The Impact of Fathers' Job Loss during the 1980s Recession on their Child's Educational Attainment and Labour Market Outcomes

Paul Gregg, Lindsey Macmillan and Bilal Nasim

April 2012

Working Paper No. 12/288

The Impact of Fathers' Job Loss during the 1980s Recession on their Child's Educational Attainment and Labour Market Outcomes

Paul Gregg[1], Lindsey Macmillan[2] and Bilal Nasim[3]

[1]*Department of Social Policy, University of Bath and the Centre for Market and Public Organisation (CMPO), University of Bristol*
[2] *Department of Economics, University of Bristol and the Centre for Market and Public Organisation (CMPO), University of Bristol*
[3] *Department of Economics, Imperial College, University of London*

April 2012

Abstract
The research on intergenerational correlations in outcomes is increasingly moving from measurement into assessment of causal transmission mechanisms. This paper analyses the causal impact of fathers' job loss on their children's educational attainment and later economic outcomes. To do so, we isolate the effect of job loss associated with major industry contractions, mainly in manufacturing, during the 1980s recession by mapping industry level employment change data from 1980 to 1983 into the British Cohort Study (BCS). Children with fathers' who were identified as being displaced did significantly worse in terms of their GCSE attainment than those from non-displaced families. A child with a displaced father obtained on average 17 grade points lower or half a GCSE grade A-C less than their otherwise identical counterparts, the equivalent of 2.2% lower wages as an adult. There is also a small effect of fathers' displacement on the early labour market attachment of children, but no direct impact on their earnings at 30/34. This does not mean that the impact of job loss will not affect social mobility. Those with lower income, education and social class were most affected by job losses and there is a direct effect on education and youth unemployment which we know to be drivers of later earnings. This suggests that the recent recession may have significant long-term consequences for the children of those who lost their jobs.

Address for correspondence
CMPO, Bristol Institute of Public Affairs
University of Bristol
2 Priory Road
Bristol BS8 1TX
P.gregg@bath.ac.uk
www.bristol.ac.uk/cmpo/

1. Introduction

The impact of job loss for an individual has been shown to be long-lasting with lower future employment and wage scars persisting for decades (Stevens, 1997, Gregg, 2001, Gregg and Tominey, 2005, Davis et. al., 2011). More recently research has considered the impact of parental job loss on child outcomes (Oreopolus, Page and Stevens, 2008, Stevens and Schaller, 2009), assessing whether parental job loss also leaves scars on the next generation. This is part of a rapidly growing literature seeking to isolate the causal transmission mechanisms underlying the intergenerational correlation in economic outcomes (see Black and Devereux, 2011). In this vein, this research considers the impact of job loss of fathers in the UK during the 1980s recession on the educational outcomes and later labour market experiences of their children who were going through early adolescence at the time of the employment shock. Previous evidence on patterns of social mobility in the UK has found that for the younger British Cohort Study (BCS), the persistence in incomes across generations was higher than that found for an earlier cohort born in 1958. Decomposing intergenerational income persistence across the two birth cohort studies suggests that education is a main driver of this persistence in the UK and that an increasing relationship between family income and educational attainment looks to have driven the increase in persistence across time (Blanden, Gregg and Macmillan, 2007). Therefore any direct effect of fathers' job loss on their child's educational attainment and later labour market outcomes could be part of this story. At a time of rising unemployment, the impact of job loss during a recession on the outcomes of the next generation is once again highly topical.

The recession of the 1980s, was deep and drawn out and had a large lingering effect on employment. The Conservatives came into power in 1979 with inflation at approximately 8% and rising with the combined effect of a second oil price shock as a result of OPEC restricting the supply of crude oil plus he implementation of a decision by the incoming Conservative government to double the rate of VAT. The Government adopted a strict Monetarist approach, raising interest rates, reducing the budget deficit and introducing money supply targets. Aggregate Demand fell significantly in the early 1980s with real GDP falling by 6% over 24 months. Inflation was eventually brought under control by 1983 but unemployment rose to 12% (3 million) and stayed around this level until 1986. This sustained employment shock disproportionately hit certain industries. A shift to monetary policy as a focus for controlling inflation led to very high interest rates and a major upward revaluation of sterling. This led to

the closure of a swathe on the UKs manufacturing plants and manufacturing output shrank by almost a third. This widespread closure of industry, in turn, led to mass displacement of many low-skilled, but not especially low paid, male workers in these industries. The timing of this recession falls in line with the adolescent years of one of our national birth cohort studies, the British Cohort Study (BCS) of all individuals' born in one week in April 1970. At the time of the 1980s recession, the cohort members were 11-13 years old and high quality data is available on the child's educational attainment at age 10 and 16, either side of the recession and their later labour market outcomes.

The BCS does not provide complete work histories of the father over this period or have a specific question about job displacement. Instead, we match in employment changes by industry from the Employment Gazette to identify fathers of BCS cohort members who were working in hit industries at the time of the 1980s recession. We combine this information with the father's observed industry and employment status six years later to define a group of fathers who were likely displaced as an effect of the large industry employment shock of the early 1980s. We argue that fathers leaving jobs, either to move to a new industry or out of employment, from rapidly contracting industries during a deep recession are those who were most likely to be displaced due to the exogenous shock of the recession. This is analogous to exploring job displacement for known plant closures (Oreopolous et al. 2008) as the recession provides an exogenous shock to employment. We assess the impact of this job loss on the educational attainment of the child at age 16, their early labour market experiences and labour market earnings at age 30/34, discussing the size of the role of a decrease in economic resources on any impact found. Given that our measure of displacement remains imperfect, the role of selection is assessed by running a placebo test on the impact of our measured displacement on child attainment in a pre-recession period. We find no evidence of selection into the displaced category in terms of prior child attainment. This supports our claim that we are measuring exogenous job displacement. Any remaining measurement error in our displacement measure will result in attenuation bias in our results and therefore these should be considered a lower bound estimate of the effect of involuntary job loss for fathers on their children's later outcomes.

In the next section we detail the previous work that has considered the impact of job loss on outcomes both within generations and across generations for the children of those experiencing the job loss. In section three we detail our estimation procedure for assessing the likely impact

of job loss on the educational attainment of the child before describing the data used in section four. Section five presents our main findings and robustness checks whilst we offer some brief conclusions in section six.

2. Background literature

There is a large literature on the impact of job loss on peoples working lives and well-being: The documented impact covers: Contemporaneous Earnings (Faber, 1997, Kuhn, 2002, Nickell et al., 2002), longer-term unemployment and earnings (Stevens, 1997, Gregg, 2001, Gregg and Tominey, 2005) and well-being (Clark and Oswald, 1994, Clark, 2003). However the literature on the intergenerational impact of job loss is less extensive.

Oreopolous, et. al. (2008) use variation induced by firm closures to explore the intergenerational effects of worker displacement. They use a Canadian panel of administrative data, following almost 60,000 father-child pairs from 1978 to 1999. The authors construct treatment and control groups of displaced and non-displaced fathers with similar pre-1982 permanent income. Displacement is defined by a vector of dummy variables indicating that a displacement has taken or will take place in a future, current or previous year, based on observable firm closures. The data also provides a post-displacement period of at least 8 years. The vector of dummy variables is designed to capture wage effects prior to displacement (future displacement), immediate displacement effects (current displacement) and any persistence in displacement effects (previous displacement). The authors first demonstrate that displacement leads to large permanent reduction (14%) in family income. They go on to show, through a reduced form regression of displacement on child outcomes, that individuals whose father's experienced an unemployment shock compared to father's who did not experienced annual earnings that were 9% lower. They were also more likely to receive unemployment insurance and social assistance. The estimates are driven by the experiences of children whose family income was at the bottom of the income distribution. They conclude that there are long term impacts of unexpected job displacement that extend beyond the effect within one generation to the later labour market outcomes of their children. It is suggested that long term reductions in family income in childhood can substantially impact the earnings of their children in adulthood, indicating that the intergenerational transmission of incomes may be causal.

Bratberg, et al (2007) use matched employer-employee data from Norway to analyse the effects of worker displacement in 1986-1987 on their children's earnings in 1999-2001. As in

Oreopolous et al, (2008), the authors directly observe displacement and treat this displacement as an exogenous shock to family income. They argue therefore that if this shock affects the children of those displaced it is evidence that economic resources have a direct effect on children's economic outcomes. The authors first compare the earnings trajectories of displaced and non-displaced workers to ensure that selection is not determining the post-displacement outcomes for the children. They find, in line with the scarring literature discussed above, that displacement is followed by a reduction in earnings and unstable employment. The second step of the analysis involves a reduced form regression of child earnings on father earnings and an indicator for fathers' displacement. The authors find no significant effects of father displacement on the earnings of their offspring, although they find evidence to suggest that the educational outcomes of the children are negatively affected. The use of individual labour market information in defining an indicator for displacement in both of these papers most closely mirrors the methodology used in this paper although the exact characterisation of displacement differs.

Rege et al (2007) also use Norwegian data to estimate how children's school performance is affected by their parents' exposure to plant closure. In contrast to the previous papers mentioned and the empirical strategy used in this paper, Rege et al (2007) proxy father displacement with the closure of the father's plant rather than the fathers own labour market status. In their analysis they treat plant closures as exogenous, independent of unobservable determinants of school performance and address any potential selection biases by including industry, municipality and school fixed effects. The authors run a reduced form regression of displacement on educational attainment and find that fathers' exposure to plant closure leads to a substantial decline in children's graduation-year grade point average, but only in municipalities with mediocre performing job markets. Interestingly, they also find that this negative effect does not appear to be driven by a reduction in father's income and employment, an increase in parental divorce, or the trauma of relocating. The authors thus argue that their findings are consistent with sociological "role theories", with parents unable to fully shield their children from the stress caused by threats to the father's traditional role as breadwinner.

As we are focusing here on the impact of job loss during a recession it is important to consider any likely direct effect of limited job opportunities on the children who will enter a similar labour market. For example, a recession may also impact directly on children's expectations and potentially their educational investments, including their effort in school. If the fact that the children observe a weaker labour market leads to worse outcomes through a dampening of

expectations then any negative impact of job displacement could be attributable to this effect rather than the fathers' job loss. The evidence suggests however that if anything this effect generally works the other way, with children choosing more education when the labour market is weak. Goldin (1999) shows that the biggest increase in high-school enrolment and graduation rates in the U.S. took place during the Great Depression. Betts and Mcfarland (1995) show that a 1% increase in the unemployment rate is associated with a 4% increase in full-time attendance at community colleges and Kane (1994) shows that the enrolment of students in college is negatively associated with average weekly earnings in manufacturing and positively associated with the state unemployment rate. More recently, McVicar and Rice (2001) find that the substantial rise in youth unemployment of the early 1990s in the U.K. contributed to the growth in participation in further education. Similarly, Clark (2011) finds that the youth labour market has large impacts on enrolment in post-compulsory education in the U.K.

3. Methodology

To estimate the impact of fathers' job loss on the educational attainment of the child we follow much of the previous literature by estimating a reduced form regression of the educational attainment of the child at age 16, $Educ_{i,t}$, on a dichotomous variable indicating whether a father has been displaced, $disp_{i,t-1}$, plus a range of baseline background controls from period t-1 as seen in equation (1).

$$Educ_{i,t} = \alpha + \beta disp_{i,t-1} + \delta lnY_{i,t-1} + \theta Educ_{i,t-1} + \mathbf{Z}_{i,t-1}\tau + \varepsilon_{i1t} \qquad (1)$$

$Educ_{i,t-1}$ is the prior attainment of the child in period t-1 and hence we are modelling the impact of the shock of job loss on a child's educational development trajectory rather than the level. $lnY_{i,t-1}$ is the prior family income in the period t-1, $\mathbf{Z}_{i,t}$ is a range of background characteristics of the child including non-cognitive skills, ethnicity, the number of siblings and gender controls and ε_{it} is the error term. The coefficient on $disp_{i,t-1}$ is our coefficient of interest. We begin with this simple baseline model to show the raw coefficient of the impact of job loss on GCSE attainment, conditional on observable differences in the child prior to the recession to control for any sample selection. We will return to this point shortly.

To control for any observable differences across the families that might be driving this raw correlation between job loss and child's educational attainment, additional controls for the socio-economic status (SES) of the father are added, $X_{i,t-1}$, in equation (2). The controls include social class, education, age, housing tenure and region of residence of the father prior to displacement. The inclusion of these controls should minimise observable differences between those fathers' who experienced job loss during the 1980s recession and those who did not hence reducing any observable selection effect. The recession, although unanticipated, hit manual industries much harder than non-manual industries. We may therefore be concerned that any effect that we are estimating is working through differences in the education levels or class of the father rather than the impact of job loss. The addition of these controls goes someway to mitigating these concerns about potential selection bias into the displaced group. All controls until this point are exogenous and pre-determined to ensure that they are not affected by the displacement.

$$Educ_{i,t} = \alpha + \beta disp_{i,t-1} + \delta lnY_{i,t-1} + \theta Educ_{i,t-1} + Z_{i,t-1}\tau + X_{i,t-1}\vartheta + \varepsilon_{i2t} \qquad (2)$$

Finally controls for income at 16 ($Y_{i,t}$) are included to assess whether this is the main driver of any impact of job loss on the child's educational attainment. If income growth, or a lack of due to job loss, is the main driver, we would expect the inclusion of income in period t to push any estimated impact, $\hat{\beta}$, toward zero.

$$Educ_{i,t} = \alpha + \beta disp_{i,t-1} + \gamma lnY_{i,t} + \delta lnY_{i,t-1} + \theta Educ_{i,t-1} + Z_{i,t-1}\tau + X_{i,t-1}\vartheta + \varepsilon_{i3t} \qquad (3)$$

To be confident that we are indeed capturing the impact of job loss with economic consequences for those families affected, we consider the impact of job displacement in period t-1 on family income in period t (16). As in Oreopolus et. al. (2008), our motivation for this stage is to illustrate that the families we identify as experiencing an employment shock during the recession can be seen to have slower income growth over the period than families who are not exposed to an employment shock. This acts as a validation that our measure is capturing involuntary job loss as it places it alongside the range of studies discussed above that have highlighted the impact of job loss on earnings and family income. Note that the post-displacement income is measured at age 16 and it is likely that people will have moved back into work by then. Therefore we are estimating a long-term income shock rather than the immediate effect of displacement. Equation 4 illustrates this

$$lnY_{i,t} = \alpha + \beta disp_{i,t-1} + lnY_{i,t-1} + \boldsymbol{X}_{i,t-1}\vartheta + u_{it} \qquad (4)$$

We estimate equation (4) in two forms. Firstly, by regressing income ($lnY_{i,t}$) in period t (age 16) on displacement ($disp_{i,t-1}$) in period t-1 and income ($lnY_{i,t-1}$) in period t-1 (age 10) plus a range of background characteristics of the fathers, $\boldsymbol{X}_{it-1}$, including the include class, education, age housing tenure and region of residence of the father prior to displacement. If there is a direct impact of displacement on later family income when controlling for prior income, there is a correlation between job displacement and income growth across the period. We also estimate the impact of job displacement on income as a first-difference across the period, directly estimating the association between displacement and income growth over the period. If our measurement of displacement is predicting income losses this provides reassurance that we are indeed measuring an employment shock that has real economic consequences for the families affected

The estimation structure in equations (1) to (3) controls for prior child attainment so that we are estimating child development across the period rather than level effects. However, there could still be a selection bias in our estimates if displaced families' children were falling behind non-displaced families' children prior to the period of displacement; a pre-existing downward trend. In an attempt to assess the impact of selection, we estimate a placebo test that considers the difference in child development trends measured before the father was displaced.

$$Educ_{i,t-1} = \alpha + \beta disp_{i,t-1} + \gamma lnY_{i,t} + \theta Educ_{i,t-2} + \boldsymbol{Z}_{i,t-2}\tau + \boldsymbol{X}_{i,t-2}\vartheta + v_{it} \qquad (5)$$

If those children with displaced fathers' differ in terms of underlying characteristics, through the transmission of genetic endowments for example, from the children with non-displaced fathers, we would expect to see a significant relationship between the displacement dummy and prior educational development measured *before* the fathers' were displaced. Equation (1) already includes prior attainment but we can go further to explore prior trends in development between the ages of 5 and 10 and so explore a difference in difference type structure looking at child development trajectories before and after the displacement shock. As will be seen in the results section, we do not observe any statistical differences in the attainment of the displaced children compared to the non-displaced children prior to the fathers' being displaced. This suggests that selection is not playing a large role in this story.

Having assessed the validity of the measure of job displacement and shown the causal impact on educational attainment we turn to consider whether there are any longer term impacts of fathers' job loss on the next generation we repeat the analysis from equation (3) replacing educational attainment with two later labour market outcomes. We consider the impact of job loss on the child's early labour market experience to assess whether there is an intergenerational transmission of unemployment. In addition, to look more directly at the impact of displacement on social mobility we also consider whether there are long term effects on the child's labour market earnings at 30/34

4. Data Section

In this study we combine information from the British Cohort Study (BCS) of those born in 1970 with industry based labour market information obtained from the Employment Gazette in 1980 and 1983. The main issue in our analysis is that unlike Oreopolus et. al. (2008) or Bratberg et. al. (2007) we cannot observe fathers' displacement due to plant closures and instead seek to use the recession as an exogenous source of job loss. The work history information for fathers in the BCS is incomplete meaning that we can only observe the employment status and industry that the father works in at two points in time, six years apart, which straddle the recession's impact on employment. We define displacement as a result of the recession as the combination of two pieces of information Firstly, we identify the father as a job leaver, which may or may not have been a voluntary decision, if they were working in 1980 but were either not working or working in a different broad industry group in 1986. Secondly, we combine this information with the extent of the industry employment shrinkage during the recession to describe a set of hard hit industries. The extent to which the industry is hit is deemed exogenous to the father's unobserved characteristics or the child's educational development and later labour market outcomes. We will check the later and more important assertion by running a placebo test on early educational attainment (as described above). Here we describe the data and define the key variables of interest.

The BCS includes all those born in Great Britain between the 4th and 11th of April, 1970. Information as obtained about the sample members and their families at birth and at ages 5, 10, 16, 26, 30 34 and 38, starting with just over 17,000 babies. The scope of enquiry has broadened from a strictly medical focus at birth, to encompass physical, social and educational development

at the ages of 5, 10 and 16, and then to include economic development and wider factors at 26 and onwards. To measure the impact of job loss, the BCS contains the employment status of the father of the cohort member in 1980 and 1986 and the disaggregated 3-digit industry code of the father for the same periods (Standard Industrial Classification (SIC)). We use the fathers' observed SIC codes in 1980 and 1986 (SIC68) to match industry level data from administrative sources described below. SIC68 consists of 10 large single digit Industry groups. These large Industry groups consist of more narrow Industry definitions, each of which is represented by a 3-digit Industry code. For example, Large Industry Group VI is "Metal Manufacture" which amongst others, contains the SIC code 322, "Copper, brass and other copper alloys". There are a total of 906 3-digit Industry groups.

Industry level employment data is taken from The Employment Gazette in 1980 and 1983. This provides us with the numbers of employees in each disaggregated (3-digit) Industry group in each year allowing us to create an employment change variable for each 3-digit Industry code. We create the Industry level employment change variables between 1980 and 1983, rather than between 1980 and 1986, as the Industry classification was modified in 1983 leaving the 1980 (SIC68) and 1986 (SIC80) SIC classifications incompatible with respect to the number of employees. Given that the recession, via unemployment, largely impacted between 1980 and 1983, we find this not to be of concern. For our placebo test we match in a similar change in 3-digit industry level employment from 1975 to 1980.

To define job leavers we create a dummy variable equal to 1 if the father is employed in 1980 and either out of work or employed in a different industry at the 1 digit level in 1986. To turn this into a measure of displacement we match in the employment data from the Employment Gazette with our BCS data on the 1980 3-digit Industry codes, thereby assigning a 1980 to 1983 employment change variable to all employed fathers with a non-missing 3-digit Industry code in 1980. With this information we are able to add additional information as to the likelihood of displacement for each father. To do this we first create a hit group, referring to a sub-group of our sample who were in the most affected (or hardest hit) industries by the recession. This group is composed of fathers' in industries in 1980 that experience a 20% loss in employment or worse from 1980 to 1983. Table 1 shows that these industries shrank by an average of 27% in just three years, compared to a decrease of just 4% in the remaining industries. This hit group covers around a quarter of children in our final sample. We explore later the robustness of the 20% cut off to alternative specifications.

We make the case that fathers in the hit group who became unemployed or changed industries were forced to do so, and for reasons unrelated to their personal characteristics, due to the exogenous shock of the recession. We choose not to restrict our displaced group to only those fathers' observed unemployed in 1986 as we would like to include those fathers who were temporarily made unemployed by the recession before finding new employment to avoid the associated selection problem. As we cannot observe the exact point at which the father was made unemployed between 1980 and 1986 we hope to include some of these fathers in our analysis via those fathers observed in a different industry in 1986. We will still not capture fathers' who are displaced and then return to the same 1-digit industry. In addition to our displaced group, we separate out a group of fathers who are in the hit group, but where information on their employment status in 1986 is missing. We create a distinct indicator for this group of fathers who were known to be in hit industries but where displacement is unobserved ('Unknown Displaced') with the assumption that these fathers will in fact be a composite of displaced and non-displaced fathers.

Both of our groups are likely to be defined with error as it is likely that some of those classified as displaced may have changed industries voluntarily and therefore not experienced job loss due to the recession. Likewise, in our comparison group, some fathers who are observed in the same industry in 1986 may have been made redundant and returned to work in the same industry for a different firm. We test this by examining whether our displaced group experience slower income growth than those who are not displaced. If there is a significant economic impact on the families of those we classify as displaced compared to our comparison group, we can be satisfied that we are estimating a genuine difference in the change in economic circumstances between the two groups during the recession regardless of the error.

Our primary dependent variable is GCSE attainment at 16 (1986), which is available as the number of GCSEs and total points score. When later outcomes are considered, information from the monthly work histories of the cohort members from 16-23 is used to create a proportion of time spent not in employment, education or training (NEET) over the period. Earnings measures are averaged from observations at age 30 and 34 to create an average adult earnings measure for the cohort member. The prior ability of the children is included in the form of age 10 cognitive and non-cognitive scores. Early childhood cognitive ability is measured using scores from reading, maths and British Ability Scale tests (IQ test) sat at age 10. In our placebo test,

cognitive tests from age 5 including a copying test and early picture and vocabulary test scores are available. Non-cognitive traits including application, extroversion, clumsiness, hyper-activity and anxiety are provided by teacher reports at age 10, while anti-social and neurotic scales are provided by mother reports at age 5. Direct questions addressed to the children provided locus of control information and self-esteem measures at age 10. Controls are also included for the gender and ethnicity of the child to remove observable differences over these domains.

Information on the family income in these years are available in banded form, where parents are asked to place their usual total income into the appropriate band (there were seven options at age 10 and eleven at age 16). We generate continuous income variables at each age by fitting a Singh-Maddala distribution to the data using maximum likelihood estimation. This is particularly helpful in allocating an expected value for those in the open top category. We adjust the variables to net measures, using the Family Expenditure Survey from 1980 and 1986, and impute child benefit for all families based on the number of children on the household[1]. Log changes in parental income between 1980 and 1986 are also derived. We utilise the detailed information on the socio-economic status of parents to control for heterogeneity across individuals. Indicators of the social class and education of the father alongside the housing tenure, parental age and the region of residence of the family are all included in the analysis to account for any variation in outcomes across these groups. To help ensure that these controls are exogenous they are all measured before the recession in 1980.

Although the BCS was nationally representative for the original sample of 17,000, this analysis requires a number of sample restrictions that limit our final sample to 3,051. Our four main restrictions are that the cohort member must report a GCSE outcome at 16, 26 or 30, we must be able to observe their family income at age 10 and age 16 and their father must be employed in 1980 and provide a 3 digit industry code. This means that children without a father figure present in the household are dropped and hence we are focused on children in families with two parents or father figures present. Finally there were a few industries where we were unable to get national data on employment levels for 1980 and 1983 and so the sample was restricted to those cohort members who had non-missing information for their Fathers' Industry level employment

---

[1] Child benefit is imputed based on the number of children in the household (and lone parents status). Child benefit rates from 1980 and 1986 were obtained from the Institute for Fiscal Studies website. http://www.ifs.org.uk/fiscalFacts/benefitTables

change between 1980 and 1983[2]. Comparing the social class of the father's at birth, a nationally representative sample, to the same variable restricted to our final sample suggests that there is minimal excess attrition from those in lower social classes. 22% of the full sample are in the bottom two classes compared to 17% in our sample and 19% of full sample are in the top two classes compared to 20% of our sample. Our sample restrictions and any attrition in the longitudinal survey do not look to be causing major differences in the socio-economic background of those who are finally selected compared to the nationally representative sample. Of course we are unable to say anything about any potential differences in the unobservable characteristics of our sample compared to the nationally representative sample.

Table 1A and 1B present summary employment statistics at industry level for each group of fathers' in the recession and pre-recession period, for the population and our working sample respectively. The figures in Tables 1A and 1B are very similar, further suggesting that sampling bias is not a concern. Focusing on Table 1B and our working sample, the first column of the top row shows that the mean change in (3-digit) Industry level employment between 1980 and 1983 for all fathers in our sample is approximately -10%. As noted above, the hit industries saw an employment shrinkage of some 27% compared to just 4% in the industries that are defined as not hit during the recession period. For those defined as displaced, that is job leavers from hit industries, their industries experienced an average 28% decrease in employment compared to 6% for those who were not displaced. Those in the 'Unknown Displaced' category for whom no information on their destination in 1986 was available come from very similar industries to those observed as displaced.

To ensure that the recession was an exogenous shock to these industries, it is important to ensure that the employment trends between 1980 and 1983, from which our hit (and subsequently displaced) group is derived, is not simply an extension of an existing employment trend which began prior to 1980. The second column of Table 1 provides information on industry level employment between 1975 and 1980 indicating that overall there was very little change in the period prior to the recession with an average 2% decrease in employment across industries. Comparing the 1975 to 1980 employment changes for our hit group to those who were not hit suggests that there was a small difference in employment trends prior to the recession across

---

[2] We restrict our sample on the cohort members' Fathers' information rather than Mothers'. Fathers' tended to be the dominant earners within families while women during the 1980s were experiencing broad changes in their labour market participation.

groups. We therefore need to ensure that there was no preceding difference in child development before the recession started. This placebo test is undertaken in the results section.

The child and parental characteristics of our final sample split into three sub-groups based on the displacement characterisation are described in Table 2. The displaced group differs significantly from the comparison group with respect to the characteristics of both the children and parents. The characteristics of the 'Unknown Displaced' fathers group look more similar to the displaced fathers than the comparison group. Row 2 shows that families where the father was displaced experienced substantial reductions in their income growth across the period relative to the non-displaced, a 9% difference in mean income growth. This suggests that the employment shock is capturing an identifiable economic impact on the families. As the income growth is from 1980 until 1986 it reflects long-term earning penalties rather than an immediate income shock from job loss, which is likely to have been much greater.

Children from households where the fathers were displaced had poorer educational outcomes at both age 10 and 16, and displaced fathers tend to have worse educational qualifications themselves. This is not surprising given the selection of industries that were hit during the recession. The fact that the displaced group had worse initial characteristics, in terms of child attainment, means that we need to establish that child development gaps would not be significantly different across these groups, conditional on observable characteristics, in the absence of displacement. This is to ensure that we are picking up the impact of job loss rather than just a selection effect at age 10 or a pre-recession trend. We attempt to address the issue of selection into our derived displaced group by comparing the *ex ante* (i.e. prior to 1980) trajectory of educational outcomes of the children of displaced fathers. To do this we utilise cognitive scores at age 5 and our pre-recession industry employment level data.

5. Results

Job Displacement and Educational Attainment

To consider the impact of fathers' job loss on the next generation's educational attainment, Table 3 shows the impact of fathers' displacement on two separate measures of GCSE attainment. In panel A we present the results for a continuous measure of attainment at 16, the total GCSE point score for a smaller sample where complete individual grades are observed (a grade A is

awarded 55 points, a grade B, 46, a grade C, 40, a grade D, 34 and a grade E, 28[3]). Panel B presents results using the outcome measure of the number of GCSEs grade A*-C obtained[4]. We choose to present the continuous point score alongside the more conventional number of grades A*-C measure as we are particularly interested in any effects at the lower end of the educational distribution given that the shock was more prevalent in low-skilled industries. The first column conditions on only child characteristics, including cognitive and non-cognitive test score attainment at age 10, ethnicity and gender, and 1980 family income. We build the regression controls in stages to show the impact of parental SES and any associated lower income growth on the relationship between job loss and attainment.

In panel A, in the least restrictive specification, children from displaced fathers' obtained 26 points less in their total point score, equivalent of dropping from an A to an E in one exam or from an A to a C in two exams. For our number of GCSEs measure in panel B, fathers' displacement is associated with a reduction of roughly two thirds of a GCSE grade A*-C given the child's attainment age 10. The average attainment in the sample is 4 GCSEs so this is a non-trivial change. As we add further background characteristics to the model, this effect reduces in magnitude and significance. Column 2 introduces the parental background characteristics including housing tenure, fathers' social class, fathers' education, fathers' age and the region of residence. These additional background controls reduce the impact of fathers' displacement in panel A to 20 points less, dropping from an A to a D in one exam. The impact on the number of GCSEs grade A*-C also falls with children with displaced fathers experiencing on average half a grade lower GCSE results than children with non-displaced fathers. This indicates that only a small proportion of the initial correlation was working through differences in the observed SES of those in the displaced group compared to the not displaced group.

When we include family income in 1986 in the specification in column 3, to assess whether income is the main driver of this effect of job loss on child attainment, it can be seen that the coefficient on our displaced measure falls again for both outcomes to 17 points in panel A and just under half of a GCSE at grade A*-C in panel B. *A priori*, one might have expected the negative association found between fathers' job displacement and family income to be important

---

[3] Based on the new GCSE point scoring system from the DoE from 2004. As A* did not exist, an average of the A* and A points score is assigned to an A grade at O level. Point scores are available for grade F and G whereas information is only available on grades A-E in the BCS. CSEs are assigned lower points (Grade 1 = 40, grade 2 =34 etc.)

[4] The sample here is larger as information on the number of GCSEs obtained was asked again at ages 26 and 30. Individual grade breakdowns were only given at age 16.

in explaining any significant association observed between fathers' job displacement and the child's GCSE outcomes. However, the evidence from columns 2 and 3 in both panels of Table 3 suggests that this is not the case with the inclusion of income only accounting for about 12% of the overall observed GCSE penalty in each measure of attainment. For both outcomes there remains a significant negative effect from fathers' job loss. Although changes in family income are not irrelevant in mediating the relationship between job displacement and the child's GCSE attainment, the proportion of the observed association between fathers displacement and GCSE attainment accounted for by the change in income between 1980 and 1986 is small, suggesting that other factors associated with fathers displacement hold the explanatory power determining this relationship[5]. Rege et. al. (2007) finds similar results that income is not the main driver of this relationship in their analysis of Norwegian data. In summary these results suggest that fathers' displacement is associated with a child achieving just under half of one GCSE less than their non-displaced counterparts. This is modest but not trivial in terms of its likely future economic impact, given that an extra GCSE leads to a 4% higher return in the labour market on average at age 30/34 for this cohort (see Appendix table A1).

Moving on to consider the impact on children's educational attainment of fathers' who were working in a hit industry with their situation in 1986 unclear ('Unknown Displaced'), table 2 suggested that the unconditional characteristics of this group resembled the children of the displaced group to a greater degree than the non-displaced comparison group. This is not supported in Table 3, row 2 in both panels. In these specifications, the children with fathers in this group obtain no fewer points and slightly lower total number of grades A*-C in their GCSEs than their non-displaced counterparts. Our interpretation of this result is that this group is likely to be a composite of fathers who were displaced from hit industries and those that were not, thus there is likely to be greater attenuation bias in the estimated impact on child outcomes.

Validation and Robustness

---

[5] We investigated this further by including a broad set of 'stress indicators' in additional (non-reported) specifications. We included alcohol and smoking indicators for the child and the parents, parental relationship status (including any changes between 1980 and 1986), parent-child conflict indicators, child mental health indicators and whether the child has been in trouble with the police. The results suggest that although all of these stress indicators were to one degree or another significant in the GCSE equation they were, perhaps surprisingly, all virtually uncorrelated with our displaced variable, such that their inclusion in the GCSE regression left the coefficient on fathers displacement effectively unchanged. This implies that the relationship between our fathers displacement and child's GCSE outcomes is not being mediated by these stress indicators.

The imperfect nature of the displacement measure means that validation is needed in terms of the economic impact of displacement and to address possible selection concerns about whether bring displaced is related to prior child development. In addition we also check the robustness of the cut off in terms of industry employment loss, used to identify the hard hit industries.

The impact of job displacement on family income

Table 4 seeks to ensure that our displaced measure is capturing a real shock to the families who were impacted by displacement during the 1980s recession. Table 2 showed that families where the father was displaced between 1980 and 1986 experienced 9% lower income growth between 1980 and 1986 than those families in the comparison group. Families with fathers in our 'Unknown Displaced' group also similarly lower family income growth on average compared to the comparison group. It is important to remember that the displaced category combines both those who do not return to employment by 1986 and those who have moved to a different industry by 1986. Table 4 therefore seeks to assess whether these observed difference from table 2 are due to selection on the background characteristics of the families experiencing displacement.

Column 1 predicts income at age 16 for the displaced groups conditional on income in 1980, fathers age, fathers social class, fathers education level, housing tenure and the region of residence in 1980. Column 2 repeats this analysis using a straight first difference, representing the income growth directly. For both measures, estimates of income growth are 6-10% lower for the two groups compared to the non-displaced comparison group. This suggests that fathers' displacement between 1980 and 1986 was not simply a proxy for other socio-economic characteristics determining family income. It is also worth noting that these effects are of a similar order of magnitude to those found in the existing job loss literature for the effects of job loss on permanent earnings (Gregory and Jukes, 1997, Nickell et al, 2002). As the gaps are very similar to the unconditional data presented in Table 2, this suggests that there are not major selection biases here on observable characteristics of the father. We can thus be confident that our measure of job displacement is capturing a shock to the family circumstances from the recession of the 1980s that is borne out in lower income growth.

Placebo test

As outlined in the methodology section, regardless of the extent to which we can condition on observable characteristics of both the parents and children, there remains the potential that the

results observed in Table 3 are driven by a selection effect or unobserved differences in the characteristics of children whose fathers are in our displaced group and those children whose fathers are not. Table 3 conditioned on prior attainment at age 10 but it is possible that those children with displaced fathers were already on a pre-existing downward trend and that this is driving the results rather than the displacement. In such an instance the observed significant association between the job loss of our displaced group and the child's GCSE attainment in Table 3 would be driven by differences in the initial unobserved heterogeneity creating a pre-existing trend in child development. To establish whether this is plausible, we investigate whether belonging to our displaced group is significant in explaining any of the variation in childhood development for cognitive outcomes between 1975 and 1980 (i.e. between Cohort Members at ages 5 and 10). If we find that there is a significant association between displacement and cognitive outcomes in 1980, prior to the recession period, it would suggest that the children in our displaced group were performing relatively poorly compared with children in the non-displaced comparison group prior to the recession, raising questions as to our claim that we are measuring the impact of fathers' job loss in the recession.

Due to data limitations it was not possible to make the control set for this selection regression exactly equivalent to that used for the final specification of Table 3, as we do not have initial income at age 5 observed in the data. Instead, Panel A of Table 5 shows the revised version of column 2 in Table 3, conditioning on later income throughout[6]. Note that the outcome of interest is now standardised attainment for comparability across attainment measures at different ages and hence these coefficients are not directly comparable with either measure used in Table 3. Table 5 indicates, as we saw in Table 3, that there is a significant impact of fathers' job loss on the child's (standardised) GCSE achievement. Again, the estimated impact for the 'Unknown Displaced' group is insignificantly different from zero when controlling for observable differences in family characteristics. These are our baseline results for comparison for the rest of the placebo tests.

Panel B of Table 5 represents our selection specification, to test whether the results of Panel A are being driven by differences in unobserved characteristics between our displaced group and our non-displaced comparison group affecting educational attainment. The outcome measure is

---

[6] We do not have family income or social class in the prior time period (1975). We therefore only condition on family income in the time period of the dependent variable (the outcome time period) and condition on social class at CM age 10 (1980) to make the regression control set transferable. Finally we standardise our outcomes measures for consistency.

standardised age 10 (1980) cognitive attainment and the controls, where possible, are from 1975. Standardised attainment measures at age 5 are included here to assess whether there are similar attainment trajectories prior to the recession. Panel B shows that the children with fathers belonging to our displaced group were not performing significantly worse in 1980 in cognitive tests compared to children with fathers in our non-displaced comparison group, given prior attainment. The coefficient is virtually zero and insignificant, suggesting that the children of displaced fathers were, conditional on other characteristics, of a comparable cognitive standard at age 10 with children from in the comparison group. This strongly suggests that the observed differences in GCSE attainment between the children with displaced fathers compared to the comparison group are not driven by selection into our displaced group on unobserved characteristics affecting educational attainment. This provides further supportive evidence to the claim that fathers' job loss during the 1980s recession significantly reduced educational development as no such gaps were emerging prior to the recession.

Although equivalent controls are used in Panels A and B of Table 5, Panel A uses measures (where possible) from 1980 (and family income from 1986) while Panel B uses equivalent measures from 1975 (and family income from 1980). To test that our placebo results are not being driven by differential changes (for our displaced and comparison group) in the values of the control variables between 1975 and 1980, we re-run Panel A using the same control set as Panel B, i.e. using the control set taken from 1975 (Cohort Member age 5). If the 1975 control set is driving the insignificant results observed in Panel B, we would expect the results of Panel C to also be insignificant. It can be seen, however, that the results in Panel C are almost identical to Panel A, suggesting that the 1975 control set is not driving the main result of Table 5. In addition, it may be the case that the more restrictive sample used in panel B (selecting further on observing all prior attainment measures) could be driving the lack of significance in the results. We therefore re-run panel A on this more restrictive sample in panel D to check that the results are not driven by this further sample restriction. As with panel C, the results are once again remarkably similar to those found in panel A suggesting that the differences between panels A and B are real and not driven by either the control set or restricted sample used in panel B. There were no significant differences in the attainment of children with displaced fathers compared to children with non-displaced fathers prior to the recession period.

Robustness to cut-offs

It is important to gauge how much of an impact our chosen definition of displacement has on the results that we find. Although our displaced and non-displaced categories are not chosen arbitrarily (they are defined by observed outcomes in 1986) the definition of being in a 'hit' and a 'not hit' industry, set at a 20% employment shock, is an arbitrary choice. Figure 1 illustrates the displacement effect from the final column of panel B in Table 3 across a range of industry level percentage employment changes. As can be seen, despite the magnitude of the displacement effect being of a similar level for industries with employment losses of 20-25%, for those fathers' who were displaced from industries experiencing above 23% employment loss, the displacement effect becomes insignificant as the confidence intervals are large, given how few displaced we can observe in this category. Below the 20% employment loss point, those displaced from industries experiencing a 17-19% employment loss still had a significant negative impact on their child's attainment of around 1/3 of a GCSE grade. At 15-16% employment loss, the effect is similar in magnitude but the estimates become too imprecise to distinguish any discernable difference between the displaced and not displaced groups. The substantive findings of the impact of job loss on educational attainment in our analysis are therefore not restricted to our specific choice of employment change. It appears to exist across a wide range of employment change values[7].

These results strongly indicate that the children of displaced fathers were not facing a pre-existing adverse deterioration in educational attainment that may have continued into the recession period. Despite achieving lower than average attainment at age 10, they were doing no worse than children with non-displaced fathers' with similar background and attainment levels prior to the recession. The fact that we also observe significant associated economic effects on family income provides clear validation that we are observing the effects of an economic shock to the family that produces a modest but significant fall in educational performance in adolescent children. Finally, the results are not sensitive to the cut off used to identify hard hit industries during the recession.

Later labour market outcomes

Other literature has found significant impacts of fathers' job loss on later life outcomes of the child including their employment experiences and earnings (Oreopolus et. al., 2008). Given that there is a significant negative impact of fathers' job loss on their children's educational

---

[7] This result is replicated when the alternative educational attainment measure of GCSE point score is used instead.

attainment and we know that educational attainment is an important driver of adult economic outcomes and hence intergenerational economic mobility, we move on to consider whether job loss has any longer term direct impacts on the children's early labour market experience and later earnings.

Table 6 presents results from our cohorts focusing on these later labour market outcomes. The upper panel presents the impact of displacement on the proportion of time the child spends not in employment, education or training (NEET) from 16 to 23 whilst the lower panel presents the same results for the adult earnings of the child, averaged at age 30 and 34. The first column is the fully conditional model including child and family background characteristics whilst the second column also conditions on prior educational attainment by adding GCSEs. There is suggestive evidence that parental job loss has a significant effect on the child's later workless experiences and that this effect is not working through the lower GCSE attainment seen in Table 3. This is consistent with work by Macmillan (2012), who finds that fathers' displacement causes their child to suffer more early worklessness and this appears to be driven more by personality traits and behavioural outcomes rather than education and cognition. Children with displaced fathers' spend on average 1.4% more time NEET than those with non-displaced fathers.

The impact of fathers' job loss on the average earnings of their children at age 30/34 is just under 6% although this effect is not statistically significant. Column 2 of Table 6 suggests that a third of this effect can be accounted for by the educational attainment of the child at age 16. Comparing this effect to the combined income effect of 10% from Table 4 and the return to half a GCSE A*-C of about 2% (calculated from a wage regression, see Appendix Table A1), this estimated wage effect is large but not implausible. It may therefore be a lack of precision in our estimates due to small sample sizes that is driving our insignificant finding rather than a null result. This does not necessarily mean that fathers' job loss does not affect intergenerational economic mobility as we have seen that this has a direct impact on education and youth unemployment which we know drives this relationship.

6. Conclusions

There has been a large literature identifying that job loss has long-term damaging effects on employment and earnings of a worker. This research provides strong evidence that this also has an intergenerational effect whereby fathers' job loss has a negative impact on children's

educational attainment and youth unemployment in the UK. By matching in employment changes by industry from the Employment Gazette, we are able to identify those fathers in the BCS cohort who were working in hit industries at the time of the 1980s recession. We combine this information with the father's observed industry and employment status six years later to define a group of fathers who were likely displaced as an effect of the large industry employment shock of the early 1980s. The evidence presented here suggests that there was a significant impact of father's being displaced from their jobs during the 1980s recession on both the economic resources of the family and their child's educational attainment. Although differences are observed between the characteristics of fathers who were displaced and those who were not, there appears to be no differences in the educational development trends of the children of the displaced fathers compared to the non-displaced before the recession and displacement occurred. This strongly suggests that this is not a selection effect.

Children with displaced fathers obtained on average 17 grade points or half a GCSE grade A*-C less than those with non-displaced fathers, equivalent to a 2% wage penalty at age 30/34.[8] Furthermore, the results suggest that it raises the child's exposure to youth unemployment by about 1 ½ percent compared to those with non-displaced fathers. The impact of fathers' job loss on the average earnings of their children at age 30/34 is estimated at 6% although this result is not statistically significant. About a third of this, albeit insignificant, result is operating through the significant education effect observed earlier. Given the size of the income shock is of the order of 10% and the education effect is about half a grade A*-C GCSE, which would have a return of about 2%[9], this estimated effect is large despite being insignificant. This may be due to poor precision in estimation, through the small sample sizes rather than the true coefficient being zero, as we do observe significantly adverse effects on education and youth unemployment. Therefore, the insignificant effect on earnings does not mean that the impact of job loss will not affect social mobility. Those with lower income, education and social class were most affected by the job loss and there is a direct effect on education and youth unemployment which we know to be drivers of later earnings. This suggests that the recent recession in the UK may have significant long-term consequences for the children of those who lost their jobs.

---

[8] See Appendix A1 for wage penalty calculation.

[9] See wage return regression Appendix Table A1

References

Blanden, J., P. Gregg and Macmillan, L. (2007) 'Accounting for Intergenerational Income Persistence: Noncognitive Skills, Ability and Education' <u>Economic Journal</u>, 117, C43-C60.

Betts, J.R. and McFarland L.L. (1995) 'Safe Port in a Storm: The Impact of Labour Market Conditions on Community College Enrollments' *Journal of Human Resources,* Vol 30 (4), pp 741-765

Bratberg, E, Nilsen, OA, and Vaage, K (2007) "Job Losses and Child Outcomes" *Discussion Paper No. 2895, IZA*

Clark, A. and Oswald A. (1994) "Unhappiness and Unemployment" *Economic Journal*, May, 104, pp.648-659

Clark, A. (2003)"Unemployment as a Social Norm: Psychological Evidence from Panel Data", *Journal of Labor Economics*, (April), 21, pp.323-351

Clark, D. (2011) "Do Recessions Keep Students in School? The Impact of Youth Unemployment on Enrolment in Post-compulsory Education in England" *Economica,* Vol. 78 pp. 523-545

Davis, S.J. and von Wachter, T. (2011) 'Recessions and the cost of job loss' for *Brookings Papers on Economic Activity*

Faber, H. (1997) The Changing Face of Job Loss in the United States1981-95, Brookings Papers on Economic Activity Microeconomics pp 55-128

Ferreira, F and Schady, N (2009) "Aggregate Economic Shocks, Child Schooling and Child Health." *The World Bank Research Observer Advance Access*

Goldin, C. (1999) 'A Brief History of Education in the United States' NBER Historical Paper 119

Gregg, P (2001) The Impact of Youth Unemployment on Adult Unemployment in the NCDS, *Economic Journal*, Vol. 111 No. 475, F626-653

Gregg, P and Tominey, E. (2005) 'The wage scar from male youth unemployment' *Labour Economics* Vol. 12

Gregory, M and Jukes, R (1997) "The Effects of Unemployment on Subsequent Earnings: A Study of British Men 1984-94."*Centre for Economic Performance & Institute of Economics, 21*

Kane, T.J. (1994) "Entry by Blacks Since 1970: The Role of College Costs, Family Background, and the Return to Education" *The Journal of Political Economic,* Vol. 102, No. 5, pp 878-911

Kuhn, PJ (2002) "Losing Work, Moving On: International Perspectives on Worker Displacement." *Upjohn Institute for Employment Research*

Macmillan, L. (2012) 'The role of personality traits, cognition, behavioural and educational outcomes in accounting for the intergenerational transmission of worklessness' mimeo

McVicar, D. and Rice, P. (2001) "Participation in Further Eduction in England and Wales: An Analysis of Post-War Trends" *Oxford Economic Papers,* Vol. 53 (1) pp. 47-66

Nickell, S.*,* Jones, T. *and* Quintini, G. *(*2002*). "*A picture of the job insecurity facing British men*" Economic Journal, 112.*

Oreopoulos, P, Page, M and Stevens, AH (2008)"The Intergenerational Effects of Worker Displacement." *Journal of Labor Economics*, 26(3)

Rege, M, Telle, K and Votruba, M (2007) "Parental Job Loss and Children's School Performance." *Discussion Papers No. 517, Statistics Norway, Research Department*

Stevens, A H (1997) "Persistent Effects of Job Displacement: The Importance of Multiple Job Losses." *Journal of Labor Economics*, 15(1, Part 1): 165---188

Stevens, A H and Schaller, J (2009) "Short-run Effects of Parental Job Loss on Children's Academic Achievement." NBER Working Paper 15480.

Table 1 Changes in employment in the industry the father was working in 1980 for recession and pre-recession periods

Panel A Full population with SIC68 information.

	Recession period (1980-1983)	Pre-recession period (1975-1980)	Sample Size
Total	-0.108	-0.021	10028
Hit	-0.271	-0.062	2660
Not hit	-0.049	-0.006	7368
Displaced	-0.281	-0.066	505
Unknown	-0.269	-0.061	1688
Not displaced	-0.061	-0.009	7835

Panel B Working sample.

	Recession period (1980-1983)	Pre-recession period (1975-1980)	Sample Size
Total	-0.095	-0.019	3051
Hit	-0.269	-0.063	740
Not hit	-0.042	-0.006	2341
Displaced	-0.278	-0.067	240
Unknown	-0.266	-0.057	238
Not displaced	-0.062	-0.011	2537

Notes
1. Hit refers to those industries experiencing over a 20% decrease in employment from 1980 to 1983 based on the 3-digit standard industrial classification of the father in 1980
2. Displaced defined as those hit hardest by the recession (over a 20% decrease in employment at their origin industry level and changed industry between 1980 and 1986 including those who dropped out of work altogether)
3. Unknown displaced defined as those in the hardest hit industries with information not available as to whether they moved or stayed in the same industry in 1986
4. Not displaced defined as those either in the less hit industries or those in the hit industries that were not displaced

Table 2 Summary statistics by group

	Displaced	Unknown displaced	Not displaced
Change in Industry Employment (1980-1983)	-0.278	-0.266	-0.062
Log change in family income (1980-1986)	-0.024	-0.018	0.072
Child's attainment			
Number of GCSEs A-C	3.046	3.303	4.253
Cognitive ability at age 10	0.121	0.110	0.299
Father's Education (% obtained)			
Degree	2.74	4.09	12.83
A-level	6.85	9.55	13.17
O-level	14.16	10.00	15.27
School leaving age	75.34	75.91	58.43
Before school leaving age	0.91	0.45	0.30

Notes
1. Sample sizes by group N=240, 238, 2573
2. Change in employment 1980-1983 refers to the change in employment based on the 3-digit standard industrial classification 1968
3. Displaced defined as those hit hardest by the recession (over a 20% decrease in employment at their origin industry level and changed industry between 1980 and 1986 including those who dropped out of work altogether)
4. Unknown displaced defined as those in the hardest hit industries with information not available as to whether they moved or stayed in the same industry in 1986
5. Not displaced defined as those either in the less hit industries or those in the hit industries that were not displaced

Table 3 Relationship between displacement and child attainment at 16

Panel A GCSE point score

	(1)	(2)	(3)
Displaced	-25.92	-20.18	-17.67
	[7.526]***	[7.287]***	[7.400]**
Unknown displaced	2.622	7.850	8.370
	[14.63]	[14.38]	[14.34]
Income at 10	32.67	0.832	-12.64
	[6.554]***	[7.282]	[8.183]
Income at 16			23.81
			[6.668]***
N	2188	2188	2188
Adj. R-Sq	0.331	0.366	0.370
Controls			
Child & prior attainment	Yes	Yes	Yes
Parents		Yes	Yes
Income at 16			Yes

Panel B Number of GCSEs grade A*-C

	(1)	(2)	(3)
Displaced	-0.674	-0.529	-0.467
	[0.191]***	[0.187]***	[0.187]**
Unknown displaced	-0.439	-0.231	-0.192
	[0.192]**	[0.189]	[0.188]
Income at 10	1.422	0.544	0.201
	[0.155]***	[0.170]***	[0.189]
Income at 16			0.629
			[0.149]***
N	3051	3051	3051
Adj. R-Sq	0.354	0.391	0.395
Controls			
Child & prior attainment	Yes	Yes	Yes
Parents		Yes	Yes
Income at 16			Yes

Notes
1. Displaced defined as those hit hardest by the recession (over a 20% decrease in employment at their origin industry level and changed industry between 1980 and 1986 including those who dropped out of work altogether)
2. Unknown displaced defined as those in the hardest hit industries with information not available as to whether they moved or stayed in the same industry in 1986
3. Not displaced defined as those either in the less hit industries or those in the hit industries that were not displaced
4. Controls: **Child** – standardised attainment in maths, reading and IQ tests, standardised non-cognitive scores, ethnicity and gender, **Parents** – housing tenure, region, father's social class, father's education, father's age

Table 4 Relationship between displacement and family income

	Family income at 16	Change in family income
Displaced	-0.101	-0.064
	[0.023]***	[0.025]***
Unknown displaced	-0.066	-0.068
	[0.023]***	[0.025]***
Income at 10	0.558	
	[0.021]***	
N	3051	3051
Adj. R-Sq	0.419	0.054
Controls	Yes	Yes

Notes
1. Displaced defined as those hit hardest by the recession (over a 20% decrease in employment at their origin industry level and changed industry between 1980 and 1986 including those who dropped out of work altogether)
2. Unknown displaced defined as those in the hardest hit industries with information not available as to whether they moved or stayed in the same industry in 1986
3. Not displaced defined as those either in the less hit industries or those in the hit industries that were not displaced
4. Controls include housing tenure, region, father's social class, father's education, father's age

Table 5 Placebo test

Panel A : Age 10-16	No. of GCSEs (std)	GCSE points score
Displaced	-0.141	-17.959
	[0.055]**	[7.412]**
Unknown displaced	-0.062	6.839
	[0.055]	[14.378]
Income at 16	0.206	19.151
	[0.039]***	[5.952]***
N	3051	2188
Adj. R-Sq	0.391	0.382
Panel B : Age 5-10	**Cognitive attainment (std)**	
Displaced	-0.029	
	[0.055]	
Unknown displaced	-0.055	
	[0.055]	
Income at 10	0.127	
	[0.051]**	
N	2502	
Adj. R-Sq	0.394	
Panel C : Age 5-16	**No. of GCSEs (std)**	**GCSE points score**
Displaced	-0.138	-19.525
	[0.057]**	[7.757]**
Unknown displaced	-0.072	5.789
	[0.057]	[15.023]
Income at 16	0.270	26.936
	[0.040]***	[6.163]***
N	3051	2188
Adj. R-Sq	0.342	0.324
Panel D : Age 5-16	**No. of GCSEs (std) – age 10 sample**	**GCSE points score – age 10 sample**
Displaced	-0.127	-18.165
	[0.063]**	[8.486]**
Unknown displaced	-0.018	17.537
	[0.062]	[16.923]
Income at 16	0.244	21.446
	[0.045]***	[9.799]***
N	2502	1799
Adj. R-Sq	0.360	0.342
Controls		
Child & prior attainment	Yes	Yes
Parents	Yes	Yes

Notes

1. Displaced defined as those hit hardest by the recession (over a 20% decrease in employment at their origin industry level and changed industry between 1980 and 1986 including those who dropped out of work altogether)
2. Unknown displaced defined as those in the hardest hit industries with information not available as to whether they moved or stayed in the same industry in 1986
3. Not displaced defined as those either in the less hit industries or those in the hit industries that were not displaced

4. Controls: **Child** – standardised attainment in maths, reading and IQ tests at age 10 in panel A and age 5 in panels B & C, standardised non-cognitive scores, ethnicity and gender, **Parents** – housing tenure, region, father's social class, father's education, father's age
5. Panel D replicates Panel C on a restricted sample requiring attainment at 10.

Table 6 Relationship between displacement and later outcomes of the child

Proportion of time spent NEET 16-23	(1)	(2)
Displaced	0.013	0.016
	[0.008]*	[0.008]**
Unknown displaced	-0.001	-0.001
	[0.008]	[0.008]
Income at 10	-0.012	-0.012
	[0.007]	[0.007]*
N	2884	2884
Adj. R-Sq	0.04	0.02
Controls		
Child & prior attainment	Yes	Yes
Parents	Yes	Yes
GCSEs		Yes
Average earnings at 30/34	(1)	(2)
Displaced	-0.057	-0.037
	[0.047]	[0.046]
Unknown displaced	-0.041	-0.021
	[0.047]	[0.045]
Income at 10	0.123	0.089
	[0.042]***	[0.041]**
N	2252	2252
Adj. R-Sq	0.320	0.360
Controls		
Child & prior attainment	Yes	Yes
Parents	Yes	Yes
GCSEs		Yes

Notes
1. Displaced defined as those hit hardest by the recession (over a 20% decrease in employment at their origin industry level and changed industry between 1980 and 1986 including those who dropped out of work altogether)
2. Unknown displaced defined as those in the hardest hit industries with information not available as to whether they moved or stayed in the same industry in 1986
3. Not displaced defined as those either in the less hit industries or those in the hit industries that were not displaced
4. Controls: **Child** – standardised attainment in maths, reading and IQ tests, standardised non-cognitive scores, ethnicity and gender, **Parents** – housing tenure, region, father's social class, father's education, father's age

Figure 1 Robustness tests on the change in industry level employment 1980-1983
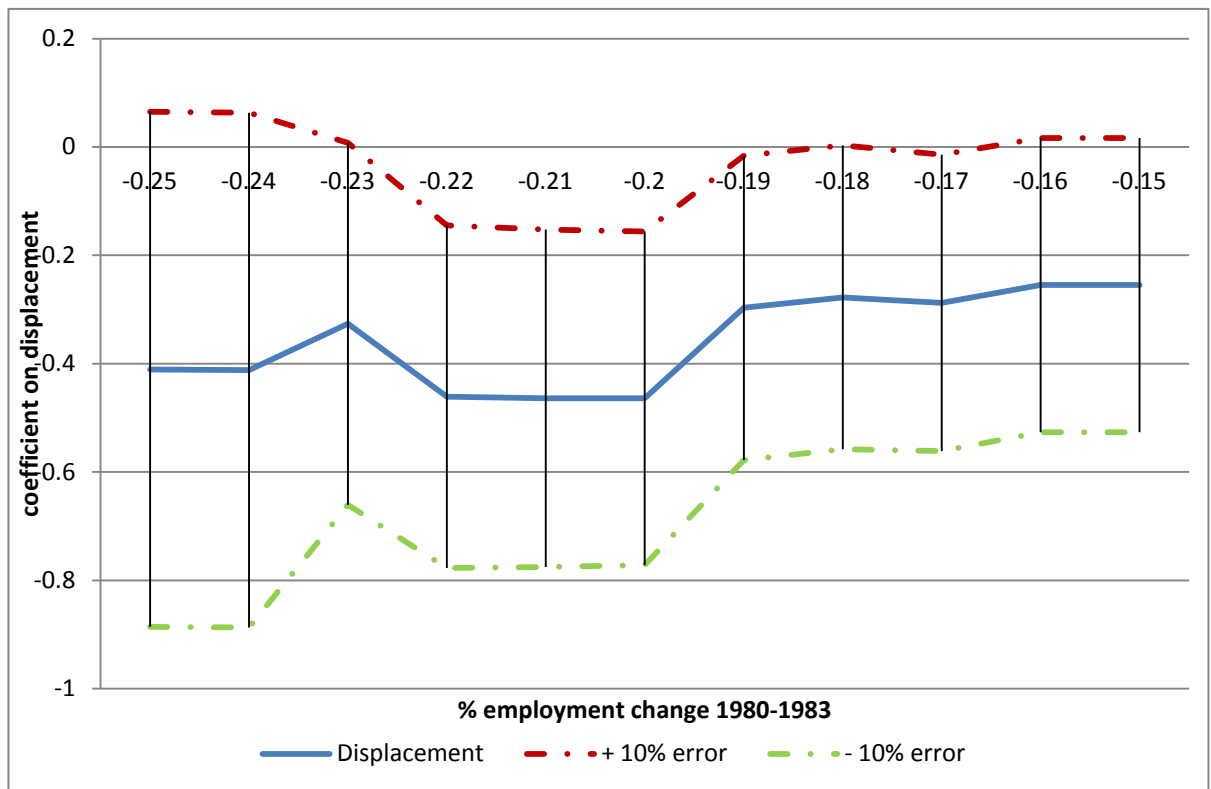
Notes

1. Displaced defined by varying % employment change and changed industry between 1980 and 1986 including those who dropped out of work altogether#

2. A full set of controls are included for each regression including income at 16. Controls: **Child** – standardised attainment in maths, reading and IQ tests, standardised non-cognitive scores, ethnicity and gender, **Parents** - region, father's social class, father's education, father's age

Appendix

Table A1 Wage return from average earnings at 30/34 of number of the GCSEs grade A*-C obtained

	(1)	(2)	(3)
No. of GCSEs	-0.057	-0.048	-0.046
	[0.004]***	[0.004]***	[0.004]***
Income at 16			0.132
			[0.033]***
N	2252	2252	2252
Adj. R-Sq	0.343	0.371	0.376
Controls			
Child & prior attainment	Yes	Yes	Yes
Parents		Yes	Yes
Income at 16			Yes

Notes
1. The wage variable is in log form, thus the coefficient on the number of GCSEs attained represents the proportional wage increase associated with one full GCSE attained. The coefficient was approximately 0.046 in the full specification (3) and is highly significant. We halve this number to provide an approximation of the wage return of a half of a GCSE, thus giving 0.023, roughly equating to 2%.
2. Controls: **Child** – standardised attainment in maths, reading and IQ tests, standardised non-cognitive scores, ethnicity and gender, **Parents** – housing tenure, region, father's social class, father's education, father's age