Lecture 11
Inequality and social mobility

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History of Economic Growth and Crises
1 December 2020

Outline of the course

1. The Malthusian Era
2. Fundamental causes of growth
3. Innovation and crises
4. Unleashing talent
    1. Migration
    2. **Inequality and social mobility**
        1. cross-sectional income inequality
        2. intergenerational mobility
        3. impact of the Finnish comprehensive school reform
    3. Women

Inequality

- We will talk about two types of income inequality
  - cross-sectional (snapshot at certain point in time)
  - intergenerational (persistence in incomes over generations)
- Next: trends in cross-sectional inequality
- Most of the lecture: intergenerational/social mobility

Trends in income inequality

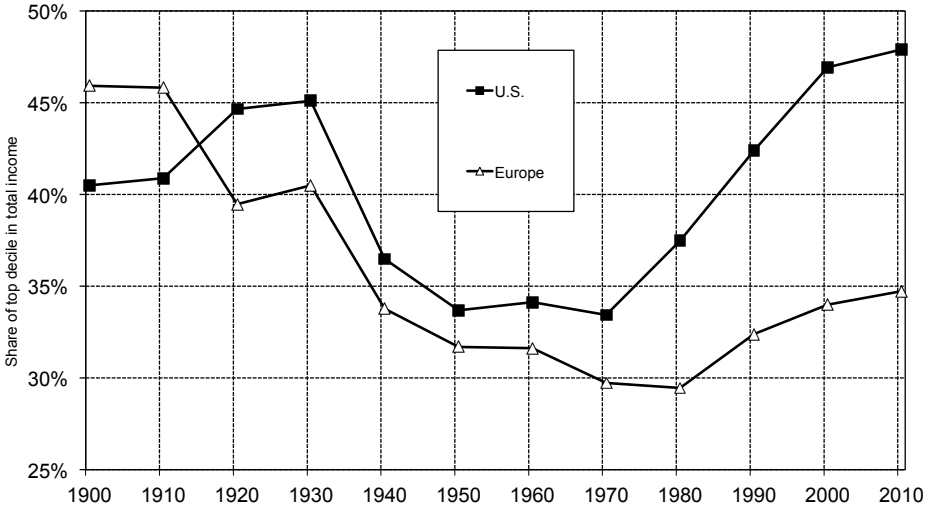
- Historical gini-coefficients not available due to data constraints
- However, tax records contain information for the top incomes
  - huge data collection initiative (Atkinson, Saez, Piketty, 2010), results available at World Wealth & Income Database

	Verotusalue / Beskattningsområde / *Districts d'imposition*	Kaikki verotetut / Samtliga beskattade / *Total des contribuables*: Verotetut tulot / Beskattade inkomster / *Revenus imposés* (1 000 mk.)	Verotettu omaisuus / Beskattad förmögenhet / *Fortune imposée* (1 000 mk.)	Henkikirjoihin merkitty väkiluku 1/1 1929 / Mantalsskriven folkmängd 1/1 1929 / *Population de droit au 1/1 1929*	Verotettujen luku / Antal beskattade / *Nombre des contribuables*	Yksityiset henkilöt — Enskilda personer — *Personnes privées*; Tuloista verotetut — För inkomst beskattade — *Imposées sur le revenu*: Luku — Antal / *Nombre*	Verotetut tulot / Beskattade inkomster / *Revenus imposés* 1 000 mk.	Luku tuloluokissa, 1 000 mk: — Antal i inkomstklasserna, 1 000 mk: — *Nombre dans les classes de revenus, 1 000 marcs:* 6.0—8.9	9.0—14.9	15.0—29.9	30.0—44.9	45.0—59.9	60.0—74.9	75.0—89.9	90.0—134.9	135.0—179.9	180.0—359.9	360.0—539.9	540.0—899.9	900.0—1 499.9	1 500.0 —
	Uudenmaan lääni — Nylands län *Dép. d'Uusimaa—Nyland* *Kaupungit: — Städer: Villes:*																				
1	Helsinki — Helsingfors	2 460 745.9	14 649 480	201 480	75 087	73 378	1 977 527.1	11 493	22 109	25 618	5 028	3 368	1 707	1 089	1 550	553	635	125	69	22	12
2	Borgå — Porvoo	50 486.3	222 331	6 574	2 146	2 096	44 762.8	438	671	693	119	72	33	25	27	6	10	2	—	—	—
3	Lovisa — Loviisa	22 108.8	106 953	3 532	1 073	1 047	20 558.9	247	391	294	51	27	12	10	7	3	4	—	—	—	1
4	Ekenäs — Tammisaari	22 676.5	59 777	3 360	1 226	1 209	22 082.4	334	351	360	88	40	15	9	9	3	—	—	—	—	—
5	Hangö — Hanko	45 451.2	105 002	7 566	2 400	2 386	42 138.3	735	675	738	119	44	37	13	15	5	5	—	—	—	—
6	**Yhteensä — Summa — *Total***	**2 601 468.7**	**15 143 543**	**222 512**	**81 932**	**80 116**	**2 107 069.5**	**13 247**	**24 197**	**27 703**	**5 405**	**3 551**	**1 804**	**1 146**	**1 608**	**570**	**654**	**127**	**69**	**22**	**13**

Example of the sources: distribution of taxable income in the Helsinki area in 1929.

Income inequality: Europe vs. the US, 1900-2010

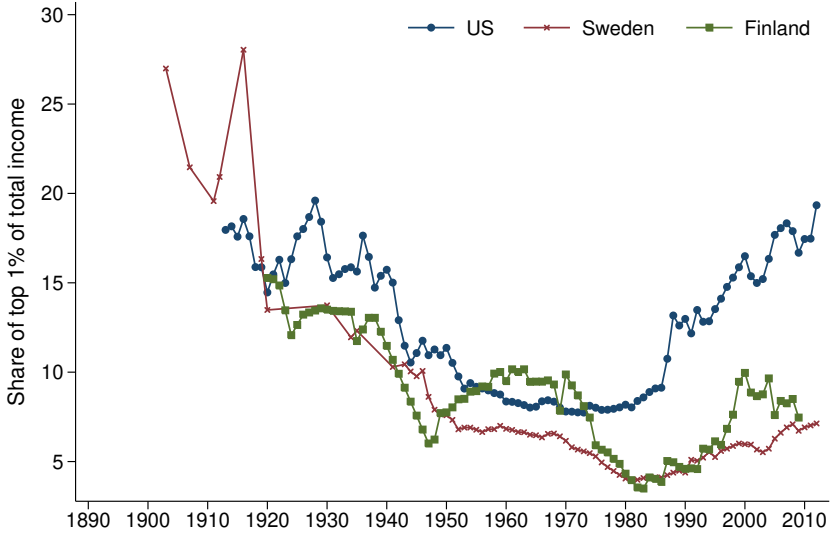
Piketty (2014)



The top decile income share was higher in Europe than in the U.S. in 1900-1910; it is a lot higher in the U.S. in 2000-2010. Sources and series: see piketty.pse.ens.fr/capital21c.

Trends in top 1% income inequality

Using data from the World Top Income Database



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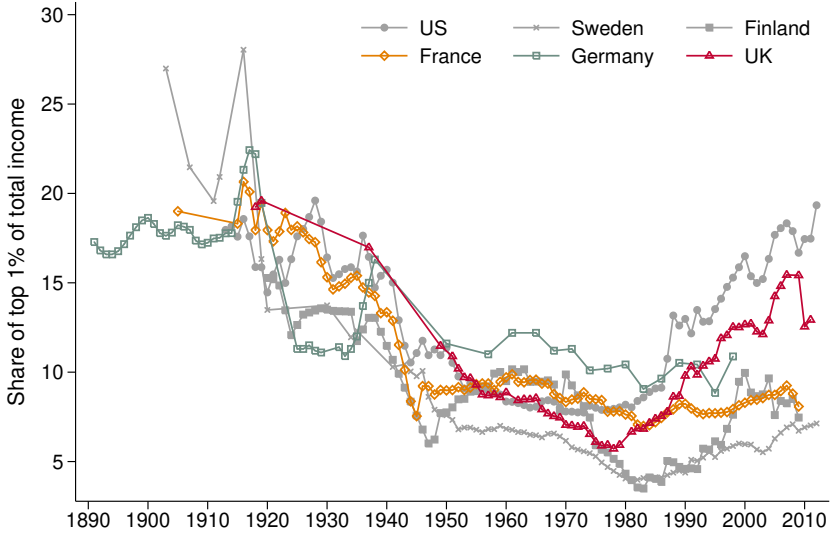
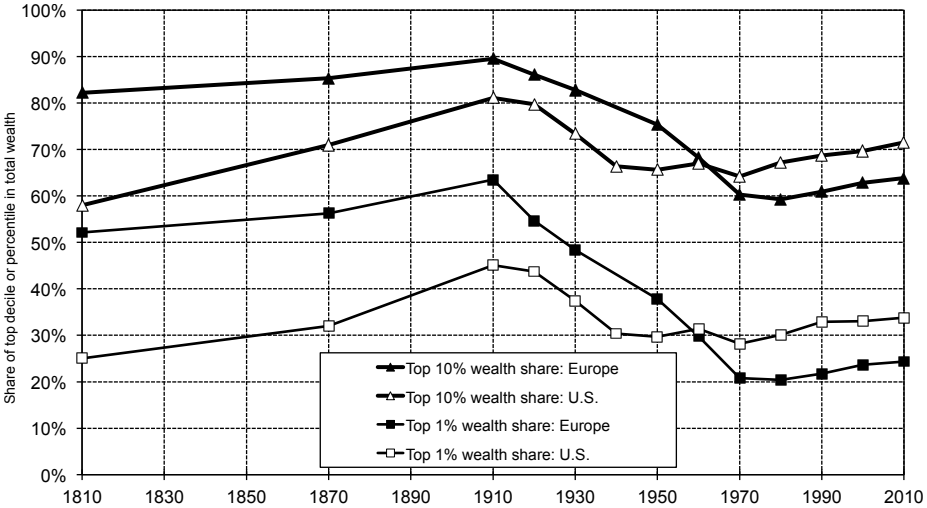


Wealth inequality, 1810-2010

Piketty (2014)



Until the mid 20th century, wealth inequality was higher in Europe than in the United States.
Sources and series: see piketty.pse.ens.fr/capital21c.

Cross-sectional and intergenerational inequality

- Think of two societies with the following characteristics
  - society A: compressed distribution of lifetime incomes within a generation, but children perfectly inherit the positions of their parents
  - society B: large cross-sectional inequality, but parents' income do not predict the incomes of their children
- Which one is more equal?

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  - society A: compressed distribution of lifetime incomes within a generation, but children perfectly inherit the positions of their parents
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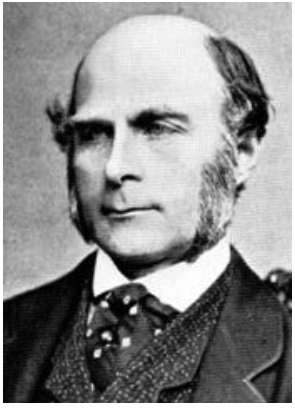
- Which one is more equal? Fair? Efficient?
  - no clear answer to the first question
  - beliefs about fairness clearly very normative
  - implications for efficiency (and fairness) depend on the sources of inequality and the lack of mobility
- Next: how to measure intergenerational mobility

The Origins of Regression

- The term “regression” originates with Galton’s studies on heritability
- For example, Galton (1886) showed that, on average, children of tall parents are tall, but not as tall as their parents (next slides)
- Galton called this property "regression toward mediocrity” (nowadays we say "regression to the mean")



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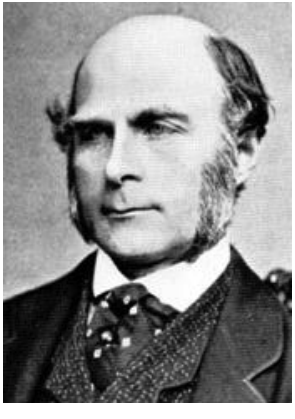


Sir Francis Galton (1822–1911), father of regression and independent rediscoverer of correlation, also made important contributions in psychology (synaesthesia, questionnaire), biology (the nature and mechanism of heredity), meteorology (anti-cyclone, weather maps) and criminology (fingerprints). “[He] is also remembered for having founded the Eugenics Society, dedicated to breeding better people. Indeed, his interest in regression came largely from this quest. We conclude from this that the value of scientific ideas should not be judged by their author’s politics.” (Angrist, Pischke 2009)

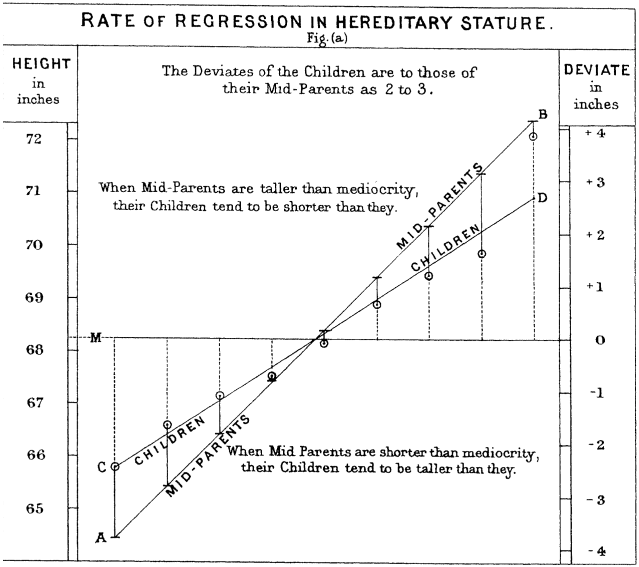
NUMBER OF ADULT CHILDREN OF VARIOUS STATURES BORN OF 205 MID-PARENTS OF VARIOUS STATURES.
(All Female heights have been multiplied by 1·08).

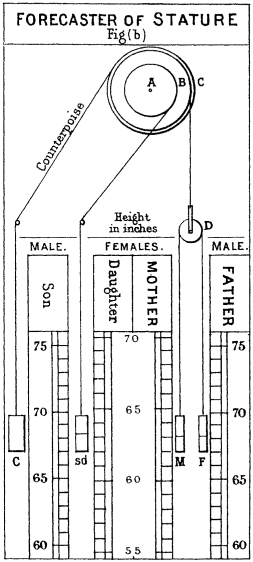
Heights of the Mid-parents in inches.	Heights of the Adult Children.													Total Number of		Medians.
	Below	62·2	63·2	64·2	65·2	66·2	67·2	68·2	69·2	70·2	71·2	72·2	73·2	Above	Adult Children.	Mid-parents.	
Above ..	..	..	..	..	..	..	..	..	..	..	..	1	3	..	4	5	..
72·5	..	..	..	..	..	..	..	1	2	1	2	7	2	4	19	6	72·2
71·5	..	..	..	..	1	3	4	3	5	10	4	9	2	2	43	11	69·9
70·5	1	..	1	..	1	1	3	12	18	14	7	4	3	3	68	22	69·5
69·5	..	..	1	16	4	17	27	20	33	25	20	11	4	5	183	41	68·9
68·5	1	..	7	11	16	25	31	34	48	21	18	4	3	..	219	49	68·2
67·5	..	3	5	14	15	36	38	28	38	19	11	4	..	..	211	33	67·6
66·5	..	3	3	5	2	17	17	14	13	4	..	..	..	..	78	20	67·2
65·5	1	..	9	5	7	11	11	7	7	5	2	1	..	..	66	12	66·7
64·5	1	1	4	4	1	5	5	..	2	..	..	..	..	..	23	5	65·8
Below ..	1	..	2	4	1	2	2	1	1	..	..	..	..	..	14	1	..
Totals ..	5	7	32	59	48	117	138	120	167	99	64	41	17	14	928	205	..
Medians ..	..	..	66·3	67·8	67·9	67·7	67·9	68·3	68·5	69·0	69·0	70·0	..	..	..	..	..

NOTE.—In calculating the Medians, the entries have been taken as referring to the middle of the squares in which they stand. The reason why the headings run 62·2, 63·2, &c., instead of 62·5, 63·5, &c., is that the observations are unequally distributed between 62 and 63, 63 and 64, &c., there being a strong bias in favour of integral inches. After careful consideration, I concluded that the headings, as adopted, best satisfied the conditions. This inequality was not apparent in the case of the Mid-parents.

The Origins of Regression

Galton (1886)





Intergenerational income mobility: measurement

- Galton's approach remains the workhorse of measuring intergenerational income mobility. The basic regression is

$$y_s = \alpha + \beta y_f + \epsilon$$

  - y_s is log lifetime earnings, y_f is his father's log lifetime earnigs,
  - β is the **intergenerational income elasticity** (IIE or IGE)
    - child's expected lifetime income is predicted to be β percent higher when father's income is 1 percent higher

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- Most existing work uses IIE, but the literature seems to be moving towards rank correlations (more below)

Intergenerational income mobility: measurement

- Important: this is a purely **descriptive** exercise
  - how does parent's income *predict* their children's income?
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  - how does changes in the education system *affect* IIE?

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- At the end of the lecture we discuss a *causal* question
  - how does changes in the education system *affect* IIE?
- We don't discuss the causal impact of family income
  - how would children's outcomes change if we would manipulate parents' income but keep everything else constant?
  - can you think of a research design to answer this question?

Measurement error: attenuation bias in action

Solon (1992)

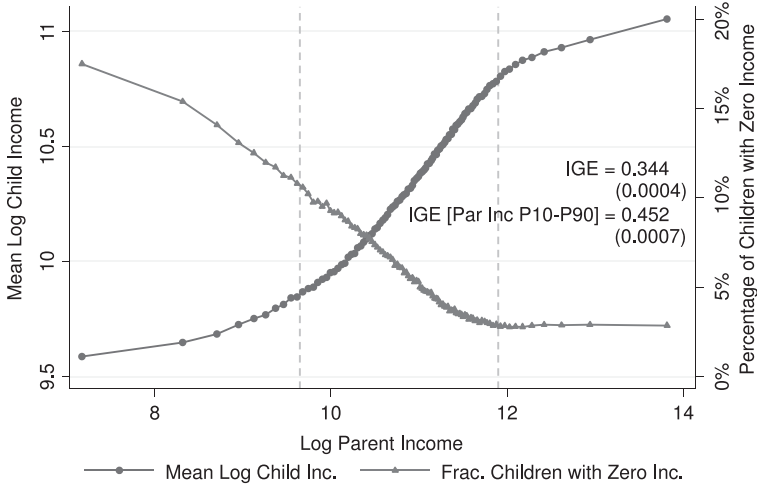
Year of father's log earnings	Measure of father's log earnings				
	Single-year measure	Two-year average	Three-year average	Four-year average	Five-year average
1967	0.386				
	(0.079)				
	[322]	0.425			
		(0.090)			
1968	0.271	[313]	0.408		
	(0.074)		(0.087)		
	[326]	0.365	[309]	0.413	
		(0.081)		(0.088)	
1969	0.326	[317]	0.369	[301]	0.413
	(0.073)		(0.083)		(0.093)
	[320]	0.342	[309]	0.357	[290]
		(0.078)		(0.088)	
1970	0.285	[312]	0.336	[298]	
	(0.073)		(0.084)		
	[318]	0.290	[301]		
		(0.082)			
1971	0.247	[303]			
	(0.073)				
	[307]				

Notes: Standard-error estimates are in parentheses, and sample sizes are in brackets.

As father's income is measured over a longer period, it becomes a better proxy of his lifetime income, there is less attenuation bias and the IIE elasticities increase substantatially. This example illustrates the difficulties of comparing IIE estimates across studies based on different sample restrictions. Solon's work led to a substantial re-evalution of the extent of social mobility among economists and pushed their views closer to those held by sociologists (who have a long tradition of measuring social mobility using occupations and/or education).

Nonlinearities: log-log

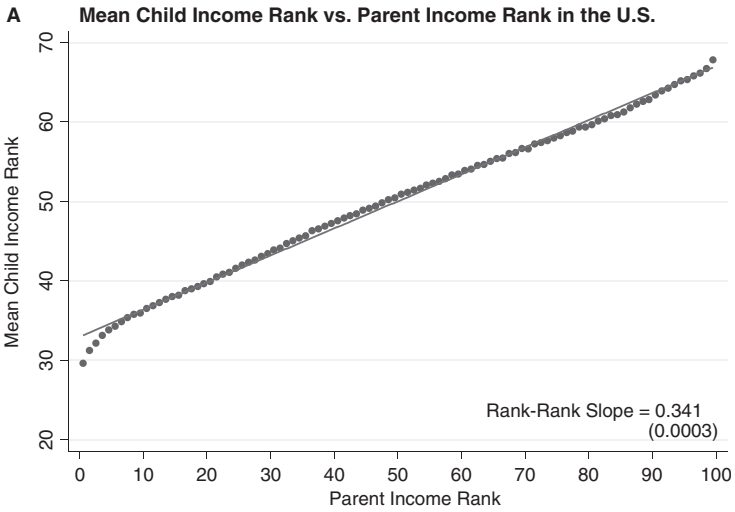
Chetty, Hendren, Kline, Saez (2014)



This figure presents log income for children (left y-axis) and the fraction of children with zero family income (right y-axis) for 100 bins of parents' log income. Data covers all US taxpayers in 2011–12. Children are born between 1980–1982. Intergenerational elasticity (IGE) estimates highly sensitive for including/excluding the tails of parental income distribution.

Nonlinearities: rank-rank

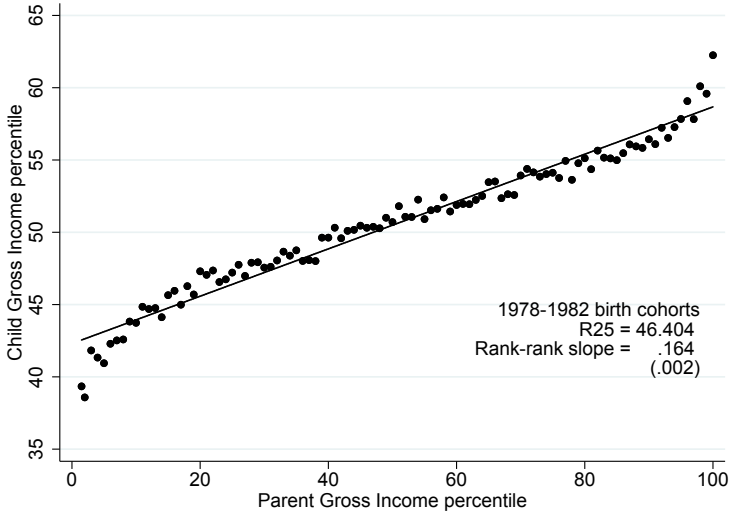
Chetty, Hendren, Kline, Saez (2014)



This figure is similar to the previous one execpt that we now plot children's income *rank* on parental income *rank*. This relationship is almost perfectly linear in CHKS data. Furthemore, people with zero income can now be included in the analysis. See here for the full story.

Nonlinearities: rank-rank

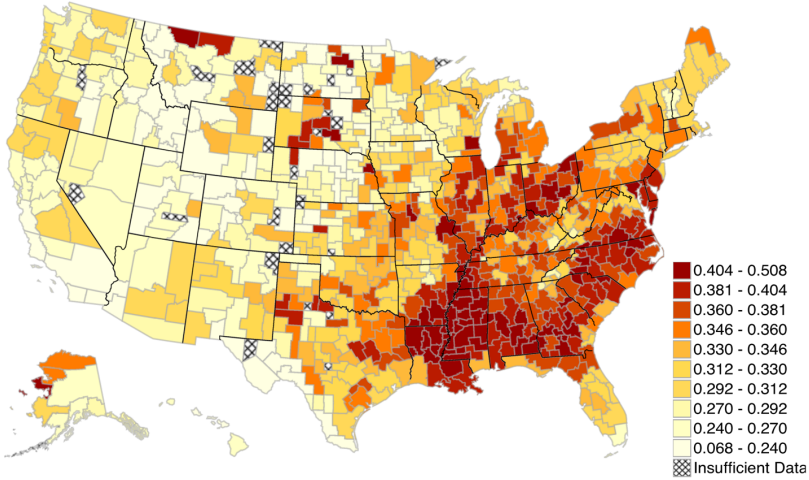
Finland, 1978–1982 birth cohorts



The same as the previous one, but using data from Finland for birth cohorts 1978–82. Child's income/earnings rank is measured at age 30, and parent's when the child is 16 years old. Data: Statistics Finland's FOLK modules.

Geographical variation in rank-rank slopes, U.S.

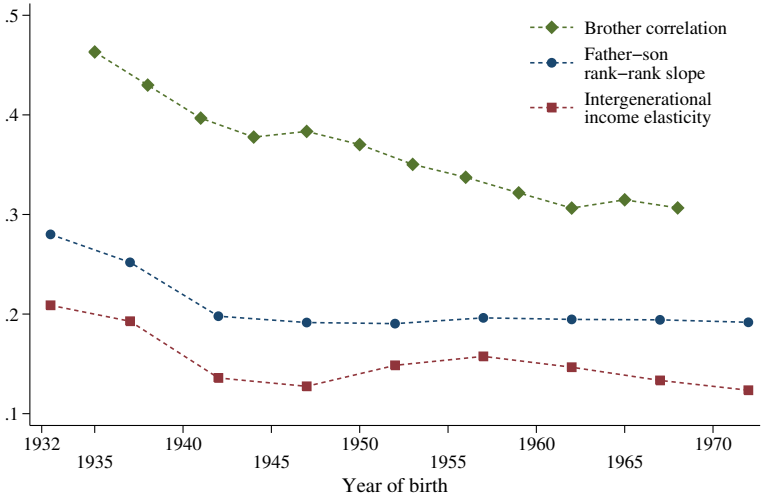
Chetty, Hendren, Kline, Saez (2014)



Heat map of rank-rank slopes by commuting zone (CZ). Children are born in 1980-82 and assigned to CZs based on the location of their parents when the child was claimed as a dependent, irrespective of where they live as adults.

Time variation in social mobility, Norway

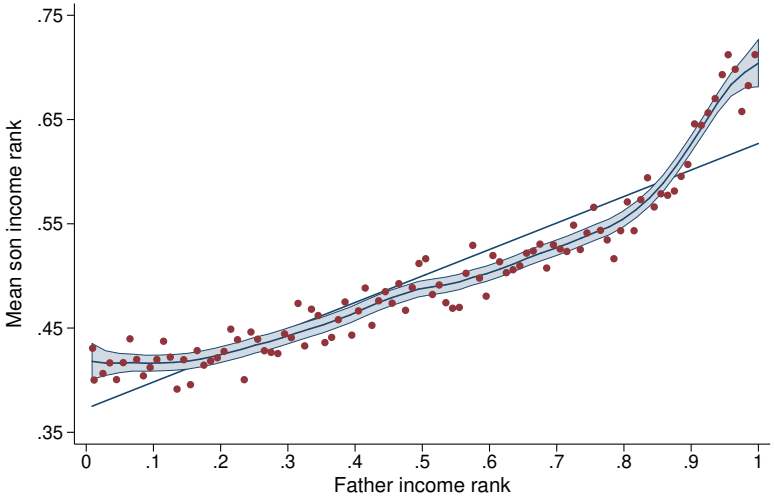
Pekkarinen, Salvanes, Sarvimäki (2017)



This figure presents three alternative measure of social mobility: rank–rank slopes, intergenerational income elasticities and brothers' income correlations. The x-axis refers to the birth year of sons (daughters are excluded due to data constraints).

Rank-rank: Norwegian men born in 1935–39

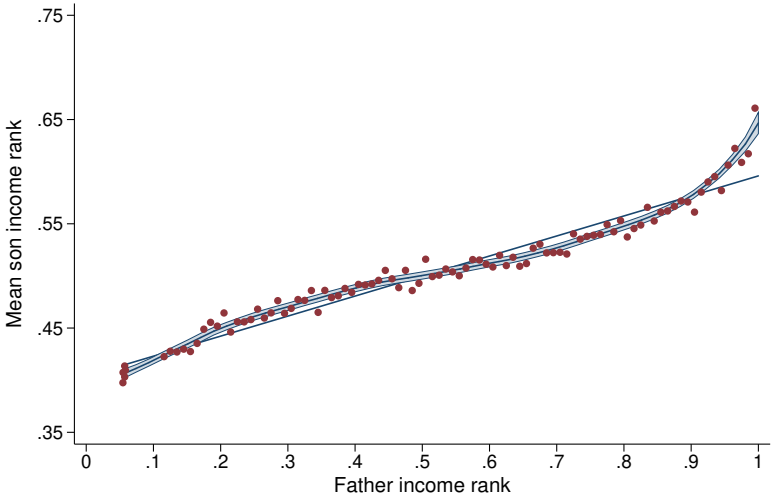
Pekkarinen, Salvanes, Sarvimäki (2017)



The rank-rank association is not linear in Norway

Rank-rank: Norwegian men born in 1970–74

Pekkarinen, Salvanes, Sarvimäki (2017)



The rank-rank association is not linear in Norway ... but becomes more so over time

Interpretation of social mobility measures

Becker and Tomes (1979); Solon (2004); Hassler et al (2007); Ichino et al (2011)

- Possibility 1: Equality of opportunity
  - educational system creates skill-gaps between the offspring of high status and low status parents
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  - low returns to skill/effort could lower father-son associations (e.g. father-son associations changed in Cambodia in late-1970s, too)

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- Next: the impact of a school reform in Finland

Comprehensive school reforms

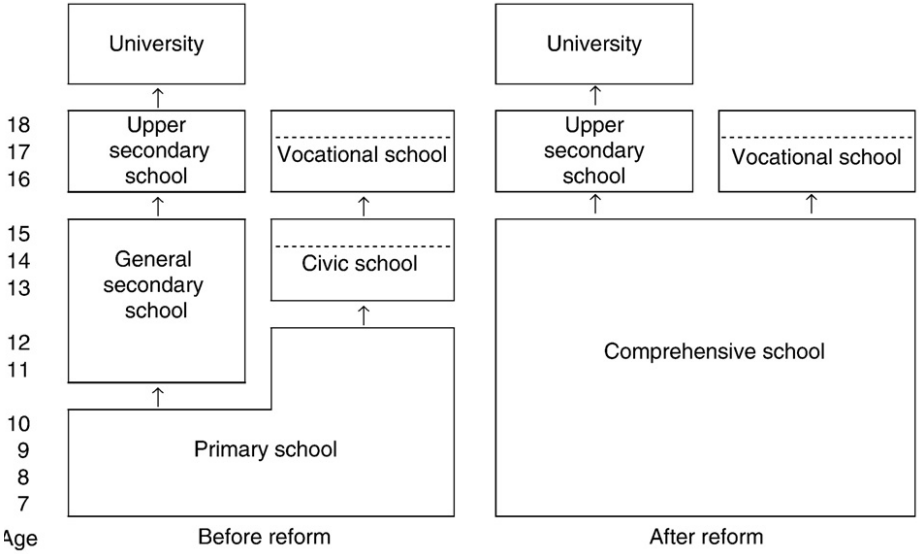
Pekkarinen, Pekkala, Uusitalo (2009)

- After WWII many European countries implemented major educational reforms
- The Finnish 1972-77 reform is a represenatative, though late, example
  - old system: selection into academic and vocational tracks at age 11
  - new system: postpone this choice to age 16
- The main motivation for the reform was to provide equal educational opportunities to all students irrespective of place of residence or social background.

"Gifted but poor. Give him an equal chance. Choose the Labour Party".
A Swedish election poster form 1948.

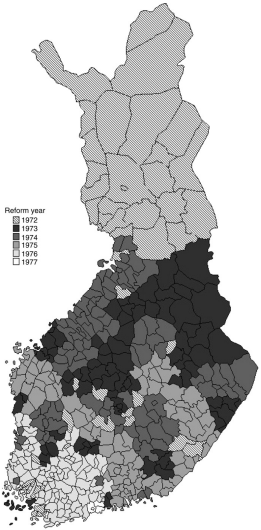
Finnish school systems

Pekkarinen, Pekkala, Uusitalo (2009)



Research design and estimation

Pekkarinen, Pekkala, Uusitalo (2009)



- Reform implemented at different times in different municipalities over a six-year period

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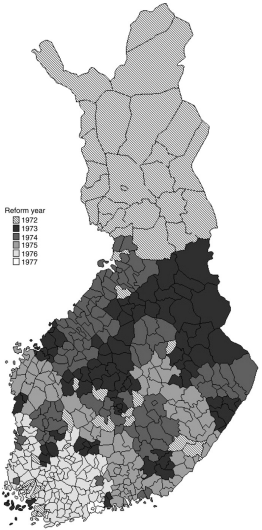

- Reform implemented at different times in different municipalities over a six-year period
- Dif-in-dif approach

$$y_{sjt} = \alpha + \beta_0 y_f + \delta (y_f \times R_{jt}) + \text{cohort and region dummies}$$

where R_{jt} is a dummy for the son attending the new system and δ is the effect of the reform on IIE

- Identifying assumption
  - changes in IIE from reasons unrelated to the reform are not systematically related to the timing of the reform in the different regions

Data

Pekkarinen, Pekkala, Uusitalo (2009)

- Census and tax registers
- 10% random sample of men born between 1960–1966
- sons' earnings: log taxable earnings in 2000 (when aged 34–40)
- father's earnings: average log taxable earnings in 1970, 1975, 1980, 1985, 1990
- reform measure based on municipalities of residence in 1970, 1975, and 1980

	Reform year						
Birth cohort	1972	1973	1974	1975	1976	1977	Total
1960	$N = 280$	$N = 437$	$N = 609$	$N = 646$	$N = 642$	$N = 348$	$N = 2962$
1961	$N = 279$	$N = 466$	$N = 624$	$N = 598$	$N = 674$	$N = 358$	$N = 2999$
1962	$N = 311$	$N = 414$	$N = 605$	$N = 599$	$N = 649$	$N = 355$	$N = 2933$
1963	$N = 318$	$N = 440$	$N = 650$	$N = 648$	$N = 719$	$N = 379$	$N = 3154$
1964	$N = 266$	$N = 414$	$N = 651$	$N = 630$	$N = 703$	$N = 407$	$N = 3071$
1965	$N = 251$	$N = 411$	$N = 598$	$N = 623$	$N = 630$	$N = 383$	$N = 2896$
1966	$N = 260$	$N = 331$	$N = 586$	$N = 579$	$N = 665$	$N = 388$	$N = 2809$
Total	$N = 1965$	$N = 2913$	$N = 4323$	$N = 4323$	$N = 4682$	$N = 2618$	$N = 20{,}824$

Results

Pekkarinen, Pekkala, Uusitalo (2009)

	1	2	3	4
Father's earnings	0.277	0.297	0.298	0.296
	(0.014)	(0.011)	(0.010)	(0.014)
Reform		−0.063	−0.019	...
		(0.012)	(0.021)	
Father's earnings*reform		−0.055	−0.069	−0.066
		(0.009)	(0.022)	(0.031)
Cohort dummies			√	√
Father's earnings*cohort dummies			√	√
Region dummies			√	√
Father's earnings*region dummies			√	√
Cohort*region dummies				√
Region-specific trends				√
Observations	20824	20824	20824	20824
R-squared	0.05	0.05	0.05	0.06

The comprehensive school reform reduced intergenerational earnings elasticity by almost seven percentage points, i.e. 23% from the pre-reform elasticity of 0.30.

Results

Pekkarinen, Pekkala, Uusitalo (2009)

	1	2	3	4	5
	1st quintile of father's earnings	2nd quintile of father's earnings	3rd quintile of father's earnings	4th quintile of father's earnings	5th quintile of father's earnings
Reform	0.036	0.038	−0.037	−0.051	−0.080
	(0.045)	(0.040)	(0.038)	(0.041)	(0.048)
Constant	9.770	9.918	10.037	10.096	10.294
	(0.025)	(0.022)	(0.021)	(0.022)	(0.026)
Observations	4165	4165	4165	4165	4164
R-squared	0.00	0.00	0.01	0.00	0.01

The results could follow from either a positive effect on the sons from the poorest families or a negative effect on the sons from the richest families. This table examines the issue by estimating the impact of reform effect separately by quintiles of the fathers' earnings. Each column in Table 5 presents the results from a separate regression in which the sons' earnings are explained by the comprehensive school reform and the cohort and region effects. The point estimates fall monotonically from a positive effect of 0.036 in the lowest quintile to a negative effect of -0.080 for the highest quintile. However, none of these estimates is statistically significant.

Impact on cognitive skills

Pekkala Kerr, Pekkarinen, Uusitalo (2013)

- The impact of the reform on IIE could be due to peer effects, social networks, opening of new educational opportunities or direct impact on productive skills
- In a follow up paper, PPU evaluate the effects on the distribution of Basic Skills test of the Finnish Army. Results:
  - small positive effect on the verbal test scores, no effect on the mean performance in the arithmetic or logical reasoning tests
  - small reduction in the standard deviation of the test scores
  - however, significantly improved scores on all tests for the students whose parents had only basic education
- Qualitatively in line with PPU (2009), but far too small to fully explain the effects on income

Inequality and mobility: concluding thoughts

- Inequality takes many forms
  - contemporaneous vs. lifetime vs. intergenerational
  - income, wealth, health, education...
  - opportunity vs. outcomes
- It is often hard to measure
  - better measurement has substantially changed our understanding of the levels and trends in intergenerational mobility
  - similarly time-trends in cross-sectional inequality have improved lately
- Normative aims, sources of inequality vital for policy design
  - equality of opportunity vs. returns to skills
  - meritocracy can also be highly inequal and immobile

Papers for essays

- Bütikofer, Dalla-Zuanna, Salvanes (2020): Breaking the Links: Natural Resource Booms and Intergenerational Mobility. Working paper.
  - estimate how the Norwegian oil boom starting in the 1970s affected intergenerational mobility
- Mitrunen (2020): Structural Change and Intergenerational Mobility: Evidence from the Finnish War Reparations. Working paper.
  - examines the long-term effects of Finnish war repatriations on industrial structure, human capital accumulation and intergenerational mobility