Moving Toward Lifetime intergenerational economic mobility in the UK

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Motivation

Intergenerational Economic Mobility

Following a raft of new research over last 15 years or so generational mobility has (re-) emerged as a major issue in social policy

Studies have sought to:

- Improve measurement
- Assess changes overtime
- Assess patterns across countries
- Understanding the drivers of mobility and potential policy levers – e.g. London Schools
- Assessing wealth not just income

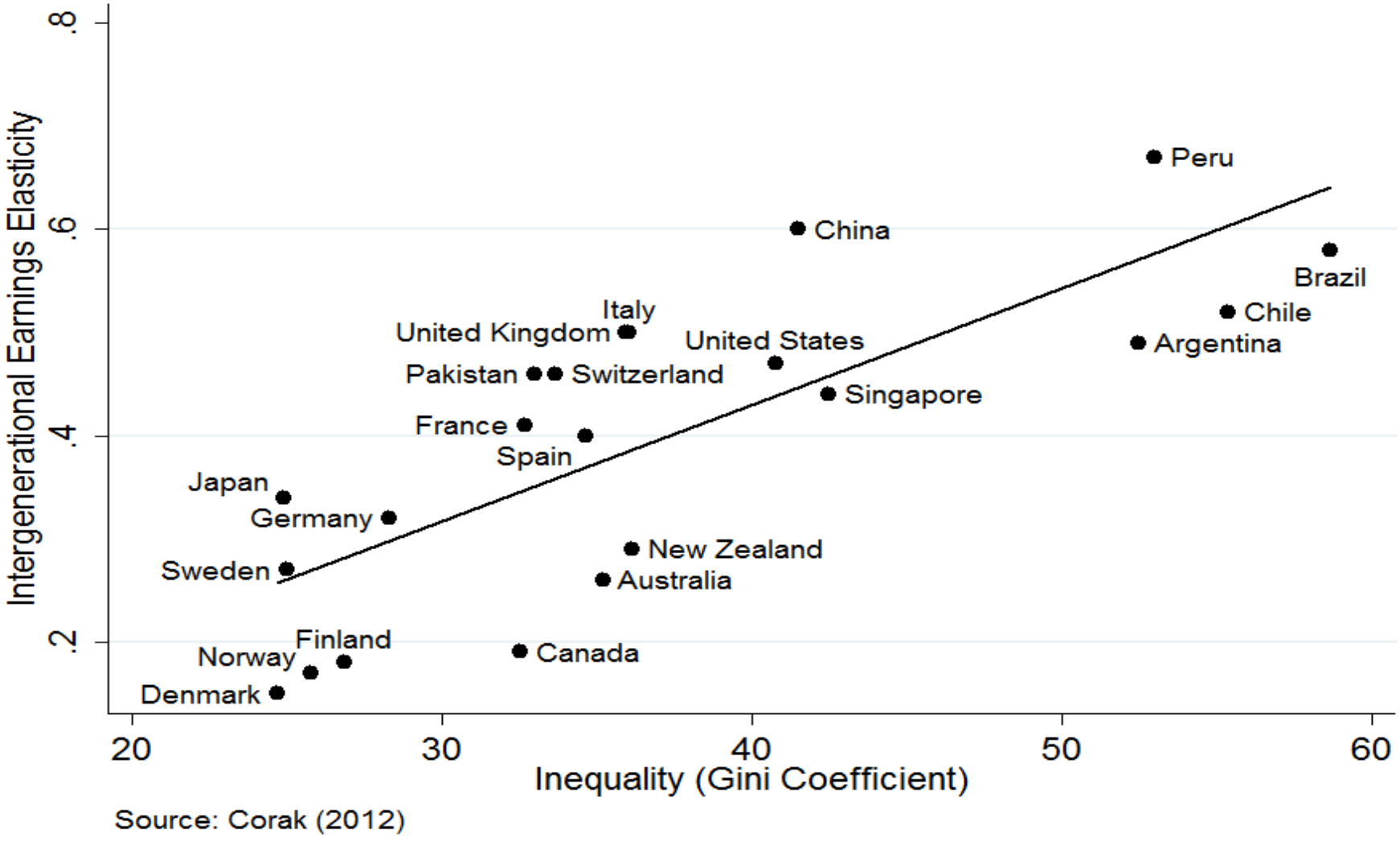
An example of research developing a policy response

Motivation

"The true test of fairness is the distribution of opportunities. That is why improving social mobility is the principal goal of the Coalition Government's social policy"

Nick Clegg, Deputy Prime Minister, Social Mobility Strategy Review, April 2011

Great Gatsby Curve



Source: Corak (2012)

Motivation

Intergenerational Economic Mobility

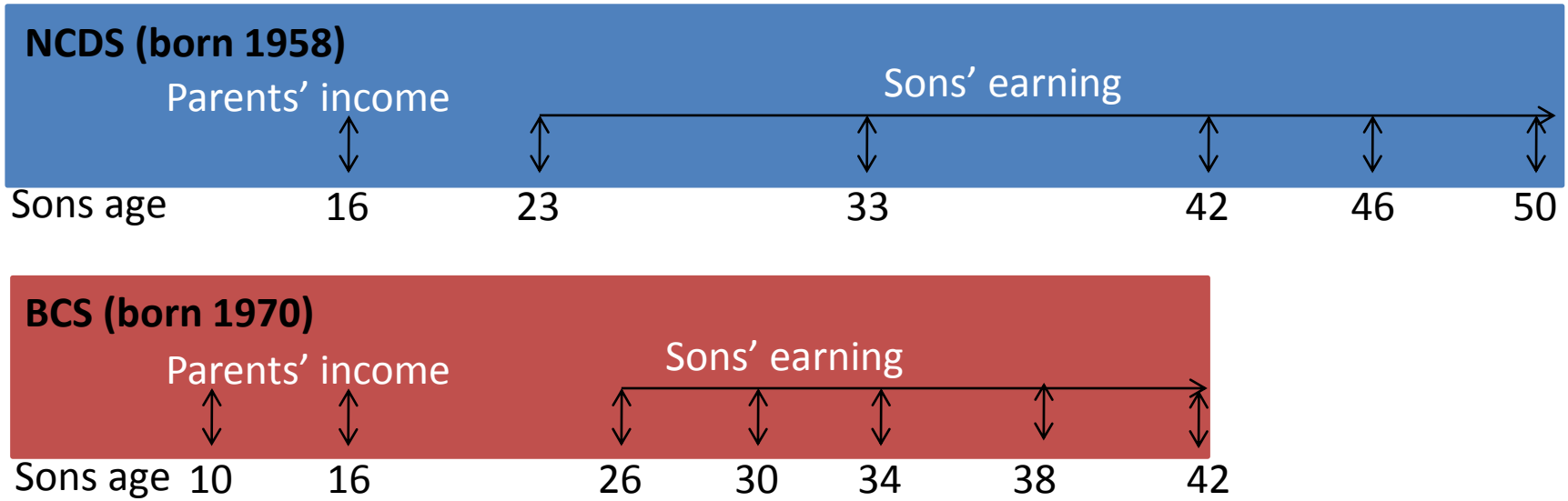
- How closely related are incomes of parents throughout childhood and offspring throughout adulthood?
- In an ideal world we would observe lifetime income of both generations – this is very data intensive
- So to date only using point time data so far
- Here we present estimates of lifetime economic mobility using British cohort data and explore the nature and extent of biases that point in time data produce

Intergenerational mobility

- Measuring mobility – the data
  The UK is unusual – we have four birth cohorts which can track how children from different family backgrounds fare through the lives but there is hole.
- **1958 – National Child Development Survey (NCDS) – age 50**
- **1970 – British Cohort Study (BCS) – age 42**
- 1990/1 Longitudinal Survey of Young People in England – (LSYPE) starts at age 14
- 1991/2 – Avon Longitudinal Survey of Children and Parents (ALSPAC)
- 1978-2009? – British Household Panel Survey (small numbers in any year) now Understanding Society
- **2000/01 – Millennium Cohort Study (MCS)**
- **2014 – Life Study (100,000 births)**

Estimation and data issues

- Income and earnings in the cohort studies



- Only observe individuals for snap-shot of time therefore observe

$$y_{it}^{parents} = y_i^{parents^*} + \varepsilon_{it}$$

$$y_{it}^{son} = y_i^{son^*} + \varepsilon_{it}$$

Motivation

Early literature for Changes in Intergenerational mMbility in the UK based point in time estimates relatively early in peoples Labour Market Experience

β	NCDS (age 33)	BCS (age 30)	Change
(r)	0.205 (.026)***	0.291 (.025)***	0.086 (.036)***
Partial correlation	0.166 (.021)***	0.286 (.025)***	0.119 (.033)***
N	2161	1976	005)

$$y_i^{son} = \alpha + \beta y_i^{parents} + u_i$$

$$r = Corr(y_i^{parents}, y_i^{son}) = \beta \frac{\sigma_{y_p}}{\sigma_{y_s}}$$

Motivation

- Parental income observed when cohort members were age 16 in NCDS and 10/16 in BCS – only comparable measure but includes lone parent families and mothers earnings
- Earnings of cohort members observed at age 33/30 in NCDS/BCS
- Three potential biases – two already identified in the literature
  1. Life-cycle bias (Bohlmark and Lindquist, 2006, Haider and Solon, 2006, Grawe, 2006)
  2. Attenuation Bias (Solon, 1992, Zimmerman, 1992, Dearden et al. 1997)
  3. Worklessness: How do we treat periods of non-earning?

Motivation

Worklessness

- Earnings of cohort members – sample restricted to those in employment
- Spells out of work are not random by family background (Macmillan 2014) are heavily concentrated on a small minority (Gregg 2001) and related to low earnings (Stewart and Swaffield , 1999 – low pay no pay cycle, Gregg and Tominey, 2005)

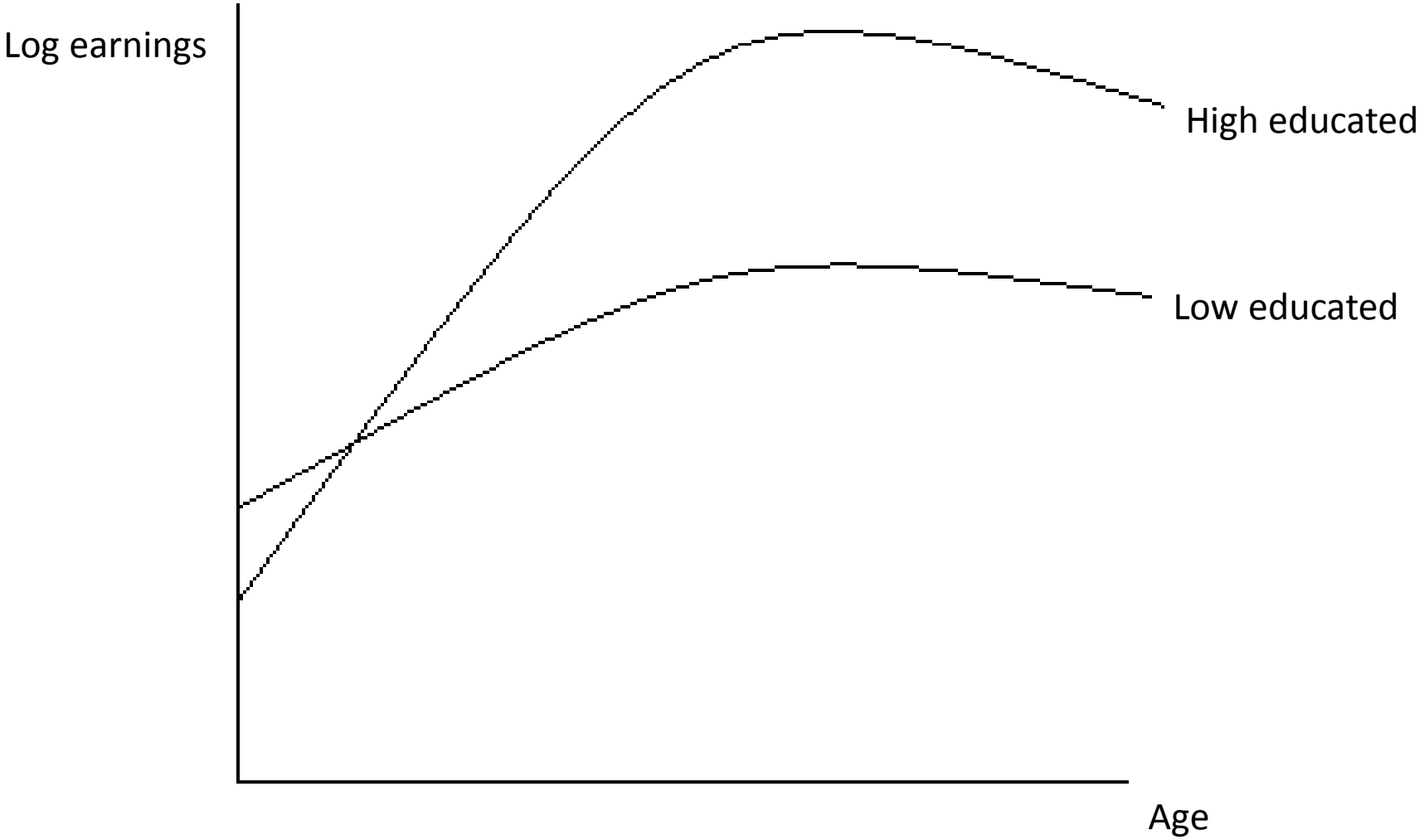
	NCDS (1958)	BCS (1970)
Proportion of time out of work	0.0759 (.020)***	0.1298 (.019)***
A year or more workless	0.2119 (.047)***	0.2611 (.034)***
N	4635	4646

$$w_i^{son} = \alpha + \beta w_i^{father} + u_i$$

Source: Macmillan (2014)

Estimation and data issues

1. Life-cycle bias



Estimation and data issues

1. Life-cycle bias - Bohlmark and Lindquist, 2006, Haider and Solon, 2006

$$y_i^{son*} = \alpha + \beta y_i^{parents*} + u_i \qquad y_{it}^{son} = \lambda_t y_i^{son^*} + \varepsilon_{it}$$

where

$$y_{it}^{son} = \alpha + \beta y_i^{parents*} + e_{it}$$

- Estimate

$$p\lim \hat{\beta} = \frac{Cov(y_{it}^{s}, y_i^{p*})}{Var(y_i^{p*})} = \frac{Cov(\beta y_i^{p*} + e_{it}, y_i^{p*})}{Var(y_i^{p*})}$$

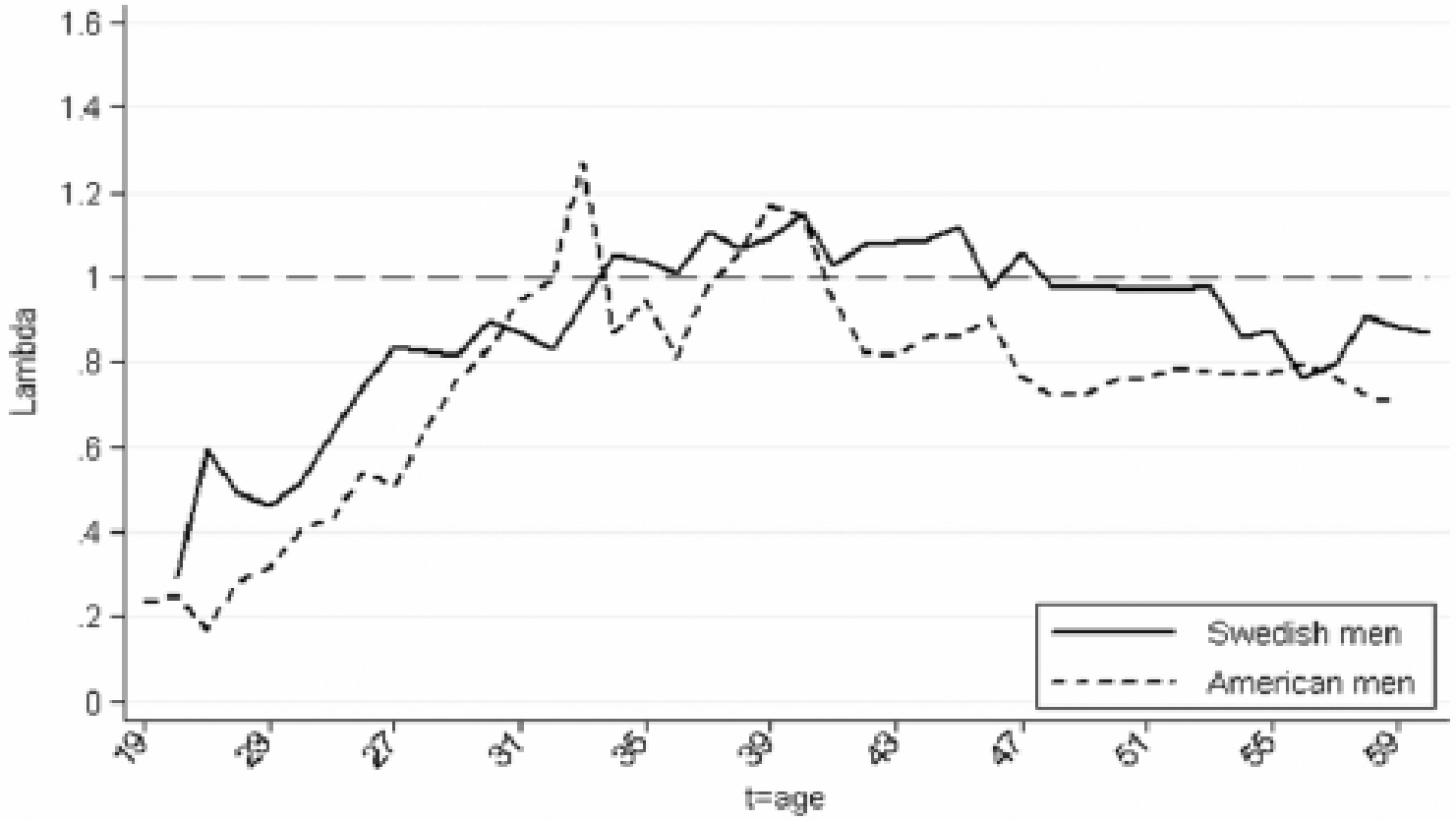
$$e_{it} = \lambda(\beta y_i^{p*} + u_i) + \varepsilon_{it} - \beta y_i^{p*}$$

where

$$\longrightarrow \qquad p\lim \hat{\beta} = \lambda_t \beta$$

Estimation and data issues

1. Life-cycle bias - Bohlmark and Lindquist (2006)



Optimal age 35 / 38 but not stable by gender or across cohorts, unknown across countries

Estimation and data issues

2. Attenuation Bias - Measurement error

- Parents average age = 40 when parental income observed BUT only observed at a point in time
- Subject to transitory fluctuation and mis-measurement that increases variance

$$y_{it}^{parents} = y_i^{parents^*} + \varepsilon_{it}$$

- Estimate $$y_i^{son*} = \alpha + \beta(y_{it}^{parents} - \varepsilon_{it}) + e_{it}$$

$$p\lim \hat{\beta} = \frac{Cov(y_{it}^p, \beta y_{it}^p + e_{it} - \beta\varepsilon_{it})}{Var(y_{it}^p)}$$

$$\longrightarrow \quad p\lim \hat{\beta} = \beta \frac{\sigma_{y^p}^2}{\sigma_{y^p}^2 + \sigma_\varepsilon^2}$$

Estimation and data issues

3. Worklessness

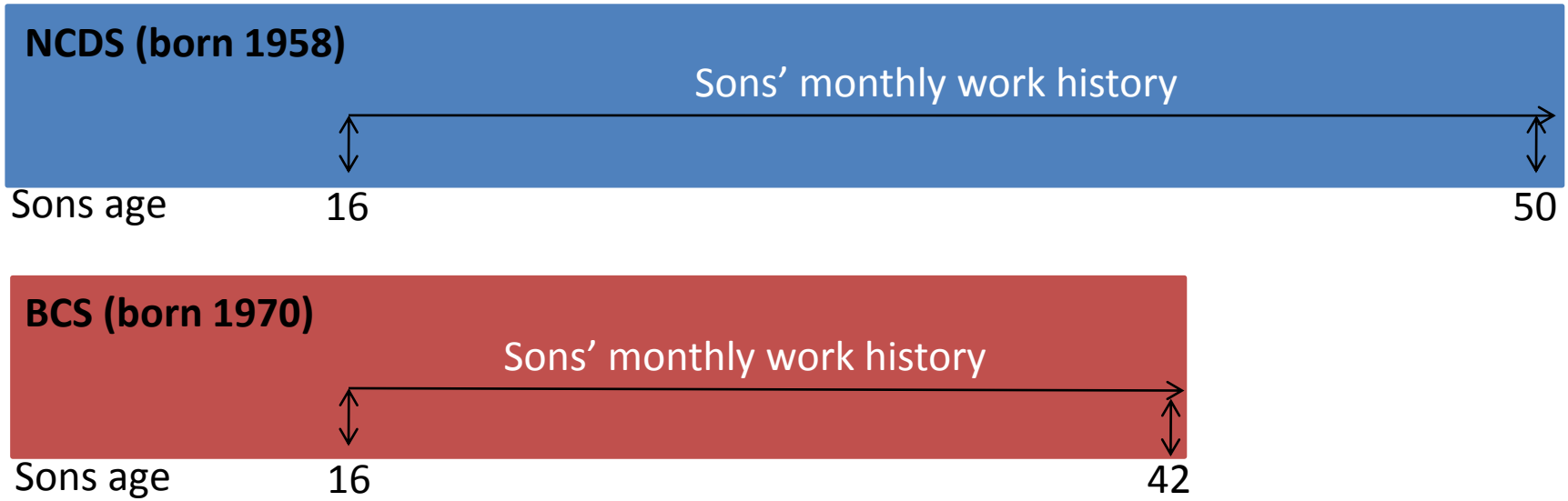
- UK cohort Earnings measure reported at a point in time – previous months earnings
- In Swedish administrative data or US NSLY we observe annual earnings – limited periods of worklessness
- Those **not** reporting any earnings excluded

Three groups

1. Those who do not report earnings but are in employment – missing item data
2. Those whose employment status is unknown - attrition
3. Those who do not report earnings because they do not have earnings – worklessness is non-random

Estimation and data issues

- Work history in the cohort studies

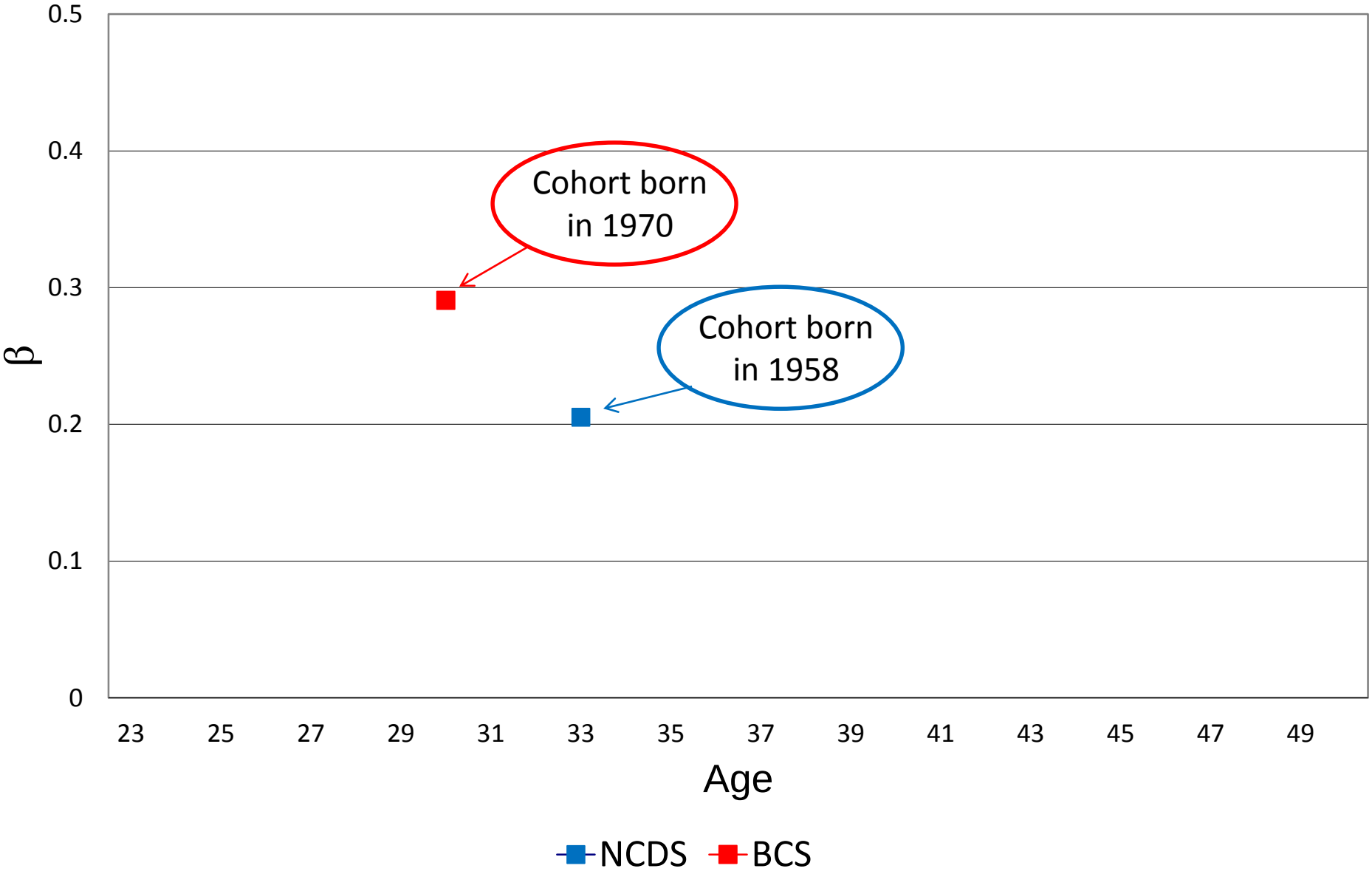


Plan

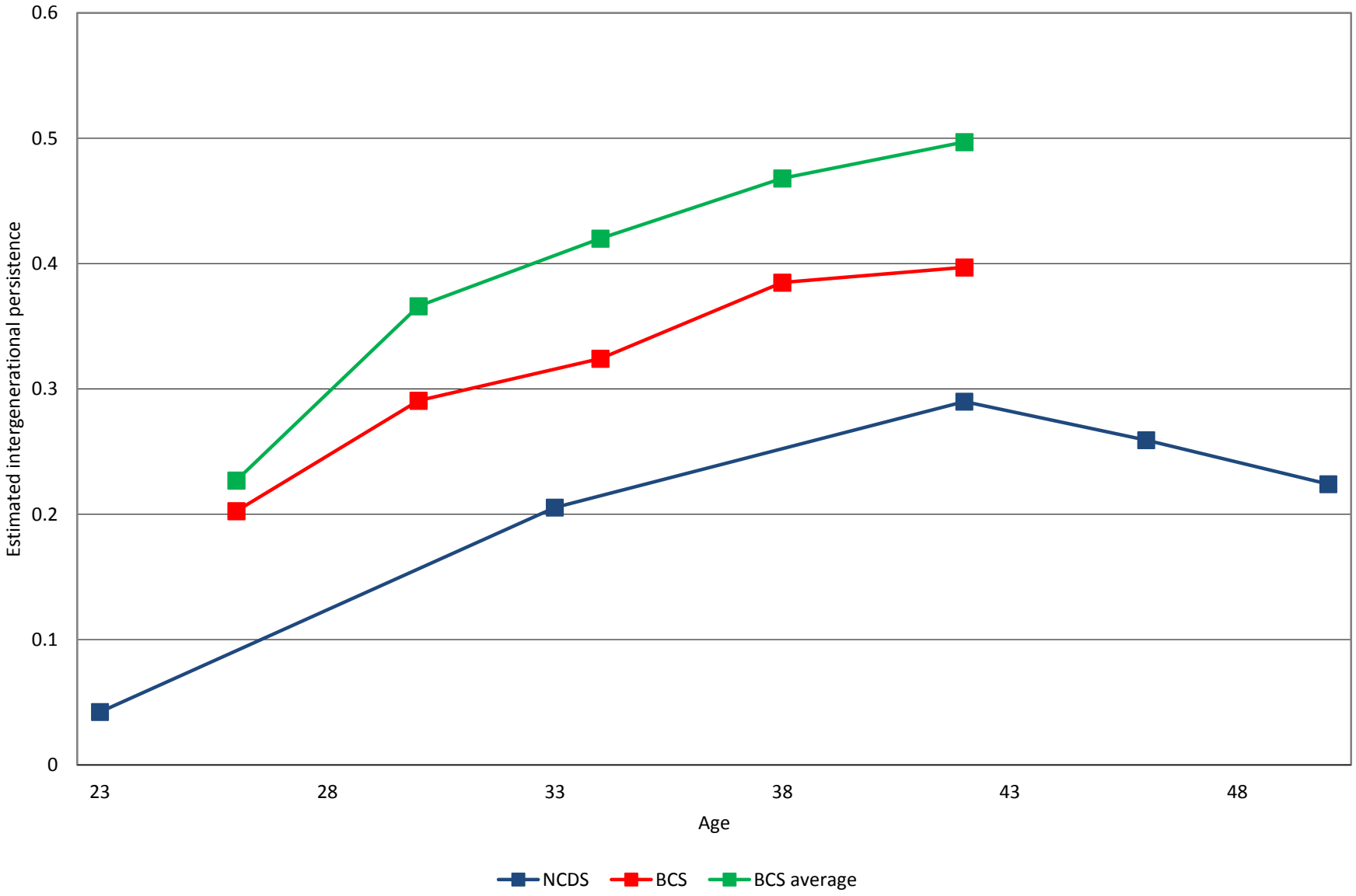
Starting with the Blanden et al. (2005) study of changes in Intergenerational Elasticity in UK

- Walk through the fist two biases from using point in time data
- Show the extent of worklessness and correlation with earnings and family income
- Provide estimates of lifetime economic mobility with alternative treatment of periods of worklessness
- Assess the size of the three biases from point in time estimation

Results – Blanden et al. original estimates



Results – life-cycle bias



Life-cycle and Attenuation Bias

- Age-IGE profile appears the same for NCDS and BCS – peaking at around age 42 then declining in NCDS data – more similar to US than Swedish data in Bohlmark and Lindquist, 2006
- Optimal IGE estimates were at age 36 Sweden and 38 US from this study
- On this basis life-cycle adjusted IGE is 0.24-0.26 in NCDS and 0.35-0.39 in BCS

Attenuation Bias- measurement error

Intergenerational elasticities and partial correlations across the life-cycle in the BCS using point in time and average family income

	26	30	34	38	42
Point in time family income (age 16)					
β	0.203 (.023)***	0.291 (.022)***	0.324 (.027)***	0.385 (.031)***	0.397 (.033)***
Partial correlation (r)	0.228 (.026)***	0.286 (.022)***	0.282 (.023)***	0.328 (.027)***	0.2941 (.024)***
N	1416	1976	1691	1266	1596
Average family income (age 10 and 16) imputing where missing					
β	0.227 (.022)***	0.366 (.022)***	0.420 (.031)***	0.468 (.031)***	0.497 (.032)***
Partial correlation (r)	0.204 (.020)***	0.279 (.017)***	0.282 (.018)***	0.318 (.021)***	0.291 (.018)***
N	2364	3340	2806	2080	2685

Life-cycle and Attenuation Bias

- Addressing Attenuation bias by averaging two income periods at ages 10 and 16 raises IGE estimate by about 0.1 to 0.44-0.47 for optimal life-cycle age
- Swedish data suggests that averaging for family income across ages 10 and 16 produces an IGE of 81% of that when averaged for all years from 1 to 16 – compared to 66% from just age 16
- This produces an estimated life-time IGE adjusted for both life-cycle and attenuation biases of around 0.58

Addressing Worklessness - Plan

Start by assessing degree of non-randomness of worklessness

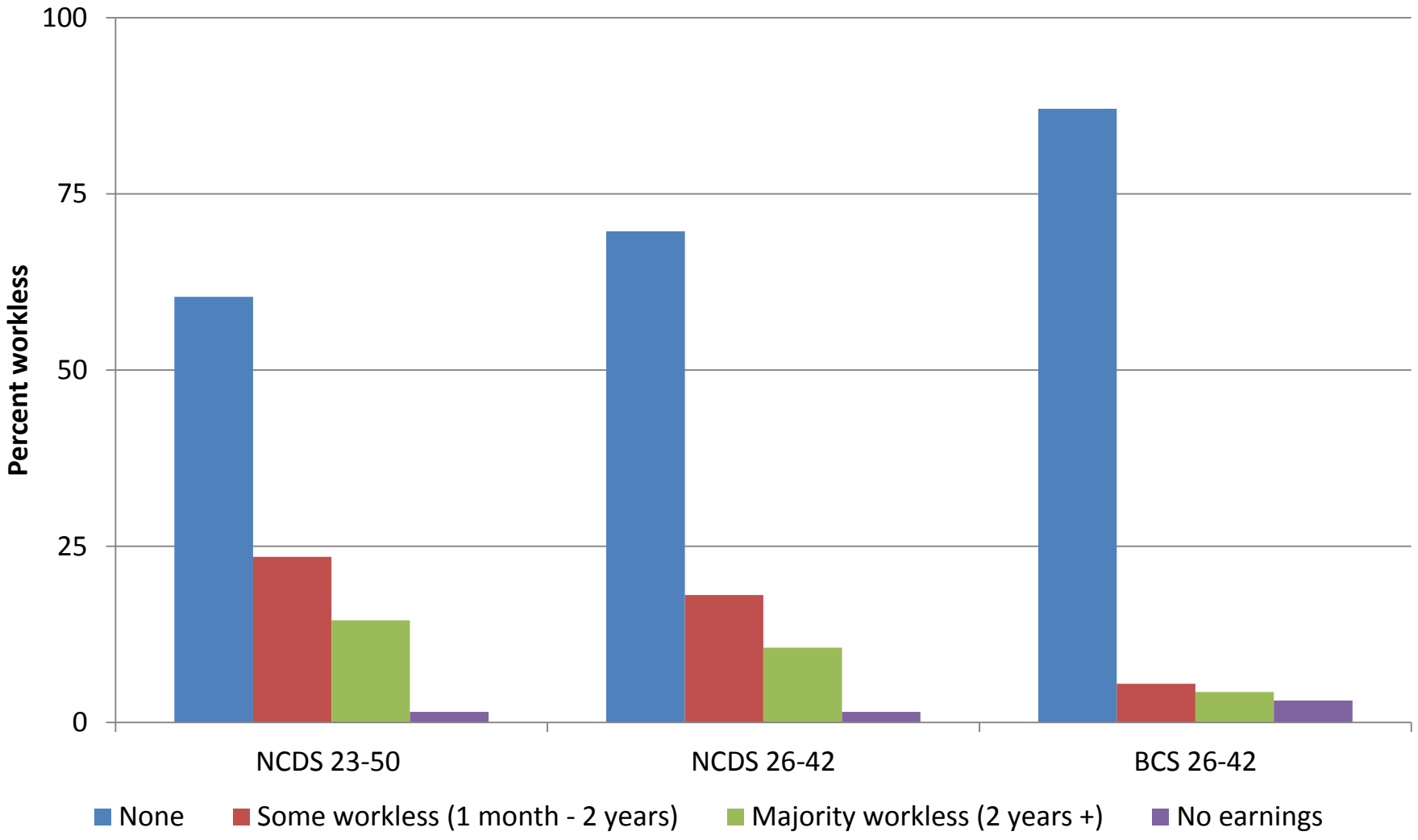
Linear imputation of earnings between earnings observations combined with panel based imputation for missing wages (Woolridge, 1995)

Show how excluding those with no earnings at any point in time produces small bias from selection even before non-earning is addressed

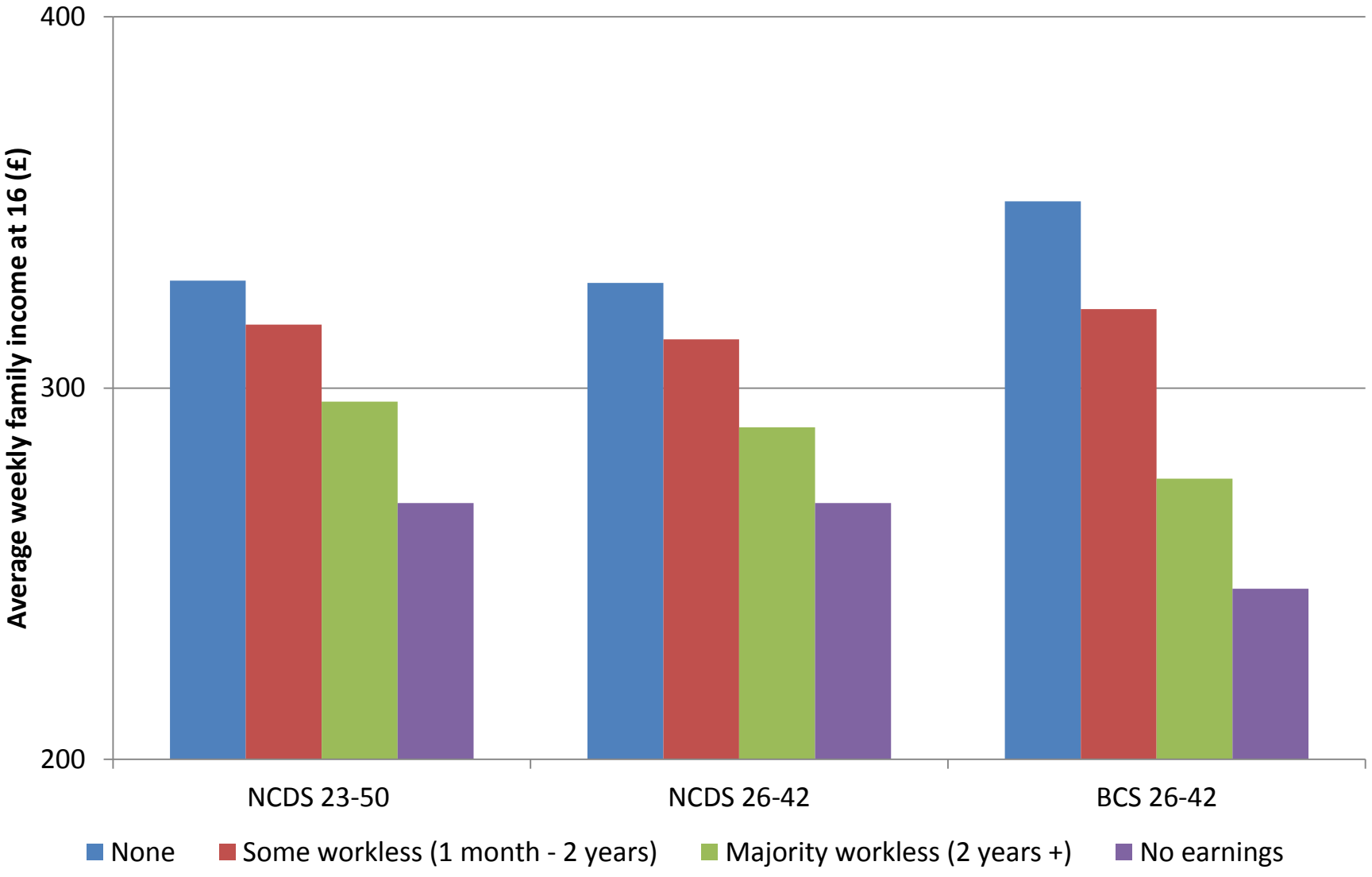
Alternative treatment of months with no earnings

- Zero earnings
- Benefits as earnings replacement
- Imputed earnings adjusted for participation selection

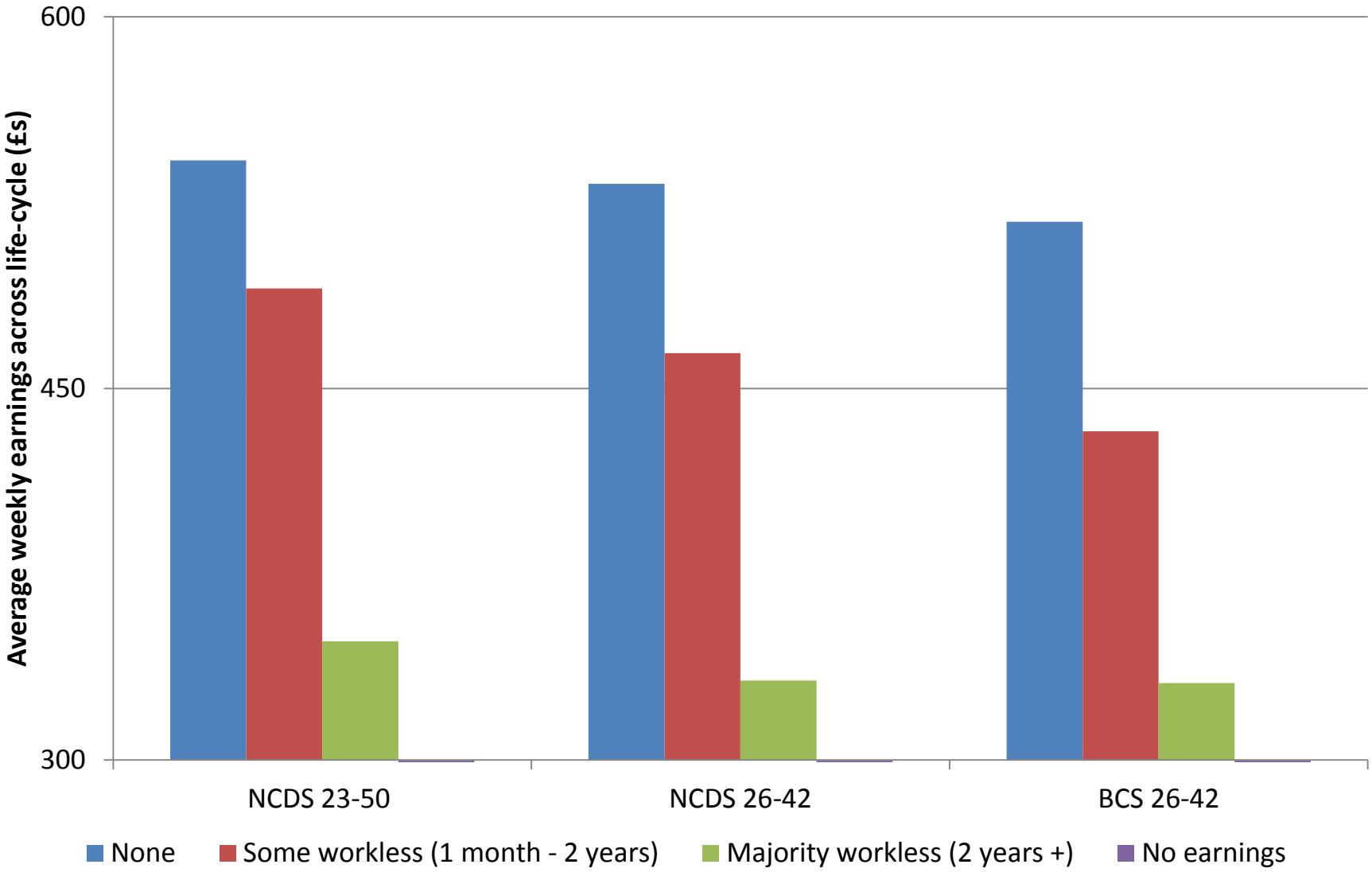
Workless spells



Family income at 16 by workless spells



Average earnings by workless spells



Lifetime earnings – non- random selection adding workless experience groups – positive earnings only

β

Cohort: Earnings life cycle period: Family income observed at: Time spent workless	NCDS 23-50 16	NCDS 26-42 16	BCS 26-42 16	BCS 26-42 10/16
No workless	0.178 (.025)***	0.183 (.023)***	0.298 (.021)***	0.372 (.020)***
+ some workless (<2 years)	0.188 (.022)***	0.190 (.022)***	0.299 (.020)***	0.371 (.020)***
+more workless (> 2 years)	0.212 (.021)***	0.207 (.021)***	0.302 (.020)***	0.383 (.020)***

Lifetime earnings – adding in worklessness

β

Cohort: Earnings life cycle period: Family income observed at:	NCDS 23-50 16	NCDS 26-42 16	BCS 26-42 16	BCS 26-42 10/16
Ignoring workless spells	0.212 (.021)***	0.207 (.021)***	0.302 (.020)***	0.383 (.020)***
Zero earnings	0.255 (.025)***	0.255 (.026)***	0.343 (.028)***	0.425 (.028)***
Benefits	0.232 (.022)***	0.230 (.023)***	0.320 (.021)***	0.398 (.021)***
Wages foregone (Selection)	0.217 (.021)***	0.210 (.021)***	0.305 (.020)***	0.386 (.020)***

Lifetime earnings – adding in always workless sample

β

Cohort: Earnings life cycle period: Family income observed at:	NCDS 23-50 16	NCDS 26-42 16	BCS 26-42 16	BCS 26-42 10/16
Ignoring workless spells	0.212 (.021)***	0.207 (.021)***	0.302 (.020)***	0.383 (.020)***
Zero earnings	0.363 (.045)***	0.366 (.046)***	0.523 (.056)***	0.654 (.056)***
Benefits	0.252 (.023)***	0.251 (.024)***	0.345 (.022)***	0.430 (.022)***
Wages foregone (Selection)	0.222 (.021)***	0.215 (.021)***	0.310 (.020)***	0.392 (.020)***

Conclusions

Optimal age for addressing life-cycle bias in NCDS is 37 when using benefit replacement for periods without work (32 if ignoring worklessness)

May not be the same for BCS but 26-42 likely to be close approximation

Half Life-time IGE adjusted for life-cycle and worklessness (benefit replacement) is 0.25 in NCDS and 0.35 in BCS

Adjusting for attenuation bias using averaged 10/16 family income in BCS – IGE is 0.43 (using Swedish estimate of resulting effects of measurement error makes this 0.54

So 55% of income inequality passed across generation

Still to do

Non-linear earnings imputation

Validate NCDS against ASHE earnings panel

Add in NCDS age 57 data

Assess impact of inactivity in over 50s and early retirement