Inequality and Poverty: the longitudinal perspective

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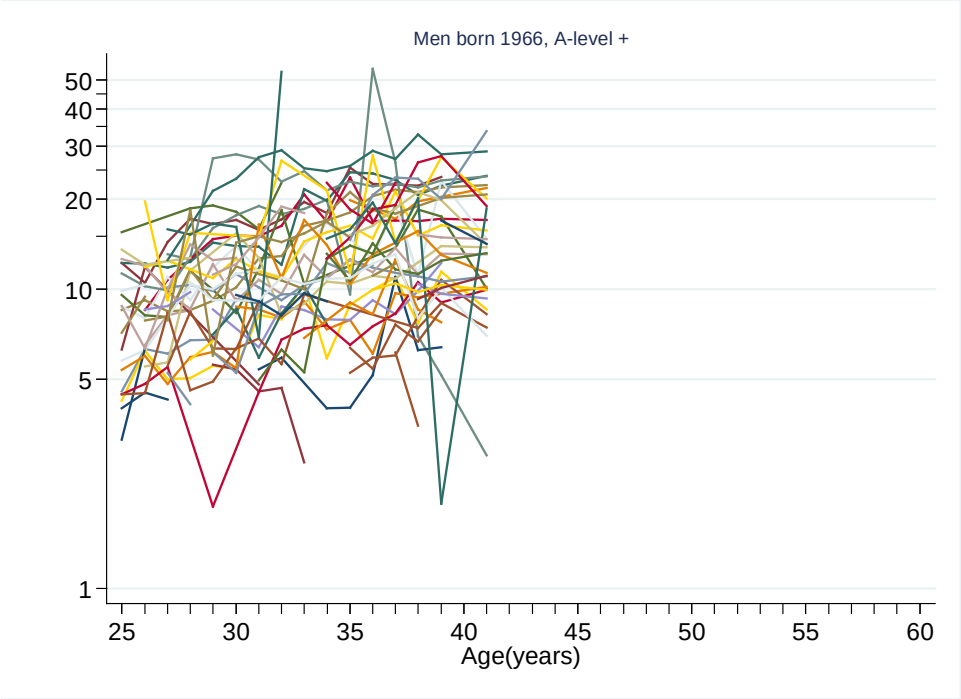
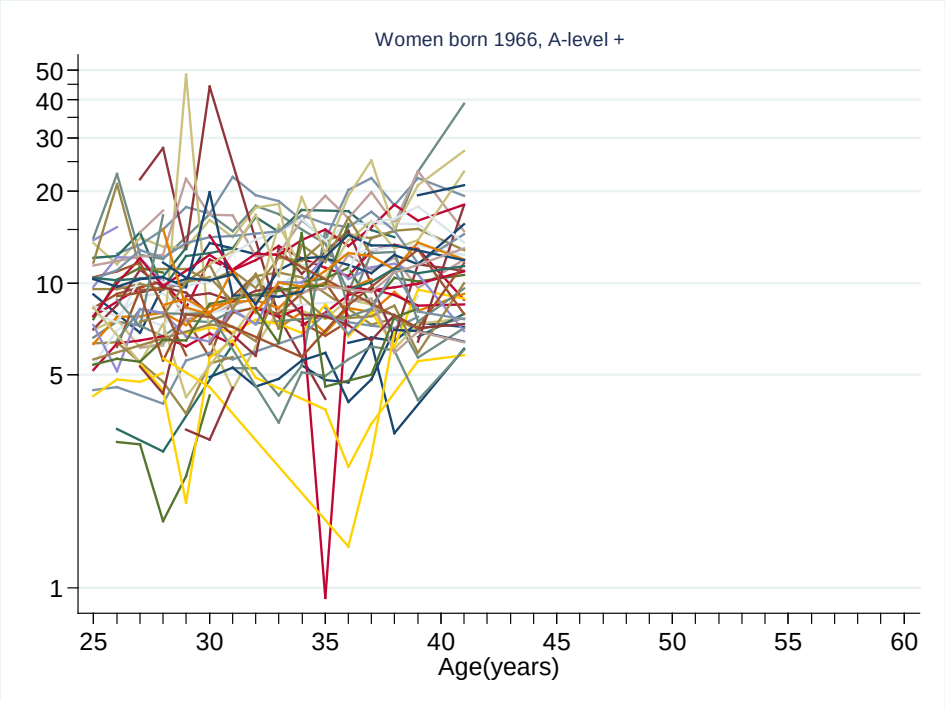
Longitudinal perspectives rather than cross-sectional ones

- Income distributions are most commonly assessed in terms of how inequality there is in a given year or by how much inequality and poverty have changed over time
  - (Repeated) cross-section perspective
  - Different set of individuals in each comparison
- This lecture makes the case for also drawing on information about income mobility, i.e. how people's incomes change between one year and the next
  - Longitudinal perspective
  - Same set of individuals tracked over time
  - [Intragenerational, not inter-generational, mobility]

Incomes in real life fluctuate over time: trajectories are like ‘spaghetti’

- Men born 1966, A-level +
- Women born 1966, A-level +





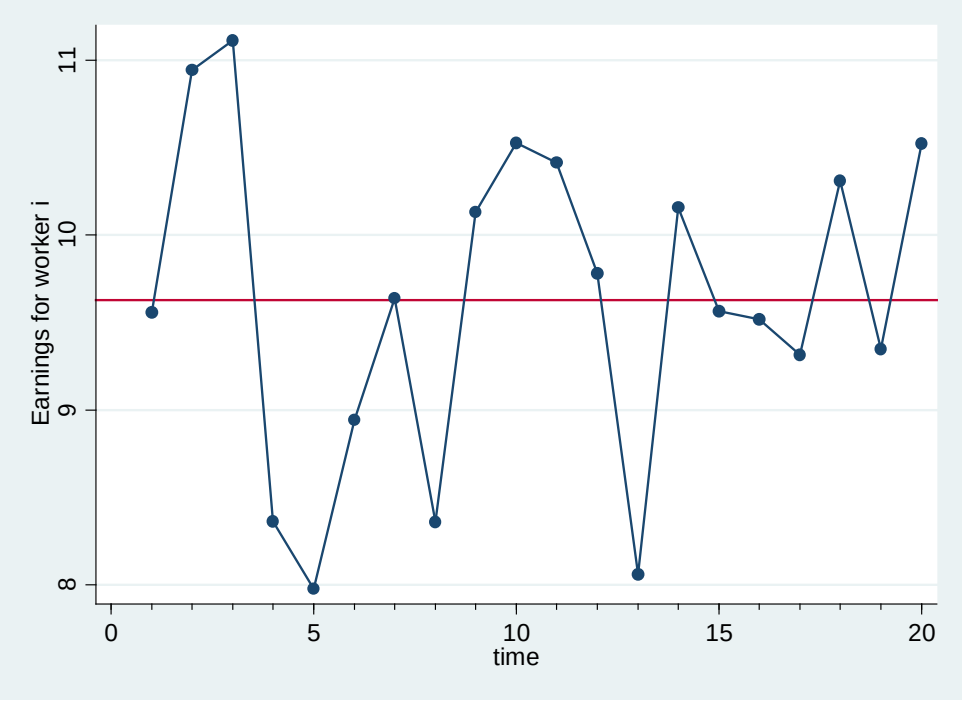
Hourly real wages (log scale) among working-age employees
Source: British Household Panel Survey data
Note: similar spaghetti pictures for equivalised net household income among all individuals

Longitudinal income variability for each person
(each spaghetti strand)

- Each individual's variability corresponds to *mobility* around his/her longitudinal average income (expected lifetime income: red line), which may not be anticipated (income *risk* or *volatility*)

Overall mobility might be summarised in multiple ways:

1. Each person's movements relative to other people
2. How much inequality
   across persons of
   longer-term average
   income is less than
   current inequality
3. Total income risk/volatility
4. Income growth (absolute; relative to cut-off)



This lecture: motivation, description, explanation

1. Motivation: why care about income mobility and poverty dynamics?
2. Description: how much mobility is there, and what are the typical patterns?
   - To/from all income ranges in general
   - Into/out of poverty in particular
3. Explanation: a ‘rubber band’ model of individual income trajectories
   - Trigger events (job loss/gain, family formation/dissolution, etc.)
   - Personal characteristics such as education and transitory income variability
   - The socio-economic environment: welfare states and labour market institutions

1. Motivations

Motivations are multiple

- Information about mobility influences our assessments of the fairness of current inequality and poverty
  - Arguably, we are more tolerant of greater inequality and poverty, the more that all have a chance of getting to the top, or of not being stuck at the bottom
  - Mobility means lifetime inequality less than current inequality
  - Poverty worse for people, the longer they are poor
- Income instability is indicative of income risk
- Individual income growth is of direct concern
  - Are real incomes growing for those at the bottom, as well as for those in the middle and top income ranges?
- Instrumental: e.g. better descriptions of poverty experience; understanding of processes of poverty exit and entry; policy for poverty (and affluence?)

Motivation: equalising opportunities

More mobility as a Good Thing: greater equalisation of access to 'good' incomes

"Higher income inequality would be less of a concern if low-income earners became high-income earners at some point in their career, or if children of low-income parents had a good chance of climbing up the income scales when they grow up. In other words, if we had a high degree of income mobility we would be less concerned about the degree of inequality in any given year."

Alan Krueger (Chairman of President Obama's Council of Economic Advisors), 2012

- Measure mobility directly in terms of the extent to which there is turnover between income groups

Motivation: inequality reduction

More mobility as a Good Thing: reducing inequality of lifetime incomes

"A major problem in interpreting evidence on the distribution of income is the need to distinguish two basically different kinds of inequality; temporary, short-run differences in income, and differences in long-run income status. Consider two societies that have the same annual distribution of income. In one there is great mobility and change so that the position of particular families in the income hierarchy varies widely from year to year. In the other there is great rigidity so that each family stays in the same position year after year. The one kind of inequality is a sign of dynamic change, social mobility, equality of opportunity; the other, of a status society"

Milton Friedman, *Capitalism and Freedom*, 1962, p. 171

- Mobility means that inequality of 'lifetime income' is less than income inequality in any given year
- Measure mobility by the extent to which inequality of longitudinally-averaged income is less than inequality in each year separately

Motivations: income risk

More mobility as a Bad Thing: increasing volatility and income risk

"[G]reater variability of incomes about the same average level is disliked by individuals who prefer a stable flow. So to the extent that mobility leads to more pronounced fluctuations and more uncertainty, it is not regarded as socially desirable."

Tony Shorrocks, *Journal of Economic Theory*, 1978

- Measure mobility in terms of measures of income risk and volatility – summarise variability around expected (longer-term average) income, and average over population

Motivations: differential income growth

More mobility as a mixed blessing: depends on whether your income level rises or falls

"[T]he justice for me is concentrated on lifting incomes of those that don't have a decent income. It's not a burning ambition for me to make sure that David Beckham earns less money. . . [T]he issue isn't in fact whether the very richest person ends up becoming richer. … the most important thing is to level up, not level down."

Tony Blair, BBC Newsnight interview, 5 June 2001

- Measure mobility by looking at the patterns of differential income growth, and summarising the extent to which it is pro-poor or pro-rich

Motivation: policy relevance

A dynamic perspective leads to a different way of thinking about anti-poverty strategies altogether

"[D]ynamic analysis gets us closer to treating causes, where static analysis often leads us towards treating symptoms. ... If, for example, we ask who are the poor today, we are led to questions about the socioeconomic identity of the existing poverty population. Looking to policy, we then typically emphasise income supplementation strategies. The obvious static solution to poverty is to give the poor more money. If instead, we ask what leads people into poverty, we are drawn to events and structures, and our focus shifts to looking for ways to ensure people escape poverty."

Ellwood (1998: 49), welfare reform advisor to President Clinton

"Snapshot data can lead people to focus on the symptoms of the problem rather than addressing the underlying processes which lead people to have or be denied opportunities"

HM Treasury (1999: 5)

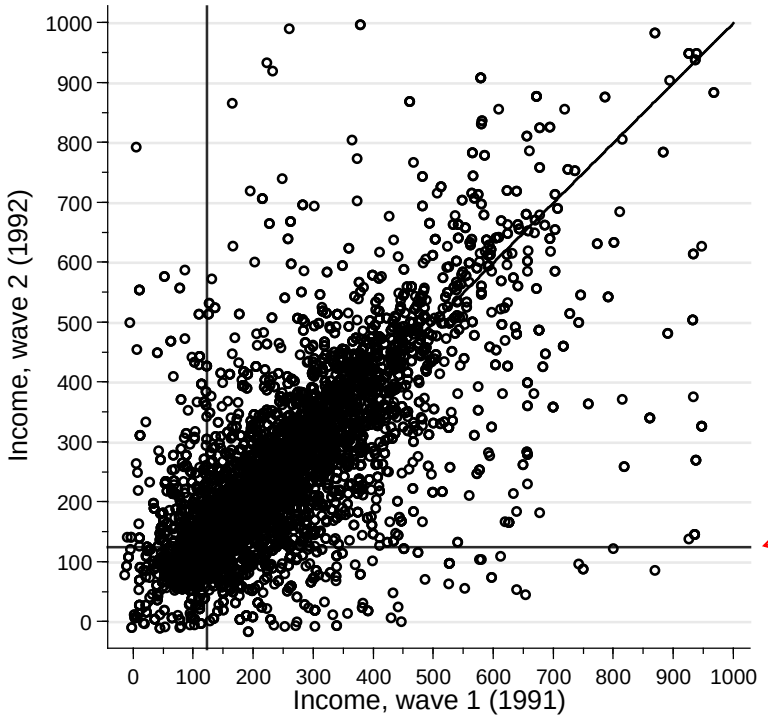
Mobility comparisons and policy context

- Mobility levels and trends within a country
  - Tax-benefit policy changes introduced, e.g. New Labour in the UK at end of the 1990s targeted families with children and pensioners
- Cross-national comparisons of mobility
  - Differences in welfare states, labour market 'institutions', etc.
  - Greater labour market flexibility, less comprehensive social safety-net in USA relative to Europe
  - Cf. welfare state 'regimes' (à la Esping-Andersen) such as 'liberal' (e.g. Britain and USA) versus 'corporate' (e.g. Germany) versus 'socio-democratic' (e.g. Sweden)

2. Description

A first look: mobility between two consecutive years

Britain 1991, 1992



- Concentration of incomes in the neighbourhood of the 45° line: most mobility over the one year interval is relatively short range – but there is some long distance movement
- Both upward mobility (points above the 45° ray from the origin) and downward income mobility (points below the 45° ray)
- Mobility is experienced by people from all income groups (rich, middle-income, and poor)
- Poverty escapers: 7%. Poverty entrants: 8%. Poor both years: 14%. Non-poor both waves: 71%. 29% had low income in at least one year, i.e. some 50% larger than in either year
  - Immediate policy points: turnover among 'The Poor', and numbers helped by the welfare state

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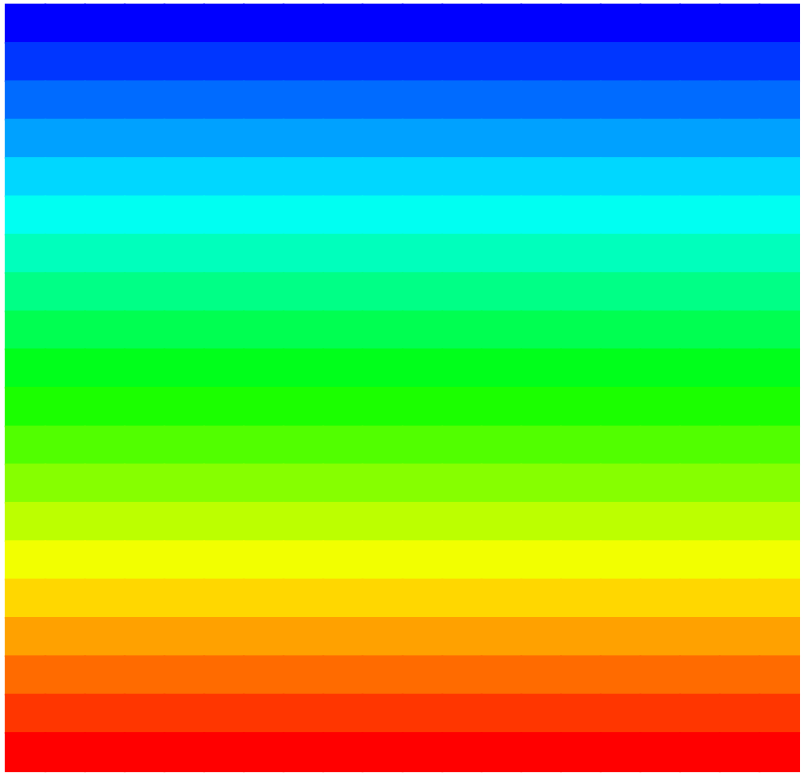
How much movement between income groups is there from one year to the next?

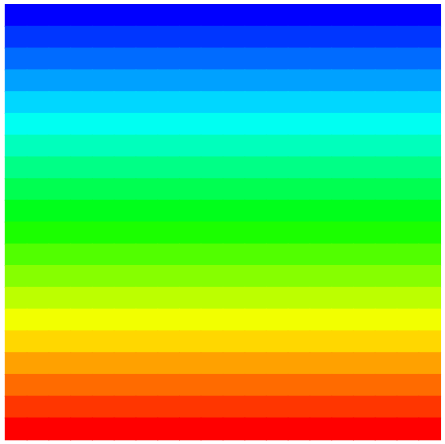
- Divide the population in *each year* into 20 equal-sized groups from poorest (top row of picture) to richest (bottom row of picture): each row contains 5%
- People are colour-coded accorded to their position in the *base-year* income distribution:
  - Blue: poorest twentieth
  - Red: richest twentieth



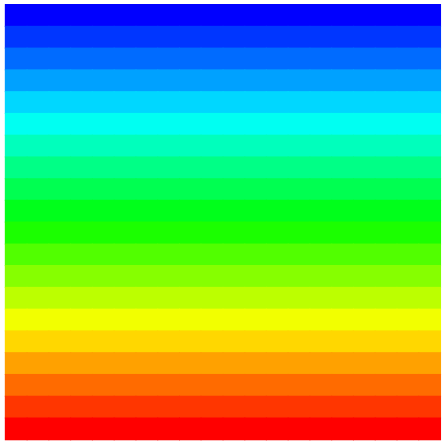
Poor ~ bottom 3–4 groups

How much movement? Some reference points:

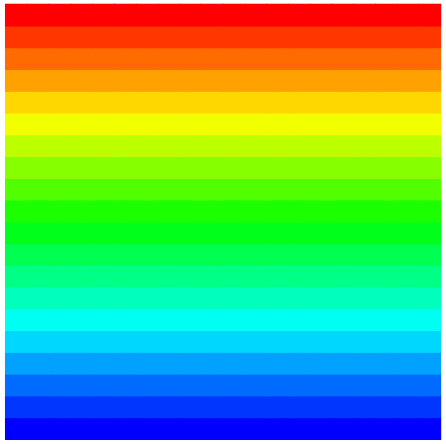
- Base year:



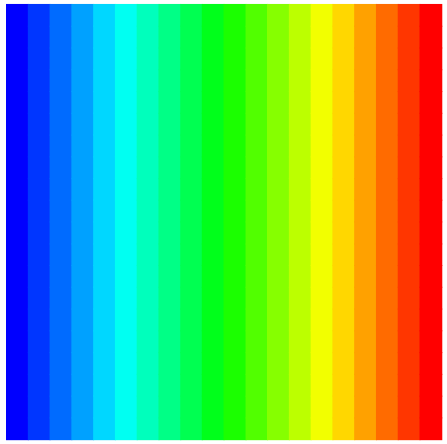
Mobility means changing income group: track change by looking at how origin groups (colours) change
rows in the pictures



(a) perfect immobility



(b) perfect mobility [*rank reversal*]

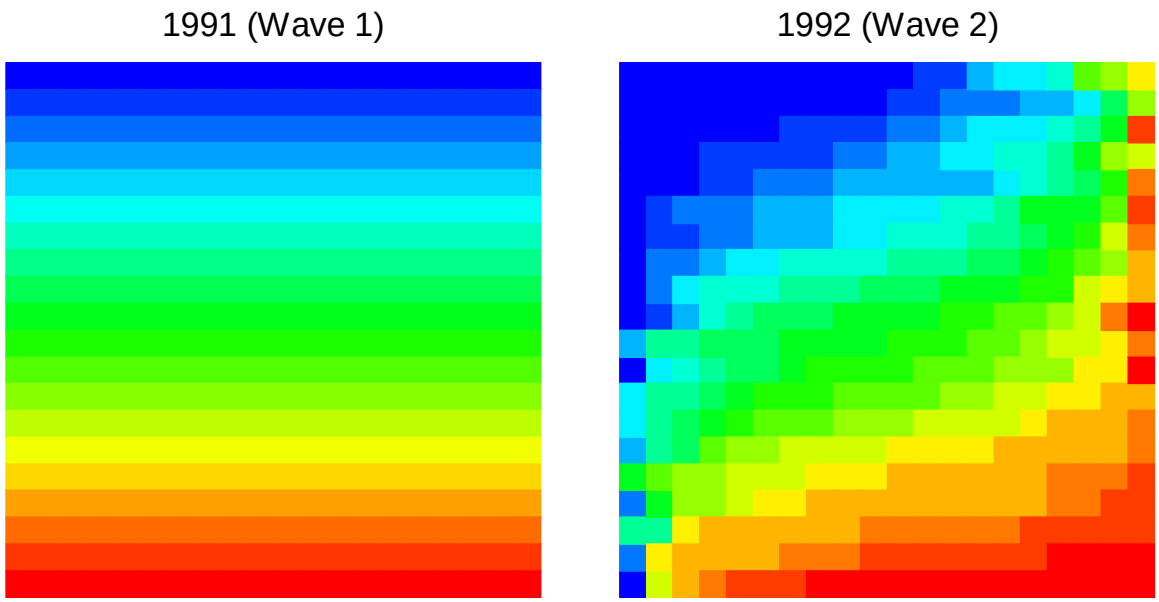


(c) perfect mobility [*origin independence*]

Final year

Income mobility over a one year interval, Britain

- Substantial amount of mobility, but mostly short distance



Annual poverty exit rate for those poor in 1991 = c. 35%
Annual poverty entry rate for those non-poor in 1991 = c. 8%

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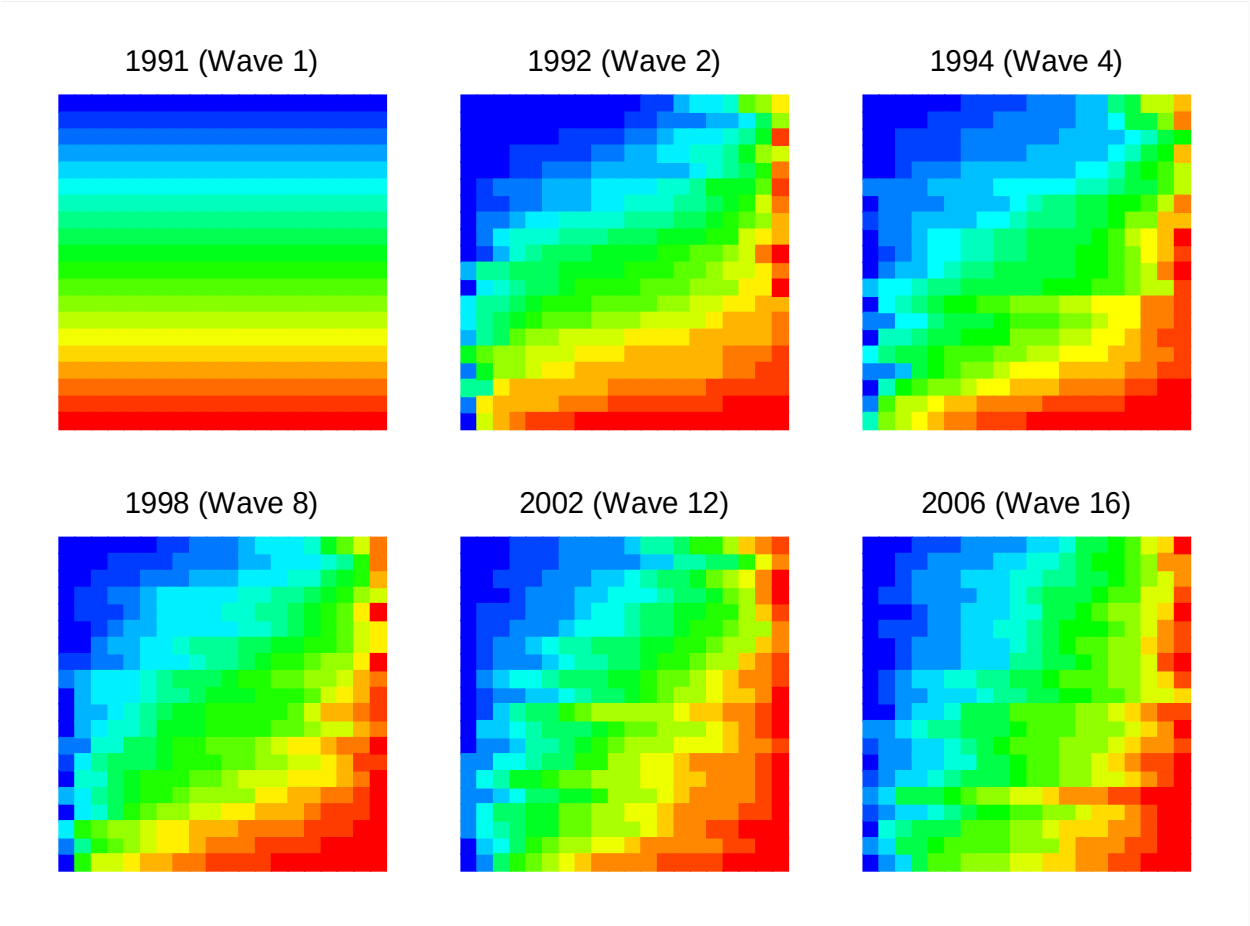
Income mobility between 1991 and a later year, Britain

- More mobility from 1991 origin as time proceeds
- But, even after 15 years, an association with origin remains, suggestive of persistent differences in people's longer-term (smoothed) incomes



Decile transition matrices (GB): numerical summaries

Summary index	(Im)mobility between wave 1 and later wave				
	Wave 2	Wave 4	Wave 8	Wave 12	Wave 16
Correlation (levels), %	79.8	68.8	63.5	43.0	36.8
Correlation (logs), %	75.4	66.9	62.8	44.0	38.1
Rank correlation, %	78.2	67.1	61.6	44.2	38.1
Percentage remaining on leading diagonal	37.4	28.0	24.2	17.9	16.6
Percentage remaining on leading diagonal ± 1	72.6	61.8	54.4	45.0	39.4
Average of individual changes (£)	4.3	5.9	17.7	52.3	66.7
Average of individual changes (logs)	1.7	3.2	8.1	20.7	24.6

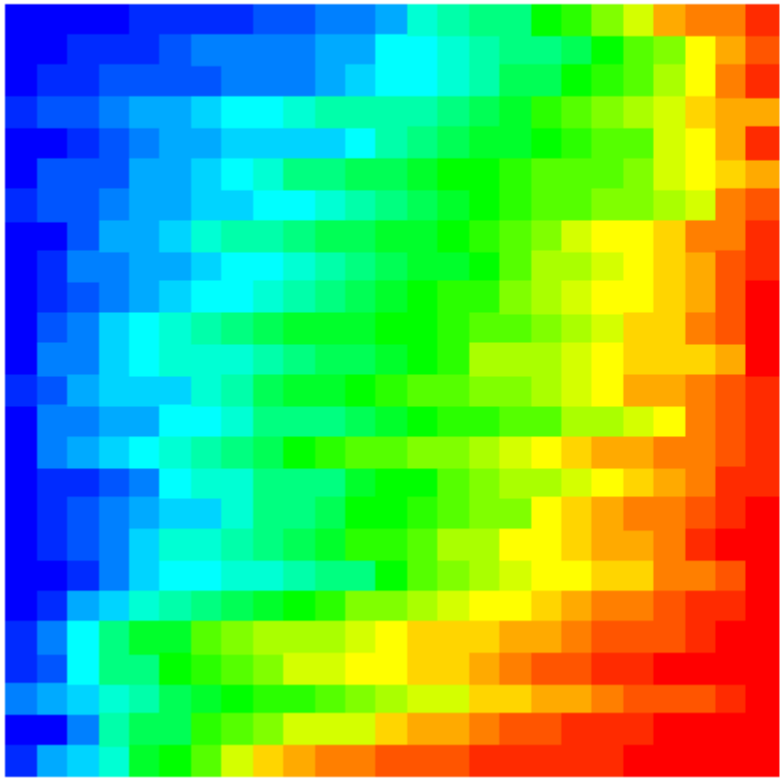
Note: wave 1 is 1991, wave 2 is 1992, …, wave 16 is 2006

More mobility in Western Germany than the USA?

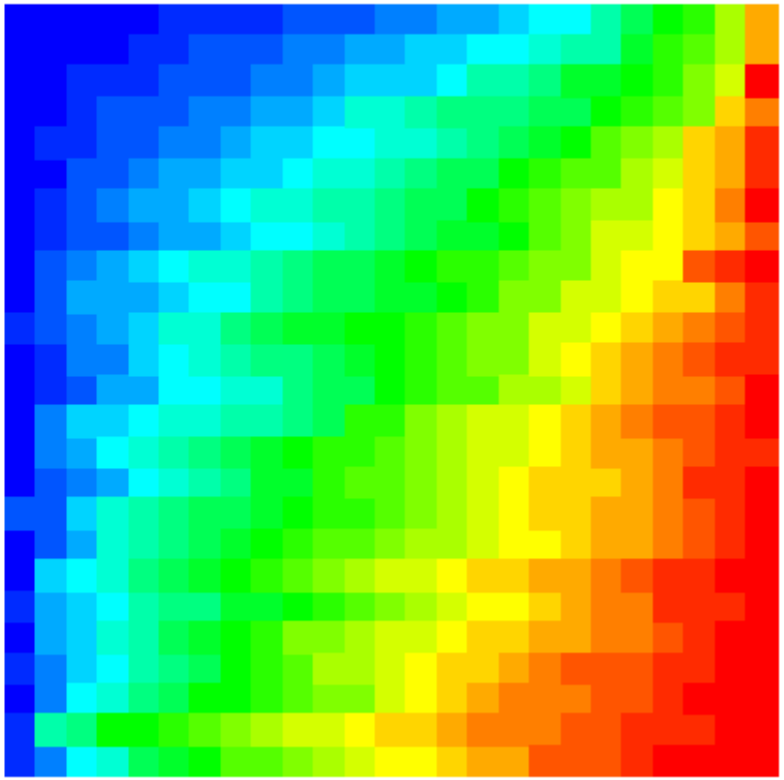
Surprising result, with the differences most apparent at the bottom

Source: Van Kerm (2011). Original finding by Burkhauser and collaborators (1997)

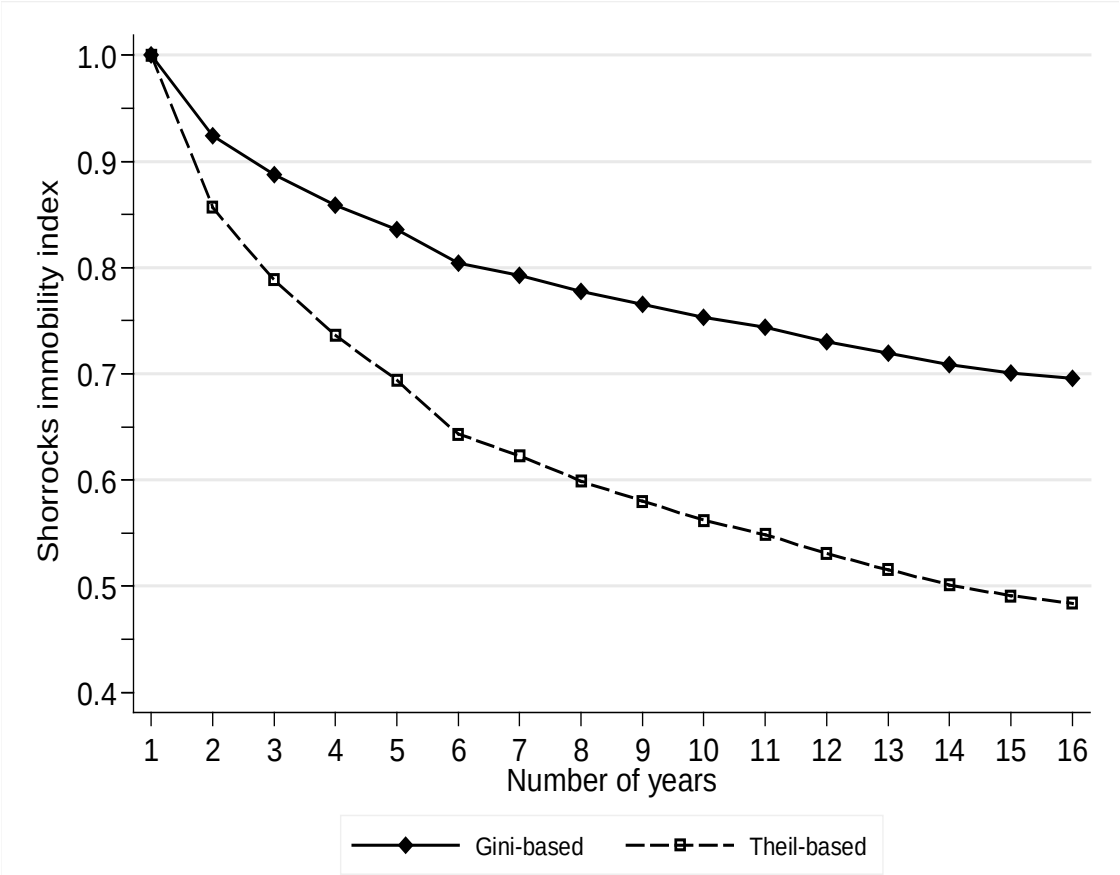
Western Germany
1985–1997



United States
1985–1997



GB: Income mobility and inequality reduction (15 years)



The lower the value, the more the mobility

Source: Jenkins (2011)

- The extent to which mobility reduces inequality of longer-term (15-year averaged) income is about the same magnitude as the change in single-year cross-sectional inequality change in GB between 1978 and 1992:
  - Inequality was 71% lower in 1978 than in 1992 according to the Gini coefficient, and 48% lower according to the MLD (IFS, 2009) – usually assessed as a ‘large’ change

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Mobility's inequality-reducing impact larger in GB than US, DE, CA

Source: Chen (*RIW* 2009), Five-year (and longer) windows

- Now a different US-DE relationship? See also Bayaz-Ozturk et al. (*Econ Inquiry* 2014) about the changing USA-Western Germany mobility differential

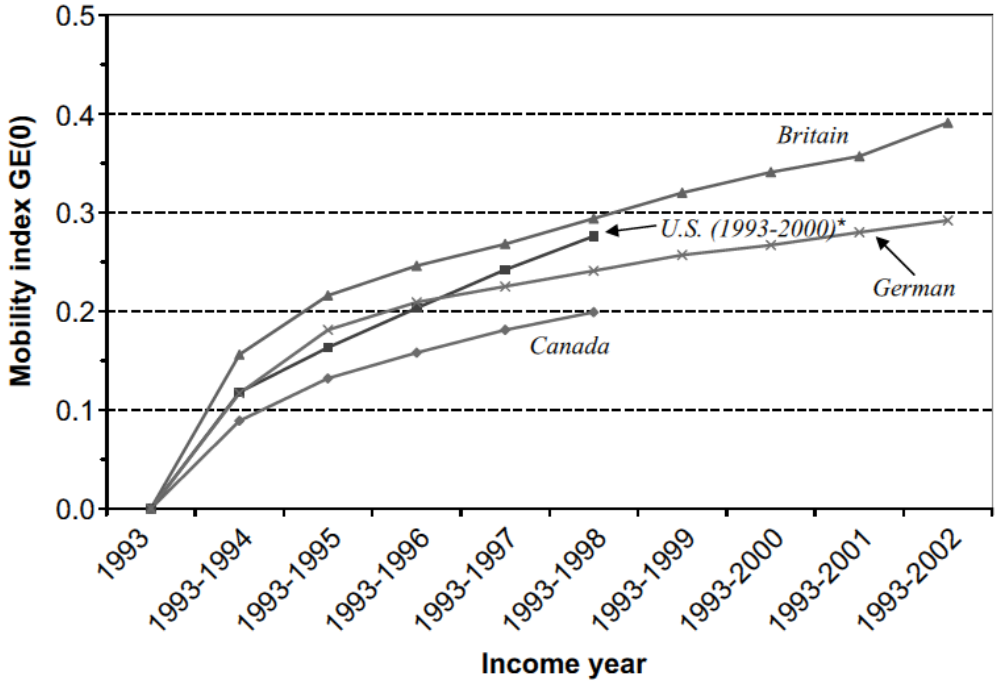


Figure 5. Mobility Profiles, Mean Log Deviation (GE(0))

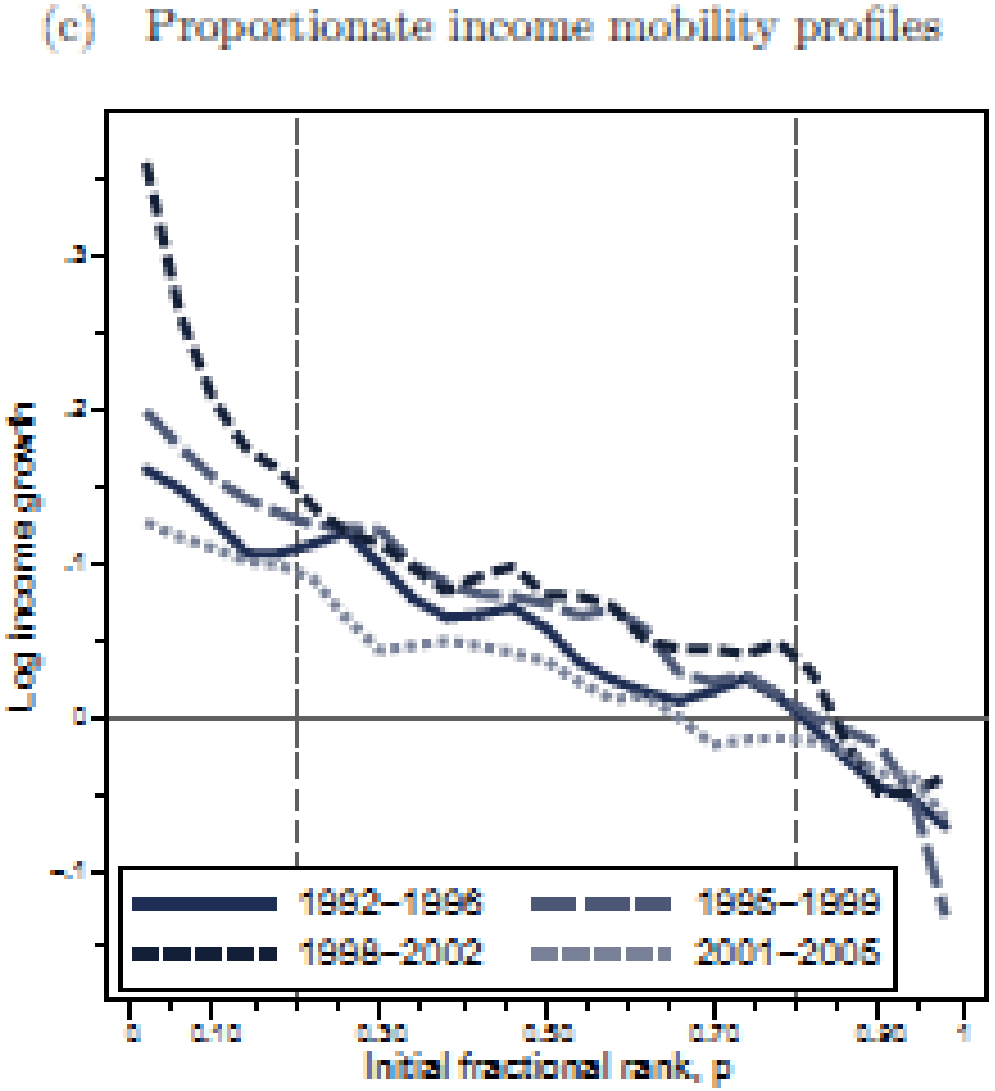
Notes:
*For the U.S. data, 1993–97 refers to income average from 1993 to 1996 and 1998; 1993–98 refers to income average from 1993 to 1996, 1998 and 2000.
Data source: CNEF 2005 release. Individuals present in all years (see also Table 4).

Differential income growth in GB, by period

Income growth (%), by base-year position

Curve for each period reflects 'regression to the mean' (negative slope) and overall average income growth (height)

But observe the more distinctly pro-poor curve for 1998–2002 (early New Labour period)

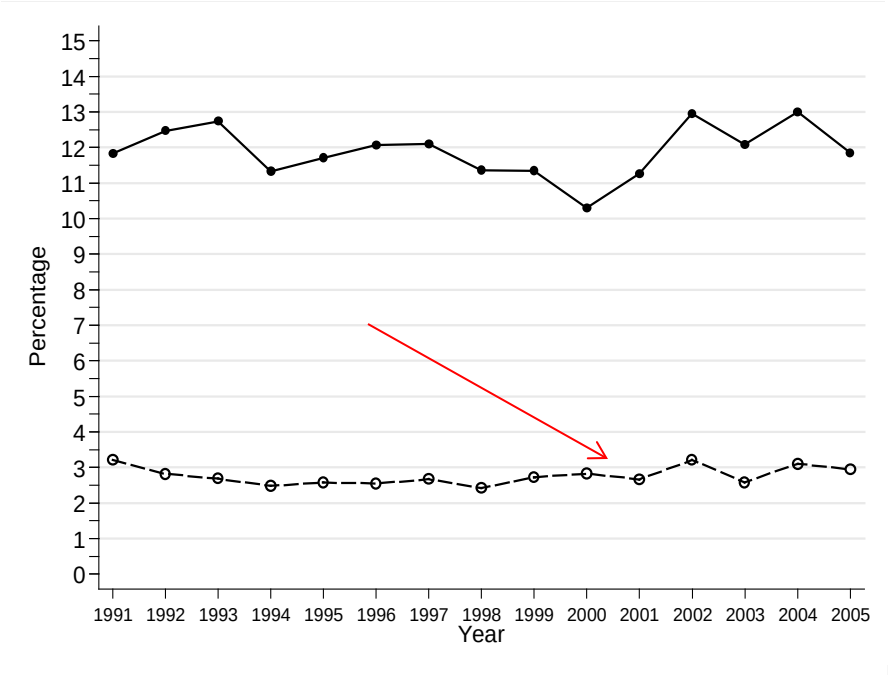


Source: Jenkins & Van Kerm (2011)

Income risk: Pr(experiencing a large income fall, *t* to *t*+1)

GB

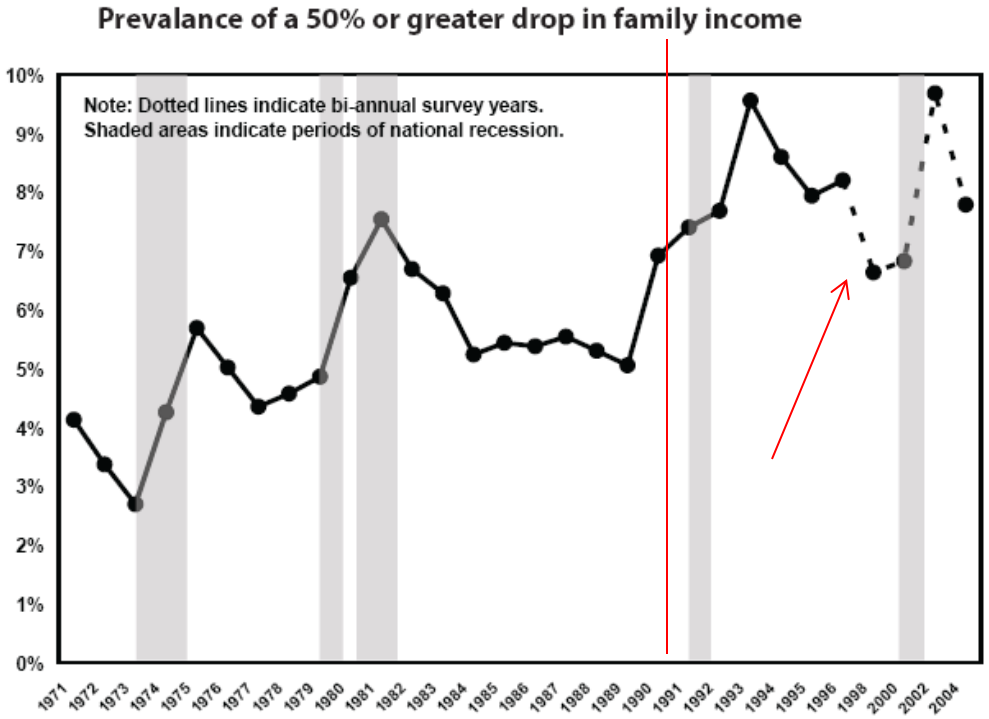
- No trend
- Probabilities always lower than in USA



Solid line: Pr(income fall by ≥ 25%)
Dashed line: Pr(income fall by ≥ 50%)

USA

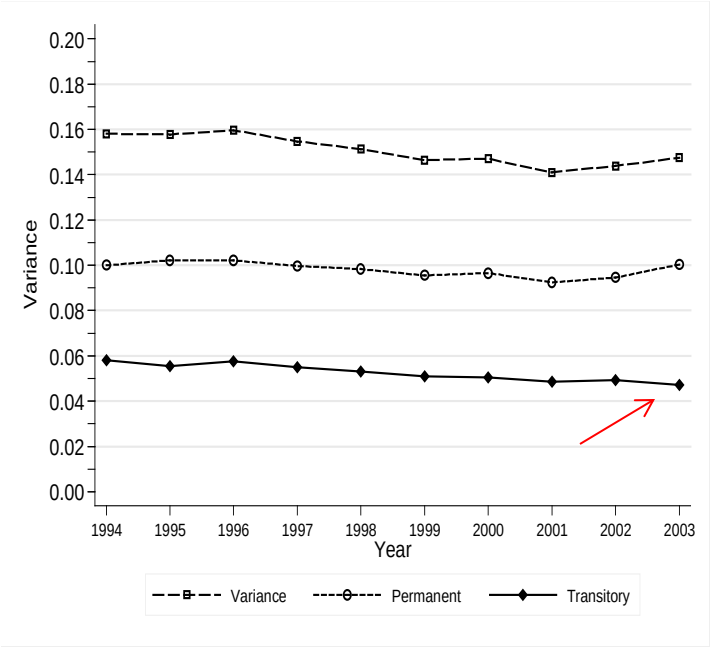
- Secular upward trend
- Fluctuation post-1991

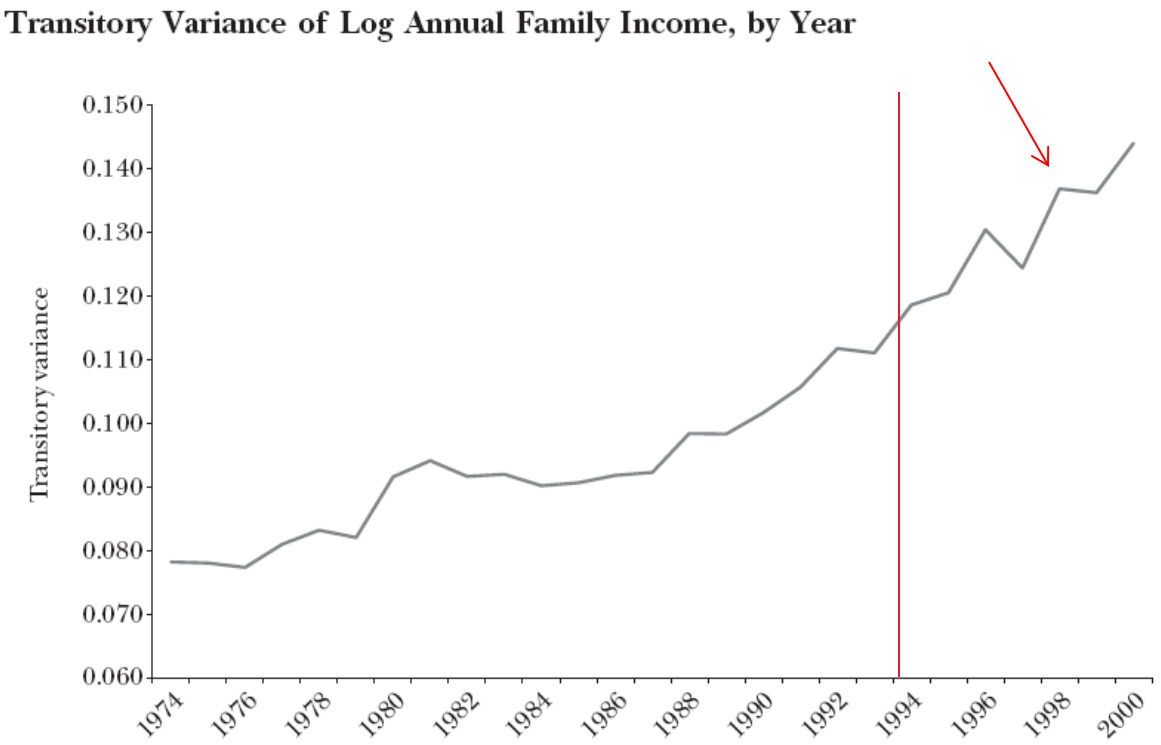


Sources: Jenkins (2011) for GB; Hacker & Jacobs (EPI WP 2008, Fig. C; Individuals aged 25–61) for USA

Household income risk (transitory variance): GB versus USA, 1994 through mid-2000s

- GB: *decline* from around 0.065 to 0.055 (down 15%)
- USA: *rise* from around 0.115 to 0.140 (up 22%)





Sources: Jenkins (2011) for GB; Moffitt & Gottschalk (*JEP* 2009, Fig. 5) for USA

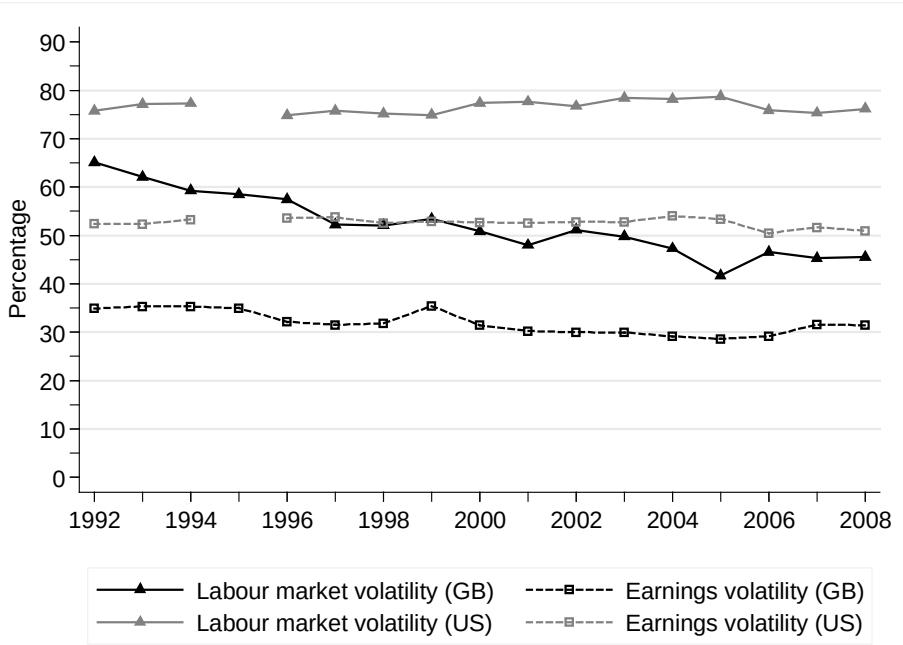
Volatility: GB versus USA (earnings and labour market)

Levels are higher in the US than GB for both sexes

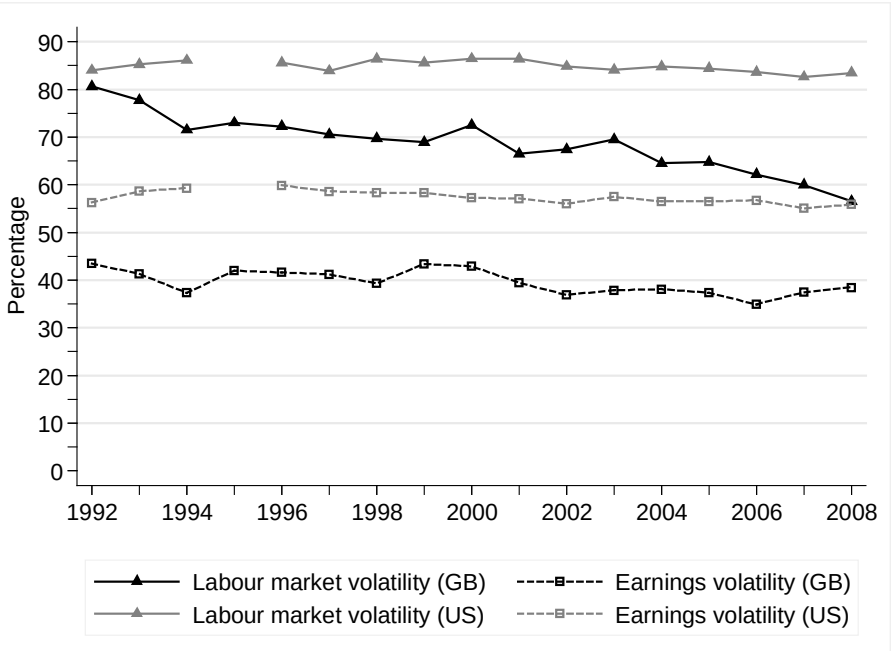
Trends differ: downward trend in labour market volatility in GB, not USA

Source: Cappellari and Jenkins (2013) with US estimates taken from Ziliak et al. (2011)

(a) Men



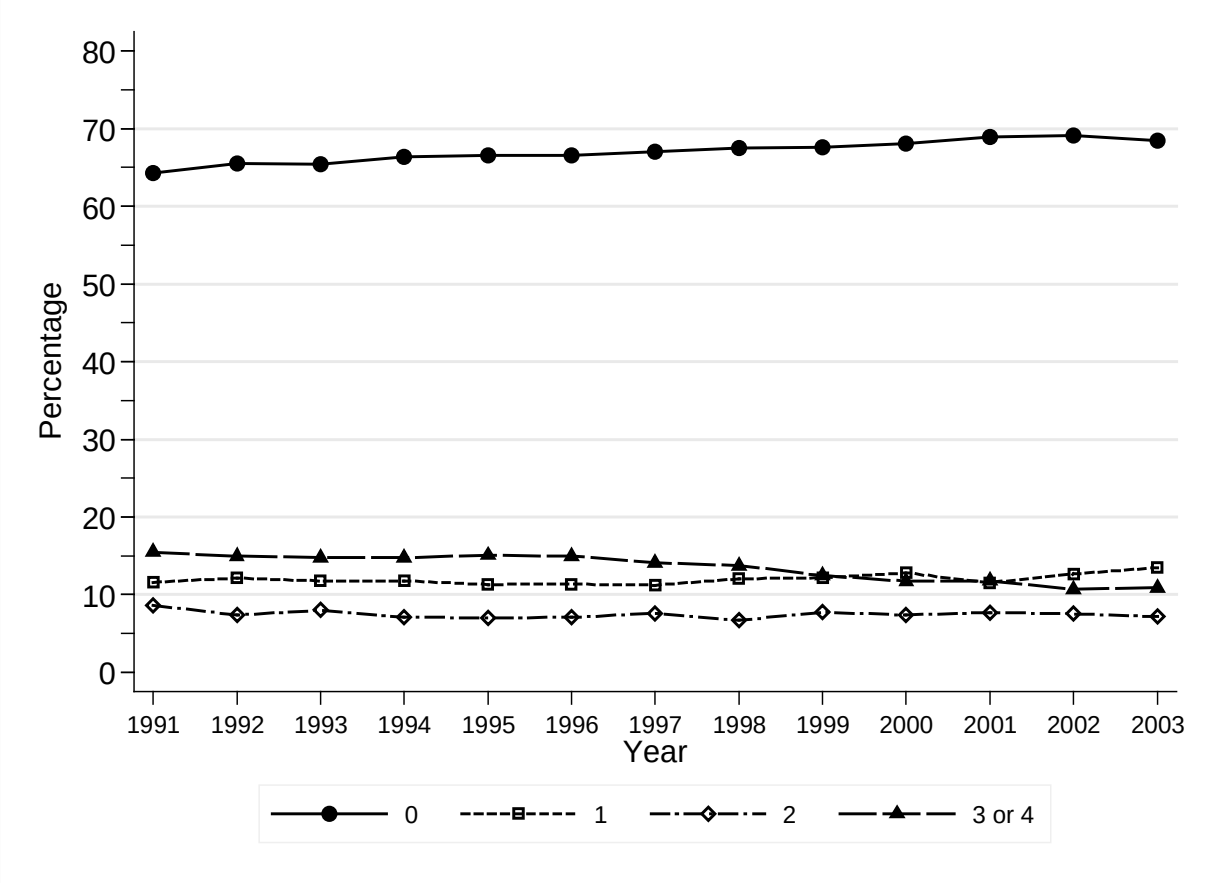
(b) Women



GB poverty persistence has fallen: number of times poor over a 4 year period (all persons)

An individual is poor if his/her equivalised household net income < 60% contemporary median

- Rise in 'never poor' rate (% with 0 years poor of 4)
- Decline in persistent poverty rate (% with 3+ of 4)



'Year' refers to first year of 4-year period
Source: Jenkins (2011)

Proportion touched by poverty over a 4-year period has declined in Britain

Percentage poor at least once in 4-year period

Person's family type	Early 1990s	Mid-2000s
All persons	35	30
Dependent children	40	35
Couple-with-kids families	30	25
Single-with-kids families	75	60
Single pensioner	70	55

- And, correspondingly, there has been a decline in the persistent poverty rates for these groups
- Proportion poor 7–9 times in 9 year period has declined for all persons and for dependent children
- New Labour helped families with kids, and pensioners

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Poverty persistence across the EU, 2007

Persistently poor (EU definition): poor in current year and at least 2 of the previous 3 years, where poor = household income < 60% national median

Near-linear relationship across countries in persistent and current poverty rates

Persistent poverty rates lowest in EU-15 with strongest welfare states

Source: Jenkins and Van Kerm, *Social Indicators Research*, 2014; calculations from EU-SILC data

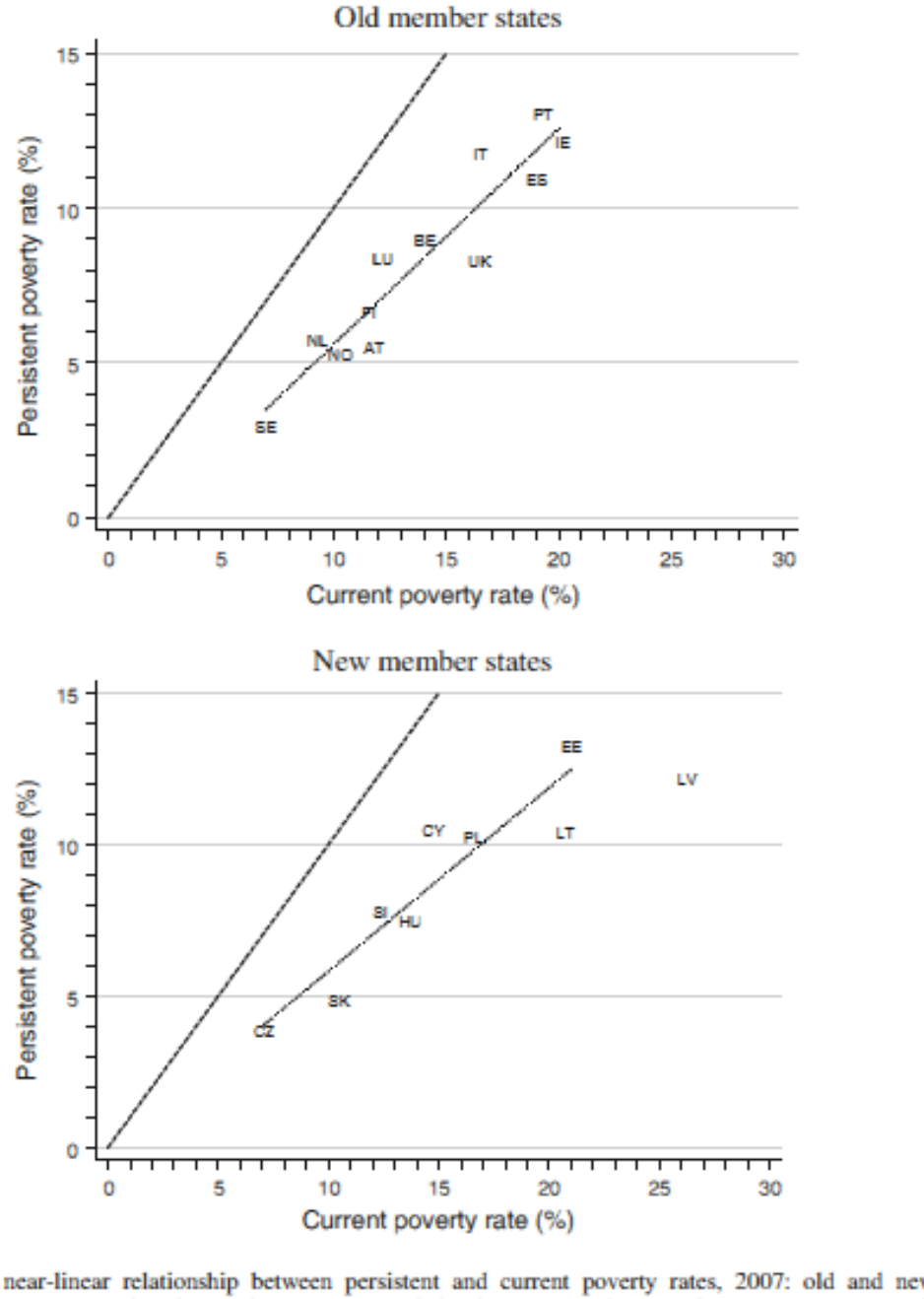


Fig. 2 The near-linear relationship between persistent and current poverty rates, 2007: old and new member states. *Notes* As for Fig. 1. The Pearson correlation between persistent and current poverty rates i 0.94 for old member states and 0.90 for new member states (0.97 for new member states excluding Latvi and Lithuania). In each chart, the dotted lines show the linear regression line fitted through the country dat points (excluding Latvia in the case of new member states)

3. Explanations

A ‘rubber band’ model of income change

- Each person’s income fluctuates about a relatively fixed longer-term average – this value is a tether on the income scale to which people are attached by a rubber band (value depends on education, sex, etc.)
- People may move away from their tethers from one year to the next, but not too far because of the band holding them. And they tend to rebound back towards and around the tether over a period of several years
- In the short-term some of the observed movement may simply be measurement error and, in the long term, the position of each person’s tether will move with secular income growth or career developments
- But, in addition, rubber bands will break if stretched too far by big ‘shocks’ (events), in which case there will be large changes in relative income position
- Consequences for income depend on the welfare state and other institutions (affecting the elasticity of the rubber band)

Modelling approaches

Two rather separate empirical literatures on income trajectories currently:

1. Trigger events and poverty transitions
   - Importance of lifecourse events for income is an old idea: “the life of a labourer is characterised by five alternating periods of want and comparative plenty” (Seebohm Rowntree, *Poverty: a Study of Town Life*, York, 1901)
2. Life-course variation on average, plus random shocks (‘luck’) leading to deviations from average
   - Mostly about employment earnings rather than household income

Trigger events associated with poverty entries and exits

Source: Jenkins (2000)

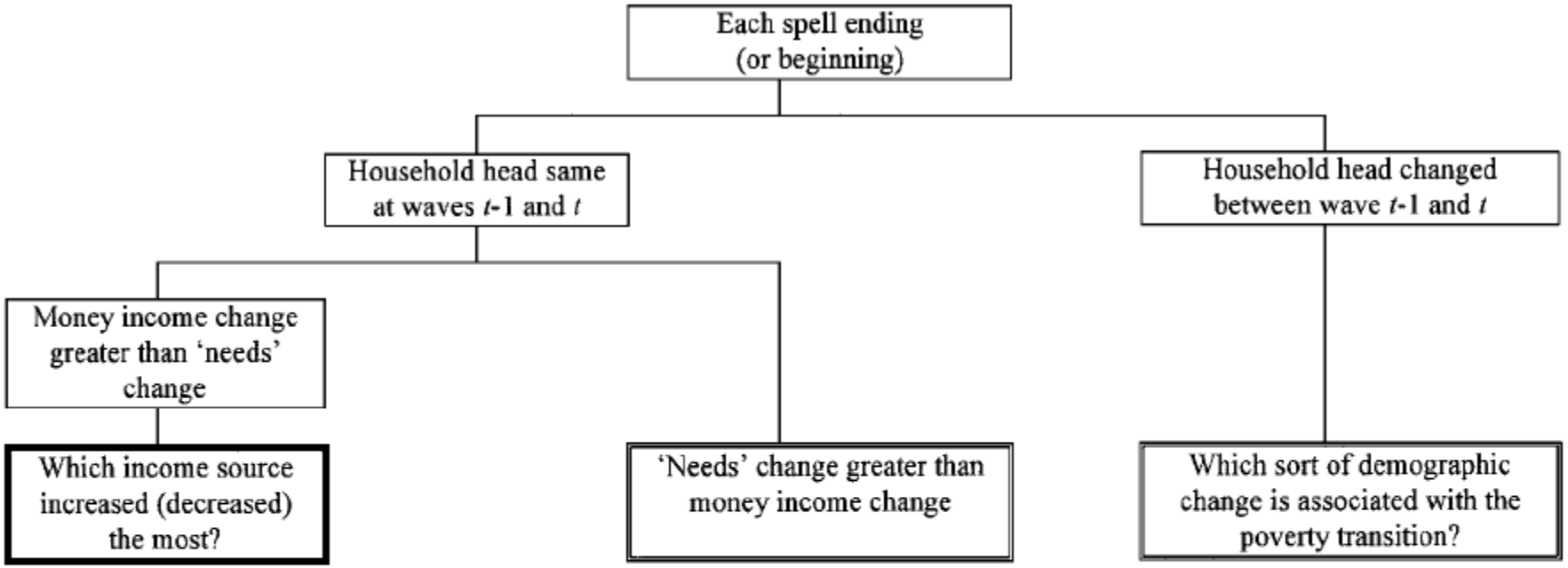


Fig. 1. Classification of 'income events' and 'demographic events' associated with a poverty spell ending (or beginning) between waves $t-1$ and t (after Bane and Ellwood 1986)

Factors associated with poverty transitions (GB)

- Income events are more important than demographic events, but latter definitely important (especially for poverty entries)
- Labour earnings changes for household heads (men) are important but not the whole story
- GB findings are similar to those of Bane & Ellwood (1986) for USA in 1980s

'Trigger events' associated with poverty transitions (column %)

Main event	Poverty exits (income increase)		Poverty entries (income decrease)	
	1991–7	1998–2004	1991–7	1998–2004
Head's labour earnings	31	30	28	27
Spouse or other labour earnings	28	29	17	19
Non-labour income	20	20	18	16
Demographic event	21	21	21	24
New entrant			16	13
All	*100%*	*100%*	*100%*	*100%*

- For breakdowns by population subgroup and policy effects, see Jenkins (2011)

Economists and lifecycle earnings models

Wages increase over the working life but at a decreasing rate (concave trajectory), because:

- Human capital story
  - Investments in education & training financed by foregone (lower) earnings initially, rewarded by faster growing earnings later; or
- Personnel economics story
  - Employment contract combining low pay early on with higher pay later provides incentives to employees not to shirk (and risk dismissal before reaping rewards)

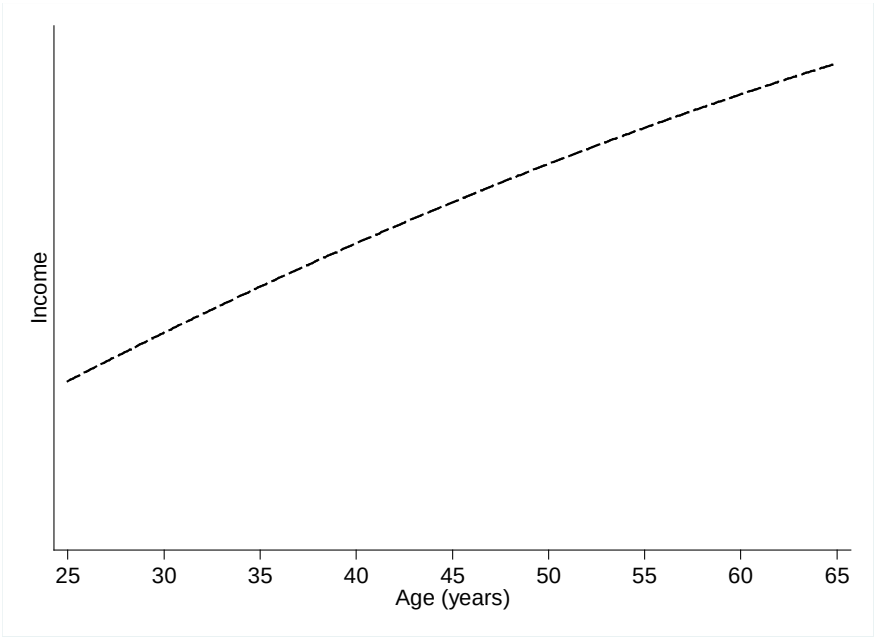
Variations in initial earnings, ceteris paribus, via differences in “ability”; trajectory crossing via subsequent learning

- Earnings not income; lifecourse “events” incorporated within transitory shocks

Stylized earnings-age trajectories for two individuals

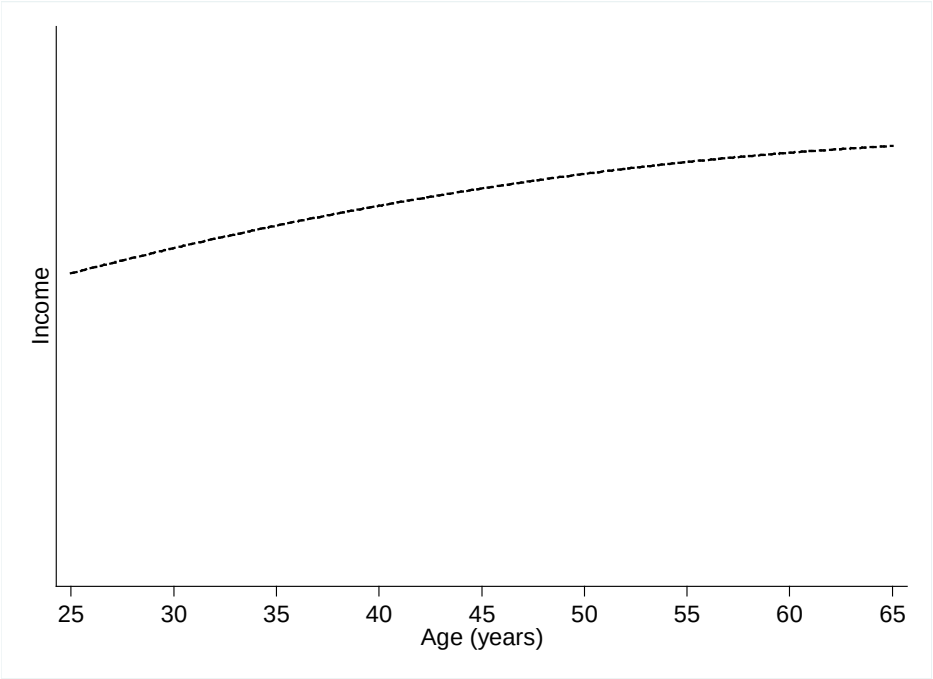
Two men, born same year, both left school at age 16 with GCSEs

"John (plumber)"



Lower initial earnings, steeper slope

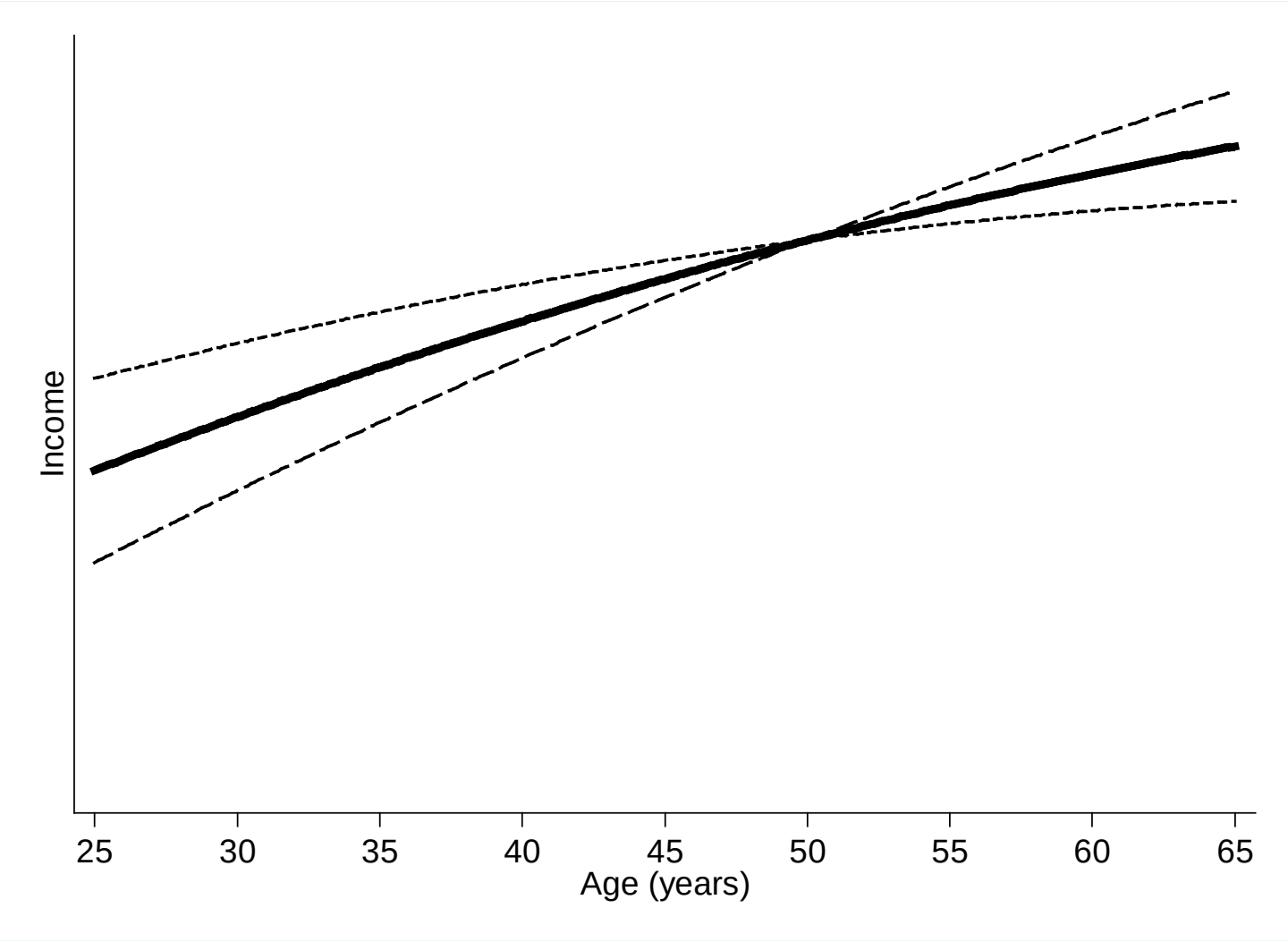
"Mike (motor mechanic)"



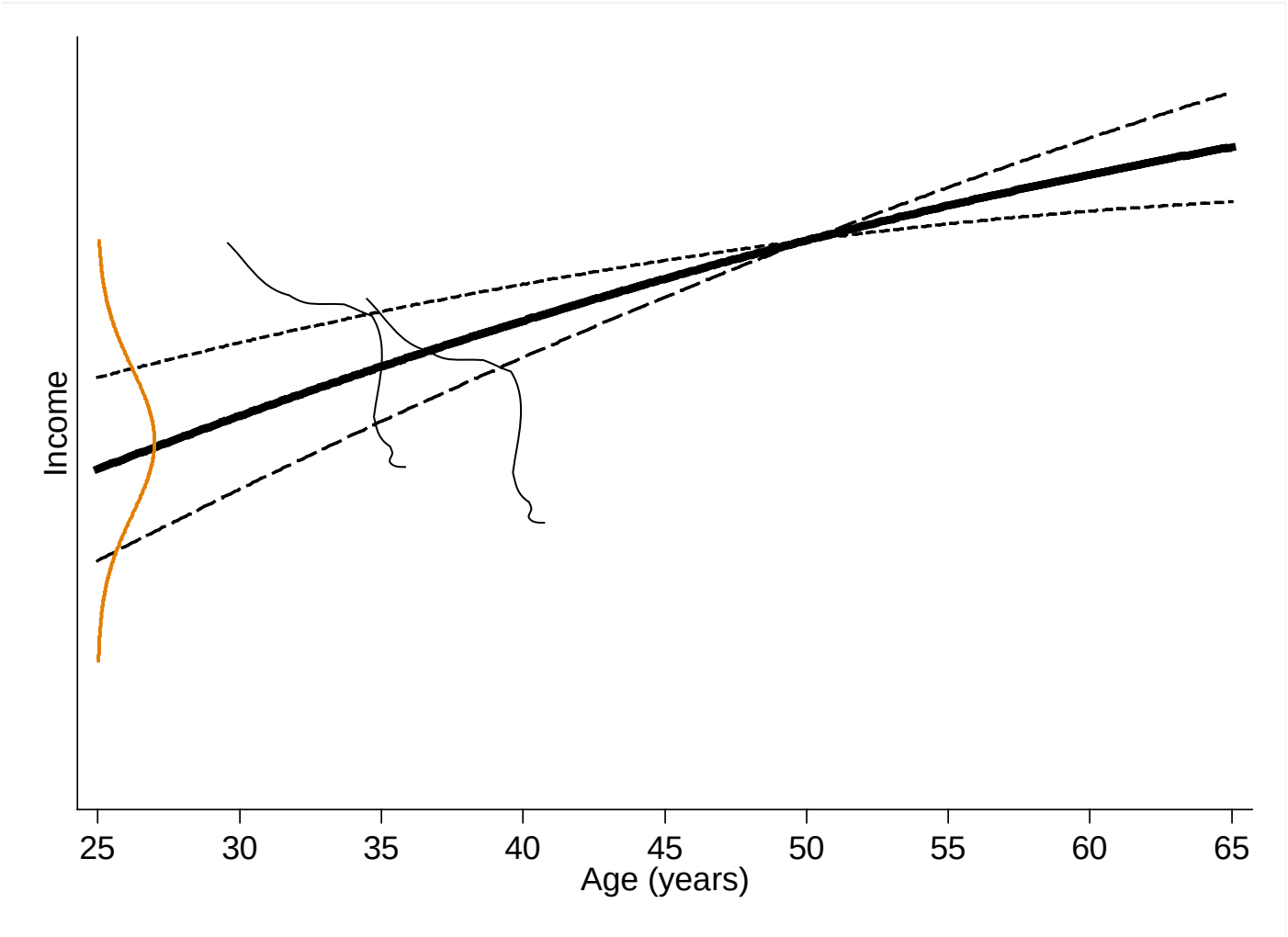
Higher initial earnings, shallower slope

Trajectories eventually cross

The “average” earnings-age trajectory



The “average” income-age trajectory, with dispersion around it: starting points, slopes, ‘error’



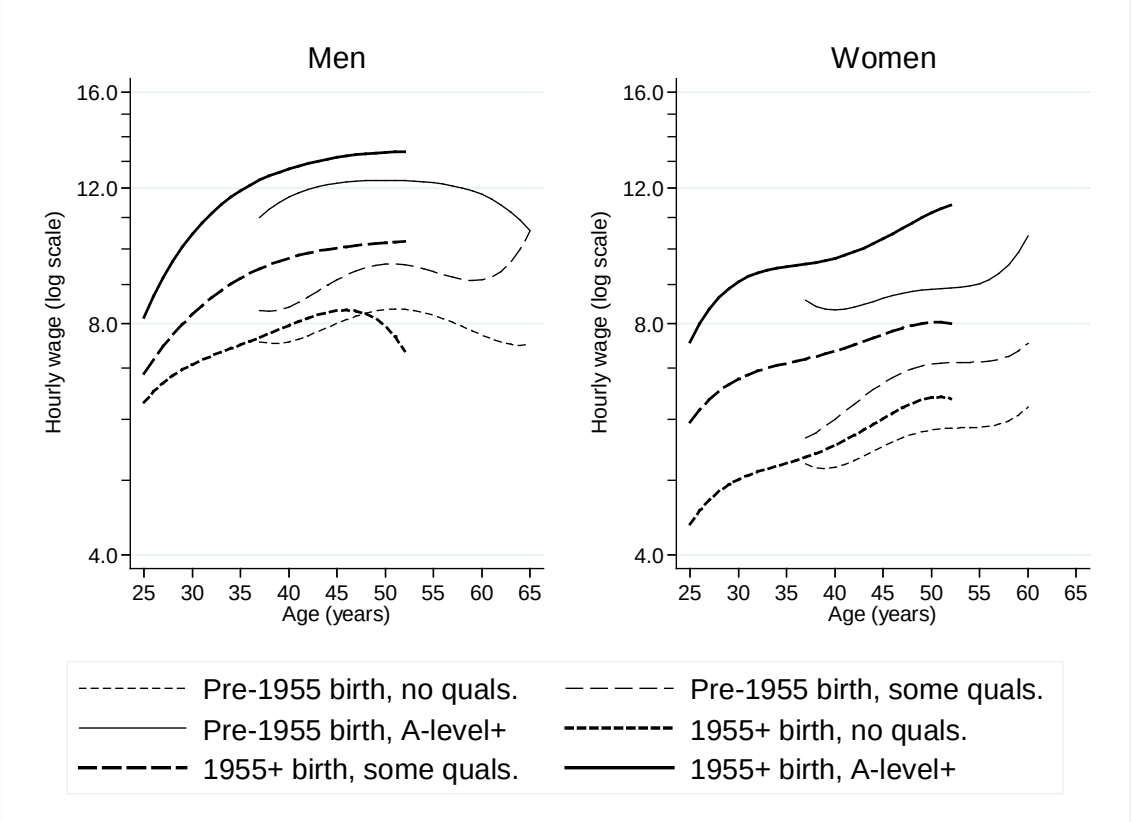
Model elements

For each group defined by a set of characteristics (fixed at start of working life),

1. An "average trajectory" for the group is combined with:
2. Individual-specific differences in incomes at the start of the working life;
3. Individual-specific differences in income growth rates; and
4. A close association between initial incomes and income growth rates – those with a lower initial income experience greater income growth on average, so there is a tendency for trajectories to cross;
5. "Transitory" variations
   - year-on-year stochastic "wiggles" in trajectories, representing the effects on income of
     - genuine transitory variation, measurement error, or
     - lifecourse events such as having children, or family formation or dissolution, health "shocks", etc.

For each group, a parametric model is described by "average trajectory" parameters (fourth-order polynomial in age; period effect), plus bivariate normal distribution and a zero-mean normal distribution (i.e. 2 means, 2 variances, 1 correlation; 1 variance)

Average trajectories (log scale), by group



Higher trajectory if:

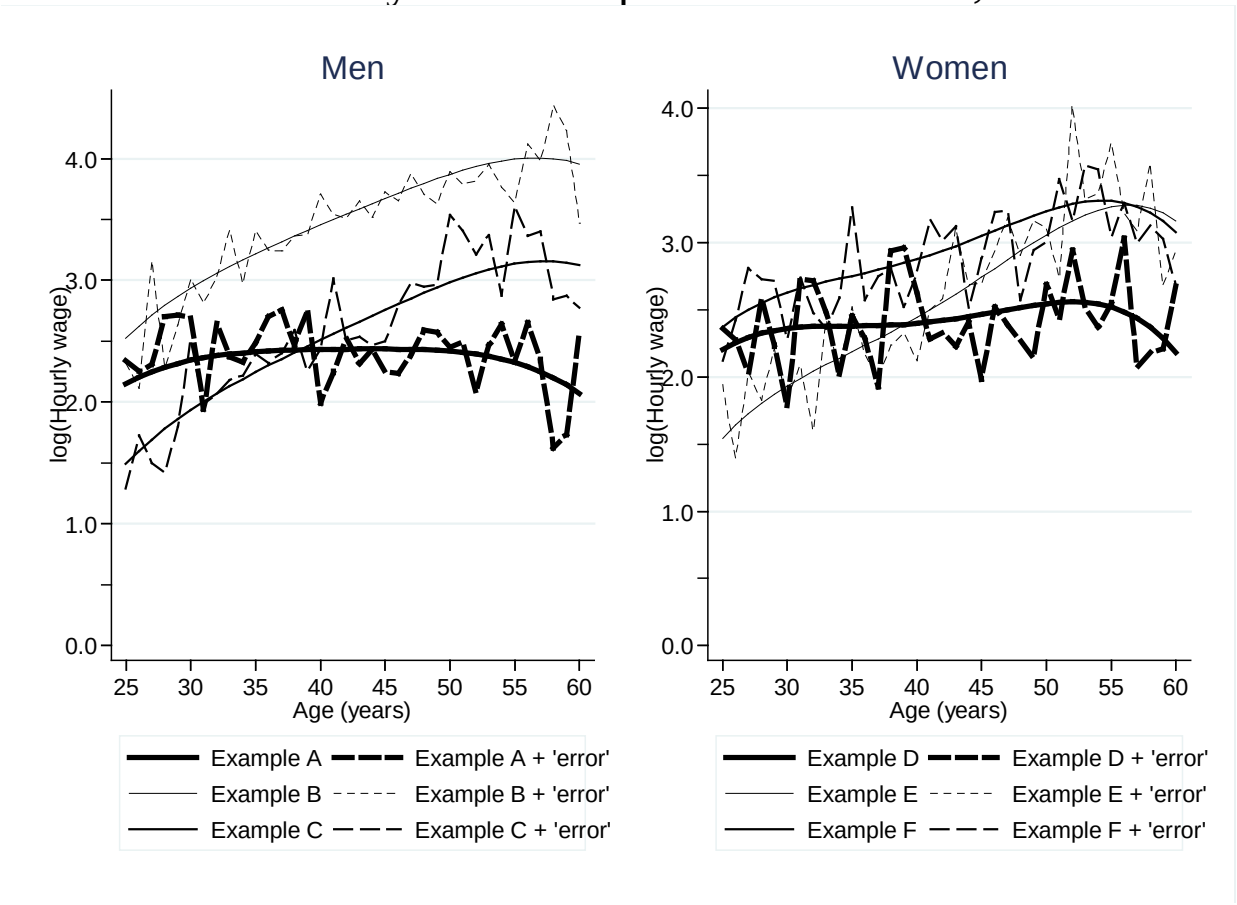
- later cohort rather than earlier cohort
- good educational qualifications rather than some or none
- man rather than a woman

Departures from concavity related to types of "self-selections"

- Women: child-bearing ages; near retirement
- Men with some educational qualifications: near retirement

Simulated trajectories illustrate potential trajectory heterogeneity within each group

- Focus on two groups: man or woman born after 1955, has A-level(s) +
- Draw 6 sets of values of intercept, slope and error from the joint distribution characterised by estimated parameters: 3 men, 3 women



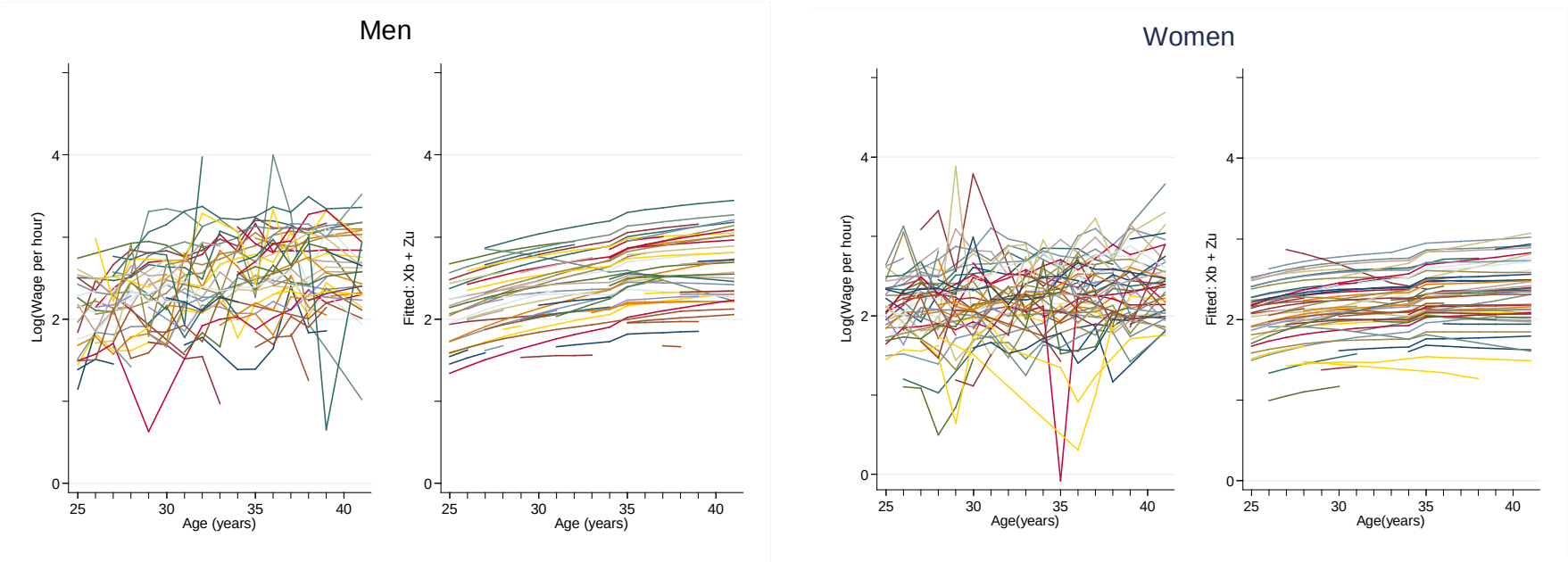
Substantially different trajectories (levels, slopes) possible even within the same group

Idiosyncratic "shocks" play a substantial role

log(hourly wage)

It's the "shocks" that cook the spaghetti: observed versus fitted (average) trajectories

Focus on two groups: man (LHS) or woman (RHS) born in 1966, has A-level(s) +



"Fitted" based on individual characteristics – observed and unobserved
(empirical Bayes / BLUP estimates)

"Fitted" portrays the heterogeneity in intercepts and slopes, but not the "wiggles"

Take-home points: the longitudinal perspective

1. Motivation

- Multiple reasons for being interested in income mobility and poverty dynamics
- Mobility has multiple facets

2. Description

- There's a lot of income mobility year-on-year, but it's mostly short distance
- There is turnover among the poor; over a period of a few years, many more people are touched by poverty than are poor in any given year
- Mobility patterns and trends partly depend on which mobility concept one is interested in

Take-home points: the longitudinal perspective

2. Description (continued)

- GB trends: poverty persistence declined from late 1990s (New Labour policies?), and so did labour market volatility (business cycle?), but some other types of mobility didn't change (surprising?)
- Cross-national differences depend on mobility concept: cf. some surprising US-WG contrasts, and they may be changing
- Impacts of Great Recession on mobility so far unknown
  - suitable longitudinal data are available only with a lag

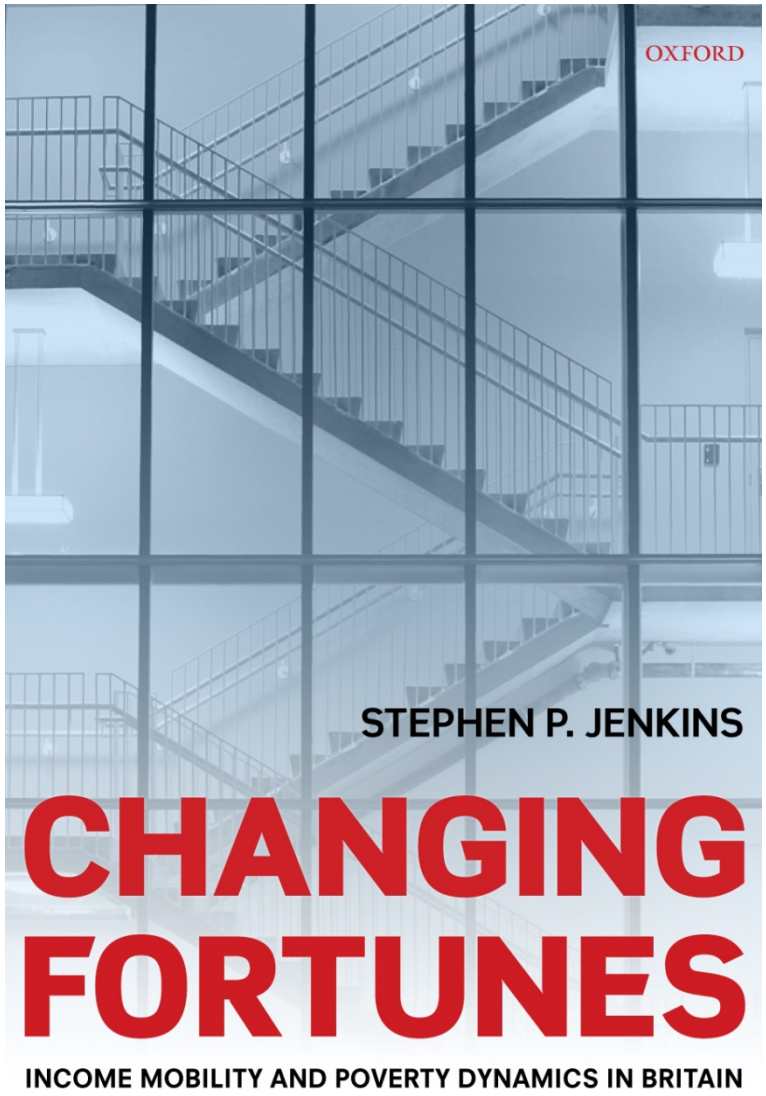
Take-home points: the longitudinal perspective

3. Explanations

- The ‘rubber band’ model is a crude distillation of a large number of approaches used in the empirical literature, but evocative
- Building better empirical models of *income* is very hard because household income is more complicated than individual labour earnings
  - Multiple income sources
  - Demography (who lives with whom)
- But building better empirical models is a worthwhile activity!

Further reading (with bibliography)

Oxford University Press, 2011



230pp., forthcoming as Ch. 11 of *Handbook of Income Distribution Volume 2*, Elsevier