Every Child Matters?
An Evaluation of "Special Educational Needs" Programmes in England

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ABSTRACT

Every Child Matters? An Evaluation of "Special Educational Needs" Programmes in England[*]

The need for education to help *every* child rather than focus on average attainment has become a more central part of the policy agenda in the US and the UK. Remedial programmes are often difficult to evaluate because participation is usually based on pupil characteristics that are largely unobservable to the analyst. In this paper we evaluate programmes for children with moderate levels of 'special educational needs' in England. We show that the decentralized design of the policy generates significant variations in access to remediation resources across children with similar prior levels of difficulty. However, this differential is not reflected in subsequent educational attainment – suggesting that the programme is ineffective for 'treated' children. In the second part of our analysis, we use demographic variation within schools to consider the effect of the programme on whole year groups. Our analysis is consistent with no overall effect on account of the combined direct and indirect (spillover) effects. Thus, the analysis suggests that a key way that English education purports to help children with learning difficulties is not working.

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I.   Introduction

A controversial issue in education throughout the world is the design of remediation policies for pupils with learning difficulties.[2] In recent times, the policy agenda in the US and the UK has moved to consider the needs of all children more explicitly (i.e. not only the average pupil). This can be seen in the US with 'No Child Left Behind' and in the UK with the 'Every Child Matters'. Whether *every* child benefits from government policy is an empirical question – and one important indicator is what government programmes do for children with learning difficulties. England has opted for a highly decentralized policy (Special Education Needs programmes, hereafter SEN), designed to address the specific difficulties of each child. Such policies are difficult to evaluate because children with learning difficulties are not randomly assigned to programmes. Furthermore, the selection mechanism is not usually fully observed (if at all) by researchers, making it very difficult to distinguish between the effects of the programme and selection into the programme in any analysis. Hence, good studies that evaluate remediation policies are rare.[3] This paper provides one of the first evaluations of the effect of a SEN programme on the relative performance of treated students compared to non-treated students within the same year group. It also investigates whether an increase in the overall proportion of treated students in a year group generates spillover effects on non-treated students in the same year group.

In England, SEN programmes largely consist of asking schools to identify pupils with learning difficulties and then to adapt their teaching strategies accordingly with the help of a Code of Practice.[4] About 20% of English pupils participate in these programmes.

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[2] See for example, the debate on the effectiveness of special education programmes in the US (Hanushek et al. 2002, versus Morgan et al. 2008) or the debate on the effectiveness of grade retention in the US, France and other countries (Manacorda, 2010).

[3] Exceptions include Crawford and Vignoles (2010) for England; Hanushek et al. (2002) for the US and Schlosser and Lavy (2005) for Israel.

[4] A small percentage of children (about 3% of the population) get a Statement of Special Educational Needs through the Local Authority.

Interventions are decided at school-level and include one-to-one tuition, teaching assistance etc. At each school, there is a SEN coordinator who oversees the implementation of this policy. The SEN team typically receives resources from the school budget to achieve the remediation targets that are specific to the school. Overall SEN expenditure amounts to about £1,320 per SEN pupil (on average). Notionally, this is about 30% of the average spending per targeted pupil. In practice, schools have flexibility about how they spend SEN resources.

SEN programmes have the attractive feature of being designed to address the specific difficulties of each pupil. They are targeted at individuals, rather than whole classes or schools. On the other hand, such a policy might possibly generate individual stigma and thus be counterproductive, especially for pupils with relatively minor difficulties. In other words, the labelling of a child as SEN could itself be a source of difficulty.

The second basic feature of SEN programmes is that they are largely defined at the local level, by school heads themselves. The obvious advantage of such decentralized policies is that they can better take account of local constraints and make better use of local resources. On the other hand, the policy may become context-specific, especially for children with moderate difficulties, for which the diagnosis is not usually medical. What this means is that a child with a significant learning difficulty may not have access to remediation simply because she attends a school where there are a lot of other children with stronger learning difficulties. At the same time a child with only moderate difficulties may have access to a remediation programme simply because she attends a school where nobody else has learning difficulties. In this way, a SEN programme defined at the school level may be a source of very significant variation across schools in the relative access to remediation programmes for children with moderate learning difficulties The first question asked by this paper is whether these variations translate into variations across schools in the relative performance of children with moderate difficulties at school.

Our paper sheds light on this issue using a unique longitudinal dataset (National Pupil Database) which provides information on SEN assignment and test scores in national tests that take place when pupils are of age 7 and 11. These data confirm that there are very significant variations in the probability of SEN assignment across children with similar learning difficulties at age 7 but attending different schools. Importantly, these differences are much less marked for pupils who achieve a relatively high performance or relatively low performance early on in primary school than for pupils in-between these two extremes. Pupils who achieve a relatively high performance at age 7 are almost never assigned to a SEN programme, regardless of their school context. Similarly, pupils who achieve very low performance at age 7 are almost always assigned to a SEN programme and there is no significant probability gap according to their school type. In contrast, the gap in access to SEN is very significant for pupils with moderate difficulties. These pupils are much more often assigned to a SEN programme when they attend a high-context school (where the average level of age 7 test attainment is relatively high) than when they attend a low-context school. Thus, the decentralized design of SEN policy generates significant inequalities in access to remediation resources across children with similar (moderate) difficulties at age 7.

Secondly, we show that the specific variation across schools in access to SEN resources for pupils with moderate difficulties early on in primary school does not generate any change in academic performance at the end of primary school. The improvement of pupil performance between age 7 and 11 is slightly faster in high-context than in low-context schools. But this difference in improvement across contexts is almost exactly the same for pupils who achieved a relatively high performance or a relatively low performance or somewhere in-between with regard to attainment in tests at age 7. In other words, the school context generates a very significant difference in access to SEN resources for children with moderate difficulties early on in primary school (when compared to other children), but no

difference at all in relative performance at the end of primary school. This result suggests that there is no net effect of being assigned to a SEN programme on the relative performance of pupils with moderate difficulties compared to other pupils in the same year group and the same school.

One possible reason for observing no significant effect of SEN programmes on the relative performance of participants may be that non-participants are themselves indirectly affected by the programme. As it turns out, SEN programmes typically involve a reorganisation of teaching practice which might generate spillover effects on non-participants. For example, if the group of non-SEN pupils keeps on working while SEN pupils are attending their particular classes, the programme may be associated with an increase in the quality of teaching received by non-SEN pupils. However, in this case, we should observe that the average performance of a year group is positively affected by the overall proportion of SEN participants in the year group. We explore this issue by using school-level demographic shocks as a source of exogenous variation in the overall proportion of children assigned to a SEN programme in a year group. Specifically, the proportion of SEN students in a given year group is shown to be positively affected by the proportion of relatively young students in other year groups, namely the proportion of August born students (in the UK, August corresponds to the end of the academic year). Using this in the context of an Instrumental Variable strategy suggests that exogenous change in the overall proportion of children assigned to a SEN programme in a year group has no perceptible effect on the average performance of the year group. In other words, we can find no evidence for significant spillover effects.

Overall, our analysis suggests that remediation programs are not working for a significant proportion of children known as 'SEN' and are not generating positive

externalities on other children. Our results suggest that the mechanisms through which vulnerable children are helped needs to be reconsidered.

There have been relatively few rigorous quantitative studies about the effects of 'special needs programmes. This is probably on account of the difficulty of dealing with selection of pupils into these programmes. Our study shows how this difficulty can be overcome in the English context. While inevitably an evaluation of a 'special needs' programme in one country does not necessarily have applicability in other countries, one general message is that well-intentioned programmes might even have negative effects due to the labelling of children.

In Section II, we provide an overview of the Special Educational Needs Programme in England. In Section III, we describe our data. Then in Section IV, we use a graphical analysis to illustrate inequality in access to SEN resources across pupils with similar learning difficulties. In Section V, we use a graphical and regression analysis to illustrate the implications of this inequality for school performance at age 11. Section VI provides evidence on spillover effects. In Section VII, we discuss the interpretation of our findings. We conclude in Section VIII.

II.   Special Educational Needs Programme in England

The current framework of special education in England was introduced about 30 years ago by the Education Act 1981. This Act introduced the legal concept of "special educational needs" (SEN) and emphasized the general principle of educating all children in mainstream schools.

Generally speaking, SEN programmes consist of asking schools to identify pupils with learning difficulties and to adapt their teaching strategies accordingly, as outlined in the Code of Practice. About 20% of English pupils participate in these programmes. The policy is led by a SEN coordinator, and the team receive resources from the school budget to achieve

remediation targets that are specific to the school[5]. Notionally SEN expenditure amounts to about 30% of the average spending per targeted pupil (about £1,320 on average). However, in practice schools have flexibility about how they spend SEN resources.

The Special Educational Needs Code of Practice recommends a graduated approach to helping children who are in need of special provision. The first stages are at the discretion of the school (both in the identification of a student as having 'special educational needs' and in the type of provision given). The later stages involve the Local Authority, with the granting of a statement being reserved for the most serious cases (about 15% of the SEN population). The first type of programme is called 'School Action', which is when the school identifies a child as having 'special educational needs' and sets about providing an intervention that is additional to or different from that which is provided to the rest of the pupils. The Code of Practice explains that the triggers for this level of intervention could be one of several concerns relating to the child: (a) makes little or no progress even when teaching approaches are targeted particularly at the child's identified area of weakness; (b) shows signs of difficulty in developing literacy or mathematics skills which result in poor attainment in some curriculum areas; (c) presents persistent emotional or behavioural difficulties which are not ameliorated by the behaviour management techniques usually employed in the school; (d) has sensory or physical problems and continues to make little or no progress despite the provision of specialist equipment; (e) has communication and/or interaction difficulties and continues to make little or no progress despite the provision of a differentiated curriculum. According to the Audit Commission (2002), in practice children with needs associated with a physical disability tend to be identified earlier and more reliably. However, they note that most needs are not clear cut – for the majority, there are no medical tests and different professionals may

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[5] The funding of schools is largely determined by pupil numbers and by the school's level of deprivation. The formula used to distribute funds to schools varies between Local Authorities. The formula typically takes account of factors that are correlated with the probability of having special needs (e.g. economic deprivation indicators), but schools do not get specific additional funding whenever they assign a child to a SEN programme. They get additional funding only if the pupil has a statement of special needs.

reach differing conclusions about the underlying causes for SEN. A report by the Schools Inspectorate (OfSTED, 2004) finds that there is wide variation between schools in the numbers defined as having SEN and that the criteria vary considerably in practice. There is no prescribed intervention strategy, but the Code of Practice gives some examples of strategies that might be deployed: one-to-one tuition; different learning materials or special equipment; group support; staff development and training to introduce more effective strategies for these students. It recommends that an Individual Education Plan should be made in relation to each child and used to assess progress in relation to targets.

The next type of programme comes into place if 'School Action' is deemed inadequate. This is where the school seeks the help of external support services and is called 'School Action Plus'. The specialist might act in an advisory capacity or provide additional specialist assessment or be involved in teaching the child directly. Finally, if all school action fails, the school may request a statutory assessment, which may lead to a statement of special educational needs for the child.[6] This statement gives details of the nature of the child's needs and how these will be provided for. It imposes a statutory duty on the Local Authority to make the provision set out in the statement. Only about 2.8% of pupils get a SEN statement.

Recently, Crawford and Vignoles (2010) evaluated the effectiveness of SEN provision in a region of the South West of England (Avon). They use a rich data set and a methodology based on statistical matching. They find no evidence that SEN provision raises educational attainment for the pupils in their sample. Keslair and McNally (2009) have also produced a descriptive study of SEN provision in England. Simple regression techniques show that the 'SEN' label continues to have a negative association with pupil outcomes even after controlling for a very rich set of controls. However, both these studies rely on 'selection by

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[6] The child's parent or guardian may also request a statutory assessment.

observables', which may be problematic as the selection process is not fully observable to the analyst. In our study, we try to apply techniques that overcome these problems.

III. Data

The National Pupil Database (NPD) is a census of all pupils in state schools in England. Available since 2002, it includes measures of each pupil's attainment in national tests, some personal information and school identifiers (which can then be linked to school-level data sets). The personal characteristics include gender, a measure of deprivation (whether the pupil is known to be eligible to receive Free School Meals), ethnicity, whether English is spoken as an additional language and whether the pupil is classified as having Special Educational Needs (SEN). If the pupil is classified as having SEN, information is also provided on SEN type[7] (severe learning difficulties, moderate learning difficulties etc.) and the programme into which he/she is placed (School Action; School Action Plus; Statemented).

In England, compulsory education is divided into various 'Key Stages', after which there is a national test. In primary school, 'Key Stage 1' tests are taken at age 7 and 'Key Stage 2' tests are taken at age 11.[8] The tests are set and marked externally to the school. As there is no grade repetition in the English system, all children within the year group (or grade) are born within a year of each other.

In this paper, we use information available on all pupils observed in the NPD at age 11 (i.e. the final year of primary school) between 2002 and 2008. For each pupil, we have information on his/her result at the national test taken at age 7[9] (Key-stage 1, hereafter KS1), his/her SEN status during the current academic year, as well as his/her result at the national

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[7] This information is only available for the last two cohorts
[8] In recent years, the test at age 7 has been replaced by teacher assessment. However, the cohorts considered in this paper all took the test at this age.
[9] We derive a composite score for Key Stage 1 based on tests in reading, writing and maths. There are six possible levels on each of these tests (0, 1, 2C, 2B, 2A, 3, 4). We assign a score to each of the six levels (0-6) and then sum across the three subjects.

test taken at the end of the academic year (Key stage 2, hereafter KS2). For each child, we can construct the average KS1 results of the other pupils in his/her school and year group (because we know the school identification number of each pupil).

It is important to note that all children have to take national tests in English, Maths and Science at KS2 and (up to recently) in English and Maths at KS1. This applies to most children who have special needs, which is one very interesting feature of the English evaluation system.[10] This is not the case in the US for instance, where existing evaluations of special education programmes have to address the difficult issue of selection into national tests (only a selected subsample of SEN students undertake the tests).

Within this framework, our first main question is to ask whether school context (as measured by peers' average KS1) has an effect on SEN assignment and whether this effect is significantly stronger for pupils with moderate difficulties early on in primary school (i.e. low-medium KS1 at age 7). The second main question is to ask whether we observe similar variation in the effect of school context on pupils' performance at KS2, which would be consistent with SEN assignment having an impact on subsequent performance. We then move on to an analysis where we investigate whether the proportion of pupils assigned to a SEN programme has an impact on the entire year group (a combination of any direct effect and a spillover effect).

IV.   School Contexts and Distribution of SEN Resources Within Year Groups

Although all schools are likely to classify pupils with more obvious needs as having 'special educational needs', there is plenty of scope for judgment to differ for the many less obvious cases. In fact, the detection of learning difficulties is likely to depend on what is considered 'normal' and this is likely to vary a lot between schools, a higher yardstick being applied in

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[10] While some children can be exempt from these tests, this is only true for a small minority of children in our data sets. We have excluded 'special schools' from the analysis – where children with very severe levels of need are often placed.

schools where average performance is higher. Of course, children of low enough ability will plausibly be assigned to a SEN programme regardless of the average performance of their peers whereas children of high enough ability will never be assigned to a SEN programme. However, significant variation across school context is likely to occur for pupils with less serious learning difficulties.

To test this assumption, Figure 1a shows variation across school context (denoted C) in the relationship between a child's score at age 7 ($KS1$) and his/her probability of being assigned to a SEN programme (i.e., E($T \mid KS1$, C), where T is a dummy indicating access to a SEN programme). For each school, the 'school context' is defined by the mean of the pupils' test score distribution at age 7. Figure 1a distinguishes between quartiles of the distribution of this variable across schools.

Interestingly, Figure 1a confirms that highly able pupils (measured at age 7) are almost never assigned to a SEN programme, regardless of the school context. Also, those at the bottom of the ability distribution will be assigned to a SEN programme in all school contexts. In contrast, for those in-between the two extremes, there is a substantial gap between the probability of being assigned to a SEN programme in a high context school compared to a low context school. For example, when we focus on a pupil with a score of 5 at age 7[11], we find that the gap between the probability of being assigned to the SEN programme is more than 20 percentage points higher in top-quartile schools than in bottom-quartile schools (see Figure 1b).

A higher probability of being assigned to a SEN programme does not necessarily mean greater access to SEN resources. It may well be that schools which assign more children to SEN programmes commit less resources per SEN pupil. In such a case, the gap across schools in the SEN assignment probability for pupils with moderate difficulties does not

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[11] A score of 5 corresponds to the average score of SEN pupils at age 7.

necessarily correspond to a gap in access to SEN resources. To address this issue, we have matched our dataset to an administrative database which provides information on the average expenditure per SEN pupil for each school. Using this, we construct a variable (t_i) which takes the value of average SEN expenditure per pupil (in the pupil's school) in the case when he/she is on a SEN programme and takes the value zero otherwise. It is reassuring to see (Figure 2) that school context has exactly the same effect on this measure of exposure to SEN programmes as on the SEN assignment probability. The reason is that school context has no specific effect on the level of SEN expenditure per pupil. The expenditure per pupil on SEN is slightly higher in in low-context schools than in high-context schools, but the gap is relatively small (about 5%-6%) and importantly, is not different for pupils with moderate difficulties early on in primary schools than it is for other pupils. Thus a higher probability of SEN assignment corresponds mechanically to higher access to SEN expenditure for these pupils.[12]

V.   School Contexts and Distribution of Performances Within Year Groups

Overall, the highly decentralized nature of SEN policy gives rise to very significant variation across school context in the distribution of SEN resources within year groups. The next important question is whether this variation in the distribution of remediation resources is associated with corresponding variation in the distribution of performance at the end of primary school.

Figures 3a-3b provide a simple test for this hypothesis by comparing the effect of school context on the distribution of SEN assignment probability and on the distribution of performance at age 11 across pupils with different age 7 test scores. For the sake of clarity, we distinguish between only two school contexts: a school is classified as "high context"

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[12]Formally, we have, E(t | $KS1$, C)≡ E(t | $KS1$, C, $T =1$) × E(T | $KS1$, C). Hence, if context C has no effect on average expenditure for pupils on SEN (as measured by E(t | $KS1$, C, $T =1$)), then it necessarily has the same impact on average expenditure E(t | $KS1$, C) and the assignment probability E(T | $KS1$, C).

when its pupils' average test score at age 7 is above the median of the distribution across schools. These Figures confirm the very strong effect of school context on SEN assignment for low-medium ability pupils, but reveal that it does not correspond to any shift in academic performance at age 11. Although "high school context" is associated with slightly better performance at age 11, the effect is neither more or less important for low-medium ability pupils than for the other pupils. In fact, we observe the same smooth quasi-linear relationship between scores at age 7 and scores at age 11 in both contexts (with a one point increase in age 7 scores being associated with a two point increase in age 11 scores).

As a robustness test, Figures A1 and A2 in the Appendix replicate these graphs when we compare schools in the top and bottom deciles of the distribution of average scores at age 7. The first stage shift in the effect of school context on the probability of being assigned to SEN (for low-medium ability pupils) is much larger with this specification. However, we do not find stronger evidence of any positive shift in the effect of school context on test scores at age 11. If anything, the variation in the effect of school context on age 11 scores is negative (though not statistically significant).

As additional specification tests, we have constructed similar graphs comparing pupils attending schools in the 1st and 2nd quartiles of the distribution of mean KS1 across schools as well as pupils attending schools in the 3rd and 4th quartiles. When we compare the 1st and 2nd quartile, the impact of school context on SEN assignment is at a maximum for KS1=4, whereas the mode is at about KS1=6 when we compare the 3rd and 4th quartiles (available on request). But in both cases, the effect of school context on KS2 results remains small and does not show any positive peak for low-medium ability pupils. This further confirms that a significant increase in the SEN assignment probability is not associated with any increase in subsequent performance, regardless of whether we focus on pupils in schools above or below the median of average ability.

Generally speaking, our Figures suggest that there is no net effect of being assigned to SEN programmes on the educational performance of pupils with moderate difficulties compared to other pupils in the same year group. This interpretation relies on the identifying assumption that the specific increase in the SEN assignment probability for children with low-medium ability in high-context schools does not relate to any confounding variation in pre-assignment characteristics. Figure 4 does not reveal any such confounding variation in observed pre-assignment characteristics. For example, it does not show any specific peak in the difference across school contexts in the probability of being eligible to receive Free School Meals for low-medium ability pupils.

V.1. *Regression analysis*

To further explore the robustness of the relationship between SEN assignment, school context and early ability, we estimate the following regression,

$$(1) \qquad SEN_{6i} = a_1 C_{s(i)} \times 1(3 \leq KS1_i \leq 7) + b_1 C_{s(i)} \times KS1_i + c_1 C_{s(i)} + X_i d_1 + u_{1i}$$

where SEN_{6i} is a dummy indicating SEN assignment at age 11 (year 6), $C_{s(i)}$ is a school context dummy indicating whether person i attends a school $s(i)$ in the top half of the test score distribution at age 7, whereas $KS1_i$ represents the score of person i at age 7 and X_i is a set of control variables which includes a full set of 14 dummies indicating the score at age 7 (i.e. $1(KS1_i=k)$ for k=1,…14). The parameter of interest is a_1 which captures the specific effect of school context on the assignment probability of pupils with low-medium ability at age 7. Table 2 shows the results of this first-stage regression, which confirm that pupils of low-medium ability have a significantly higher probability of being assigned to a SEN programme in high context schools. The estimated difference in SEN assignment is about 5.6 percentage points and this first-stage estimate is not influenced by adding controls for attainment at age 7, school context, gender, ethnicity, Free School meal status or a dummy

indicating that English is second language at home (column 2). Also it is unchanged when we further control for school fixed effects (column 3), which confirms that observed variation in SEN assignment across school contexts is not driven by school unobserved heterogeneity. First stage estimates are all highly significant at standard levels across specifications.

Table 2 also shows the results of the corresponding reduced-form regressions of performance at age 11 ($KS2_i$) on the same set of explanatory variables as in Eq. (1):

$$(2) \qquad KS2_i = a_2 C_{s(i)} \times 1(3 \le KS1_i \le 7) + b_2 C_{s(i)} \times KS1_i + c_2 C_{s(i)} + X_i d_2 + u_{2i}$$

The results confirm that the relative (age 11) performance of pupils with low-medium ability is not larger in high context schools. The estimated reduced-form effect is actually small and negative (about -2% of a SD). It does not vary significantly across specifications, although it becomes marginally significant when we control for both individual observed heterogeneity and school fixed effects. Overall, Table 2 provides results that are consistent with the previous graphical analysis: pupils of low-medium ability have a higher probability of being assigned to a SEN programme in high context schools, but no higher test scores at KS2.

To take this one step further, Table 3 shows the results of the corresponding OLS and IV regressions of SEN assignment on performance at age 11,

$$(3) \qquad KS2_i = a_3 SEN_{6i} + b_3 C_{s(i)} \times KS1_i + c_3 C_{s(i)} + X_i d_3 + u_{3i}$$

where the IV regressions uses the interaction between school context and whether the pupil has an age 7 test score in the range from 3 to 7 as an instrumental variable (i.e. $Z = C_{s(i)} \times 1(3 \le KS1_i \le 7)$). The identifying assumption is simply that the effect of school context ($C_{s(i)}$) on the test score at the end of primary school ($KS2_i$) is neither particularly strong nor particularly weak for pupils who have a test score at age 7 in the range of 3 to 7, i.e. the very children for whom we find school context to be a key determinant of access to the SEN programme. Let us emphasize that we do not constrain the effect of school context to be the same for pupils with low and high ability (the effect may indeed vary monotonically across

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ability levels). The only restriction is that there is no specific peak in this effect for pupils with moderate learning difficulties at age 7.

The OLS results show that pupils involved in a SEN programme have a test score at age 11 which is about one third of a standard deviation lower than other pupils. It is consistent with the assumption that selection into a SEN programme is based in part on unobservable characteristics that are negatively associated with school performance. The IV strategy plausibly removes these selection effects and yields a causal estimate of the effect of SEN programmes on age 11 test scores. As expected from first-stage and reduced-form estimates, the IV estimate is negative, small (about -5% of a SD) and not very precisely estimated. It becomes marginally significant at standard levels when we control for both observed individual heterogeneity and school fixed effects.

Note that this causal effect is identified for pupils who are likely to have moderate difficulties (i.e. whether they are placed on a SEN programme is sensitive to school context) but not for pupils who would always be placed on a SEN programme (i.e. very severe difficulties that involve assignment to a SEN programme in all school contexts). Our results suggest that students with moderate difficulties do not benefit from being involved in the SEN programme.

V. 4   *Alternative specifications*

The approach developed in this paper sheds light on whether SEN assignment during the last year of primary school (i.e. age 11) has an impact on school performance at the end of this year (i.e. Year 6) using variation in assignment across school contexts (at age 11) as a source of identification. It is worth emphasising, however, that a small fraction of children are on a SEN programme at age 10 but not on a SEN programme at age 11. It may be that our specification does not capture the effect of SEN assignment on these children. To address this

issue, it is possible to focus on the effect of SEN assignment the year *before* Year 6 (i.e. age 10) on performance at KS2 using variation in assignment across school contexts observed at age 10 (i.e. the mean KS1 scores of peers at age 10) as a source of identification[13]. We have checked that this specification produces exactly the same results as the basic one (see Figure A3 in the appendix).

Another possible specification test involves focusing on the effect of SEN assignment in any year between age 7 and 11, and then using variation in assignment across school context at age 7 as a source of identification.[14] Again, the results are very similar.

VI.   Spillover Effects of SEN Programmes Across Year Groups

In the previous section, we have found that variation in the difference in performance at Key Stage 2 between mid and low ability students (or between high and mid-ability students) is largely unrelated to exogenous variation in the difference in exposure to SEN programmes between these students. This finding suggests that, within a given school context, SEN programmes have no significant effect on the relative performance of students who participate in these programmes compared to other students.

However, it does not necessarily follow that SEN programmes have no effect at all on students' outcomes. In particular, it still remains possible that SEN programmes jointly affect treated and non-treated pupils, i.e. have direct effects on treated pupils and indirect spillover effects on non-treated students. In such a case, a SEN programme may have no perceptible effect on the relative performance of treated students compared to the other students in the same year group, but have a significant effect on the overall performance of the year group.

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[13] When we use this strategy, we have to exclude the 2002 cohort since the data does not include this cohort when at age 10.

[14] When we use this strategy, we have to focus on the 2006 cohort only, since it is the only one for which we observe SEN assignment each year between the age of 7 and 11.

There are several channels through which a SEN programme may induce spillover effects. On the one hand, given that SEN programmes are not associated with increases in the school budget, any new SEN programme (or any increase in the size of the existing programme) is likely to be associated with a decline in the level of resources allocated to non-SEN pupils, which may be detrimental to these pupils. If teachers have to spend more time with SEN pupils, the number of hours spent with non-SEN pupils will decrease.[15] On the other hand, we cannot exclude the possibility that the help provided to low-ability pupils in a year group has a positive effect on the overall performance of the year group. In particular, it may be that the overall quality of teaching will be improved by SEN programmes. Teachers may spend fewer hours with non-SEN pupils, but if these hours are less disrupted by SEN pupils with behavioural problems, we may observe positive spillover effects on non-SEN pupils (if only because the class of non-SEN pupils keep on working while SEN pupils are attending their particular courses). Overall, SEN programmes might well generate spillover effects on non-SEN pupils, although the sign and magnitude of these effects are difficult to predict.

In this Section we do not provide a separate identification of direct and spillover effects, but provide an evaluation of the overall effect of SEN programmes – bearing in mind that this is likely to be a combination of direct and spillover effects. Specifically, we deliver an analysis at the level of the year group. We analyse the effect of the proportion of pupils assigned to a SEN programme on the average performance of pupils. The estimated effect can be understood as a reduced-form impact at the year-group level.

With respect to identification, we need to isolate a source of variation in the proportion of SEN pupils in a year group which has no direct effect on the performance of this year group. To address this issue, we build on demographic shocks which affect the other year

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[15] Cullen (1997) provides evidence that special education needs programmes may detract from spending on regular education students.

groups in the same school. As discussed below, these shocks directly affect the proportion of SEN pupils in these other year groups, while also having an indirect effect on the proportion of SEN pupils in the year group under consideration. This is due to school-level constraints in the overall size of the SEN programme. Under the maintained assumption that demographic shocks in other year groups do not have any direct effect on the performance of the year group under consideration, this provides an interesting tool for identifying the overall effect of the proportion of SEN pupils in a year group on their average performance. Under the weaker assumption that adverse shocks in other year groups also reduce access to other school resources (i.e. not just to SEN resources), this strategy provides an upper bound for the effect of the SEN programme.

VI. 2 *Spillover Effects of SEN assignments Across Year Groups*

Existing qualitative evidence and official regulations imply a couple of basic features about the process of pupil assignment to a SEN programme. First, the overall level of resources allocated to SEN in a given school is to a large extent determined at the school level and stable over time. For example, there is typically only one SEN coordinator per school and the contribution of this key input does not vary substantially from one year to the other. Given these school level constraints, the amount of SEN resources allocated to a specific year group at a given time is likely to depend not only on the proportion of pupils with learning difficulties within this year group, but also on the proportion of pupils with learning difficulties in other year groups within the same school. In particular, if the year group who entered into school s at date t_0 is followed at date t_0+1 by a year group with a relatively high proportion of pupils with learning difficulties, then the year group who entered at t_0 will undergo a more severe competition for holding on to SEN resources during the five

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subsequent years after t_0+1. Consequently, this year group is likely to have relatively low access to these resources.

To provide a test for the assumption that younger year groups influence the SEN resources allocated to older year groups within schools, we need an instrumental variable which affects the proportion of SEN pupils in the younger year groups, but which is unrelated to the other potential determinants of SEN resources in the older year groups. One possible candidate is the proportion of pupils born in August[16] within the younger year groups. In the English system, pupils born in August are the youngest in their year group and it has long been established that the least mature children within a given year group are also the most exposed to early learning difficulties.[17] Within the English context, a year group with a relatively high proportion of August born children is likely to be a year group with a relatively high proportion of pupils with learning difficulties and, consequently, a year group with a relatively high proportion of SEN pupils. Under the maintained assumption that this is the only channel through which the proportion of August born pupils in a year group affects the proportion of SEN pupils within older year groups, the proportion of August born pupils within a year group can be used as an instrument to identify spillover effects in SEN assignment across year groups. Specifically, if $\overline{SEN}_{k,s,t}$ denotes the proportion of SEN pupils in grade k, school s at date t. Table 4 reports the results of the IV regressions of $\overline{SEN}_{6,s,t}$ on $\overline{SEN}_{5,s,t}$

$$(4) \qquad \overline{SEN}_{6,s,t} = \alpha \overline{SEN}_{5,s,t} + X_{6,st}\beta + \varepsilon_{1,s,t}$$

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[16] We have tried to use other aspects of the distribution of month of birth within the younger age group (such as mean month of birth), but the proportion August born has the strongest first-stage effects.
[17] See, for example, Crawford et al. (2007) for England.

where we use three alternative sets of control variables[18] $X_{6,st}$ and where the spillover effect α is identified using the proportion ($August_{5,s,t}$) of pupils born in August observed in grade *5* and school *s* at date *t* as an instrumental variable. To start with, the two first columns of Table 4 show the results of the first stage regressions of $\overline{SEN}_{5,s,t}$ on $August_{5,s,t}$ which confirms that the proportion of pupils assigned to a SEN programme in a year group is very significantly affected by the proportion of pupils born late within the year, even when we focus on the last grades of primary school. The estimated effect does not vary significantly across specifications and suggests that a 10 percentage point increase in the proportion of August born pupils in a year group is associated with a 0.3 percentage point increase in the proportion of SEN pupils in this year group.

Most interestingly, columns (3) and (4) show that $August_{5,s,t}$ has also a significant reduced-form effect on $\overline{SEN}_{6,s,t}$ the proportion of SEN pupils observed in the older year group. Again, the estimated effect is stable across specifications. It suggests that a 10 percentage point increase in the proportion of August born children in the younger year group is associated with a decrease of about 0.17 percentage points in the proportion of SEN in the older year group. The stability of this effect across specifications suggests that the instrument is not correlated with the other observed determinants of SEN in the older year group. In Appendix B, we report additional regressions (using the same specifications) providing direct evidence on the fact that the instrument used in this analysis is not related to the main control variables. In particular, there is no significant association between the proportion of August born pupils in the younger year group and the proportion of pupils with low Key Stage 1 results in the older year group.

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[18]In baseline specification, we only control for school context (as measured by four dummies indicating the proportion of low KS1 pupils within school *s* over the period under consideration) whereas the second specification controls for the size of the year group, various other school-level characteristics including the proportion of low KS1 pupils in year group 6 in school *s* at date *t*

Finally, columns (5) and (6) show the corresponding IV regressions of $\overline{SEN}_{6,s,t}$ on $\overline{SEN}_{5,s,t}$ using $August_{5,s,t}$ as an instrument. They provide estimates for the parameter which are significant and consistent with previous first-stage and reduced-form analysis. They suggest that a 10 percentage point increase in the proportion of SEN pupils in year group 5 causes a reduction of 5 percentage points in the proportion of SEN pupils in year group 6.

Overall, our data suggest that there are significant spillover effects from SEN assignment across year groups. In the next subsection, we build on this externality to provide an evaluation of the effect of the proportion of pupils assigned to a SEN programme in a year group on the average performance of pupils in this year group.

VI.3   *Proportion of SEN Pupils and Year Group Average Performance*

Because of school-level constraints on SEN assignment, the proportion of August born pupils in a year group significantly affects the proportion of SEN pupils in the older year group. The next question is whether it also affects average performance for the older year group. To test this assumption, Table 5 reports the results of regressing the average performance at KS2 of year group 6 in school s at date t (denoted $KS2_{6,s,t}$) on the proportion of August born pupils in year group 5 at the same date in the same school,

$$(5) \qquad KS2_{6,s,t} = \gamma August_{5,s,t} + X_{6,st}\theta + \varepsilon_{2,s,t},$$

using the same set of alternative specifications as in Table 4. Variable $KS2_{6,s,t}$ is standardized with mean 50 and standard deviation 10. The estimate of the reduced-form effect

of proportion of August born pupils on attainment at KS2 is stable across specifications and is positively signed (although not statistically significant).

Table 5 also shows the corresponding IV regressions of $KS2_{6,s,t}$ on $\overline{SEN}_{6,s,t}$,

$$(6) \qquad KS2_{6,s,t} = \lambda \overline{SEN}_{6,s,t} + X_{6,st}\phi + \varepsilon_{3,s,t}$$

where $August_{5,s,t}$ is used as an instrument to identify the year-group level effect γ. It provides an evaluation of the effect of the proportion of SEN pupils in a year group on the average performance of this year group, under the maintained assumption that the proportion of August born pupils in a year group affects the average performance of older year groups only through its spillover effect on SEN assignment in these year groups. Given the normalization used, the point estimates suggest that a 10 percentage point increase in the proportion of SEN pupils in a given year group is associated with a *decrease* of about 13% of a SD in the average performance at KS2. However, the effects are not significant at conventional levels (i.e. they are only significant at the 20% level). Nonetheless, they suggest that positive effects can be ruled out.

To take this one step further, we have replicated the regression analysis by focusing on SEN assignment and average KS2 performance of the subgroup of high-ability pupils (KS1 above 11). As expected the instrument $August_{5,s,t}$ has no effect on SEN assignment for this sub-group (see Columns 1 and 2 of Table 6), which confirms that the instrument affects the proportion of SEN pupils in year group 6 only because it affects the probability of SEN assignment for low and mid-ability pupils[19]. Given this fact, any effect of the instrument $August_{5,s,t}$ on the average performance at KS2 of high-ability pupils may be interpreted as the pure spillover effect of the programme on these pupils. As shown by Columns 3 to 6 of Table 6, we do not find any such spillover effect. Overall, SEN programmes have had no significant effect on the relative performance of treated pupils and no significant spillover effects on the performance of untreated pupils.

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[19]The sample used in Table 6 is slightly different than the sample used in Tables 4 or 5 due to a small subset of schools having no high-ability pupils.

VII   Discussion

Overall, our findings suggest that the programme for Special Educational Needs in England is ineffective for pupils with moderate difficulties early on in primary school. As discussed above, a key feature of the programme is its high degree of decentralization. Building on the existing literature in psychology and education as well as on official reports, this Section discusses the potential failures of such a system.

To begin with, it is often hypothesised in the literature that being labelled as having special needs has stigmatizing effects on pupils (compared to similar pupils who are not labelled), which may generate low self-esteem and worsen subsequent outcomes. Analyzing a longitudinal survey of about 8,000 American pupils and using Propensity Score Matching techniques, Morgan et al. (2008) confirm that pupils with a relatively low *ex ante* probability of being placed into special education (but who nevertheless were so placed) more frequently displayed subsequent problems of self-esteem, sadness and anxiety. Also, they found that these pupils displayed significantly lower reading and mathematical skills at the end of primary school than closely matched peers who did not receive special education services. In fact, one issue with being labelled as SEN may be that it makes pupils (and families) attribute causes of low performance to low intrinsic ability rather than to lack of effort. As it happens, modern theories of cognition argue that the propensity to attribute causes of negative outcomes (such as failure at school) to stable self-referent terms (such as low personal ability) is a determinant of depression and hopelessness (Abramson et al., 1978). Using a sample of about 1,800 Norwegian pupils and Path Analysis techniques, Valas (2001) confirms that children who attribute the causes of failure at school to ability rather than to effort have on average lower self-esteem, expect less from increased efforts in the future and perform less well at school.

Another general issue with labelling children as having SEN is that it can change teachers' perceptions and expectations (see Fogel and Nelson, 1983). According to a recent report of English School Inspectorates (OfSTED, 2004), lack of expectation is actually one important reason for why pupils on SEN make too little progress. The report argues that in six out of ten primary and secondary school visited, expectations of improvement in reading and writing were too low.

Another general criticism is that labelling specific children as "special needs" often induces schools to treat them separately and differently rather than to adapt the regular class (Ho, 2004). A report by the Qualifications and Curriculum Authority (QCA, 2004) confirms that 'when a child is identified as having SEN, a whole set of processes and structures come into operation. While these may be valuable in bringing a rigour to planning and possibly extra resources, they also imply a separateness that can be unhelpful. For example, the presence of a learning support assistant may mean that the class teacher gives less attention to a child with SEN'. Similar problems are emphasized by OfSTED (2004) who reports that SEN pupils are kept out of the main class for too much of the day, isolated from their peers and deprived of access to a broad curriculum and the classroom teacher.

Additional problems may also come from the highly decentralized nature of this type policy and lack of central monitoring and regulations. As discussed in this paper, it generates strong inequalities in the probability of treatment across children with similar learning difficulties, but it may also be one explanation for why the teaching of pupils with SEN is of varying quality and not necessarily adequate. The Audit Commission (2002) confirms that 'a lack of systematic monitoring by schools and Local Education Authorities means that poor practice may go unchallenged'. Their survey found that only half of Local Education Authorities were systematically monitoring schools' work on SEN. The report also suggests that one of the reasons why schools and Local Education Authorities have difficulty analyzing

the performance of children with SEN is a lack of national benchmarks for children with learning difficulties. Similar conclusions are reported by OfSTED (2004), which also finds that few schools evaluate their provision for pupils with SEN systematically. More recent research reported by Wilkins (2008) finds that only 47 per cent of Local (Education) Authorities detail the help they are providing for SEN children on their websites and only 27 percent explain the funding of School Action and School Action Plus; only 29 percent of authorities explained how they monitored the effectiveness of SEN spending (another legal requirement). OfSTED (2004) suggest that lack of provision of appropriate data at Local Authority level means that they cannot easily compare how well they are doing with the lowest-attaining pupils compared with other schools and that this weakens the drive to challenge underachievement.

VIII. Conclusion

Remediation programmes are difficult to evaluate because the selection process is not fully observed by analysts and those pupils who are selected are likely to be relatively low achievers. In this paper, we build on the highly decentralized nature of the Special Educational Needs programme in England to evaluate whether increased access to the programme for a year group, or for a group of pupils within a year group, is accompanied by an increase in the relative performance of this year group or this group of pupils.

We first demonstrate that the probability of assignment to a SEN programme is much more sensitive to school context for the group of children with low-mid ability than for other children. Specifically the group of pupil with low-mid ability will have a relatively high probability of being placed on a SEN programme in a 'high context' school (i.e. where the average ability of peers is higher), but a relatively low probability in a 'low context' school. Secondly, we show that this variation in the relative probability of SEN assignment does not

translate into variation in the relative performance of the group of children with low-mid ability compared to other children within the same year group. This suggests that SEN programmes have no effect on relative performance for the marginal pupil with moderate learning difficulties compared to other pupils within the same year group.

One possible reason for why we see no effect may be that other children in the same year group are indirectly affected by the SEN programme. In particular, high ability pupils might indirectly benefit from low-mid ability pupils being put into a SEN programme if this improves the quality of the class (e.g. if more SEN students are taken out of the classroom and this includes some additional badly behaved pupils). In such a case, SEN programmes could improve the average performance of all pupils in the year group, even though they do not necessarily improve the relative performance of the treated. The second main contribution of the paper is to test for such year group effects, using exogenous demographic shocks that affect the distribution of SEN resources across the different year groups. Specifically, we build on the fact that an unusually large fraction of relatively young pupils within a year group (i.e. a relatively large fraction of August born pupils) increases the probability of SEN assignment for this year group, but decreases it for the other year groups in the same school (because of overall budget constraints). Under the assumption that this type of shock affects other year groups only through the reallocation of SEN resources, we are able to use the proportion of relatively young children in a year group as an instrument for identifying the impact of the proportion of SEN students in the other year groups. As it turns out, this analysis rules out positive effects at the year group level – confirming that the SEN policy has, at best, a negligible overall impact.

Overall, the different parts of our analysis suggest that SEN policies are not effective in achieving their stated aims. Therefore the ways in which vulnerable children are helped by school-level initiatives need to be reconsidered.

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Figure 1a: Test Scores at Age 7 and Probability of SEN Assignment, by School Context
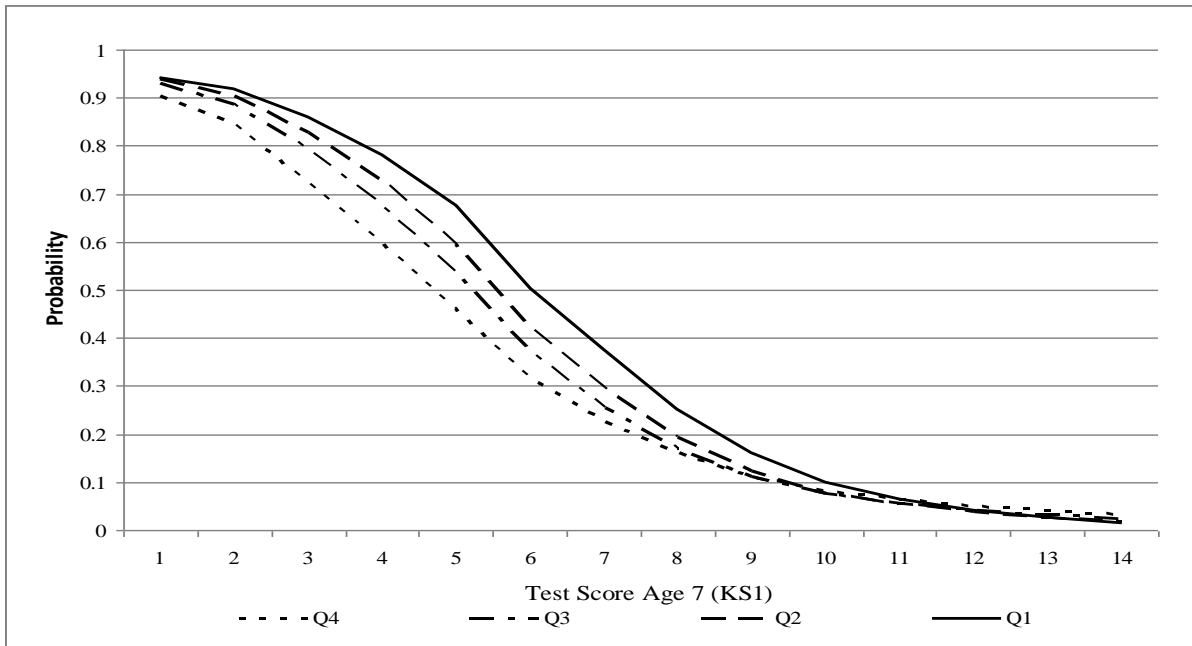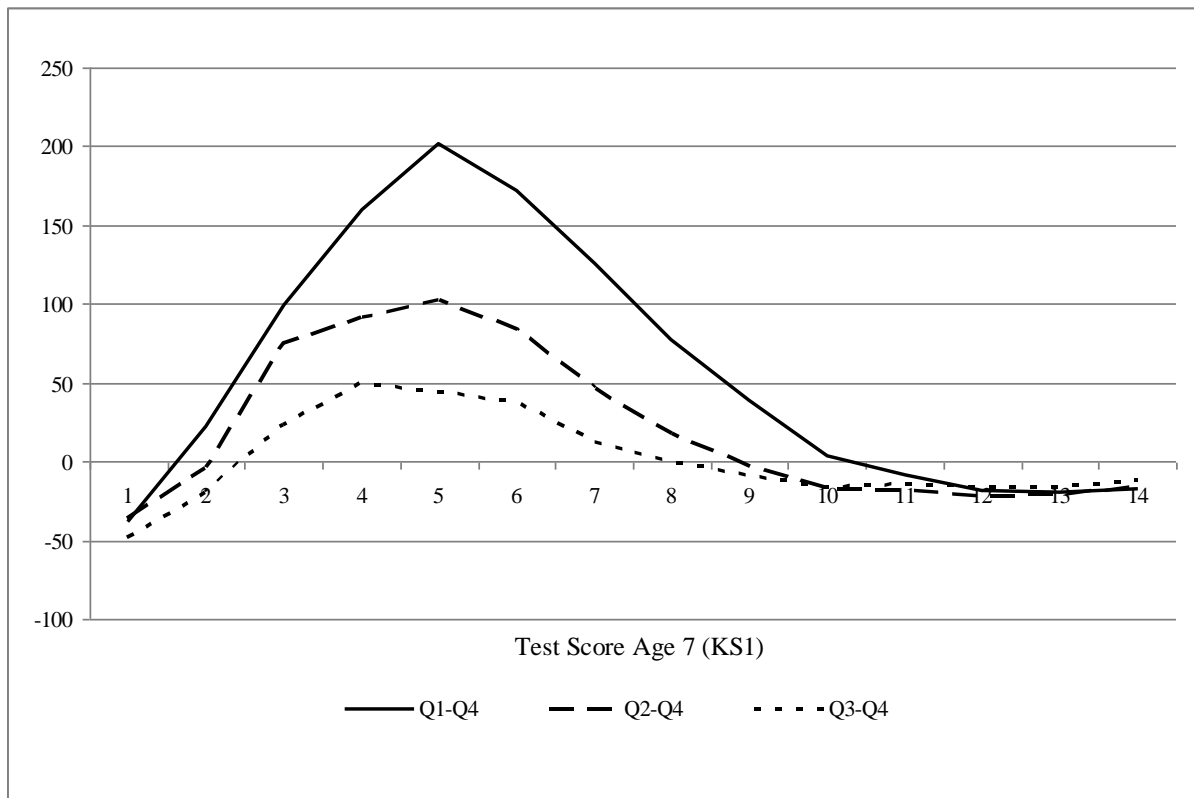

Note: For each KS1 score, the full line 'Q1' shows the probability of SEN assignment for pupils attending schools in the top quartile of the distribution of average KS1. The three other lines show the probability of SEN assignment for the three other quartiles.

Figure 1b: Test Scores at Age 7 and the Difference across School Contexts in the Probability of SEN Assignment.
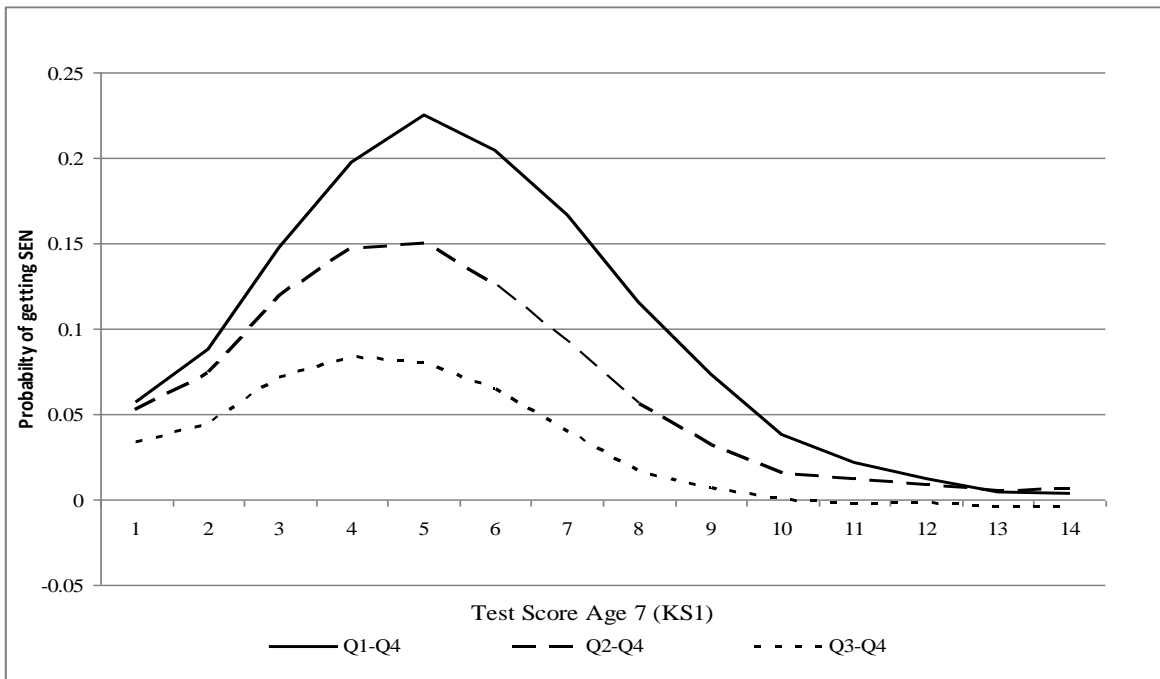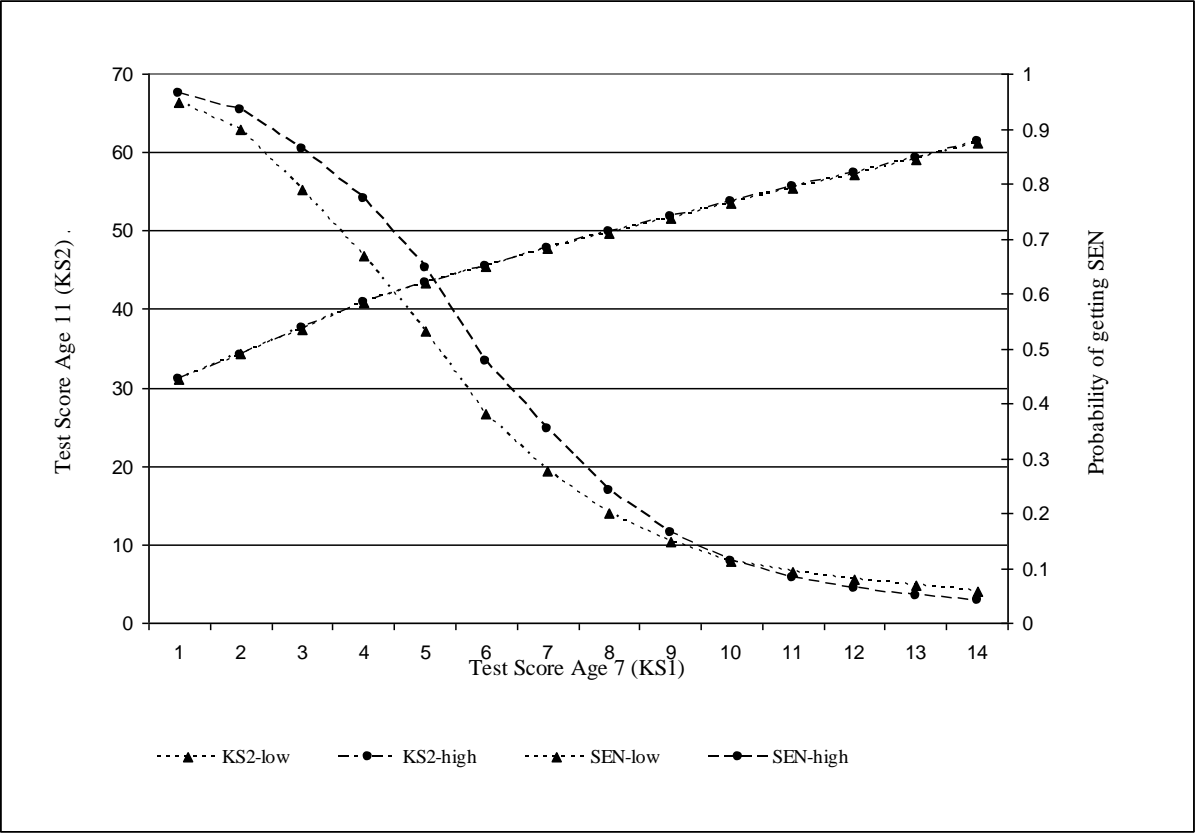

Note: For each KS1 score, the full line 'Q1-Q4' shows the difference in the probability of SEN assignment between pupils attending schools in the top quartile (Q1) of the distribution of average KS1 and pupils attending schools in the bottom quartile (Q4). The two other lines show the difference between second and fourth quartile and between third and fourth quartile.

Figure 2: Test Scores at Age 7 and the Difference across School Contexts in SEN Expenditure per Pupil
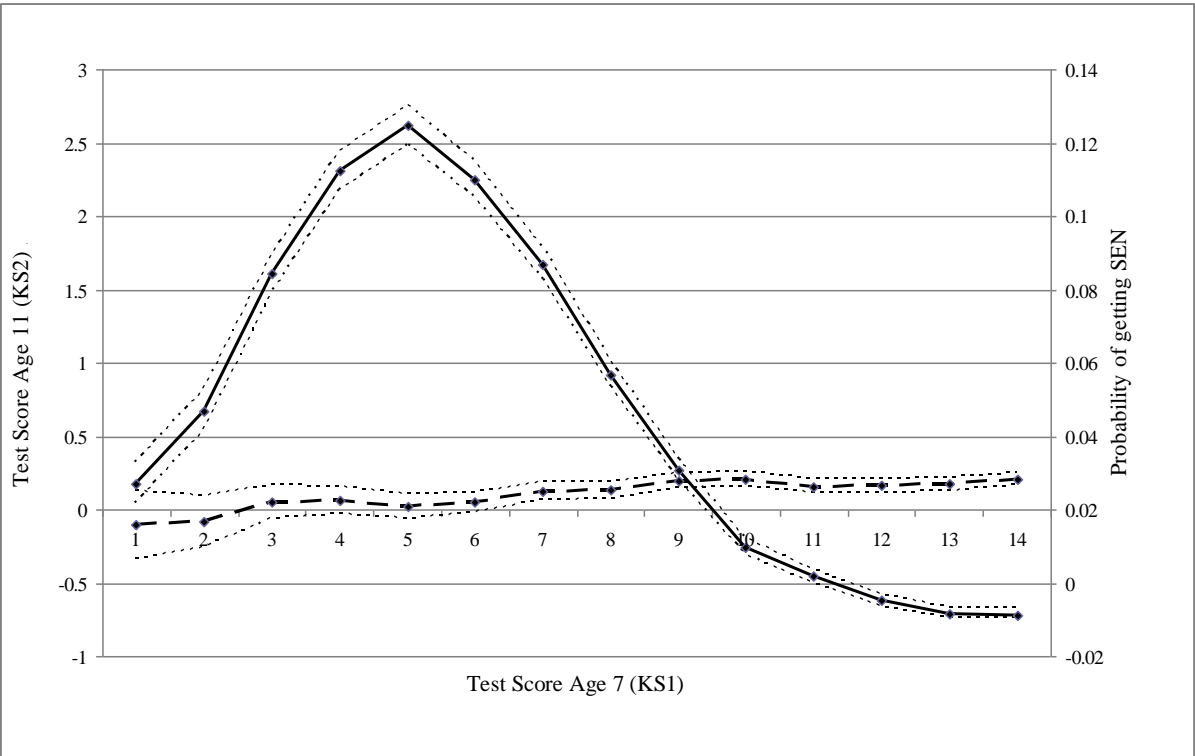

Note: For each KS1 score, the full line 'Q1-Q4' shows the difference in the conditional average expenditure per pupil between pupils attending schools in the top quartile (Q1) of the distribution of average KS1 and pupils attending schools in the bottom quartile (Q4). The two other lines show the difference between the second and fourth quartile and between the third and fourth quartile.

Figure 3a: Variation in Performance at Age 11 (KS2) and probability of SEN Assignment across Test Scores at Age 7, by School Context
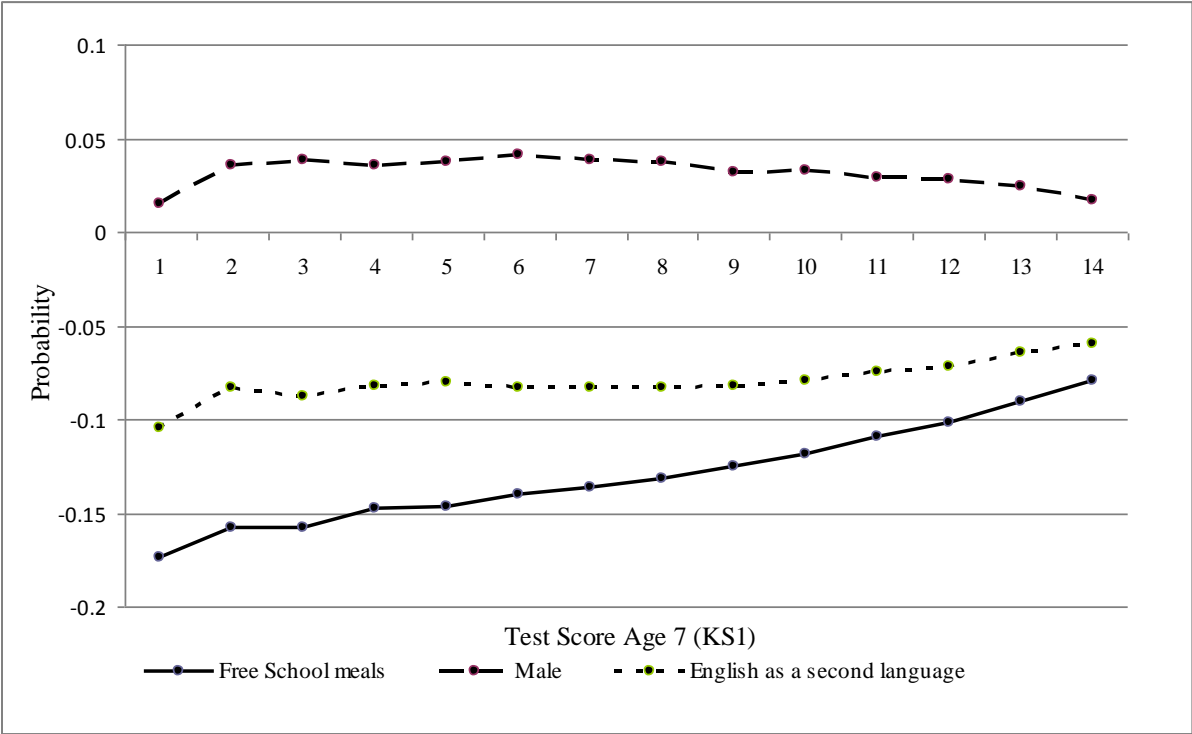

Note: For each KS1 score, the 'KS2-low' (resp. 'KS2-high') line shows the average performance at age 11 of pupils attending schools above (below) the median of the distribution of average KS1. Symmetrically, the 'SEN-low' (resp. 'SEN-high') line shows the probability of SEN assignment at age 11 of pupils attending schools above (below) the median of the distribution of average KS1.

Figure 3b: Test score at Age 7 and the Difference across School Contexts in the Probability of SEN assignment and in the Performance at Age 11.

 Note: For each KS1 score, the full bold line shows the difference in the probability of SEN assignment between pupils attending schools above the median of the distribution of average KS1 and pupils attending schools below the median. The dotted bold line shows the difference in the performance at age 11 between pupils attending schools above the median of the distribution of average KS1 and pupils attending schools below the median. For each bold line, the two thin dotted lines show confidence intervals.

Figure 4: Test Score at Age 7 and the Difference across School Contexts in the Probability of SEN assignment and in the Performance at Age 11.

Note: For each KS1 score, the full bold line shows the difference in the probability of Free School Meals between pupils attending schools above the median of the distribution of average KS1 and pupils attending schools below the median. The two other lines show difference in proportion of male students and difference in the proportion of students having English as a second language.

Table 1 : Descriptive statistics

	All	Mean KS1 above the median	Mean KS1 below the median
		School type	
Panel A : Full sample			
KS2 (score)	50 (10)	52.45 (8.7)	47.62 (10.2)
KS1 (score)	9.37 (3.7)	10.46 (3.4)	8.20 (3.7)
SEN	0.23 (0.42)	0.17 (0.38)	0.28 (0.45)
Mean KS1	9.36 (1.45)	10.41 (0.81)	8.03 (1.00)
Free School Meals	0.16 (0.37)	0.08 (0.28)	0.24 (0.43)
English as additional language (EAL)	0.09 (0.28)	0.05 (0.21)	0.13 (0.34)
Support staff expenditure per SEN pupil (£)	1320	1289	1360
Number of observations	3,767,550	1,951,223	1,816,327
Number of schools	14,345	7,172	7,173
Panel B :SEN subsample			
KS2 (score)	39.59 (10.1)	37.98 (10.2)	42.08 (10.1)
KS1 (score)	5.39 (3.1)	6.31 (3.2)	4.79 (2.9)
Free School Meal	0.27 (0.44)	0.16 (0.36)	0.34 (0.47)
English as an additional language (EAL)	0.08 (0.27)	0.04 (0.19)	0.11 (0.31)
Treatment duration (in years)[20]	3.37 (0.95)	3.30 (0.92)	3.42 (0.93)
Number of observations	886,971	350,886	536,085

Notes. Standard deviations in brackets.

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[20] This data is available only for the 2006 cohort and relates to SEN treatment from YG3 onwards.

Table 2:Variation in the relative outcomes of low-medium ability students across school types

	Dependent variables :					
	SEN assignment (first stage)			KS2 score (reduced form)		
	(1)	(2)	(3)	(4)	(5)	(6)
KS1 in [3-7]	.056	.056	.057	-.021	-.029	-.035
×School type	(.0015)	(.0015)	(.001)	(.025)	(.025)	(.019)
School type	.084	.095	.105	.000	-.049	-1.10
	(.0021)	(.0021)	(.002)	(.051)	(.051)	(.032)
KS1 x School type	-.0068	-.0070	-.0070	.015	.016	.007
	(.0001)	(.0001)	(.0001)	(.004)	(.004)	(.003)
Additional controls		Y	Y		Y	Y
School fixed effects			Y			Y
Obs.	3,435,003	3,435,003	3,435,003	3,435,003	3,435,003	3,435,003

Note: All models include a set of 7 cohort dummies (from 2002 to 2008) and a set of 15 KS1 dummies (from KS1=1 to 15). Additional controls include dummies for eligibility to receive free school meals; whether English is spoken as an additional language; gender; as well as interactions of these controls with a dummy indicating school type (i.e. a dummy indicating that the average KS1 is above the median of the distribution of average KS1 across schools). As KS2 standard deviation is 10, a coefficient of 1 on SEN assignment indicates that the programme raise pupil achievement by one tenth of a standard deviation.

Table 3: The Effect of SEN Assignment on Individual Performance at the End of Primary School

| | Dependant variables : KS2 score | | | | | |
| | IV regressions | | | OLS regressions | | |
	(1)	(2)	(3)	(4)	(5)	(6)
SEN assignment	-0.375	-0.522	-0.623	-3.327	-3.453	-3.436
	(0.456)	(0.448)	(0.338)	(0.014)	(0.014)	(0.008)
School type	0.031	-0.0001	-	.49	.25	-
	(0.081)	(0.084)		(.040	(.039)	
KS1 x School type	0.012	0.012	-.0070	-.024	-.014	.007
	(0.0066)	(0.0066)	(.0001)	(.003)	(.003)	(.003)
Additional controls		Y	Y		Y	Y
School fixed effects			Y			Y
Obs.	3,435,003	3,435,003	3,435,003	3,435,003	3,435,003	3,435,003

Note: All models include a set of 7 cohort dummies (from 2002 to 2008) and a set of 15 KS1 dummies (from KS1=1 to 15). Additional controls include dummies for whether a pupil receives free school meals, speaks English as a second language, gender, as well as interactions of these controls with a dummy indicating school type (i.e., a dummy indicating that the average KS1 is above the median of the distribution of average KS1 across schools). As KS2 standard deviation is 10, a coefficient of 1 on SEN assignment indicates that the program raise pupils achievement by one tenth of a standard deviation.

Table 4: The Effect of the Proportion of SEN Pupils in Year Group 5 on the Proportion of SEN Pupils in Year Group 6.

| | Prop. SEN Pupils in Year Group 5 | | Prop. SEN Pupils in Year Group 6 | | | |
| | First Stage | | Reduced Form | | IV | |
	(1)	(2)	(3)	(4)	(5)	(6)
Prop. August born Year Group 5	0.029 (0.007)	0.030 (0.007)	-0.017 (0.007)	-0.017 (0.007)	-	-
Prop. SEN Pupils in Year Group 5	-	-	-	-	-0.610 (0.346)	-0.578 (0.316)
School-level controls		Y		Y		Y
F test	-	-	-	-	16.4	18.2
Obs.	81,208	81,208	81,208	81,208	81,208	81,208

Note : set of all primary schools in England, excluding independent and special schools, observed every year from 2002 to 2008. All regressions include control dummies for school type (i.e., dummies indicating the quintile in the distribution across schools of mean KS1 over the period of observation) and cohort dummies. School-level controls are the following: proportion eligible to receive free school meals, proportion of boys, proportion of pupils born in August in year group 6, size of year group 6 and year group 6 KS1 past achievement at age 7. The F test on the last set of regressions stands for the Cragg Donald statistic of the excluded instrument.

Table 5: The Effect of the Proportion of SEN Pupils on the Year Group 6 Performance at the End of Primary School

| | Proportion SEN Pupils in Year Group 6 | | Year group 6 performance (KS2) | | | |
| | First Stage | | Reduced Form | | IV | |
	(1)	(2)	(3)	(4)	(5)	(6)
Prop. August born Year Group 5	-0.017 (0.007)	-0.017 (0.007)	0.238 (0.185)	0.234 (0.173)	-	-
Prop. SEN Pupils in Year Group 6	-	-	-	-	-13.37 (10.12)	-13.38 (9.98)
School-level controls		Y		Y		Y
F test	-	-	-	-	5.88	6.21
Obs.	81,208	81,208	81,208	81,208	81,208	81,208

Note : set of all primary schools in England, excluding independent and special schools, observed every year from 2002 to 2008. All regressions include control dummies for school type (i.e., dummies indicating the quintile in the distribution across schools of mean KS1 over the period of observation) and cohort dummies. School-level controls are the following: proportion eligible to receive free school meals, proportion of boys, proportion of pupils born in August in year group 6, size of year group 6 and year group 6 KS1 past achievement at age 7. The F test on the last set of regressions stands for the Cragg Donald statistic of the excluded instrument.

Table 6: The Effect of the Proportion of SEN Pupils on the Year Group 6 Performance of Top Achievers at the End of Primary School.

	Dependant variables:					
	Proportion of SEN Pupils among top achievers in Year Group 6		Year group 6 performance (KS2)			
			Reduced Form		IV	
	(1)	(2)	(3)	(4)	(5)	(6)
Prop. August born Year Group 5	0.0067 (0.0058)	0.0070 (0.0059)	-0.011 (0.158)	0.042 (0.152)	-	-
Prop. SEN Pupils in Year Group 6	-	-			0.79 (12.76)	-2.02 (11.65)
School-level controls		Y		Y		Y
F test	-	-			3.16	3.41
Obs.	79,938	79,938	79,938	79,938	79,938	79,938

Note : set of all primary schools in England, excluding independent and special schools, observed every year from 2002 to 2008. All regressions include control dummies for school type (i.e., dummies indicating the quintile in the distribution across schools of mean KS1 over the period of observation) and cohort dummies. School-level controls are the following, computed for the subsample of top achievers in the school: proportion of pupils eligible to receive free school meals, proportion of boys, proportion of pupils born in August in year group 6, size of year group 6 and year group 6 KS1 past achievement at age 7. The F test on the last set of regressions stands for the Cragg Donald statistic of the excluded instrument. KS2 is standardized at the individual level with mean 50 and standard deviation 10. An IV estimate of -10 would mean that a 10 percentage points increase in the SEN proportion in YG6 will decrease KS2 mean achievement by 1 tenth of an individual standard deviation. KS1 top achievers are pupils with KS1 strictly greater than 11.

Appendix A: Robustness tests for the individual level regressions

Figure A1: Variation in Performance at Age 11 (KS2) and probability of SEN Assignment across Test Scores at Age 7, by School Context (extreme deciles)
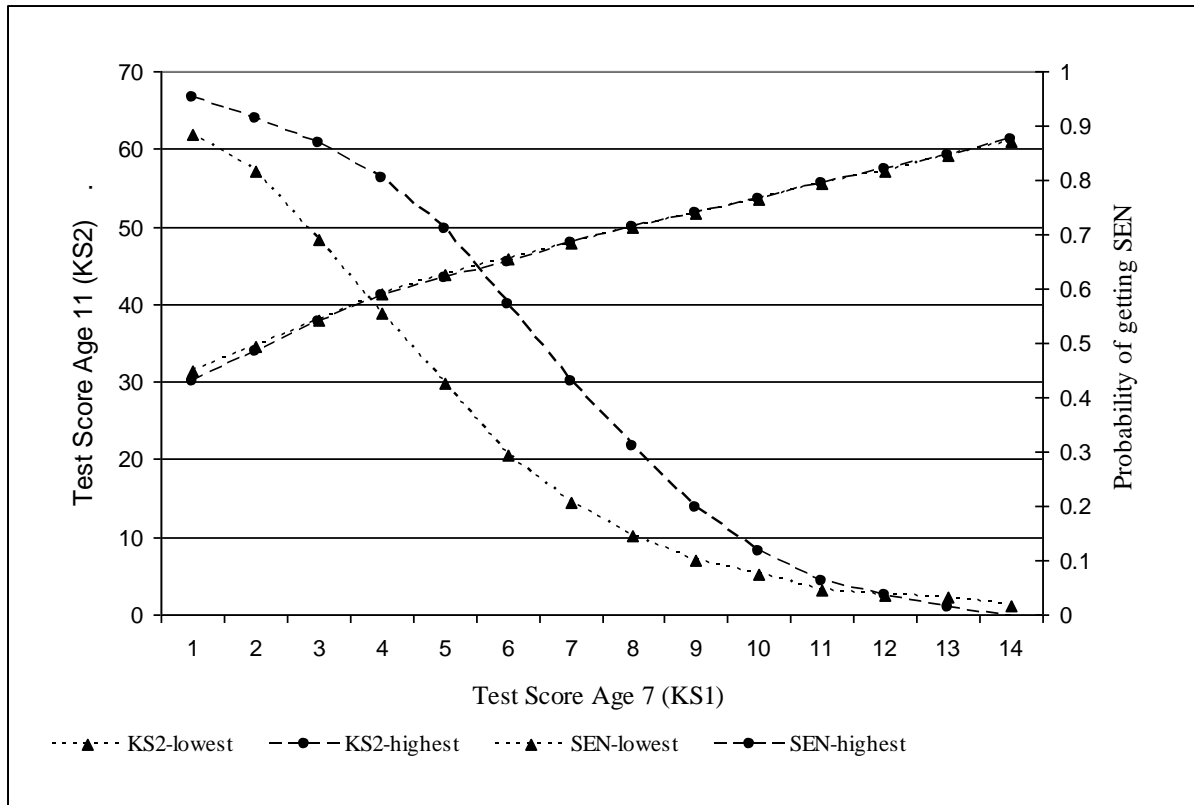

For each KS1 score, the 'KS2-lowest' (resp. 'KS2-highest') line shows the average performance at age 11 of pupils attending schools in the worse (best) decile of the distribution of average KS1. Symmetrically, the 'SEN-lowest' (resp. 'SEN-highest') line shows the probability of SEN assignment at age 11 of pupils attending schools in the worse (best) decile of the distribution of average KS1.

Figure A2: Test Score at Age 7 and the Difference across Worst and Best Deciles of School Contexts in the Probability of SEN Assignment and in the Performance at Age 11.
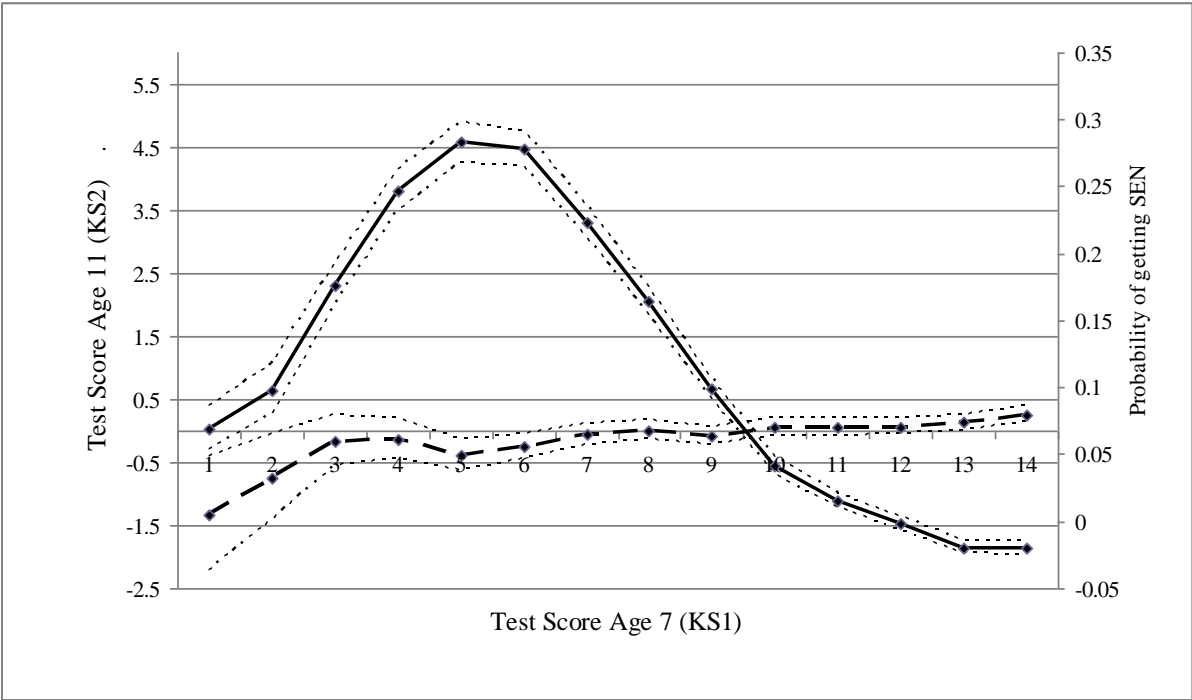
For each KS1 score, the full bold line shows the difference in the probability of SEN assignment between pupils attending schools in the best decile of average KS1 and pupils attending schools in the worst one. The dotted bold line shows the difference in the performance at age 11 between pupils attending schools in the best decile of average KS1 and pupils attending schools in the worst one. For each each bold line, the two thin dotted lines show confidence intervals.

Figure A3: Variation in the Effect of School Context on Probability of SEN Assignment at age 10 and on Performance at Age 11 (KS2) across Test Scores at Age 7
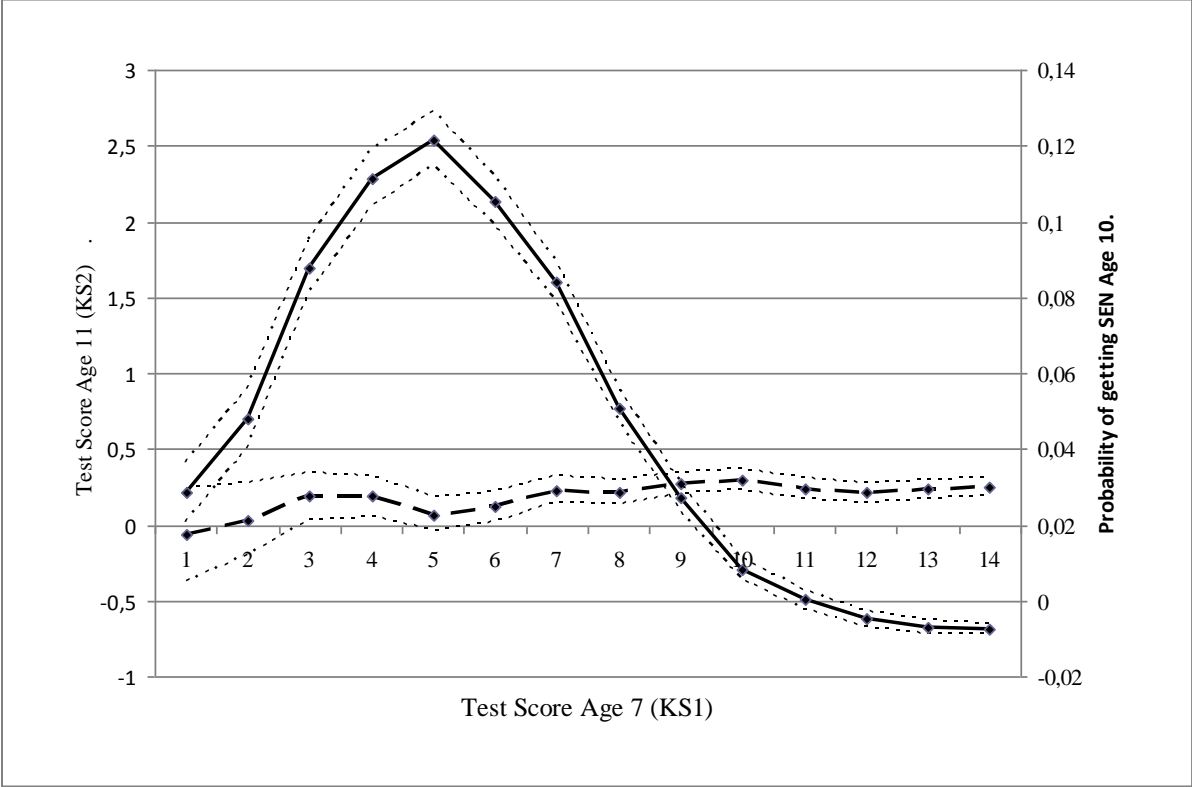
Note: For each KS1 score, the full bold line shows the difference in the probability of SEN assignment at age 10 between pupils attending schools above the median of the distribution of average KS1 and pupils attending schools below the median. The dotted bold line shows the difference in the performance at age 11 between pupils attending schools above the median of the distribution of average KS1 and pupils attending schools below the median. For each bold line, the two thin dotted lines show confidence intervals.

Appendix B: Robustness test for the school level regressions

Table B1: Relationships between The Proportion of August born Pupils in Year Group 5 and The Demographic Characteristics of Year Group 6.

	Dependant Variables:			
	Mean KS1 *YG6*	*FSM prop* *YG6*	*Male Prop* *YG6*	*Mean MoB* *YG6*
	(1)	(2)	(3)	(4)
Proportion August Born Year Group 5	-0.016 (0.054)	-0.0063 (0.0069)	-0.0075 (0.0065)	-0.0026 (0.0044)
Observations	81,208	81,208	81,208	81,208

Note: All regressions in a set of dummies controlling for school type (i.e., dummies indicating the quintile in the distribution across schools of mean KS1 over the period of observation) and additional control dummies: proportion of pupils eligible to receive free school meals, proportion of boys, proportion of pupils born in August in year group 6, size of year group 6 and year group 6 KS1 past achievement at age 7 (excluding the dependant variable)