Intergenerational mobility of women (and men) across working ages: the role of partnership and participation

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Introduction

There are two motivations for studying intergenerational persistence.

1. To understand the transmission of human capital, motivated by Becker and Tomes (1986) and more recent theoretical models.

2. To understand the intergenerational transmission of inequality in resources. As resources tend to be shared in families this has more complex drivers.

Studies of persistence at the individual level tend to assume that individuals work full-time, they are therefore less suited to measuring mobility for women, for whom labour market participation is more variable.

Motivated by 2 it has become more common to measure persistence at family level, which incorporates the effect of partnership and labour supply decisions.

Few papers seek to bridge the gap from human capital persistence to resource persistence, this depends on participation, partnership and assortative matching. All of these aspects will be considered in the wider project.

Research questions

How does intergenerational earnings mobility differ by sex?

How does earnings mobility for women and men change over the life course, i.e. are they differentially affected by life-cycle bias?

What role does differential labour market participation play?

Does looking at couples' total income change our understanding of the extent of persistence and how it differs for men and women?

To what extent is the role of partnership for persistence driven by a) selection into partnership? b) assortative matching? b) family labour supply decisions? [won't have time for all this]

Previous literature - earnings mobility for women

The international literature has mixed findings on the relative earnings mobility of men and women, but few studies have given a comprehensive account, especially over the lifecycle.

Raaum et al (2007) states that assortative matching and labour supply responses leads to lower persistence in married women's earnings compared to men in the US and UK but not in the Nordic countries.

New papers by Branden et al (2023) and Ahrsjö et al (2023) address the mobility of women, but focus on mother-daughter transmissions.

Previous literature - family income mobility

There have been a few papers that consider the role of partnership and participation for IGM in family incomes:

- Chadwick and Solon (2002) for the US - three-quarters of the IGE between parents' income and daughter's family income is due to income similarity between the daughter and her spouse.
- Holmlund (2022) shows that assortative matching (AM) contributes to levels of income persistence (particularly for women).
- Choi et al (2020) incorporate the role of *who partners* and the impact of this and AM on the difference between individual and family income mobility.

Our contribution

We consider both earnings and family income mobility, looking at the impact of partnership, participation and assortative mating.

We consider changes through the life-cycle and approximate a lifetime measure by averaging from ages 30-46. Previous contributions have only considered men (Haider and Solon, 2006, Gregg et al, 2016).

We highlight differences between elasticity and rank measures, demonstrating how these are affected by inequality.

We explore the role of participation for earnings mobility by adjusting our measures for hours worked and by imputing a measure of 'potential wage'.

We assess the role of partnership formation and assortative matching for family income mobility.

Estimation

Earnings elasticity: $y_i = \alpha + \beta y_i^p + u_i$ (all in logs)

We also show results for rank mobility: $r_i = \alpha + \rho r_i^p + u_i$

The use of the rank-rank correlation has become increasingly common as a complement to the elasticity (Kenedi and Sirugue, 2023).

It is less sensitive to both measurement error (from the parental income variable) and lifecycle bias (from the child's earnings) than the elasicity is (Nybom and Stuhler, 2017).

The rank measure does not capture the full consequences of inequality. Intergenerational persistence has a greater impact if the rungs on the ladder are further apart.

Data

The British Cohort Study includes all children born in a single week in 1970.

Contains information on parental income measured at ages 10 and 16 (we average across these).

Information on earnings, work and partnership status is available at ages 30, 34, 38, 42 and 46.

We also have rich information on ability and education level which enables us to obtain measures of potential earnings.

Information on other components of family income is also available, apart from at age 38.

No information is included on partner's detailed characteristics or family background.

Descriptive statistics for women

	Age 30	**Age 34**	**Age 38**	**Age 42**	**Age 46**
With a partner	0.69	0.74	0.76	0.76	0.76
Employed	0.76	0.76	0.80	0.82	0.85
Employed part-time	0.23	0.27	0.42	0.28	0.23
Child 0-14	0.37	0.45	0.53	0.39	0.25
Share of family income contributed by own earnings	0.42	0.45		0.39	0.50
Share of family income contributed by partners' earnings	0.39	0.39		0.39	
Earnings sample size	3,450	2,429	2,189	2,253	2,086
Family income sample size	4,822	3,317		2,871	2,756

Descriptive statistics for men

	Age 30	Age 34	Age 38	Age 42	Age 46
With a partner	0.63	0.71	0.76	0.75	0.79
Employed	0.89	0.92	0.93	0.91	0.93
Employed part-time	0.01	0.01	0.02	0.02	0.02
Child 0-14	0.26	0.36	0.53	0.36	0.25
Share of family income contributed by own earnings	0.71	0.74		0.63	0.69
Share of family income contributed by partners' earnings	0.17	0.15		0.22	
Earnings sample size	3,905	2,429	2,189	2,167	1,881
Family income sample size	4,499	2,933		2,459	2,421

Conceptual framework - own earnings elasticity

Standard approaches in the literature measure intergenerational *earnings* mobility:
$y_i = \alpha + \beta y_i^p + u_i$

Implicit in this is that monthly earnings (the measure we use) are a function of labour supply and wages: $Y_i = L_i W_i$

Conceptually closer to the theoretical literature is the intergenerational transmission from parental income to wages, net of any labour supply decisions (as a measure of the value of human capital in the labour market): $w_{it} = \alpha + \lambda y_i^p + u_i$

Conceptual framework - labour supply decisions

What is driving the difference between β and λ?

When individuals are in couples, labour supply depends on their own wages and their partner's wage: $l_i = \eta w_i - \eta_i^s w_i^s + \kappa_i$

Couples match on wages: $w_i^s = \pi w_i + (1 = \pi)\bar{w}^s$ where $\bar{w}^s$ is the average across the population that spouses are drawn from.

so $\beta = ((1 + \eta) - \pi\eta^s)\lambda$

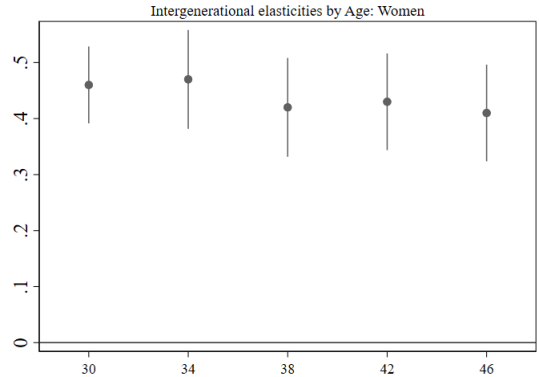
If $\beta > \lambda : ((1+\eta) > \pi\eta^s)$ - labour supply decisions affected more by own wages than partner's.

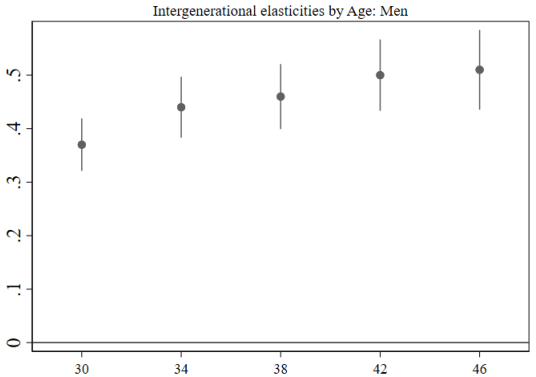
If $\beta < \lambda : ((1+\eta) < \pi\eta^s)$ - labour supply decisions affected more by partner's wages than own.

We can show that women work less if their partners' earnings are higher, this will depress persistence compared to what it could be.

But: wages might not fully capture human capital, this is particularly a concern for women.

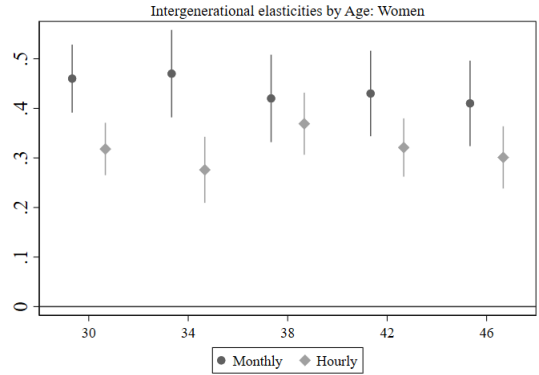
Intergenerational earnings persistence β

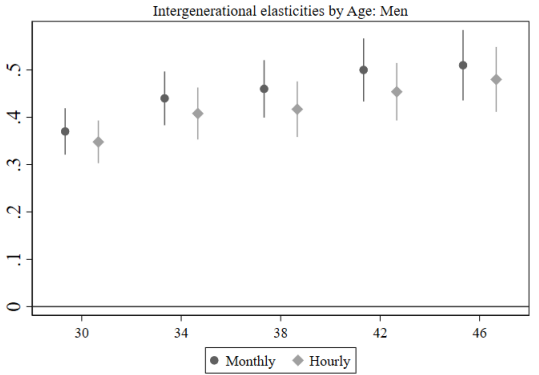




The rise in intergenerational persistence for men as they age is not found for women. Two explanations: returns and labour supply. ▸ net earnings ▸ common sample

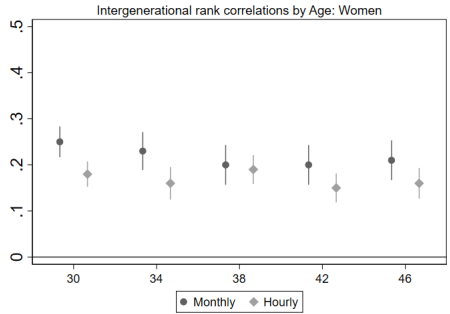
Adjusting for labour supply at a point in time is much more consequential for women - λ





Part of women's earnings persistence comes through labour supply effects, implying that own labour supply effects dominate effects through assortative mating.

Women are more mobile than men by rank mobility



The difference between β_f and λ_f is coming in part through reduced inequality in wages compared to earnings, the adjustment is less consequential for ranks.
The rise in persistence for men is not in evidence for rank measures beyond age 30 .

The role of partnering for earnings mobility

Our speculation is that many of the differences between men and women are driven by family labour supply decisions, and are therefore likely to be stronger for those with partners.

With positive assortative matching, income effects from spouses' wages will mean that earnings mobility is lower than it would be if individuals were single. We expect earnings persistence to be lower among those with partners. This is a 'within group' effect.

Intergenerational persistence is also affected by sorting into partnership as those with partners tend to work less and have lower earnings. This is a 'between group' effect.

If the effect of partnership occurs only through observed participation we would expect to see no difference in within group transmission for wages.

The influence of these elements on the IGE can be decomposed as in Hertz (2008).

Decomposition analysis - Hertz (2008)

Let the groups of interest (defined by partnership status within sex) be indexed by $g = 1 \ldots G$ and let $\hat{\psi}_g$ represent the share of the population of interest in that group.

Let x be parental income and y be child's income, with sample means $\bar{x}$ and $\bar{y}$ and estimated variances $\hat{\sigma_x^2}$ and $\hat{\sigma_y^2}$, the group values are indexed by g, so $\bar{x}_g$, $\sigma_x\hat{(g)}^2$.

$\hat{\beta}_g$ is the intergenerational elasticity for subgroup g (capturing the within-group persistence),

$\hat{\delta_g}$ is the group-size-weighted between group regression coefficient

$\hat{\delta_g} = \Sigma_g \hat{\psi_g}(\bar{y}_g - \bar{y})(\bar{x}_g - \bar{x}) / \Sigma_g \hat{\psi_g}(\bar{x}_g - \bar{x})^2$

The overall elasticity, pooled across subgroups, can be written as

$\hat{\beta} = \sum_g \hat{\psi_g}(\widehat{\beta_g} \frac{\sigma_x(g)^2}{\sigma_x^2}) + \hat{\delta_g} \frac{\sum_g \hat{\psi_g}(\bar{x}_g - \bar{x})^2 \sigma_x^2}{\sigma_x^2}$

Decomposition analysis 2

The final term can be distributed by group, allowing all elements to be decomposed.
$\hat{\beta} = \sum_g \hat{\psi_g}(\hat{\beta_g} \frac{\sigma_x(g)^2}{\sigma_x^2} + \frac{(\bar{x}_g - \bar{x})}{\sigma_x^2}$

When we report results we show

- $\hat{\beta_g}$ (within group persistence)
- $\hat{\beta_g} \frac{\sigma_x(g)^2}{\sigma_x^2} + \frac{(\bar{x}_g - \bar{x})}{\sigma_x^2}$ (within and between group elements)
- $\hat{\psi_g}(\hat{\beta_g} \frac{\sigma_x(g)^2}{\sigma_x^2} + \frac{(\bar{x}_g - \bar{x})}{\sigma_x^2})$ (weighted by the group share)

An example decomposition for women at age 42

As expected, earnings persistence is weaker among women in partnerships, but not once hours are taken into account

		Partner (74% of the sample)			No partner (26% of the sample)		
	Total IGE	Within-group IGE	Between and within	Weight by share	Within-group IGE	Between and within	Weight by share
Earnings	0.432 (0.044)	0.393 (0.052)	0.383	0.147	0.537 (0.083)	0.571	0.148
Hours adjusted	0.323 (0.030)	0.313 (0.036)	0.308	0.228	0.340 (0.058)]	0.366	0.095

Men in partnerships display more intergenerational persistence than single men, this increases as they age

		With Partner			No partner		
	Total IGE	Within-group IGE	Between and within	Weight by share	Within-group IGE	Between and within	Weight by share
Age 30	0.371 (0.025) [3905]	0.377 (0.030) [2598]	0.378	0.252	0.358 (0.042) [1307]	0.357	0.120
Age 34	0.436 (0.029) [2,750]	0.445 (0.032) [2,108]	0.448	0.344	0.372 (0.059) [642]	0.396	0.092
Age 38	0.459 (0.031) [2,076]	0.472 (0.034) [1,680]	0.491	0.397	0.242 (0.078) [396]	0.323	0.062
Age 42	0.496 (0.034) [2167]	0.516 (0.037) [1765]	0.524	0.427	0.309 (0.079) [402]	0.372	0.069
Age 46	0.511 (0.038) [1881]	0.527 (0.041) [1542]	0.537	0.441	0.290 (0.093) [339]	0.391	0.071

Potential earnings

But does adjusting for hours go far enough? Hourly wages are a function of past and expected future labour supply decisions.

We follow Holmlund (2022) in imputing potential earnings based on median earnings among individuals with the same characteristics.

Has the additional benefit in our context that it provides an estimate of earnings for those who do not report them in the particular survey, reducing selection problems.

Explanatory variables used here: reading and maths ability at 10, the Rutter score to capture non-cognitive skills at 10, information on highest academic and vocational qualifications obtained by 30.

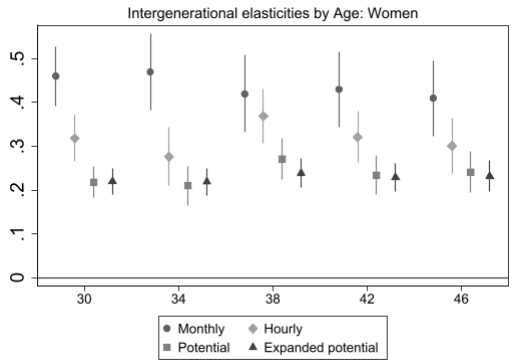
Notice that persistence in potential earnings captures intergenerational persistence as predicted by Xs - excludes persistence that comes from connections, occupational links and other routes.

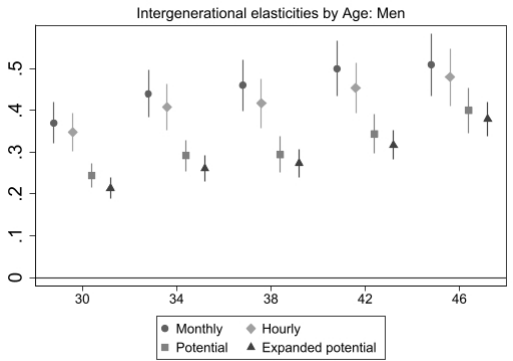
With the limited cohort data we face a trade off - precision v common support.

Potential earnings - precision v common support - Women

		Actual IGE (hours adj)	Potential wage based on quartiles of ability and education		Potential wage based on quintiles of ability and education		Potential wage based on deciles of ability and education	
			Earnings sample	Expanded sample	Earnings sample	Expanded sample	Earnings sample	Expanded sample
30	IGE	0.32 (0.035)	0.190 (0.015)	0.186 (0.013)	0.218 (0.018)	0.220 (0.015)	0.257 (0.024)	0.251 (0.021)
	Sample	[3450]	[3450]	[4995]	[2450]	[4928]	[3450]	[4296]
	Corr with wage		0.534		0.609		0.855	
46	IGE	0.30 (0.044)	0.249 (0.022)	0.242 (0.015)	0.241 (0.024)	0.232 (0.018)	0.259 (0.029)	0.274 (0.024)
	Sample	[2086]	[2086]	[3853]	[2086]	[3665]	[2086]	[2858]
	Corr with wage		0.628		0.713		0.904	

Earnings results - including potential wage





Rank correlations for potential wage measures are notably lower for women.

Average earnings results confirm that women are more mobile by the rank measure, but potential wage results are notable

IGE	Women	Men
Earnings unadjusted	0.54 (0.040)***	0.54 (0.030)***
Hours adjusted	0.33 (0.027)***	0.45 (0.025)***
Potential – same sample	0.28 (0.023)***	0.38 (0.022)***
	[3797]	[3457]
Potential – extended sample	0.26 (0.022)***	0.35 (0.020)***
	[4468]	[4096]
Rank correlations		
Earnings unadjusted	0.22 (0.016)***	0.32 (0.017)***
Hours adjusted	0.14 (0.011)***	0.27 (0.015)***
Potential – same sample	0.20 (0.016)***	0.30 (0.017)***
	[3797]	[3457]
Potential – extended sample	0.19 (0.015)***	0.28 (0.016)***
	[4468]	[4096]

Summary of Findings on Intergenerational Earnings Persistence

There are important differences between rank and elasticity measures of mobility for men and women.

Elasticities clearly rise for men - driven by those in partnerships. Changes in rank mobilities are smaller.

There is less change over the lifecycle for women.

Persistence as measured by ranks is smaller for women compared to men.

Adjusting for hours worked reduces observed persistence for both men and women, more so for women.

Average earnings measures confirm that persistence in earnings is higher for men compared to women.

Observed patterns are not much affected by using potential wage measures, although there is evidence that using this approach on average wages is capturing something additional for women.

Family income persistence Chadwick and Solon (2002)

Spouses' earnings elasticity: $y_i^s = \alpha^s + \beta^s y_i^p + v_i$

β^s is stronger the closer the association in earnings between partners (assortative matching).

Family income elasticity

$y_i^f = \alpha^f + \mu y_i^p + \epsilon_i$

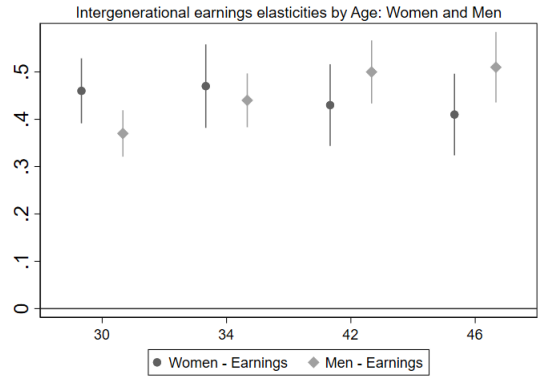
$\mu = \beta$ for those where the child is only earner

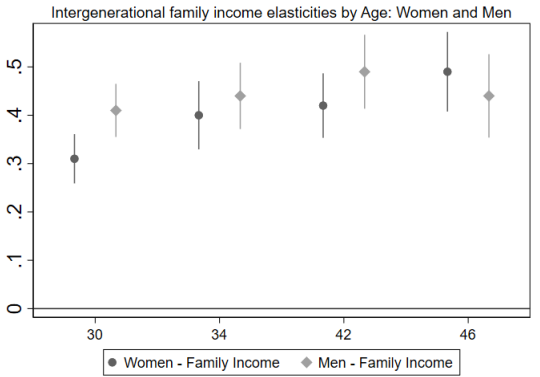
$\mu = \beta^s$ for those where the partner is the only earner

And under some assumptions.

$\mu = \theta\beta + (1 - \theta)\beta^s$ where θ is the share of income contributed by the child.

Using couples' income as the outcome moderates the difference in trends and levels across sexes





Rank mobility in family income is almost identical across sexes

Summary and next steps

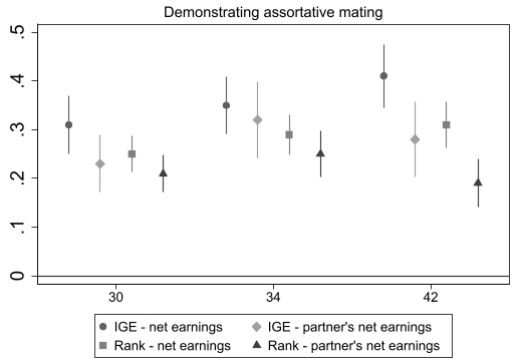
This project has so far delivered a number of insights about men's and women's earnings mobility.
The next step is to document the mechansims that drive family income mobility for men and women.
We have made the following elements:
1. Assortative matching is strong, implying that the correlation in potential earnings between partners is between 0.7 and 0.9.
2. Matching cohort members with random partners reduces intergenerational persistence by one quarter for women, and around 10% for men. This is in line with estimates from Holmlund.
3. Decomposing family income persistence by partnership status shows that being in a partnership contributes to women's family income persistence, in contrast to what is found for earnings persistence.

There is strong evidence of assortative mating

Following Raaum et al (2008) and assuming minimal labour supply reactions for men a comparison of β and β^s based on male earnings provides an estimate of the extent of assortative mating.
$\pi = \beta_f^s / \beta_m$

	Elasticity of own earnings on parental income	Elasticity of partners' earnings on parental income	Rank correlation of own earnings with parental income	Rank correlation of partners' earnings on parental income
Women				
Age 30	0.30 (0.040)*** [2653]	0.23 (0.030)*** [2878]	0.18 (0.020)*** [2653]	0.21 (0.019)*** [2990]
Age 34	0.34 (0.045)*** [2004]	0.32 (0.040)*** [1751]	0.20 (0.023)*** [2004]	0.25 (0.024)*** [1751]
Age 42	0.32 (0.046)*** [1691]	0.28 (0.039)*** [1713]	0.17 (0.025)*** [1691]	0.19 (0.025)*** [1713]
Men				
Age 30	0.31 (0.030)*** [2771]	0.26 (0.046)*** [1907]	0.25 (0.019)*** [2771]	0.18 (0.023)*** [2049]
Age 34	0.35 (0.030)*** [2241]	0.25 (0.064)*** [1084]	0.29 (0.021)*** [2241]	0.13 (0.021)*** [1084]
Age 42	0.41 (0.033)*** [1769]	0.11 (0.054)*** [1361]	0.31 (0.024)*** [1769]	0.08 (0.028)*** [1362]

There is strong evidence of assortative mating - β_m and β_f^s are close



Shutting off the assortative mating channel

We can demonstrate the impact of assortative mating by subtracting partners' earnings from family income and replacing it with the earnings from a randomly matched partner. At present, we do this five times and take the average.

Women	Age 30	Age 34	Age 42
Actual intergenerational elasticity	0.315 (0.026)	0.400 (0.036)	0.423 (0.034)
With random matching (averaged)	0.240	0.293	0.325
Actual rank correlation	0.212 (0.015)	0.229 (0.018)	0.246 (0.019)
With random matching (averaged)	0.156	0.165	0.185
Men			
Actual intergenerational elasticity	0.406 (0.028)	0.441 (0.035)	0.493 (0.039)
With random matching (averaged)	0.362	0.421	0.473
Actual rank correlation	0.243 (0.015)	0.256 (0.019)	0.277 (0.020)
With random matching (averaged)	0.205	0.233	0.243

Partnership formation also contributes to intergenerational persistence

		Partner			No partner		
	Total IGE	Within-group IGE	Between and within	Weight by share	Within-group IGE	Between and within	Weight by share
Age 30	0.315 (0.026)***	0.267(0.030)***	0.263	0.181	0.354 (0.040)***	0.427	0.134
		[69%]		(57%)	[31%]		(43%)
Age 34	0.400 (0.036)***	0.353 (0.041)***	0.355	0.259	0.462 (0.060)***	0.520	0.140
		[73%]		(65%)	[27%]		(35%)
Age 42	0.424 (0.033)***	0.375 (0.034)***	0.385	0.284	0.410 (0.061)***	0.533	0.140
		[74%]		(67%)	[26%]		(33%)
Age 46	0.485 (0.042)***	0.448 (0.044)***	0.457	0.351	0.475 (0.076)***	0.577	0.135
		[77%]		(72%)	[23%]		(28%)

Patterns are similar for net earnings

	Age 30	Age 34	Age 38	Age 42	Age 46	Working age (av. 30-46)
Women						
Intergenerational elasticity	0.36 (0.032)***	0.35 (0.038)***	0.32 (0.035)***	0.35 (0.038)***	0.30 (0.040)***	0.31 (0.030)***
Intergenerational rank correlation	0.21 (0.016)***	0.21 (0.019)***	0.19 (0.020)***	0.19 (0.021)***	0.18 (0.022)***	0.20 (0.020)***
Sample size	3,825	2,747	2,555	2,279	2,090	3,029
Men						
Intergenerational elasticity	0.32 (0.025)***	0.34 (0.027)***	0.35 (0.025)***	0.41 (0.030)***	0.37 (0.035)***	0.38 (0.022)***
Intergenerational rank correlation	0.25 (0.016)***	0.28 (0.018)***	0.28 (0.020)***	0.31 (0.021)***	0.27 (0.023)***	0.31 (0.018)***
Sample size	4,193	2,950	2,383	2,173	1,881	3,353

Sensitivity to attrition - only including those in the sample at 46

	Age 30	Age 34	Age 38	Age 42	Age 46
Women					
Intergenerational elasticity	0.45 (0.044)***	0.54 (0.056)***	0.44 (0.053)***	0.43 (0.050)***	0.42 (0.044)***
Intergenerational rank correlation	0.26 (0.022)***	0.25 (0.025)***	0.21 (0.026)***	0.20 (0.024)***	0.21 (0.022)***
Sample size	2,057	1,575	1,502	1,736	2,086
Men					
Intergenerational elasticity	0.36 (0.032)***	0.44 (0.035)***	0.44 (0.035)***	0.52 (0.038)***	0.51 (0.038)***
Intergenerational rank correlation	0.28 (0.021)***	0.33 (0.024)***	0.32 (0.026)***	0.33 (0.024)***	0.31 (0.023)***
Sample size	4,193	2,950	2,383	2,173	1,881

Alternative average income measures

	Women		Men	
	Working age 1 (av. 30-46) Includes imputed	Working age 2 (av. 30-46) Includes zeroes	Working age 1 (av. 30-46) Includes imputed	Working age 2 (av. 30-46) Includes zeroes
IGE	0.40 (0.035)***	0.54 (0.040)***	0.48 (0.025)***	0.54 (0.030)***
Hours adjusted	0.26 (0.024)***	0.33 (0.027)***	0.42 (0.023)***	0.45 (0.025)***
Potential – same sample	0.23 (0.022) ***	0.28 (0.023)***	0.37 (0.021)***	0.38 (0.022)***
Potential – extended	0.22 (0.020) ***	0.26 (0.022)***	0.35 (0.018)***	0.35 (0.020)***
sample	[4149]	[4468]	[4058]	[4096]
Rank correlation	0.20 (0.018)***	0.22 (0.016)***	0.32 (0.017)***	0.32 (0.017)***
Hours adjusted	0.14 (0.012)***	0.14 (0.011)***	0.29 (0.016)***	0.27 (0.015)***
Potential – same sample	0.20 (0.018)***	0.20 (0.016)***	0.31 (0.017)***	0.30 (0.017)***
Potential – extended	0.20 (0.016)***	0.19 (0.015)***	0.31 (0.017)***	0.28 (0.016)***
sample	[4149]	[4468]	[4058]	[4096]
Sample size	3,262	3,797	3,349	3,457