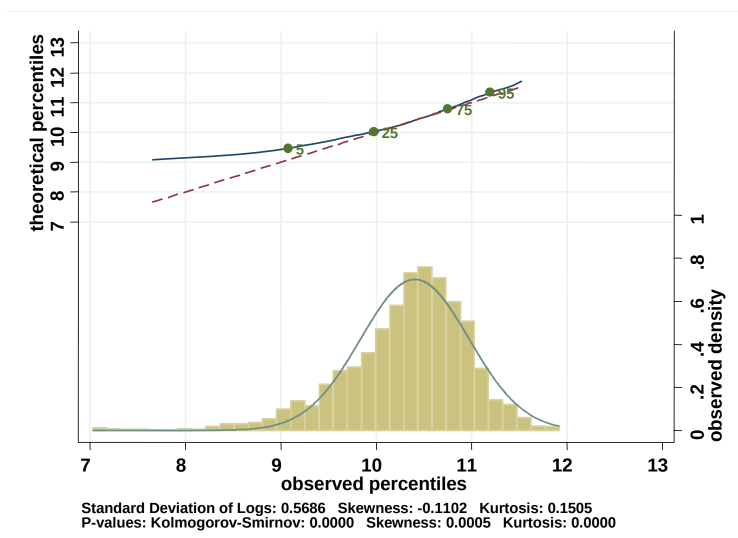
Figure 2a: The distribution of log consumption: US CEX



COHORT 1950-59 Age 31-35

Source: Battistin, Blundell and Lewbel (2005)

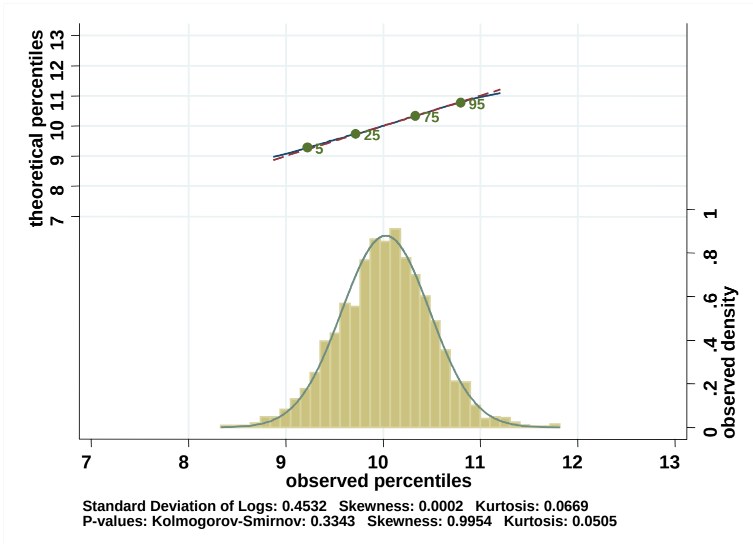
Figure 2b: The distribution of log income: US CEX



Age 31-35, income

Source: Battistin, Blundell and Lewbel (2005)

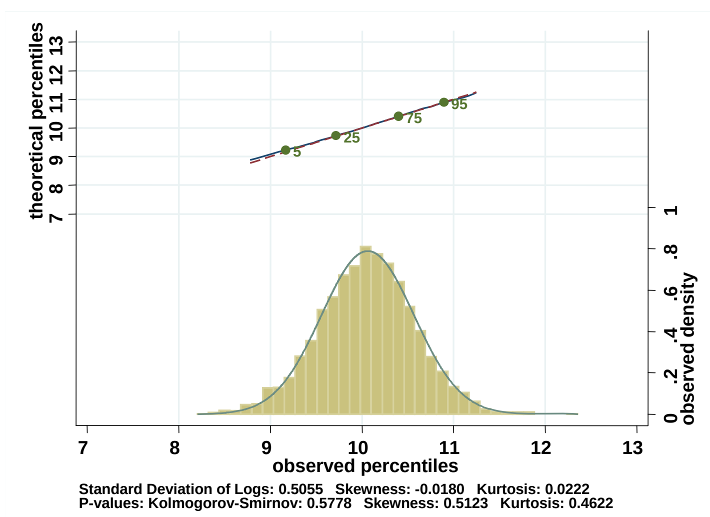
Figure 2c: The distribution of log consumption: US CEX



COHORT 1950-59 Age 36-40

Source: Battistin, Blundell and Lewbel (2005)

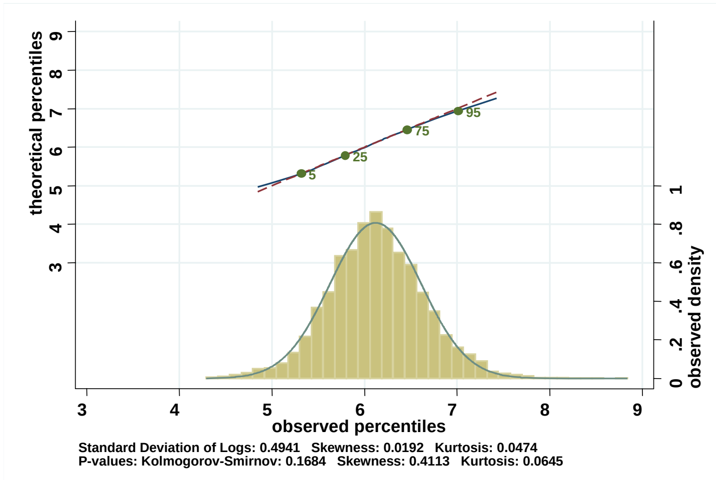
Figure 2d: The distribution of log consumption: US CEX



COHORT 1950-59 age 41-45

Source: Battistin, Blundell and Lewbel (2005)

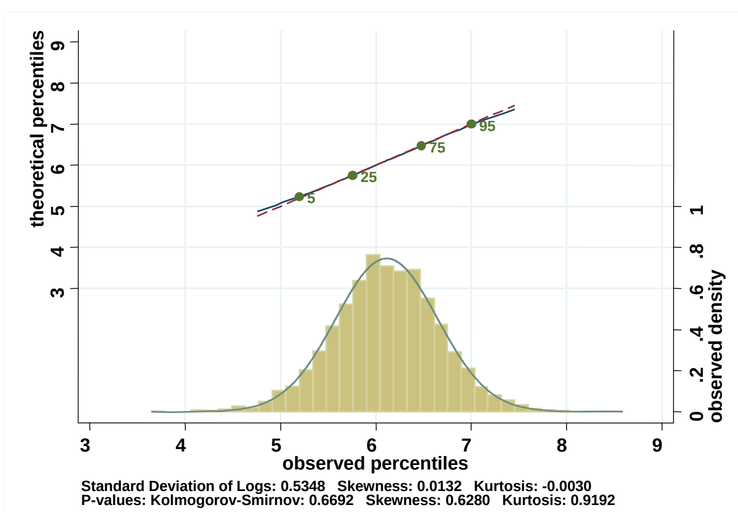
Figure 3a: The distribution of log consumption: UK FES



COHORT 1940-49, AGE 41-45

Source: Battistin, Blundell and Lewbel (2005)

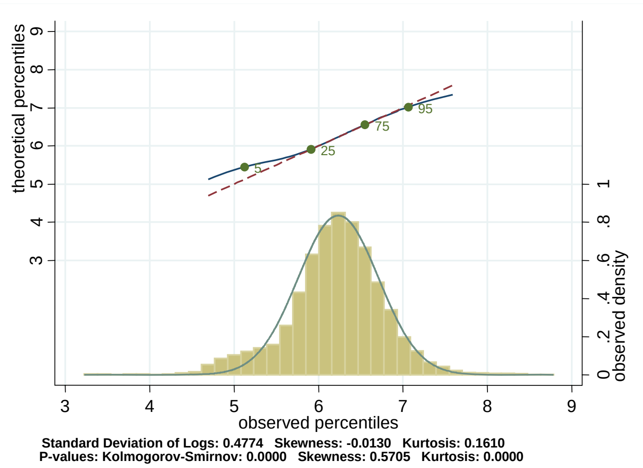
Figure 3b: The distribution of log consumption: UK FES



COHORT 1940-49, AGE 51-55

Source: Battistin, Blundell and Lewbel (2005)

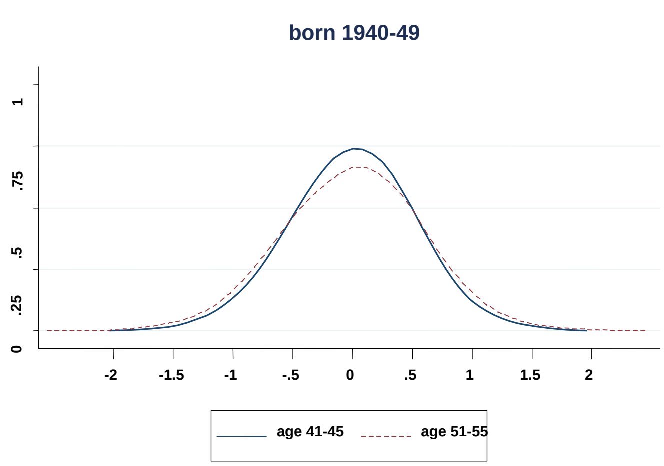
Figure 3c: The distribution of log income: UK FES



COHORT 1940-49, AGE 41-45

Source: Battistin, Blundell and Lewbel

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

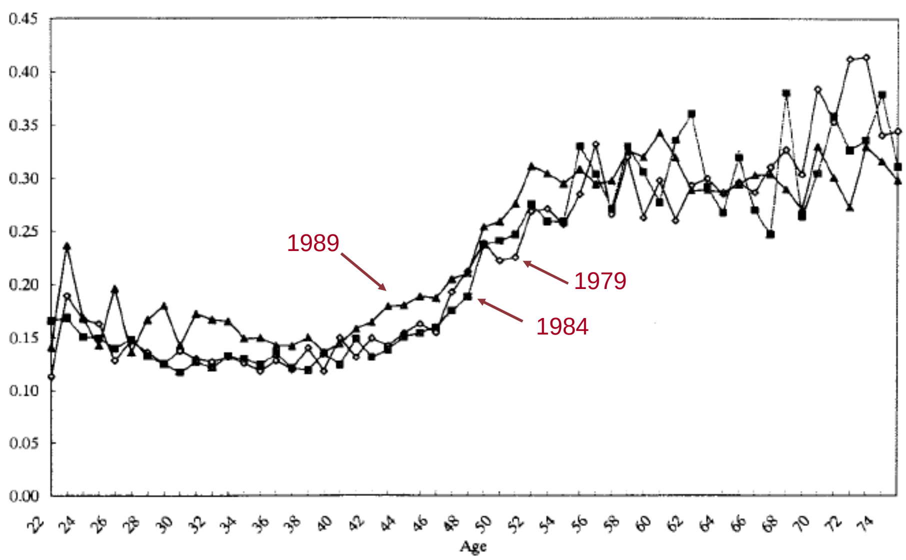


Source: Battistin, Blundell and Lewbel

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

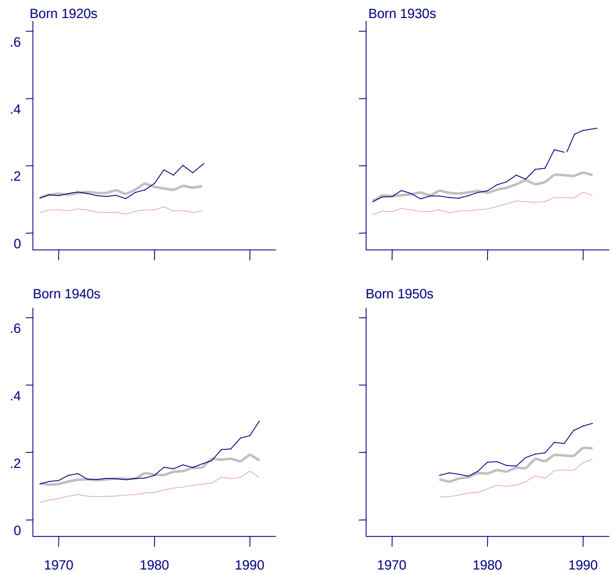
Source: Blundell, Pistaferri and Preston (2005)
Variance of log equivalised, PSID

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



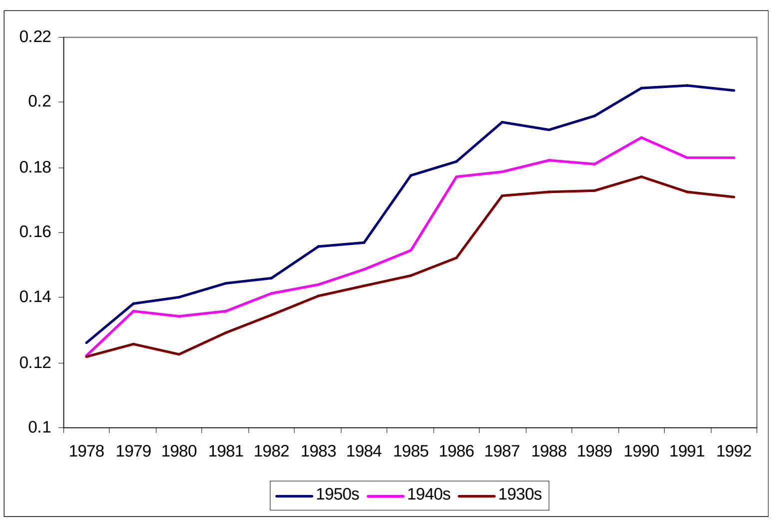
Source: Othake and Saito (1998)
Var (log); NSFIE

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	$var(\Delta y_t)$	$cov(\Delta y_{t+1}, \Delta y_t)$	$cov(\Delta y_{t+2}, \Delta y_t)$
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	$var(\Delta y_t)$	$cov(\Delta y_{t+1}, \Delta y_t)$	$cov(\Delta y_{t+2}, \Delta y_t)$
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)

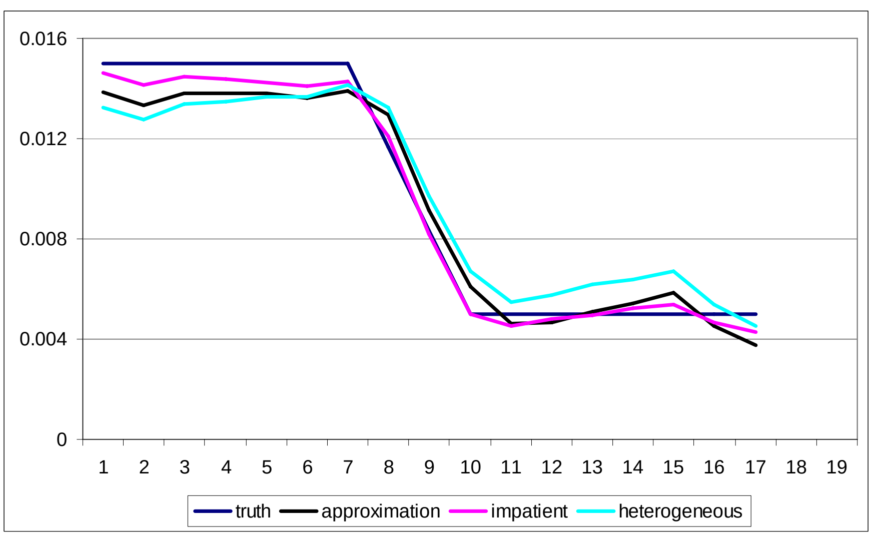
Source: Etheridge (2006)
Variance of log equivalised, BHPS

Table IIc: The Covariance Structure of Income - ECFP

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

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

Figure 5: A Simulated Economy, permanent shock variance estimates



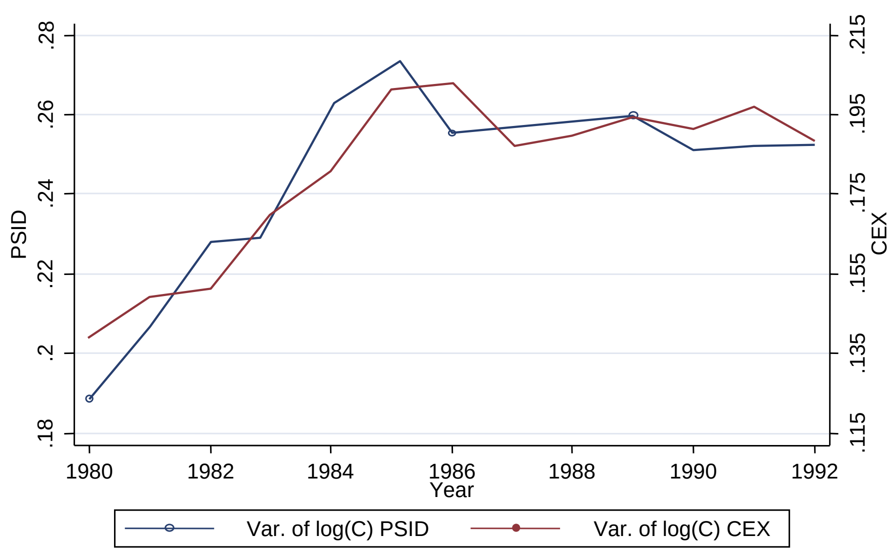
Source: Blundell, Low and Preston (2004)

Table III: The Demand For Food

Variable	Estimate	Variable	Estimate	Variable	Estimate
$\ln c$	0.8503 (0.1511) [0.012]	$\ln c$ * 1992	0.0037 (0.0056) [0.083]	Family size	0.0272 (0.0090)
$\ln c$ *High School dropout	0.0730 (0.0718) [0.050]	$\ln c$ *One child	0.0202 (0.0336) [0.150]	$\ln p_{food}$	−0.9784 (0.2160)
$\ln c$ *High School graduate	0.0827 (0.0890) [0.027]	$\ln c$ *Two children	−0.0250 (0.0383) [0.120]	$\ln p_{transports}$	5.5376 (3.0500)
High school dropout	−0.7030 (0.6741)	$\ln c$ *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	$var(\Delta c_t)$	$cov(\Delta c_{t+1}, \Delta c_t)$	$cov(\Delta c_{t+2}, \Delta c_t)$
1980	0.1319	-0.0599	0.0021
	(0.0111)	(0.0092)	(0.0057)
1981	0.1231	-0.0576	0.0030
	(0.0121)	(0.0077)	(0.0045)
1982	0.1316	-0.0624	0.0004
	(0.0106)	(0.0085)	(0.0052)
1983	0.1476	-0.0676	-0.0017
	(0.0140)	(0.0074)	(0.0063)
1984	0.1656	-0.0781	-0.0129
	(0.0136)	(0.0125)	(0.0087)
1985	0.1816	-0.0866	NA
	(0.0221)	(0.0192)	
1990	0.1676	-0.0601	-0.0062
	(0.0206)	(0.0060)	(0.0065)
1991	0.1520	-0.0649	NA
	(0.0104)	(0.0088)	

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

Table IVb: The Covariance of Consumption and Income

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

Test $cov(\Delta y_{t+1}, \Delta c_t) = 0$ **for all** t — **p-value 0.3305**

Test $cov(\Delta y_{t+2}, \Delta c_t) = 0$ **for all** t — **p-value 0.6058**

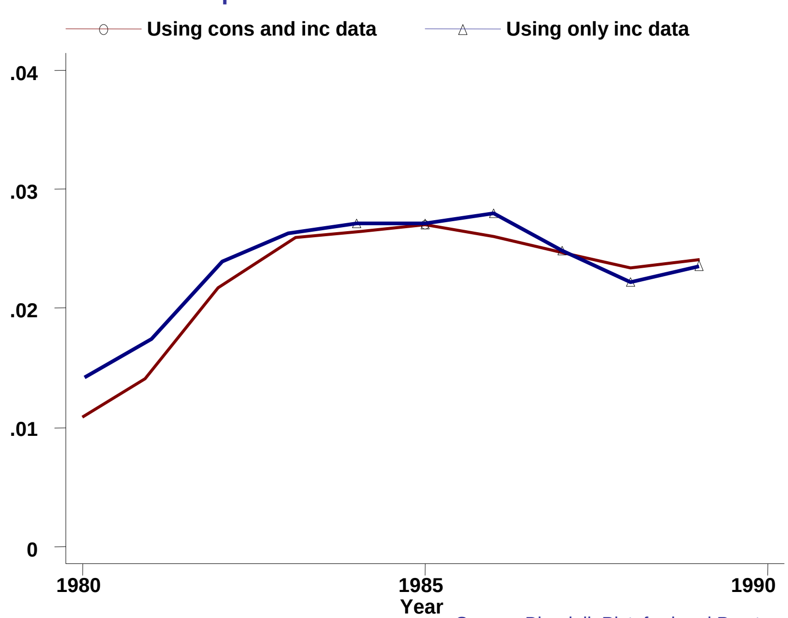
Source: Blundell, Pistaferri and Preston (2005)

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%

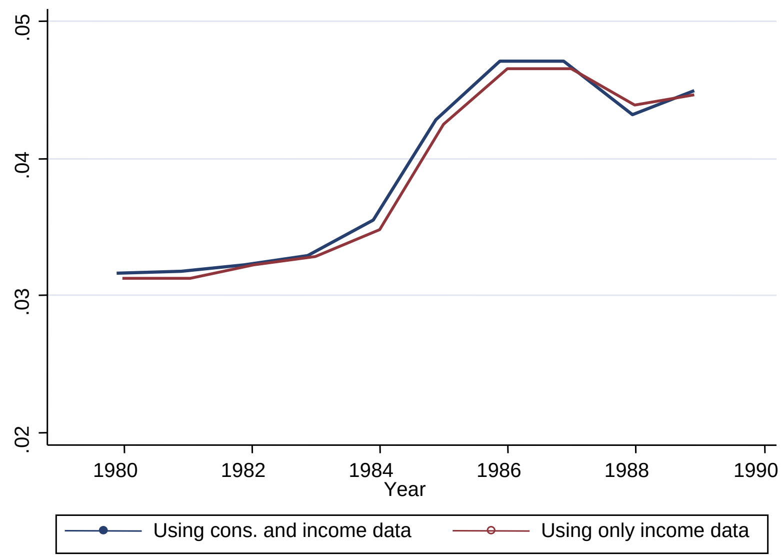
Source: Blundell, Pistaferri and Preston (2005)

Figure 7a: Variance of permanent shocks



Source: Blundell, Pistaferri and Preston (2005)

Figure 7b: Variance of transitory shocks



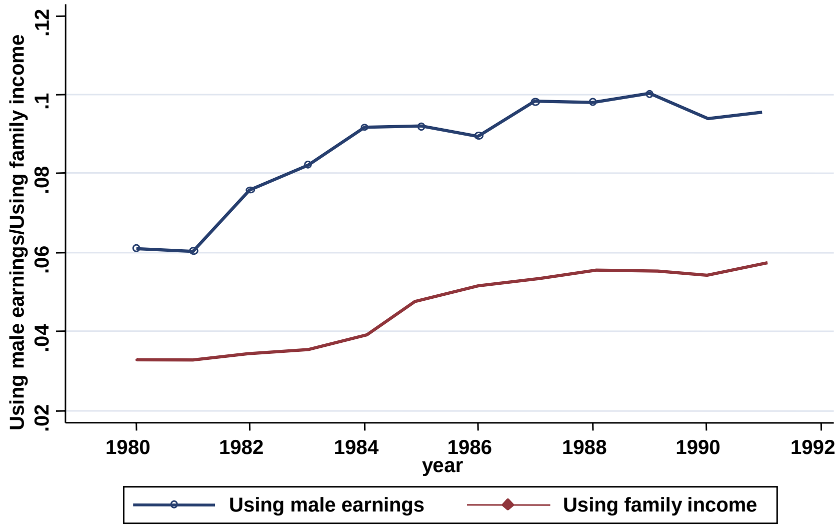
Source: Blundell, Pistaferri and Preston (2005)

Table Vb: Structural Estimates: Cohort Decomposition: ECFP

	Year	*Cohort*		
		1965-1955	1955-1945	1945-1935
σ_{ς}^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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