Lecture 7
Geographical and social mobility

Matti Sarvimäki

Economic History
3 April 2018

Outline of the course

1 Monday: Introduction, fundamental causes of growth
   1 Introduction and the Malthusian Model
   2 Luck, Geography and Culture
   3 Institutions I

2 Yesterday: fundamental (con't), Innovations and crises
   1 Institutions II
   2 Technology
   3 Finance

3 Today: Unleashing talent

   1 **Geographical and social mobility**
   2 Marriage, family and work

Geographical misallocation of labor?

- Observationally identical individuals have very different income by country of residence
  - constraining international migration may create a large distortion to the global economy (Clemens 2011, JEP)

Geographical misallocation of labor?

- Observationally identical individuals have very different income by country of residence
  - constraining international migration may create a large distortion to the global economy (Clemens 2011, JEP)
- ... and by sector of employment within a country
  - getting workers to the modern sector could increase growth

Geographical misallocation of labor?

- Observationally identical individuals have very different income by country of residence
  - constraining international migration may create a large distortion to the global economy (Clemens 2011, JEP)
- ... and by sector of employment within a country
  - getting workers to the modern sector could increase growth
  - puzzle: most countries do not restrict internal migration, so why do people stay in agriculture?

Geographical misallocation of labor?

- Observationally identical individuals have very different income by country of residence
    - constraining international migration may create a large distortion to the global economy (Clemens 2011, JEP)
- ... and by sector of employment within a country
    - getting workers to the modern sector could increase growth
    - puzzle: most countries do not restrict internal migration, so why do people stay in agriculture?
- Next: why the stylized facts may give a misleading estimate for returns to migration

Estimating returns to migration: the challenge
Roy (1951), Borjas (1987), Banerjee, Newman (1998), Chiqiuar, Hanson (2005)...

- Think of a world with two locations and wage equations

$$w_{ji} = \mu_j + \delta_j s_i$$

where the (log) wage of individual i in location j is a function of location-specific base wage, μ_j, returns to skill, δ_j, and individual-specific skill, s_i.

Estimating returns to migration: the challenge
Roy (1951), Borjas (1987), Banerjee, Newman (1998), Chiquiar, Hanson (2005)...

- Think of a world with two locations and wage equations

$$w_{ji} = \mu_j + \delta_j s_i$$

where the (log) wage of individual i in location j is a function of location-specific base wage, μ_j, returns to skill, δ_j, and individual-specific skill, s_i.

- Individual born in 0 moves to 1 iff $w_{j1} - C_i > w_{j0}$
    - C_i is migration cost (direct costs, amenity differences, networks, risk...)
    - the models differ mainly in their assumptions on what drives the migration costs

Estimating returns to migration: the challenge
Roy (1951), Borjas (1987), Banerjee, Newman (1998), Chiqiuar, Hanson (2005)...

- Think of a world with two locations and wage equations

$$w_{ji} = \mu_j + \delta_j s_i$$

where the (log) wage of individual i in location j is a function of location-specific base wage, μ_j, returns to skill, δ_j, and individual-specific skill, s_i.

- Individual born in 0 moves to 1 iff $w_{j1} - C_i > w_{j0}$
  - C_i is migration cost (direct costs, amenity differences, networks, risk...)
  - the models differ mainly in their assumptions on what drives the migration costs

- Selection into moving is determined by individual's skills, moving costs and locations' wage distributions
  - simple comparison of wages across locations unlikely to measure returns to migration
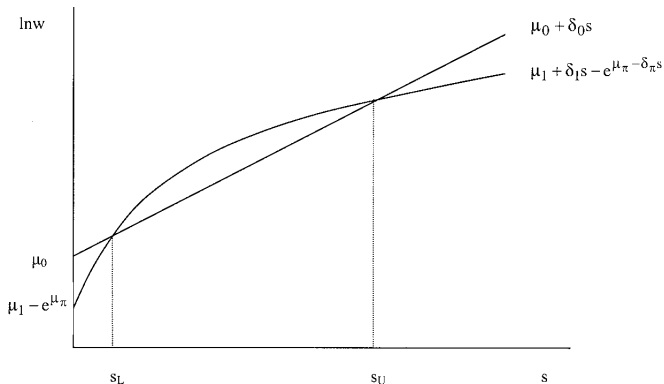
Selection to migration
Chiqiuar, Hanson (2005)
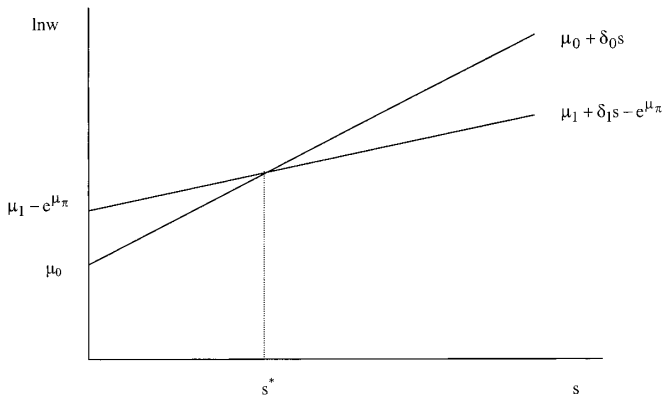
Negatively selected migration. Location 1 has more equal wage distribution than location 0. As a consequence, everyone with skill levels below s* migrate from 0 to 1 when migration costs are e^{μ_π} (note that wages are in logs, so here migration costs are assumed to be *time-equivalent* across the skill distribution).

Selection to migration
Chiqiuar, Hanson (2005)

Selection from the middle: everyone with skill levels between s_L and s_U migrate from 0 to 1. Now time-equivalent migration costs are assumed to be decreasing with skill (skilled workers have to work fewer hours to cover the migration costs than non-skilled workers). Credit constraints would yield qualitatively similar selection.

11% of Finns displaced during WWII and resettled to the remaining parts of the country

•10 henkeä

2

•3

4

Vuoksenranta

100 km
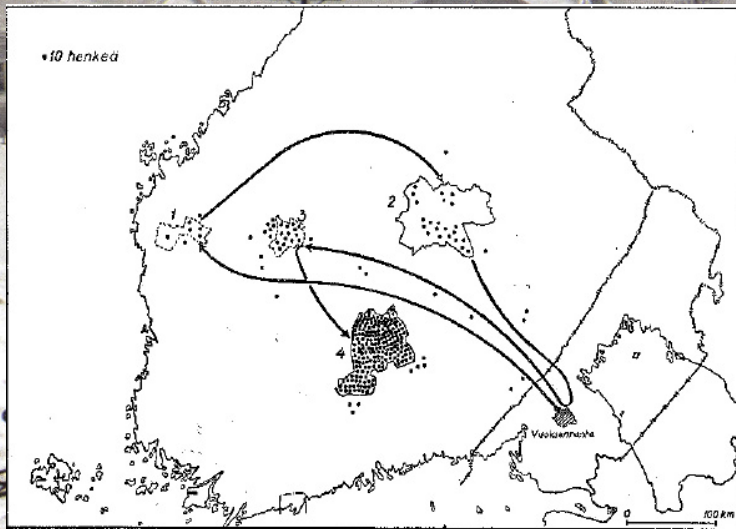
(1): Evacuation area 1939–40, (2): Resettlement area 1940–, (3): Evacuation area 1944–45, (4): Resettlement area 1945–. Dots present 1949 location of people living in Vuoksenranta in 1939. Source: Waris et al. (1952)

The resettlement policy

- Farmers: aim to reconstruct the pre-war situation
  - provided land and assistance for setting up new farms
    - location determined by source area
    - soil and weather conditions similar to source areas
    - fields exproriated from local landowners, cleared from forest
  - villages resettled together to preserve social connections
  - farmers free to sell their land and to migrate afterwards

The resettlement policy

- Farmers: aim to reconstruct the pre-war situation
    - provided land and assistance for setting up new farms
        - location determined by source area
        - soil and weather conditions similar to source areas
        - fields exproriated from local landowners, cleared from forest
    - villages resettled together to preserve social connections
    - farmers free to sell their land and to migrate afterwards
- Others: compensated with government bonds
- Resettlement funded through massive and highly progressive capital taxation (up to 20% of the *level* of wealth)

This paper
Sarvimäki, Uusitalo, Jäntti (2019)

- **Data**: 10% sample of the 1950 Census linked to the 1970 Census and 1971 tax records
  - focus on cohorts born between 1907–1924 (N=85,836)
- **Research design**: everyone living in the ceded area left
  - displaced and non-displaced persons similar in pre-war observable characteristics
- **Main results:** displacement increased farmers' income
  - decreased income of urban population
  - driven by increased transitions to non-agriculture

This paper
Sarvimäki, Uusitalo, Jäntti (2019)

- **Data**: 10% sample of the 1950 Census linked to the 1970 Census and 1971 tax records
    - focus on cohorts born between 1907–1924 (N=85,836)
- **Research design**: everyone living in the ceded area left
    - displaced and non-displaced persons similar in pre-war observable characteristics
- **Main results:** displacement increased farmers' income
    - decreased income of urban population
   - driven by increased transitions to non-agriculture
- **Broader take-away**: attachment to a place stops many from leaving farming despite large monetary returns
    - can be formalized with a Roy model augemented with habit formation for residential location

1971 taxable real income and 1939 location
Thousands of *markka* (inc. zeros), deflated by municipality level cost of living index
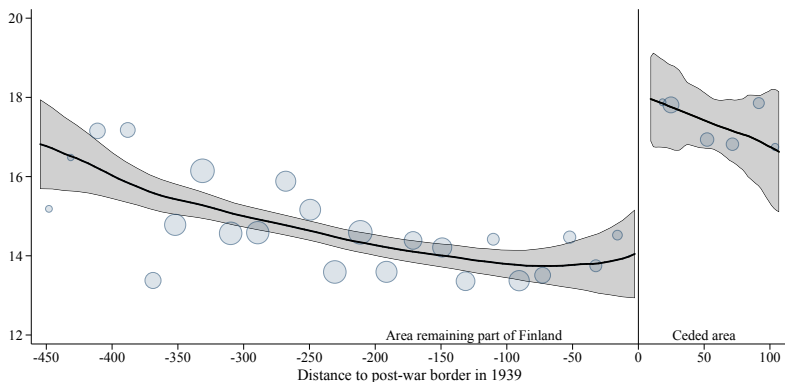
Data: 13,987 men born between 1907 and 1925, who worked in agriculture in 1939. The lines represent local linear estimates using the edge kernel and the optimal bandwidth of Imbens and Kalyanaraman (2012). The dots correspond to the sample means by 20km bins. On average, each dot represent 478 individuals.

Non-Agricultural Employment in 1970
Share of 1939 farmers working outside of agriculture in 1970
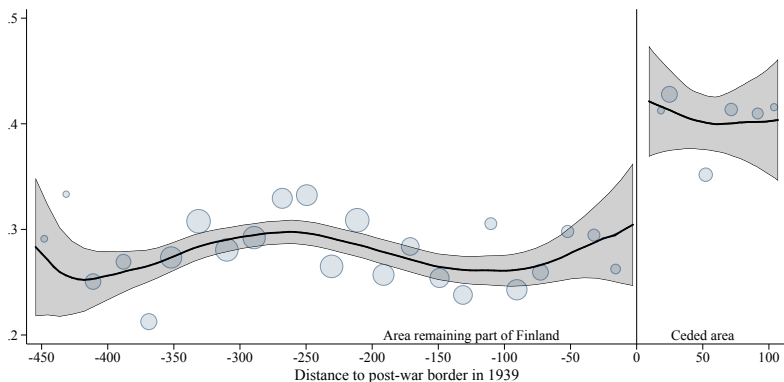
Data: 13,987 men born between 1907 and 1925, who worked in agriculture in 1939. The lines represent local linear estimates using the edge kernel and the optimal bandwidth of Imbens and Kalyanaraman (2012). The dots correspond to the sample means by 20km bins. On average, each dot represent 478 individuals.

Returns to leaving agriculture
Sarvimäki, Uusitalo, Jäntti (2019)

- Effects on income driven by sectoral mobility
    - impacts for income and sector move together
    - small impact on education
    - displaced and non-displaced persons living and working in same places after the war have similar income

Returns to leaving agriculture
Sarvimäki, Uusitalo, Jäntti (2019)

- Effects on income driven by sectoral mobility
  - impacts for income and sector move together
  - small impact on education
  - displaced and non-displaced persons living and working in same places after the war have similar income
- IV interpretation: return to leaving agriculture $\approx 70\%$
  - using displacement as an instrument for leaving agriculture
  - probably pushing too far: exclusion restriction likely violated

Returns to leaving agriculture
Sarvimäki, Uusitalo, Jäntti (2019)

- Effects on income driven by sectoral mobility
  - impacts for income and sector move together
  - small impact on education
  - displaced and non-displaced persons living and working in same places after the war have similar income
- IV interpretation: return to leaving agriculture $\approx 70\%$
  - using displacement as an instrument for leaving agriculture
  - probably pushing too far: exclusion restriction likely violated
- *The* Question: If returns to leaving agriculture were so high, why didn't the non-displaced farmers move?

Rationalizing our results
Sarvimäki, Uusitalo, Jäntti (2019)

- Our main explanation: **attachment to a place**
    - we rationalize our results with the help of a simple Roy model augmented with habit formation for residential location
    - review large surveys from the turn of the 1950s
    - return migration when Finland temporarily took back the areas

Rationalizing our results
Sarvimäki, Uusitalo, Jäntti (2019)

- Our main explanation: **attachment to a place**
  - we rationalize our results with the help of a simple Roy model augmented with habit formation for residential location
  - review large surveys from the turn of the 1950s
  - return migration when Finland temporarily took back the areas
- Alternative explanations
  - networks
  - cultural distance and discrimination
  - intertia, learning and education
  - quality of the new farms
- Some consistent with some of our results, but not with others

Summary
Sarvimäki, Uusitalo, Jäntti (2019)

- We examine pop. displacements in 1940s Finland and find that
  - leaving agriculture substantially increased long-term income
- We interpret this as evidence on the importance of attachment to a place ("habit formation")
  - forced migration increased income, but reduced welfare
  - but: welfare impact on later generations may be positive
- Broader take-away
  - habit formation may be quantiatively important reason behind the apparent "misallocation" of labor across sectors

Cross-sectional and intergenerational inequality

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

Cross-sectional and intergenerational inequality

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

- 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")
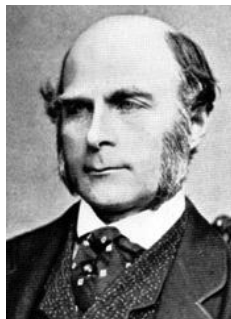
The Origins of Regression

- 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")
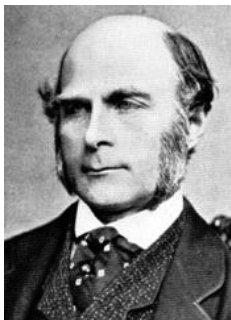
Sir Francis Galton (1822–1911), the father of regression and the independent rediscoverer of correlation, also made important contributions in psychology (synaesthesia, questionnaire), biology (the nature and mechanism of heredity), meteorology (anti-cyclone, weather maps) and criminology (fingerprints). "[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)

The Origins of Regression
Galton (1886)

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)
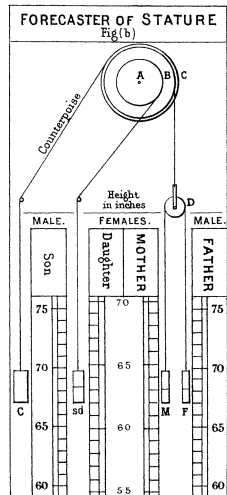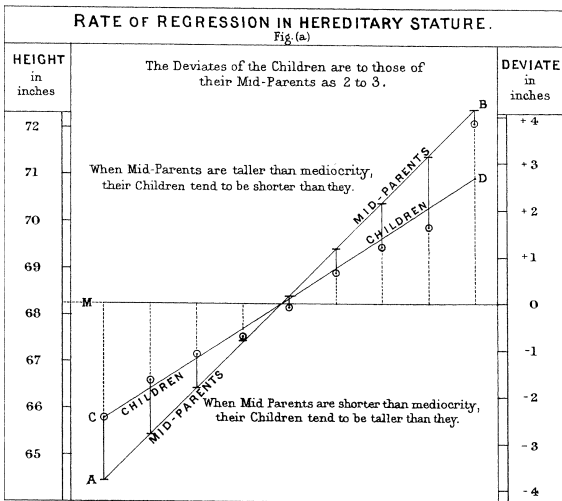
Intergenerational income mobility: measurement

- 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

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

- Challenges in estimating β
  - measurement error in father income (attenuation bias)
  - association btw son's and father's log incomes highly nonlinear
  - $\log(0)$ not defined

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

- Challenges in estimating β
  - measurement error in father income (attenuation bias)
  - association btw son's and father's log incomes highly nonlinear
  - $\log(0)$ not defined

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

Rank-rank: Norwegian men born in 1935–39
Pekkarinen, Salvanes, Sarvimäki (2017)
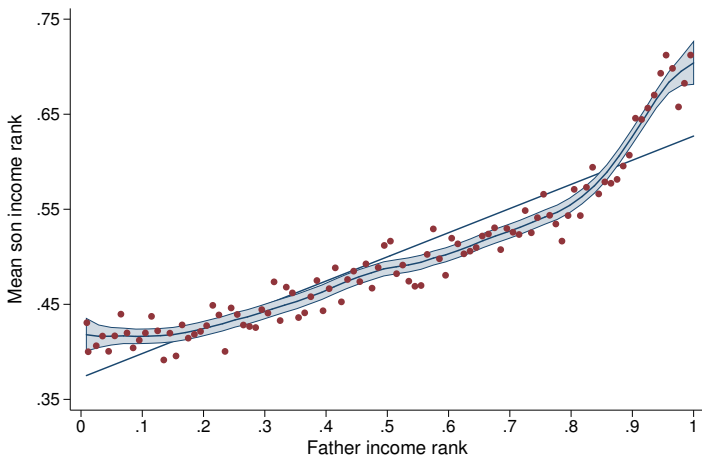
The rank-rank association is not linear in Norway

Rank-rank: Norwegian men born in 1970–74
Pekkarinen, Salvanes, Sarvimäki (2017)
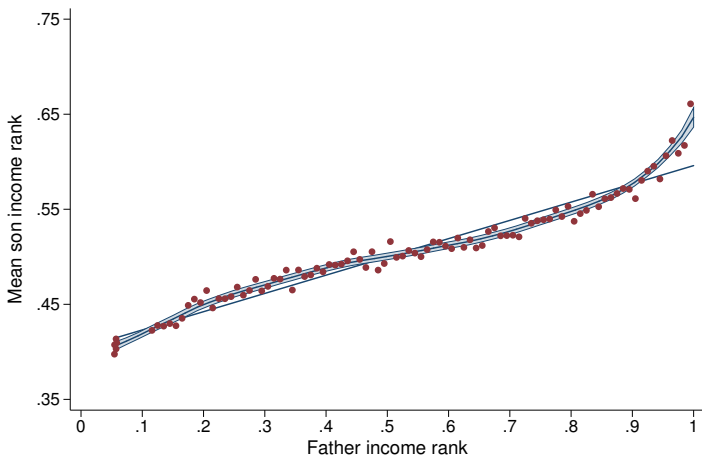
The rank-rank association is not linear in Norway ... but becomes more so over time

Intergenerational income mobility: measurement

- Important: this is a purely **descriptive** exercise
    - how does parent's income *predict* their children's income?
    - *not*: how it *affects* their children's income?

Intergenerational income mobility: measurement

- Important: this is a purely **descriptive** exercise
    - how does parent's income *predict* their children's income?
    - *not*: how it *affects* their children's income?
    - thus ommitted variables bias is not a concern

Intergenerational income mobility: measurement

- Important: this is a purely **descriptive** exercise
    - how does parent's income *predict* their children's income?
    - *not*: how it *affects* their children's income?
    - thus ommitted variables bias is not a concern
- Often intepretted as a measure of equality of opportunity
    - educational system creates skill-gaps between the offspring of high status and low status parents
    - or: children of the elite get the best jobs regardless of skill

Intergenerational income mobility: measurement

- Important: this is a purely **descriptive** exercise
  - how does parent's income *predict* their children's income?
  - *not*: how it *affects* their children's income?
  - thus ommitted variables bias is not a concern

- Often intepretted as a measure of equality of opportunity
  - educational system creates skill-gaps between the offspring of high status and low status parents
  - or: children of the elite get the best jobs regardless of skill

- Alternative interpretation: Equality of outcomes
  - low returns to skill/effort could lower father-son associations
    (e.g. father-son associations changed in Cambodia in late-1970s, too)

Intergenerational income mobility: measurement

- Important: this is a purely **descriptive** exercise
    - how does parent's income *predict* their children's income?
    - *not*: how it *affects* their children's income?
    - thus ommitted variables bias is not a concern

- Often intepretted as a measure of equality of opportunity
    - educational system creates skill-gaps between the offspring of high status and low status parents
    - or: children of the elite get the best jobs regardless of skill

- Alternative interpretation: Equality of outcomes
    - low returns to skill/effort could lower father-son associations
    (e.g. father-son associations changed in Cambodia in late-1970s, too)

- Next: how does changes in the education system *affect* IIE
    - *causal* question about *education policy*

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)
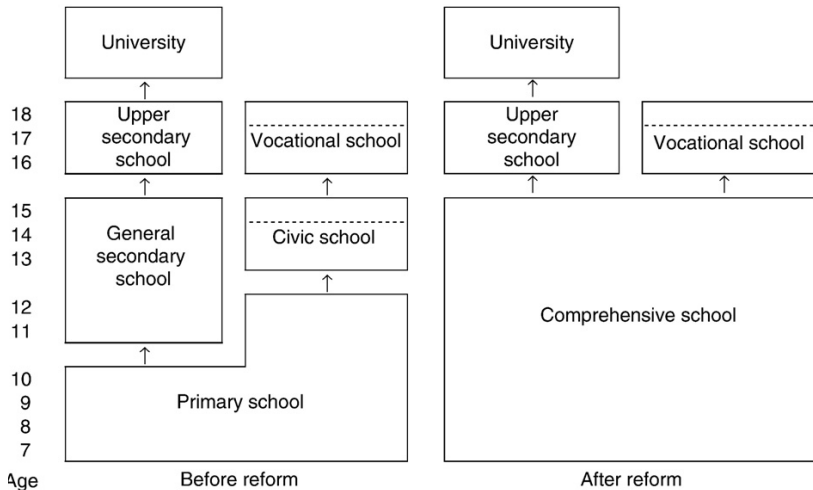
Research design and estimation
Pekkarinen, Pekkala, Uusitalo (2009)

Reform year
☐ 1972
■ 1973
■ 1974
■ 1975
■ 1976
☐ 1977

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

Research design and estimation
Pekkarinen, Pekkala, Uusitalo (2009)

Reform year
- 1972
- 1973
- 1974
- 1975
- 1976
- 1977
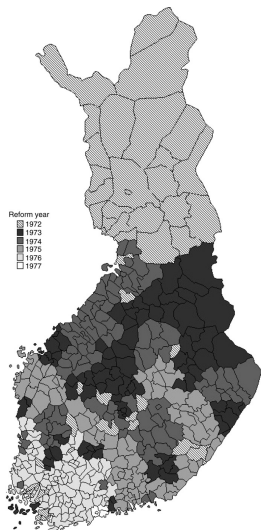
- Reform implemented at different times in different municipalities over a six-year period
- Dif-in-dif approach

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

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
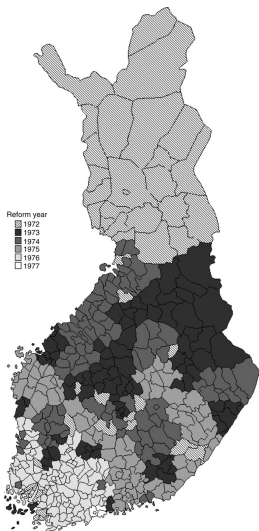
Data
Pekkarinen, Pekkala, Uusitalo (2009)

- 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. This is a 23% reduction in the elasticity compared to
the pre-reform level 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 intergenerational mobility
  - similar development in time-trends in cross-sectional inequality
- 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

- Hornung (2014): Immigration and the Diffusion of Technology: The Huguenot Diaspora in Prussia. *AER* 104(1): 84-122
  - In 1685, religiously persecuted French Huguenots settled in Brandenburg-Prussia and compensated for population losses due to plagues during the Thirty Years' War. This paper finds a substantial long-term effects of Huguenot settlement on the productivity of textile manufactories.
- Moser, Voena, Waldinger (2014): German Jewish Emigres and U.S. Invention. *AER* 104(10): 3222-3255
  - Examine the impact of Jewish émigrés from Nazi Germany on chemical innovation in the U.S. and find that patenting by U.S. inventors increased by 31 percent in émigré fields. Inventor-level data indicate that émigrés encouraged innovation by attracting new researchers to their fields, rather than by increasing the productivity of incumbent inventors.

Papers for essays

- Ferrie, Long (2013): Intergenerational Occupational Mobility in Britain and the U.S. Since 1850, *AER* 103(4): 1109-37
  - Measure intergenerational mobility in the UK and US using linked census files. The US was more mobile than Britain through 1900, but this lead over Britain was erased by the 1950s, as US mobility fell from its nineteenth century levels.

- Olivetti, Paserman (2015): In the Name of the Son (and the Daughter): Intergenerational Mobility in the United States, 1850-1940. *AER* 105(8): 2695-2724
  - Examines changes in intergenerational mobility in the US using information about socioeconomic status conveyed by first names. Find a sharp drop in social mobility between 1900 and 1920.