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Abstract

There is substantial evidence of a significant relationship between parents' income and sons' earnings in the UK, and that this relationship has strengthened over time. We extend this by exploring a broader measure of net family income as an outcome. In doing so, we uncover three additional trends in social mobility. Partnership, and the level of earnings from any partner, are increasingly related to family background. The progressive direct tax and benefit system in the UK acts to offset intergenerational income persistence and has a stronger effect for the later cohort. Finally, men from higher-income backgrounds are significantly more likely than those from lower-income backgrounds to be in paid work and hence have higher incomes. Including out-of-work men in the analysis increases the estimates of intergenerational income persistence.

1. Introduction

The economics literature on intergenerational mobility has evolved significantly over the last 30 years. The early research focused on the relationship between fathers' and sons' labour market earnings (Solon, 1992; Zimmerman, 1992; Dearden et al., 1997; Couch and Lillard, 1998; Mazumder, 2005), but the more recent literature has considered all resources available in families in childhood, to adapt to the growing importance of mothers' earnings and to demographic changes with the increase in single-parent families (see Black and Devereux (2011) and Jäntti and Jenkins (2013) for recent reviews). However, most studies still use the labour market earnings of sons in the second generation rather than family incomes (Minicozzi, 2003; Blanden et al., 2004; Corak, 2013; Gregg et al., 2016).

As discussed in Jäntti and Jenkins (2013), this raises questions about what we are trying to measure. Early studies focused on the association of earnings across generations, which was perhaps adequately captured by measuring intergenerational earnings persistence. In recent studies, the switch of focus to account for combined parental income or labour market earnings of parents has placed an emphasis on the association between available childhood resources and adult labour market outcomes. This switch towards resources available in childhood moves the focus toward considering the origin and destination outcomes of the child and away from comparing fathers and sons. However, these existing studies do not capture all the realised resources available for the second generation to consume or indeed to invest in their *own* (third-generation) children, as only own earnings are captured. If it is the association of living standards that we are in fact interested in, then 'it would make sense to study disposable income, i.e. to add public transfers and deduct income taxes paid' (Jäntti and Jenkins, 2013, 139) in both childhood and adulthood generations.

This study therefore focuses on intergenerational income mobility by measuring the association in net family incomes across generations for the first time in the UK (Chetty et al. (2014a, 2014b) using pre-tax incomes and Mitnik et al. (2015) using net family incomes consider this for the US). In doing so, ours is the first UK study to measure the intergenerational transmission of living standards. Although there is a small literature that has explored intergenerational poverty, which does reflect all income sources, it is self-evidently focused only on low incomes (see Corak (2004) and Blanden and Gibbons (2006)).

By moving from measures of labour market earnings of sons to measures of their entire family incomes in adulthood, we describe the important processes of partnering, assortative mating and fertility, which will influence living standards. We also account for the influence

of the direct tax and benefit system on intergenerational inequality. By using two birth cohort studies born 12 years apart, we are able to describe how these processes have changed over time and how they have contributed to changes in the intergenerational transmission of living standards over time. By undertaking the analysis in stages, we assess the relative importance of each component of income in the second generation and how this has changed over time.

Consistent with previous literature, we confirm that the strength of the association between parental income and sons' labour market earnings increases between cohorts born in 1958 and 1970 (Blanden et al., 2004; Blanden et al., 2005; Nicoletti and Ermisch, 2008).[1] Further, we find that the relationship between childhood income and *partners'* earnings is stronger in the later cohort. A positive association is consistent with the existing literature on the role of assortative mating (Ermisch et al., 2006; Raaum et al., 2007). Importantly, we find it is actually both *whether* individuals are in partnerships, and the earnings of *who* they partner with, that has changed over time (in contrast, the labour force participation of the partner does not become more strongly associated with family background). Stable partnership has become increasingly selected in favour of the more affluent. This is in line with the literature on lone parenthood (see, for example, Gregg et al. (2016)).

In the later cohort, individuals from higher-income families are significantly more likely to have a partner in adulthood and, if that partner works, more likely to have a higher-earning partner than those from lower-income families. These factors mean that the total association between parental income and gross private family income has increased by over 17 log points (14 percentage points) between the cohorts studied. This is in line with Blanden et al. (2004), who consider combined family earnings (own combined with that of any spouse).

Taking account of the direct tax and benefit system (and fertility, which influences benefits received) reduces our estimates of income persistence in both cohorts; this reflects the progressivity of the direct tax and benefit system meaning that those with higher gross earnings pay more tax and receive less benefit income. However, taking into account tax paid and benefits received also reduces the increase in income persistence between the cohorts, likely reflecting progressive changes to the tax and benefit system (Adam and Browne, 2010). This goes some way to offset the increased association between parental incomes and gross private income in adulthood in the later cohort. We also account for family size in both

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[1] See Blanden et al. (2013) and Breen et al. (2015) for a discussion of differences between class and income mobility regarding trends over time.

the parents' and children's generations. In doing so, our estimates more closely reflect the real level of resources available to each family and hence provide a better measure of living standards.[2]

Finally, by using a measure of net family income rather than gross individual earnings, we are able to include out-of-work individuals in our analysis. We find parental income is an important predictor of own employment status, with individuals from higher-income families more likely to be in work at age 42. This selection into employment represents an important component of intergenerational income transmission, and the failure to incorporate out-of-work individuals leads to a significant underestimate of the level of income persistence (see also Gregg et al. (2017)).

Overall, we estimate that for the population of males born in 1970, a 1% higher parental income at age 16 is associated with 0.35% higher net family income at age 42. This has increased by 0.12 percentage points (or 48%) since 12 years prior.

The paper proceeds as follows. Section 2 reviews the relevant literature on intergenerational income mobility and assortative mating. Section 3 discusses the data and empirical strategy. Section 4 presents the results and the paper ends in Section 5 with a discussion and some brief conclusions.

2. Related literature

The extent of intergenerational income mobility in the UK has received a growing amount of attention over the last decade. Yet in many ways the literature is still in its infancy. Given the difficulty in assessing the magnitude of intergenerational associations without context, most of this literature has focused either on comparisons using geographical variation (Blanden, 2013; Corak, 2013; Chetty et al., 2014b; Jerrim and Macmillan, 2015) or on assessing trends over time (Blanden et al., 2004; Blanden et al., 2005; Lee and Solon, 2009; Chetty et al., 2014a). International comparisons find large differences in intergenerational elasticities across countries, which also relate to levels of income inequality: typically, countries with higher income inequality are less mobile (Corak, 2013; Jerrim and Macmillan, 2015). Studies that look over time suggest that intergenerational income mobility in the US and the UK has at least remained stable (Lee and Solon, 2009; Chetty et al., 2014a) or declined (Putnam

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[2] Our definition of income closely resembles that used in living standards, poverty and inequality analysis in the UK (Department for Work and Pensions, 2017).

(2015) and Davis and Mazumder (2017) for the US and Blanden et al. (2004), Blanden et al. (2005) and Nicoletti and Ermisch (2008) for the UK).

As noted, much of the early literature on intergenerational income mobility focused on the association between the labour market earnings of fathers and sons (Solon, 1992; Zimmerman, 1992; Dearden et al., 1997; Couch and Lillard, 1998; Mazumder, 2005). Jäntti and Jenkins (2013) argue this literature was concerned with the measurement of intergenerational elasticities in lifetime permanent incomes across generations using point-in-time earnings as a proxy. In the era of the male breadwinner, this was perhaps not unreasonable. A particular focus was on dealing with transitory variations and measurement error in point-in-time earnings as proxy measures for permanent incomes, an issue first raised by Atkinson (1981) and Jenkins (1987).

Since then, many studies have shifted focus to consider the incomes of both the father and the mother in the first generation, and hence could take into account the growing number of single-parent families (more than 20% of children in the US and the UK live with a sole parent (OECD, 2016)) and hence the lack of information on fathers' labour market incomes (Blanden et al., 2004; Corak, 2013; Gregg et al., 2016). Recent studies in the US have gone further, utilising improvements in access to administrative data to measure intergenerational income mobility using family incomes in both generations, reflecting the availability of resources in childhood and for these children as adults (Chetty et al., 2014a, 2014b; Mitnik et al., 2015). Mazumder (2015) points out that this type of measure in both generations gets us closer to measures of lifetime consumption, which are suggested by economic theory to be the best proxy for utility. Whilst Mitnik et al. (2015) provide a fairly comprehensive assessment of intergenerational correlations in income sources, this has not yet been applied to the UK or compared across time periods where there have been profound changes in female labour market participation and earnings and family instability.

By considering the role of partners' earnings, this work also contributes to the literature on partnering and assortative mating by background. Much of the previous research in this area has considered partnering within social class groups, education groups, races and religions (Kalmijn, 1998; Blossfeld, 2009; Schwartz, 2013). Raaum et al. (2007) consider assortative mating by earnings and find that this is stronger in the US and the UK than in Nordic countries for a cohort born in 1958. Previous research by Atkinson et al. (1983) and Ermisch et al. (2006) suggests that there is strong evidence of people partnering with similarly educated individuals in the UK and that this accounts for up to 40% of the intergenerational

transmission of incomes. A limitation of Ermisch et al. (2006) and Raaum et al. (2007) is that they focus only on partnered individuals and hence do not assess the role of partnering and relationship stability, independently of who individuals partner with. Partnership itself has been found to show a strong social pattern by McLanahan (2004) and Putnam (2015) for the US and Gregg et al. (2016) for the UK. Using administrative data in the US, Mitnik et al. (2015) find that both partnering and assortative mating play an important role in the intergenerational transmission of incomes.

3. Data and empirical strategy

This research uses the two mature birth cohort studies currently available in the UK, the National Child Development Study (NCDS), of people born in one week in March 1958, and the British Cohort Study (BCS), of people born in one week in April 1970. These studies have been widely used to study intergenerational income mobility in the UK (Blanden et al., 2004; Blanden et al., 2005; Blanden et al., 2007, 2013; Gregg et al., 2016) but recent work to harmonise the income variables available in the various survey waves has improved the comparability of measures, allowing for a direct comparison of the association in net family incomes in two generations across cohorts for the first time. We give details of this harmonisation process below.

Information is available on the cohort members and the parents of the cohort members at birth, 7, 11 and 16 in the NCDS and birth, 5, 10 and 16 in the BCS. The cohort members are also followed into adulthood and information is collected at 23, 33, 42, 46 and 50 in the NCDS and 26, 30, 34, 38 and 42 in the BCS. Previous studies have typically focused on estimates of intergenerational income mobility based on parental income measured at age 16 (parental income is also available at age 10 in the BCS but not in the NCDS – see Gregg et al. (2016) for discussions of likely attenuation bias from this point-in-time estimate) and sons' labour market earnings at age 33/30 in the NCDS/BCS (Blanden et al., 2004; Blanden et al., 2005; Blanden et al., 2007, 2013). Gregg et al. (2016) present estimates across the range of ages available and find that estimates using sons' earnings at age 42 in both cohorts (0.291 and 0.391) are close to the half-lifetime estimates based on sons' earnings from age 26 through to 42 (0.251 and 0.345). We therefore focus here on measures of parental income at age 16 and measures of sons' family income at age 42. For comparability with the existing literature and hence to focus on the effect of widening the concept of income on estimated intergenerational income mobility, we report outcomes for sons.

Parental income at age 16 is derived from questions that asked parents to place their usual income within the appropriate band. In the BCS this question asked for 'usual gross family income' and in the NCDS three questions asked for 'father's net earnings', 'mother's net earnings' and 'other household income'. Authors create continuous measures by imputing income or income component within each band using the Family Expenditure Survey (FES). Income is predicted in the FES within each band using characteristics that are correlated with incomes and are also observed in the BCS or NCDS. These estimated relationships are then used to predict income, within the reported bands, in the two cohorts. Adjustments are made to account for differences in income definition: converting gross to net, removing the income of non-family members in the household, and consistently accounting for child benefit. For more details on this procedure, see Belfield et al. (forthcoming).

At age 42 in each cohort, all the components of family income are recorded on a continuous basis. Sons' gross family income at age 42 combines information on sons' earnings, their partner's earnings and gross private income from other sources. Sons' net family income is calculated as total gross private income after direct taxes have been deducted and state benefits added. Net family incomes both in childhood and in adulthood are equivalised, as a final step in the study, using a root-n equivalisation scale.

We estimate a standard reduced form model of the log of total net family income of individual i in cohort c at time t (y^{son}) on the log of their parents' total net family income in cohort c at time $t-1$ (y^{parent}), as shown in equation (1).

$$y_{ict}^{son} = \alpha + \beta y_{ict-1}^{parent} + u_i \qquad (1)$$

The estimated coefficient β gives the intergenerational elasticity for cohort c or the extent to which incomes persist across generations. A larger estimate therefore indicates more persistence in incomes or less mobility across generations. In our main specification, we measure the son's income, y_{ict}^{son}, at age 42 and parental income, y_{ict-1}^{parent}, when the son is aged 16. Additionally, we control for the ages of sons' fathers.

As we are interested in how the components of income contribute to the overall level of intergenerational income persistence in a given cohort, we build the picture in stages, focusing first on the log of son's labour market earnings as the dependent variable, as in

previous papers, before considering the log of their partner's labour market earnings as shown in equation (2).

$$y_{ict}^{son's\ partner} = \alpha + \beta y_{ict-1}^{parent} + e_i \qquad (2)$$

This allows us to assess the relative contribution of partners' earnings to the overall picture. However, the level of partners' earnings can be broken down further still. First, we estimate the probability of having a partner at time t, based on the parents' total net family income at time $t-1$. This is estimated using a probit model as shown in equation (3). Second, conditional on having a partner, we estimate the probability of whether that partner is in work, also using a probit model. Finally, we consider the association between the log of the partner's earnings at time t and the log of the parents' total net family income at time $t-1$, for those who do have a partner who works, using a restricted form of equation (2).

$$F(Partner_{ict}^{son}) = \Phi(\alpha + \beta y_{ict-1}^{parent}) \qquad (3)$$

By estimating these three stages separately, we are able to observe the extent to which being in a relationship is socially graded *and* whether those from richer families are more likely to choose richer partners in adulthood.

In a similar fashion, additional components of income can be added to move from combined earnings to total private income and taxes and transfers. As benefits include payments for resident children (child benefit and tax credits), as a final step we equivalise net family income to account for family size, as is standard in the household income inequality and poverty literature. This step will be heavily influenced by the presence of children in the household and will thus reflect fertility patterns.

4. Results

Before we analyse the relationship between incomes across generations, Table 1 presents descriptive statistics of the income concepts used and the samples that form our analysis. These income measures show expected levels of real income growth both between the cohorts and between generations within a cohort. The samples of working males at age 42

have mean individual gross earnings of around £900 per week in 2016 prices in both the NCDS and the BCS.[3] This is higher than is observed in nationally representative data for a similar population in the same years.[4] The discrepancy is likely to be at least in part driven by non-random attrition in the cohort studies. The average level of partners' gross earnings does not grow between the cohorts because the proportion of individuals with a partner falls from 84% to 77%, offsetting the increase in female labour market participation.

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[3] The appendix presents means by parental income quintile.

[4] In the Family Expenditure Survey, working males between 40 and 45 have average gross earnings of around £760 in 2000 and around £600 in 2012. This fall is likely to be driven by the Great Recession. It is somewhat surprising that a similar fall is not observed in the cohort studies.

Table 1. Summary statistics of income and earnings measures in the NCDS and BCS

Mean	NCDS	BCS
Age 16	*1974*	*1986*
Parents' net family income	£528 [242]	£556 [308]
Parents' equivalised net family income	£269 [139]	£300 [168]
Age 42	*2000*	*2012*
Sons' individual gross earnings	£900 [2,385]	£903 [869]
Sons' partners' individual gross earnings	£288 [2,134]	£277 [417]
Son's gross family private income	£1,205 [3,874]	£1,210 [1,000]
Sons' net family income	£899 [2,447]	£890 [673]
Sons' equivalised net family income	£539 [1,715]	£513 [383]
Proportion with partner	84%	77%
Proportion with children	70%	74%
Sample	*1,788*	*1,143*

Notes: Standard deviations are shown in square brackets. Figures presented are in per-week terms in 2014 prices. Equivalisation is carried out using a root-n equivalisation scale and figures are reported as equivalised to a single adult. The sample includes all employed males who report family income at 16 and all the relevant components of income at 42. This excludes self-employed males and, in the BCS, any men whose partner is self-employed – due to issues recording self-employment income. This excludes 15% of the sample in the NCDS and 20% in the BCS.

It is also worth noting that a marked increase in income inequality over time is observed. The Gini coefficient of sons' equivalised net family income is 0.44 in the NCDS and 0.50 in the BCS. This is important because an increase in intergenerational income persistence can be driven either by an increase in the persistence of income rank, where there is a closer matching of the ordering of who has high and low incomes across the two generations, or by an increase in income inequality which means there are larger income gaps between high and low income groups to be passed across generations. For all results presented, we examine whether the findings also hold when only looking at income rank persistence, in doing so stripping out the impact of any changes in income inequality.

We begin by estimating the intergenerational correlation between sons' own gross earnings at 42 and parental income, presented in Table 2. This analysis is limited to males who are in work at age 42 and hence report gross earnings. This sample restriction is relaxed later on as we move to using income as an outcome measure. We find significant evidence of income persistence and that this increases across cohorts.[5] These findings are in line with the existing work on these cohorts (Gregg et al., 2016). We repeat this analysis using the rank of income rather than log income and find the results do not change significantly, although the increase in income rank persistence is slightly smaller. Rising income inequality appears to play a small role in the increase in income persistence, but the majority of the increase is due to an increase in rank persistence. We use this as a starting point for examining how estimates of intergenerational persistence are affected by including additional sources of income and moving from individual gross earnings to a measure of equivalised net family income.

Table 2. Intergenerational persistence in male earnings in the NCDS and BCS at age 42 for working males

	NCDS	BCS	*Change*
Intergenerational elasticity using sons' gross earnings	0.223*** (0.029)	0.358*** (0.035)	*+0.135** (0.046)*
Rank measure	0.226*** (0.023)	0.322*** (0.029)	*+0.096** (0.037)*
N	*1,788*	*1,143*	

Notes: *** = p<0.001; ** = p<0.01; * = p<0.05. Standard errors are shown in parentheses. Intergenerational elasticity reports the coefficient for log parental income from an OLS regression of sons' gross earnings at age 42 on log parental income, controlling for a quadratic of fathers' age. Rank measure reports the coefficient from an OLS regression of the rank of sons' gross earnings on the rank of parental income. The sample includes all employed males who report family income at 16 and all the relevant components of income at 42. This excludes self-employed males and, in the BCS, any men whose partner is self-employed – due to issues recording self-employment income.

First, we consider the role of partners' earnings. The first panel of Table 3 presents the intergenerational elasticity of partners' gross earnings with respect to sons' parental income. This shows a clear change over time. Here when there is no partner, or the partner is not working, an arbitrary value for earnings is used, as log of zero is not defined. However, the result is not shaped by this decision. For the NCDS cohort (born in 1958) there is little or no relationship between a son's income in childhood and the earnings of his partner, but in the 1970 (BCS) cohort there is a strong positive relationship. This is repeated for the rank-based measure, where zeros are less of an issue, but the effect is much weaker. This is the first

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[5] A cross-equation test that the parameters are equal is rejected at the 5% level.

evidence suggesting that having a working partner and the partner's earnings have both become increasingly sorted by family origins.[6]

Table 3. The association between parental income, partnering and assortative mating in the NCDS and BCS at age 42 for working males

	NCDS	BCS	*Change*
All			
Partners' earnings	0.0651	0.563***	*+0.498***
	(0.133)	(0.169)	*(0.215)*
Rank measure	0.0273	0.153***	*+0.126***
	(0.027)	(0.038)	*(0.048)*
N	*1,788*	*1,143*	
Subgroup probabilities			
Probability in couple	0.033	0.095***	*+0.061*
	(0.073)	(0.025)	*(0.077)*
N	*1,788*	*1,143*	
Probability partner works	−0.020	0.008	*+0.028*
	(0.017)	(0.026)	*(0.032)*
N	*1,502*	*884*	
Conditional on having working partner			
Partners' earnings	0.021	0.137*	*+0.116*
	(0.051)	(0.057)	*(0.077)*
Rank measure	0.027	0.069**	*+0.042*
	(0.020)	(0.024)	*(0.031)*
N	*1,117*	*714*	

Notes: *** = $p<0.001$; ** = $p<0.01$; * = $p<0.05$. Standard errors are shown in parentheses. Results presented in the first row are the coefficient for log parental income from an OLS regression of partners' gross earnings at age 42 on log parental income at age 16, controlling for a quadratic of fathers' age. Rank measure reports the coefficient from an OLS regression of the rank of partners' gross earnings on the rank of parental income. Subgroup probabilities report the average marginal effect of parental income on a binary outcome of being in a couple or having a working partner, estimated using a probit model. The bottom panel repeats the analysis in the top panel for the subsample of sons with partners. The sample includes all employed males who report family income at 16 and all the relevant components of income at 42. This excludes self-employed males and, in the BCS, any men whose partner is self-employed – due to issues recording self-employment income.

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[6] In practice, this increase in income persistence could be driven by differential measurement error between the cohorts. Blanden et al. (2013) explore this possibility in great detail and reject the hypothesis, finding no evidence of differential measurement error.

The second and third panels of Table 3 show how this relationship builds up from having a partner, that partner being in work and their earnings from that employment. The probability of having a partner at 42 is positively correlated with family income in the later cohort, but there is little relationship in the earlier cohort. This is in line with the findings of McLanahan (2004) and Putnam (2015), who provide evidence of growing social selection in relationship breakdown amongst families with children. Then, conditional on having a partner in the household, we find that whether that partner is working is unrelated to the son's family income in both cohorts. Finally, amongst individuals who have a working partner, partners' earnings are uncorrelated with sons' family background in the NCDS but are significantly more socially patterned in the BCS.

So the evidence clearly suggests that both the social gradient in partnering and assortative mating, along the lines of earnings, amongst those with partners have increased between these cohorts. The combined effect is a marked increase in the association between partners' earnings and sons' family background. The result is that when we take account of partners' earnings, intergenerational income persistence increases by more than when we limit our focus to individual gross earnings (although not statistically significantly so), as shown by the results in Table 4. Between the 1958 and 1970 cohorts, intergenerational income persistence increases by 13 log points when we only consider individual earnings and by 17 log points when we also include partners' earnings.[7] Incorporating other sources of income to arrive at total gross private income has little impact on the estimates.[8]

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[7] In terms of percentage points, a doubling of parental income translates into 11 percentage points higher individual earnings in the 1970 than in the 1958 cohort. The figure is 14 percentage points for combined earnings.

[8] We do find the income from other sources is significantly related to parental income in the BCS – potentially due to investment income on inherited wealth. However, income from these sources is very small compared with earnings and so has little impact of overall income persistence.

Table 4. Intergenerational gross income persistence in the NCDS and BCS at age 42 and the association between parental income and non-earnings income for working males

	NCDS	BCS	Change
Gross individual earnings	0.223***	0.358***	*+0.135**
	(0.029)	(0.035)	*(0.046)*
Rank measure	0.226***	0.322***	*+0.096**
	(0.023)	(0.029)	*(0.037)*
Gross combined earnings	0.203***	0.372***	*+0.169***
	(0.030)	(0.035)	*(0.046)*
Rank measure	0.202***	0.338***	*+0.136***
	(0.023)	(0.029)	*(0.037)*
Gross private income	0.200***	0.374***	*+0.174***
	(0.030)	(0.036)	*(0.046)*
Rank measure	0.200***	0.337***	*+0.137***
	(0.023)	(0.029)	*(0.037)*
N	*1,788*	*1,143*	

Notes: *** = $p<0.001$; ** = $p<0.01$; * = $p<0.05$. Standard errors are shown in parentheses. The top row of each panel presents the coefficient for log parental income from an OLS regression of sons' gross earnings, combined gross earnings or total gross private income at age 42 on log parental income at age 16, controlling for a quadratic of fathers' age. Gross private income is the sum of gross labour earnings for cohort members and their partners and other gross income. Rank measure reports coefficient from an OLS regression of the rank of sons' gross earnings, combined gross earnings or total gross private income on the rank of parental income. The sample includes all employed males who report family income at 16 and all the relevant components of income at 42. This excludes self-employed males and, in the BCS, any men whose partner is self-employed – due to issues recording self-employment income.

Next, we introduce the role of the state in terms of benefits and direct taxes, moving from gross private income to net family income. As shown in Table 5, the effect of the state is to reduce intergenerational correlations. This follows directly from the progressive nature of the tax and benefit system: those with higher gross earnings pay more tax and receive less benefit income; those with higher parental incomes have higher gross earnings; therefore those with higher parental incomes benefit less from or contribute more to the tax and benefit system. Table 5 shows that this effect is transmitted entirely through taxes; there is no relationship between parental income and benefit income. Given we are focusing on a sample of employed males and their families, we would expect direct taxes to be a more important component of income than benefits; however, we might have expected the presence of in-work benefits to result in some relationship between parental income and benefit income. The move from gross to net family income reduces the overall level of income inequality and so

reduces the income persistence. As such, the rank-based correlations do not reduce by as much.

Table 5. Intergenerational net income persistence in the NCDS and BCS at age 42 and the association between parental income and benefits and taxes for working males

	NCDS	BCS	Change
Gross private income	0.200***	0.374***	+0.174***
	(0.030)	(0.036)	(0.046)
Rank measure	0.200***	0.337***	+0.137***
	(0.023)	(0.029)	(0.037)
Net family income	0.170***	0.307***	+0.137**
	(0.027)	(0.032)	(0.042)
Rank measure	0.191***	0.309***	+0.118**
	(0.023)	(0.029)	(0.037)
Equivalised net family income	0.160***	0.282***	+0.123**
	(0.026)	(0.030)	(0.044)
Rank measure	0.185***	0.295***	+0.110**
	(0.025)	(0.029)	(0.037)
Taxes paid	0.262***	0.479***	+0.217**
	(0.043)	(0.056)	(0.071)
Benefits received	−0.006	0.016	+0.023
	(0.009)	(0.098)	(0.130)
N	1,788	1,143	

Notes: *** = p<0.001; ** = p<0.01; * = p<0.05. Standard errors are shown in parentheses. The top row of the first three panels presents the coefficient for log parental income from an OLS regression of gross private income, net family income or equivalised net family income at age 42 on log parental income at age 16, controlling for a quadratic of fathers' age. Gross private income is the sum of gross labour earnings for cohort members and their partners and other gross income. Net family income is measured after direct taxes have been paid and benefits have been received. Income is equivalised using the root-n scale. Rank measure reports the coefficient from an OLS regression of the rank of gross private income, net family income or equivalised net family income on the rank of parental income. The sample includes all employed males who report family income at 16 and all the relevant components of income at 42. This excludes self-employed males and, in the BCS, any men whose partner is self-employed – due to issues recording self-employment income.

Deducting taxes and including benefits also reduces the increase in the intergenerational correlation across cohorts. This is, in part, again a direct reflection of the progressive nature of the tax and benefit system. In the later cohort, gross earnings are more strongly correlated with parental incomes; therefore we would expect the relationship between parental background and net taxes (shown in the bottom panel) to be stronger too. However, the smaller increase in intergenerational correlation across cohorts may also reflect the increased progressivity of the tax and benefit system between 2000 and 2012 with the expansion of

family-related tax credits and the increase in the personal income tax allowance. It is perhaps surprising that benefits received are not related to family background but, as we are currently focusing on working males, this result may be dominated by child benefit, which is a universal benefit for those with children.

Finally, in order to best approximate living standards in each generation, we control for family size by equivalising income at the family level. As shown in Table 5, this has very little impact on our estimates of intergenerational income elasticity.

Up to this point – and in the majority of the existing literature – the sample used to analyse social mobility is based on in-work males. This is largely because earnings are undefined for those not in work and estimates are very sensitive to the treatment of the zeros (see Gregg et al. (2016)). However, men who are not in paid work represent a non-trivial subset of the population and potentially, if parental income affects labour market attachment, an important component of the intergenerational transmission of incomes. Net family incomes, unlike gross individual earnings, are defined for out-of-work individuals and so we can include this group in our measure of a net family income correlation. This is undertaken in Table 6.

Table 6. Intergenerational equivalised net family income persistence in the NCDS and BCS at age 42 by employment status

	NCDS	BCS	Change
Working males	0.160***	0.282***	+0.123**
	(0.026)	(0.030)	(0.044)
N	1,788	1,143	
Non-working males	0.083	0.110	+0.027
	(0.195)	(0.273)	(0.335)
N	220	111	
All	0.238***	0.354***	+0.116*
	(0.038)	(0.045)	(0.058)
N	2,008	1,254	

Notes: *** = p<0.001; ** = p<0.01; * = p<0.05. Standard errors are shown in parentheses. Results presented are the coefficient for log parental income from an OLS regression of equivalised net family income at age 42 on log parental income at age 16, controlling for a quadratic of fathers' age. Net family income is measured after direct taxes have been paid and benefits have been received. Income is equivalised using the root-n scale. This is estimated separately for the group of employed and not employed males. The sample includes all non-self-employed males who report family income at 16 and all the relevant components of income at 42. In the BCS, this excludes any men whose partner is self-employed – due to issues recording self-employment income.

The estimated intergenerational income persistence for the group of out-of-work males is considerably smaller than that for employed males (although not statistically significant). This is likely because this group will receive a large proportion of their incomes from benefits which are unrelated to their parental income. However, when we combine both groups to examine intergenerational mobility in the male population as a whole, we find larger estimates than when we only include employed men. Table 7 provides a clear explanation for this: parental income is a strong predictor of employment status, which feeds into intergenerational income persistence as employed individuals typically have a higher average family net income than those who are out of work. The exclusion of men who are not in paid work therefore leads to an underestimate of the true level of intergenerational income persistence.

Table 7. Marginal effects of parental income on sons' employment status

	NCDS	BCS	*Change*
Employed	0.060***	0.083***	*+0.023*
	(0.014)	(0.030)	*(0.033)*
N	*2,008*	*1,254*	

Notes: *** = p<0.001; ** = p<0.01; * = p<0.05. Standard errors are shown in parentheses. The table reports the average marginal effect of log parental income at age 16 on the probability of being employed at age 42, estimating through a probit model. The sample includes all non-self-employed males who report family income at 16 and all the relevant components of income at 42. In the BCS, this excludes any men whose partner is self-employed – due to issues recording self-employment income.

5. Conclusion

We have estimated the persistence of intergenerational equivalised family net income in the UK. As this is the definition of income typically used when analysing changes in living standards and inequality because it best captures the level of resources available to a family, our estimates represent estimates of the intergenerational transmission of living standards.

In line with the existing literature, we find significant evidence of persistence in living standards and that this persistence has grown over time; the magnitude of this increase is similar to that seen for individual earnings. However, using this more complete measure of income, we have uncovered three important and offsetting components of the intergenerational transmission of income.

First, we found evidence that increased socially patterned relationship breakdown and assortative mating amongst those with partners contributed to an increase in intergenerational income persistence through the level of partners' earnings. Second, the progressive nature of

the tax and benefit system plays an increasingly important role in reducing intergenerational persistence. The substantial expansion of family-related tax credits in the 2000s is likely to be at the heart of this. Finally, by using net income rather than gross earnings, we have been able to include out-of-work individuals in our analysis. We found that higher parental income is associated with sons being more likely to be employed. As non-employed individuals typically have lower incomes than the employed, the exclusion of this group leads to considerable underestimation of the level of income persistence.

The findings echo for the UK those of Putnam (2015) in the US that intergenerational inequalities are widening on a number of dimensions. The literature on income persistence has established evidence of increasing inequalities in family formation and relationship longevity and Blanden and Machin (2017) report widening inequalities in homeownership. The sole force pulling against these moves toward intergenerational inequalities is the progressivity of the tax and welfare systems. Taken together, this suggests that a broader policy response is needed that goes above and beyond improving the educational opportunities of deprived children.

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Appendix

Table A1. Probability of being in a couple, by quintile of parental income at age 16

	All men	Employed men
1958 cohort		
Poorest 20%	75%	82%
Richest 20%	83%	87%
1970 cohort		
Poorest 20%	66%	74%
Richest 20%	85%	88%

Notes: The sample includes all males or all employed males who report family income at age 16 and all the relevant components of income at age 42. This excludes self-employed males and, in the BCS, any men whose partner is self-employed – due to issues recording self-employment income.
Sources: National Child Development Study and British Cohort Study, various waves. Income variables derived as part of the CLOSER data harmonisation work.

Table A2. Probability of relationship formation and breakdown by age 42, by quintile of parental income at age 16: all men

	Never married	Divorced
1958 cohort		
Poorest 20%	12%	9%
Richest 20%	11%	5%
1970 cohort		
Poorest 20%	36%	11%
Richest 20%	20%	5%

Notes: The sample includes all males who report family income at age 16 and all the relevant components of income at age 42. This excludes self-employed males and, in the BCS, any men whose partner is self-employed – due to issues recording self-employment income.
Sources: National Child Development Study and British Cohort Study, various waves. Income variables derived as part of the CLOSER data harmonisation work.

Table A3. Average level of income components for males at age 42, by quintile of parental income at age 16 (2016 prices): employed men

	Gross male earnings	Gross partner earnings	Gross family income	Net family income	Equivalised net family income
1958 cohort					
Poorest 20%	£720	£250	£990	£780	£440
Richest 20%	£1,060	£290	£1,360	£1,010	£580
% difference	47%	17%	37%	30%	30%
1970 cohort					
Poorest 20%	£680	£220	£920	£720	£410
Richest 20%	£1,270	£350	£1,680	£1,170	£650
% difference	88%	62%	82%	63%	57%

Notes: The sample includes all employed males who report family income at age 16 and all the relevant components of income at age 42. This excludes self-employed males and, in the BCS, any men whose partner is self-employed – due to issues recording self-employment income.
Sources: National Child Development Study and British Cohort Study, various waves. Income variables derived as part of the CLOSER data harmonisation work.

Table A4. Average level of partner earnings for males at age 42, by quintile of parental income at age 16 (2016 prices): employed men

	All women	Employed women
1958 cohort		
Poorest 20%	£250	£400
Richest 20%	£290	£440
% difference	18%	11%
1970 cohort		
Poorest 20%	£220	£380
Richest 20%	£350	£500
% difference	62%	34%

Notes: The sample includes all employed males with a partner who report family income at age 16 and all the relevant components of income at age 42. This excludes self-employed males and, in the BCS, any men whose partner is self-employed – due to issues recording self-employment income.
Sources: National Child Development Study and British Cohort Study, various waves. Income variables derived as part of the CLOSER data harmonisation work.

Table A5. Average level of partner earnings for males at age 42, by quintile of parental income at age 16 (2016 prices): all men

	All women	Employed women
1958 cohort		
Poorest 20%	£200	£380
Richest 20%	£270	£440
% difference	32%	18%
1970 cohort		
Poorest 20%	£200	£380
Richest 20%	£340	£510
% difference	73%	32%

Notes: The sample includes all males with a partner who report family income at age 16 and all the relevant components of income at age 42. This excludes self-employed males and, in the BCS, any men whose partner is self-employed – due to issues recording self-employment income.
Sources: National Child Development Study and British Cohort Study, various waves. Income variables derived as part of the CLOSER data harmonisation work.

Table A6. Average level of income tax and National Insurance contributions paid by the household at age 42, by quintile of parental income at age 16 (2016 prices): employed men

	Tax paid
1958 cohort	
Poorest 20%	£250
Richest 20%	£390
% difference	53%
1970 cohort	
Poorest 20%	£240
Richest 20%	£540
% difference	126%

Notes: The sample includes all employed males who report family income at age 16 and all the relevant components of income at age 42. This excludes self-employed males and, in the BCS, any men whose partner is self-employed – due to issues recording self-employment income.
Sources: National Child Development Study and British Cohort Study, various waves. Income variables derived as part of the CLOSER data harmonisation work.

Table A7. Probability of being in work at age 42, by quintile of parental income at age 16

	In work
1958 cohort	
Poorest 20%	85%
Richest 20%	92%
1970 cohort	
Poorest 20%	85%
Richest 20%	93%

Notes: The sample includes all non-self-employed males who report family income at age 16 and all the relevant components of income at age 42. In the BCS, this excludes any men whose partner is self-employed – due to issues recording self-employment income.
Sources: National Child Development Study and British Cohort Study, various waves. Income variables derived as part of the CLOSER data harmonisation work.

Table A8. Probability of being on disability benefits at age 42, by quintile of parental income at age 16

	On disability benefits
1958 cohort	
Poorest 20%	5%
Richest 20%	4%
1970 cohort	
Poorest 20%	11%
Richest 20%	4%

Notes: The sample includes all non-self-employed males who report family income at age 16 and all the relevant components of income at age 42. In the BCS, this excludes any men whose partner is self-employed – due to issues recording self-employment income.
Sources: National Child Development Study and British Cohort Study, various waves. Income variables derived as part of the CLOSER data harmonisation work.

Table A9. Average level of equivalised net family income at age 42, by quintile of parental income at age 16 (2016 prices)

	Employed males	All males
1958 cohort		
Poorest 20%	£440	£400
Richest 20%	£580	£540
% difference	30%	37%
1970 cohort		
Poorest 20%	£410	£380
Richest 20%	£650	£660
% difference	57%	75%

Notes: The sample includes all non-self-employed males who report family income at age 16 and all the relevant components of income at age 42. In the BCS, this excludes any men whose partner is self-employed – due to issues recording self-employment income.
Sources: National Child Development Study and British Cohort Study, various waves. Income variables derived as part of the CLOSER data harmonisation work.