# The GDP cost of the lost earning potential of adults who grew up in poverty

Jo Blanden, Kirstine Hansen and Stephen Machin

October 2008

**Growing up in poverty reduces employment prospects and earnings in later life. This has a negative impact on GDP through lost productivity. Quantifying these personal and public costs opens the way to discovering the potential impact of abolishing child poverty.**

This report uses data from The British Cohort Study to estimate the impact of growing up in poverty on earnings and employment. It then calculates the aggregate effect of eliminating these disadvantages and therefore improving the labour market earnings of individuals.

The report covers:

- empirical estimates of the impact of growing up in child poverty on adult earnings and employment;
- the role of education in the relationship between child poverty and adult earnings and employment;
- estimates of the overall monetary costs of child poverty;
- the plausibility of these estimates under different assumptions of how poverty eradication would affect labour market opportunities;
- a final assessment of the GDP benefits of abolishing child poverty in terms of foregone earning, employment and benefit savings.

JOSEPH ROWNTREE FOUNDATION

www.jrf.org.uk

# Contents


List of figures and tables 4

Executive summary 5

**Background 7**

**Empirical estimates of the relationship poverty between and adult outcomes 8**

**The economic costs of child poverty under the assumption that all child poverty is eradicated with no other effects 11**

**Sensitivity tests 13**

**Summary and estimates of the economic costs of child poverty 15**

**Figures and tables 16**

Notes 24

References 25

# List of figures and tables

## Figures

1 Child poverty rates over time

## Tables

1 Log earnings at age 34 and poverty at age 16

2 Probability employed at age 34 and poverty at age 16

3 Log earnings and poverty at age 16

4 Probability of employment and poverty at age 16

5 Poverty and educational attainment

6 A simple calculation of costs of child poverty

7 Benefit savings loss due to higher unemployment

8 Additional tax accruing from higher employment levels

# Executive summary

Child poverty reduces individual earnings and employment prospects. Costs to the economy come in the form of lost productivity and unemployment benefits. This report aims to get close to discovering the impact of abolishing child poverty. It offers a set of empirical estimates of the impact of growing up in poverty on the earnings and employment of adults before going on to calculate the effect of eliminating these disadvantages through the abolition of poverty.

Data from the longitudinal British Cohort Study (BCS70) is used to calculate the impact of growing up in child poverty on adult earnings and employment. Children living in poverty are identified as those aged 16 living in households with less than £100 per week gross household income. Outcomes are measured at cohort member ages 26, 29/30 and 34.

The results show that childhood poverty reduces earnings by between 15 and 28 per cent. Poverty also reduces the probability of being in employment at age 34 by between 4 and 7 per cent.

Controlling for education in these calculations reduces the employment penalty experienced by poor children. This shows that their lower earnings are largely due to a lack of skills. Our results assume that children are lifted out of poverty their skills and productivity will improve. We also assumes that these effects would apply to all; abolishing child poverty would mean all those currently living below the poverty line being raised above it and would experience similar increases in productivity.

With 22.3 per cent of children poor, according to our definition, and mean earnings of around £25,000 a year, this calculation leads to an earnings loss of £38 billion a year. A 12 per cent reduction in employment leads to a productivity loss of £9 billion a year. With UK GDP being £1.2 trillion a year in 2006, the two effects amount to almost 4 per cent of GDP. Using 'lower bound' effects, which do not assume that child ability and basic parental characteristics will change when children are lifted out of poverty the total cost is reduced to £22 billion or 1.8 per cent GDP.

The benefit costs associated with the employment effects of child poverty are calculated using figures from the 2004–2005 Family Resources Survey. Uprating to 2006 prices to be consistent with other figures gives £1.5 billion. This does not include additional savings that would be made because those in employment obtain higher earnings and therefore receive fewer in-work benefits.

Ending child poverty would mean additional tax being paid by both those earning more and those moving into work. This works out at an additional £6.3 billion, meaning that around 28 per cent of the additional productivity generated would benefit public finances.

The report goes on to consider the plausibility of these estimates, bearing in mind the assumptions underlying them. It may be, for example, that raising earnings for the child poverty group could impact on others in the labour market. The increased relative supply of workers may not be fully reflected in additional labour market opportunities.

Three scenarios are used to explore how the estimated GDP effects would be moderated. In the first, relative demand increases and all workers are absorbed. In the second, there is no compensatory shift in relative demand so the relative wage falls. In the third scenario,

only some of the workers have their wages and employment opportunities improved.

The extent to which ending child poverty will lead to the estimated GDP gains outlined here therefore depends on how far relative demand adjusts to respond to the increased supply of workers.

With this consideration in mind, the overall GDP savings made by eradicating child poverty lie somewhere between 1 and 1.8 per cent of GDP. Adopting a conservative view on whether the labour market would be able to absorb the higher skill workers created by the abolition of child poverty pushes one towards the lower end of the range.

The report concludes that the benefits of abolishing child poverty in terms of foregone earnings, employment and benefit savings correspond to about 1 per cent of GDP. Between a quarter and third of this 1 per cent will be transferred to the Treasury through direct taxes. There will also be a relatively small impact on the exchequer through benefit savings.

# Background

This working paper aims to provide some plausible estimates of the cost to GDP of the lost earning potential of adults who grew up in poverty. It offers a set of empirical estimates of the impact of growing up in poverty on the earnings and employment of adults. Based upon these estimates, the paper goes on to calculate the aggregate effect of eliminating these disadvantages through the abolition of poverty and therefore improving the labour market earnings of individuals. The exercise has strong similarities to the US paper by Holzer *et al.* (2007) who estimated the foregone earnings due to child poverty at 1.3 per cent of GDP and the total costs (in terms of the labour market, crime and health) to be around 4 per cent of GDP.

The first section of this report presents empirical estimates of the impact of growing up in child poverty on adult earnings and employment. It also considers the role of education in this relationship. The second section reports the overall monetary costs of child poverty by aggregating the empirical estimates under the assumption that all of those in child poverty were lifted out of it, and that this improves their earnings/employment potential. The report goes on to consider the plausibility of aggregating up in this way and shows how the magnitude of the monetary costs is altered under different assumptions about the way in which poverty eradication would impact on labour market opportunities. The final section concludes and offers a plausible range of estimates of the economic costs of child poverty.

# Empirical estimates of the relationship between poverty and adult outcomes

The British Cohort Study (BCS70) is a longitudinal study which follows all those living in England, Scotland and Wales who were born in one particular week in April 1970. This cohort of children was identified at birth and cohort members were followed up at age 5, 10, 16, 26, 29/30 and 34. The information on income data at age 16 means that we are able to relate child poverty to later outcomes. This report measures childhood poverty as children living in households at age 16 with less than £100 per week gross household income. Outcomes are measured at cohort member ages 26, 29/30 and 34. The less-than-£100-a-week bracket is chosen for simplicity, as it covers the bottom two categories of the income variable.

Using this cut-off in the BCS70 data, around 20 per cent of households who report income information were in poverty when the cohort children were 16 years old. We might be concerned that basing the poverty line on gross unequivalised income rather than the use of net equivalised income leads to a biased measure of who is actually poor. Blanden (2006) explores alternative approaches to measuring poverty in the BCS, and shows that all measures lead to an estimated poverty line of 20–25 per cent in these data. Attempts to construct a poverty variable closer to the 'official' equivalised measure do not show substantially stronger impacts on poverty at later outcomes, and nor does combining the other available information on childhood income from the age 10 sweep of the BCS70 survey.

Figure 1 presents information on how the child poverty rate has changed using a definition of the poverty line as 60 per cent of median equivalised income before housing costs and Family Expenditure Survey data (from unpublished figures produced by the Institute of Fiscal Studies). This figure shows a 21 per cent child poverty rate for 1986, very close to the rate in this study sample. Interestingly, the rise in child poverty post-1986 combined with the fall in the second half of the 1990s means that the rate of child poverty among the BCS generation is close to the rate for children today.

Aggregate numbers in this report treat the impact of poverty at age 34 as the impact on the majority of the population. Recent research on intergenerational mobility (Gregg and Macmillan, 2008) shows that, for the UK at least, the impact of parental income on earnings grows up to age 34 and then remains constant as far as can be observed. For younger individuals, the impact of poverty at 26 and 30 is used to reflect how the impact of poverty on outcomes worsens as individuals settle into the labour market.

This paper aims to get close to discovering the impact of abolishing child poverty. If this were done through redistribution and improved working incentives (the current Government approach) we would expect that many parental characteristics will remain the same as income changes. To get close to observing the causal impact of child poverty, the first step is to add controls for easily observable parental characteristics (such as parental education and lone parent status). It is unlikely that this will be sufficient though, as there will also be many other characteristics that are associated with child poverty but are less easily observable (Blanden and Gregg, 2004).

One of these characteristics might be child ability. If poorer parents are less able and pass this on to their children then this aspect of the association between poorer outcomes and child poverty would not be influenced by redistribution. However, removing the association between child poverty and outcomes which comes through child ability (measured by vocabulary and copying scores at age five) might be netting out too much as it would remove any impact of poverty on pre-school outcomes, an important formative period. However, these results will still include the impact of other unobservables, so

not completely clear if we will be over- or under-estimating the impact of poverty on outcomes.

The approach used here for controlling for parental and child characteristics may be too stringent if approaches to ending child poverty substantially change the characteristics of parents, for example if parents education and skills are improved. We can therefore think of our approach as somewhat conservative, although it is in keeping with the literature on estimating the causal effect of parental income on children's outcomes.

Blanden and Gregg (2004) review and explore even more stringent tests to identify the causal impact of parental income on children's educational attainment. One way of approaching this is to look at within-family or within-individual changes in income. For example, looking at how children's outcomes evolve between 10 and 16 as the level of family income changes. If children's performance deteriorates when their relative income position declines, then this can be considered a causal effect. When this approach is applied, the impacts of family income are still significant but are about one third of those where family characteristics and test scores are controlled for. However, this approach is likely to be downward biased for two reasons: first, the abolition of child poverty would lead to higher family incomes throughout childhood; and second, these estimates rely on income changes which tend to include a great deal of measurement error.

Another way of dealing with questions of causality is to compare poor children to those with incomes just above this line. In the second set of models in this study, only those with incomes less than £200 a week are included and those with incomes of less than £100 a week are considered poor. This reduces the sample to just over half the size. The shift from living in poverty to living with an income just above the poverty line can be thought of as a realistic interpretation of the consequences of ending child poverty.

Results documenting the association between exposure to child poverty and labour market outcomes at age 34 using the BCS data are reported in Tables 1 to 3. Table 1 examines the relationship between (log) earnings at 34 and poverty at 16. It reports four specifications: the first is a simple regression of (log) earnings on child poverty; the second controls for some individual characteristics which may affect this relationship: gender, parental age and region. The third specification adds family controls: lone parent status and parental education, while the fourth adds qualifications achieved by the individual prior to being observed in the labour market. Panel A of the table shows the results of these different specifications for the full sample. Panel B runs the same specifications on the full sample, but also controls for ability at age five. The lower panels of the table repeat the analysis using a sub-sample of individuals whose household income was less than £200 per week when they were aged 16. In this case the poverty measure takes a value of zero if household income was between £100 and £200 per week and one if income was below that level. Table 2 reports results from the same specifications for the probability of being employed at age 34. The results show that childhood poverty reduces all outcomes examined. Log earnings are reduced by between 15 and 28 per cent in the full sample, depending on the factors controlled for. Including individual and family characteristics reduces the magnitude of the original poverty coefficient which is further reduced by controlling for education. When test scores are included in the model (B) this further reduces the poverty coefficient. But the coefficients remain sizeable and statistically significant at the one per cent level in all specifications. As we might expect, when the sample is restricted to only those growing up in poverty the coefficients are smaller in magnitude, but effects are still important and significant. The estimated impact on earnings is approximately 21 per cent in the full sample when parental characteristics and ability are controlled for and 13 per cent in the restricted sample.

Poverty also reduces the probability of being in employment at age 34 (Table 2). Individuals in poor households at age 16 are between 4 and 7 percentage points less likely to be employed at age 34. Adding controls reduces the poverty coefficient, but it remains significant in all specifications. Again panels C and D of the table show a reduced effect for the restricted sample.

The results in the final column of each panel control for education and give a clue to the sources of the wage and employment penalty experienced by poor children. In all cases the

penalty is reduced substantially by the inclusion of the education variable. We interpret this as demonstrating that much of the lower earnings experienced by poor children is due to their lack of skills (the simple education variable we add will provide a lower bound on this). We therefore imagine that as children are lifted out of poverty their skills and productivity will be improved. This is a crucial assumption for this report's calculation of the total impact of child poverty.

Tables 3 and 4 provide comparisons of results across ages 26, 30 and 34. As noted above, these assume that the impacts of child poverty on earnings rise until age 34 and then remain fairly constant across an individual's working life. Tables 3 and 4 show how they might change up until this age and show that the earnings penalty associated with being brought up in poverty definitely increases as individuals age. The impact of poverty on employment is stronger at ages 26 and 30; this is mostly driven by larger effects on the employment of women at these ages. We use the estimates from earlier ages in the BCS to calculate the penalties of growing up in poverty for younger groups.

Results so far have been based on a single cohort study, and for children growing up in the 1980s. The British Household Panel Survey (BHPS) provides a means of confirming basic patterns with an alternative dataset. The focus here is on the impact of growing up in poverty on education outcomes, we do not have very large samples of individuals who are observed at age 16 and then in the labour market as adults. Table 5 shows that the impact of growing up in poverty on the number of good GCSEs achieved (O levels for the BCS) and on degree attainment is strikingly similar between the BHPS and BCS. These figures for the BHPS are for a poverty line comparable with the £100 gross income cut-off used in the BCS. Using the official definition of poverty finds that poor children have two fewer good GCSEs than non-poor children, compared to the figures reported here of an average impact of 2.1 good GCSEs.

# The economic costs of child poverty under the assumption that all child poverty is eradicated with no other effects

With estimates of the impact of poverty on earnings and employment in hand, it is possible to move on to calculating the total earnings loss associated with child poverty. This requires some strong assumptions, some of which will be relaxed in the next section:

- Impacts of poverty on the BCS cohort are assumed to apply to the whole population (with age 34 impacts applied to the whole population of 35 and over).
- 'Abolition' of child poverty would mean that all those currently living below the poverty line would be raised above it.
- When individuals are removed from poverty all the negative impacts of poverty are removed. This means that all workers improve their skills and are absorbed by the labour market at the wage prevailing before the supply expansion.
- Those shifted into work would earn at the 25th percentile.

We make separate calculations for the earnings losses of those currently working and the losses experienced because of the reduced probability of working associated with growing up in poverty. For the working population, population figures for each age group are multiplied by the poverty rate (currently 22.3 per cent) and the relevant employment rate. This provides the number of workers who grew up in poverty in each age group. The wage loss for each worker is then calculated by multiplying the estimated wage penalty by mean earnings within the age group. This is aggregated up by the number of workers who grew up in poverty to give the total cost of lost productivity for those currently working.

Lost employment is calculated as the percentage point reduction in employment multiplied by the population who grew up poor (again this is done by age group). This is aggregated up to a productivity loss by assuming that if these additional individuals worked they would earn at the 25th percentile for their age group. All population, employment and earnings figures used are for 2006.

The first panel of Table 6 calculates the total cost of poverty using the first earnings and employment impacts estimated in Tables 1 and 2, comparing the poor with everyone else and not controlling for any family or individual characteristics. As we saw previously, the estimated earnings effects from these models are 28 per cent at age 34, and a little lower for younger individuals. With 22.3 per cent of the population poor and mean earnings of around £25,000 a year, this leads to an earnings loss of £38 billion a year. The 13 per cent reduction in employment leads to a productivity loss of £9 billion a year. With UK GDP being £1.2 trillion a year in 2006, the two effects amount to almost 4 per cent of GDP.

Panel B repeats this exercise but using 'lower bound' earnings and employment effects. These are taken from models that compare the outcomes of those who were poor as children with those with slightly higher incomes and control for test scores and parental characteristics. With earnings effects around one third of the size of those used in the previous calculations and employment effects about half the size, the effects are clearly a lot smaller. Nonetheless, the total cost of poverty is still sizable, at £22 billion or 1.8 per cent of 2006 GDP.

Table 7 considers simple estimates of the benefit cost associated with the reduced

employment that results from child poverty. These are calculated from the mean income-related benefit received by non-working individuals from the Family Resources Survey in 2004–2005. This aggregates to £1.4 billion; uprating to 2006 prices to be consistent with other figures gives £1.5 billion. Additional savings would be made from a reduction in in-work benefits as those in employment obtain higher earnings; these are not quantified here.

It is interesting to consider the total GDP effects of ending child poverty in terms of the benefits to the exchequer and the benefits to private individuals. Assuming that all those already in work who benefit from higher earnings have reached their tax allowance and will be taxed on their additional income at the basic rate of income tax and national insurance (currently 31 per cent combined), the Inland Revenue will obtain an additional £5.3 billion. The picture for those who move into employment is more complex as tax-free earnings allowances must be considered. This is explored in Table 8. Those moving into employment are once again assumed to earn at the 25th percentile for their age group. Taxes are based on current NI and income tax allowances and rates. The total additional tax paid by this group is around £0.8 billion. The total additional tax paid would therefore be £6.3 billion, meaning that roughly 28 per cent of the additional productivity generated would benefit public finances. As noted above, there will be an additional benefit to the Treasury of around £1.5 billion in terms of benefit savings, but this should not be thought of as increased GDP as it is merely a transfer.

# Sensitivity tests

The estimated GDP effects of the previous section rest on some important assumptions. In this section we consider the sensitivity of the estimates. For example, there is the possibility that raising earnings for the child poverty group could impact on others in the labour market who did not experience child poverty (so called 'general equilibrium' effects).

The previous section assumes earnings gains for all of the child poverty group and that all the non-employed move into work. Underlying this is the notion that the child poverty group are able to close the earning and employment gap with those who did not experience poverty in childhood. For example, they have acquired skills which raise them to the earnings level of the non-poor. This also requires employer demand to match the new supply of more productive workers.

In reality, it may not be the case that the increased relative supply of workers is fully reflected in additional labour market opportunities; for this to happen there needs to be some expansion in employment demand. Three different scenarios can be used to explore how the estimated GDP effects would be moderated.

These scenarios require a highly stylised and simplistic version of the labour market. Suppose there are three kinds of workers in the world where child poverty exists: high skill workers (HS), intermediate skill workers not affected by child poverty (IS) and low skill workers affected by child poverty (LS). Employers choose to hire these workers depending on their relative costs and how easily they can be substituted for one another. Abolition of child poverty effectively converts the LS workers into IS workers (e.g. their skill levels rise).

The abolition of child poverty will change the nature of the labour market because the relative supply of IS workers rises. Because there are now more of them, their relative wages should, in the absence of any other change, fall. However, workers are more skilled so we may well expect relative demand to also rise as firms take advantage of the availability of more skilled workers (e.g. due to capital-skill complementarity). The issue is, by how much? Consider the following scenarios:

Scenario 1: relative demand increases leaving the relative wage unchanged. Thus all workers are absorbed and there is no need to modify the impact on GDP estimated in the previous section (this is often assumed and/or observed in the literature on immigration where supply increases due to increased immigration flows are fully absorbed; see Manacorda, Manning and Wadsworth, 2006).

Scenario 2: there is no compensatory shift in relative demand so the relative wage falls. The extent to which this happens depends on the elasticity of substitution between HS and IS workers. To illustrate what happens, consider a numerical example. In the world with child poverty the shares of HS, IS and LS workers are 0.2, 0.6 and 0.2.[1] We then 'transform' the LS workers into IS workers so that the shares of HS and IS workers are 0.2 and 0.8. The relative supply of IS to HS workers increases by a third (from an LS/H ratio of 3 to 4). A simple relative supply and demand framework (as in Katz and Murphy (1992) for the US and in Manacorda *et al.* (2006) for the UK) relates the relative wage to relative supply as:

$$\ln(W_{HS}/W_{IS})_t = (1/\sigma)[D_t - \ln(N_{HS}/N_{IS})_t] \quad (1)$$

where D is the demand shift (assumed here to be zero, but assumed to entirely offset the supply increase under Scenario 1) and $\sigma$ is the elasticity of substitution between the two labour types.

Thus the impact on wages is $(1/\sigma)$ multiplied by the relative supply increase. In Manacorda *et al.* (2006) $\sigma = 5.8$ so the relative wage of HS to IS workers would fall by about 5 per cent, under the example above where all the child poverty jobs (0.2) are eliminated.[2] Thus if only supply effects operate then around half of the wage gains would be eradicated. This makes the point that supply effects are likely to dampen down the GDP benefits, in this example by around 50 per cent, from about 10 per cent to around 5 per cent wage improvement in panel B of Table 6.

Scenario 3: Under Scenario 2 all the LS jobs disappear, but perhaps a more plausible scenario is one where not all LS workers are transformed

into IS workers. The easiest way to think about this is that only a share, say $\sigma$, have their wages and employment opportunities improved. This involves scaling the GDP estimates from our lower bound in Tables 6. We consider a range from 0.5 (where the full supply effect lowers relative wages as in Scenario 2) up to 1.0 (as in Scenario 1 where a relative demand effect fully offsets the relative supply effect), as follows:

| $\sigma$ | 0.5 | 0.75 | 0.9 | 1.0 |
|---|---|---|---|---|
| Lower bound on saving as % of GDP | 0.91 | 1.36 | 1.63 | 1.81 |

This section thus makes it clear that the extent to which ending child poverty will lead to the GDP gains outlined in this report will depend on the extent to which relative demand adjusts in response to the increased supply of workers. If there is no adjustment, the GDP benefit of eradicating child poverty can be estimated at 0.9 per cent. Full adjustment will lead to the full estimated impact of 1.81 per cent of GDP in additional output.[3]

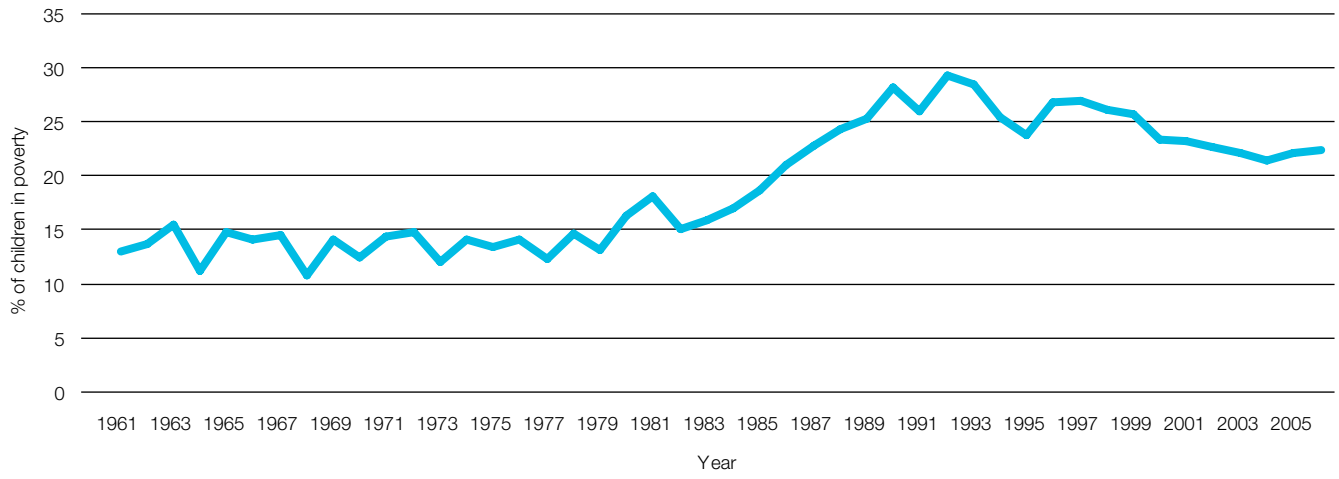
One useful way of thinking about this is to look at what happens in other countries, where child poverty is much lower and where the tail of low wage workers is not present. In the Scandinavian countries labour markets have tended to absorb workers further up the skill distribution meaning that wage inequality is lower as wages and skills at the lower end of the labour market are superior to the UK case. This suggests that demand does respond to increased supply without significantly lowering relative wages or employment. It is also true that most or all of the LS jobs disappear in the scenarios we consider: of course, some of these jobs exist in the Scandinavian countries but they are better paid than in countries with wide income distributions and high child poverty rates like the UK and US.

# Summary and estimates of the economic costs of child poverty

This report calculates the GDP savings made by eradicating child poverty as somewhere between 1 and 1.8 per cent of GDP. This is based on estimating the foregone earnings (and employment prospects) of workers who experienced child poverty (at age 16). It does require that the labour market would be able to absorb the higher skilled workers who would be created by the abolition of child poverty. Adopting a conservative view on this pushes one towards the lower end of the range. From this empirical exercise it is reasonable to conclude that the benefits of abolishing child poverty in terms of foregone earnings, employment and benefit savings correspond to about 1 per cent of GDP. Of this 1 per cent, between one quarter and one third will be transferred to the Treasury through direct taxes. There will also be a relatively small impact on the exchequer through benefit savings.

# Figures and tables

Figure 1: Child poverty rates over time




Source: Spreadsheet accompanying Brewer *et al.* (2008).
Note: Rates are constructed using a poverty line of 60 per cent of median equivalised income, before housing costs. There is a discontinuity in the series between 1993 and 1994 as the data source changed from the Family Expenditure Survey to the Family Resources Survey.

Table 1 Log earnings at age 34 and poverty at age 16

| | | | | |
|---|---|---|---|---|
| **A. Full sample** | | | | |
| Poverty at age 16 | –0.280<br>(0.035) | –0.271<br>(0.033) | –0.211<br>(0.035) | –0.150<br>(0.033) |
| Basic controls | No | Yes | Yes | Yes |
| Family controls | No | No | Yes | Yes |
| Education | No | No | No | Yes |
| R-squared | 0.018 | 0.217 | 0.247 | 0.343 |
| Sample size | 3336 | 3336 | 3336 | 3336 |
| **B. Full sample plus test scores** | | | | |
| Poverty at Age 16 | –0.216<br>(0.035) | –0.222<br>(0.032) | –0.188<br>(0.034) | –0.140<br>(0.033) |
| Test scores | Yes | Yes | Yes | Yes |
| Basic controls | No | Yes | Yes | Yes |
| Family controls | No | No | Yes | Yes |
| Education | No | No | No | Yes |
| R-squared | 0.071 | 0.248 | 0.265 | 0.349 |
| Sample size | 3336 | 3336 | 3336 | 3336 |
| **C. Income at age 16 < £200 sample** | | | | |
| Poverty at age 16 | –0.115<br>(0.038) | –0.137<br>(0.034) | –0.133<br>(0.036) | –0.104<br>(0.034) |
| Basic controls | No | Yes | Yes | Yes |
| Family controls | No | No | Yes | Yes |
| Education | No | No | No | Yes |
| R-squared | 0.005 | 0.219 | 0.249 | 0.357 |
| Sample size | 1658 | 1658 | 1658 | 1658 |
| **D. Income at age 16 < £200 sample plus test scores** | | | | |
| Poverty at age 16 | –0.085<br>(0.037) | –0.111<br>(0.034) | –0.117<br>(0.036) | –0.098<br>(0.034) |
| Test scores | Yes | Yes | Yes | Yes |
| Basic controls | No | Yes | Yes | Yes |
| Family controls | No | No | Yes | Yes |
| Education | No | No | No | Yes |
| R-squared | 0.054 | 0.260 | 0.272 | 0.364 |
| Sample size | 1658 | 1658 | 1658 | 1658 |

Note: Standard errors in parentheses. Basic controls: gender; age; region. Family controls: father's education; mother's education; lone parent in childhood.
The cohort member's education level has nine categories and gives information on the NVQ level and type (academic or vocational) of the individual's highest qualification by age 30.

Table 2 Probability employed at age 34 and poverty at age 16

| | | | | |
|---|---|---|---|---|
| **A. Full sample** | | | | |
| Poverty at age 16 | –0.066<br>(0.015) | –0.066<br>(0.015) | –0.052<br>(0.016) | –0.037<br>(0.015) |
| Basic controls | No | Yes | Yes | Yes |
| Family controls | No | No | Yes | Yes |
| Education | No | No | No | Yes |
| Sample size | 4937 | 4937 | 4937 | 4937 |
| **B. Full sample plus test scores** | | | | |
| Poverty at age 16 | –0.049<br>(0.015) | –0.053<br>(0.015) | –0.045<br>(0.016) | –0.033<br>(0.015) |
| Test scores | Yes | Yes | Yes | Yes |
| Basic controls | No | Yes | Yes | Yes |
| Family controls | No | No | Yes | Yes |
| Education | No | No | No | Yes |
| Sample size | 4937 | 4937 | 4937 | 4937 |
| **C. Income at age 16 < £200 sample** | | | | |
| Poverty at age 16 | –0.041<br>(0.017) | –0.043<br>(0.017) | –0.038<br>(0.018) | –0.025<br>(0.018) |
| Basic controls | No | Yes | Yes | Yes |
| Family controls | No | No | Yes | Yes |
| Education | No | No | No | Yes |
| Sample size | 2519 | 2519 | 2519 | 2519 |
| **D. Income at age 16 < £200 sample plus test scores** | | | | |
| Poverty at age 16 | –0.032<br>(0.017) | –0.035<br>(0.017) | –0.033<br>(0.018) | –0.023<br>(0.018) |
| Test scores | Yes | Yes | Yes | Yes |
| Basic controls | No | Yes | Yes | Yes |
| Family controls | No | No | Yes | Yes |
| Education | No | No | No | Yes |
| Sample size | 2519 | 2519 | 2519 | 2519 |

Note: Probit marginal effects reported.
Standard errors in parentheses. Basic controls: gender; age; region. Family controls: father's education; mother's education; lone parent in childhood.
The cohort member's education level has nine categories and gives information on the NVQ level and type (academic or vocational) of the individual's highest qualification by age 30.

Table 3 Log earnings and poverty at age 16

| A. Full sample | Age 26 | Age 30 | Age 34 |
|---|---|---|---|
| Poverty at age 16 | –0.172<br>(0.026) | –0.250<br>(0.029) | –0.280<br>(0.035) |
| Basic controls | No | No | No |
| Family controls | No | No | No |
| Education | No | No | No |
| R-squared | 0.013 | 0.019 | 0.018 |
| Sample size | 3420 | 3897 | 3336 |
| **B. Full sample plus controls** | | | |
| Poverty at age 16 | –0.120<br>(0.026) | –0.205<br>(0.028) | –0.211<br>(0.033) |
| Basic controls | Yes | Yes | Yes |
| Family controls | Yes | Yes | Yes |
| Education | No | No | No |
| R-squared | 0.155 | 0.228 | 0.247 |
| Sample size | 3420 | 3897 | 3336 |
| **C. Full sample plus controls including test scores** | | | |
| Poverty at age 16 | –0.111<br>(0.027) | –0.186<br>(0.028) | –0.188<br>(0.034) |
| Basic controls | Yes | Yes | Yes |
| Family controls | Yes | Yes | Yes |
| Education | Yes | Yes | Yes |
| R-squared | 0.169 | 0.244 | 0.265 |
| Sample size | 3420 | 3897 | 3336 |
| **D. Income at age 16 < £200 sample plus test scores** | | | |
| Poverty at age 16 | –0.066<br>(0.028) | –0.130<br>(0.031) | –0.117<br>(0.036) |
| Test scores | Yes | Yes | Yes |
| Basic controls | Yes | Yes | Yes |
| Family controls | Yes | Yes | Yes |
| Education | No | No | No |
| R-squared | 0.191 | 0.234 | 0.272 |
| Sample size | 1591 | 1939 | 1658 |

Note: Standard errors in parentheses. Basic controls: gender; age; region. Family controls: father's education; mother's education; lone parent in childhood.
The cohort member's education level has nine categories and gives information on the NVQ level and type (academic or vocational) of the individual's highest qualification by age 30.

Table 4 Probability of employment and poverty at age 16

| A. Full sample | Age 26 | Age 30 | Age 34 |
|---|---|---|---|
| Poverty at age 16 | –0.128<br>(0.018) | –0.138<br>(0.015) | –0.066<br>(0.015) |
| Basic controls | No | No | No |
| Family controls | No | No | No |
| Education | No | No | No |
| Sample size | 4499 | 5530 | 4937 |
| **B. Full sample plus controls** | | | |
| Poverty at age 16 | –0.109<br>(0.019) | –0.106<br>(0.016) | –0.052<br>(0.016) |
| Basic controls | Yes | Yes | Yes |
| Family controls | Yes | Yes | Yes |
| Education | No | No | No |
| Sample size | 4499 | 5530 | 4937 |
| **C. Full sample plus controls including test scores** | | | |
| Poverty at age 16 | –0.102<br>(0.019) | –0.097<br>(0.016) | –0.044<br>(0.016) |
| Basic controls | Yes | Yes | Yes |
| Family controls | Yes | Yes | Yes |
| Test scores | Yes | Yes | Yes |
| Sample size | 4499 | 5530 | 4937 |
| **D. Income at age 16 < £200 sample plus test scores** | | | |
| Poverty at age 16 | –0.081<br>(0.021) | –0.083<br>(0.018) | –0.033<br>(0.018) |
| Test scores | Yes | Yes | Yes |
| Basic controls | Yes | Yes | Yes |
| Family controls | Yes | Yes | Yes |
| Education | No | No | No |
| Sample size | 2248 | 2873 | 2519 |

Note: Standard errors in parentheses. Basic controls: gender; age; region. Family controls: father's education; mother's education; lone parent in childhood.
The cohort member's education level has nine categories and gives information on the NVQ level and type (academic or vocational) of the individual's highest qualification by age 30.

Table 5 Poverty and educational attainment

| Panel A Number of good GCSEs and poverty at age 16 | | |
|---|---|---|
| **A. Full sample** | **BCS** | **BHPS** |
| Poverty at age 16 | –2.190<br>(0.177) | –2.072<br>(0.255) |
| Basic controls | No | No |
| Family controls | No | No |
| Education | No | No |
| R-squared | 0.043 | 0.05 |
| Sample size | 3345 | 1579 |
| **B. Full sample plus controls** | | |
| Poverty at age 16 | –1.517<br>(0.181) | –1.220<br>(0.265) |
| Basic controls | Yes | Yes |
| Family controls | Yes | Yes |
| R-squared | 0.197 | 0.214 |
| Sample size | 3345 | 1579 |
| **Panel B Degree attainment and poverty at age 16** | | |
| **A. Full sample** | **BCS** | **BHPS** |
| Poverty at age 16 | –0.132<br>(0.011) | –0.132<br>(0.045) |
| Basic controls | No | No |
| Family controls | No | No |
| Education | No | No |
| R-squared | 0.022 | 0.017 |
| Sample size | 4706 | 688 |
| **B. Full sample plus controls** | | |
| Poverty at age 16 | –0.087<br>(0.013) | –0.026<br>(0.045) |
| Basic controls | Yes | Yes |
| Family controls | Yes | Yes |
| Sample size | 4706 | 688 |

Table 6 A simple calculation of costs of child poverty

| Panel A Using upper bound impacts | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age group | Number in population (000s) | Number poor (00s) | Proportion in work | Number workers poor in childhood (000s) | Earnings loss | Mean annual earnings | Earnings cost per poor worker | Aggregate earnings cost (£000s) | Reduced chance of employment | Workers lost (000s) | 25th percentile earnings | Lost earnings (£000s) |
| 18–24 | 5638 | 1257 | 65% | 817 | 17% | 15251.6 | 2593 | 2,118,849 | 13% | 163 | 9199 | 1,503,477 |
| 25–34 | 7896 | 1761 | 80% | 1409 | 25% | 23015.2 | 5754 | 8,105,378 | 14% | 247 | 13775 | 3,395,798 |
| 35–39 | 4599 | 1026 | 82% | 841 | 28% | 26265.2 | 7354 | 6,184,328 | 7% | 72 | 14596 | 1,047,813 |
| 40–49 | 8814 | 1965 | 82% | 1612 | 28% | 27092 | 7586 | 12,225,766 | 7% | 138 | 13,520 | 1,860,107 |
| 50–59 | 7593 | 1693 | 82% | 1389 | 28% | 24986 | 6996 | 9,713,749 | 7% | 119 | 12,527 | 1,484,761 |
| | | | | | | | Total | 38,348,070 | | | | 9,291,955 |
| | | | | | | | % of GDP | 3.17 | | | % of GDP | 0.77 |
| **Panel B Using lower bound impacts** | | | | | | | | | | | | |
| Age group | Number in population (000s) | Number poor (00s) | Proportion in work | Number workers poor in childhood (000s) | Earnings loss | Mean annual earnings | Earnings cost per poor worker | Aggregate earnings cost (£000s) | Reduced chance of employment | Workers lost (000s) | 25th percentile earnings | Lost earnings (£000s) |
| 18–24 | 5638 | 1257 | 65% | 817 | 7% | 15251.6 | 1067.612 | 872,467 | 8% | 101 | 9,198.8 | 925,217 |
| 25–34 | 7896 | 1761 | 80% | 1409 | 13% | 23015.2 | 2991.976 | 4,214,796 | 8% | 141 | 13,774.8 | 1,940,456 |
| 35–39 | 4599 | 1026 | 82% | 841 | 12% | 26265.2 | 3151.824 | 2,650,426 | 3% | 31 | 14,596.4 | 449,063 |
| 40–49 | 8814 | 1965 | 82% | 1612 | 12% | 27092 | 3251.04 | 5,239,614 | 3% | 59 | 13,520.0 | 797,189 |
| 50–59 | 7593 | 1693 | 82% | 1388 | 12% | 24986 | 2998.32 | 4,163,035 | 3% | 51 | 12,526.8 | 636,326 |
| | | | | | | | Total | 17,140,339 | | | | 4,748,250 |
| | | | | | | | % of GDP | 1.42 | | | % of GDP | 0.39 |

1. The proportion in poverty is 22.3% and is the proportion of children classified as poor before housing costs according to IFS 'Poverty and Inequality' Table 4.2. Earnings and employment impacts are taken from row 1 of Tables 4 and 5 for Panel A and row 4 of Tables 3 and 4 for Panel B.
2. Mean and median earnings are obtained from Table 6.1a of 2007 ASHE results. Age bandings given in these results do not match perfectly with other sources so the figures given here are derived from averaging across some categories. http://www.statistics.gov.uk/downloads/theme_labour/ASHE_2007/2007_age.pdf
3. Employment rates are obtained from ONS employment figures by age from the LFS. http://www.statistics.gov.uk/StatBase/xsdataset.asp?vlnk=1378&Pos=&ColRank=1&Rank=272. They refer to the April–June 2007 quarter.
4. Population figures are for mid-2006 and are obtained from Table A1 in 'Key Population and Vital Statistics 2007' http://www.statistics.gov.uk/downloads/theme_population/KPVS33_2006/FINAL_KPVS2006-web.pdf
5. United Kingdom GDP is estimated at £1,209,344 million in 2006 current prices. Figure comes from the amended 2006 Blue Book available at http://www.statistics.gov.uk/downloads/theme_economy/Blue_Book_2007_web.pdf

Table 7 Benefit savings loss due to higher employment

| Age group | Number poor | Reduced chance of employment | Workers lost (000s) | Average benefits received | Aggregated benefits received (£000s) |
|---|---|---|---|---|---|
| 18–24 | 1,257.25 | 8% | 100.58 | 2,600.52 | 261,560.66 |
| 25–34 | 1,760.87 | 8% | 140.87 | 5,130.84 | 722,781.39 |
| 35–39 | 1,025.51 | 3% | 30.77 | 3,643.12 | 112,081.69 |
| 40–49 | 1,965.46 | 3% | 58.96 | 3,468.92 | 204,540.20 |
| 50–59 | 1,693.24 | 3% | 50.80 | 2,806.44 | 142,559.21 |
| | | | | | 1,443,523.14 |
| | | | | Uprated to 2006 prices | 1,523,273.40 |
| | | | | % of GDP | 0.13 |

Note: Tax rates and allowances are derived from IFS Fiscal Facts
Benefit receipts for those not working by age group are derived from the Family Expenditure Survey 2004–2005. We thank Shiqponja Telhaj for producing these analyses.

Table 8 Additional tax accruing from higher employment levels

| Age group | Number poor | Reduced chance of employment | Workers lost (000s) | 25th percentile | Taxable income | Tax +NI | Tax per worker | Aggregated tax (£000s) |
|---|---|---|---|---|---|---|---|---|
| 18–24 | 1,257.25 | 8% | 100.58 | 9,198.80 | 3,763.80 | 31% | 1,166.78 | 117,354.69 |
| 25–34 | 1,760.87 | 8% | 140.87 | 13,774.80 | 8,339.80 | 31% | 2,585.34 | 364,196.54 |
| 35–39 | 1,025.51 | 3% | 30.77 | 14,596.40 | 9,161.40 | 31% | 2,840.03 | 87,374.51 |
| 40–49 | 1,965.46 | 3% | 58.96 | 13,520.00 | 8,085.00 | 31% | 2,506.35 | 147,783.55 |
| 50–59 | 1,693.24 | 3% | 50.80 | 12,526.80 | 7,091.80 | 31% | 2,198.46 | 111,675.44 |
| | | | | | | | Total | 828,384.74 |
| | | | | | | | % of GDP | 0.07 |

# Notes

1. The proportion of high skilled workers is roughly equal to the proportion of workers with degrees in the population while the LP group is the proportion of workers growing up in poverty (assuming current rates).

2. The elasticity of substitution is estimated for those leaving school at 18 or below compared to those leaving school at 19 or above.

3. Of course if the full employment and earnings effects are not felt then this will also be reflected in our estimates of tax receipt increases and benefit savings.

# References


Blanden, J. (2006) ''Bucking the Trend': What enables those who are disadvantaged in childhood to succeed in later life', *Department for Work and Pensions Working Paper No. 31*. Leeds: Corporate Document Services

Blanden, J. and P. Gregg (2004) 'Family Income and Educational Attainment: A Review of Approaches and Evidence for Britain', *Oxford Review of Economic Policy* (Special Issue on Education), Vol. 20, pp. 245–263

Brewer, M, A. Muriel, D. Phillips, L. Sibieta (2008) 'Poverty and Inequality in the UK: 2008', *IFS Commentary* C105

Gregg, P. and L. Macmillan (2008) *Intergenerational Mobility and Education in The Next Generation: Forecasting Intergenerational Mobility for Current Cohorts of Youths.* University of Bristol: Mimeo.

Holzer, H., D. Whitmore Schanzenbach, G. Duncan and J. Ludwig (2007) *The Economic Costs of Child Poverty in the United States: Subsequent Effects of Children Growing Up Poor*. Washington: Center for American Progress

Katz, L. and K. Murphy (1992) 'Changes in Relative Wages, 1963–87: Supply and Demand Factors', *Quarterly Journal of Economics*, Vol. 107, pp. 35–78

Manacorda, M., Manning A. and J. Wadsworth (2006) 'The Impact of Immigration on the Structure of Wages and Employment: Theory and Evidence From Britain', CEP *Discussion Paper* 754

# About the authors

Jo Blanden, Department of Economics, University of Surrey and Centre for Economic Performance, London School of Economics.

Kirstine Hansen, Centre for Longitudinal Studies, Institute of Education.

Stephen Machin, Department of Economics, University College London and Centre for Economic Performance, London School of Economics.

The Joseph Rowntree Foundation has supported this project as part of its programme of research and innovative development projects, which it hopes will be of value to policy makers, practitioners and service users. The facts presented and views expressed in this report are, however, those of the author[s] and not necessarily those of the Foundation.

Joseph Rowntree Foundation
The Homestead
40 Water End
York YO30 6WP
www.jrf.org.uk

A CIP catalogue record for this report is available from the British Library.



First published 2008 by the Joseph Rowntree Foundation