

Income inequality and intergenerational income mobility

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This presentation relies in part on joint work with Jesper Roine (Jäntti and Roine, 2021).

Outline

Introduction

Theory

- Inequality and mobility – positive theory

- Inequality and mobility – normative theory

Measurement

Empirical approaches

- Absolute mobility

- Relative mobility

Concluding comments

Introduction

- ▶ income mobility, esp. intergenerational income mobility, is subject to substantial public policy, media, and research interest
- ▶ the “stylized facts” regarding the relationship between inequality and mobility have evolved considerably – cf. Friedman’s “Capitalism and Freedom” (Friedman, 1962) to the “Great Gatsby”-curve (Krueger, 2012)
- ▶ in this presentation, I will:
 - ▶ discuss the theoretical underpinnings of the currently widespread view that inequality and (intergenerational) mobility are negatively correlated
 - ▶ offer some critical remarks on that view
 - ▶ discuss the welfare economics of mobility (i.e., the question of whether mobility is good or bad)
 - ▶ show some recent evidence from Sweden about trends in “absolute” and relative inequality

Intergenerational persistence

- ▶ the intergenerational income elasticity (IGE), the Galtonian regression applied to log incomes of parents and children, is an empirical quantity of enduring interest:

$$y_O = \alpha + \beta y_P + \epsilon \quad (1)$$

- ▶ two interpretations for β :
 - ▶ the slope of the conditional expectation of offspring income, given parental income (“mechanical”):

$$\beta := \frac{\partial E[y_O | y_P]}{\partial y_P} \quad (2)$$

- ▶ the causal effect of a change in parental income on child income (“economic”):

$$\beta := \frac{\partial y_O^*}{\partial y_P} \quad (3)$$

Note the y_O^* , intended to convey the sense in the second equation/interpretation that offspring income is at least in part the results of optimizing behavior on the part of parents.

A “canonical” model of intergenerational transmission

- ▶ there are many theoretical models of intergenerational transmission of economic status . . .
- ▶ . . . most refer to the Becker and Tomes (1979, 1986) model for inspiration
- ▶ a simple version is due to Solon (2004);

$$y_{i,O} = \mu^* + [(1 - \gamma)\theta p]y_{i,P} + p e_{i,O}. \quad (4)$$

- ▶ e is the offspring human capital endowment (itself an AR(1) process with transmission from parent)
- ▶ p is the return on human capital
- ▶ γ measures the progressivity in human capital
- ▶ θ measures how effectively human capital investments turn into capital
- ▶ λ captures the IG transmission of the endowment

A “canonical” model of intergenerational transmission

- ▶ in steady state, the IGE is

$$\beta = \frac{(1 - \gamma)\theta p + \lambda}{1 + (1 - \gamma)\theta p \lambda} \quad (5)$$

- ▶ the intergenerational persistence *increases* in
 - ▶ the heritability of human capital endowments λ
 - ▶ the productivity of human capital investments θ
 - ▶ the income or earnings return to human capital pand *decreases* with
 - ▶ progressivity of public education spending γ

A “canonical” model of intergenerational transmission

- ▶ dynastic income is a first-order autocorrelated process with autocorrelated errors (the term $\rho e_{i,o}$) so the steady-state variance is

$$\text{Var}[y] = \frac{[1 + (1 - \gamma)\theta\rho\lambda]\rho^2\text{Var}[v]}{[1 - (1 - \gamma)\theta\rho\lambda](1 - \lambda^2)\{1 - [(1 - \gamma)\theta\rho]^2\}} \quad (6)$$

- ▶ while not immediately obvious, this also increases in heritability, human capital investment productivity and the returns to human capital and decreases in progressivity of public education spending
- ▶ this, the theoretical underpinning of the so-called “Great Gatsby”-curve is that (in steady state) cross-sectional inequality is affected in the same way . . .
- ▶ . . . so the IGE is also positively correlated with cross-section inequality

Alternative models

- ▶ there are many alternative models but Becker and Tomes (1979, 1986) appears the clear favourite
- ▶ inequality and persistence may be negatively *or* positively correlated in some, depending on circumstances, e.g.,
 - ▶ Checchi, Ichino, and Rustichini (1999) have a more complex model of school financing, where for some parameter values, the correlation is positive and others it is negative
 - ▶ Hassler, Rodrigues, and Zeira (2007) construct a model where the configuration of labour market institutions leads to a negative or positive correlation of the two
- ▶ see also Goldberger (1989)

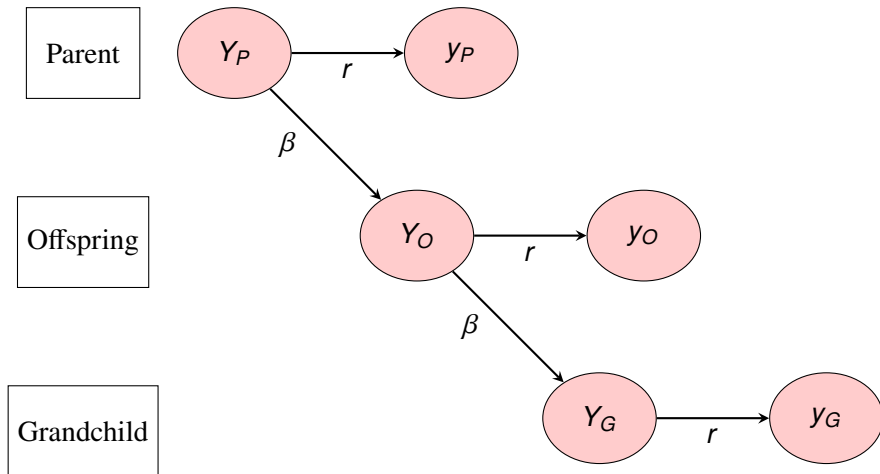
On the welfare economics of (relative) intergenerational mobility

Atkinson (2008); Jäntti and Jenkins (2015)

- ▶ whether intergenerational income mobility is good (or bad) is often taken for granted
- ▶ the “goodness” of mobility can be studied in the utilitarian framework (Atkinson and Bourguignon, 1982) or in the equality-of-opportunity framework (Roemer, 1998) – indirectly, treating parental income as a (or the sole) circumstance
- ▶ in the utilitarian approach, we need to treat the parent-offspring pair (or the dynasty in multi-generational settings) as the unit of analysis (and welfare)
- ▶ an interesting insight, due to Atkinson (2008), is that *intra*- and *interegenerational* mobility play similar roles

Intra- and inter-generational “dynastic” mobility

Atkinson (2008)



Inter- and intragenerational mobility

- ▶ focus on 2-generation case
- ▶ the annual income that fluctuates around the long-run average such that

$$Y_j = \prod_{t_1}^T \tilde{y}_{jt}^{1/T} \text{ and } \ln Y_j = \frac{1}{T} \sum_{t=1}^T y_{jt} \quad j = F, S \quad (7)$$

- ▶ a parent's utility (or the ex ante evaluation) is

$$U(Y_P, Y_O) = [\ln Y_P + \delta \ln Y_O] / \Delta, \Delta = 1 + \delta \quad (8)$$

- ▶ we'll measure social welfare by $-\text{Var}[\cdot]$, so we need

$$\begin{aligned} \text{Var}[U(Y_P, Y_O)] = & \text{Var}[\ln Y_P] + \delta^2 \text{Var}[\ln Y_O] + \\ & \delta 2\beta \text{Var}[\ln Y_P]^{1/2} \text{Var}[\ln Y_O]^{1/2} \end{aligned} \quad (9)$$

(β is the intergenerational income *correlation*; δ is the discount rate)

Inter- and intragenerational mobility

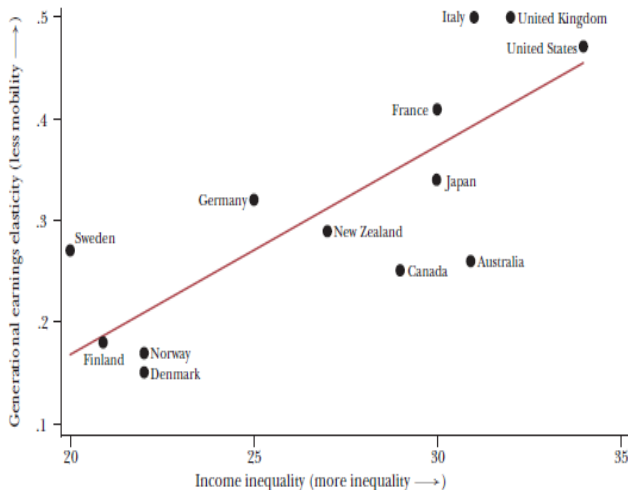
- ▶ assume T large and impose stationarity ($\sigma_P = \sigma_O = \sigma$; $r_P = r_O = r$):

$$W = -\text{Var}[U(Y_P, Y_O)] = -\sigma^2 r (1 + \delta^2 + \delta 2\beta) / \Delta^2 \quad (10)$$

- ▶ social welfare can be kept constant by trade-offs between cross-sectional variance (σ^2), intra- (r) and intergenerational (β) persistence

The Great Gatsby curve

Intergenerational earnings persistence and cross-sectional income inequality. Source: Corak (2013, Figure 1)

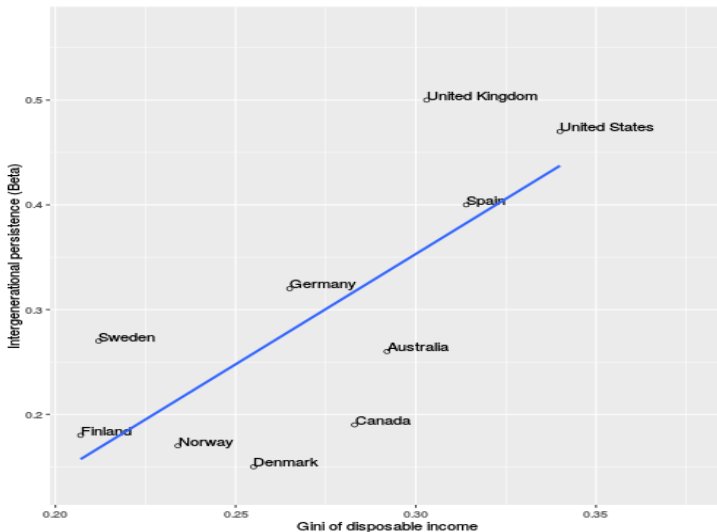


Remarks

- ▶ persistence = $-1 \times$ mobility
- ▶ mobility and persistence are in *relative* terms
- ▶ in the theory, inequality and persistence of *permanent labour income* are driven by the same factors . . .
- ▶ . . . but Great Gatsby curves typically display
 - ▶ horizontal: inequality of disposable income among all persons (in parental generation)
 - ▶ vertical: persistence of long-run labour earnings between father-son pairs

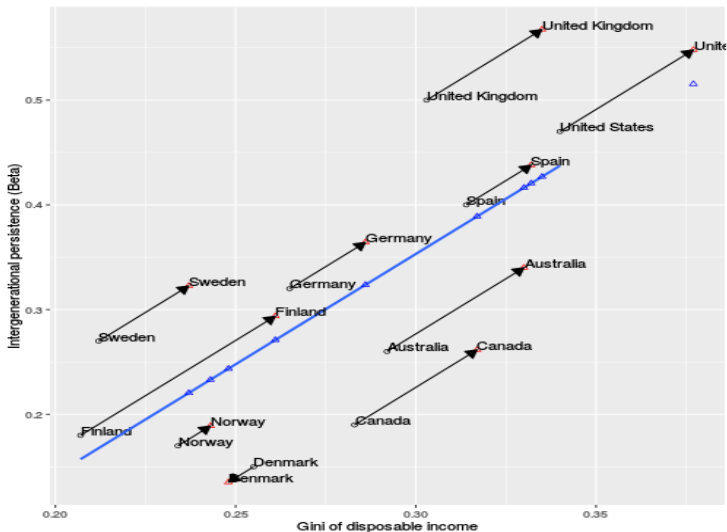
The expected evolution of income persistence, *given change in inequality*

GG curve for subset of countries in Corak (2013) also in Luxembourg Income Study



The expected evolution of income persistence, *given change in inequality*

GG curve for subset of countries in Corak (2013) also in Luxembourg Income Study



Intergenerational mobility/persistence among whom?

- ▶ much of the literature focuses on *men* in both generations. . .
- ▶ . . . with sometimes having both parent's income/earnings on right hand side
- ▶ but we have multiple possibilities:

| Offspring | Parents | | |
|-----------|---------|--------|------|
| | Father | Mother | Both |
| Son | | | |
| Daughter | | | |
| All | | | |

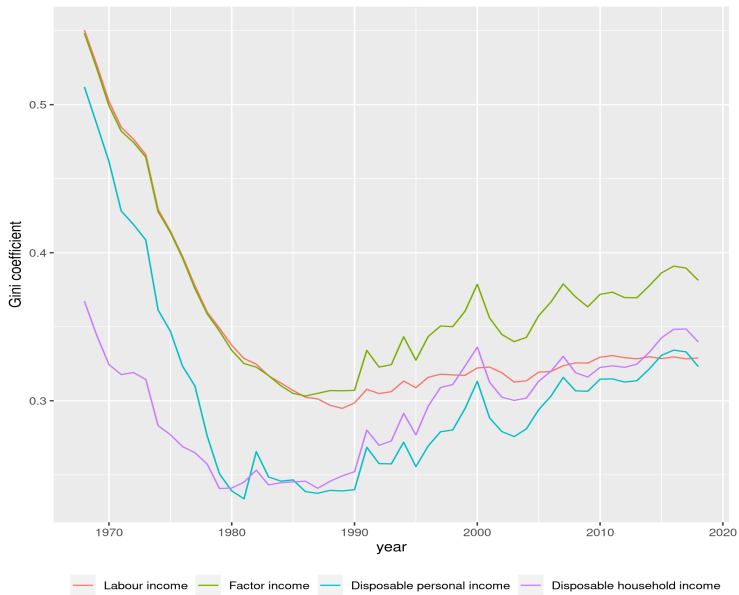
- ▶ arguably, the very last cell (both parents; all offspring) is most relevant

Disposable income: a double sum

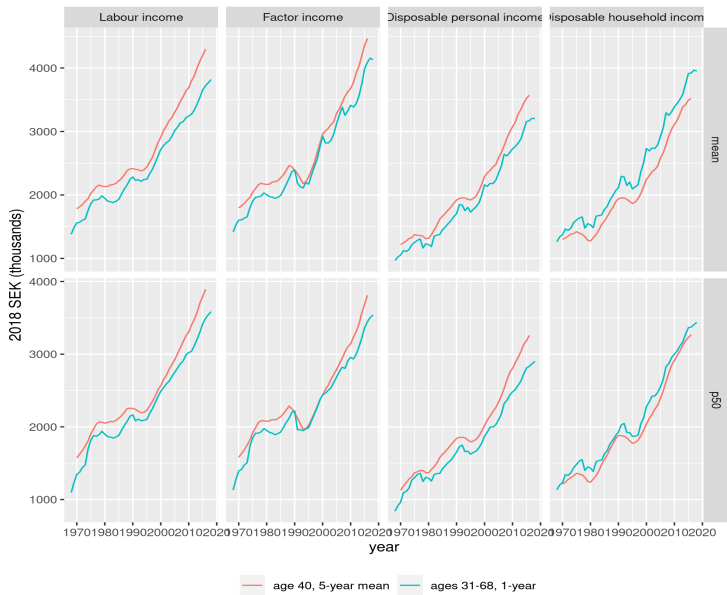
| Income component | HH members | | | Aggregate |
|----------------------------|------------|---|-----|-----------|
| | A | B | ... | |
| Earnings | ✓ | . | . | . |
| + Capital income | . | . | . | . |
| = Factor income | ✓ | . | . | . |
| + Transfers | . | . | . | . |
| – Direct taxes | . | . | . | . |
| = Disposable income | ✓ | . | . | ✓ |

Note that “A+B” for now entails summing across columns *and* taking into account the equivalent number of family members.

Inequality in cross-section



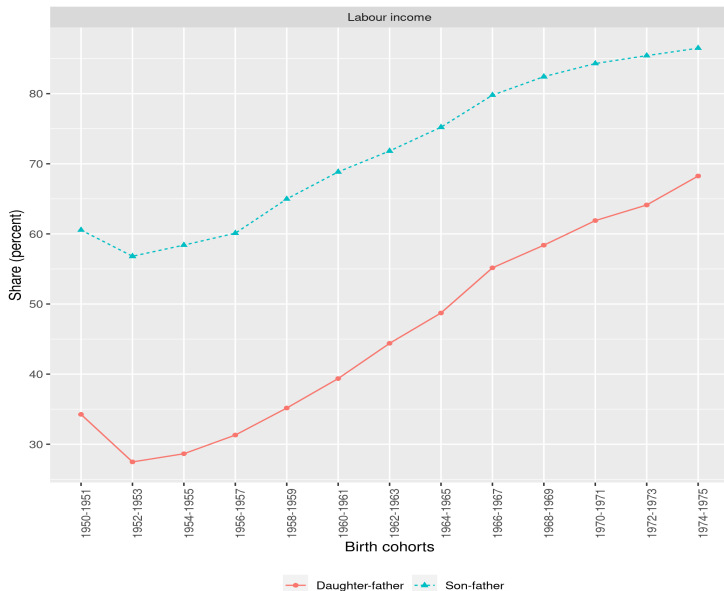
Cross-sectional and longitudinal income



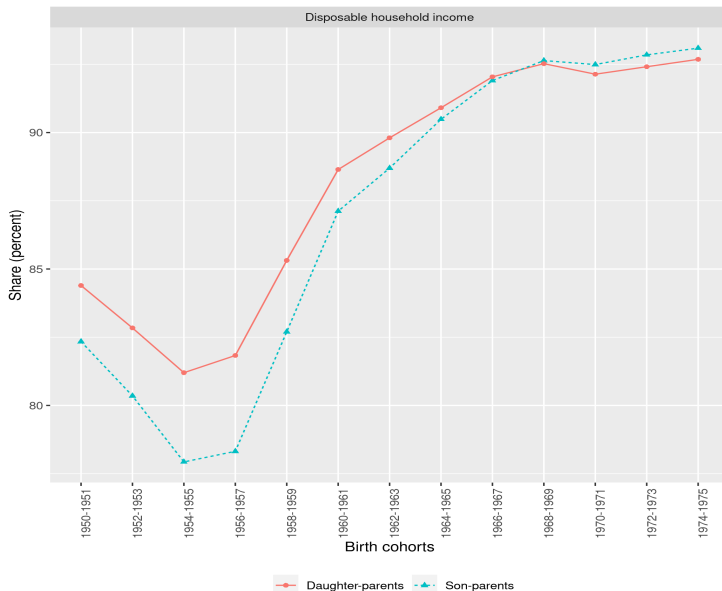
“Absolute” intergenerational income mobility

- ▶ huge public and research interest, following pathbreaking work in the U.S. by Raj Chetty and coauthors (e.g. Chetty, Grusky, et al., 2017; Chetty, Hendren, et al., 2014)
- ▶ international comparisons (Manduca et al., 2020), trends (Berman, 2022)
- ▶ it turns out that absolute mobility is mostly a function of the marginal distributions (Berman, 2022), not the joint distribution (captured by the copula) so apparently mostly just captures economic growth
- ▶ the welfare-economics basis for real income comparisons across different populations is complex (Dowrick and Quiggin, 1994; Sen, 1976) issues of mobility of what, among whom (and when) (Jäntti and Jenkins, 2015) remain

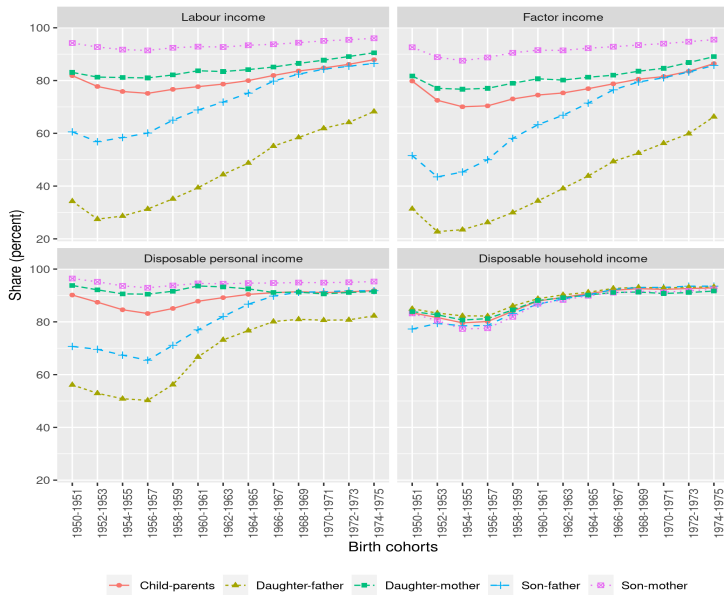
Fraction of children with income higher than parents – earnings



Fraction of children with income higher than parents – disposable household income



Fraction of children with income higher than parents



Counterfactual calculations – is it growth or inequality?

- ▶ let the income distribution in year t be completely characterized by a vector of parameters θ that we can partition into $\theta_{t,s} = (\mu_t, \phi_s)'$ so that ranks and income levels are

$$r = F_{t,s}(y; \mu_t, \phi_s); y = F_{t,s}^{-1}(r; \mu_t, \phi_s), \quad (11)$$

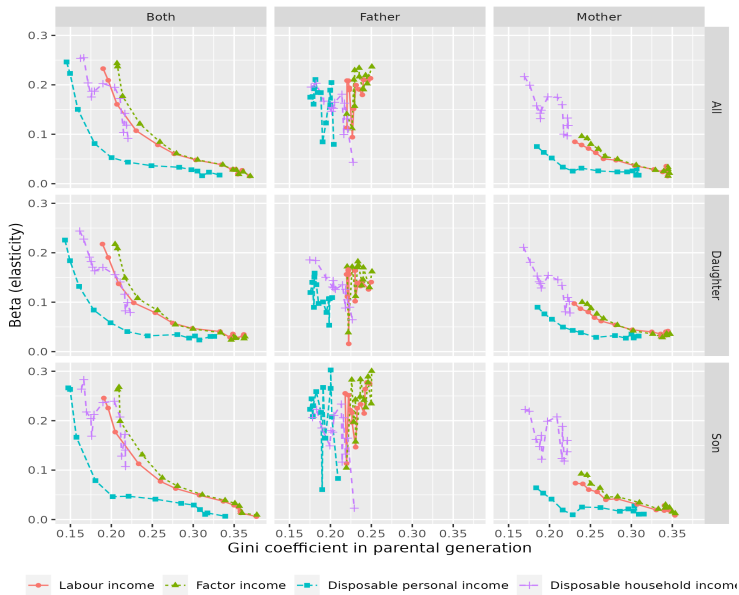
(for $t = s$ these are just the distribution and inverse distribution functions)

- ▶ with this notional partition, we can non-parametrically generate counterfactual distributions that fix either the mean or inequality:

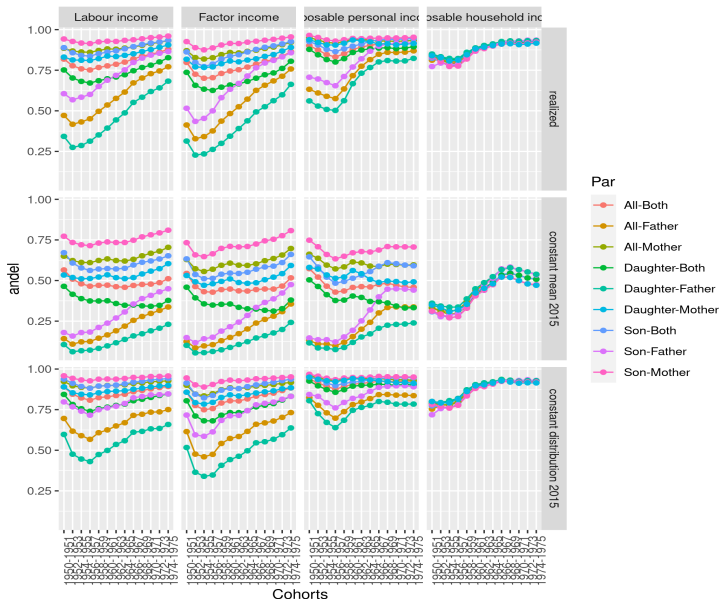
$$\begin{aligned} y_{s,t} &= y_{t,t} \times \mu_s / \mu_t; & E[y_{s,t}] &= \mu_s \\ y_{t,s} &= F_{s,s}^{-1}(r_{t,t}) \times \mu_s / \mu_t; & I[y_{t,s}] &= I_s. \end{aligned} \quad (12)$$

- ▶ we use this to generate counterfactual series for our absolute mobility measures, keeping either income levels or relative inequality constant (in the examples, fixing them at their 2015 levels)

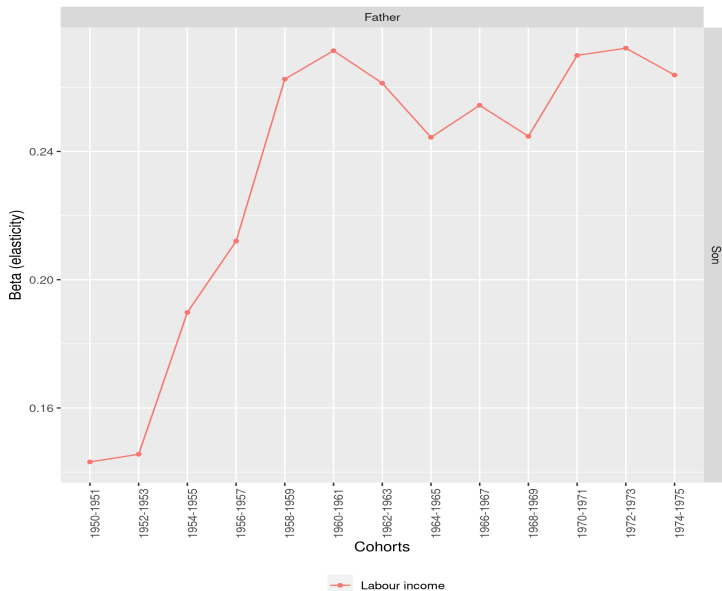
The within-country Great Gatsby curve



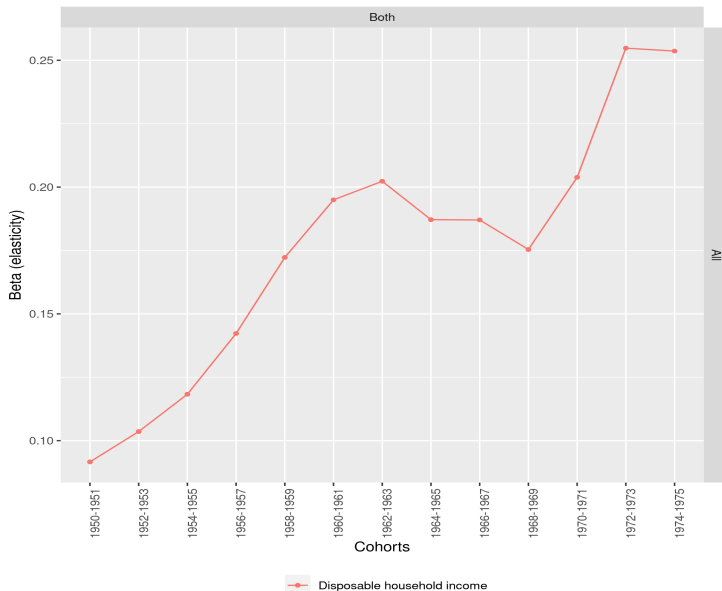
Counterfactual mobility – no growth or constant inequality



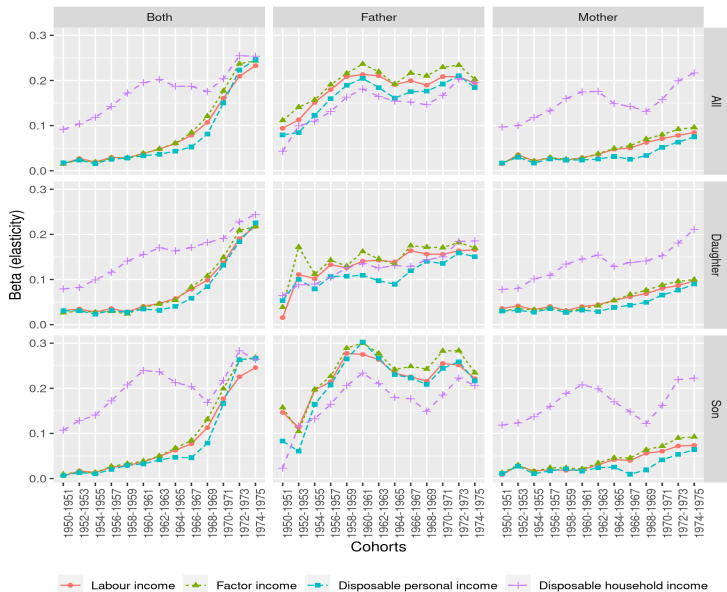
Relative intergenerational mobility – elasticity father-son earnings



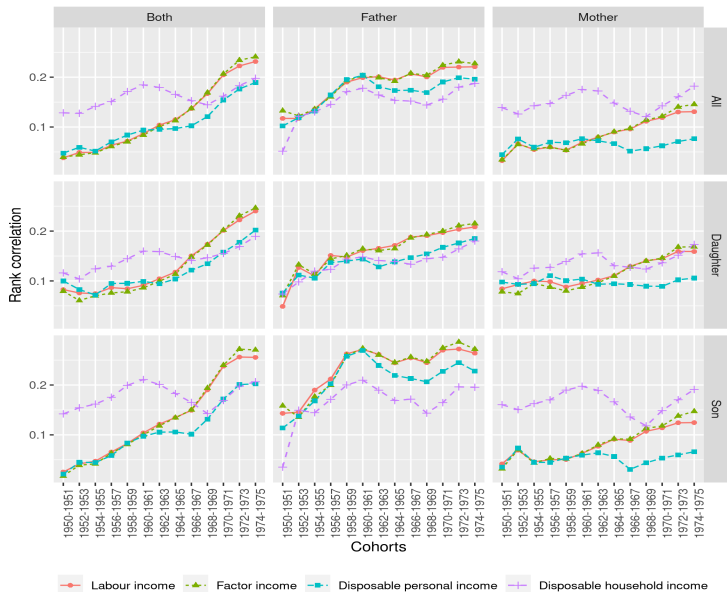
Relative intergenerational mobility – elasticity parent-child disposable household income



Relative intergenerational mobility – elasticity



Relative intergenerational mobility – rank correlations



Concluding remarks

- ▶ the notion that inequality and mobility (persistence) are negatively (positively) correlated has won widespread acceptance
- ▶ the empirical patterns may be called into question with within-country evidence and alternative theoretical models in turn undermine the theoretical underpinnings
- ▶ the casual view that mobility is good in the welfare-economic sense may be true, but requires a lot of structure
- ▶ broadening the examination of mobility to include all persons rather than only fathers and sons, and looking at broader income concepts is called for

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