

# Aimhigher:Excellence Challenge: A Policy Evaluation Using the Labour Force Survey

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The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Education and Skills.

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## **Executive Summary**

Over the past decades, an increasing number of young people have entered into higher education in the UK. Yet, despite this growth, the UK still has a low ranking in international comparisons for the rate of participation in post-compulsory education. Furthermore, young people from disadvantaged backgrounds are greatly under-represented.

Aimhigher: Excellence Challenge is one of the government initiatives designed in an attempt to address this problem. The policy was introduced in September 2001 in the same areas as those targeted by the Excellence in Cities (EiC) programme. Its stated aims are to raise aspirations and participation in tertiary education of individuals aged between 14 and 19; a special focus is on the targeting of people with a disadvantaged background.

In this paper we study the impact of Aimhigher: Excellence Challenge using information contained in the Labour Force Survey (LFS) for individuals aged between 16 and 20. Individuals in Local Education Authorities (LEA) where the programme was introduced are compared to individuals in LEAs where the policy was not implemented. The difference in average outcomes over time is compared for Aimhigher: Excellence Challenge LEAs and the ‘comparison group’ of LEAs outside the programme. This ‘difference-in-differences’ methodology allows us to distinguish the impact of the policy on outcomes from the (time-constant) effect of unobserved LEA attributes and trends common to both groups of LEAs. Yet, given that the policy was implemented in EiC areas, and that there may be complementarities between the two programmes, our results should not be interpreted as isolating the independent effect of the Aimhigher: Excellence Challenge programme.

Overall, we find that the policy did not have a positive and statistically significant effect on further/higher education participation rates (and educational attainments) for young individuals. In fact, while point estimates of the impact of Aimhigher: Excellence Challenge suggest a positive impact of the policy on the fraction of young individuals studying beyond compulsory education, there is enormous variation around these estimates and they do not provide (statistically) reliable information on the effectiveness of the policy. This is due to the way in which the policy was implemented to cover only a few (very broadly defined) ‘treatment’ areas, which have to be compared to a similarly broadly defined comparison group. As a result, there is considerable variation in the outcome variables and only very large policy effects might be expected to result in statistical significance.

However, our analysis gives stronger evidence of heterogeneity in the effects of the policy. Individuals from more disadvantaged backgrounds (for example, as indicated by those living on social housing or having unemployed fathers) have seemed to benefit more from the policy, compared to students from better-off backgrounds— their probability of entering post-compulsory education is significantly higher as a result of the policy. However, again, the estimates are relatively sensitive to specification and therefore should be interpreted with some caution.

## 1. Introduction

Although the participation rate in post-compulsory education in the UK has increased over time, it remains low by international standards (OECD, 2005) and failed to increase for some years in the 1990s. Furthermore, there is evidence of a considerable gap in access to post-compulsory education by socio-economic group and that this gap has widened over time (see, for example, Blanden and Machin, 2004; Machin and Vignoles, 2004).

Against this background, the government has introduced policies to encourage young people from disadvantaged backgrounds to stay on in education beyond the age of compulsory school-leaving. Aimhigher: Excellence Challenge is one of these policies and was introduced in the same areas as those targeted for a programme to improve standards in schools, ‘Excellence in Cities’ (EiC).<sup>1</sup> The Aimhigher: Excellence Challenge programme was introduced in September 2001 whereas the EiC programme was introduced in various phases from September 1999 onwards. As one would expect complementarities between these policies, for some outcomes (affecting the population of young people over 14 years of age in these areas), it is difficult to distinguish the separate impact of these programmes without making strong assumptions. A more conservative interpretation of evaluation results is therefore that they reflect the additional impact of Aimhigher: Excellence Challenge in areas where EiC was also in operation. Our estimates are instead little informative about the effects of the policy in areas where EiC had not already ‘set the ground’ for the Aimhigher: Excellence Challenge intervention.

In this paper, we aim to evaluate the impact of the Aimhigher: Excellence Challenge policy on educational outcomes for young people between the age of 16 and 20. We use information contained in waves of the Labour Force Survey (LFS) and conduct a ‘difference-in-differences’ analysis. Individuals in Local Education Authorities (LEA) where the programme was introduced (i.e. Aimhigher: Excellence Challenge LEAs or ‘the treated group’) are compared to individuals in a ‘comparison group’ of LEAs, where the programme was not introduced. This comparison is made before and after the programme was implemented and allows estimation of the effect of Aimhigher:

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<sup>1</sup> In fact, Aimhigher was also introduced in some non-EiC EAZ areas; yet, these areas are not included in our main analysis, due to their markedly different characteristics.

Excellence Challenge on a range of educational outcomes, while controlling for unobserved factors that may affect our results.

An important limitation of our analysis is that the unit of ‘treatment’ (i.e. the whole LEA) is very broadly defined and there are relatively few units (i.e. LEAs in the treatment and comparison groups). Specifically, since LEAs contain many individuals, variation in the values of the outcome variables is very wide within each group of LEAs. This implies that the policy would need to have a very large impact on average outcomes in order to identify a significant effect. As a consequence of this, we are unable to say very much about the effect of Aimhigher: Excellence Challenge on average outcomes. In fact, overall, our analysis suggests that the policy did not have positive and significant effects on further/higher education participation rates (and educational attainments) for young individuals. This is due to enormous variation around the point estimates. However, when we consider heterogeneity in the effect of Aimhigher: Excellence Challenge across various subgroups, we find that the policy appears to have a strong impact on the educational participation decisions of those from disadvantaged backgrounds – particularly as defined by the father’s employment status.

The outline of the rest of this paper is as follows. In Section 2, we describe Aimhigher: Excellence Challenge and related policies and describe the data with which we evaluate the policy. In Section 3, we describe the ‘differences in differences’ methodology. In Section 4 we discuss regression results before concluding in Section 5.

## **2. Policy and Data Description**

The Aimhigher: Excellence Challenge programme was introduced in September 2001 with the aim of encouraging young people from disadvantaged backgrounds to participate in higher education, through awareness raising and aspiration-raising activities. The policy was initially introduced in 2001, in Excellence in Cities (EiC) Phase 1 and 2 Local Education Authorities (LEAs), as well as in some Education Action Zones (EAZ), and extended to EiC Phase 3 LEAs in 2004. The target population is 14 to 19 year olds.

The programme consists of two main parts: the first concentrates on activities to widen participation in further education (FE) and higher education (HE); the second focuses on special support for gifted and talented pupils for young people post-16.

However, there is overlap in the two aspects of the programme. The policy includes various strands. The four initial strands aimed at: (i) Improving links between universities, colleges and schools; this includes day visits to campuses or visits by university delegates to schools and colleges. (ii) Increasing funds to HE institutions to facilitate outreach to disadvantaged young people; a high proportion of this funding has been used to set up summer schools for prospective students at various universities. (iii) Providing better information and marketing. (iv) Providing Opportunity Bursaries, i.e. small amounts of money (usually £2,000 over three years) to help cover university expenses.<sup>2</sup>

The main intended outcome of the policy is to increase aspirations and participation in FE/HE; intermediately, the policy aims at improving GCSE and A-level attainment. Although the academic route is most prominent among the targets set by the policy, other forms of FE/HE participation are also mentioned (vocational routes).

Early analysis of Aimhigher: Excellence Challenge suggests that overall the policy may have had some positive impact on attainment at school and stimulated aspirations to participate in FE/HE for young people (see Emmerson *et al.* 2005; Morris and Golden 2005). In this paper, we present an overall evaluation of the policy using data from the Labour Force Survey. Although we are not able to separately estimate the impact of the various strands of the policy, the use of the LFS enables us to examine the effect of Aimhigher: Excellence Challenge on actual participation in FE/HE.<sup>3</sup>

The Labour Force Survey (LFS) is a household based survey containing information on a wide range of topics such as employment status, education, training, hours of work and personal characteristics of household members. Since 1992, the LFS has been available on a quarterly basis, with an approximate size of 60,000 households in each quarter. The Survey is a rotating panel and includes 5 waves, each of about 12,000 households. Households are interviewed in 5 successive quarters and then replaced.<sup>4</sup> The

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<sup>2</sup> The Opportunity Bursaries strand of the policy has now been discontinued and replaced by wider interventions aimed at providing financial assistance to pupils entering Higher Education.

<sup>3</sup> Also, the analysis in this paper does not include EAZ areas among the Aimhigher: Excellence Challenge LEAs, due to their radically different nature and characteristics.

<sup>4</sup> In our analysis, we keep all individual observations, including repeated observation for the same individuals in different quarters. This is in line with the idea that individual educational choice (and attainments) may change between one interview and the next. Yet, our results are not spuriously driven by

four quarters of the LFS cover the following periods: January-end of March (Q1); April-end of June (Q2); July-end of September (Q3); October-end of December (Q4).

Public access individual-level LFS files do not contain disaggregated information about the geographic location of individuals. For the purpose of this policy evaluation, we were given access to the LFS, matched with Unitary Authority data for the period 2000:Q3 to 2004:Q1. From this we can identify individuals living in EiC Phase 1 and 2 LEAs, and therefore covered by the Aimhigher: Excellence Challenge programme.<sup>5</sup>

Given the intended aims of the policy, and given that the policy targets persons between the age of 14 and 19, we identify the following outcomes of interest from the LFS:<sup>6</sup>

- The proportion of 16-20 year olds who are studying.
- The proportion of 16-20 year olds who are studying full-time.
- The proportion of 16-17 year olds obtaining GCSE as their highest qualification.
- The proportion of 17-19 year olds obtaining A/AS Levels as their highest qualification.
- The proportion of 16-18 year olds studying for A/AS Levels.
- The proportion of 18-20 year olds studying for HE.

Since the policy was introduced in September 2001, we expect outcomes to be first affected in the following quarters: 2002:Q3, 2002:Q4 and 2003:Q1. These quarters include educational achievements obtained at the end of the academic year 2001/2002 and educational decisions made for the academic year 2002/2003. The second period to be affected by the introduction of the policy consists of 2003:Q3, 2003:Q4 and 2004:Q1; - roughly the academic year 2003-2004. The periods used as the control cohorts are as follows: 2001:Q3, 2001:Q1, 2000:Q4 and 2000:Q3. Note that in all the analysis we

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considering the same individuals more than once; we will get back to this point in Section 4, where we comment on our results.

<sup>5</sup> Yet, two caveats apply to the use of LFS for this purpose. First, we can only identify individuals' usual place of residence, and not whether they attended schools or LEAs affected by Aimhigher. Second, we can only track individuals who are heads of their household (very few), or for whom the head of the household is providing information; however, the non-response rate is not too high. These two issues should not create major problems for our analysis, as long as the introduction of Aimhigher did not dramatically affect mobility rates and housing decisions. In general, the LFS may not provide a fully representative picture of the UK student population.

<sup>6</sup> Results are not sensitive to the use of other age groupings.



exclude the second quarter (Q2). The reasons for doing this are as follows: first, this quarter is not available for the second year of the policy (2004:Q2) and we aim at keeping our sample as balanced as possible; second, interviews in Q2 terminate at the end of June, when the academic year is almost at an end.<sup>7</sup>

### **3. Methodology**

The aim of our analysis is to estimate the impact of Aimhigher: Excellence Challenge on the educational outcomes of young persons aged between 16 and 20 years, by comparing LEAs where the programme has been introduced to LEAs in a comparison group. In order to do this, our methodology needs to take account of many possible confounding factors. Firstly Aimhigher: Excellence Challenge LEAs may differ from comparison areas according to some observable (and potentially time varying) characteristics, such as the composition of the labour force or ethnicity. Secondly, areas could also differ according to unobservable factors that impact on educational participation and achievement. Thirdly, there could be trends in educational achievement common to all areas, and relevant even in the absence of the policy.

To address these issues, we use a ‘difference-in-differences’ methodology. This involves comparing educational outcomes in treated (Aimhigher: Excellence Challenge) and comparison LEAs, before and after implementation of the policy. This strategy allows one to control for time-constant differences between outcomes in Aimhigher: Excellence Challenge and non-Aimhigher: Excellence Challenge areas as well as the effect of trends that are common across areas.

More formally, let us define  $Y^T_0$  and  $Y^C_0$  as the average outcomes before the policy for, respectively, treated (Aimhigher: Excellence Challenge) and control (comparison) LEAs. Next, define  $Y^T_1$  and  $Y^C_1$  average outcomes after the policy introduction for the treated and control groups. A simple ‘difference-in-differences’ estimator can be constructed as follows:  $(Y^T_1 - Y^T_0) - (Y^C_1 - Y^C_0)$ .

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<sup>7</sup> In fact, we found a large decrease in the share of individuals reporting to be in education in this wave; yet, this fraction was back to its average across the whole year in the 3<sup>rd</sup> quarter (interviews terminates in the end of September). Including the second LFS quarter would have thus generated additional noise in our estimates.

A regression approach can be easily implemented to further account for the effect of observable and time varying factors, both at the individual and at the LEA level.<sup>8</sup> The ‘difference-in-differences’ regression model can be written as follows:

$$Y_{ilt} = \alpha + \beta \text{Aimhigher}_l * \text{Policy-on} + \gamma \text{Aimhigher}_l + X_{ilt} \delta + Z_{lt} \theta + \mu D_t + \varepsilon_{ilt}$$

where  $Y_{ilt}$  is the educational outcome of interest for individual  $i$  at time  $t$  in LEA  $l$ ;  $X_{ilt}$  is a vector of individual-level characteristics affecting educational outcomes for individual  $i$  in time  $t$  and LEA  $l$ ;  $Z_{lt}$  is a vector of LEA characteristics for LEA  $l$ , in time  $t$ ;  $D_t$  is a set of year dummies; and  $\varepsilon_{ilt}$  is an error term.  $\text{Aimhigher}_l$  is a dummy variable for all LEAs in Aimhigher: Excellence Challenge areas.  $\text{Aimhigher}_l * \text{Policy-on}$  is a dummy variable that switches to ‘1’ in Aimhigher: Excellence Challenge areas in time periods in which the Aimhigher: Excellence Challenge policy was implemented.

The parameter of interest is  $\beta$ , as this corresponds to an estimate of the policy impact based on the ‘difference-in-differences’ regression approach. A more stringent version of this model would replace  $\text{Aimhigher}_l$  with a full set of LEA dummies (i.e. controlling for time-constant affects within each LEA rather than time constant effects in a more aggregate grouping). Although the results we report in this analysis are based on models that only include the  $\text{Aimhigher}_l$  dummy, we experimented with this alternative; our findings are robust to the use of the more demanding specification.

The identification of the policy impact using a ‘difference-in-differences’ regression approach rests on the assumption that trends are not changing differentially across the treated and comparison groups for reasons other than the introduction of the Aimhigher: Excellence Challenge policy. This assumption would be violated if, for example, treated LEAs were experiencing exceptionally negative trends in outcomes just before policy implementation and then reverted towards the mean immediately after the policy was introduced (‘mean reversion’). It would also be violated if there was another education policy introduced at the same time in Aimhigher: Excellence Challenge areas. We test our results for the presence of pre-policy trends.

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<sup>8</sup> This approach has been used as one element of the longitudinal evaluation of Excellence in Cities (Machin et al. 2005).

One important way to avoid the above problem is to choose a control group that is similar to the treated (i.e. Aimhigher: Excellence Challenge) group in the pre-policy period. A first and natural choice involves using all LEAs in EiC Phase 3. These areas are similar to those in Aimhigher: Excellence Challenge, in terms of their observable characteristics; and, most importantly, they are all covered by the EiC policy. Under the assumption that the effect of the previously implemented programme was constant across various phases, comparing Aimhigher: Excellence Challenge LEAs (EiC Phase 1 and 2) to EiC Phase 3 areas, would enable the difference to be attributed to the Aimhigher: Excellence Challenge policy. However, Machin et al. (2005) document that the impact of EiC has been growing over time – and differentially between EiC areas (particularly EiC Phase 1 and the other phases). Therefore, we cannot completely disentangle the effect of EiC and Aimhigher: Excellence Challenge. Yet, if the results for this paper (applying to KS3 outcomes) are also true for later outcomes, one could hypothesise that the ‘Aimhigher: Excellence Challenge effect’ might be more plausibly attributed to the difference in outcomes between EiC Phase 2 and EiC Phase 3 areas<sup>9</sup>; we examine this possibility below. Finally, it is important to bear in mind that the P4P program operated more intensely in EiC Phase 3; this should counterbalance the growing effect of the EiC policy over time. As a result, it is not easy to assess whether using EiC Phase 3 as a ‘control’ group to evaluate the Aimhigher: Excellence Challenge intervention gives us an upward or downward biased estimate of the policy effect. A more cautious interpretation of the evaluation results is therefore that they only reflect any additional impact of Aimhigher: Excellence Challenge in areas where EiC was also in operation.

As a robustness check, we also use an alternative comparison group, which is composed of a set of LEAs that do not belong to any phase of the EiC programme.<sup>10</sup> However, most of these areas are radically different from Aimhigher: Excellence Challenge LEAs. In order to make sure that we compare like with like, we adopt a statistical procedure that selects LEAs that are similar in terms of observable

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<sup>9</sup> Machin et al. (2005) show that the effect of EiC Phase 2 and EiC Phase 3 on KS3 Maths in 2002 and 2003 is similar and is supported by the multilevel modelling analysis of national anonymised NPD data (Kendall and Schagen, 2005).

<sup>10</sup> Clearly, this does not help to distinguish the impact of the Aimhigher: Excellence Challenge and EiC policies (indeed, it should reflect the combined effect of both policies). However, we find some evidence of ‘mean reversion’ when using EiC Phase 3 as a comparison group. Use of another comparison group helps us to discern whether results in the former approach are credible.

characteristics before the policy implementation. More specifically, this procedure (statistical matching) involves predicting the probability that an LEA is treated (i.e. exposed to the Aimhigher: Excellence Challenge), based on a set of characteristics before the introduction of the programme (i.e. the propensity score). Then, only Aimhigher: Excellence Challenge and non-Aimhigher: Excellence Challenge LEAs within a similar range of the propensity score (i.e. those in the ‘common support’), are chosen for the analysis.<sup>11</sup> Excluded areas are those which are very different in the treatment and comparison groups on the basis of a range of pre-policy characteristics.

## **4. Regression Results**

### **4. The effect of ‘Aimhigher: Excellence Challenge’ on educational outcomes**

In this section, we present results obtained by comparing Aimhigher: Excellence Challenge LEAs (i.e. LEAs also in EiC Phase 1 and 2) to LEAs participating in EiC Phase 3. First, we discuss sample characteristics and simple ‘difference-in-differences’ calculations; next, we present regression evidence; finally, we report on the robustness of results to use of an alternative comparison group.

#### **4.1. Descriptive Statistics**

In Table 1, we show descriptive statistics for LEAs in Aimhigher: Excellence Challenge areas and those in the comparison group before the implementation of the programme. We provide summary statistics for the following variables: the Multiple Deprivation Index; the percentage of pupils with 5 or more A\*-C GCSEs, the percentage of pupils with no GCSE passes; the percentage of pupils eligible for free school meals; the fraction of individuals from ethnic minorities; average household income; the number of criminal offences per pupil; and the adult unemployment rate.<sup>12</sup>

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<sup>11</sup> We model the probability that an LEA is assigned to ‘Aimhigher: Excellence Challenge’ as a function of the Multiple Deprivation Score (a composite index of deprivation, described below). See Appendix 1 for a plot of the propensity score in Aimhigher: Excellence Challenge and non-EiC areas.

<sup>12</sup> The multiple deprivation score is a synthetic measures at the LEA level based on these domains: income; employment; health deprivation and disability; education, skills and training; housing; and geographical access to services.

There are 46 LEAs where the Aimhigher: Excellence Challenge policy was implemented and 11 LEAs in the comparison group.<sup>13</sup> Table 1 shows that LEAs in the treated and comparison groups perform quite poorly in terms of educational achievement, in comparison with the national average. Similarly, unemployment rates and other measures of social disadvantage tend to be high (and similar) in these areas – in particular, the deprivation index, which takes account of education, health, housing and employment, scores well above 30 both the Aimhigher: Excellence Challenge and comparison group areas, whereas outside these areas, the average is around 20. The fact that LEAs in the treatment and comparison groups rank similarly in terms of their overall disadvantage does not come as a surprise since the EiC programme mainly targeted inner city, deprived schools.

Table 2 reports a first set of ‘difference-in-differences’ estimates for various educational outcomes. For LEAs in the treated (i.e. Aimhigher: Excellence Challenge) group and those in the comparison group, we present the average value of each outcome variable before and after the Aimhigher: Excellence Challenge policy was introduced and the difference over time (in columns 1 and 2). Then in column 3, we report the ‘difference-in-differences’ estimate (with standard errors). The ‘difference-in-differences’ estimate is positive for the probability of being observed as a student or a full-time student. However, small negative coefficients are reported for the probability of obtaining GCSEs or A-levels or studying for A-levels. There is much imprecision around these estimates – the standard errors are larger than the coefficients.<sup>14</sup> This means that we cannot say whether or not the Aimhigher: Excellence Challenge policy improved the first two outcomes.

Tables 3 and 4 repeat this simple exercise separately for the quarters of the LFS in the immediate aftermath of the policy (2002/2003), and for the following year (2003/2004). Results suggest that (if anything) Aimhigher: Excellence Challenge had a

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<sup>13</sup> Notice that, although Aimhigher: Excellence Challenge was introduced into some EiC Phase 3 areas, this was not for the period used in our evaluation; this allows using EiC Phase 3 LEAs as a suitable control group to identify the policy effects.

<sup>14</sup> Standard errors are clustered at the LEA level; this procedure is equivalent to a multilevel analysis. Notice that, using LFS and given the design of the policy, we cannot identify smaller units of analysis (such as wards or schools). The LEA is therefore the smallest geographical information we can use to infer whether an individual was treated by the Aimhigher: Excellence Challenge policy (or else).

positive average effect immediately after its introduction but that this effect reduced in the subsequent period (2003/2004).<sup>15</sup>

In the next Section we use a regression approach to further control for time varying individual- and aggregate-level characteristics.

## 4.2. Regression Results

The first set of regression results is reported in Table 5: for each educational outcome, we report results with and without controls. Regression results without controls are algebraically identical to those in Table 2, and reported here for comparability to the regressions with controls. The full set of additional controls is listed in Appendix 2, Table A1. These include: individual-level characteristics (such as health, ethnicity and accommodation arrangement); family background characteristics (living alone, with partner, with lone parent, in an intact family or with another adult; educational and employment characteristics of relatives or other adults); LEA aggregate characteristics (such as the deprivation score in 2000 and adult unemployment rates).<sup>16</sup> Descriptive statistics for these variables are presented separately for Aimhigher: Excellence Challenge and comparison group areas, before and after policy introduction. They show that Aimhigher: Excellence Challenge LEAs and those in the comparison group are quite similar, and that big differences did not emerge after the policy was introduced.

Regression estimates in Table 5 show that the ‘difference-in-differences’ estimate of Aimhigher: Excellence Challenge becomes larger when controls are added when the outcome variable is whether an individual of age 16-20 is participating in any education (columns 1 and 2) or full-time education (columns 3 and 4) but results are not statistically significant.<sup>17</sup> Estimated coefficients on the other outcome variables remain negative, and

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<sup>15</sup> Our analysis includes repeated observations for individuals across different quarters of the LFS. To check the sensitivity of our analysis to the problem of multiple observations and sample size inflation, we reproduced our estimates only considering 2000:Q3, 2001:Q3, 2003:Q3 and 2004:Q3. In this case, no individual is repeated in any of the quarters. When we did this we only found marginally different estimates of the policy effects; our main conclusions were not affected.

<sup>16</sup> We also experimented with a more stringent specification that includes a full set of LEA dummies; both point estimates and reported standard errors were only marginally affected.

<sup>17</sup> The fact that most results discussed here are not statistically significant is directly linked to the policy design, implemented at the LEA level. Almost mechanically (and in the absence of enormous policy effects) programmes involving few treated and comparison areas will have no statistically significant

become closer to zero, when controls are added. In Table 6, we show results for the first and second years of the policy. When controls are added, the coefficient on ‘student’ or ‘full-time student’ increases in the second year of the policy. However the estimated coefficient in the first year is at least twice as high as that in the most recent year. We do not report instead regression results where the outcome variable is whether the individual entered higher education. This is because a robustness check, testing for pre-policy trends in the outcomes of interest, shows that the regression results on this variable is highly spurious. This involves estimating a ‘difference-in-differences’ regression using two pre-policy periods instead of a pre-policy and post-policy period. If there is no differential trend between Aimhigher: Excellence Challenge and non-Aimhigher: Excellence Challenge areas in the pre-policy period (an assumption we need for this approach), then the ‘difference-in-differences’ estimate should be zero in this robustness check. Notice also that our robustness check also suggests that the positive coefficient on ‘student’ or ‘full-time student’ may be in part attributable to pre-policy trends in Aimhigher: Excellence Challenge areas (see Appendix Table A3); this suggests additional caution in interpreting our findings.

In conclusion, the estimates of the ‘Aimhigher: Excellence Challenge’ policy effect are too imprecisely determined to tell us anything about whether the policy was effective. The imprecision appears to be due to the fact that the unit of ‘treatment’ is the whole LEA – and there are only 46 LEAs in the treatment (Aimhigher: Excellence Challenge) group and 11 LEAs in the control group. The average effect of the policy is too small in relation to the standard deviation of outcome variables within and across LEAs. However, we might observe positive results when the target group is more narrowly defined. This is the issue to which we now turn.

### **4.3. Heterogeneity in the effect of Aimhigher: Excellence Challenge**

Since the Aimhigher: Excellence Challenge policy was aimed at disadvantaged individuals, it is of interest to see whether the ‘difference-in-differences’ estimate is higher for more disadvantaged groups than it is for others in the relevant population. To

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impact; this due to the large standard deviation of outcomes at the LEA level, compared to the variation induced by the policy in educational measures.

examine this, we re-estimate regressions including interactions between included variables and whether an individual belongs to a particular subgroup. Table 7 shows the ‘difference-in-differences’ estimates for two regressions. In the upper panel, variables are interacted with whether the family is ‘living on social rent’ and the coefficients of interest are ‘Aimhigher’\*PolicyOn\*Living on Social Rent’ and ‘Aimhigher’\*PolicyOn\*Not on Social Rent’. The lower panel reports ‘difference-in-differences’ estimate from another regression where variables are interacted with the father’s employment status (i.e. employed; not working; ‘occupation missing’). Notice that ‘Living on Social Rent’ and ‘Not Working Fathers’ are good proxies for individual disadvantaged backgrounds. In fact, for example: 36% of young individuals living on social rents come from lone parent families, compared to 15% for individuals not living on social rents; 62% of these individuals have fathers with educational records lower than GCSE or equivalent, viz. 37% for individuals not on social rents; finally, 35% of individuals on social rents have non-working fathers, compared to 8% for other individuals. To conclude, it is interesting to note that while only 17% of individuals with working fathers having non-working partners, this fraction is about 60% for non-working fathers.

In both cases, we see that whether a person aged between 16 and 20 is a student or full-time student is strongly affected by the Aimhigher: Excellence Challenge policy if he/she comes from a disadvantaged background, whereas other groups are unaffected. These results suggest that participation rates in education (and full-time education) are 15-16 percentage points higher as a result of Aimhigher: Excellence Challenge. These results are not only large in magnitude, but are also strongly statistically significant.<sup>18</sup> We cannot rule out that these effects are also attributable to the effect of the EiC policy.<sup>19</sup> However, it is interesting that they are driven by the difference between Aimhigher: Excellence Challenge areas in EiC Phase 2 and the comparison group (EiC Phase 3) rather than the difference between EiC Phase 1 and 3 (results not reported).<sup>20</sup>

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<sup>18</sup> To check that these results are not driven by the inclusion of controls that may have a different impact across the various subsets under analysis (for example ‘living on social rent’ viz. ‘not living on social rent’), we re-run our analysis: a-excluding controls; b-treating the various partitions as different samples. Our findings were fully confirmed.

<sup>19</sup> Importantly, we checked that these results are not driven by pre-policy trends.

<sup>20</sup> Machin et al. (2005) find a more similar pattern in the effect of EiC over time between Phase 2 and Phase 3 than between Phase 1 and the other EiC Phases. However, their analysis is with respect to Key Stage 3 outcomes and school attendance outcomes – and not the outcomes of interest here.



We estimated other similar regressions (not reported here) for various subgroups. The probability of participation is also stronger for individuals living with lone parents. However, the estimated impact of the policy is not large for those with less well educated parents or conditional on the individual's ethnicity.

Given the strength of these results, it is very important to check if they are robust to the use of an alternative comparison group.

#### **4.4. Robustness Checks**

The robustness checks reported here are results when an alternative comparison group is used instead of EiC Phase 3. As described in Section 3, for this analysis we select Aimhigher: Excellence Challenge LEAs and LEAs outside EiC Phase 3 that are similar in relation to pre-policy characteristics. Tables 8a and 8b show the characteristics of LEAs in the treated (i.e. Aimhigher: Excellence Challenge) group and comparison group before and after statistical matching. As expected, they are far more similar after this process, although a comparison with Table 1 suggests that EiC Phase 3 is still more similar to Aimhigher: Excellence Challenge LEAs than the alternative comparison group.

In general, results using the alternative comparison group are consistent with those reported above. In Table 9, we show results (comparable to Table 5) that show the average effect of the Aimhigher: Excellence Challenge policy. Again, the coefficients suggest a positive impact of Aimhigher: Excellence Challenge on the probability of participation in education beyond the age of 16. However, the estimates are small or negative for other outcomes.<sup>21</sup> Similarly to the previous analysis, there is too much variation around the estimates to say whether or not Aimhigher: Excellence Challenge had a positive impact on these outcome measures.

In Table 10, we show whether there is evidence of the effect of Aimhigher: Excellence Challenge varying by subgroup (comparable to the analysis reported in Table 7). Unlike with the former comparison group, the effect of the 'Aimhigher: Excellence Challenge' policy does not vary by whether or not the family lives on social rent.

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<sup>21</sup> It is also the case that coefficients are higher in the first year of the policy than they are in the second year of the policy. Note that we include an outcome variable for whether the individual is participating in higher education. Unlike when using EiC Phase 3 as the comparison group, there is no evidence of important pre-policy trends for this variable.

However, the coefficients for educational participation beyond the age of 16 (i.e. ‘student’; ‘full-time student’) are positive in both cases. Results for other outcome variables are either negative or zero. When the relevant subgroup is father’s employment status (i.e. in the lower panel), then results are similar to those reported using EiC Phase 3 as a comparison group. The coefficients for educational participation are positive and of a similar (though slightly lower) magnitude. The estimates are just below statistical significance. Unlike estimates in Table 7, there is also a positive coefficient for the probability of attaining GCSEs. However, the standard error is also high.

We also repeated this analysis when matching Aimhigher: Excellence Challenge areas to all other LEAs (i.e. including those in EiC Phase 3; results not shown). Again, the results vary and while point estimates suggest a stronger effect of the policy on those from disadvantaged backgrounds, the standard errors are also very large (and results are not statistically significant). In general, point estimates are lower than those reported above.

This analysis shows that one has to be careful about inferring results from statistical analysis when there are relatively few ‘treated/non-treated’ units (i.e. LEAs in Aimhigher: Excellence Challenge and LEAs in the comparison group). Estimates are not well determined. However, available results suggest that Aimhigher: Excellence Challenge may have had an impact on participation and these effects seem to be more evident for disadvantaged groups (at least as defined by the employment status of the father).

## 5. Conclusion

The Aimhigher: Excellence Challenge programme was introduced in September 2001 with the aim of increasing the number of young people from disadvantaged backgrounds who study beyond compulsory levels and enter HE. The programme was initially introduced in EiC Phase 1 and 2 LEAs, and is currently being extended to other areas.

In this paper, we have evaluated its impact using information contained in Labour Force Surveys (LFS), and applying a ‘difference-in-differences’ methodology that compares Aimhigher: Excellence Challenge and non-Aimhigher: Excellence Challenge LEAs, before and after the policy implementation. Our findings suggest that Aimhigher: Excellence Challenge may have had a positive impact on the participation rate in education beyond 16. However, on account of the way in which the policy was implemented (across whole LEAs), we are unable to find statistically significant impacts. More encouragingly, we find evidence that the policy had a significant positive impact on the participation decisions of those from disadvantaged backgrounds. However, our robustness checks suggest that the magnitude of effects and their statistical significance are sensitive to what LEAs are in the treatment (i.e. Aimhigher: Excellence Challenge) and comparison groups.

Importantly for the interpretation of the results, the policy design does not allow us to fully disentangle the impact of Aimhigher: Excellence Challenge from that of Excellence in Cities (EiC). A more conservative interpretation of evaluation results is therefore that they reflect the additional impact of Aimhigher: Excellence Challenge in areas where EiC was also in operation.

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Table1: LEA characteristics before policy introduction; Aimhigher: Excellence Challenge LEAs (EiC Phase 1 and 2) vs. Control LEAs (EiC Phase 3).

Controls	Aim Higher		Other LEAs	
	Mean	Standard deviation	Mean	Standard deviation
Deprivation score, 2000	39.54	9.93	35.69	6.53
% Pupils with $\geq 5$ A*-C GCSEs, 1999	36.46	6.61	39.17	6.40
% Pupils with No Passes, 1999	7.13	2.34	6.23	2.06
% Pupils receiving free school meals, 1999	30.40	10.56	21.99	2.72
% Individuals from Ethnic Minorities, 1999	16.29	15.95	14.00	12.85
Average HH Income, 1999	20.55	4.45	19.62	3.10
No .of Crime Offences pee Pupil, 1999	0.443	0.233	0.312	0.067
Unemployment Rate (adults), 2000	5.63	2.10	4.90	2.54
<i>Number of LEAs</i>	<i>46</i>		<i>11</i>	

Note: Deprivation score, 2000; % Pupils with  $\geq 5$  A\*-C GCSEs, 1999; % Pupils with No Passes, 1999; % receiving free school meals only available for 10 EiC Phase 3 LEAs.

Table 2: Educational Achievements by Aimhigher: Excellence Challenge and Control Group (EiC Phase 3), before and after the policy introduction; *all periods* (2000:Q3-2004:Q1).

Education Outcomes (proportion)	Aimhigher: Excellence Challenge LEAs	Control LEAs	<i>Diff-in-Diff</i>
<i>Student</i>			
Pre-Policy (2000-2001)	0.318	0.295	
Post-Policy (2002-2004)	0.340	0.296	
Difference	0.022	0.001	<i>0.021</i> <i>(0.024)</i>
<i>Full-time Student</i>			
Pre-Policy (2000-2001)	0.309	0.288	
Post-Policy (2002-2004)	0.327	0.290	
Difference	0.018	0.002	<i>0.016</i> <i>(0.024)</i>
<i>GCSEs, Highest Qualification</i>			
Pre-Policy (2000-2001)	0.505	0.496	
Post-Policy (2002-2004)	0.428	0.434	
Difference	-0.077	-0.062	<i>-0.015</i> <i>(0.040)</i>
<i>A Levels, Highest Qualification</i>			
Pre-Policy (2000-2001)	0.204	0.187	
Post-Policy (2002-2004)	0.254	0.254	
Difference	0.050	0.067	<i>-0.017</i> <i>(0.029)</i>
<i>Studying for A Levels</i>			
Pre-Policy (2000-2001)	0.259	0.255	
Post-Policy (2002-2004)	0.273	0.280	
Difference	0.014	0.025	<i>-0.011</i> <i>(0.025)</i>

Note: Student is fraction of 16/20 year old individuals studying to achieve qualifications. Full-time Student is fraction of 16/20 year old individuals studying full-time to achieve qualifications. GCSEs, Highest Qualification is fraction of 16/17 year old with GCSEs as highest qualification. A Levels, Highest Qualification is fraction of 17/19 year old with A Levels as highest qualification. Studying for A Levels is fraction of 16/18 year old enrolled in courses leading to A/AS Levels. Pre-policy quarters: 2000:Q3, 2000:Q4, 2001:Q1, 2001:Q3; After-policy quarters: 2002:Q3, 2002:Q4, 2003:Q1, 2003:Q3, 2003:Q4, 2004:Q1.

Table 3: Educational Achievements by Aimhigher: Excellence Challenge and Control Group (EiC Phase 3), before and after the policy introduction; *first year impact* (2000:Q3-2003:Q1).

Education Outcomes (proportion)	Aimhigher: Excellence Challenge LEAs	Control LEAs	<i>Diff-in-Diff</i>
<i>Student</i>			
Pre-Policy (2000-2001)	0.318	0.295	
Post-Policy (2002-2003)	0.349	0.288	
Difference	0.031	-0.007	<i>0.038</i> <i>(0.025)</i>
<i>Full-time Student</i>			
Pre-Policy (2000-2001)	0.309	0.288	
Post-Policy (2002-2003)	0.333	0.280	
Difference	0.024	-0.008	<i>0.032</i> <i>(0.024)</i>
<i>GCSEs, Highest Qualification</i>			
Pre-Policy (2000-2001)	0.505	0.496	
Post-Policy (2002-2003)	0.448	0.432	
Difference	-0.057	-0.064	<i>0.007</i> <i>(0.042)</i>
<i>A Levels, Highest Qualification</i>			
Pre-Policy (2000-2001)	0.204	0.187	
Post-Policy (2002-2003)	0.257	0.258	
Difference	0.053	0.071	<i>-0.018</i> <i>(0.029)</i>
<i>Studying for A Levels</i>			
Pre-Policy (2000-2001)	0.259	0.255	
Post-Policy (2002-2003)	0.280	0.278	
Difference	0.021	0.023	<i>-0.002</i> <i>(0.031)</i>

Note: Student is fraction of 16/20 year old individuals studying to achieve qualifications. Full-time Student is fraction of 16/20 year old individuals studying full-time to achieve qualifications. GCSEs, Highest Qualification is fraction of 16/17 year old with GCSEs as highest qualification. A Levels, Highest Qualification is fraction of 17/19 year old with A Levels as highest qualification. Studying for A Levels is fraction of 16/18 year old enrolled in courses leading to A/AS Levels. Pre-policy quarters: 2000:Q3, 2000:Q4, 2001:Q1, 2001:Q3; After-policy quarters: 2002:Q3, 2002:Q4, 2003:Q1, 2003:Q3, 2003:Q4, 2004:Q1.

Table 4: Educational Achievements by Aimhigher: Excellence Challenge and Control Group (EiC Phase 3), before and after the policy introduction; *second year impact* (2000:Q3-2001:Q3 vs. 2003:Q3-2004:Q1).

Education Outcomes (proportion)	Aimhigher: Excellence Challenge LEAs	Control LEAs	<i>Diff-in-Diff</i>
<i>Student</i>			
Pre-Policy (2000-2001)	0.318	0.295	
Post-Policy (2003-2004)	0.329	0.304	
Difference	0.011	0.009	<i>0.002</i> <i>(0.027)</i>
<i>Full-time Student</i>			
Pre-Policy (2000-2001)	0.309	0.288	
Post-Policy (2003-2004)	0.320	0.299	
Difference	0.011	0.011	<i>0.000</i> <i>(0.029)</i>
<i>GCSEs, Highest Qualification</i>			
Pre-Policy (2000-2001)	0.505	0.496	
Post-Policy (2003-2004)	0.408	0.436	
Difference	-0.097	-0.060	<i>-0.037</i> <i>(0.054)</i>
<i>A Levels, Highest Qualification</i>			
Pre-Policy (2000-2001)	0.204	0.187	
Post-Policy (2003-2004)	0.252	0.251	
Difference	0.052	0.064	<i>-0.012</i> <i>(0.054)</i>
<i>Studying for A Levels</i>			
Pre-Policy (2000-2001)	0.259	0.255	
Post-Policy (2003-2004)	0.266	0.282	
Difference	0.007	0.027	<i>-0.020</i> <i>(0.025)</i>

Note: Student is fraction of 16/20 year old individuals studying to achieve qualifications. Full-time Student is fraction of 16/20 year old individuals studying full-time to achieve qualifications. GCSEs, Highest Qualification is fraction of 16/17 year old with GCSEs as highest qualification. A Levels, Highest Qualification is fraction of 17/19 year old with A Levels as highest qualification. Studying for A Levels is fraction of 16/18 year old enrolled in courses leading to A/AS Levels. Pre-policy quarters: 2000:Q3, 2000:Q4, 2001:Q1, 2001:Q3; After-policy quarters: 2002:Q3, 2002:Q4, 2003:Q1, 2003:Q3, 2003:Q4, 2004:Q1.



Table 5: Regression Estimates of the Policy Impact; *all periods*. Control group: EiC Phase 3.

	Education Outcomes (proportion)									
	Student	Student	FT Student	FT Student	GCSEs	GCSEs	A Levels	A Levels	Study-A Lev.	Study-A Lev.
Aimhigher* PolicyOn	0.021 (0.024)	0.035 (0.027)	0.016 (0.024)	0.027 (0.028)	-0.015 (0.040)	-0.015 (0.036)	-0.017 (0.029)	-0.013 (0.023)	-0.011 (0.025)	-0.004 (0.030)
No. of LEAs	57	56	57	56	57	56	57	56	57	56
No. of Obs.	20,907	16,679	20,907	16,679	8,356	6,630	12,276	9,800	12,328	9,806
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Note: Student is whether individual of 16-20 years old is observed in education; Full-time Student is whether individual of 16-20 years is observed in full-time education. GCSEs, Highest Qualification is whether 16-17 year olds have GCSE as their highest qualification; A Levels, Highest Qualification is whether 17-19 year olds have A-level as their highest qualification. Studying for A Levels is whether 16-18 year olds are enrolled in courses leading to A/AS Levels. Pre-policy quarters: 2000:Q3, 2000:Q4, 2001:Q1, 2001:Q3; After-policy quarters: 2002:Q3, 2002:Q4, 2003:Q1, 2003:Q3, 2003:Q4, 2004:Q1. Standard errors clustered at the LEA level. Controls listed in Tables A1.

Table 6: Regression Estimates of the Policy Impact; *first vs. second year impact*. Control group: EiC Phase 3.

	Education Outcomes (proportion)									
	Student	Student	FT Student	FT Student	GCSEs	GCSEs	A Levels	A Levels	Study-A Lev.	Study-A Lev.
Aimhigher* PolicyOn*02/03	0.038 (0.025)	0.040 (0.026)	0.032 (0.024)	0.032 (0.026)	0.007 (0.042)	0.009 (0.038)	-0.018 (0.029)	-0.023 (0.023)	-0.002 (0.031)	-0.002 (0.034)
Aimhigher* PolicyOn*03/04	0.002 (0.027)	0.022 (0.033)	0.000 (0.029)	0.013 (0.035)	-0.037 (0.054)	-0.081 (0.050)	-0.012 (0.054)	0.012 (0.032)	-0.020 (0.025)	-0.011 (0.029)
No. of LEAs	57	56	57	56	57	56	57	56	57	56
No. of Obs.	20,907	16,679	20,907	16,679	8,356	6,630	12,276	9,800	12,328	9,806
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Note: Student is whether individual of 16-20 years old is observed in education; Full-time Student is whether individual of 16-20 years is observed in full-time education. GCSEs, Highest Qualification is whether 16-17 year olds have GCSE as their highest qualification; A Levels, Highest Qualification is whether 17-19 year olds have A-level as their highest qualification. Studying for A Levels is whether 16-18 year olds are enrolled in courses leading to A/AS Levels. Pre-policy quarters: 2000:Q3, 2000:Q4, 2001:Q1, 2001:Q3; After-policy quarters: 2002:Q3, 2002:Q4, 2003:Q1, 2003:Q3, 2003:Q4, 2004:Q1.

Standard errors clustered at the LEA level. Controls listed in Tables A1.

Table 7: Regression Estimates of the Policy Impact, *all periods*; by some background characteristics (living on social rent; father's occupation, in intact families). Control group: EiC Phase 3.

	Education Outcomes (proportion)									
	Student	FT Student	GCSEs	A Levels	Study-A Lev.	Student	FT Student	GCSEs	A Levels	Study-A Lev.
Aimhigher*PolicyOn* Living on Social Rent	0.159** (0.053)	0.156** (0.056)	0.117 (0.078)	-0.029 (0.055)	0.040 (0.031)					
Aimhigher*PolicyOn* Not on Social Rent	-0.009 (0.025)	-0.019 (0.024)	-0.078 (0.050)	-0.005 (0.034)	-0.029 (0.044)					
Aimhigher*PolicyOn* Father Employed						-0.046 (0.032)	-0.054 (0.030)	-0.073 (0.050)	0.018 (0.037)	-0.042 (0.049)
Aimhigher*PolicyOn* Father Not Working						0.151** (0.051)	0.163** (0.051)	0.008 (0.101)	0.098 (0.072)	0.088 (0.088)
Aimhigher*PolicyOn* Father's Occupation Missing						0.095 (0.055)	0.066 (0.049)	-0.256 (0.237)	-0.004 (0.109)	0.259 (0.139)
No .of LEAs	56	56	56	56	56	56	56	56	56	56
No. of Obs.	16,679	16,679	6,630	9,800	9,806	9,117	9,117	4,305	5,596	6,189
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: Student is whether individual of 16-20 years old is observed in education; Full-time Student is whether individual of 16-20 years is observed in full-time education. GCSEs, Highest Qualification is whether 16-17 year olds have GCSE as their highest qualification; A Levels, Highest Qualification is whether 17-19 year olds have A-level as their highest qualification. Studying for A Levels is whether 16-18 year olds are enrolled in courses leading to A/AS Levels. Pre-policy quarters: 2000:Q3, 2000:Q4, 2001:Q1, 2001:Q3; After-policy quarters: 2002:Q3, 2002:Q4, 2003:Q1, 2003:Q3, 2003:Q4, 2004:Q1.

Standard errors clustered at the LEA level. Controls listed in Tables A1.

Table 8a: LEA characteristics before policy introduction; all Aimhigher: Excellence Challenge LEAs (EiC Phase 1 and 2) vs. all Potential Control LEAs (EiC Phase 3); *before matching*.

Controls	Aim Higher		Other LEAs	
	Mean	S.D.	Mean	S.D.
Deprivation score, 2000	39.54	9.93	21.01	7.45
% Pupils with $\geq 5$ A*-C GCSEs, 1999	36.46	6.61	48.54	6.19
% Pupils with No Passes, 1999	7.13	2.34	4.94	1.53
% FSME Pupils	30.40	10.56	12.08	4.25
% Individuals from Ethnic Minorities	16.29	15.95	5.33	7.57
Average HH Income, 1999	20.55	4.45	22.24	3.31
No. of Crime Offences per Pupil	0.443	0.233	0.247	0.098
Unemployment Rate (adults), 2000	5.63	2.10	3.56	1.27
<i>Number of LEAs</i>	<i>46</i>		<i>91</i>	

Note: Deprivation score, 2000; % Pupils with  $\geq 5$  A\*-C GCSEs, 1999; % Pupils with No Passes, 1999; % FSME Pupils only available for 87 potential control LEAs.

Table 8b: LEA characteristics before policy introduction; all Aimhigher: Excellence Challenge LEAs (EiC Phase 1 and 2) vs. all Potential Control LEAs (EiC Phase 3); *after matching*.

Controls	Aim Higher		Other LEAs	
	Mean	S.D.	Mean	S.D.
Deprivation score, 2000	32.68	5.65	25.16	5.42
% Pupils with $\geq 5$ A*-C GCSEs, 1999	39.54	5.62	45.95	5.72
% Pupils with No Passes, 1999	6.65	1.82	5.23	1.67
% FSME Pupils	26.64	7.33	14.00	3.61
% Individuals from Ethnic Minorities	17.03	14.67	5.51	7.73
Average HH Income, 1999	22.53	5.30	20.65	2.28
No. of Crime Offences per Pupil	0.482	0.290	0.256	0.081
Unemployment Rate (adults), 2000	5.78	2.33	3.93	1.31
<i>Number of LEAs</i>	<i>21</i>		<i>53</i>	

Table 9: Regression Estimates of the Policy Impact; *all periods*. Matched Sample.

	Education Outcomes											
	Student	Student	FT Student	FT Student	GCSEs	GCSEs	A Levels	A Levels	Study-A Lev.	Study-A Lev.	Study-HE	Study-HE
Aimhigher* PolicyOn	0.028 (0.029)	0.027 (0.024)	0.027 (0.028)	0.025 (0.023)	-0.013 (0.028)	-0.004 (0.025)	-0.022 (0.030)	-0.018 (0.023)	-0.022 (0.024)	-0.021 (0.020)	-0.012 (0.035)	-0.006 (0.023)
No. of LEAs	74	74	74	74	74	74	74	74	74	74	74	74
No. of Obs.	32,088	25,894	32,088	25,894	13,701	11,032	19,010	15,355	20,041	16,128	18,387	14,862
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Note: Student is whether individual of 16-20 years old is observed in education; Full-time Student is whether individual of 16-20 years is observed in full-time education. GCSEs, Highest Qualification is whether 16-17 year olds have GCSE as their highest qualification; A Levels, Highest Qualification is whether 17-19 year olds have A-level as their highest qualification. Studying for A Levels is whether 16-18 year olds are enrolled in courses leading to A/AS Levels; Studying for Higher Education (HE) is whether 18-20 year olds are enrolled in HE (academic) courses. Pre-policy quarters: 2000:Q3, 2000:Q4, 2001:Q1, 2001:Q3; After-policy quarters: 2002:Q3, 2002:Q4, 2003:Q1, 2003:Q3, 2003:Q4, 2004:Q1. Standard errors clustered at the LEA level. Controls are the same as those in previous regressions.

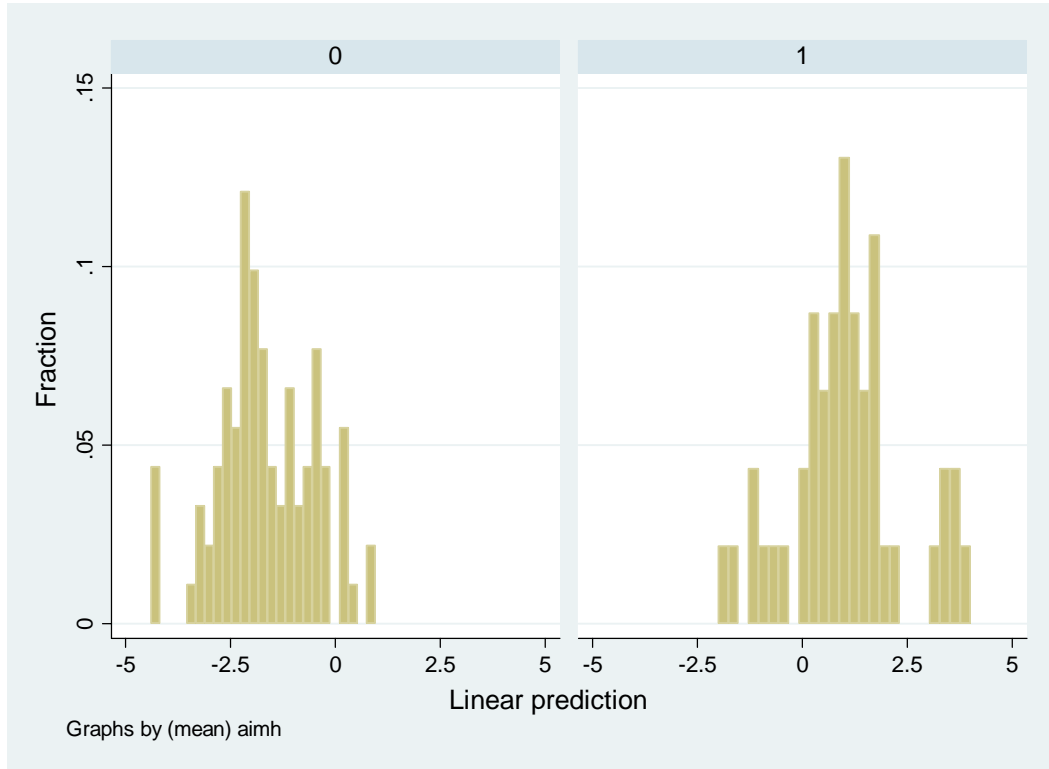
Table 10: Regression Estimates of the Policy Impact, *all periods*; by some background characteristics (living on social rent; father's occupation, in intact families). Matched Sample.

	Education Outcomes											
	Student	FT Student	GCSEs	A Levels	Study-A Lev.	Study-HE	Student	FT Student	GCSEs	A Levels	Study-A Lev.	Study-HE
Aimhigher*PolicyOn* Living on Social Rent	0.040 (0.031)	0.030 (0.032)	0.014 (0.056)	0.017 (0.031)	0.041 (0.032)	-0.020 (0.034)						
Aimhigher*PolicyOn* Not on Social Rent	0.022 (0.025)	0.024 (0.024)	-0.028 (0.029)	-0.023 (0.034)	-0.052* (0.023)	-0.001 (0.027)						
Aimhigher*PolicyOn* Father Employed							0.014 (0.027)	0.016 (0.026)	-0.039 (0.029)	0.015 (0.039)	-0.059* (0.026)	-0.044 (0.040)
Aimhigher*PolicyOn* Father Not Working							0.113 (0.060)	0.107 (0.063)	0.143 (0.098)	0.007 (0.079)	0.086 (0.070)	-0.010 (0.063)
Aimhigher*PolicyOn* Father's Occupation Missing							0.007 (0.067)	0.011 (0.067)	-0.055 (0.102)	0.055 (0.076)	0.050 (0.107)	-0.017 (0.080)
No. of LEAs	74	74	74	74	74	74	74	74	74	74	74	74
No. of Obs.	25,894	25,894	11,032	15,355	16,128	14,862	16,616	16,616	8,150	10,227	11,657	8,466
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: Student is whether individual of 16-20 years old is observed in education; Full-time Student is whether individual of 16-20 years is observed in full-time education. GCSEs, Highest Qualification is whether 16-17 year olds have GCSE as their highest qualification; A Levels, Highest Qualification is whether 17-19 year olds have A-level as their highest qualification. Studying for A Levels is whether 16-18 year olds are enrolled in courses leading to A/AS Levels; Studying for Higher Education (HE) is whether 18-20 year olds are enrolled in HE (academic) courses. Pre-policy quarters: 2000:Q3, 2000:Q4, 2001:Q1, 2001:Q3; After-policy quarters: 2002:Q3, 2002:Q4, 2003:Q1, 2003:Q3, 2003:Q4, 2004:Q1. Standard errors clustered at the LEA level. Controls are the same as those in previous regressions.

## Appendix 1

Figure 1: Propensity Scores for Aimhigher: Excellence Challenge and Non Aimhigher: Excellence Challenge -Non EiC Phase 3 LEAs.



Selected For Matching Specification:  
Schools with predicted linear index of the propensity score between -2.000 and 0.952.

Note: Propensity score is obtained from a probit estimation of probability of treatments on the Multiple Deprivation Index 2000 and a constant. The total number of LEAs for the matching specifications is: 74; 21 are Aimhigher: Excellence Challenge LEAs, while 53 form the comparison group.

## Appendix 2

Table A1: Descriptive Statistics of Regression Controls; before introduction of the policy, all quarters. Aimhigher: Excellence Challenge LEAs and EiC Phase 3 Control Group.

Controls	Aim Higher		Comparison Group	
	Mean	S.D.	Mean	S.D.
<i>Individual Level Controls</i>				
Married/Was Married	0.014	0.471	0.014	0.120
White	0.667	0.471	0.705	0.456
Black	0.056	0.231	0.028	0.166
Asian	0.104	0.306	0.127	0.333
Mixed	0.030	0.170	0.026	0.158
Missing Ethnicity	0.143	0.350	0.114	0.317
English	0.856	0.351	0.902	0.297
Irish	0.003	0.059	0.004	0.064
Other	0.068	0.251	0.035	0.183
Missing	0.073	0.260	0.059	0.235
Live in Owned House	0.097	0.296	0.147	0.354
Live in House with Mortgage	0.400	0.490	0.518	0.500
Living in Rented House	0.503	0.500	0.335	0.472
Missing Housing Information	0.001	0.037	0	0
House on Social Rent	0.333	0.471	0.260	0.439
Health Problems	0.144	0.351	0.141	0.348
Living Alone	0.021	0.145	0.017	0.130
Living with Partner	0.078	0.268	0.062	0.241
Living in Intact family	0.528	0.500	0.659	0.474
Living with Lone Parent	0.221	0.415	0.200	0.400
Living with Other Adult	0.151	0.358	0.062	0.242
<i>Parental Background information</i>				
Father, has Higher Education	0.157	0.364	0.153	0.361
Father, has A Levels	0.272	0.364	0.264	0.441
Father, has GCSEs,	0.107	0.309	0.121	0.326
Father, has Other Education	0.374	0.484	0.384	0.487
Father, has Missing Education	0.089	0.285	0.078	0.268
Father, is Employed	0.738	0.440	0.738	0.440
Father, is Unemployed	0.039	0.195	0.046	0.210
Father, is Out of Labor Force	0.162	0.368	0.168	0.374
Father, has Missing Occupation	0.061	0.239	0.048	0.215
Mother, has Higher Education	0.169	0.374	0.153	0.361
Mother, has A Levels	0.094	0.291	0.103	0.304
Mother, has GCSEs,	0.190	0.392	0.223	0.416
Mother, has Other Education	0.500	0.500	0.491	0.500
Mother, has Missing Education	0.049	0.216	0.029	0.169
Mother, is Employed	0.622	0.485	0.684	0.465
Mother, is Unemployed	0.018	0.132	0.009	0.097
Mother, is Out of Labor Force	0.317	0.465	0.278	0.448



Mother, has Missing Occupation	0.043	0.203	0.028	0.166
Other Adult, has Higher Education	0.092	0.289	0.100	0.302
Other Adult, has A Levels	0.511	0.500	0.255	0.439
Other Adult, has GCSEs,	0.027	0.162	0.133	0.342
Other Adult, has Other Education	0.141	0.348	0.244	0.432
Other Adult, has Missing Education	0.230	0.420	0.267	0.445
Other Adult, is Employed	0.313	0.464	0.333	0.474
Other Adult, is Unemployed	0.031	0.172	0.122	0.329
Other Adult, is Out of Labor Force	0.503	0.500	0.378	0.487
Other Adult, has Missing Occupation	0.153	0.153	0.167	0.375
Lone Parent, has Higher Education	0.140	0.347	0.108	0.310
Lone Parent, has A Levels	0.103	0.304	0.062	0.242
Lone Parent, has GCSEs,	0.219	0.414	0.281	0.450
Lone Parent, has Other Education	0.502	0.500	0.517	0.501
Lone Parent, has Missing Education	0.035	0.185	0.031	0.174
Lone Parent, is Employed	0.547	0.498	0.535	0.500
Lone Parent, is Unemployed	0.057	0.232	0.080	0.271
Lone Parent, is Out of Labor Force	0.376	0.485	0.361	0.481
Lone Parent, has Missing Occupation	0.020	0.139	0.024	0.154
<i>LEA Level Controls</i>				
Deprivation Score 2000	39.65	9.68	35.52	6.26
Average HH Income, 1999	19.54	3.47	19.64	3.05
Unemployment Rate (adults)	5.63	1.92	4.93	1.67
No. of Crime Offences per Pupil, 2000	0.423	0.181	0.308	0.066
% Individuals from Ethnic Minorities	14.99	14.53	13.34	11.24

Note: Figures may not sum up to 1; this is due to rounding.

Table A2: Descriptive Statistics of Regression Controls; after introduction of the policy, all quarters. Aimhigher: Excellence Challenge LEAs and EiC Phase 3 Control Group.

Controls	Aim Higher		Comparison Group	
	Mean	S.D.	Mean	S.D.
<i>Individual Level Controls</i>				
Married/Was Married	0.013	0.114	0.007	0.083
White	0.692	0.462	0.784	0.412
Black	0.059	0.236	0.034	0.183
Asian	0.118	0.322	0.104	0.305
Mixed	0.059	0.236	0.038	0.191
Missing Ethnicity	0.071	0.257	0.040	0.196
English	0.847	0.360	0.927	0.260
Irish	0.003	0.053	0.004	0.067
Other	0.079	0.270	0.029	0.169
Missing	0.071	0.256	0.038	0.193
Live in Owned House	0.114	0.317	0.164	0.371
Live in House with Mortgage	0.414	0.492	0.517	0.500
Living in Rented House	0.471	0.499	0.318	0.466
Missing Housing Information	0.001	0.035	0	0
House on Social Rent	0.322	0.467	0.243	0.430
Health Problems	0.156	0.362	0.212	0.410
Living Alone	0.022	0.146	0.019	0.137
Living with Partner	0.066	0.249	0.051	0.219
Living in Intact family	0.528	0.499	0.614	0.487
Living with Lone Parent	0.248	0.432	0.260	0.439
Living with Other Adult	0.136	0.343	0.057	0.231
<i>Parental Background information</i>				
Father, has Higher Education	0.187	0.390	0.180	0.384
Father, has A Levels	0.250	0.433	0.312	0.463
Father, has GCSEs,	0.107	0.310	0.118	0.323
Father, has Other Education	0.371	0.483	0.332	0.471
Father, has Missing Education	0.084	0.278	0.058	0.234
Father, is Employed	0.747	0.434	0.803	0.398
Father, is Unemployed	0.037	0.188	0.028	0.164
Father, is Out of Labor Force	0.153	0.360	0.121	0.326
Father, has Missing Occupation	0.062	0.241	0.049	0.216
Mother, has Higher Education	0.166	0.372	0.179	0.383
Mother, has A Levels	0.109	0.311	0.094	0.292
Mother, has GCSEs,	0.222	0.416	0.241	0.428
Mother, has Other Education	0.445	0.497	0.444	0.497
Mother, has Missing Education	0.060	0.233	0.042	0.202
Mother, is Employed	0.639	0.480	0.673	0.469
Mother, is Unemployed	0.016	0.127	0.015	0.124
Mother, is Out of Labor Force	0.292	0.455	0.269	0.444
Mother, has Missing Occupation	0.053	0.224	0.042	0.202

Other Adult, has Higher Education	0.119	0.324	0.168	0.376
Other Adult, has A Levels	0.454	0.498	0.186	0.391
Other Adult, has GCSEs,	0.044	0.205	0.080	0.272
Other Adult, has Other Education	0.182	0.386	0.265	0.443
Other Adult, has Missing Education	0.201	0.401	0.301	0.461
Other Adult, is Employed	0.346	0.476	0.451	0.500
Other Adult, is Unemployed	0.052	0.223	0.044	0.207
Other Adult, is Out of Labor Force	0.440	0.496	0.416	0.495
Other Adult, has Missing Occupation	0.161	0.367	0.088	0.285
Lone Parent, has Higher Education	0.157	0.363	0.125	0.331
Lone Parent, has A Levels	0.111	0.315	0.168	0.374
Lone Parent, has GCSEs,	0.216	0.412	0.283	0.451
Lone Parent, has Other Education	0.485	0.500	0.408	0.492
Lone Parent, has Missing Education	0.031	0.173	0.015	0.123
Lone Parent, is Employed	0.522	0.500	0.628	0.484
Lone Parent, is Unemployed	0.058	0.234	0.081	0.273
Lone Parent, is Out of Labor Force	0.398	0.490	0.275	0.447
Lone Parent, has Missing Occupation	0.022	0.148	0.015	0.123
<i>LEA Level Controls</i>				
Deprivation Score 2000	39.35	9.59	36.25	6.08
Average HH Income, 1999	19.62	3.41	19.26	2.88
Unemployment Rate (adults)	5.53	1.71	4.82	1.29
No. of Crime Offences per Pupil, 2000	0.417	0.175	0.301	0.067
% Individuals from Ethnic Minorities	17.28	15.81	13.33	10.75

Note: Figures may not sum up to 1; this is due to rounding.

Table A3: Testing for Pre-Policy Trends; Regression Estimates of a Simulated Policy Starting in September 2000; *comparing 2000:Q3 and 2001:Q3.*

	Education Outcomes									
	Student	Student	FT Student	FT Student	GCSEs	GCSEs	A Levels	A Levels	Study-A Lev.	Study-A Lev.
AimHigher* PolicyOn	-0.063 (0.041)	-0.073 (0.034)*	-0.053 (0.043)	-0.063 (0.038)	-0.083 (0.061)	-0.051 (0.050)	-0.083 (0.038)	-0.068 (0.046)	-0.045 (0.043)	-0.048 (0.039)
N.of LEAs	57	56	57	56	57	56	57	56	57	56
N.of Obs.	4270	4227	4270	4227	1690	1671	2457	2433	2461	2434
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Note: Student is whether individual of 16-20 years old is observed in education; Full-time Student is whether individual of 16-20 years is observed in full-time education. GCSEs, Highest Qualification is whether 16-17 year olds have GCSE as their highest qualification; A Levels, Highest Qualification is whether 17-19 year olds have A-level as their highest qualification. Studying for A Levels is whether 16-18 year olds are enrolled in courses leading to A/AS Levels. Standard errors clustered at the LEA level. Controls listed in Tables A1.

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