

# Presentation to Winter School IT6

10<sup>th</sup>-13<sup>th</sup> Jan 2011

**'Intergenerational Mobility  
in UK and the Role of  
Inequality and Education  
Paul Gregg**

## Introduction & Background

- ◆ "Most people are willing to accept wide inequalities if they are coupled with equality of opportunities" – *The Economist* (Oct 2006)
- ◆ Resurgence of interest in intergenerational mobility – especially in UK where it has been connected with debates over child poverty and poor childrens life chances – A raft of policy interventions and official studies, a white paper and a (Milburn) commission

## Introduction & Background

- ◆ Cameron and Clegg have both emphasised intergenerational mobility as a policy priority esp. education inequality
- ◆ Policy Areas have been heavily focused on education– Sure Start and Early years education, narrowing attainment gaps in schools (Inequalities Bill) Educational Maintenance Allowance, Aim Higher etc and prospect of raising school leaving age

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## Introduction & Background

- ◆ So theres a wider sense under which this topic covers Social Gradients in children`s life chances – how life chances differ by a measure of (permanent) social background
- ◆ e.g. Marmot commission highlighting extent of social gradients in physical and mental health and how these emerge in childhood
- ◆ Strong link with the economics of child development led by Heckman.

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## Introduction & Background

- ◆ Research has developed in distinct phases
  - Measurement and error
  - Comparisons across time or countries
  - drivers – education/cognitive, non-cognitive, job access
- ◆ Latest areas focus on causal policy effects and new estimators

## Methodology - Matrices

- ◆ Income, Education or Social class mobility can all be measured using transition matrices
- ◆ The groupings are fixed quintiles in income but for Ed, class they are based on groups which as a fraction of the population will change across cohorts – thus ED/Class have concept of absolute mobility – are people moving into higher groupings as well as relative mobility.
- ◆ Users then calculate a range of summary measures but they have clear limitations when applied to continuous data

## Methodology – Income Mobility Matrices

NCDS						BCS					
	Destination						Destination				
Origin	1	2	3	4	5	Origin	1	2	3	4	5
1	5.4	4.7	3.5	3.8	2.6	1	6.5	4.6	3.1	3.5	2.4
2	4.7	4.5	4.2	3.5	3.2	2	5.5	5.1	4.1	3.3	3.0
3	4.3	3.9	4.6	3.5	3.6	3	3.4	4.1	4.4	4.1	2.8
4	3.4	3.8	3.8	4.7	4.5	4	3.0	3.4	4.3	5.1	4.3
5	2.3	3.1	3.9	4.6	6.0	5	1.6	2.8	4.0	4.0	7.5

## NCDS Social Class transition matrix

Origin	Destination							
	1	2	3	4	5	6	7	Σ
<b>1</b>	6.1	4.9	1.7	0.9	0.9	2.0	2.6	<b>19.1</b>
<b>2</b>	6.9	7.3	2.0	1.8	2.1	4.4	6.2	<b>30.7</b>
<b>3</b>	1.4	1.4	0.4	0.5	0.3	1.0	1.2	<b>6.2</b>
<b>4</b>	1.3	1.0	0.3	1.5	0.2	0.6	1.1	<b>6.0</b>
<b>5</b>	1.4	1.5	0.6	0.6	1.1	2.1	2.7	<b>10.1</b>
<b>6</b>	1.5	2.4	1.0	0.8	1.5	3.7	6.0	<b>16.9</b>
<b>7</b>	1.0	1.0	0.4	0.4	0.8	2.4	5.5	<b>11.5</b>
<b>Σ</b>	<b>19.6</b>	<b>19.5</b>	<b>6.4</b>	<b>6.5</b>	<b>6.9</b>	<b>16.3</b>	<b>25.3</b>	<b>100</b>

## Social class mobility summary

	NCDS	BCS
Upward Mobility	44.3	42.4
Downward Mobility	28.1	29.7
Horizontal Mobility	2.5	4.2
<b>Total Mobility</b>	<b>74.9</b>	<b>76.3</b>

- ◆ Also range measures for different parts of the distribution
- ◆ 30% of those with fathers in the bottom two classes make it into the top two classes
- ◆ 65% of those with fathers in the top two social classes remain in the top two

## Methodology – Continuous

### Intergenerational Income Mobility

$$\ln Y_i^{son} = \alpha + \beta \ln Y_i^{parents} + \varepsilon_i$$

$$r = \text{Corr}_{\ln Y^{parents}, \ln Y^{son}} = \beta \left( \frac{SD^{\ln Y^{parents}}}{SD^{\ln Y^{son}}} \right)$$

Income/earnings	NCDS	BCS
$\beta$	<b>0.205</b> (.026)	<b>0.291</b> (.025)
Partial correlation ( $r$ )	<b>0.166</b> (.021)	<b>0.286</b> (.025)

## Concepts

- ◆ Original concept of Intergenerational Earnings mobility is ideally comparison of life time (permanent) earnings of father and sons
- ◆ This is very data intensive so shorter term earnings measures used
- ◆ More recently the question has shifted towards childhood experience and later life chances which has shifted emphasis toward family income in childhood
- ◆ This also allows for absentee fathers which varies across cohorts in a non-random way

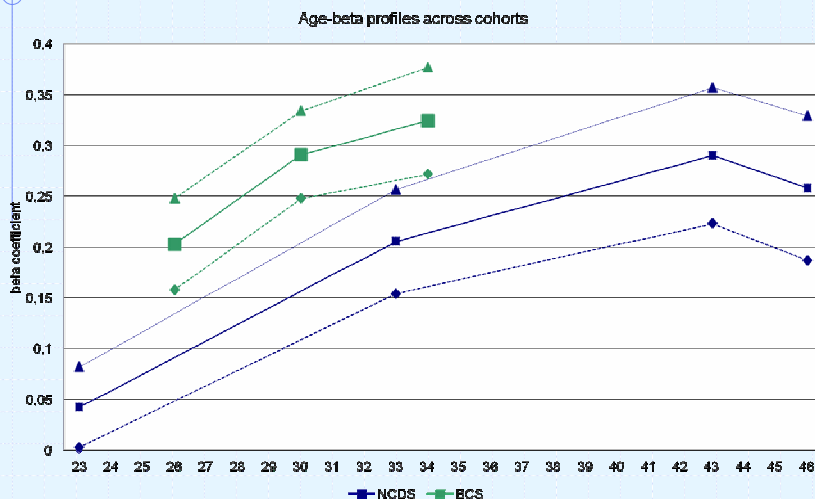
## Measurement I

- ◆ Early earnings based research had highlight high levels of mobility but concerns raised over biases generated by measurement error and life cycle stage
- ◆ ME addressed by averaging or 2SLS fathers earnings The deviation from the true beta by ME 
$$p \lim \hat{\beta} = \beta \frac{\sigma_y^2}{\sigma_y^2 + \sigma_u^2}$$
- ◆ The bias is reduced by averaging  $\frac{\sigma_u^2}{T}$
- ◆ So using US NLSY single period = 0.32, average over 3 periods = 0.45 implies true estimate = 0.54
- ◆ 2SLS will be upward biased if predictors also drive outcome for same data estimate is 0.65

## Measurement II

- ◆ Life cycle bias comes from the age(s) at which earnings are measured and how good a proxy they are for lifetime earnings
- ◆ Note that when thinking of family income experienced in childhood age of father stops becoming an issue
- ◆ When earnings is measured early or late in life course it is a less good proxy for lifetime earnings (optimal is at about 40)
- ◆ The issues of ME and life course biases are also present in social class but maybe lesser and for education the life course bias is largely absent

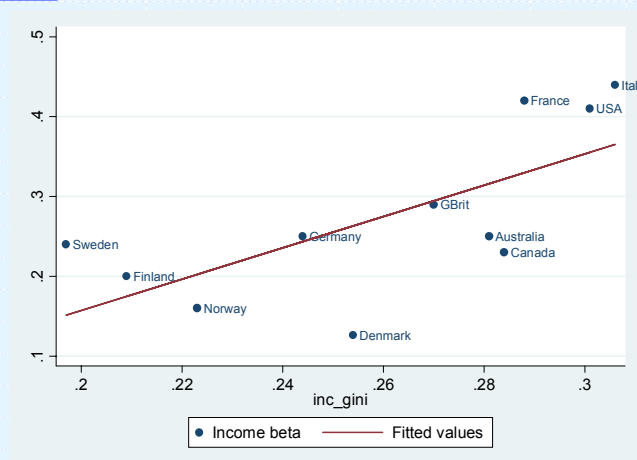
## Life Cycle bias in UK



## Education/Inequality/Genes

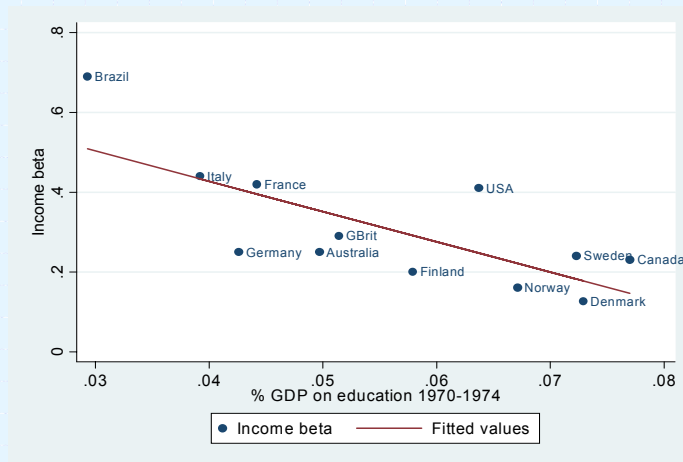
- ◆ The more recent literature has been looking at the key patterns of mobility and beginning to look at the drivers
- ◆ Whether mobility is high or low needs a benchmark so international comparisons and changes across time in countries have been widely investigated
- ◆ A natural next step was to explore how these patterns match on to inequality and education (for example Blanden, 2009)

## Estimated Intergenerational Income Persistence and Income Inequality (in 1970s)





## Estimated Intergenerational Income Persistence and Education Expenditure Countries



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## Educational Transmission

Following Solon (2004), explore the drivers of intergenerational mobility that are measured at earlier ages. The process of obtaining  $\beta$  can be thought of in two stages.

$$\text{cog}_i^{\text{Child}} = \alpha^{\text{cog}} + \lambda^{\text{cog}} \ln Y_i^{\text{Parent}} + \varepsilon_i^{\text{cog}}$$

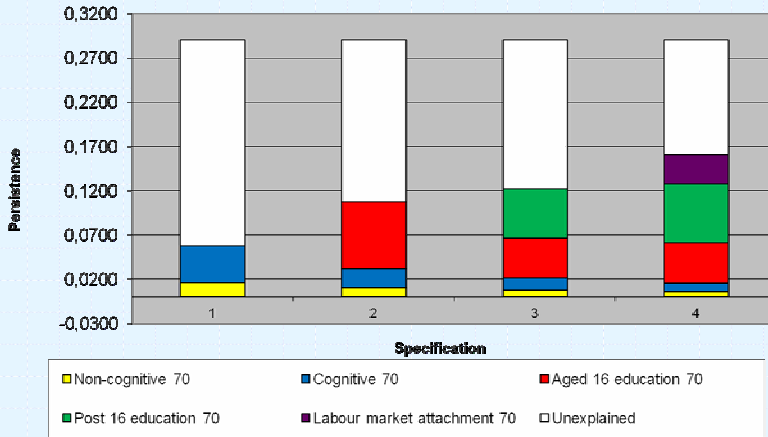
$$\ln Y_i^{\text{Child}} = \alpha + \gamma^{\text{cog}} \text{cog}_i^{\text{Child}} + \delta^{\text{inc}} \ln Y_i^{\text{Parent}} + u_i$$

$$\frac{\partial \ln Y_i^{\text{Child}}}{\partial \ln Y_i^{\text{Parent}}} = \beta = (\gamma^{\text{cog}} \lambda^{\text{cog}}) + \delta^{\text{inc}}$$

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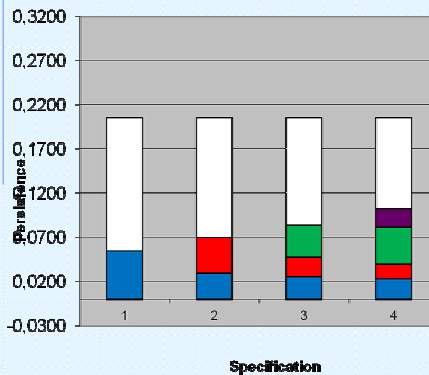
# Decomposing the intergenerational correlation in the BCS

Decomposition; 1970 cohort

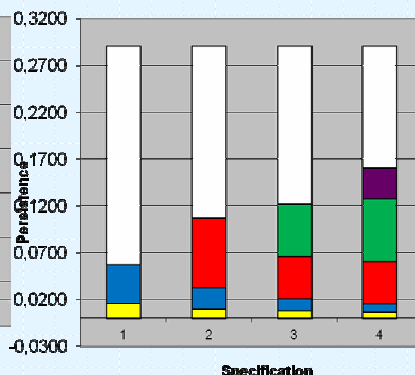


# Cross-cohort decomposition

Decomposition; 1958 cohort



Decomposition; 1970 cohort



## Educational Transmission

- ◆ In data with moderately detailed education records, around 50% of intergenerational mobility in UK comes through education
- ◆ Further, around 80% of the rise in intergenerational income persistence comes from increased strength of the relationship between family background and education (Blanden et al. 2007)
- ◆ Following Heckman big interest in non-cog Mood et al. (2010) explore personality traits as well as education for Sweden and suggest that that about 45% of IGE is explained with 2/3 by cognitive/ed and 1/3 by personality measures

## Parental Educational and Genetics

- ◆ Studies of genetics using partialling out variances between identical twins, siblings etc suggest about 40-50% of IQ is heritable. For personality it is lower (20%) but measurement maybe less well developed
- ◆ Similar approaches being used in IGE estimation (Bjorklund et al. 2006)

	Non-adoptees Biological father	Adoptees Adoptee Father	Adoptees Biological father
Years of schooling	.24	.114	.113
Income	.241	.173	.059

## Parental Educational and Genetics

- ◆ Estimates of the impact these drivers is moving into causal analysis
- ◆ For instance, looking at increased parental education on child education/earnings
- ◆ Results suggest raising a parents education by 1 year results in increase in child's education by 0.1-0.25
- ◆ Similar analysis in personality areas coming

## Conclusions

- ◆ Intergenerational mobility has become a substantial issue in UK and US recently and is more widely accepted politically than poverty or inequality
- ◆ Measured using incomes, education and social class but wider issue is differences in life chances by social background
- ◆ Large amount of effort on measurement and comparability moving onto assessment of drivers, especially non-cognitive and causal relationships and policy change

## Conclusions

Rather speculatively

- ◆ Societies with higher inequality have lower mobility for two reasons – 1) higher inequality gives parents greater incentives/different resource to invest in children. 2) the educational inequalities get higher pay offs in high inequality countries
- ◆ School environment is more equal than home environment and tends to generate mobility but this will depend on the extent of resources in the schooling system and the degree of inequality in schooling experience (this is behind arguments for pre-school expansion on mobility grounds)

## Conclusions

- ◆ Boudon (1974) argued schooling would equalise life chances through time – post-compulsory ed appears to working against this
- ◆ Large part of intergenerational transmission not through education or personality traits so far identified
- ◆ Residual may reflect post-childhood parental support (e.g. jobs), unmeasured or poorly measured drivers or something else?
- ◆ Genetic transmission likely to be important but not dominant in this field

Additional slides

## BCS transition matrix

Orig	Destination							
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	$\Sigma$
<b>1</b>	3.6	<b>1.5</b>	<b>2.0</b>	<b>1.1</b>	<b>0.8</b>	<b>2.5</b>	<b>1.2</b>	<b>12.7</b>
<b>2</b>	<b>5.6</b>	3.8	<b>4.3</b>	<b>1.6</b>	<b>1.6</b>	<b>5.0</b>	<b>3.6</b>	<b>25.5</b>
<b>3</b>	1.9	1.4	1.7	0.9	0.7	<b>2.3</b>	<b>1.6</b>	<b>10.5</b>
<b>4</b>	1.9	1.3	1.2	1.6	0.5	<b>2.7</b>	<b>1.8</b>	<b>11.0</b>
<b>5</b>	0.7	0.6	0.7	0.2	0.7	<b>1.8</b>	<b>1.5</b>	<b>6.2</b>
<b>6</b>	1.6	1.5	1.8	1.1	1.3	5.9	<b>5.5</b>	<b>18.7</b>
<b>7</b>	0.9	0.7	1.1	0.6	1.3	4.4	6.6	<b>15.6</b>
$\Sigma$	<b>16.2</b>	<b>10.8</b>	<b>12.8</b>	<b>7.1</b>	<b>6.9</b>	<b>24.6</b>	<b>21.8</b>	<b>100</b>

# Permanent Income Decomposition

## Components of Permanent Childhood and Current Income in the BHPS

	Percentage share of variance	Correlation with permanent childhood income
<b>Permanent childhood income, components associated with:</b>		
Fathers' social class ( $\hat{\delta}_p SC_p$ )	15.67	0.431
Other income predictors ( $\hat{\phi}_p X_p$ )	22.26	0.615
Residual permanent income ( $\hat{\epsilon}_p$ )	62.07	0.716
<b>Current income, components associated with:</b>		
Fathers' social class ( $\hat{\lambda}_p SC_p$ )	7.54	0.398
Other income predictors ( $\hat{\phi}_p X_p$ )	17.41	0.514
Transitory and measurement error ( $\hat{u}_p + \hat{\epsilon}_p$ )	40.55	-0.041
Residual permanent income ( $\hat{\pi}_p + \hat{\tau}_p + \hat{\epsilon}_p$ )	34.52	0.706
Error and residual unmeasured income, ( $\hat{\pi}_p + \hat{\tau}_p + \hat{\epsilon}_p + \hat{u}_p + \hat{\epsilon}_p$ )	75.06	0.487
<b>Current income (<math>y_p</math>)</b>		
$(\hat{\lambda}_p SC_p + \pi_p) + (\hat{\phi}_p X_p + \tau_p) + \varepsilon_p + u_p + e_p$		0.735
Current income without error = permanent childhood income		1.000
$(\hat{\lambda}_p SC_p + \pi_p) + (\hat{\phi}_p X_p + \tau_p) + \varepsilon_p$		