

# From Income to Consumption: Understanding the Transmission of Inequality

Robert J. Lampman Memorial Lecture

IRP, Wisconsin, May 13, 2010

Richard Blundell

(University College London and Institute for Fiscal Studies)

*slides and references on my website:*

<http://www.ucl.ac.uk/~uctp39a/>

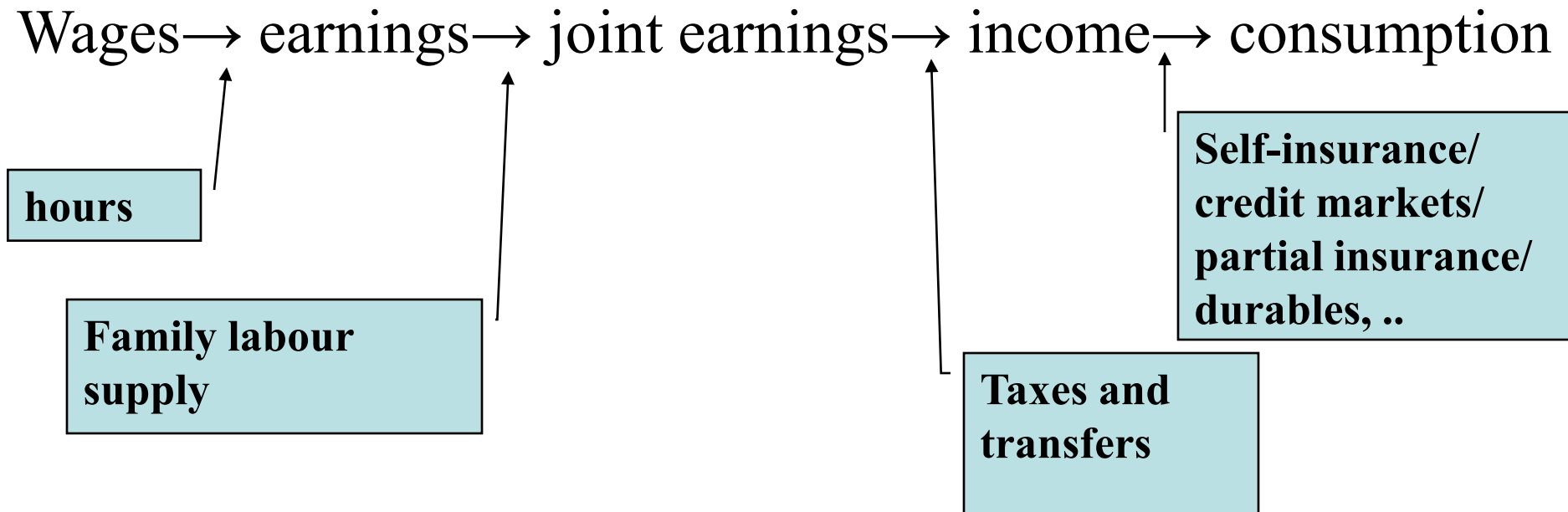
# Setting the Scene

- Inequality has many dimensions:
  - wages, earnings, income, consumption
- The link between the various types of inequality is mediated by multiple ‘insurance’ mechanisms
  - including adjustment in assets
  - family labour supply
  - taxes and transfers
  - durable replacement
  - informal contracts and gifts, etc

# Setting the Scene

- Aim in this work is delve behind the inequality figures and to answer three questions:
  - How well do families insure themselves against adverse shocks?
  - What mechanisms are used?
  - How do these vary across the life-cycle, the business cycle and the wealth distribution?
- Draw on three background ‘technical’ papers:
  - Blundell, Pistaferri and Preston, *AER*, 2008 (BPP)
  - Blundell, Low and Preston, *IFS*, 2009 (BLP)
  - Blundell, Econometric Society Presidential Lecture.

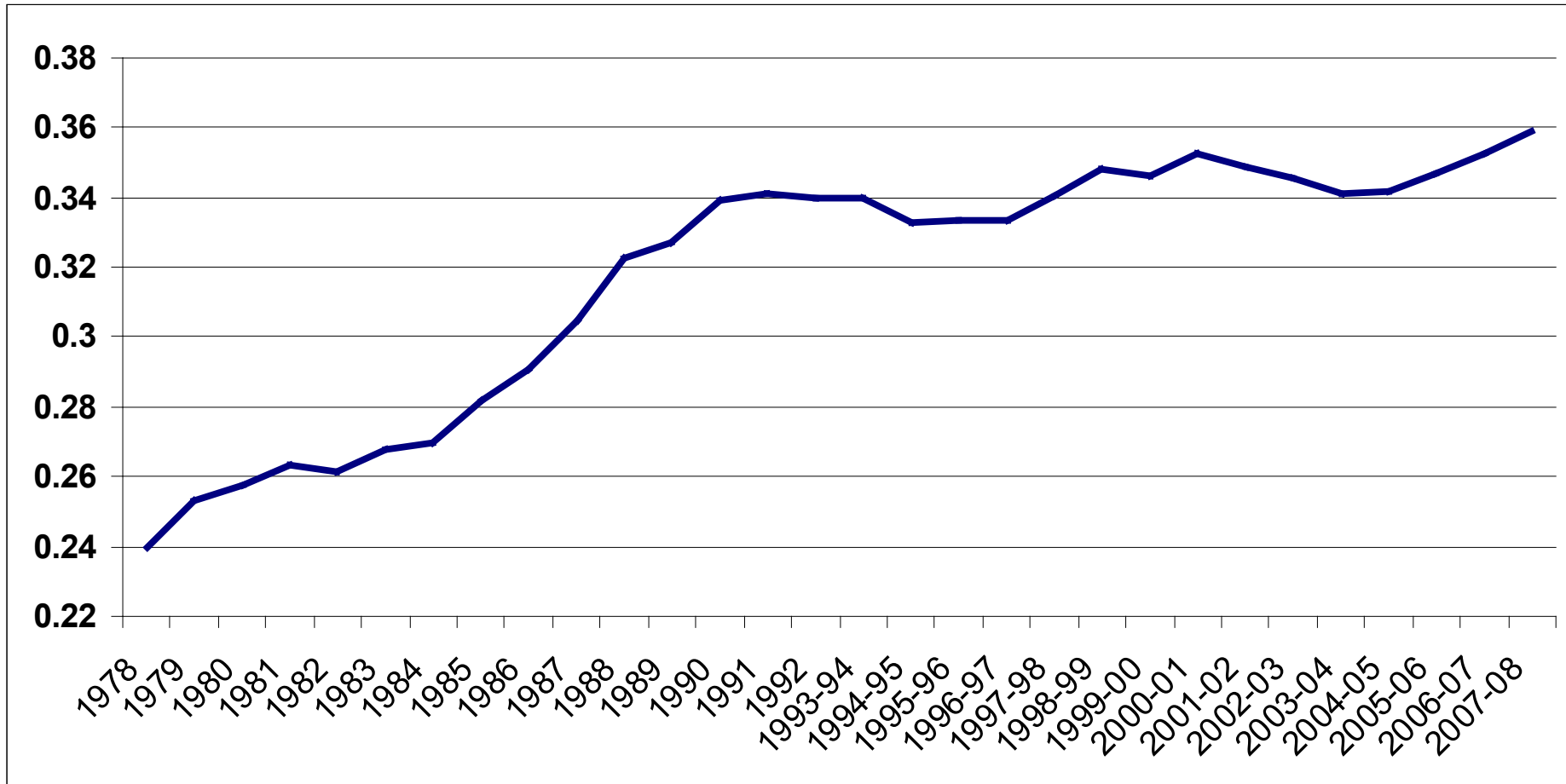
# 'Insurance' mechanisms...



- These mechanisms will vary in importance across different types of households at different points of their **life-cycle** and at different **points in time**.
- First lets explore the characteristics of inequality growth since the late 1970s

# Inequality in Britain

The Gini coefficient, 1979 to 2007–08 (GB)

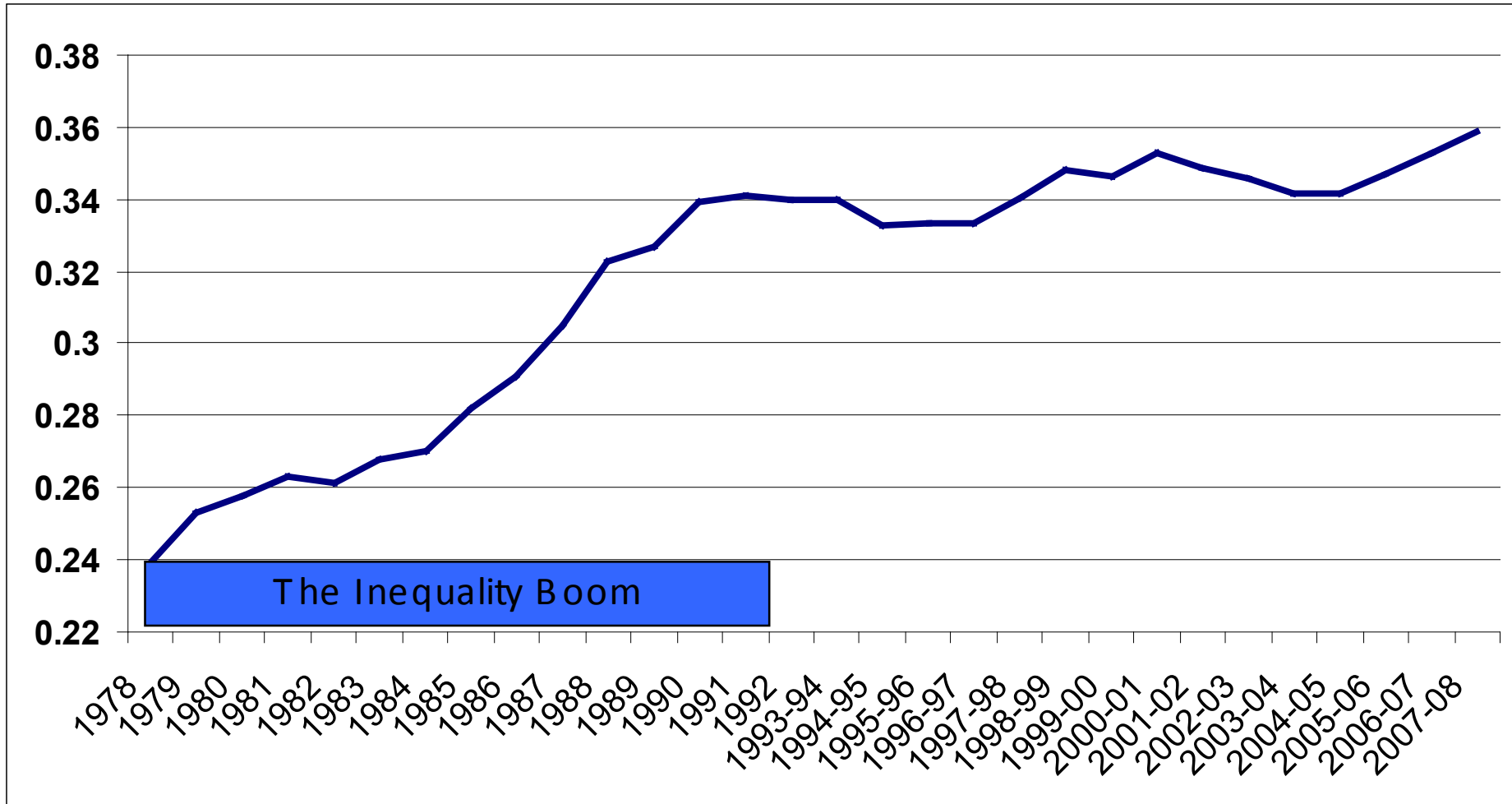


Notes: FES/FRS, BHC

Source: Brewer, Muriel, Phillips and Sibieta (2009)

# Inequality in Britain

The Gini coefficient, 1979 to 2007–08 (GB)



Notes: FES/FRS, BHC

Source: Brewer, Muriel, Phillips and Sibietta (2009)

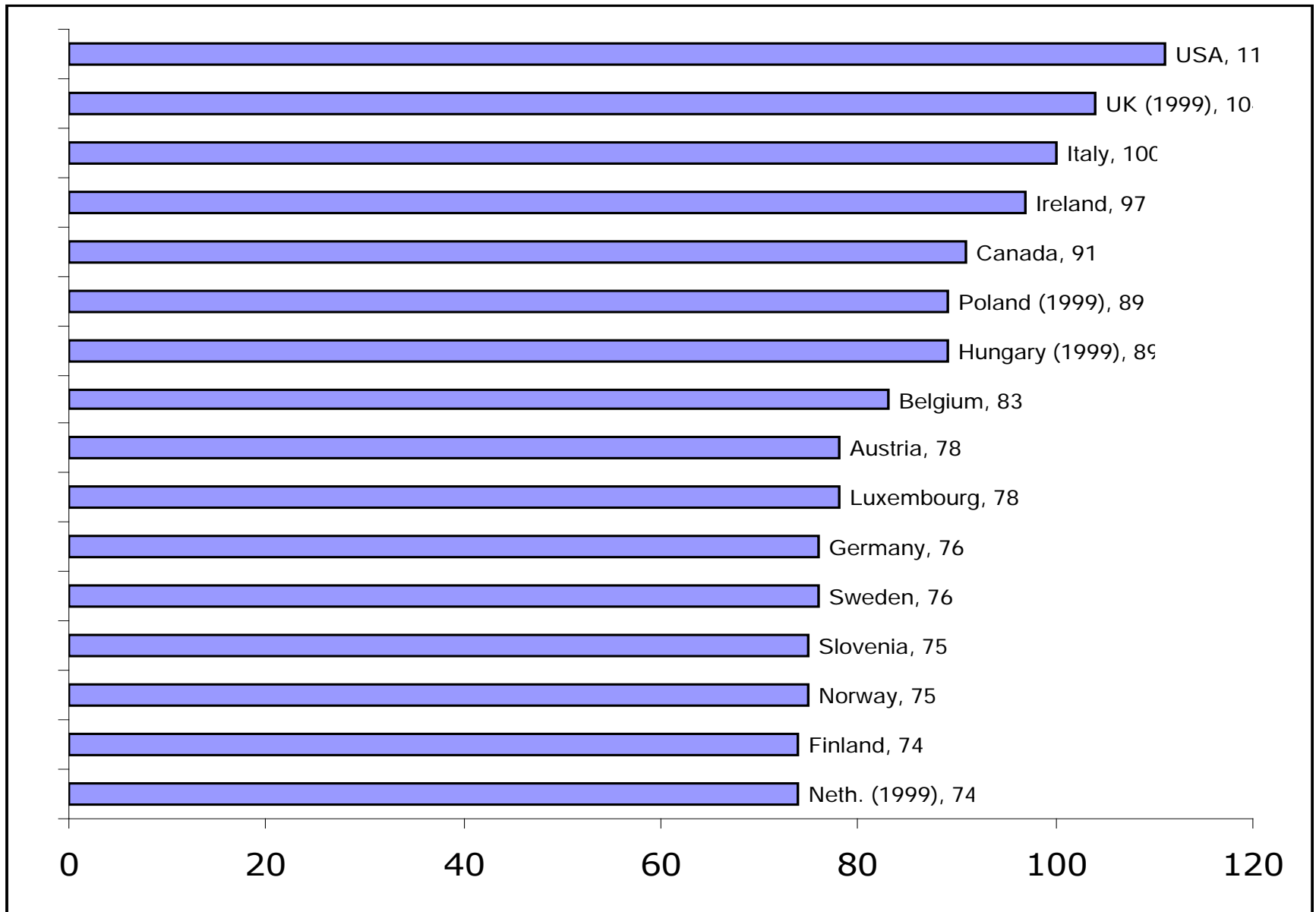
# Income Inequality in the UK and US: 1978-1992

<b>UK</b>			
<b>Goodman and Oldfield (IFS, 2004)</b>	<b>1978</b>	<b>1986</b>	<b>1992</b>
<b>Income Gini</b>	<b>.23</b>	<b>.29</b>	<b>.34</b>
	.	.	
<b>US</b>			
<b>Johnson and Smeeding (BLS, 2005)</b>	<b>1981</b>	<b>1985</b>	<b>1990</b>
<b>Income Gini</b>	<b>.34</b>	<b>.39</b>	<b>.41</b>
	.	.	.

Both studies bring the figures up to early 2000s.

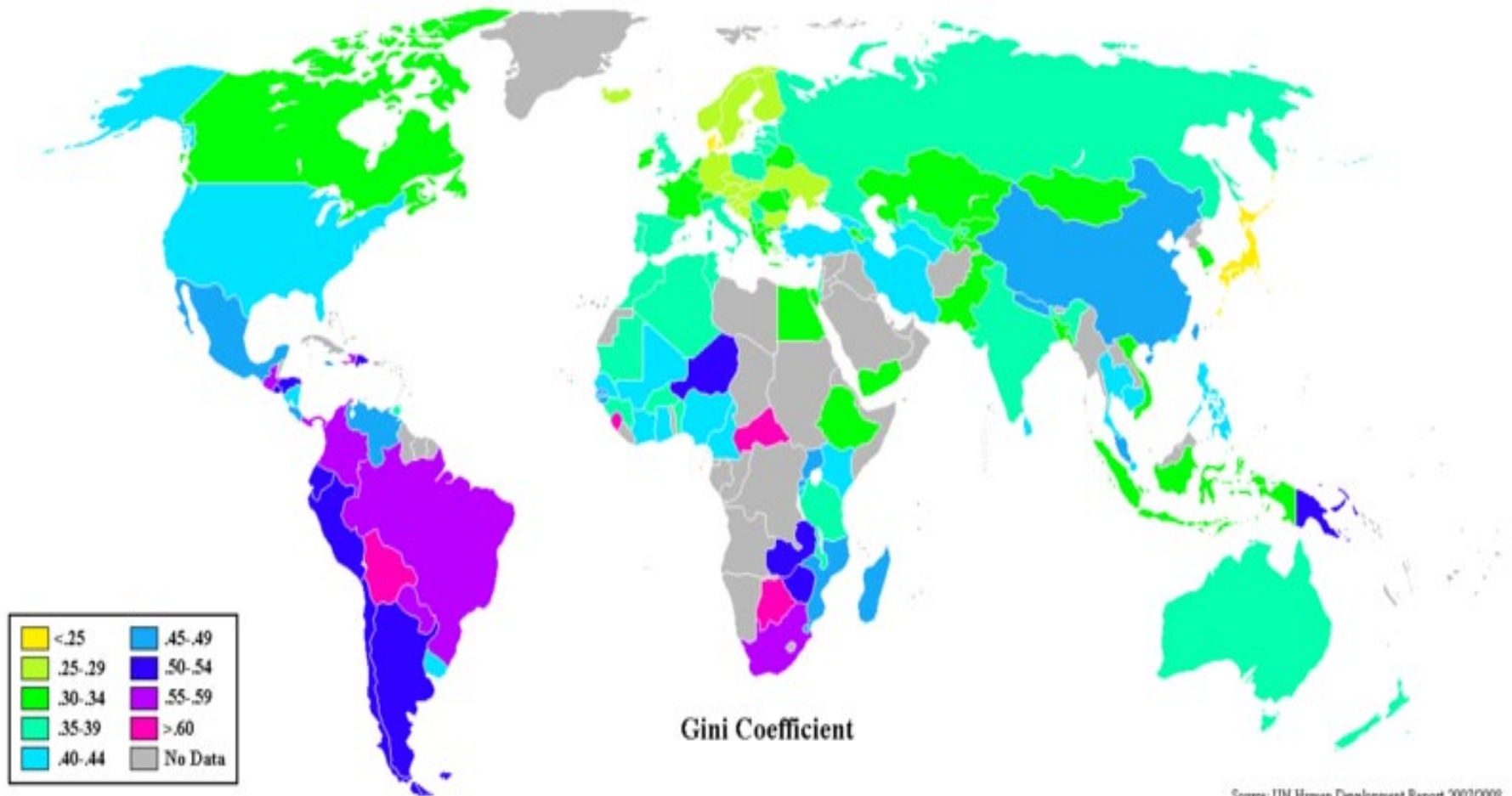
- Atkinson (1997): UK income Gini rises more than 10 points late 70s to early 90s.

# Gini index (Italy=100)



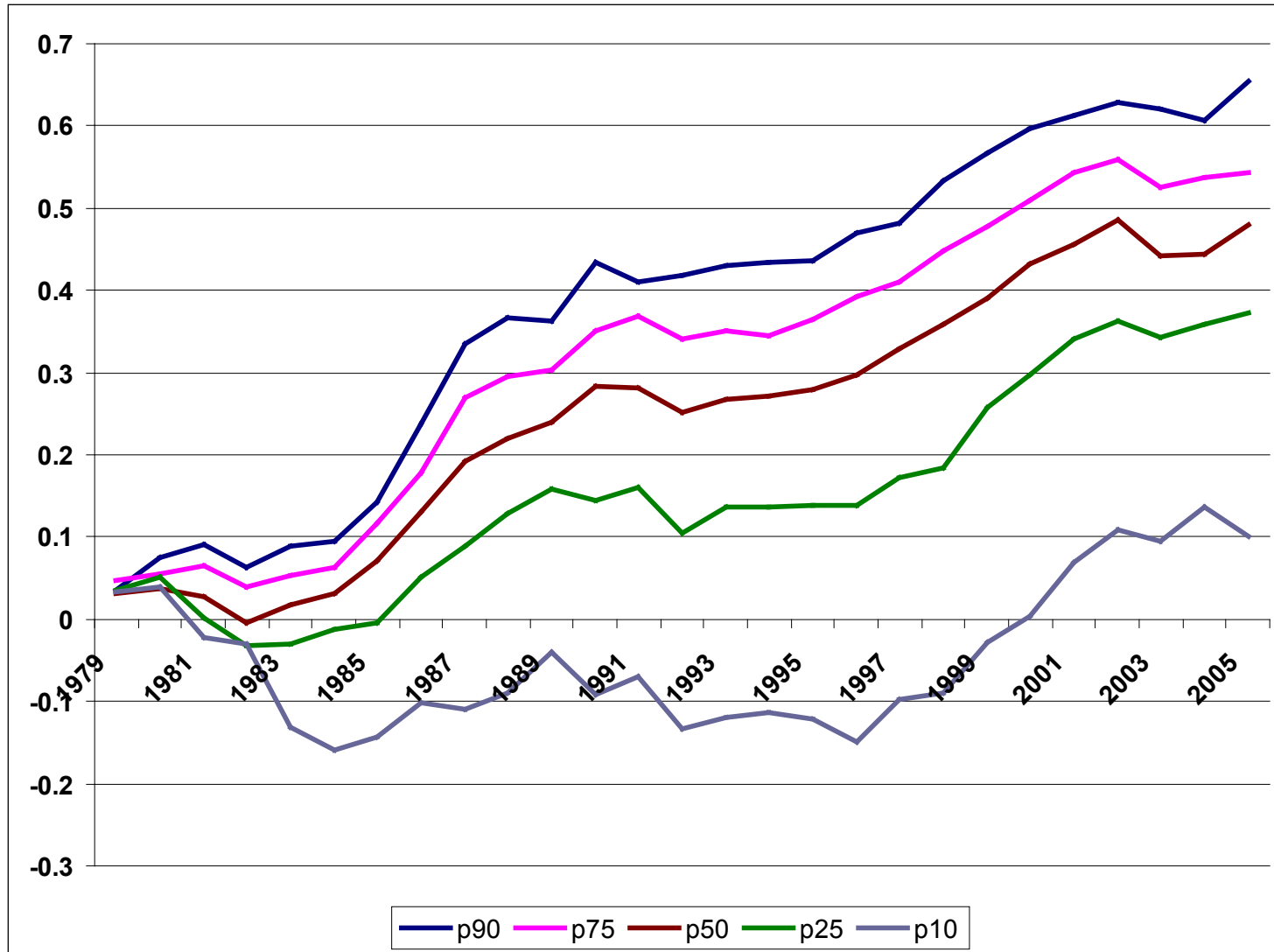


# Some International Comparisons – Gini



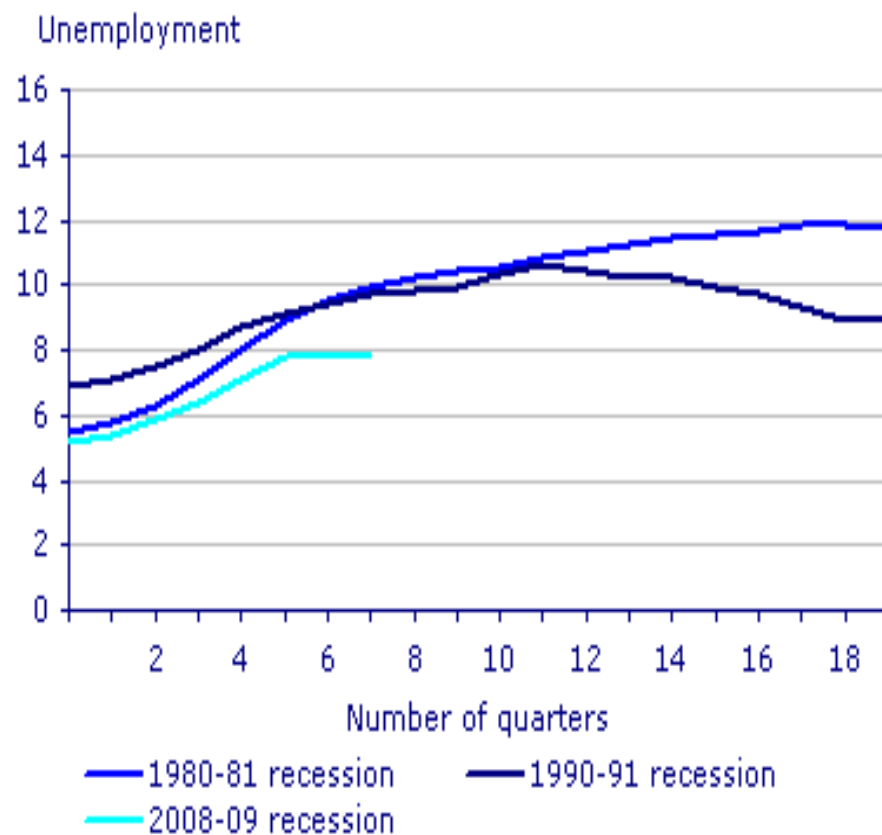
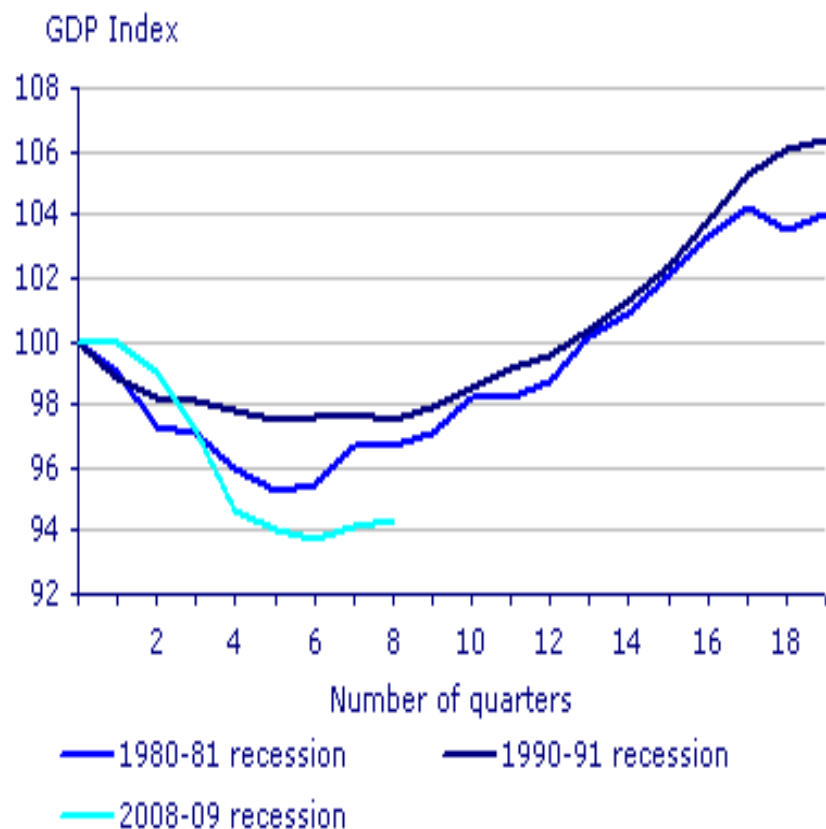


# Percentiles of the household income distribution (Britain)



Source: Blundell and Etheridge (2010)

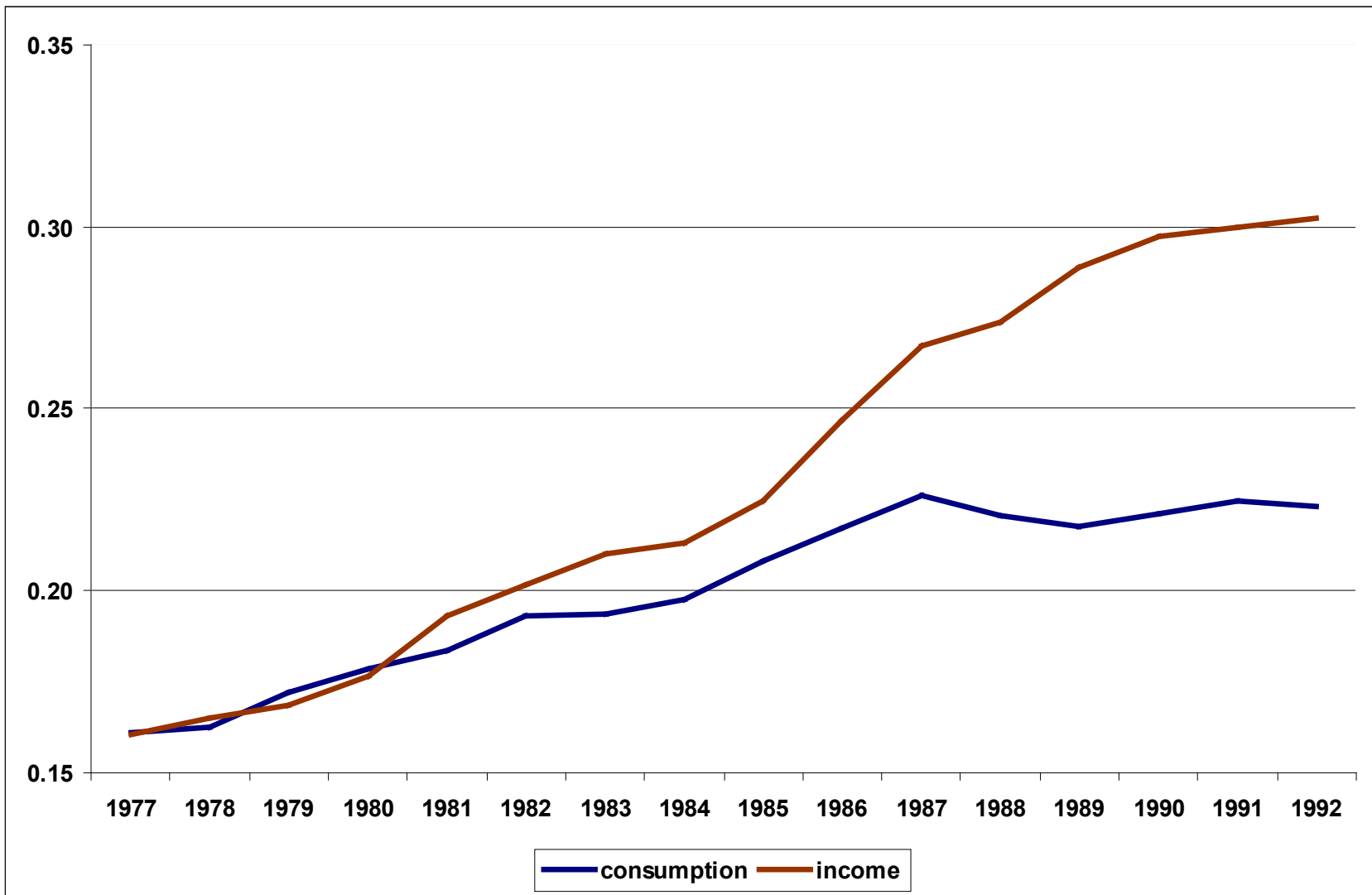
# UK Recessions – GDP and the unemployment rate



## But What of Consumption Inequality?

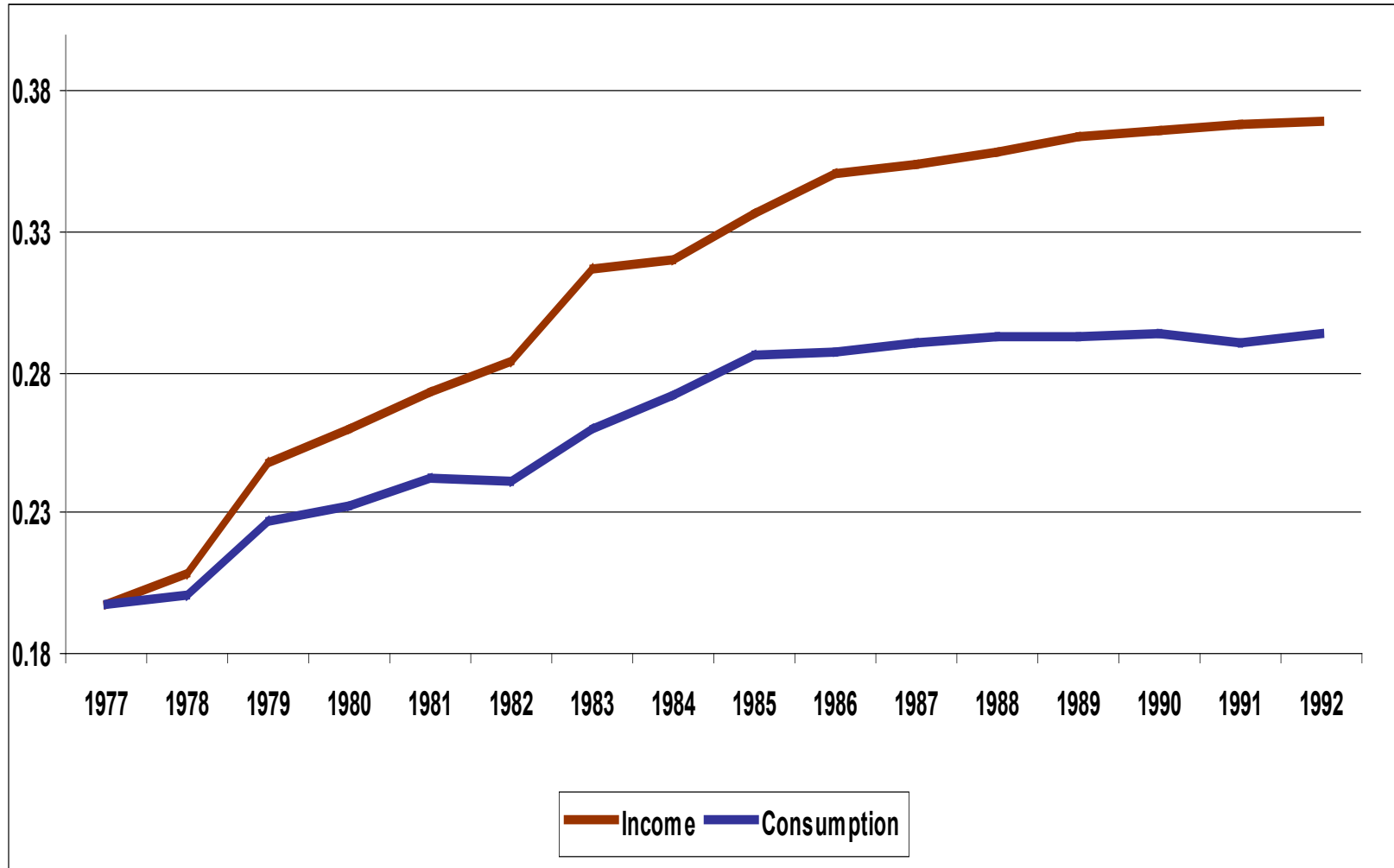
- **Fact # 1:** consumption inequality is lower than income inequality
- **Fact # 2:** in general, income inequality grows more rapidly than consumption inequality
- This is true of US and UK as well as other countries
  - But what does it tell us?
- First showed up dramatically in the inequality boom ... of the early 1980s recession

# Income and Consumption Inequality in the UK Inequality Boom



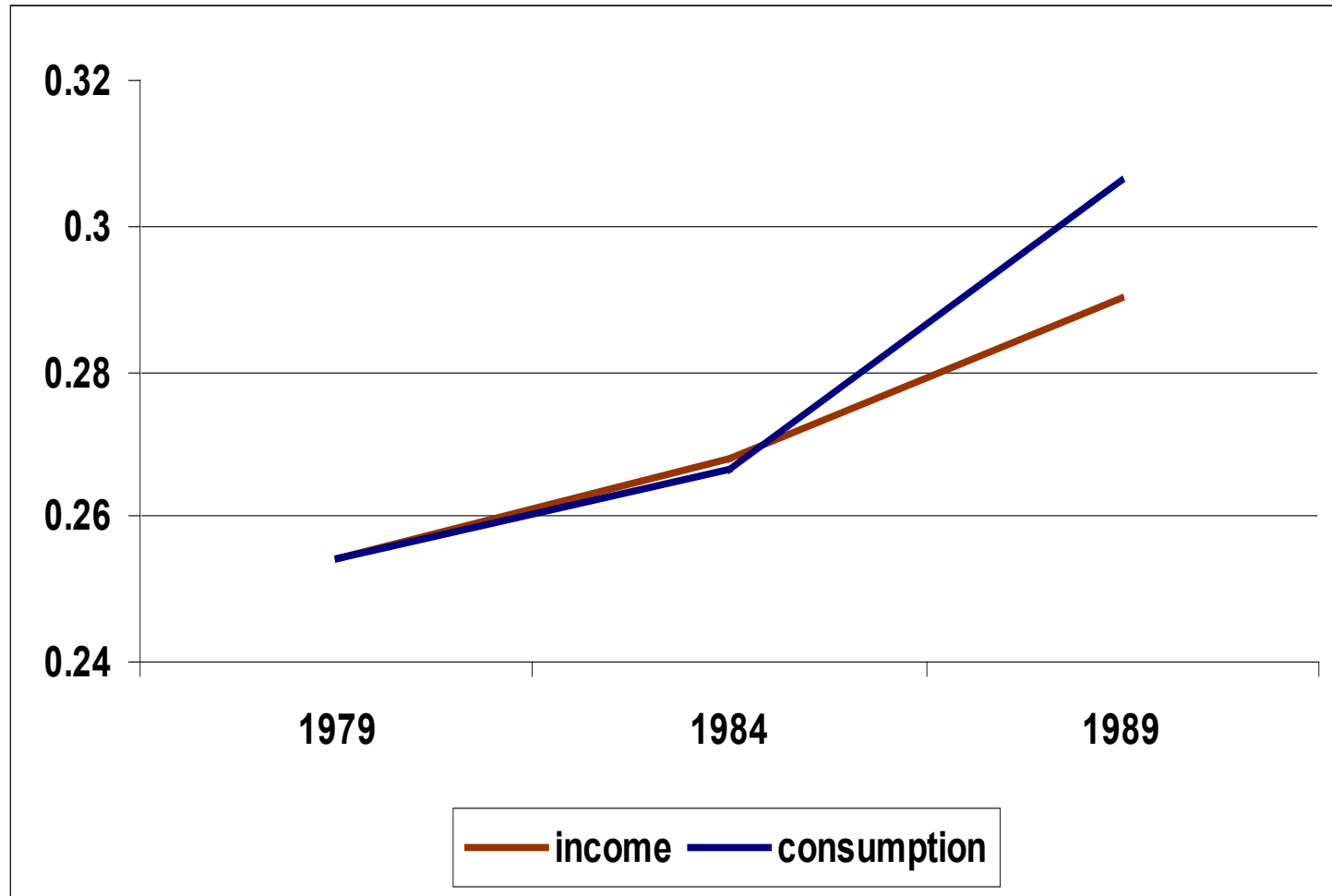
Blundell and Preston (QJE, 1998); UK FES  
Variance of log equivalised, cons rebased at 1977, smoothed.

# Income and Consumption Inequality in the US Inequality Boom



Source: Blundell, Pistaferri and Preston (2005) : CEX/PSID  
Variance of log equivalised, cons rebased at 1977, smoothed

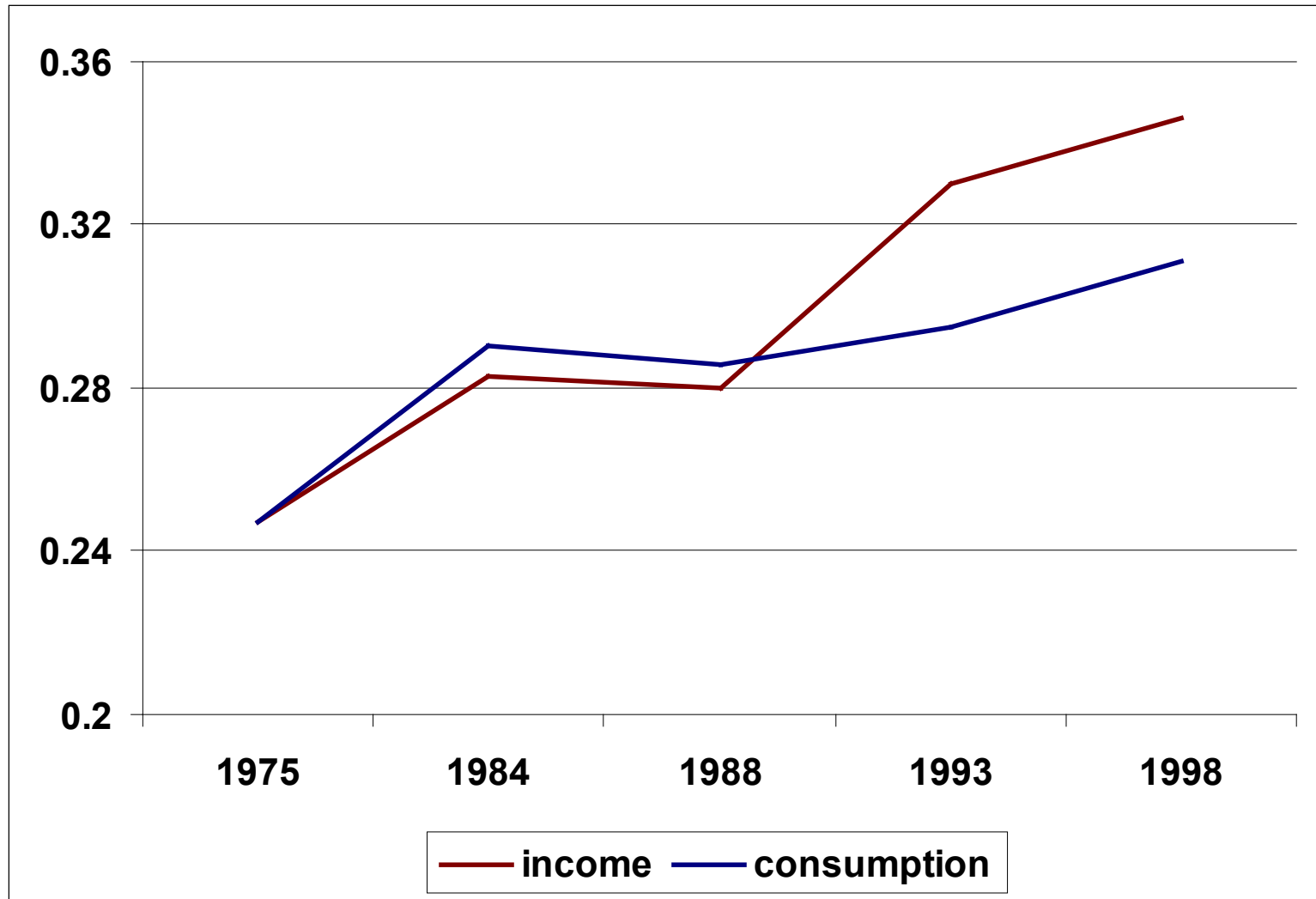
# Income and Consumption Inequality in Japan



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



# Consumption and Income Inequality in Australia



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

# Income and Consumption Inequality in the UK and US: 1978-1992

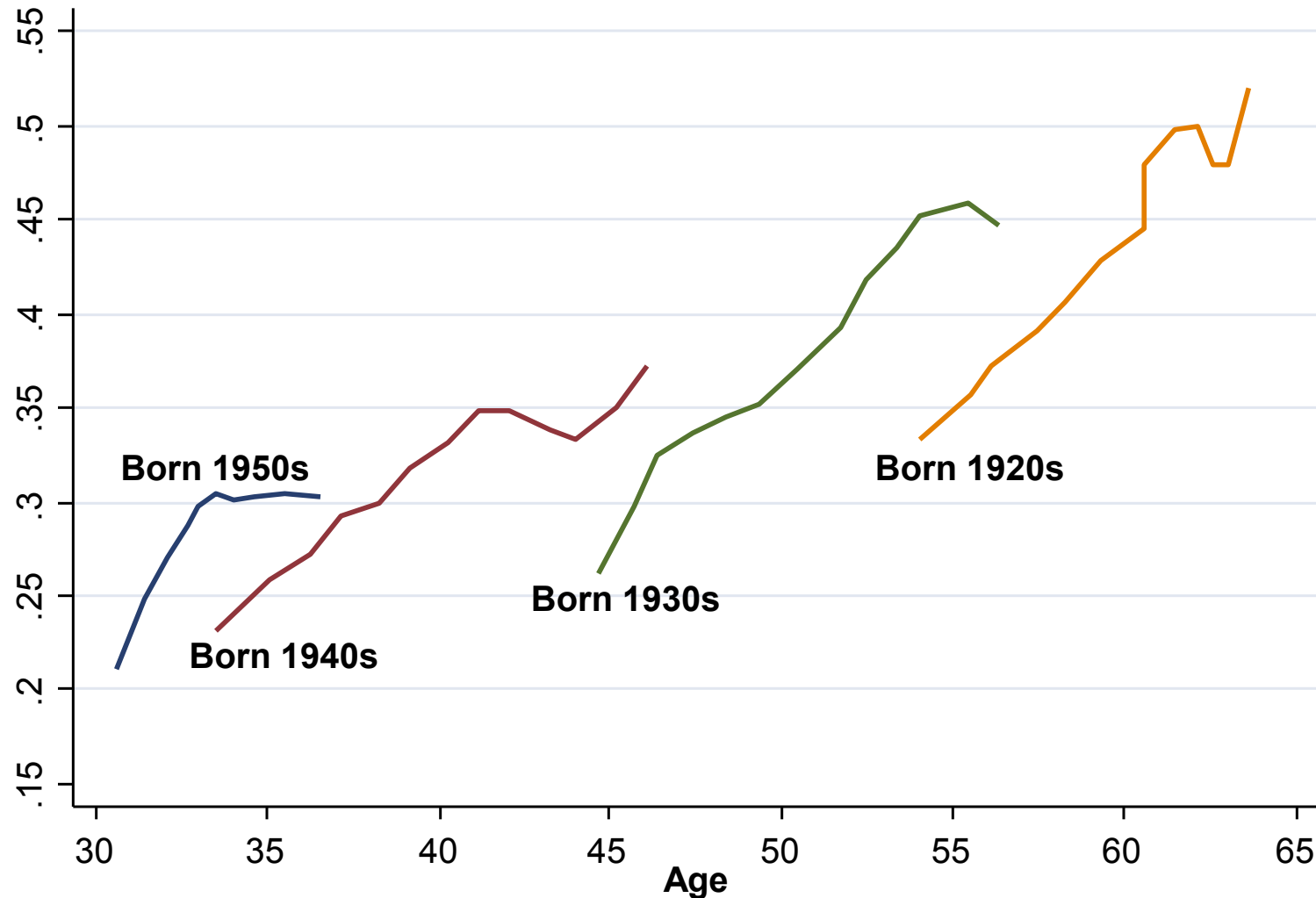
**Both these studies bring the figures up to 2001.**

**Relate to other key literature:**

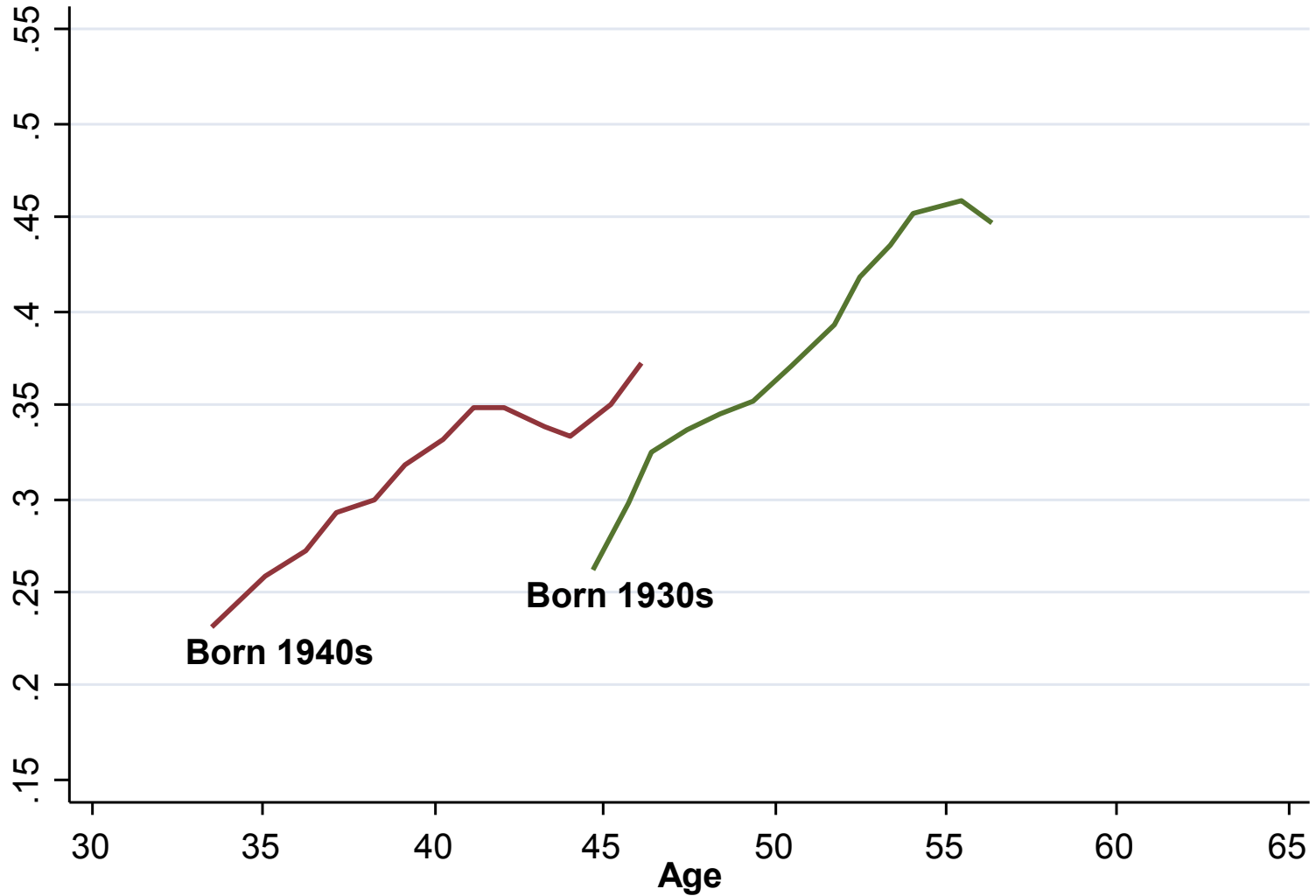
- Atkinson (1997): UK income Gini rises 10 points late 70s to early 90s.**
- Cutler and Katz (1992): US consumption Gini 65% of income inequality, 80-88.**
- Gottschalk and Moffitt (1994): 1980s transitory shocks account for 50% growth**

**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.**

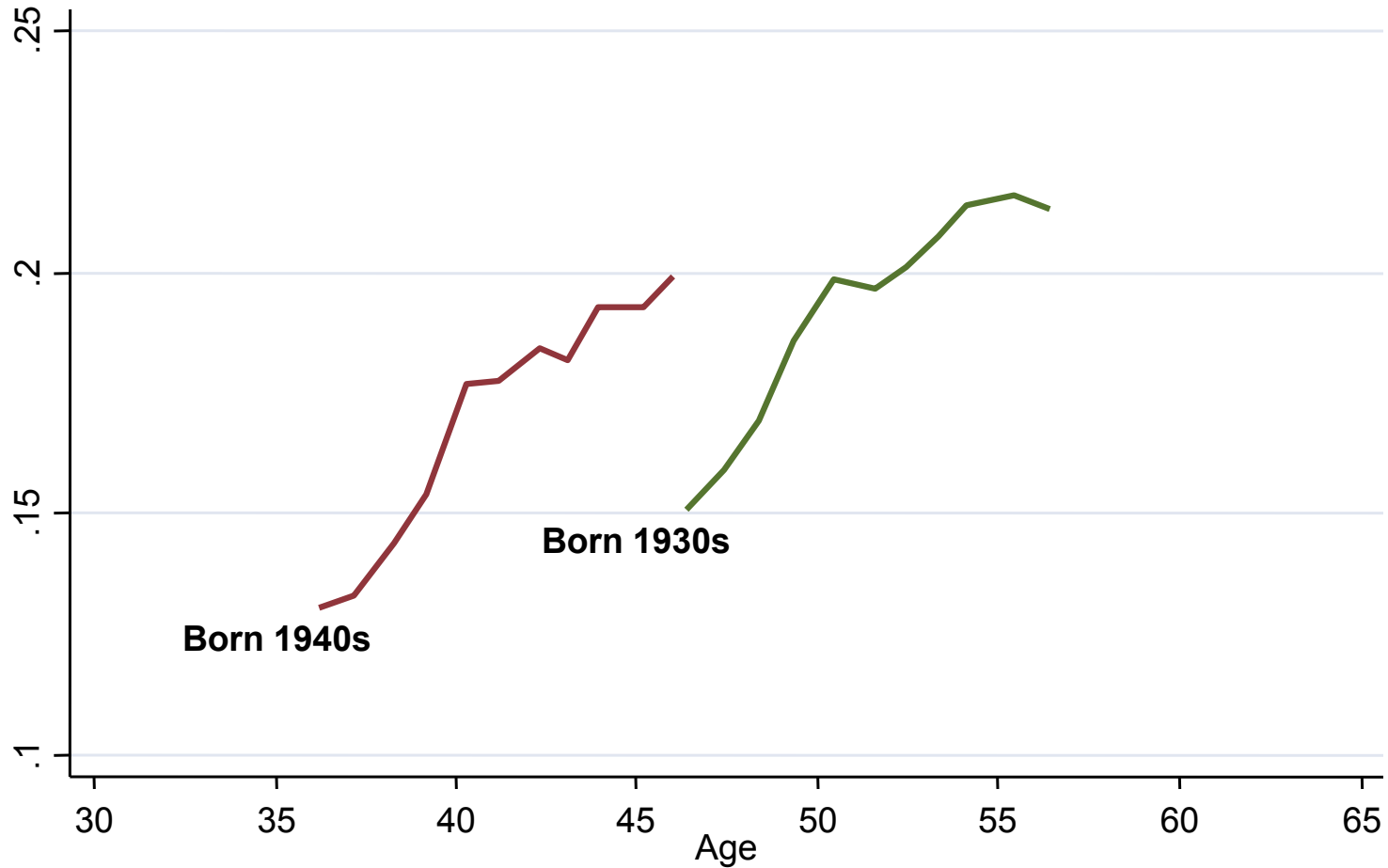
# Birth-Cohort Income Inequality in the US by Cohort



# Birth-Cohort Income Inequality in the US by Cohort

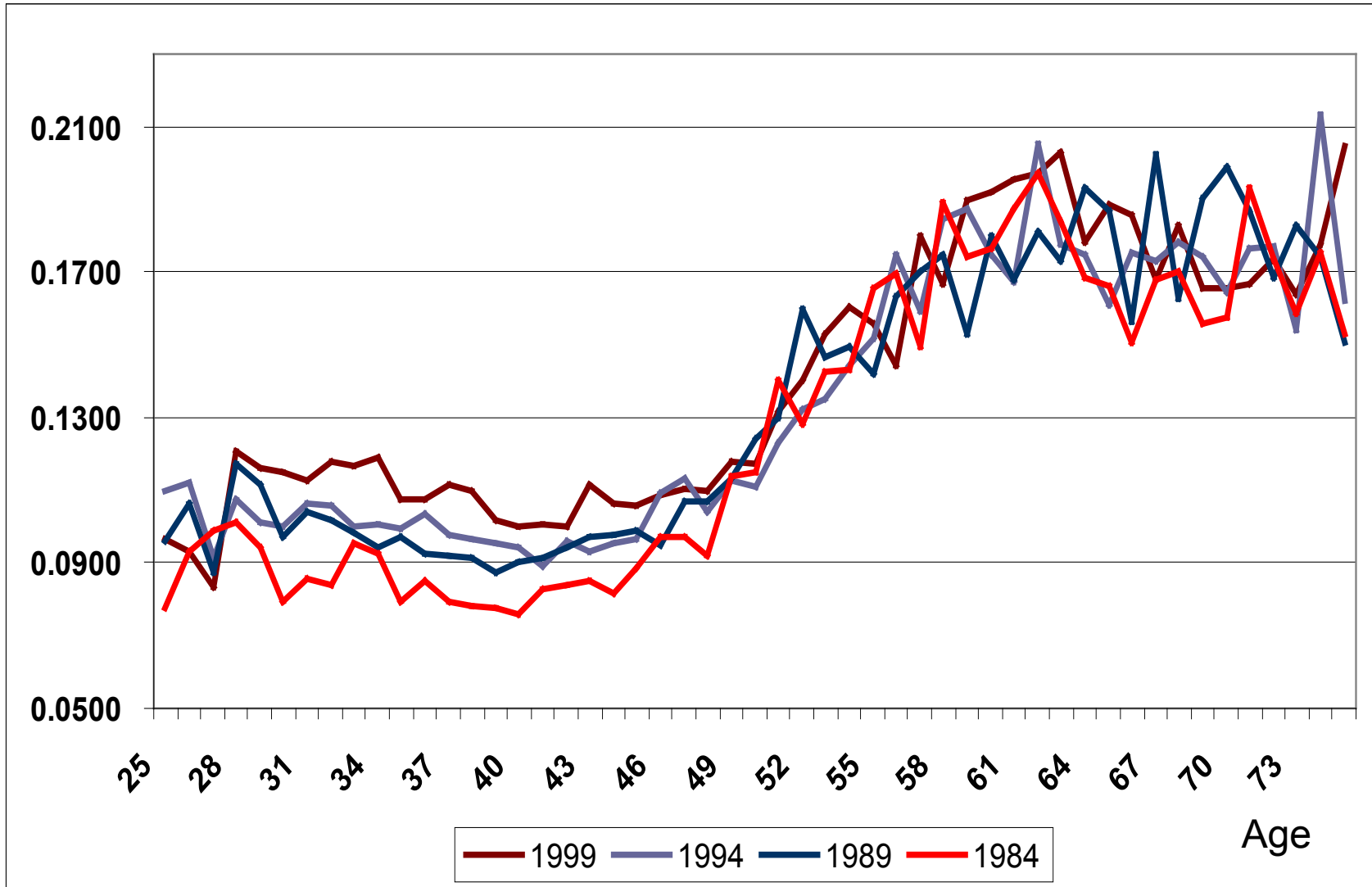


# Cohort Consumption Inequality in the US by Cohort



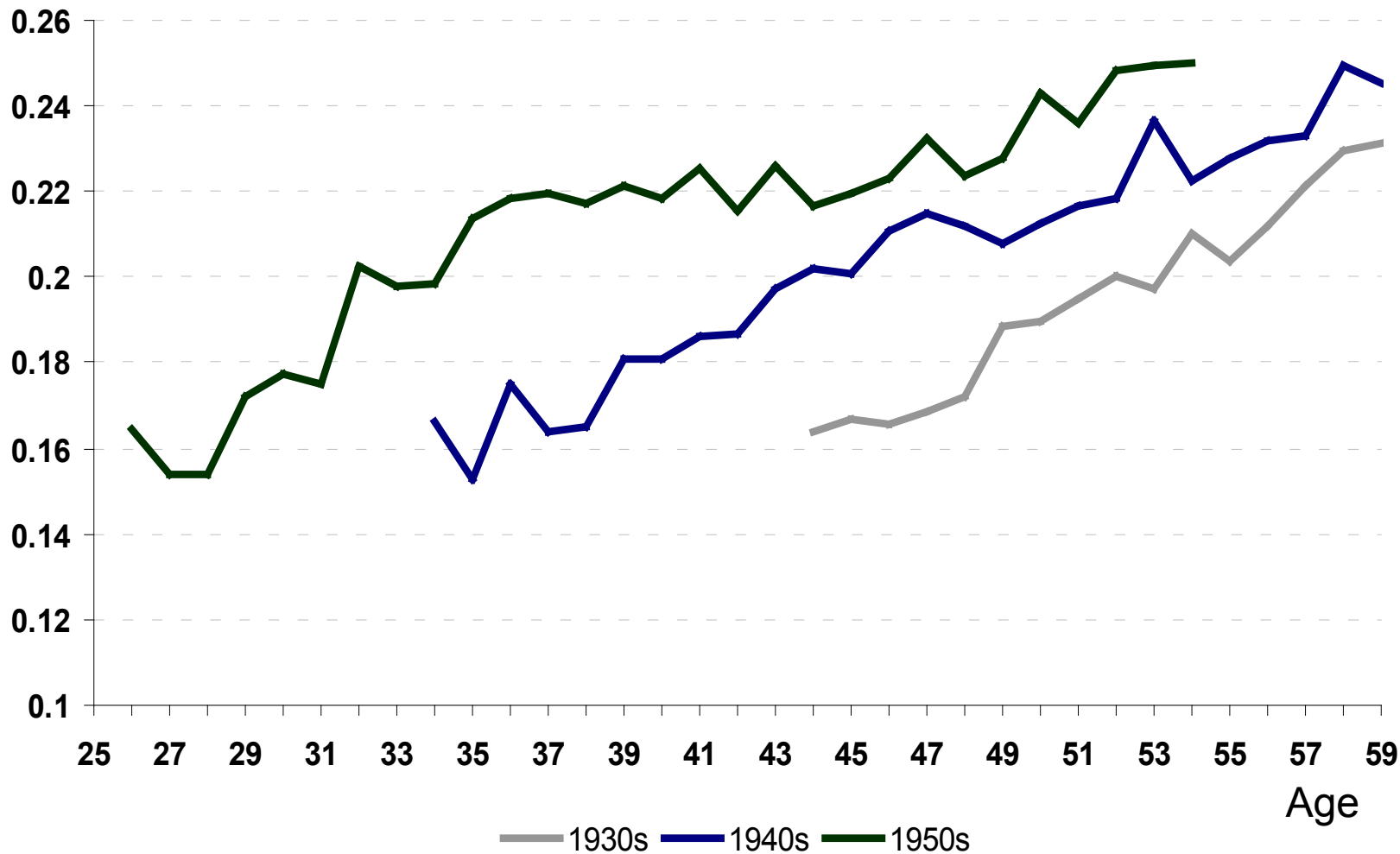
Source: Blundell, Pistaferri and Preston (2005)  
Variance of log equivalised, PSID

# Consumption Inequality over the Life-Cycle in Japan



Source: Abe and Yamada (2009)  
Var (log); NSFIE

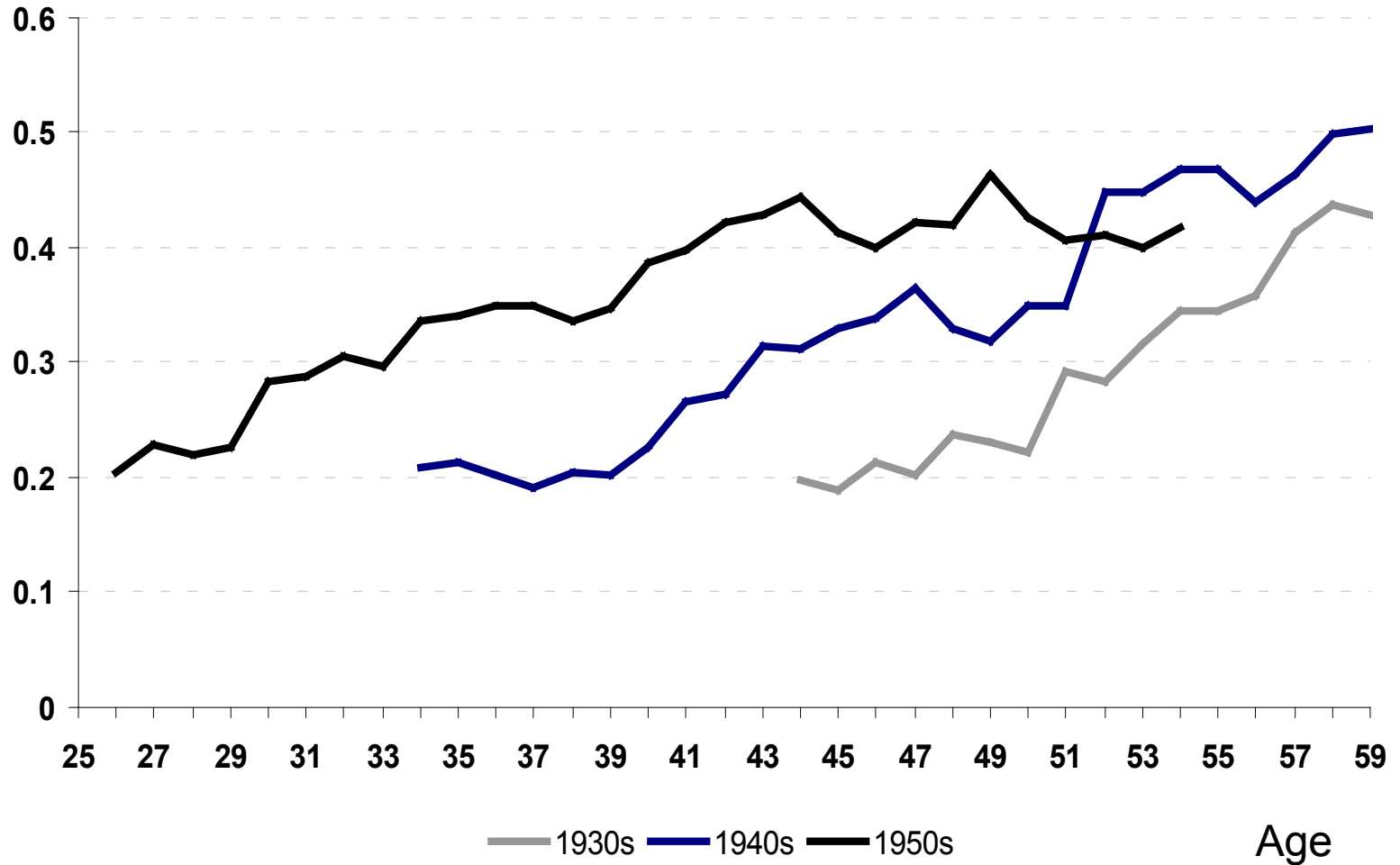
# Birth-Cohort Consumption Inequality in UK



Source: Blundell, Low and Preston (2009)

(variance of log equivalised)

# Birth-Cohort Income Inequality in UK

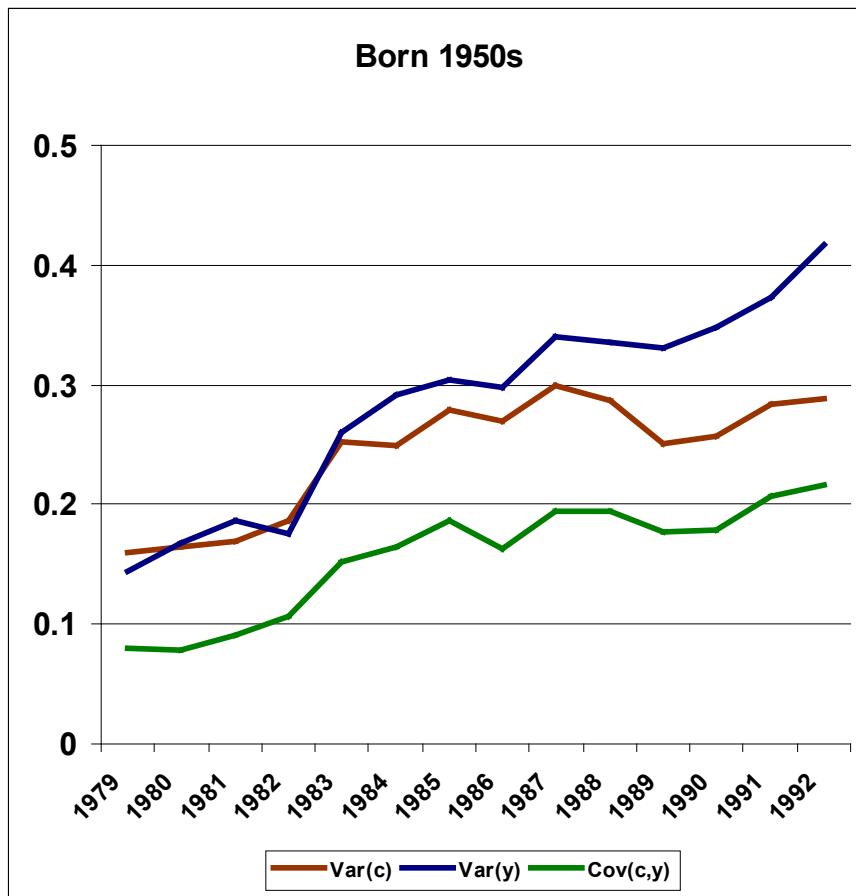
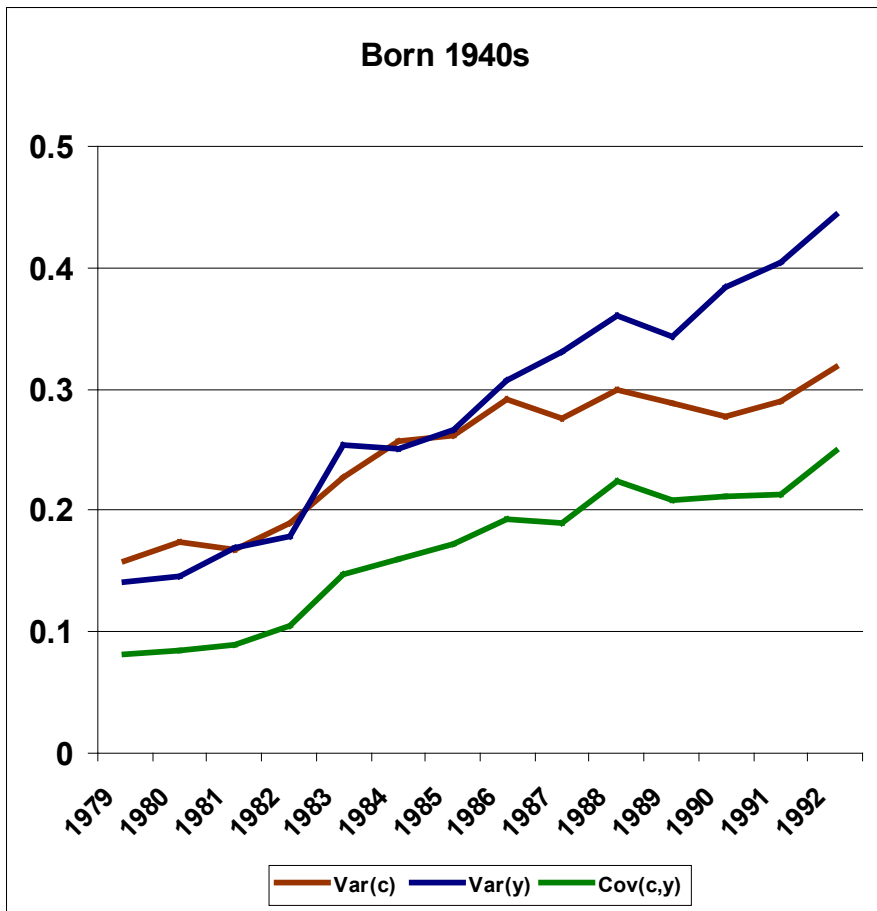


Source: Blundell, Low and Preston (2009)

(variance of log equivalised)



# Cohort Income Inequality in UK, the 1980s recession and after



Source: Blundell, Low and Preston (2009)

# Income dynamics

- To understand the transmission from income to consumption we have to understand income dynamics
  - the degree of persistence in income shocks
- These dynamics will vary across time and across the life-cycle for different types of individuals and families
- The key idea is that different ‘shocks’ to income will have different degrees of persistence
- In general, less persistent shocks are somewhat easier for individuals, and for society, to ‘insure’

# Income Dynamics

General specification for income dynamics:

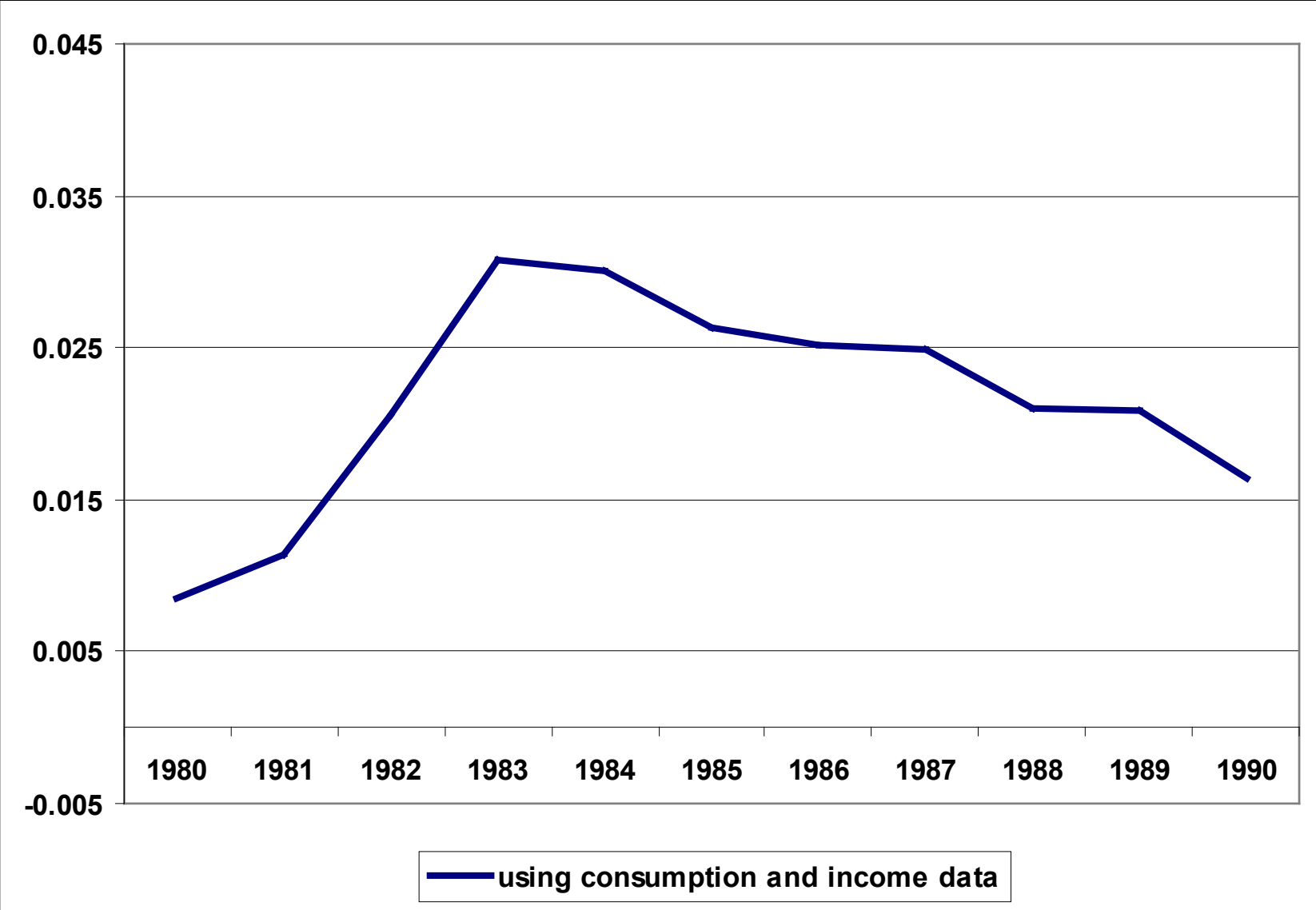
$$\ln Y_{i,t} = \lambda' Z_{i,t} + y_{i,t}^P + y_{i,t}^T + b_t f_{1i} + f_{0i}$$

- $Z$  are observables
- $y^P$  is a persistent process driven by income shock  $\zeta$ .

$$y_{i,t}^P = \rho y_{i,t-1}^P + \zeta_{i,t}$$

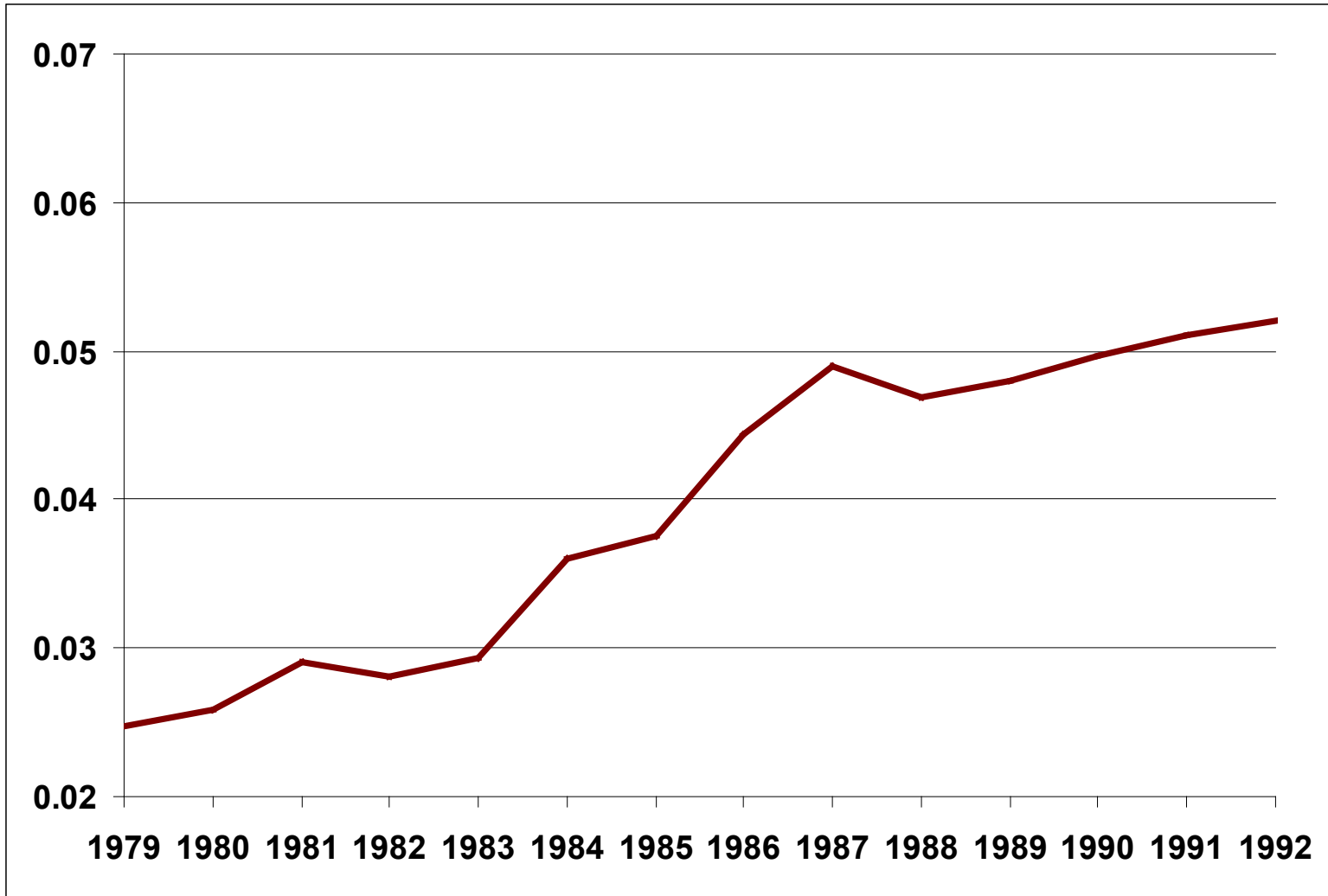
- $y^T$  is a transitory process given by low order MA process  $\varepsilon$ .
- An idiosyncratic trend  $b_t f_i$  suggests less persistence in  $y^P$ 
  - such trends are concentrated in early working life
- allow variances of  $y^P$  and  $y^T$  to vary with time,
  - ratio of variances indicates degree of persistence

# Results: Variance of permanent shocks in US



Source: Blundell, Pistaferri and Preston (2008)

# Results: Variance of transitory shocks



Source: Blundell, Pistaferri and Preston (2008)

- But what of the link to consumption dynamics?

# Consumption dynamics

To account for various ‘insurance’ mechanisms and excess sensitivity, for any birth cohort consumption growth write:

$$\Delta \ln C_{it} \approx \theta' Z_{it} + \phi_t \zeta_{it} + \psi_t \varepsilon_{it} + \xi_{it}$$

**Partial insurance coefficient**  
w.r.t. *permanent* shocks,  $0 \leq \phi \leq 1$

**Excess sensitivity**  
coefficient w.r.t.  
*transitory* shocks,  $0 \leq \psi \leq 1$

- In this notation, the transmission parameters  $\phi$  and  $\psi$  subsume the self-insurance model
- This ‘factor’ structure provides the key panel data moments that link the evolution of distribution of consumption to the evolution of income distribution
- It describes how consumption updates to income shocks

# Panel Data

- CEX: Provides consumption and income, but it's not a panel
- PSID: Provides panel data on income and earnings but limited information on consumption (food)
  - Use a structural demand relationship for food in the CEX (monotonic)

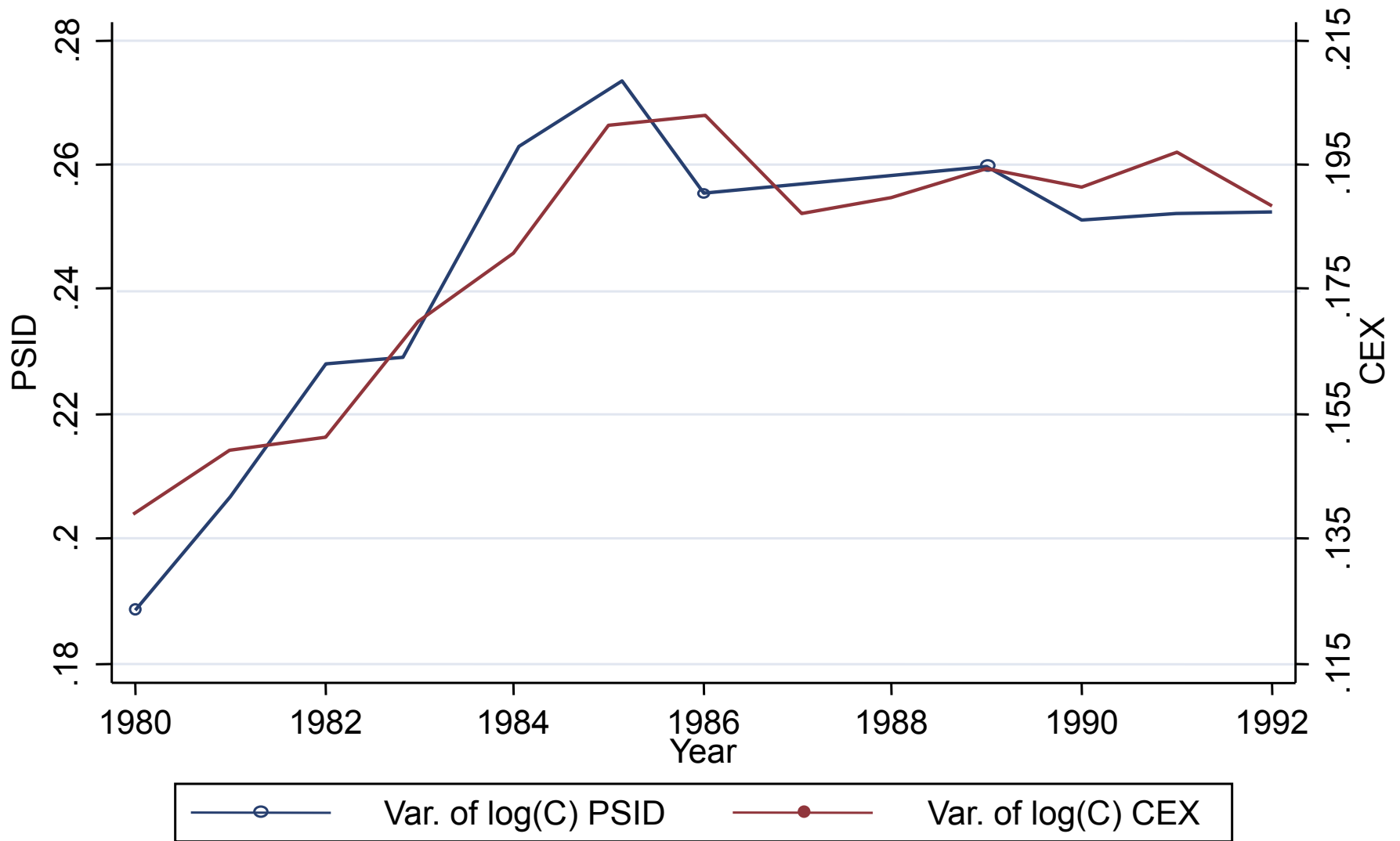
$$\ln f_{it} = \gamma' Z_{it} + \beta_t' Z_{it} \ln C_{it} + \lambda' \ln p_t + e_{it}$$

- Conditioning on  $Z$  allows for non-separabilities with demographics and labour supply

- It can be inverted in the PSID to obtain an imputed measure of consumption



# Does the method work?



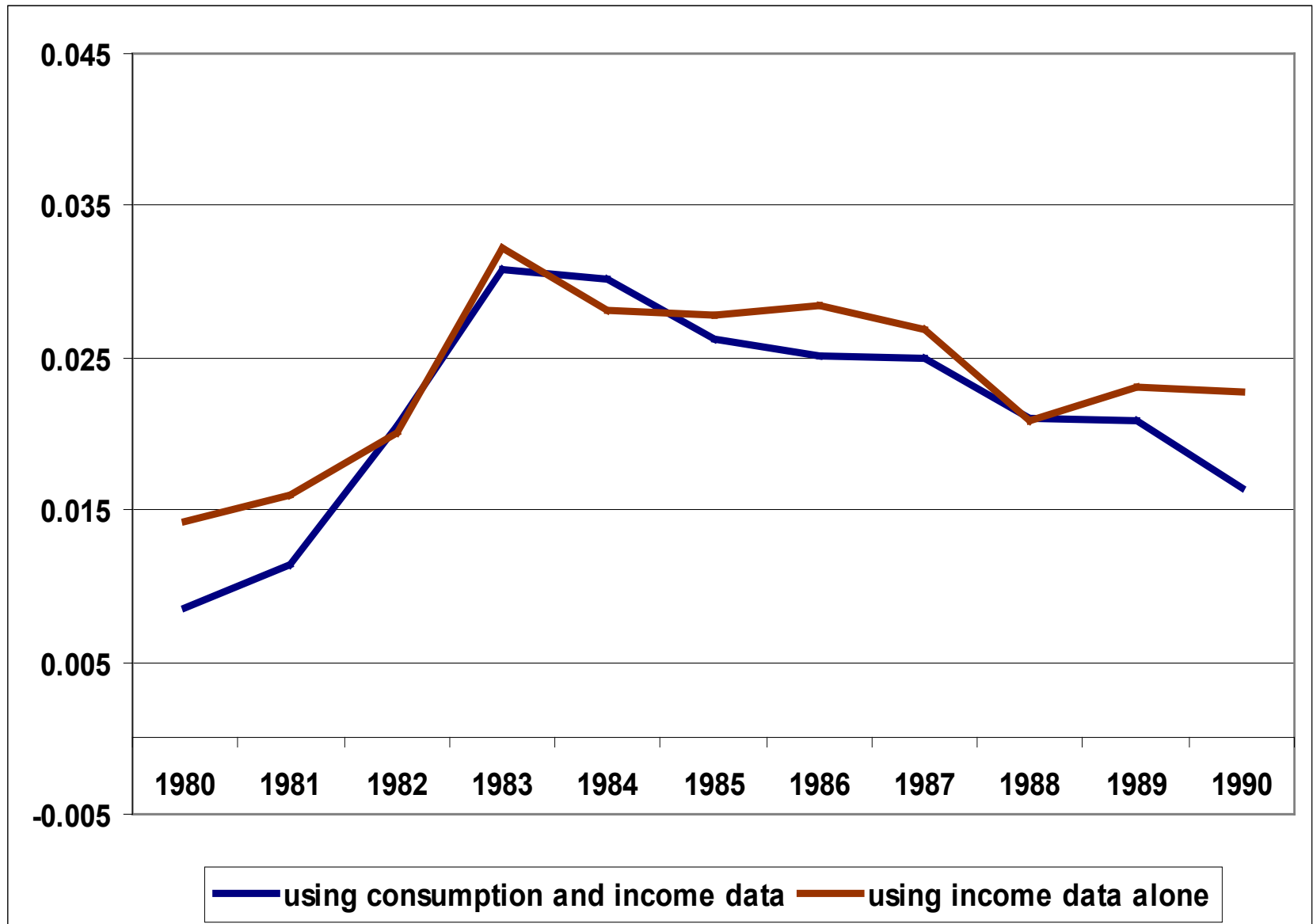
Source: Blundell, Pistaferri and Preston (2004)

# Results: Variance of permanent shocks in US



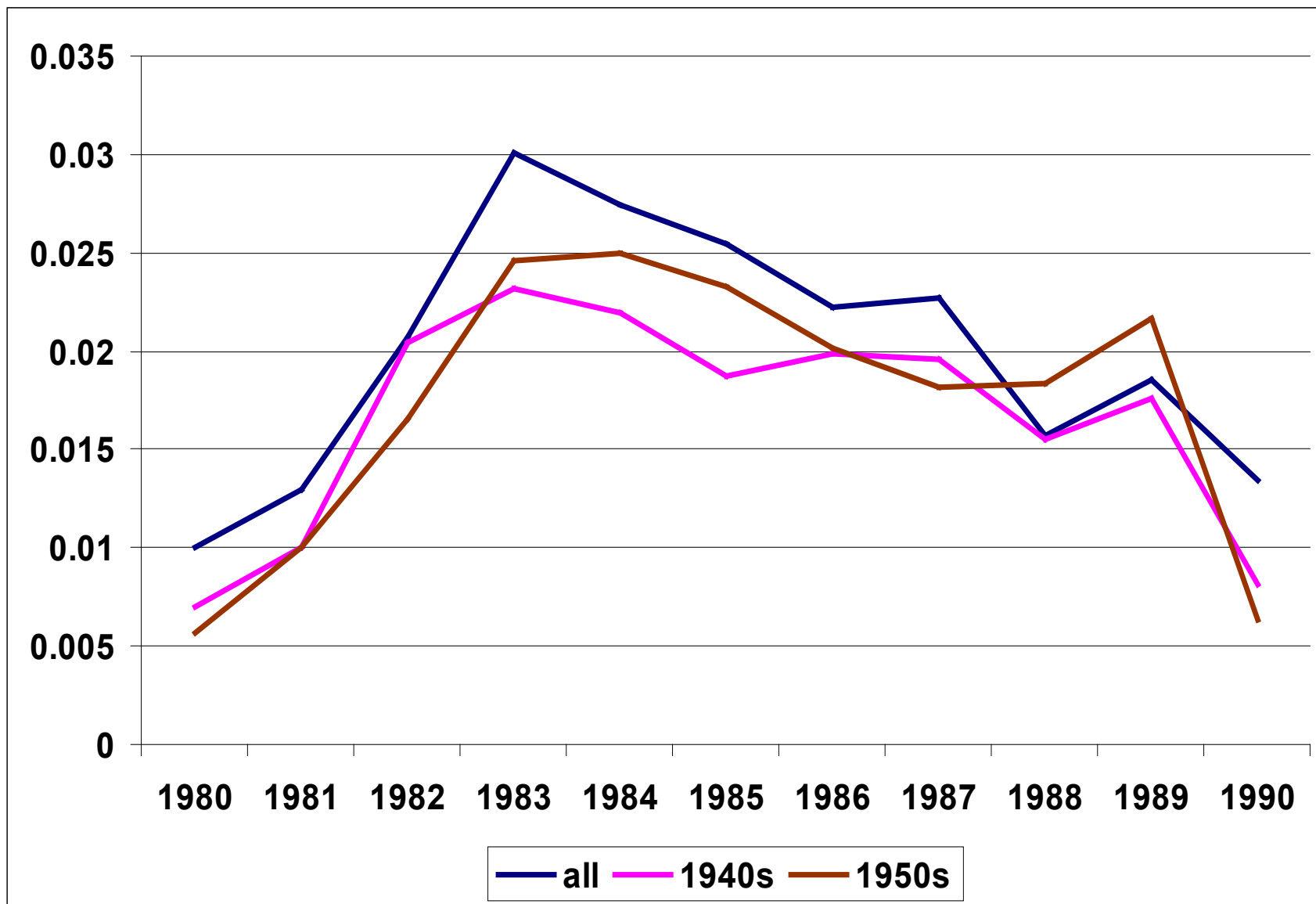
Source: Blundell, Pistaferri and Preston (2008)

# Results: Variance of permanent shocks

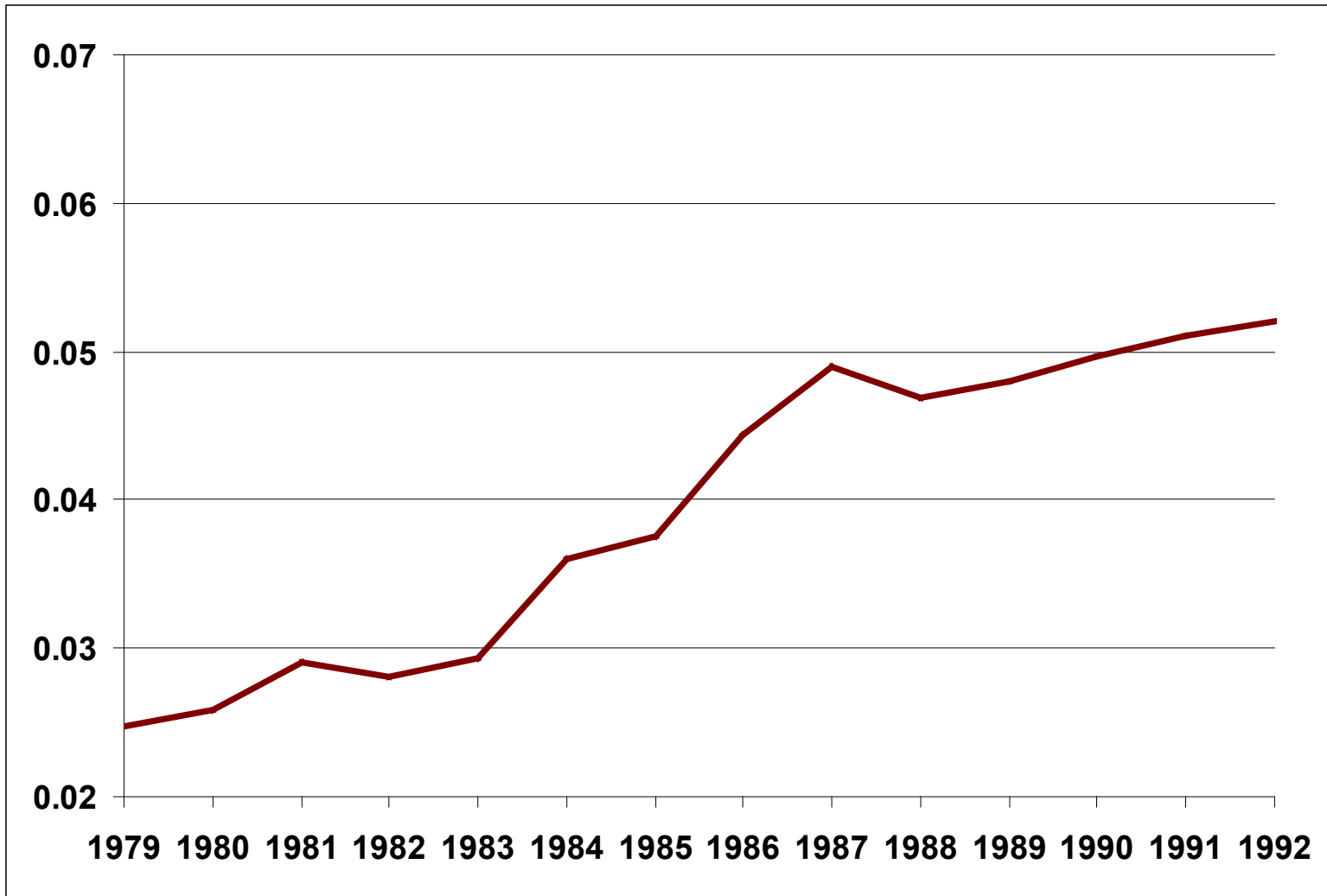


Source: Blundell, Pistaferri and Preston (2008)

# Results: Variance of permanent shocks by cohort



# Results: Variance of transitory shocks



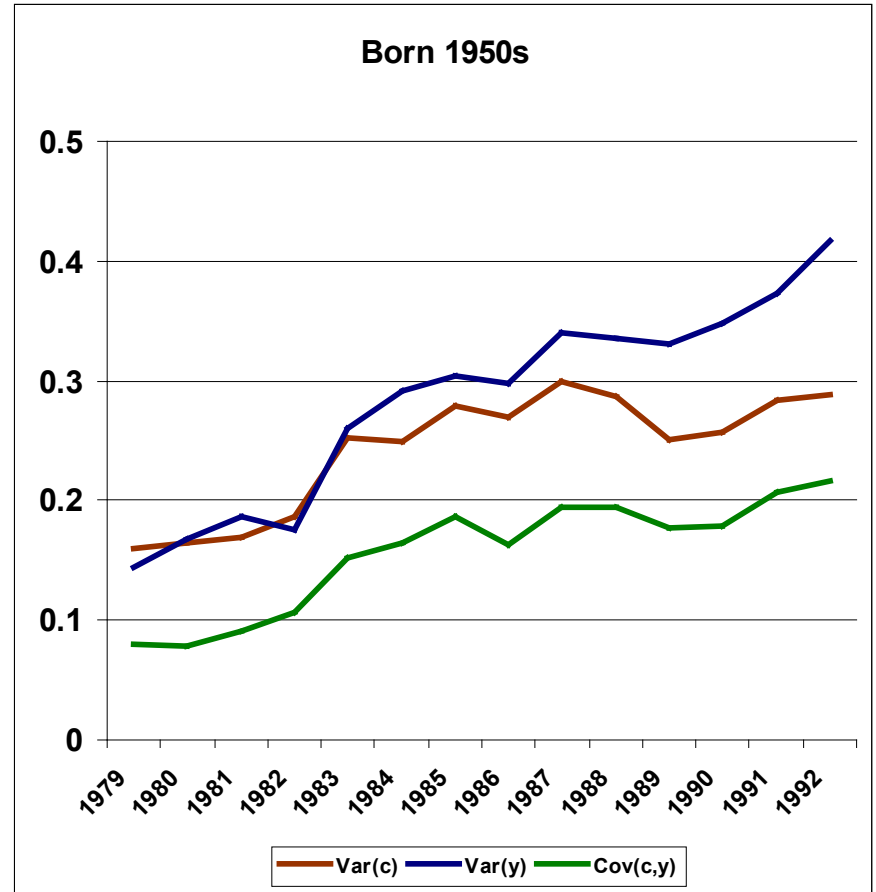
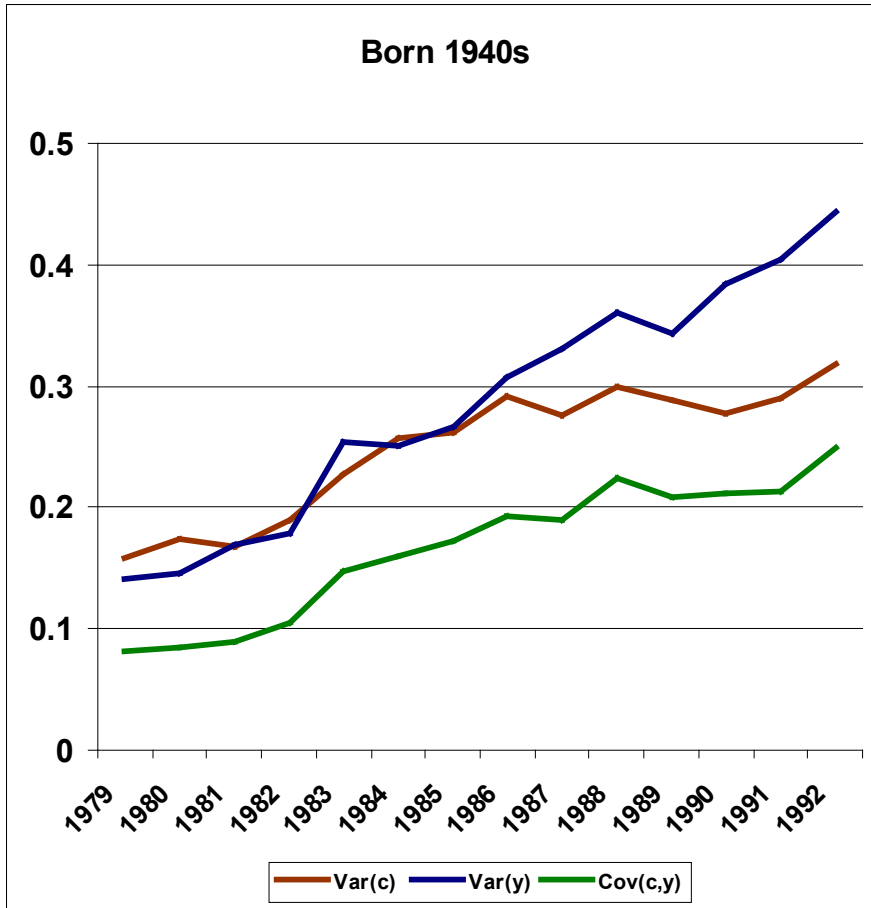
Source: Blundell, Pistaferri and Preston (2008)

# Results: Income-Consumption Transmission Parameters - Cohort and College Decomposition

	<b>Whole sample</b>	<b>George W. Bush cohort (born 1940s)</b>	<b>Donald Rumsfeld cohort (born 1930s)</b>	<b>Low educ.</b>
<b>Transmission of permanent shock</b>	<b>0.6423 (0.0945)</b>	<b>0.7928 (0.1848)</b>	<b>0.6889 (0.2393)</b>	<b>0.9439 (0.1783)</b>
<b>Transmission of transitory shock</b>	<b>0.0533 (0.0435)</b>	<b>0.0675 (0.0705)</b>	<b>0.0781 (0.0737)</b>	<b>0.1568 (0.0602)</b>

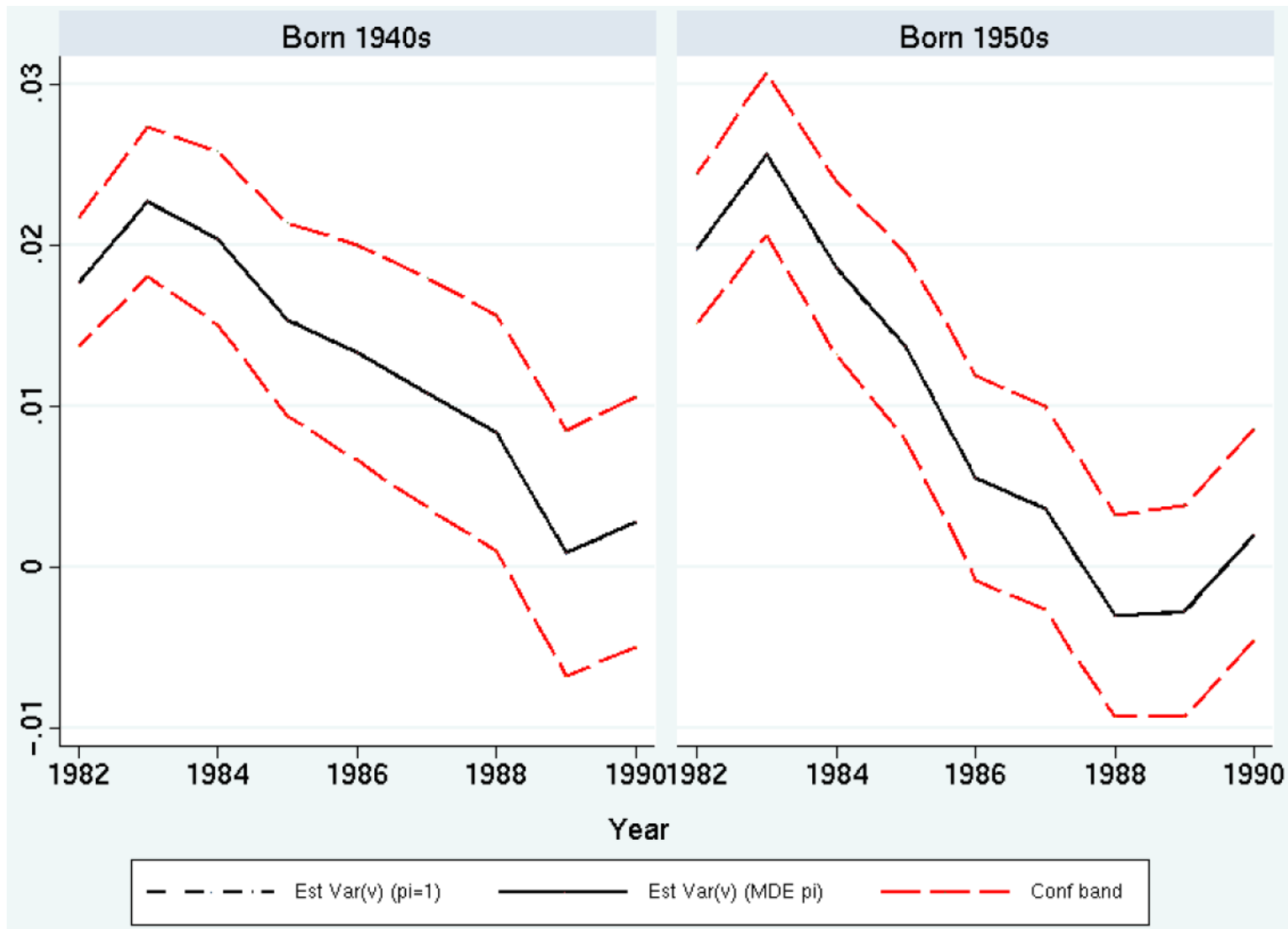
- Note: almost identical results updating with the recent PSID data

# Remember the inequality charts by cohort for Britain



Source: Blundell, Low and Preston (2008)

# Variance of permanent shocks by cohort - Britain



Source: Blundell, Low and Preston (2008)

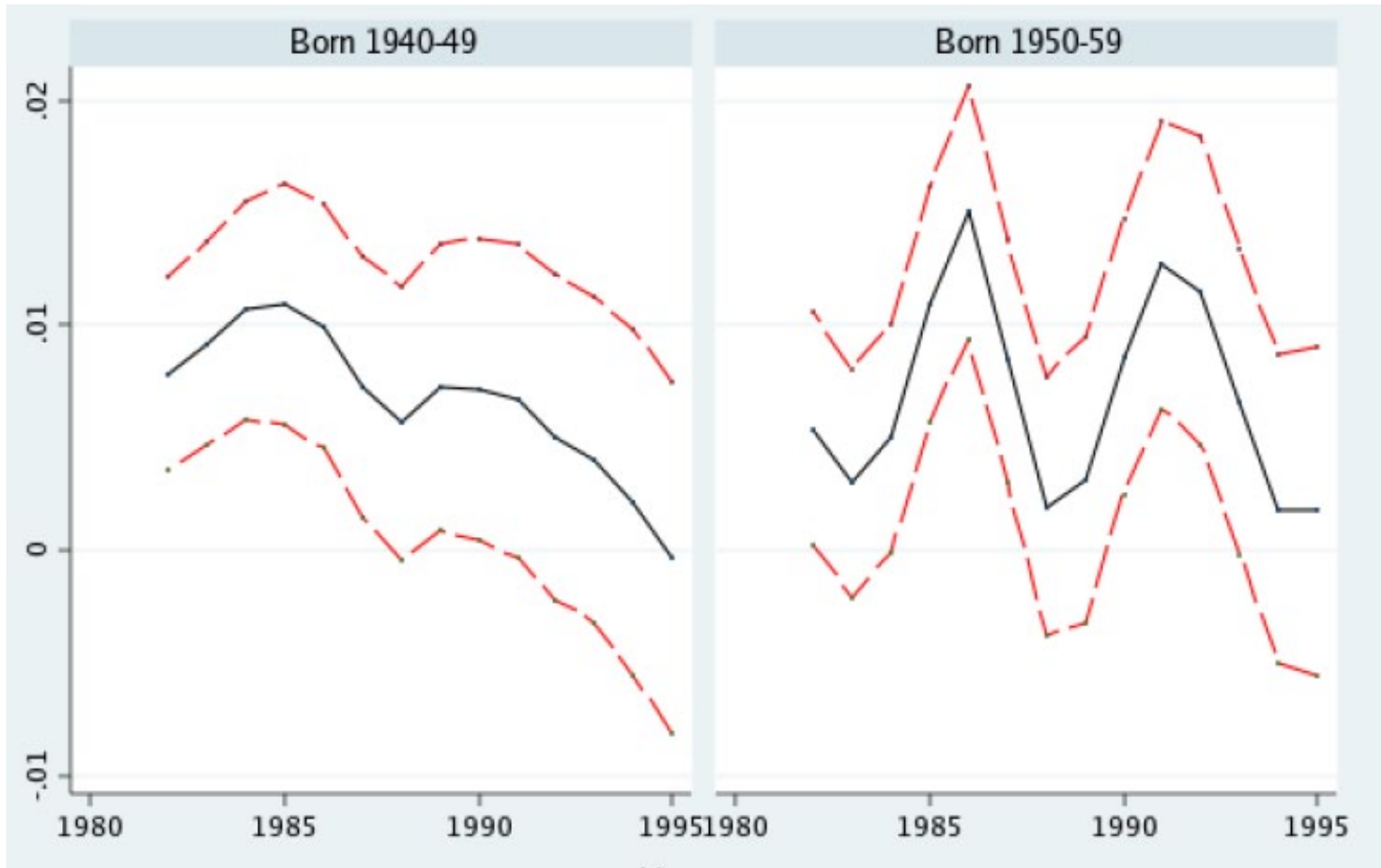


# Variance (growth) of transitory shocks by cohort - Britain



Source: Blundell, Low and Preston (2008)

# Variance of permanent shocks by cohort - Britain



Source: Blundell, Low and Preston (2008)

# Implications for inequality dynamics...

- A key driving force in the evolution of income and consumption inequality is the durability of income shocks
- The 1980s recession period (US and UK) is characterised by a large spike in the variance of permanent shocks.
- This can explain the lions share of the differential growth in consumption and income inequality over this period.
- Quite different behaviour among low wealth households
  - other ‘insurance’ mechanisms?

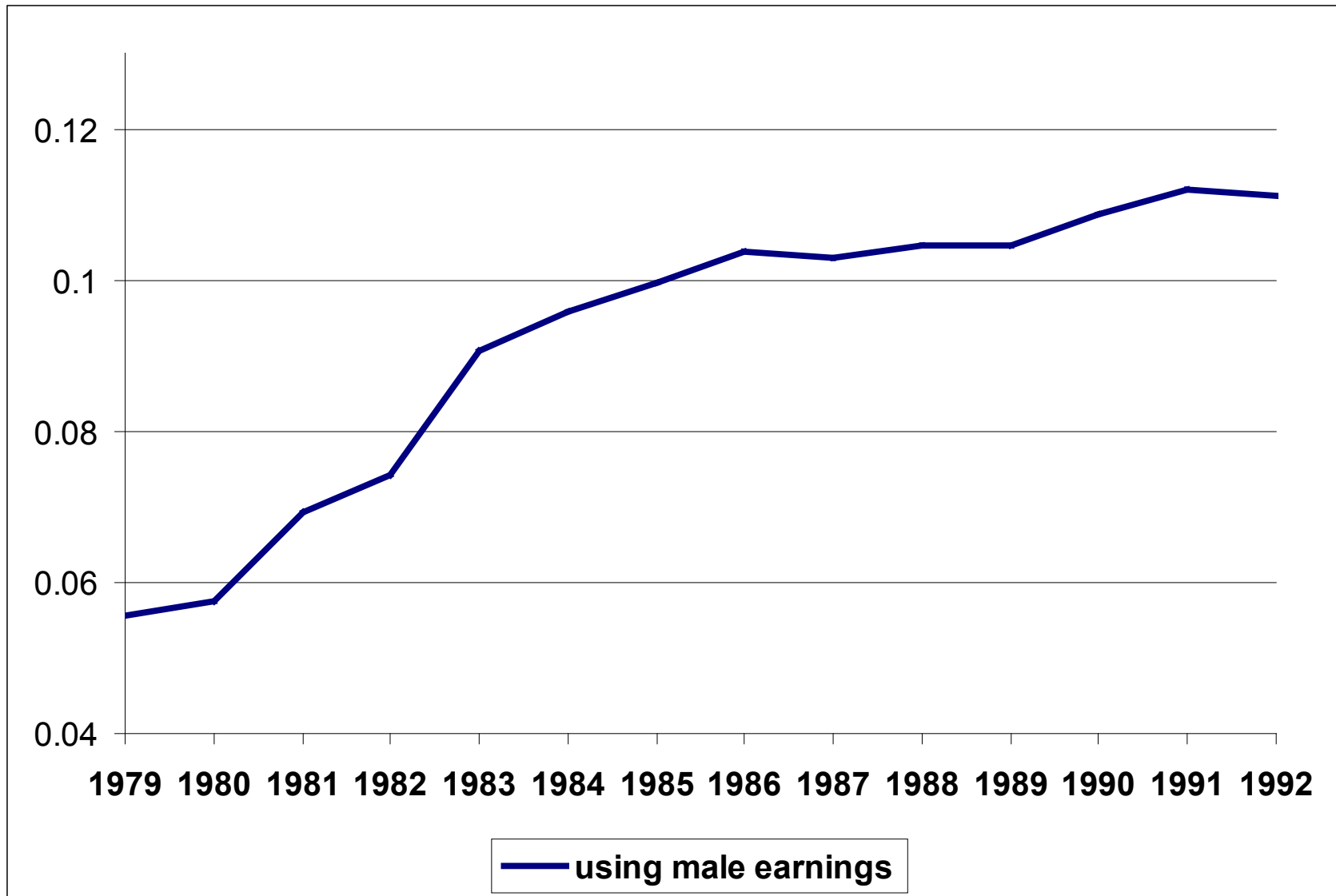
# Additional 'Insurance' Mechanisms

- Individual and family labor supply
- Redistributive mechanisms: social insurance, transfers, progressive taxation
- Family and interpersonal networks
- Durable replacement

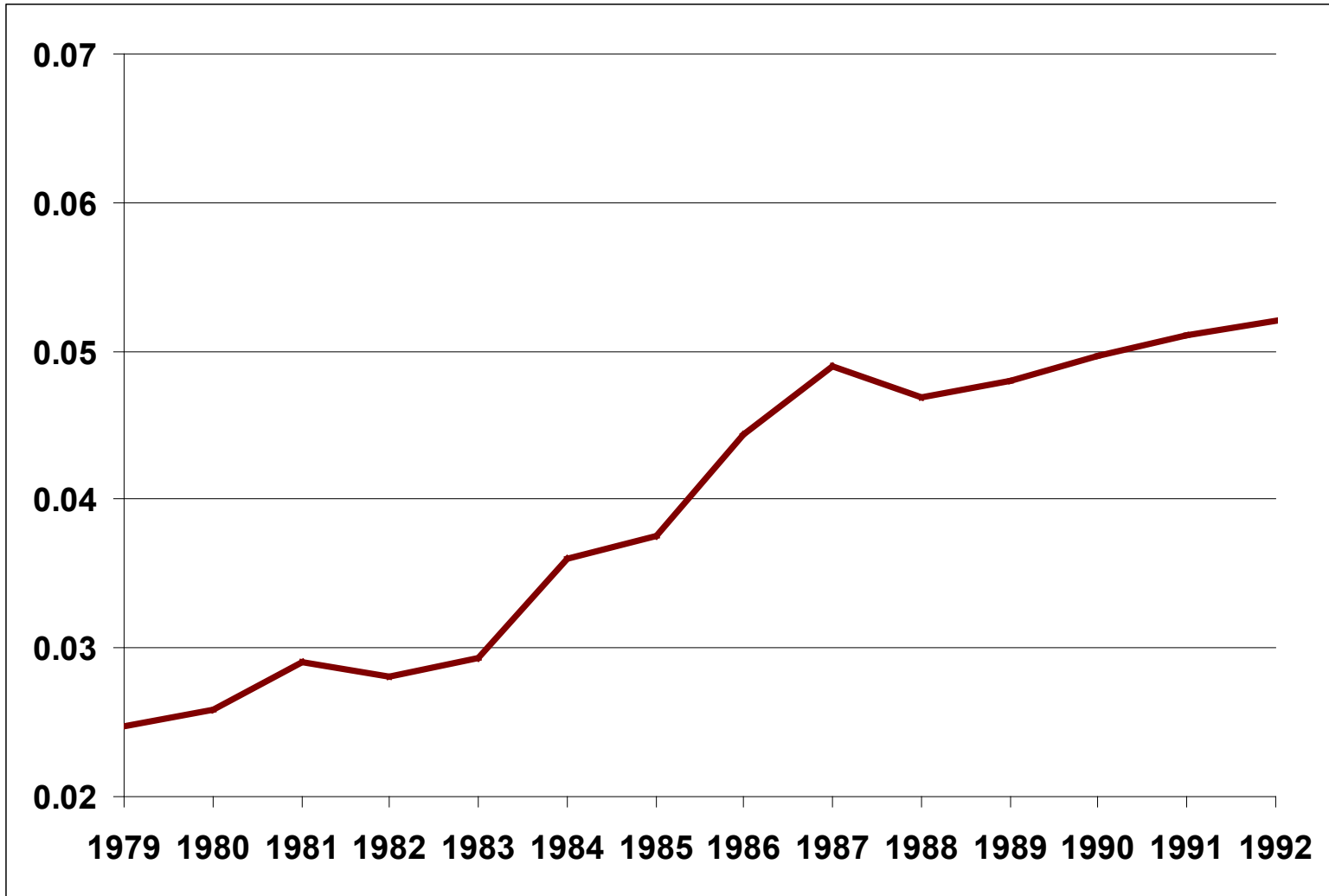
# Family Labour Supply

- An individual income shock may be compensated through an increase in the labour supply of another family member –
  - even for *transitory* shocks
  - especially the case for low wealth households
  - changes our view of ‘transitory’ shocks

# Results: Variance of transitory shocks



# Results: Variance of transitory shocks (net income)



# Taxes and Welfare

- The tax and welfare system clearly provides insurance to earnings shocks
  - unemployment insurance and income support
  - earning income tax credits like the WTC in the UK
  - food stamps in the US, income support in the UK for low income households
  - time-limited transfers like IWC in the UK, ERA in the US
- Provide substantial insurance against adverse shocks e.g. Blundell and Pistaferri (JHR, 2003).



# Wealth and Durables

- Low wealth households may have less access to the credit market to smooth even transitory shocks
- Durable replacement (and family labour supply) may also be used as a smoothing mechanism
  - For poor households at least - absence of even a simple credit market
  - Excess sensitivity among low wealth households - even more impressive use of durables among low wealth households
- Select (30%) initial low wealth.

## Results: Wealth and Durables

<b>Transmission Coefficients</b>	<b>Low wealth sample</b>	<b>Low wealth sample, including durables</b>
<b>Permanent Shock</b> $\phi$	<b>0.9589</b> <b>(0.2196)</b>	<b>0.9300</b> <b>(0.3131)</b>
<b>Transitory Shock</b> $\Psi$	<b>0.2800</b> <b>(0.0696)</b>	<b>0.4259</b> <b>(0.1153)</b>

# Summary

- The focus has been on the different evolution of income and consumption inequality
  - found that a key driving force is the nature and the durability of shocks to labour market earnings
  - recessions show a ‘spike’ in permanent variance
- We also found a key role for family labour supply and durables, *especially* for low wealth households
  - important implications for tax and welfare policy

## Have argued that...

- it is not enough just to describe inequality
  - we need to analyse determinants and understand how individuals/families cope with adverse shocks
- what mechanisms are used? What is the balance between:
  - taxes and welfare
  - self-insurance through the credit market
  - family labour supply
  - durable replacement
- Understanding these mechanisms is a key factor in the design of policy towards redressing the adverse consequences of inequality and poverty.

# Further Issues

- Is there evidence of anticipation?
- What if we use food consumption data alone?
- What if we ignore the distinction between permanent and transitory shocks?
- Alternative markets and models

THE END

From Income to Consumption:  
Understanding the Transmission of Inequality

Richard Blundell

<http://www.ucl.ac.uk/~uctp39a/>

UCL and IFS

For references see “Consumption Inequality and Partial Insurance,”  
(with Luigi Pistaferri and Ian Preston), *American Economic Review*,  
2008, [http://www.ucl.ac.uk/~uctp39a/aer\\_final.pdf](http://www.ucl.ac.uk/~uctp39a/aer_final.pdf)

# Anticipation

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  
Test  $\text{cov}(\Delta y_{t+3}, \Delta c_t) = 0$  for all  $t$ : p-value 0.8247  
Test  $\text{cov}(\Delta y_{t+4}, \Delta c_t) = 0$  for all  $t$ : p-value 0.7752

- We find little evidence of anticipation.
- This suggests the persistent labour income shocks that were experienced in the 1980s were not anticipated.
- These were largely changes in the returns to skills, shifts in government transfers and the shift of insurance from firms to workers.

# Food Data in the PSID

- Food data alone?
  - This means there's no need to impute
  - The coefficients of partial insurance now are the product of two things: partial insurance of non-durable consumption and the budget elasticity of food
  - These coefficients fall over time



# The Permanent-Transitory Distinction

- Suppose we ignore the durability distinction between permanent and transitory shocks
  - The transmission coefficient for labour income shocks is now a weighted average of the coefficients  $\varphi$  and  $\psi$ , with weights given by the importance of the variance of permanent (transitory) shocks
  - Thus, one will have the impression that ‘insurance’ is growing more rapidly.

# Alternative Income Dynamics

General specification for labour income dynamics:

$$\ln Y_{i,a,t} = Z_{i,a,t} \lambda + B_{i,a,t} f_i + y_{i,a,t}^P + v_{i,a,t}$$

$$y_{i,a,t}^P = \rho y_{i,a-1,t-1}^P + \zeta_{i,a,t}$$

- but idiosyncratic trends suggest less persistence through  $y^P$
- Lillard, Haider, Baker, Solon and Guvenen
- however, the change in the overall persistence is similar, information acquisition and the degree of persistence is subsumed in the ‘partial insurance’ parameter

# The Auto-Covariance Structure of Income Growth

Test  $\text{cov}(\Delta y_{t+1}, \Delta y_t) = 0$  for all  $t$ : p-value 0.0048

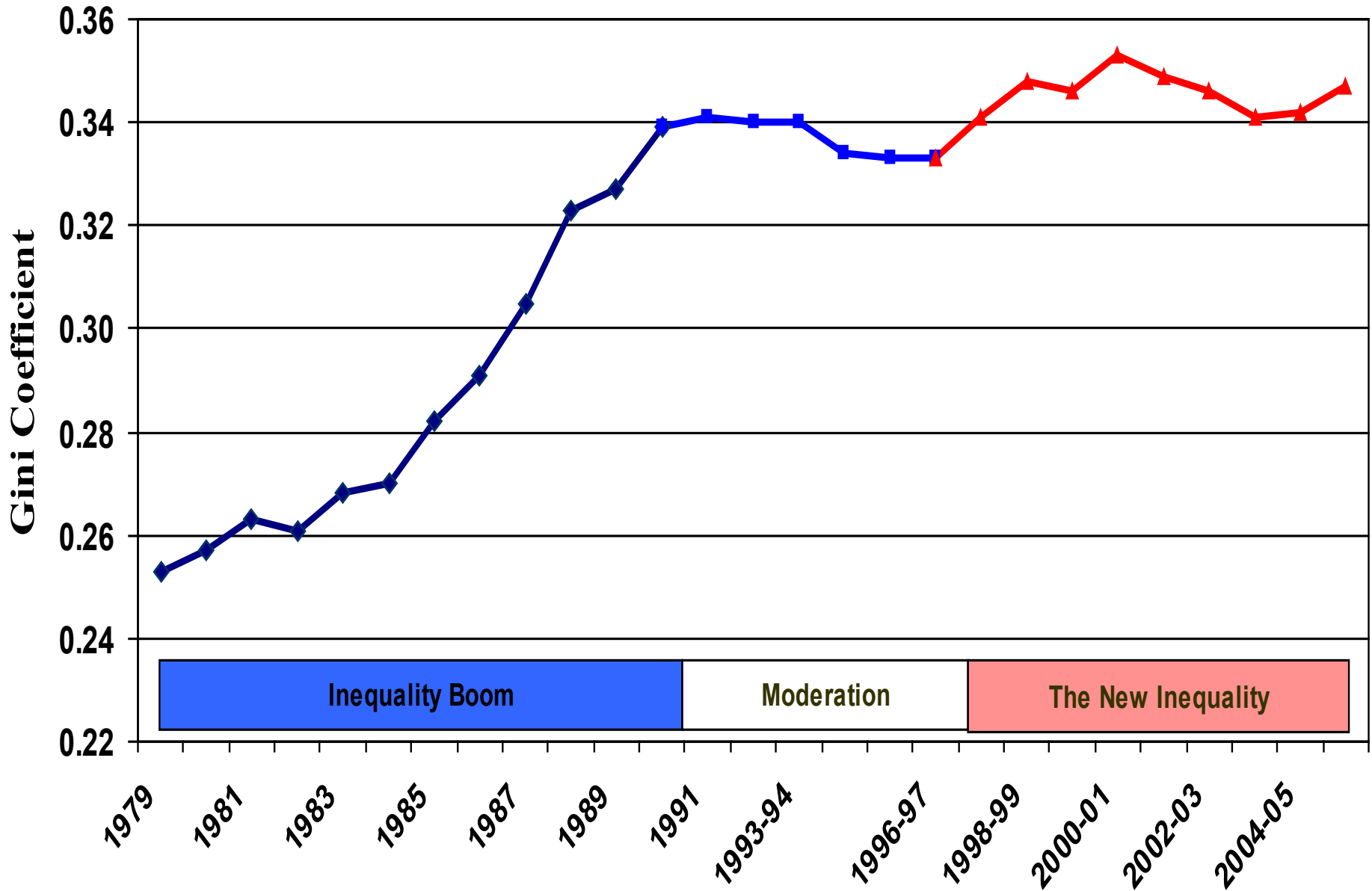
Test  $\text{cov}(\Delta y_{t+2}, \Delta y_t) = 0$  for all  $t$ : p-value 0.0125

Test  $\text{cov}(\Delta y_{t+3}, \Delta y_t) = 0$  for all  $t$ : p-value 0.6507

Test  $\text{cov}(\Delta y_{t+4}, \Delta y_t) = 0$  for all  $t$ : p-value 0.9875

- relate to extensive literature by Baker, Solon, Haider, Cuhna and Heckman, Guvenen, etc
- age selection matters for removing idiosyncratic trends
- forecastable components and differential trends are most important early in the life-cycle

# Inequality in the UK



# The 'Permanent-Transitory' Model

- implies a simple structure for the autocovariance of income growth

$$\text{let } y_{it} \equiv \ln Y_{it} - Z_{it}'\beta$$

$$\text{then } y_{it} = f_i + y_{it}^P + y_{it}^T$$

$$\text{where } y_{it}^P = y_{it-1}^P + \zeta_{it}$$

$$\text{so that } \Delta y_{it} = \zeta_{it} + \Delta y_{it}^T$$

$\Rightarrow$  simple restrictions on  $\text{cov}(\Delta y_{it}, \Delta y_{it+s})$

- how well does it work?

# I'm going to argue that...

- it is not enough just to describe inequality
  - we need to analyse determinants and understand how individuals and families cope with adverse shocks
- what mechanisms are used to ameliorate the adverse impact of inequality? What is the balance between
  - taxes and benefits
  - self-insurance through the credit market
  - family labour supply
  - durable replacement?
- Do the poor use difference mechanisms to the more wealthy?

- Until we understand these mechanisms we cannot hope to appropriately design policy towards redressing inequality.
- A key idea will be that the manner and scope for ‘insurance’ depends on the durability of income shocks.
  - poor households use different mechanisms including *durable replacement and family labour supply*
  - and welfare, of course
- The objective of this lecture is to understand the nature of transmission and the mechanisms used

# Three key literatures

- I. Examination of inequality over time in consumption and in income
  - In particular, studies from the BLS, Johnson and Smeeding (2005); early work in the US by Cutler and Katz (1992) and in the UK by Blundell and Preston (1991) and Atkinson (1997), etc



# Three key literatures

- I. Examination of inequality over time via consumption and income
- II. Microeconometric work on the panel data decomposition of income dynamics
  - Lillard and Willis (1978), MaCurdy(1982), Abowd and Card (1989), Gottschalk and Moffitt (1995, 2004), Haider (2001), Meghir and Pistaferri (2004), Haider and Solon (2006), etc

# Three key literatures

- I. Examination of inequality over time via consumption and income
  - II. Microeconometric work on panel data income dynamics
  - III. Work on intertemporal consumer decisions under uncertainty, especially on partial insurance, excess sensitivity:
    - Hall and Mishkin (1982), Campbell and Deaton (1989), Cochrane (1991), Deaton and Paxson (1994), Attanasio and Davis (1996), Krueger and Perri (2006), Guvenen (2007), Blundell, Preston and Pistaferri (2008), etc
- All three literatures suggest looking at birth cohorts.

# Wealth and Durables

- Low wealth households may have little ability to ‘insure’ any shocks – permanent or transitory
- Durable replacement and family labour supply may be used as ‘insurance’ mechanisms for transitory shocks
  - For poor households at least - absence of even a simple credit market
  - Excess sensitivity among low wealth households - even more impressive use of durables among low wealth households

- Until we understand these mechanisms we cannot hope to appropriately design policy towards redressing inequality.
- A key idea was be that the manner and scope for ‘insurance’ depends on the durability of income shocks.
  - These differ between recessions and periods of growth
  - poor households use different mechanisms including *durable replacement and family labour supply*
  - and welfare, of course

# From Income to Consumption...

- The objective here is to understand the transmission between wages, earnings, income and consumption inequality
- *‘There is a surprising difference between the trends in the dispersion of holdings of claims to goods and services (income and wealth) and trends in the dispersion of actual consumption, which is, of course, the ultimate determinant of material or economic well-being’ [Alan Greenspan]*
- First lets explore the characteristics of inequality growth since the late 1970s

# Income dynamics

- Technology and productivity shocks will change the value of an individual's skills in the labour market and will be quite persistent. Health shocks can have similar almost 'permanent' impacts
- Other shocks are shorter run and more 'transitory' in nature
- In general, less persistent shocks are somewhat easier for individuals, and for society, to 'insure'
- The extensive panel data we now have on individual and family incomes mean that we can really begin to understand income dynamics and how it changes over time

# Panel Data Moments

$$\text{var}(\Delta y_{it}) = \text{var}(\zeta_{it}) + \text{var}(\Delta \varepsilon_{it})$$

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

$$\text{var}(\Delta c_{it}) = \phi_t^2 \text{var}(\zeta_{it}) + \psi_t^2 \text{var}(\varepsilon_{it}) + \text{var}(\xi_{it})$$

$$\text{cov}(\Delta c_{it}, \Delta c_{it+1}) = -\text{var}(u_{it}^c)$$

$$\text{cov}(\Delta c_{it}, \Delta y_{it}) = \phi_t \text{var}(\zeta_{it}) + \psi_t \text{var}(\varepsilon_{it})$$

$$\text{cov}(\Delta c_{it}, \Delta y_{it+1}) = -\psi_t \text{var}(\varepsilon_{it})$$

Note: lower case y and c are log income and consumption respectively.

- Additional moments providing ‘over-identifying’ restrictions and can allow for measurement error

# The 'Permanent-Transitory' Model

A useful specification is one which represents the evolution over time as the sum of two components:

- $y^P$  is a random walk driven by income 'shock'  $\zeta$ .
- $y^T$  is a transitory process - some low order MA process in 'shock'  $\varepsilon$ .
- implies a very simple structure for the auto-covariance of income growth
  - Works well for the PSID?



# The Auto-Covariance Structure of Income Growth

Year	Var ( $\Delta y_t$ )		Cov ( $\Delta y_{t+1} \Delta y_t$ )		Cov ( $\Delta y_{t+2} \Delta y_t$ )	
	est.	s.e.	est.	s.e.	est.	s.e.
1979	0.0801	0.0085	-0.0375	0.0077	0.0019	0.0037
1980	0.0830	0.0088	-0.0224	0.0041	-0.0019	0.0030
1981	0.0813	0.0090	-0.0291	0.0049	-0.0038	0.0035
1982	0.0785	0.0064	-0.0231	0.0039	-0.0059	0.0029
1983	0.0859	0.0092	-0.0242	0.0041	-0.0093	0.0053
1984	0.0861	0.0059	-0.0310	0.0038	-0.0028	0.0038
1985	0.0927	0.0069	-0.0321	0.0053	-0.0012	0.0042
1986	0.1153	0.0120	-0.0440	0.0094	-0.0078	0.0061
1987	0.1185	0.0115	-0.0402	0.0052	0.0014	0.0046
1988	0.0930	0.0084	-0.0314	0.0041	-0.0017	0.0032
1989	0.0922	0.0071	-0.0303	0.0075	-0.0010	0.0043
1990	0.0988	0.0135	-0.0304	0.0058	-0.0060	0.0046

Variance of log, PSID: after tax total labour income

# Income dynamics

- The permanent-transitory model aligns well with the autocovariance structure of the PSID – a note on age selection
- also the BHPS(UK), JPID(Japan) and ECFP(Spain)
- Can use this autocovariance structure to recover separately the variance of the permanent and the variance of the transitory shocks
- Document how these change over time
- The relative variance of these components is a measure of persistence or durability of income shocks
- This change in the persistence is the key idea.

# Results: Taxes, Transfers and Family labor supply

<b>Transmission Coefficients</b>	<b>Baseline</b>	<b>Couples earnings</b>	<b>Male earnings</b>
<b>Permanent Shock</b> $\phi$	<b>0.6423</b> <b>(0.0945)</b>	<b>0.4668</b> <b>(0.0977)</b>	<b>0.2902</b> <b>(0.0611)</b>
<b>Transitory Shock</b> $\Psi$	<b>0.0533</b> <b>(0.0435)</b>	<b>0.0574</b> <b>(0.0286)</b>	<b>0.0436</b> <b>(0.0291)</b>

# Results: Income-Consumption Transmission Parameter

## - Cohort and College Decomposition

	<b>Whole sample</b>	<b>George W. Bush cohort (born 1940s)</b>	<b>Donald Rumsfeld cohort (born 1930s)</b>	<b>Low educ.</b>	<b>High educ.</b>
<b>Transmission Coeff. perm. shock (<math>\phi</math>)</b>	<b>0.6423 (0.0945)</b>	<b>0.7928 (0.1848)</b>	<b>0.6889 (0.2393)</b>	<b>0.9439 (0.1783)</b>	<b>0.4194 (0.0924)</b>
<b>Transmission Coeff. trans. shock (<math>\psi</math>)</b>	<b>0.0533 (0.0435)</b>	<b>0.0675 (0.0705)</b>	<b>-0.0381 (0.0737)</b>	<b>0.0768 (0.0602)</b>	<b>0.0273 (0.0550)</b>

- Note: almost identical results updating with the recent PSID data