



# Health and education expansion



Jonathan James<sup>1,\*</sup>

University of Bath, Claverton Down, Bath, BA2 7AY, United Kingdom

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## ABSTRACT

In this paper I exploit a reform that expanded UK post-compulsory education during the 1980s and 1990s to examine the effect of education on health. The expansion resulted in a rapid increase in education over the whole education distribution. I find evidence that education had an effect in reducing body mass index, waist circumference and weight. For other health measures (self-reported general health, long term or limiting illnesses), blood pressure and health behaviours (smoking and drinking) there were small to no improvements. There is suggestive evidence that the mechanisms driving these results are improvements in labour market and social status.

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## 1. Introduction

Across developed countries there have been large increases in post-compulsory schooling during the last few decades. The UK saw a particularly rapid rise over a short period of time. From the late 1980s to the early 1990s the proportion of 18 year olds in full time education rose from around 17% in 1985 to over 35% in the late 1990s. There has been increasing interest in the effects of education beyond the effect on wages from within both academia and among policy makers. This paper examines this rapid post-compulsory education expansion in the UK to examine the effects on health.

Many recent studies have used quasi-experimental evidence, in particular using schooling laws in an instrumental variables setting or using regression discontinuity (RD) designs (Lochner, 2011). For example, Clark and Royer (2013)

examine the effect of two compulsory schooling law changes. In the UK the minimum school leaving age was increased by one year to fifteen in 1947 and to sixteen in 1973. They investigate the effect of these changes on mortality, other health outcomes, and behaviours. They find insignificant effects of these law changes. Lleras-Muney (2005) used changes in compulsory schooling laws and child labour laws in the US exploiting the variation in timing and geographical implementation of these laws. She finds additional schooling leads to reductions in mortality although this is not robust to the inclusion of state-specific trends (Mazumder, 2008). Albouy and Lequien (2009) use a RD strategy similar to Clark and Royer (2013) and also do not find any effects on mortality using French data. In contrast, Van Kippersluis, O'Donnell, and van Doorslaer (2011) do find effects on mortality by exploiting a change in the Dutch compulsory schooling laws. Their large sample size and strong effect of the law change on schooling means that they are able to detect small effects which other studies may not be able to. Arendt (2005) uses a Danish reform and panel data to find some evidence of an effect on self-reported health and smoking.

Turning to other measures of health (Oreopoulos, 2007), and (Silles, 2009) also examine compulsory law changes in

\* Tel.: +447786260013.

E-mail address: [jj412@bath.ac.uk](mailto:jj412@bath.ac.uk), [j.james@bath.ac.uk](mailto:j.james@bath.ac.uk)

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the UK and find reductions in the probability of self-reported poor health. This is in contrast to [Clark and Royer \(2013\)](#) who use month of birth, rather than year of birth, and account for cohort trends. [Powdthavee \(2010\)](#) examines an important biomarker – blood pressure. He finds that education reduces hypertension for men. [Jürges, Kruk, and Reinhold \(2013\)](#) estimate no significant effect of the 1947 and 1973 law changes on two other biomarkers that are relevant for heart disease, C-reactive protein and blood fibrinogen. [Braakmann \(2011\)](#) exploited a discontinuity in the month a student could leave school which resulted in an increase in the probability to obtain a qualification but found no impact on health outcomes or behaviour. [Arendt \(2005\)](#) exploits a Danish schooling reform to examine the effect on hospitalisations. Whereas these studies rely on the exogenous increase in education that almost exclusively had an effect at the bottom of the education distribution, this paper examines a reform that lead to an increase throughout the education distribution.

There are four main reasons why the expansion considered in this paper can provide valuable new evidence on the relationship between education and health. First, the reform was very large and resulted in a doubling in post-compulsory schooling participation. Second, the reform lead to changes throughout the distribution. There were changes at both the upper and lower ends of the education spectrum. Therefore, given this unusual distributional impact we may expect that this reform to have a different impact on health. Whereas the compulsory schooling law changes compel just those at the bottom of the distribution to stay on, it has been shown by [Bladen and Machin \(2007\)](#), that this particular education expansion mainly, although not exclusively, benefited those from better-off backgrounds. This reform is an interesting natural experiment as it results in estimating a different local average treatment effect (LATE) than in, for example, [Clark and Royer \(2013\)](#).

Third, the timing of the reform is relatively recent. Therefore, many of the health dangers of smoking, and drinking were becoming, if not already were, well known at the time of the reforms and therefore it may be the case that education has a less important role to play. Therefore, examining this reform may give a better insight into the relationship between health and education today. Finally, there is a policy relevant aspect to this reform. Expansion of higher education is a policy target of many countries. If a spill-over from this is improvements in health then this should be taken into account when forming higher education policy.

The results are somewhat mixed. There is little or no impact on self-reported health measures (general health and long standing illness), although there is a reduction in limiting illness overall. There is no effect on ‘bad’ health behaviours such as smoking and heavy drinking. However, I do find there is an impact of education in reducing body size shown by BMI and waist size. These results are robust to a range to different specifications. Mechanisms that could be driving these findings are also examined. In addition to the income effects that the reform lead to as shown by [Devereux and Fan \(2011\)](#) and [Machin, Marie, and Vujić \(2012\)](#) I also examine social class and economic activity. While there were improvements in social class, with more moving into the pro-

fessional, and managerial classes, there was not an equivalent change in economic activity. Other mechanisms such as peer effects due to partners who were affected by the reforms are examined but there is no evidence to suggest that they have an impact.

The paper proceeds as follows: [Section 2](#) explains the features of the expansion in education. [Section 3](#) describes the data and descriptive statistics including a graphical analysis. [Section 4](#) sets out the empirical strategy. [Section 5](#) presents the results. [Section 6](#) concludes.

## 2. Institution setting: education expansion in the UK

In the UK the proportion of 18 year olds in full time education has rapidly expanded since the mid-1980s. [Fig. 1](#) shows the rapid increase in participation over the period, represented by a significant step change. The rise in full time participation increased from 17% in 1985 to 40% in 1995. The effect was not just on the lower part of the distribution. [Fig. 1](#) also shows that the rise occurred for both further education i.e. post compulsory schooling (the law in place at the time prohibited leaving school before 16) and higher education. For both measures there was over a doubling in participation over the period. In [Section 3](#) I will examine the degree of the changes in more detail using the Health Survey of England.

There were two main causes for the rapid rise in education over this period. First, there was a significant change to the high school exam system. Second, there were significant changes to the supply in higher education. The main high school exams were replaced ([Bladen & Machin, 2004](#)). The General Certificate of Secondary Education (GCSE) combined the O-level (General Certificate of Education (GCE)), a higher tier exam, and the Certificate of Secondary Education (CSE), a lower tier exam. These changes led to an improvement in results, which may have encouraged people to stay on into further and higher education. There were two main reasons why this exam change may have led to an improvement in attainment. First, a cap on the number of people who could receive a specific grade was removed. Therefore, more could achieve grades A–C which are considered to be passing grades. This move from norm-reference exams, which placed emphasis on relative performance, to criterion-referenced assessment meant that it was possible for everyone to get the top grades ([Bladen, Gregg, & Machin, 2003](#)). Second, there was a move away from the assessment being based just on exam performance to include a sizeable element of coursework.

[Gray, Jesson, and Tranmer \(1993\)](#) show that the most important determinant in predicting post-16 schooling were the qualifications they had received. [Gray et al. \(1993\)](#) also provide evidence that there were big jumps in attainment. Using the Youth Cohort Study (YCS) they find that 30% obtained 4 or more high grade passes in 1986 (pre-GCSE), this increased to 40% in 1988 the first year of the GCSE. There was an increase at almost every level. Therefore someone born in 1972 and after who had the same ability and other similar characteristics (such as a similar discount rate) that someone born before 1972 would have had a greater opportunity to stay on in education due to the change in the

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