Income Mobility

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Outline

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Introduction

- integrated discussion of within- and between-generation income mobility
- selective update of empirical literature
- more wide-ranging than other recent surveys, because
  1. we provide the integrated discussion of within and between;
  2. we incorporate insights on the consequences of measurement issues for estimates presented in recent research;
  3. we consider both mobility in general, and persistence/mobility in different parts of the distribution
- coverage of principles and empirics (data, estimation, and evidence)
- draw on and informed by contributions from
  1. various fields of economics, e.g. welfare economics, income distribution, labour economics, and
  2. from outside the discipline of economics, especially sociology and social stratification.

Limitations

- stick to comparing incomes in two periods
- selective review (both concepts, measurement, and evidence)
- ignore structural approaches to mobility

Outline

Mobility concepts

. . . the mobility literature does not provide a unified discourse of analysis. This might be because the very notion of income mobility is not well-defined; different studies concentrate on different aspects of this multi-faceted concept. At any rate, it seems safe to say that a considerable degree of confusion confronts a newcomer to the field (Fields and Ok, 1999b, p. 557).

Mobility concepts

- focus on the distribution of income in two "periods" (e.g., two years for intra-, generations for inter-generational mobility)
- income distribution if $\boldsymbol{x}$ in period 1, $\boldsymbol{y}$ in period 2, with joint density $f(\boldsymbol{x}, \boldsymbol{y})$
- mobility can be thought of as transformation linking the marginal distribution $\boldsymbol{x}$ with marginal distribution $\boldsymbol{y}$
- sometimes, study of a single (longitudinal) population can be informative...
- but as a rule, mobility is about *comparing* two populations A and B (two countries, two different periods, etc)

Mobility concepts

- concepts:
  - positional change
  - individual income growth
  - mobility as inequality reduction
  - income risk
- social desirability of mobility
  - may differ across within/between
  - may differ across concepts
  - relationship to equality of opportunity

Mobility as positional change

- most easily thought of as defined in terms of not the distribution of income but its inverse (summarize positions not by incomes but by the rank associated with an income)
- abstract from the shape of (and changes in) the marginal distribution ("exchange" as opposed to "structural" mobility)
- for every positional change in one direction there must be a corresponding change in the opposite direction
- "no mobility" occurs when no rank changes take place ($a_{jk} \equiv 1 \forall j = k, a_{jk} \equiv 0 \forall j \neq k$)
- "full" mobility:
  - origin independence ($a_{jk} = a_{mk}$; each row of the transition matrix has identical entries)
  - rank reversal ($a_{jk} > 0 \quad j = K, \ldots, 1, k = 1, \ldots, K$; all entries in transition matrix on the anti-diagonal)

Mobility as individual income growth

- aggregation of individual income changes (gains or losses)
- no distinction between exchange and structural mobility:
  - no standardization of the distributions
  - all can be upwardly or downwardly mobile
- immobility: $x_i = y_i \forall i$
- mobility: is greater if $d_i = y_i - x_i$ greater, all else equal
- measures: directional growth (gains vs. losses) as opposed to non-directional growth

Mobility as inequality reduction

- comparison of inequality of marginal with “long-term” distribution; defined in terms of $\frac{1}{2}(x_i + y_i)$
- no mobility: income of each person in every period is equal to their longer-term income
- maximum mobility: no inequality in longer-term incomes despite inequality in per-period incomes
- directional mobility not relevant
- related to positional change

Mobility as income risk

- period-specific income is sum of a ‘permanent’ component (the longer-term average) and a ‘transitory’ component (the period-specific deviation from the average)
- transitory components represent unexpected idiosyncratic shocks to income (long-term income interpreted as “permanent” income)
- the greater their dispersion across individuals each period, the greater is income risk for this population
- inequality reduction from longitudinal averaging now re-interpreted as a measure of income risk (and has different normative implications

Is income mobilty socially desirable?

- relation to (in)equality of opportunity (but that relationship is complex)
- differs in the intra- and intergenerational cases
- positional change: mobility [often] good in inter- but not necessarily in intra-case
- income growth: gains good, losses bad
- inequality reduction: good (but for instrumental, not intrinsic, reasons)
- income risk: mobility bad

The social desirability of mobility as income risk

the presumption that individuals are indifferent between two income streams offering the same real present value. This might be true if capital markets were perfect (or if there was perfect substitutability of income between periods), but it seems likely that individuals are concerned with both the average rate of income receipts and the pattern of receipts over time. We may go further and suggest that individuals tend to prefer a constant income stream, or one which is growing steadily, to one which continually fluctuates (Shorrocks, 1978a, p. 392).

The social desirability of mobility as income risk

define for each individual a ‘constant income flow rate generating receipts which gives the same level of welfare as the income stream he currently faces’

> *[r]eplacing actual recorded incomes with this alternative income concept in the computation of inequality values introduces a new dimension into the discussion of mobility. No longer is mobility necessarily desirable. Changes in relative incomes still tend over time to equalise the distribution of total income receipts, and to this extent welfare is improved. But greater 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. A more detailed examination of these two facets of mobility will provide a better understanding of the impact of income variability and the implications for social welfare (Shorrocks, 1978a, pp. 392–393).*

Income mobility and social welfare

- the social welfare foundations of mobility measurement is small, with contributions including Atkinson (1981), Atkinson and Bourguignon (1982), Markandya (1984), and Gottschalk and Spolaore (2002)
- social welfare, W, is the expected value (average) of the utility-of-income functions of individuals.
- in two-period case, the utility-of-income function is $U(x, y)$, and weighted by the joint probability density $f(x, y)$:

$$W = \int_0^{a_y} \int_0^{a_x} U(x, y) f(x, y) dx dy \tag{1}$$

where $U(x, y)$ is differentiable and a_x and a_y are the maximum incomes in periods 1 and 2.

- increases in income in either period assumed desirable (so positive income growth raises utility): $U_1 \geq 0$ and $U_2 \geq 0$.

Income mobility and social welfare

- focus is on case where marginal distributions identical (so close to positional mobility analysis)
- if U additively separable (so $U_{12} = 0$), mobility irrelevant and only margins matter
- if $U(x, y)$ is a concave transformation of the sum of the per-period utilities, then $U_{12} < 0$

Income mobility and social welfare

- Atkinson and Bourguignon (1982) examine restricted class of utility functions with homothetic preferences
- $U.$ is neatly characterized by two parameters (Gottschalk and Spolaore, 2002, p. 295):
  - $\epsilon > 0$ summarizes *aversion to inequality of multi-period utility*,
  - $\rho > 0$ summarizes the degree of *aversion to inter-temporal fluctuations in income*
- $U_{12} < 0$ corresponds to $\epsilon > \rho$, i.e. multi-period inequality aversion offsets aversion to inter-temporal fluctuations
- when $\rho = 0$ and perfect substitution of income between periods, one is only interested in the reduction of multi-period inequality

Outline

Mobility measurement: methods

- descriptive devices (mostly graphical)
- mobility dominance (also in relation to graphical devices)
- scalar indices (elasticity/correlation; volatility and risk
- more than two data points:
  - mobility as inequality reduction (Shorrocks, 1978b)
  - “transitory” and “permanent” inequality decompositions
  - poverty persistence

The mobility and transition matrices

- divide income range into n categories and let $n \times n$ *mobility matrix* M have elements m_{ij} with being the relative frequency of observations in with incomes in period 1 in range i and period 2 in range j
- or let m_t^k be the relative frequency of cases in range $k = 1, \ldots, n$ in period t; then marginal distributions $m_t = (m_t^1, \ldots, m_t^n)'$ are linked by the *transition matrix* A:

$$m_1 = m_2 A$$

- often the income ranges correspond to quantile groups (decile, quintile, quartile) in which case $m_1 \equiv m_2$ and A is bistochastic (corresponds closely to mobility as positional movement)
- Go to US transition matrices
- marginal distributions may be of interest (in other mobility concepts); income ranges can be defined in real terms (conveys information on income growth), or relative to (say) median income (relate to income growth and possibly to

Mobility dominance

- return to Atkinson and Bourguignon (1982): Welfare comparisons of differences in mobility for distributions f and f^* (with $\Delta f(x,y) = f - f^*$):

$$\Delta W = \int_0^{a_y} \int_0^{a_x} U(x,y)\Delta f(x,y)dxdy \tag{2}$$

- focus identical **x** and **y**, and $U()$ satisfies $U_1 \geq 0$, $U_2 \geq 0$, and $U_{12} < 0$
- a necessary and sufficient condition for $\Delta W \geq 0$ is that $\Delta F(x,y) \leq 0$ for all x and y (differences in the cumulative bivariate distribution are lower at each point – a first-order stochastic dominance condition)

Mobility dominance

- an example that would generate a welfare improvement is a 'correlation-reducing transformation' which leaves the marginal distributions unchanged but reduces the correlation between x and y (for $\eta, h, k > 0$):

$$\left\{\begin{array}{cc} x & x+h \\ y & \text{density reduced by } \eta \quad \text{density increased by } \eta \\ y+k & \text{density increased by } \eta \quad \text{density reduced by } \eta \end{array}\right\}$$

- mobility dominance powerful in theory but not used much in practice – results apply to simplified situations (identical margins, homothetic preferences, positional mobility)
- Dardanoni (1993) provides an alternative approach to dominance (stochastic dominance results for mobility processes summarised by transition matrices with the same steady-state income distribution)

Mobility indices

- measures of bivariate association (intuitive indices)
- specialised indices
- features/contrasts:
  - different normalizations (e.g., min/max mobility)
  - pure positional change/other measures
  - how common (relative or absolute) income change picked up
  - directionality
  - decomposability (by subgroup; structual/exchange; subperiod; change progressivity)

Bivariate association

- Beta (β): the slope coefficient from a least-squares linear regression of log(period-2 income) on log(period-1 income)
- The Pearson correlation $r = \beta \frac{\sigma_1}{\sigma_2}$
- The Spearman rank correlation
- We argue only the rank correlation fully standardized the marginal distributions and is preferable
- D'Agostino and Dardanoni (2009) provide an axiomatic characterisation of the Spearman rank correlation as an measure of exchange mobility

Immobility ratios and related measures

- Immobility ratios summarise how much clustering there is on (or, sometimes, also around) the leading diagonal of a transition matrix (summarize positional change)
- related: the normalized trace (and many, many other matrix-based indices)

Other measures

- income growth: for example, Fields and Ok (1999a)

$$D1 = c[\frac{1}{N}\sum_{i=1}^{N}(\log(y_i) - \log(x_i))] \tag{3}$$

  (c is a normalizing constant; N is the population size)
- mobility (or rigidity) as reduction long-term inequality (Shorrocks, 1978a):

$$R(T) = \frac{I[Y(T)]}{\sum_{k=1}^{k=T} w_k I[Y^k]}. \tag{4}$$

- income risk (Jenkins, 2011, chapter 6): (at *very* simplest) suppose annual income is

$$\log y_{it} = u_i + v_{it}; \tag{5}$$

  total inequality as measured by variance of log incomes:

$$\sigma_t^2 = \sigma_u^2 + \sigma_v^2. \tag{6}$$

- income flux (e.g. Fields and Ok, 1996): per capita measure of absolute measure of absolute income movement is:

Measurement – examples

- Go to US transition matrices
- Go to Transition colour plot examples
- Go to Scatterplot example
- Go to Density plot example
- Go to Contourplot example
- Go to Conditional density plot
- Go to Transition probability plot
- Go to Mobility profiles
- Go to Income rigidity

Outline

Intra-generational mobility: evidence

- discuss data and empirical implementation
- selective:
  - evidence on USA, contrasted with Germany
  - household income (not the most common labour earnings of most often men)
  - ignore statistical inference

Data and issues of empirical implementation

Three ‘W’ issues + comparability

- mobility of What (e.g., what income concept),
- among Whom (e.g., what longitudinal population),
- and When (e.g., how long is the income measurement period, and how distant are period 1 and 2)
- comparisons across populations (trends over time or across countries) add the issue of comparability

Intra-generational mobility – evidence

- ▸ Go to Dominance checks in USA
- ▸ Go to Selected mobility indices in USA
- ▸ Go to Progressivity of individual income growth in USA
- ▸ Go to Trends in positional mobility in USA
- ▸ Go to Trends in mobility as income smoothing in USA
- ▸ Go to Transitory variance in USA
- ▸ Go to Mobility in USA and (West) Germany compared

Outline

Intergenerational mobility: evidence

- vast majority of studies
  - vaguely refer to equality of opportunity
  - report Betas (and hence persistence, not mobility)
  - study labour earnings (not household income)
  - pertain to father-son mobility
- the “Great Gatsby curve” (Corak, 2013a; Krueger, 2012)

▸ Go to “Great Gatsby curve”

Inter-generational mobility – evidence

- the evidence on Betas *extremely* sensitive to obscure details of specifications: US estimates reported in a single table by Mazumder (2005a) encompass the majority of the estimates reported in Figure **??**, excluding only Peru at the top end and Canada, Finland, Norway and Denmark at the low end
- US studies most prevalent
- few studies of correlations (either product-moment or rank)
- few studies using mobility matrices (esp. cross-country and trends)
- women's mobility poorly understood
- few studies look at household or family income, or disposable income (i.e., less taxes, often not even plus transfers)
- dominance analysis highly unusual

Inter-generational mobility – evidence

- Go to “Great Gatsby curve”
- Go to Trends in intergenerational persistence
- Go to Non-parametric quantile IG regression in USA
- Go to Intergenerational transition matrices in USA and Canada
- Go to IG persistence statistics in Canada, Sweden, and USA
- Go to IG persistence statistics in Germany, the UK, and USA
- Go to IG mobility dominance Canada and USA compared
- Go to IG mobility dominance Germany, the UK, and USA compared
- Go to Sibling correlations
- Go to the “sibling correlation Great Gatsby”

Outline

Concluding comments

- intra-generational mobility: more evidence (with measures tied to concepts) across more countries and periods needed
- intergenerational mobility: more evidence based on positional movement, for both men and women, and for more inclusive income concepts; more sibling correlation estimates

Outline

Decile transition matrices: USA, (a) 1979–1988

Note: Income refers to equivalized real annual family disposable income, distributed among all individuals (adults and children). The decile groups are ordered from poorest (1) to richest (10). Source: Hungerford (2011, Tables 2 and 3), based on PSID data.

▸ Go back to mobility measurement

	Destination									
Origin	1	2	3	4	5	6	7	8	9	10
1979					**1988**					
1	44.3	18.3	12.4	9.2	7.1	3.0	1.8	2.0	0.7	1.3
2	18.1	25.3	21.0	11.7	7.5	5.4	4.7	3.2	1.9	1.1
3	10.6	18.2	15.3	16.8	11.6	9.0	8.8	4.9	3.1	1.7
4	7.2	8.9	14.0	14.0	14.7	15.7	12.0	5.6	6.0	2.1
5	6.1	9.2	10.9	12.8	13.3	16.9	12.3	7.5	7.7	3.4
6	4.1	5.2	8.8	10.3	11.8	10.0	14.2	16.9	12.6	6.2
7	3.5	6.5	6.9	8.6	10.4	13.4	13.3	16.8	13.4	7.2
8	3.1	4.6	3.2	7.7	12.3	9.5	12.6	15.7	17.7	13.6
9	1.2	2.2	4.8	6.3	6.9	10.2	12.2	14.7	18.0	23.5
10	2.1	1.5	2.8	2.5	4.2	7.0	8.5	12.8	18.6	40.0

Decile transition matrices: USA, (b) 1989–1998

Note: Income refers to equivalized real annual family disposable income, distributed among all individuals (adults and children). The decile groups are ordered from poorest (1) to richest (10). Source: Hungerford (2011, Tables 2 and 3), based on PSID data.

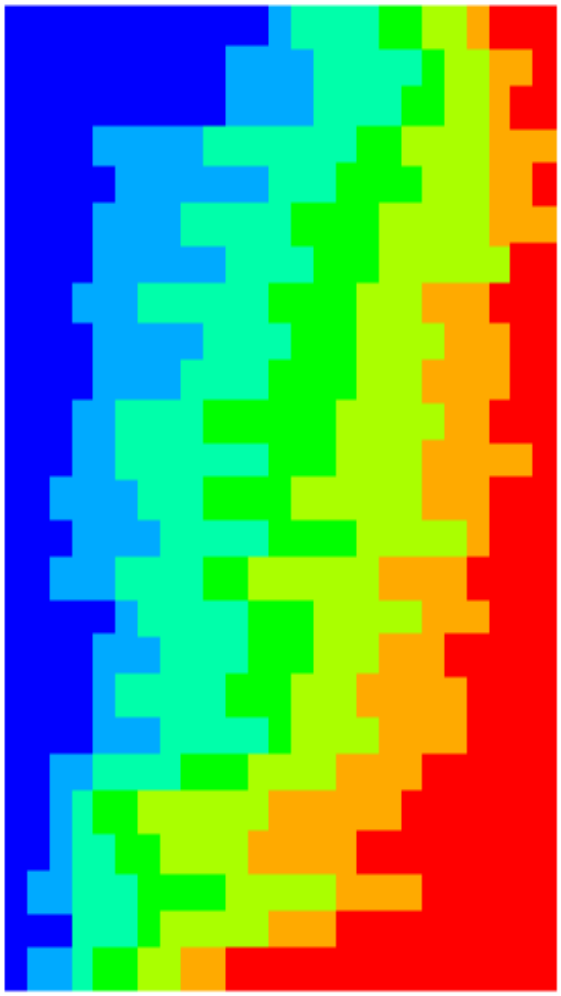
▸ Go back to mobility measurement

	Destination									
Origin	1	2	3	4	5	6	7	8	9	10
1989					**1998**					
1	41.9	21.6	13.7	7.0	4.6	3.7	2.7	2.2	1.9	0.7
2	20.4	22.5	15.4	11.6	11.0	8.1	4.0	4.0	1.7	1.2
3	12.5	20.8	17.1	16.4	10.9	10.3	5.2	3.2	1.7	1.9
4	6.9	11.6	15.5	16.9	14.5	11.4	10.1	7.7	2.3	3.1
5	4.8	6.2	12.2	13.8	16.0	14.2	12.4	7.1	7.5	5.8
6	3.2	3.7	9.1	11.6	16.0	14.4	15.7	11.7	7.7	6.9
7	3.2	4.5	7.6	9.3	8.7	12.2	16.3	15.6	16.8	5.8
8	3.0	4.7	5.2	5.4	7.9	12.1	17.2	17.0	19.3	8.3
9	2.5	3.1	4.0	4.9	7.5	7.1	10.7	18.2	21.8	20.3
10	1.7	1.0	0.4	3.2	3.0	6.3	6.0	13.1	19.3	46.1

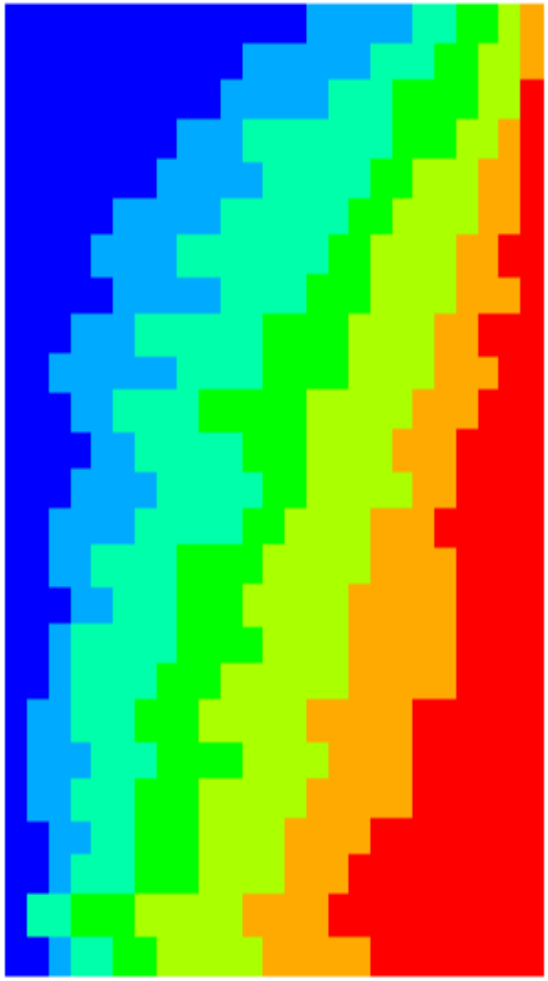
Transition colour plot examples

Source: Van Kerm (2011). ▸ Go back to mobility measurement

Western Germany
1985–1997



United States
1985–1997



Scatterplot example

Source: Jenkins (2011, Figure 1.2). ▸ Go back to mobility measurement

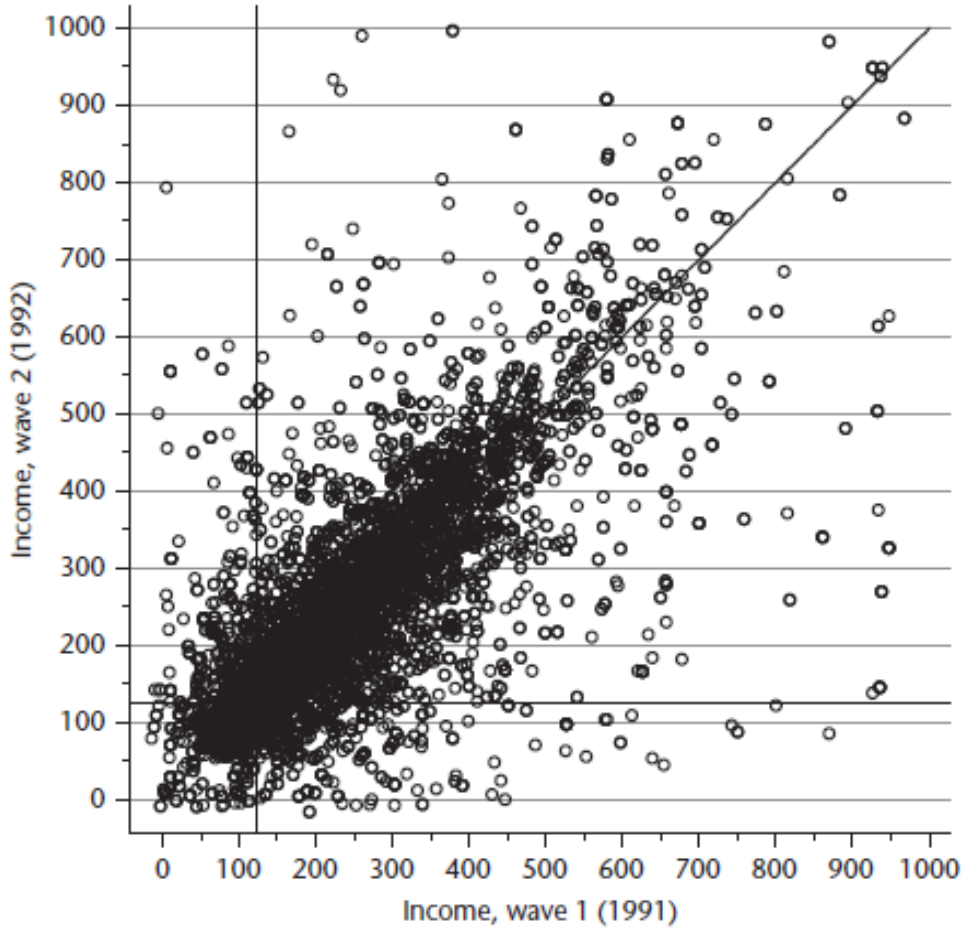


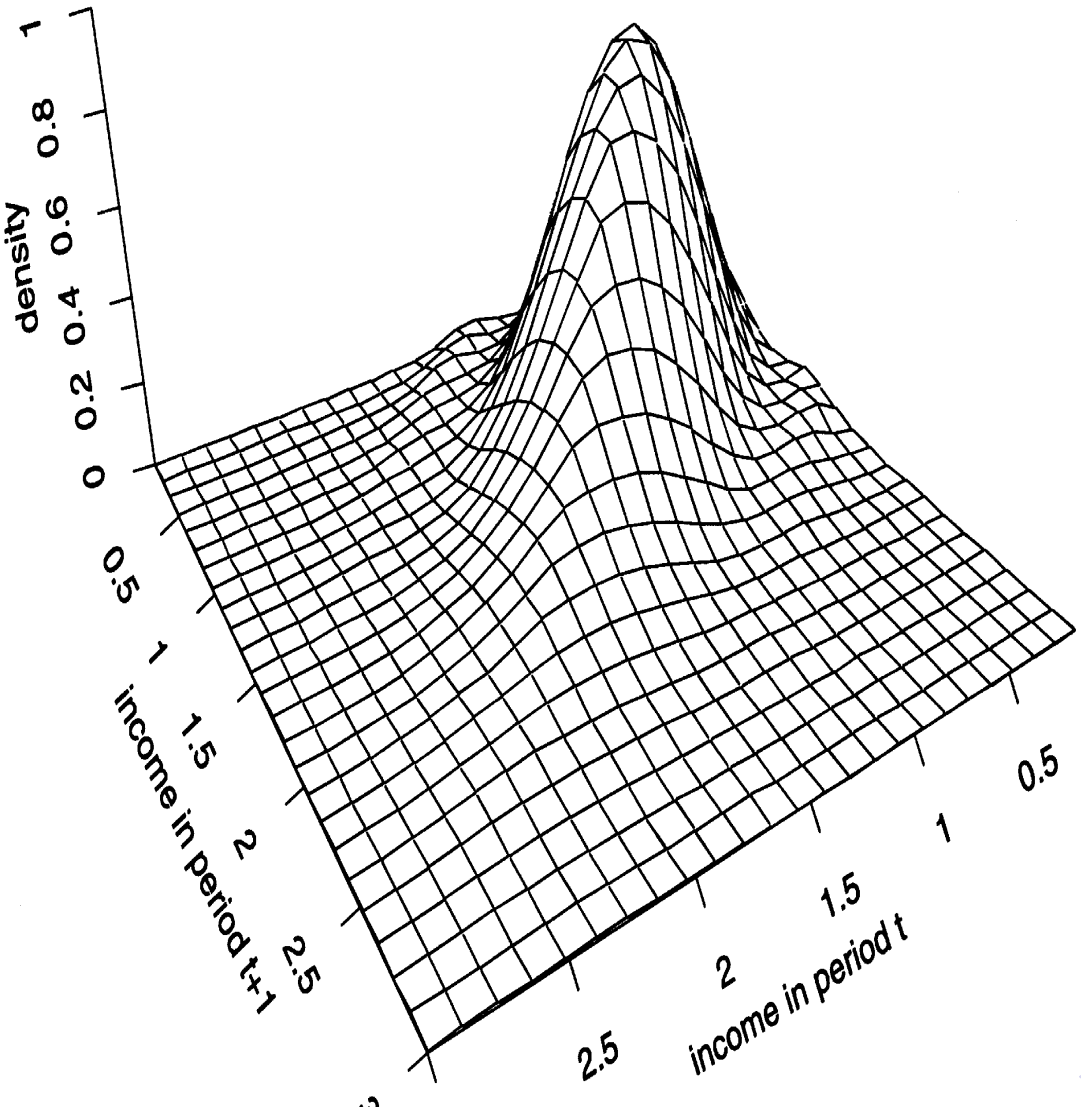
Figure 1.2. Scatter plot of 1991 and 1992 incomes

Notes: Sample of individuals (adults and children) present at BHPS waves 1 (1991) and 2 (1992) with incomes less than £1,000 per week. Each circle represents the incomes for the two years for each individual. The definition of income is given in the text (the adjustment for differences in household size and composition uses the Modified OECD equivalence scale). Incomes are expressed in pounds per week (January 2008 prices). The dark horizontal and vertical lines correspond to an income equal to 60% of contemporary median income (£123 per week for wave 1; £126 per week for wave 2).

Bivariate density plot example

Note: the charts shows a ‘typical’ kernel density estimate for incomes in two consecutive periods.Source: Schluter (1998, Figure 1).

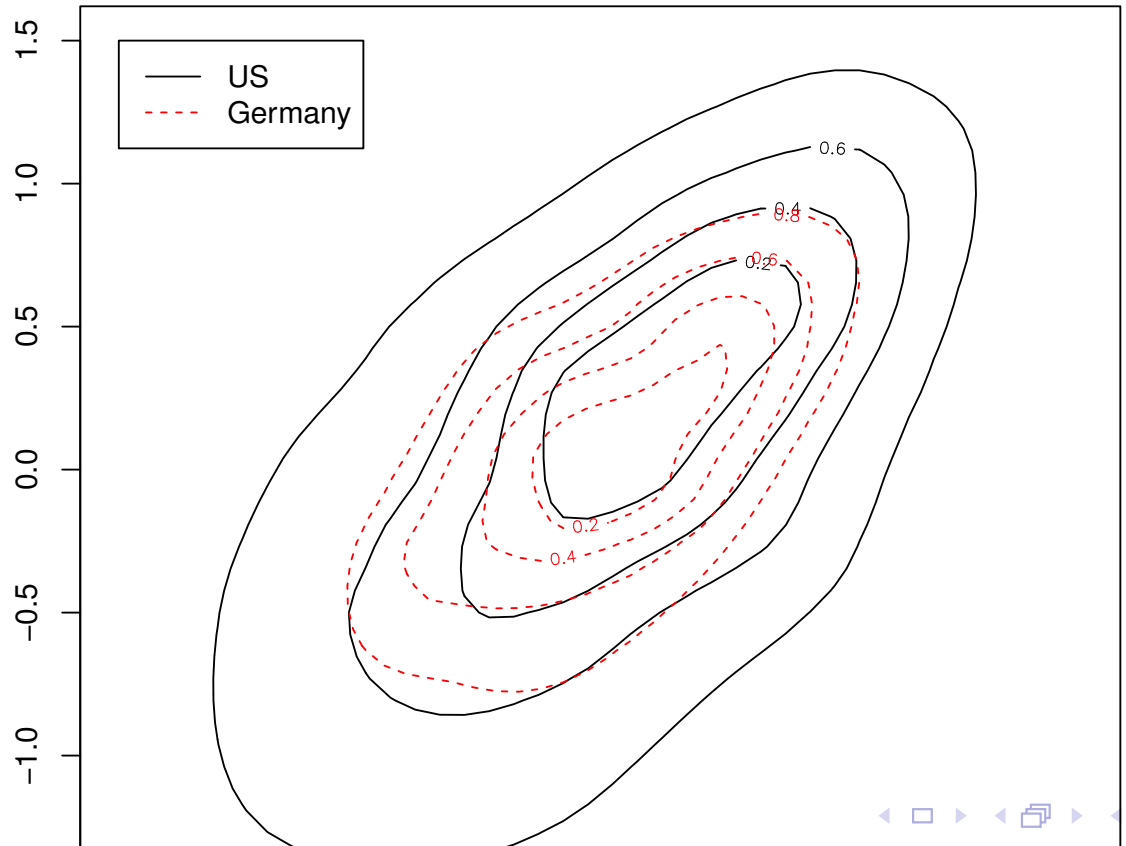
▸ Go back to mobility measurement



Contour plot example

Note: the chart shows the kernel-smoothed joint density of income in 1984 and 1993 for the USA and West Germany, where income is post-tax post-transfer family income equivalised by the PSID equivalence scale, and income for each year is expressed as a deviation from the year-specific mean. Source: Gottschalk and Spolaore (2002, Figure 1), redrawn by the authors.

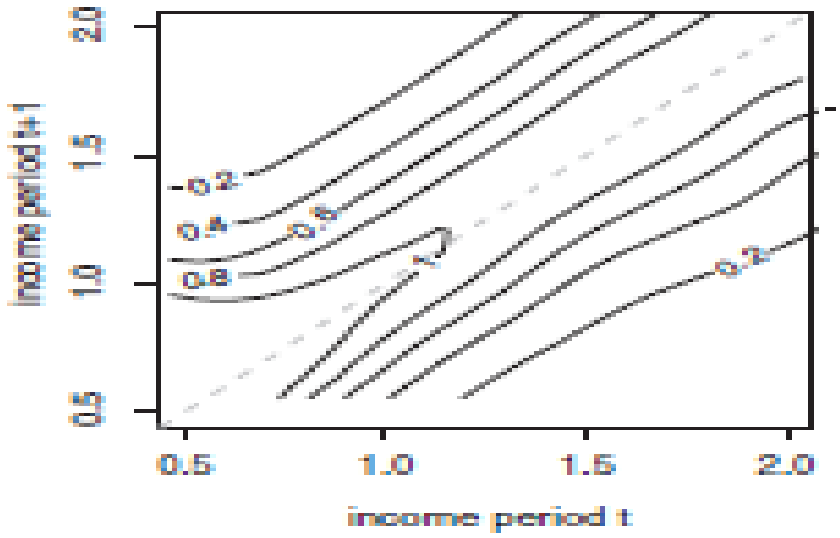
▸ Go back to mobility measurement

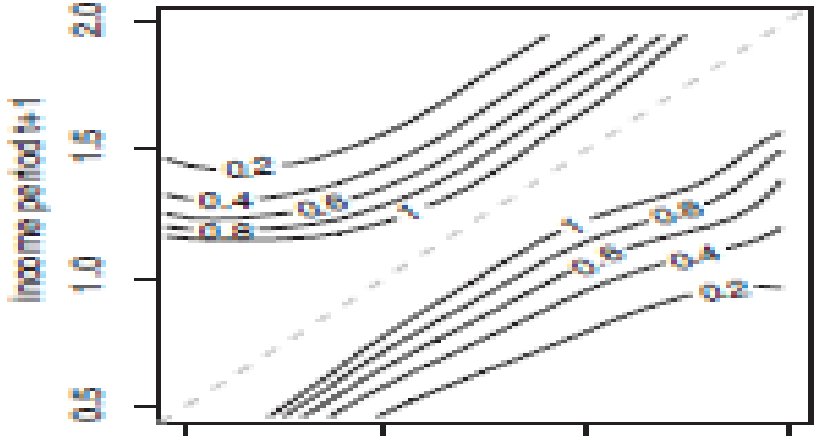


Conditional density plot example

Note: Year t refers to 1987; year $t+1$ refers to 1988. The top chart refers to the USA; the bottom chart to Western Germany.Source: Schluter and Van de gaer (2011, Figure 2).

▸ Go back to mobility measurement

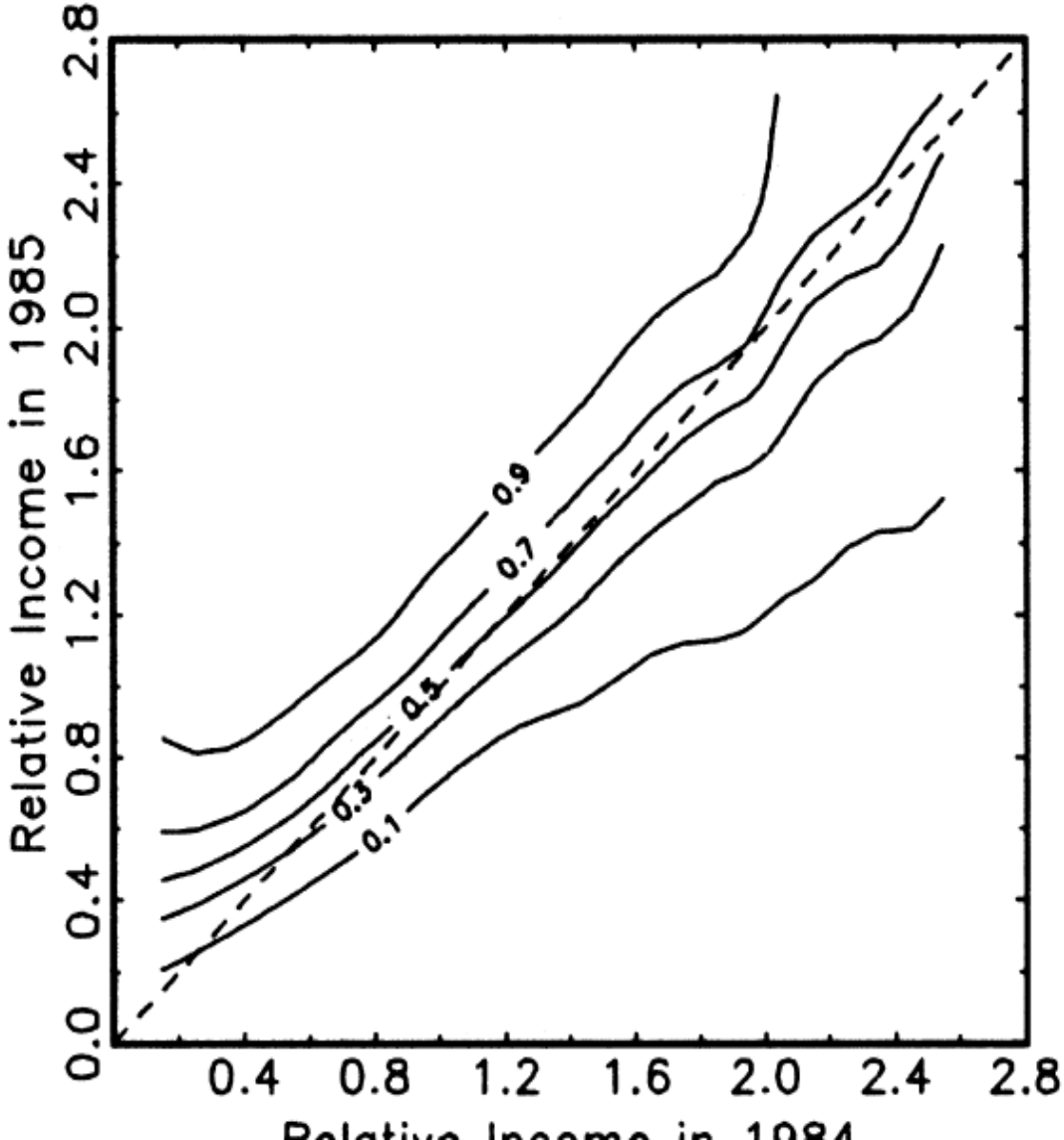




Non-parametric transition probability plot example.

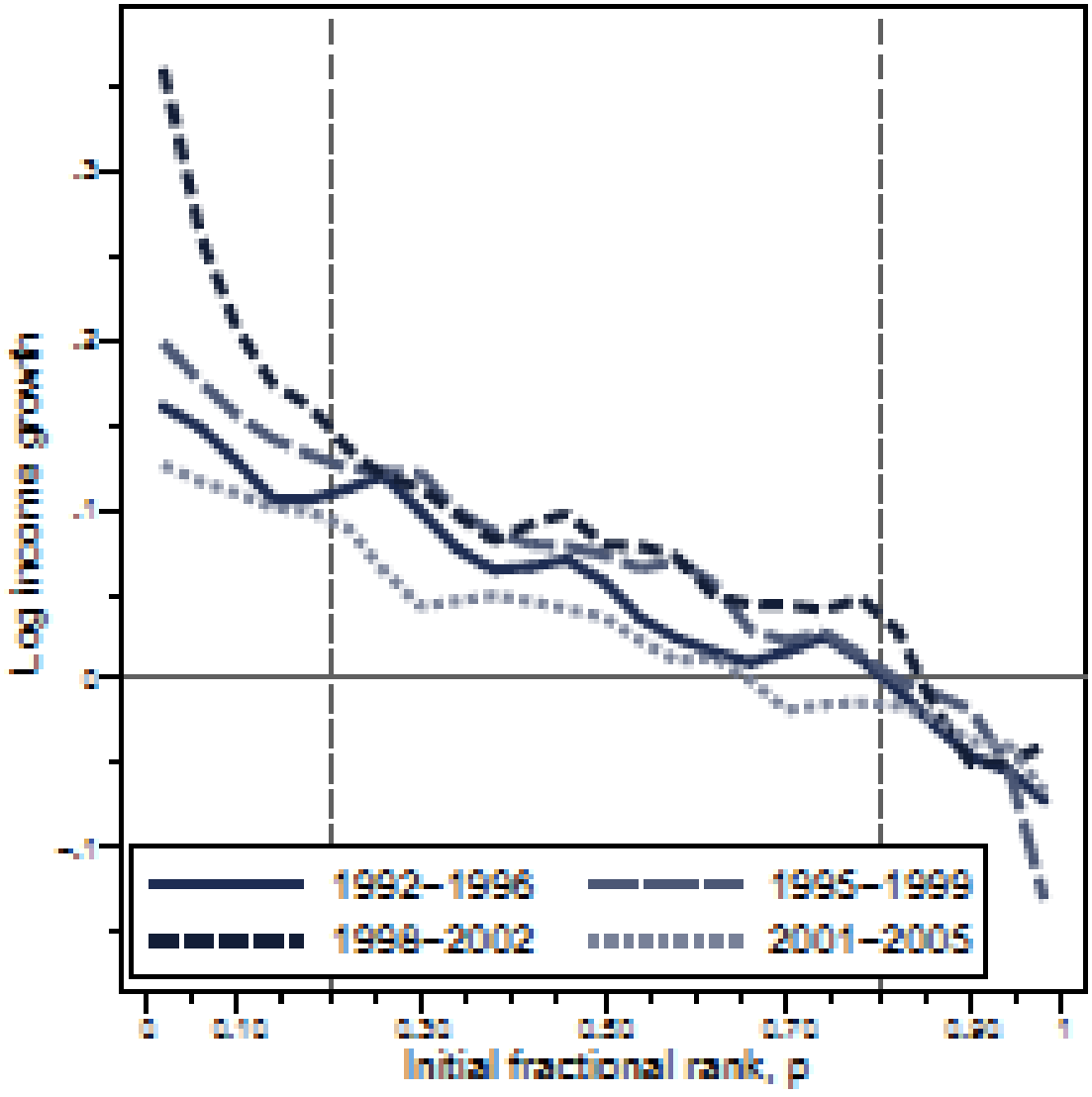
Note: Relative income in each year equal to income divided by the 1984 median income.Source: Trede (1998, Figure 1).

▸ Go back to mobility measurement



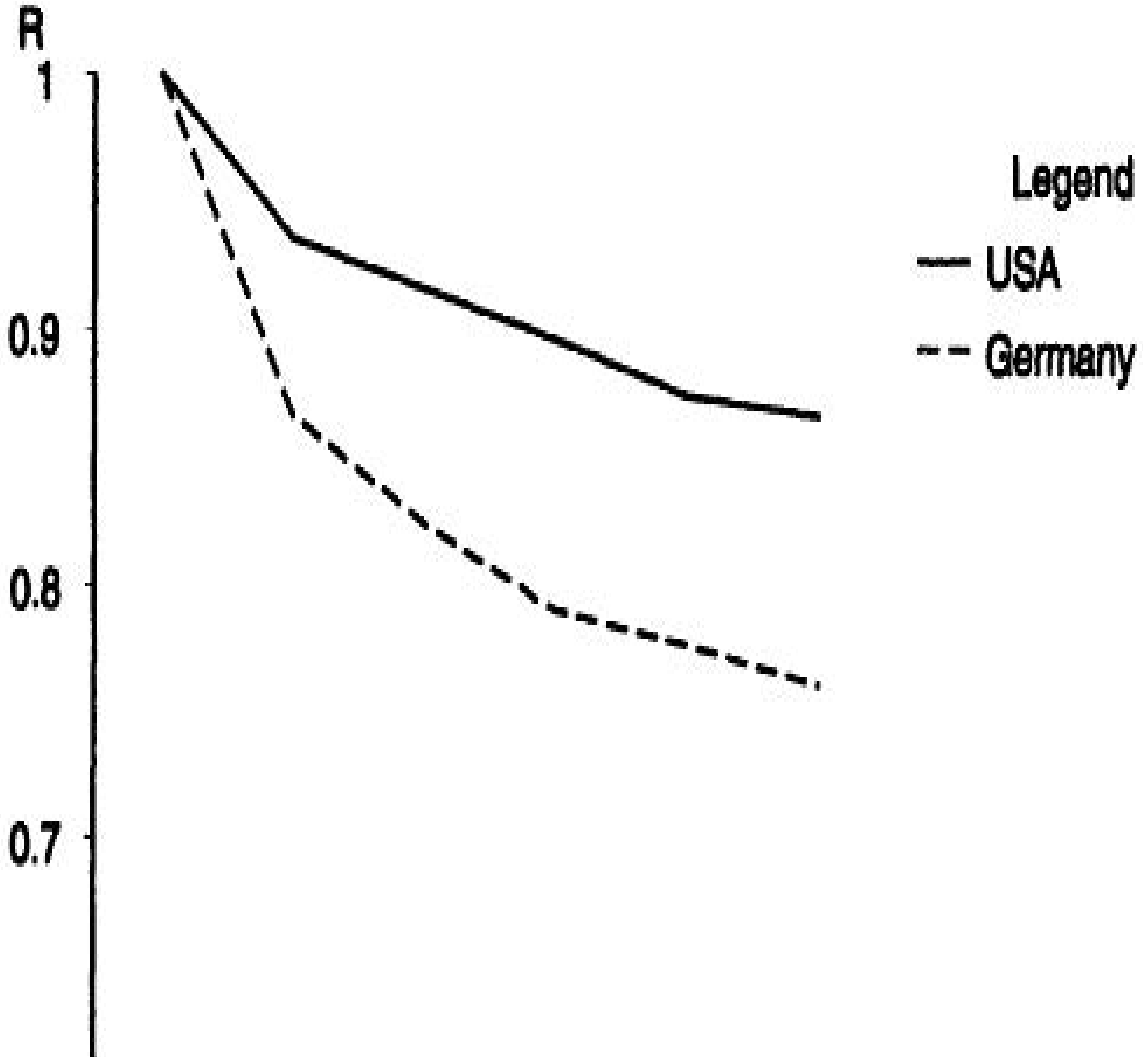
Individual income growth and mobility profiles

Source: Jenkins and Van Kerm (2011). ▸ Go back to mobility measurement



Income rigidity (longer-term inequality expressed as a fraction of total inequality) falls as the time period is lengthened

Source: Burkhauser and Poupore (1997, Figure 2). Go back to mobility measurement



Differences in cumulative density: USA, 1979–1988 versus 1989–1998

Source: Authors' calculations from (Hungerford, 2011, Tables 2 and 3), based on PSID data.

▸ Go back to Intra-generational evidence

	Destination group							
Origin group	1	2	3	4	5	6	7	8
1	0.2	–0.1	–0.2	0.0	0.3	0.2	0.1	0.1
2	0.0	0.0	0.4	0.6	0.5	0.2	0.2	0.1
3	–0.2	–0.5	–0.2	0.0	0.0	–0.5	–0.1	–0.1
4	–0.2	–0.7	–0.6	–0.6	–0.7	–0.7	–0.2	–0.3
5	0.0	–0.3	–0.3	–0.5	–0.7	–0.5	0.0	–0.1
6	0.1	–0.1	–0.1	–0.4	–1.1	–1.3	–0.9	–0.5
7	0.1	0.2	0.0	–0.3	–0.8	–0.9	–0.8	–0.3
8	0.1	0.2	–0.2	–0.2	–0.3	–0.7	–1.1	–0.7
9	0.0	–0.1	–0.3	–0.2	–0.4	–0.4	–0.7	–0.6
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Selected mobility indices (%): USA, 1979–1988 versus 1989–1998

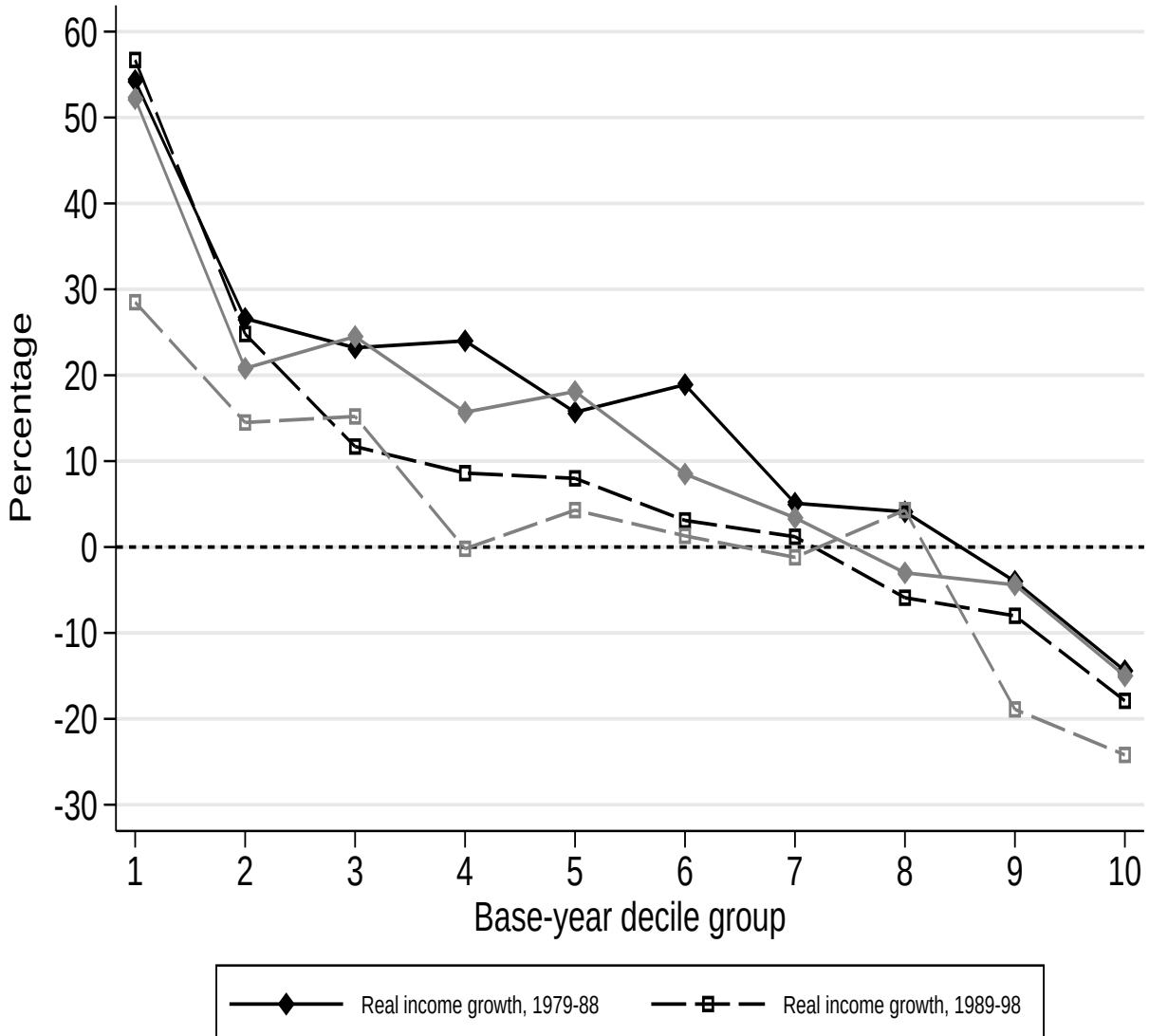
Source: Authors' calculations from Hungerford (2011, Tables 4 and 8, and p. 97), based on PSID data. ▸ Go back to Intra-generational evidence

Index	1979–88	1989–98
Decile mobility	79.1	77.0
Normalized trace	87.9	85.6
Gini mobility	36.2	34.4
Equalization (Shorrocks, Gini-based)	10.9	11.1
Equalization (Fields, Gini-based)	2.1	8.2
Average of absolute income changes ($D1$)	11,368	13,878
Average of absolute income share changes	0.421	0.459

Median real income growth, by base-year decile group: USA, by period

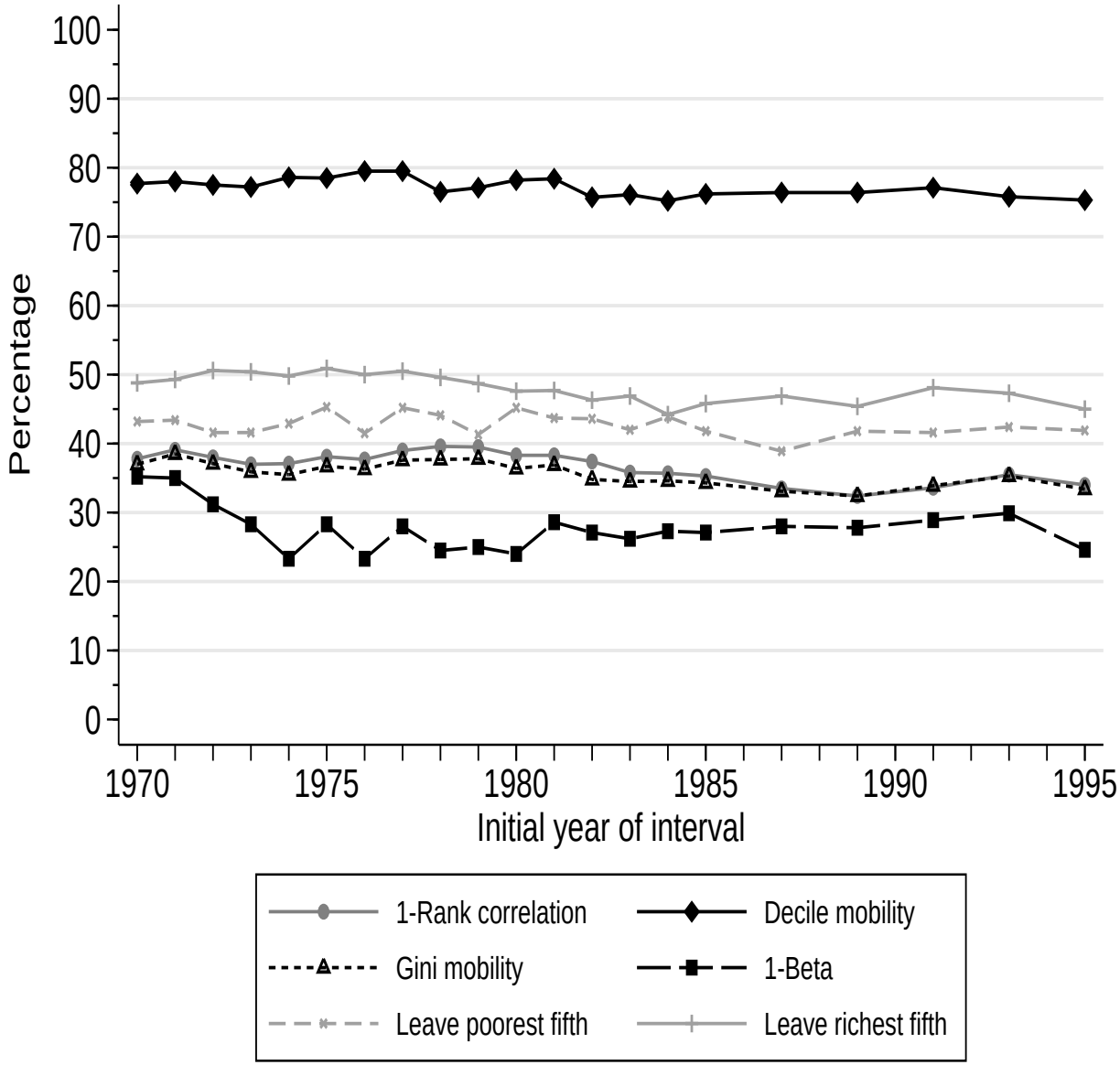
Source: Hungerford (1993, Figure 9) and Hungerford (2011, Figures 5 and 6).

▸ Go back to Intra-generational evidence



Indices of positional income mobility: USA, 1970–1995

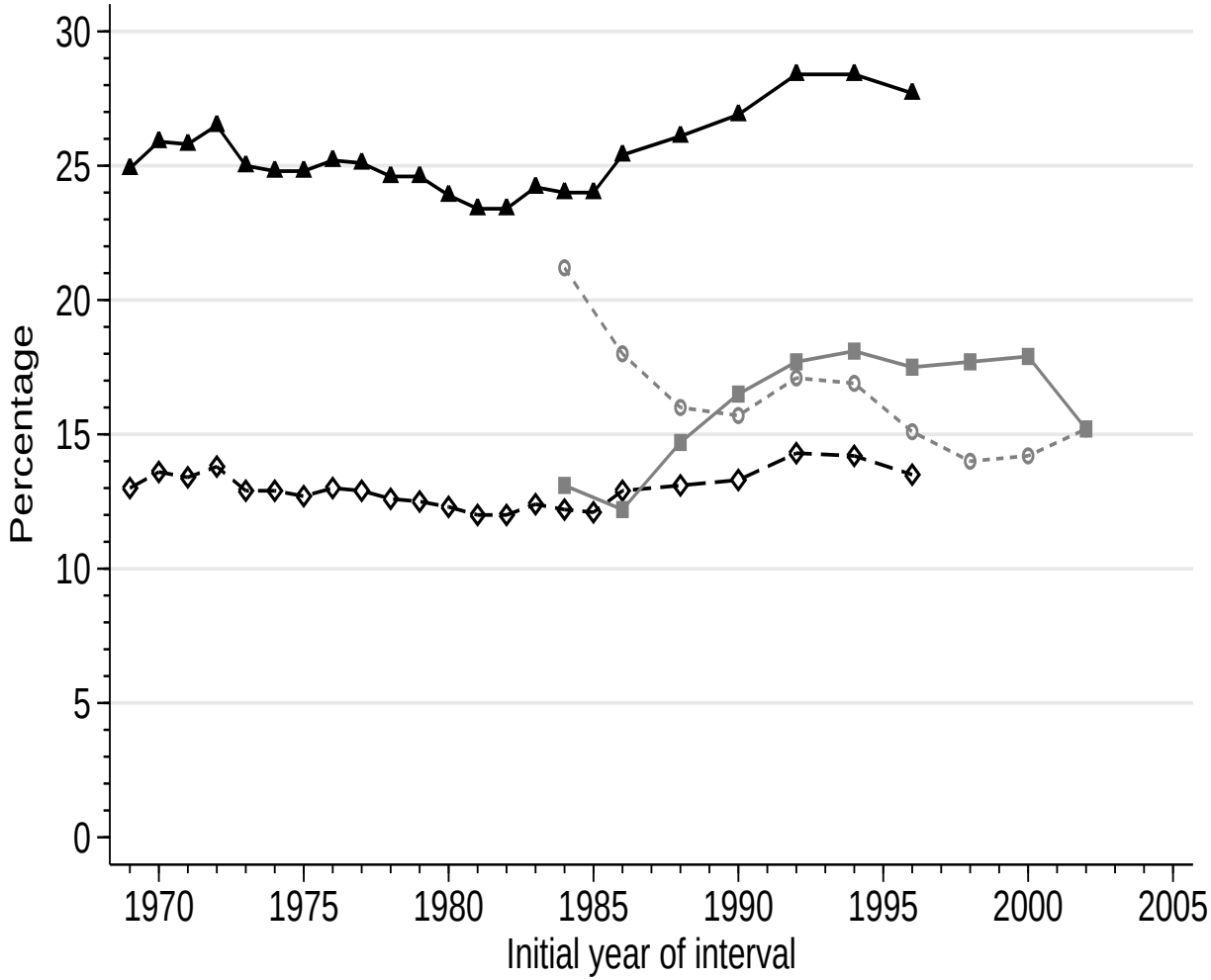
Source: Bradbury (2011, Figures 2 and 3). ▸ Go back to Intra-generational evidence



Mobility as longer-term income inequality reduction: USA, 1970–1995

Sources: Bradbury (2011, Figure 4) for the series shown in black and Bayaz-Ozturk, Burkhauser, and Couch (2013, Figure A1) for the series shown in gray. Both use PSID (CNEF) data.

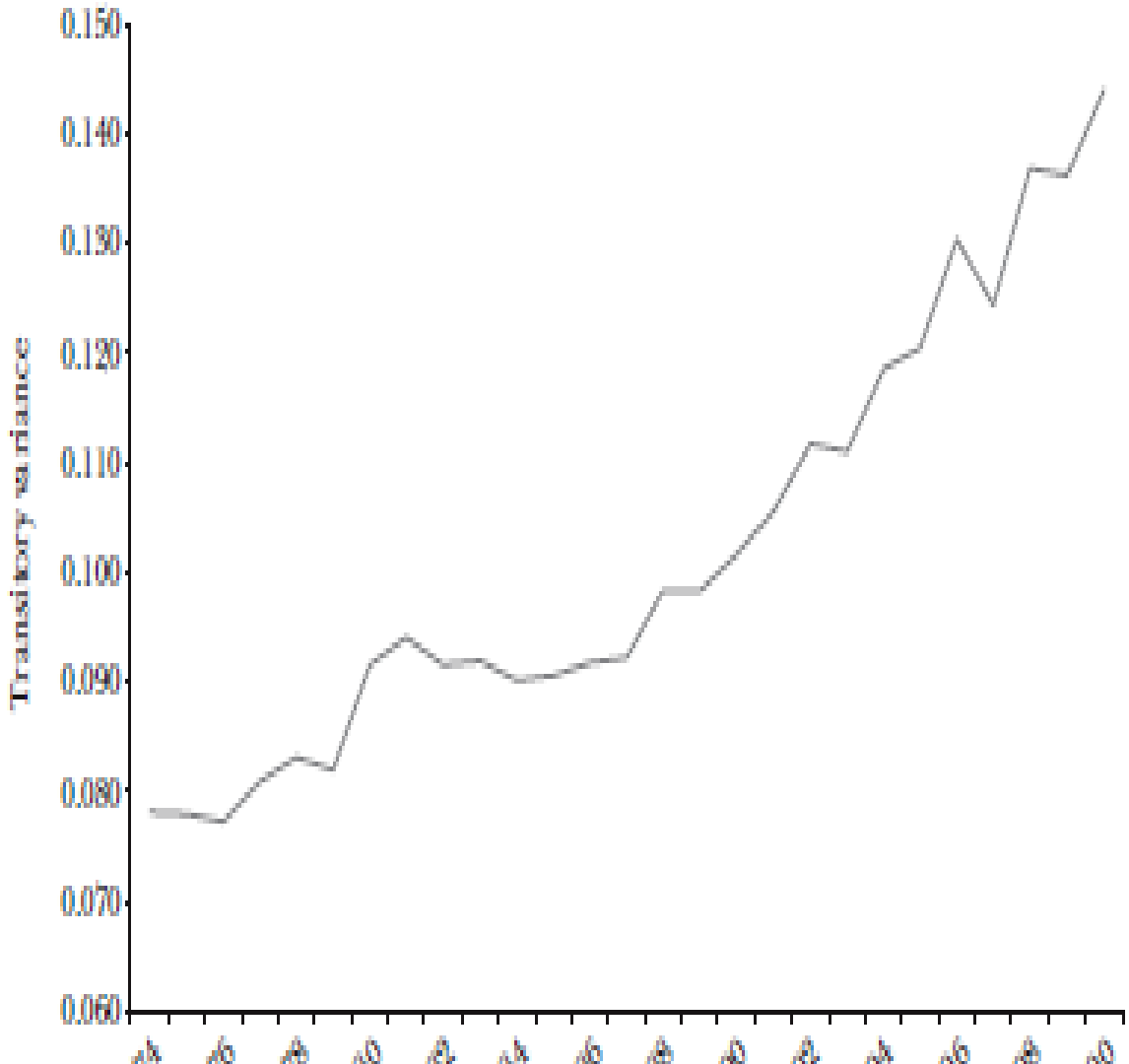
▸ Go back to Intra-generational evidence



Transitory variance of log annual family income: USA, 1974–2000

Source: Gottschalk and Moffitt (2009, Figure 5), based on PSID data.

▸ Go back to Intra-generational evidence



Studies comparing household income mobility in the USA and Western Germany (WG)

▸ Go back to Intra-generational evidence

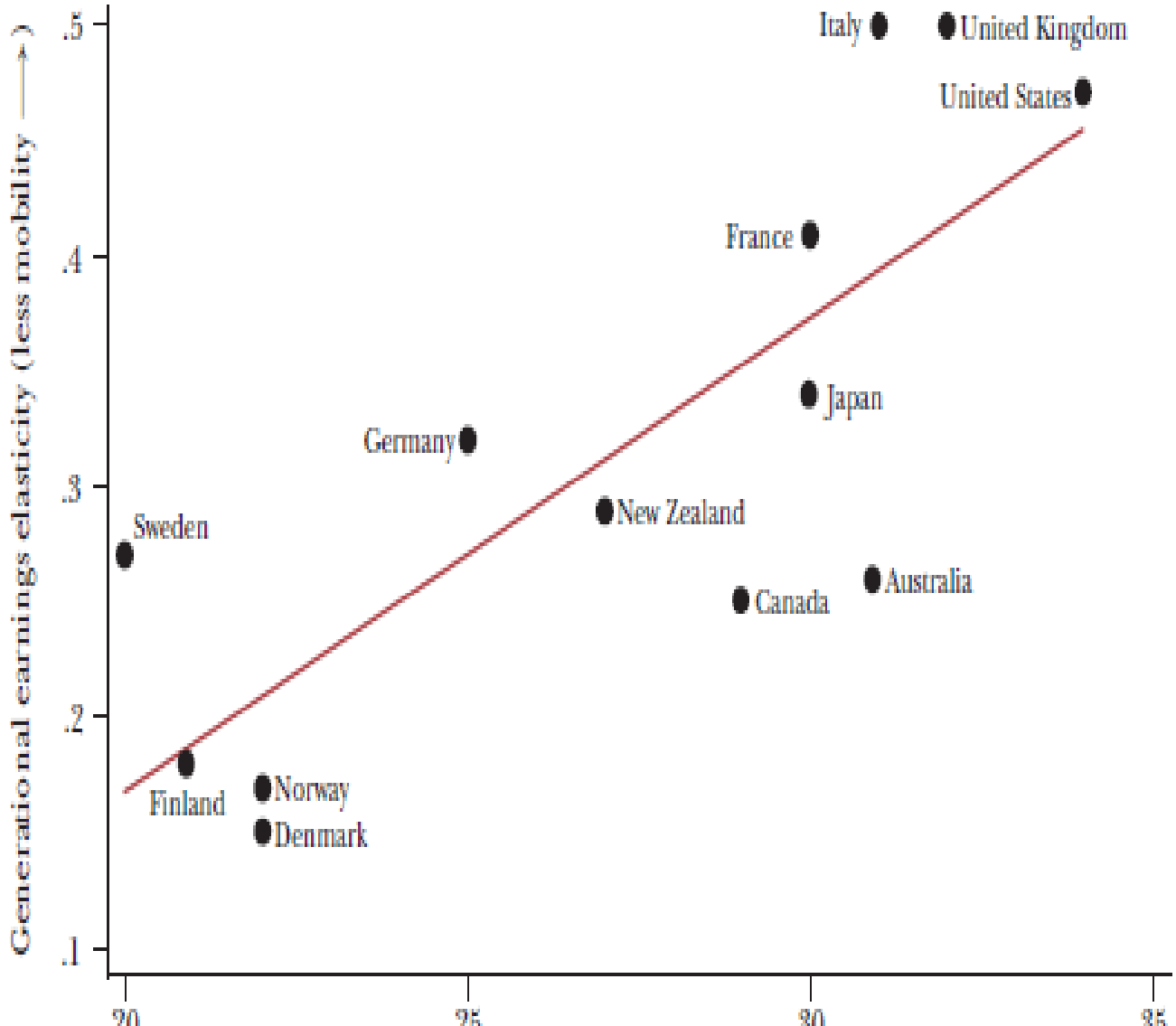
Study	Time period covered	(Im)mobility measure(s)	Remarks
Burkhauser and Poupore (1997)	1983–88	Shorrocks R	First finding that mobility greater in WG than in USA
Burkhauser, Eakin, and Rhody (1998)	Year pairs $t, t+\tau$, $\tau = 1, \ldots, 5$, 1983–88	Quintile transition matrices	Slightly more income mobility in WG
Maasoumi and Trede (2001)	1984-89	Maasoumi-Shorrocks R	Greater mobility in WG; statistically significant
Gottschalk and Spolaore (2002)	1983, 1993	SWF-based indices	WG–USA difference depends on index parameters

The Great Gatsby curve

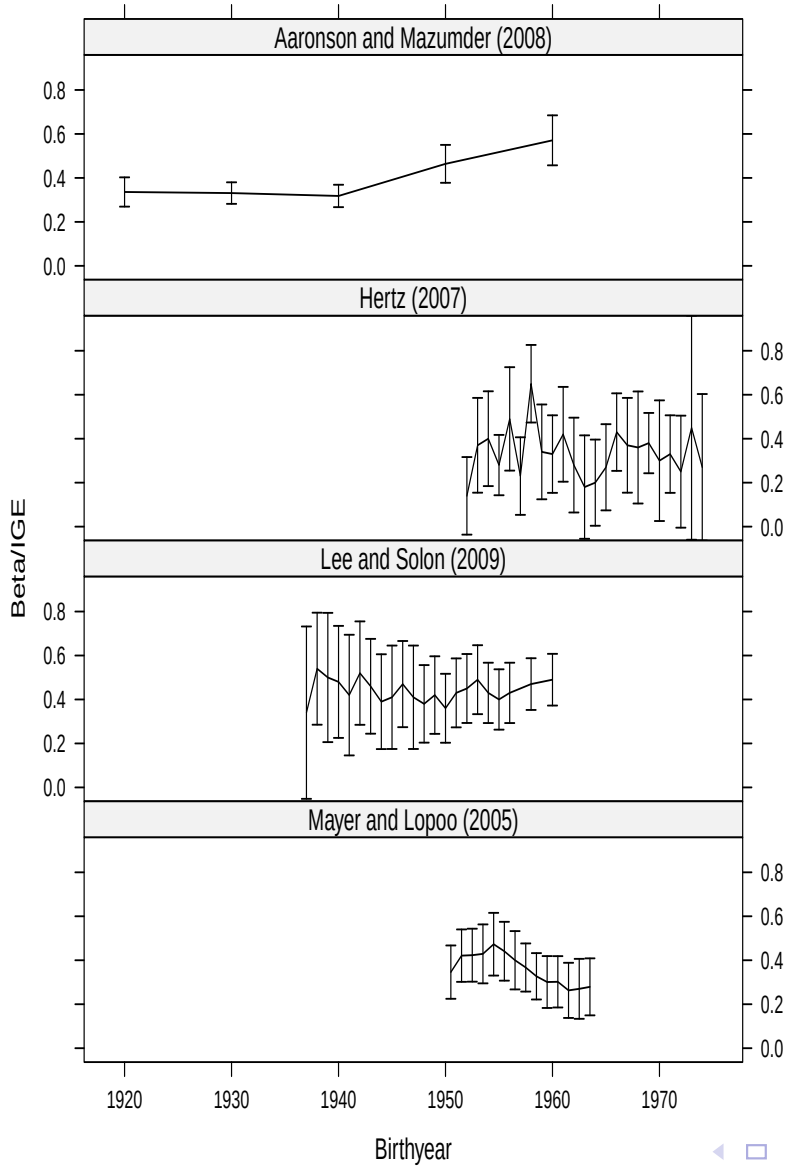
the relationship between intergenerational earnings persistence and cross-sectional income inequality; Source: Corak (2013a, Figure 1).

▸ Go back to Start of section

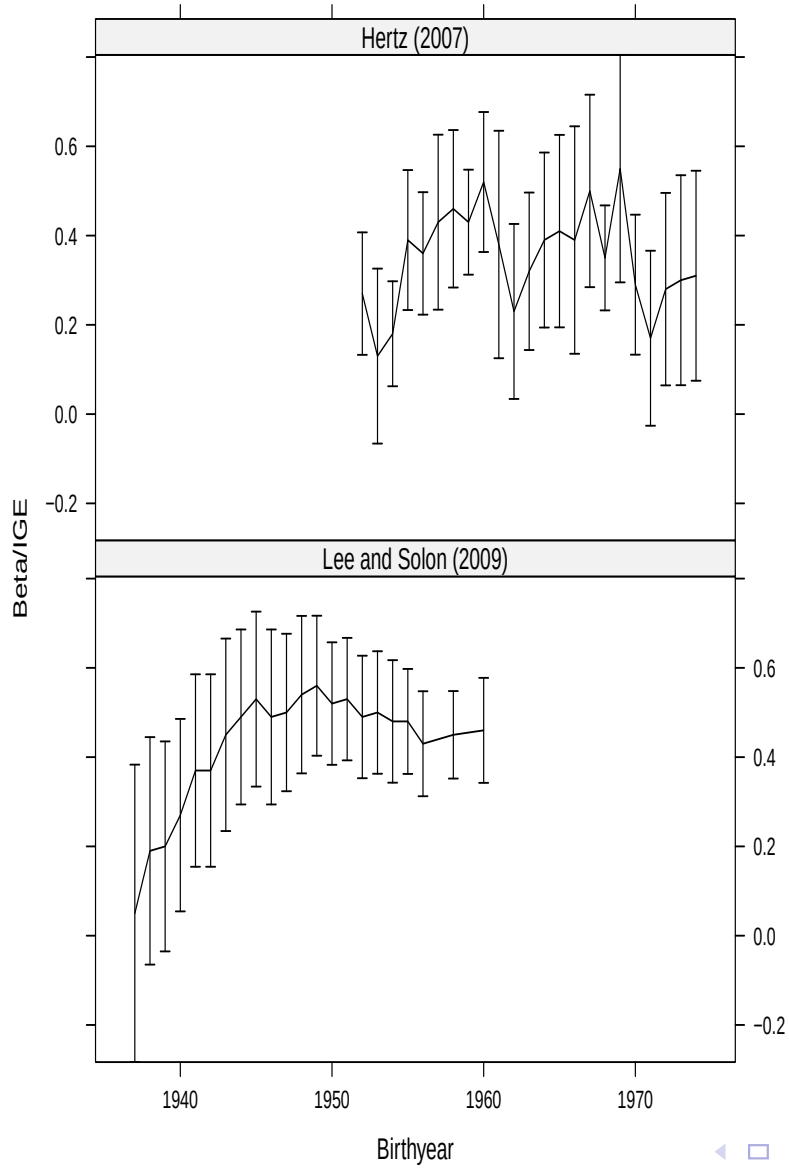
▸ Go back to Inter-generational evidence



Trends in US intergenerational income persistence – men



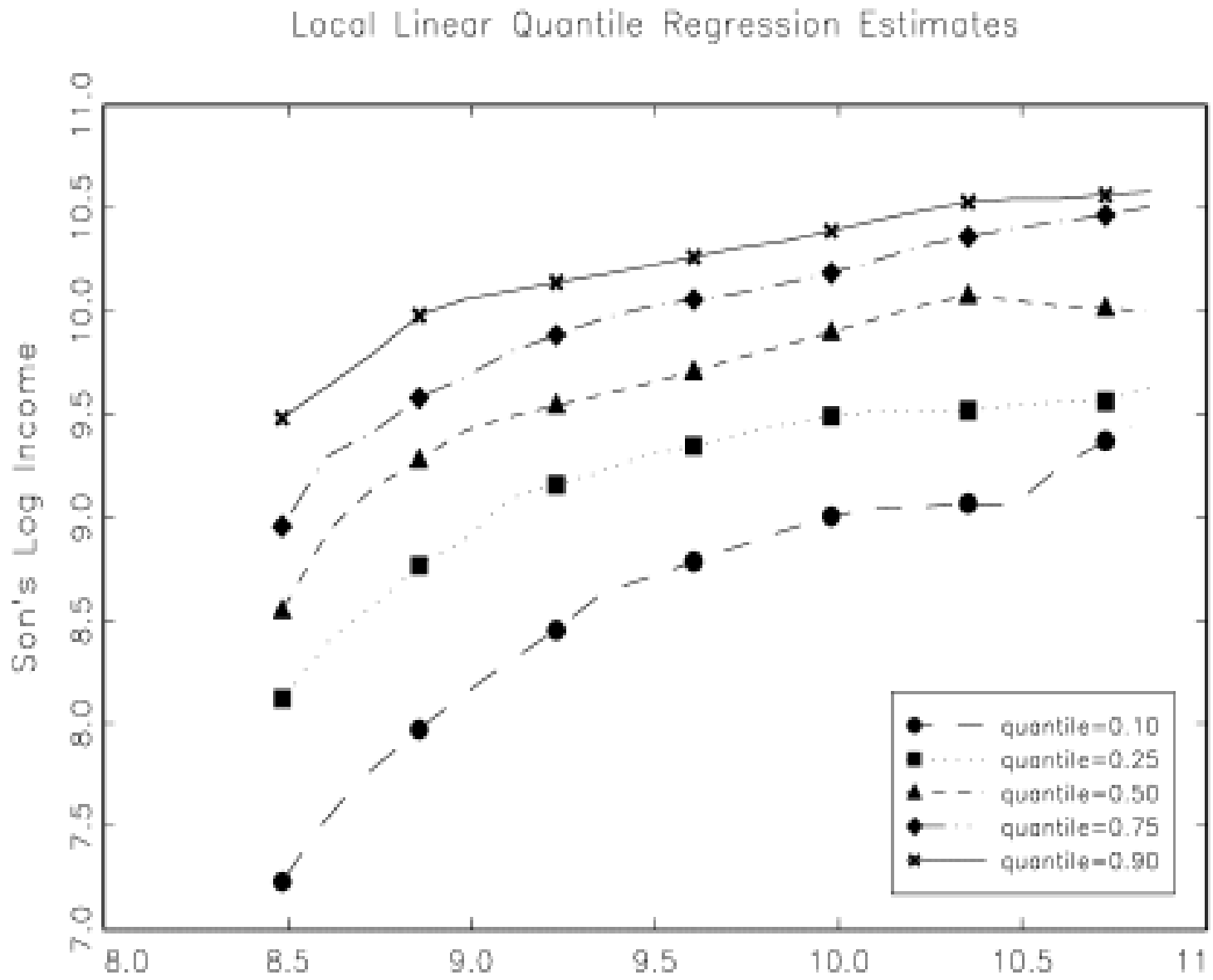
Trends in US intergenerational income persistence – women



Intergenerational income persistence: non-parametric quantile regression for US father-son pairs

Source: Lee, Linton, and Whang (2009, Figure 1).

▸ Go back to Inter-generational evidence



Intergenerational decile transition matrices for earnings, father-son pairs – the USA

Source: Mazumder (2005b, Table 2.2) and Corak and Heisz (1999, Table 6).

▸ Go back to Inter-generational evidence

	Son									
	1	2	3	4	5	6	7	8	9	10
Father										
1	22	18	10	10	11	11	5	5	2	7
2	9	15	16	15	9	9	9	5	9	5
3	9	10	12	17	15	9	9	7	7	5
4	17	9	10	12	3	15	9	11	7	7
5	12	7	12	6	14	9	12	10	12	8
6	7	11	6	10	11	13	13	11	7	11
7	8	7	12	9	11	9	16	13	9	5
8	8	8	8	11	10	7	11	15	13	8
9	4	8	8	5	9	11	7	9	20	19
10	3	8	6	7	7	5	10	16	11	26

Intergenerational decile transition matrices for earnings, father-son pairs – Canada

Source: Mazumder (2005b, Table 2.2) and Corak and Heisz (1999, Table 6).

▸ Go back to Inter-generational evidence

	Son									
	1	2	3	4	5	6	7	8	9	10
Father										
1	16	14	12	11	10	9	8	7	7	7
2	13	13	12	12	11	10	9	8	7	6
3	11	11	12	12	12	11	10	8	8	7
4	10	10	11	11	11	11	11	10	8	7
5	9	10	10	10	11	10	11	11	10	8
6	9	9	10	10	10	11	11	11	10	9
7	8	9	9	9	10	10	11	11	11	11
8	8	8	8	9	9	10	11	12	12	12
9	8	8	8	8	8	10	10	12	13	15
10	8	8	8	8	8	9	10	11	13	18

Intergenerational earnings mobility in Canada, Sweden and the USA: Beta, *r*, and the rank correlation

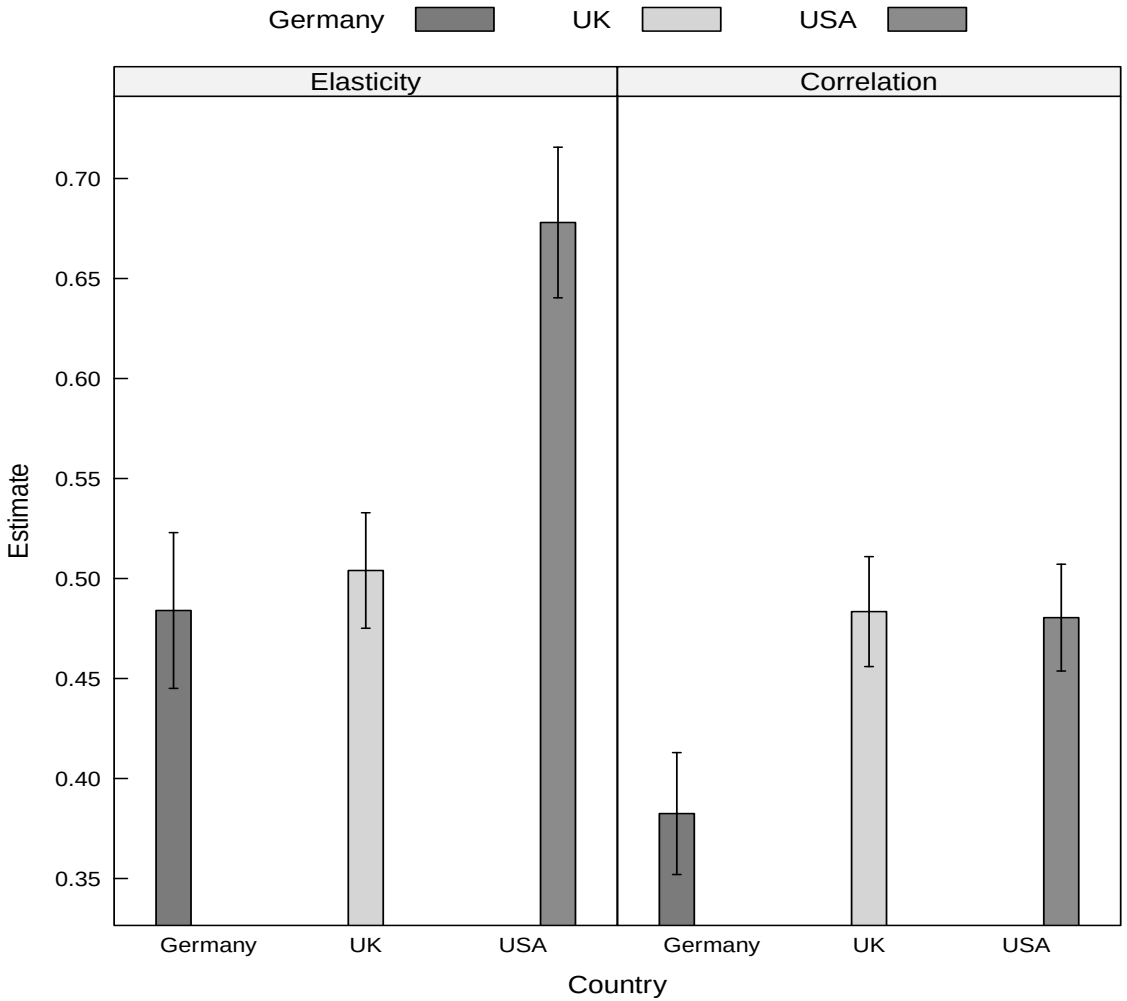
Source: Corak, Lindquist, and Mazumder (2013, pp. 10–11).

Country	Beta		*r*		Rank correlation	
	Estimate	Rank	Estimate	Rank	Estimate	Rank
Canada	0.26	(2)	0.23	(2)	0.24	(1)
Sweden	0.25	(1)	0.21	(1)	0.30	(2)
USA	0.40	(3)	0.26	(3)	0.30	(2)

▸ Go back to Inter-generational evidence

Intergenerational persistence of disposable income: elasticities versus correlations

Source: Eberharter (2013, Tables 1, 2). Go back to Inter-generational evidence



Cumulated differences in intergenerational mobility frames across earnings decile groups for father-son pairs in Canada and the USA (USA-CAN)

Source: Authors' derivations using transition matrices shown in Table 63 from Mazumder (2005b) and Corak and Heisz (1999). ▸ Go back to Inter-generational evidence

	Son									
	1	2	3	4	5	6	7	8	9	10
Father										
1	6	10	9	8	9	11	8	6	1	1
2	2	9	11	13	12	14	11	6	3	2
3	1	6	8	16	18	18	15	8	4	2
4	8	11	13	21	16	20	15	10	4	2
5	10	12	15	19	17	19	15	9	7	4
6	9	12	11	15	14	19	17	11	5	4
7	8	9	12	15	15	18	22	18	10	3
8	8	9	11	17	17	17	21	21	13	2
9	4	5	7	9	10	12	12	9	9	2
10	−1	0	0	2	2	0	0	2	−1	0

Cumulated differences in intergenerational transition matrices in disposable income among all persons for Germany, the UK and the USA

Source: Authors' calculations from Eberharter (2013, Table 3).

▸ Go back to Inter-generational evidence

A. USA – Germany

	Offspring				
	1	2	3	4	5
Father					
1	3	5	5	1	0
2	9	11	4	2	0
3	9	18	6	2	0
4	9	18	9	9	0
5	4	13	1	2	0

B. USA – UK

	Offspring				
	1	2	3	4	5
Father					
1	−10	−1	−1	0	0
2	−11	−5	−2	−6	0
3	−11	1	−4	−9	0
4	−8	−3	−12	−10	−1
5	−10	−11	−21	−20	−1

Brother correlations in earnings and income

Source: Schnitzlein (2013) and authors' compilation from sources listed in last column.

Denmark	0.23	1951–1968	ANOVA	Björklund et al. (2002)
Denmark	0.20	1958-1971	REML	Schnitzlein (2013)
China	0.57	Not reported	REML	Eriksson and Zhang (2012)
Finland	0.26	1953–1965	ANOVA	Björklund et al. (2002)
Finland	0.26	1950–1960	ANOVA	Österbacka (2001)
Finland	0.24	1955–1965	ANOVA	Björklund et al. (2004)
Germany	0.43	1958-1971	REML	Schnitzlein (2013)
Norway	0.14	1950–1970	ANOVA	Björklund et al. (2002)
Norway	0.14	1953–1969	ANOVA	Björklund et al. (2004)
Sweden	0.37	1962–1968	GMM	Björklund, Jäntti, and Lindquist (2009
Sweden	0.25	1953	REML	Björklund, Lindahl, and Lindquist (20
Sweden	0.25	1948–1965	ANOVA	Björklund et al. (2002)
Sweden	0.22	1962–1968	REML	Björklund, Jäntti, and Lindquist (2007
Sweden	0.19	1951–1968	ANOVA	Björklund et al. (2004)
USA	0.49	1947–1955	REML	Mazumder (2008)
USA	0.45	1944–1952	REML	Levine and Mazumder (2007)
USA	0.45	1951–1958	ANOVA	Solon et al. (1991)
USA	0.43	1951–1967	ANOVA	Björklund et al. (2002)
USA	0.45	1958-1971	REML	Schnitzlein (2013)

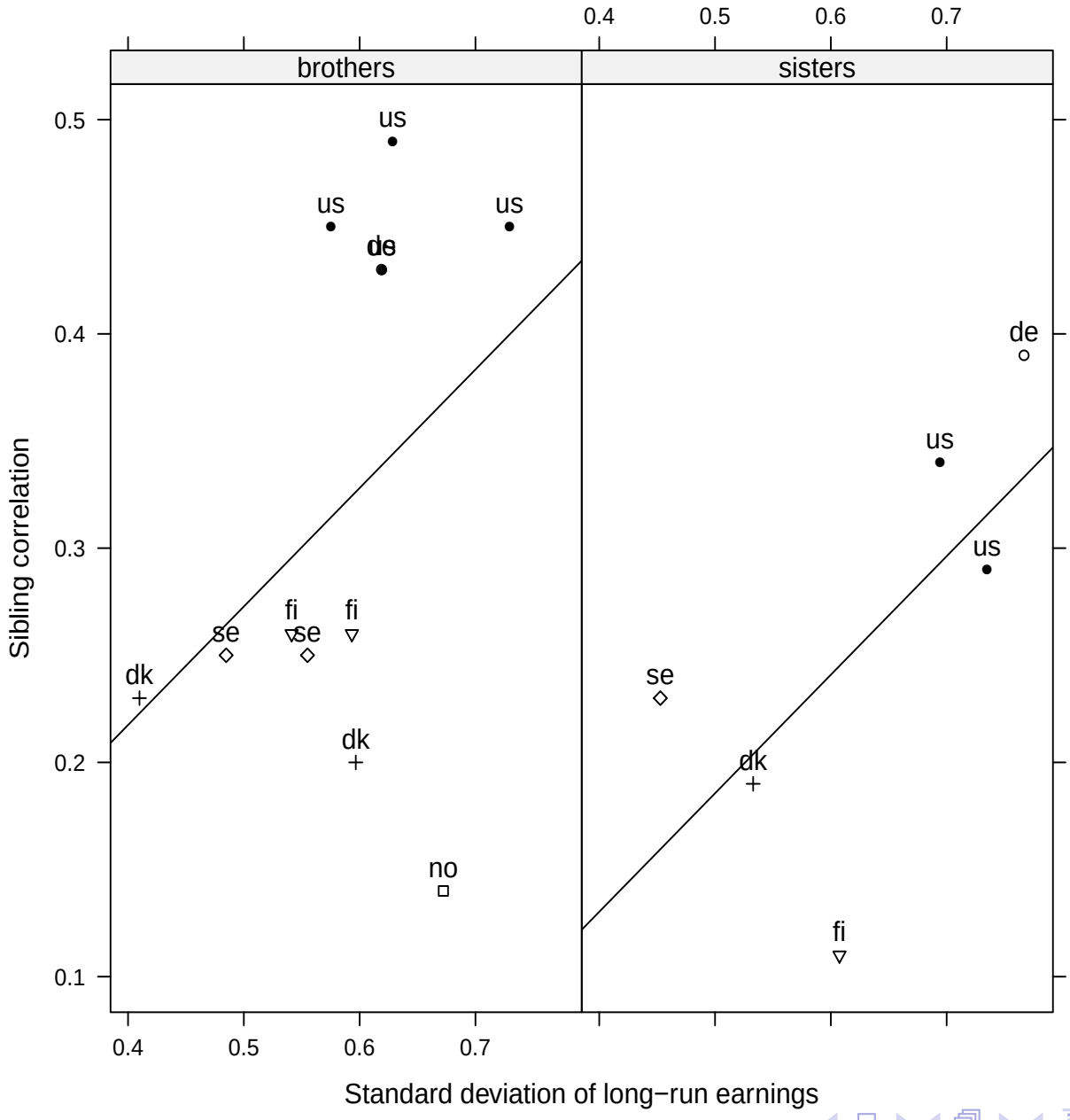
Sister correlations in earnings and income

Source: Schnitzlein (2013) and authors' compilation from sources listed in last column.

Denmark	0.19	1958-1971	REML	Schnitzlein (2013)
Finland	0.13	1950–1960	ANOVA	Österbacka (2001)
Finland	0.11	1955–1965	ANOVA	Björklund et al. (2004)
Germany	0.39	1958-1971	REML	Schnitzlein (2013)
Sweden	0.15	1951–1968	ANOVA	Björklund et al. (2004)
Sweden	0.23	1953	REML	Björklund, Lindahl, and Lindquist (201
Norway	0.12	1953–1969	ANOVA	Björklund et al. (2004)
USA	0.34	1947–1955	REML	Mazumder (2008)
USA	0.28	1951–1958	ANOVA	Solon et al. (1991)
USA	0.29	1958-1971	REML	Schnitzlein (2013)

▸ Go back to Inter-generational evidence

Sibling correlation and long-run earnings inequality



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