

Spending it wisely: How can schools use their resources to help poorer pupils?

For the past 15 years, governments have seen higher school spending as a way of raising standards. Between 2000 and 2010, under Labour, spending on schools increased by 69 per cent in real terms. In 2011, the coalition government introduced the pupil premium that gives additional funding to each pupil eligible for free school meals (£900 in the academic year 2013/14).

There has been a steady improvement in the proportion of pupils getting good qualifications at 16. Yet attainment gaps between pupils from different backgrounds and ethnic minorities remain. For example, students eligible for free school meals are half as likely to have good GCSE results as those who are not. So the money spent does not seem to yield the same return for all pupils though we do not know why.

This research looks at what happens in a secondary school if it spends an extra £1,000 on each pupil per year. It uses data from the National Pupil Data base, including test scores, and asks which pupils benefit from extra spending and which groups gain most from different types of spending. This is the first paper to look at how the productivity of money spent in secondary schools is influenced by pupils' past achievement. The study pre-dates the introduction of the pupil premium, designed to support the poorest pupils, and was conducted for a time-period that targeted other groups such as pupils with special educational needs. It shows that targeting pupils in school policies can hugely improve progress.

KEY POINTS

1. Spending in secondary schools is most productive for pupils who are already doing well at the end of primary school. The top 10 per cent make far more progress than the bottom ten per cent.
2. Very able pupils who are eligible for free school meals (FSM) or who are black are not fulfilling their potential. They make less progress between the end of primary school and the GCSE examinations than any other group. In particular, the ablest girls eligible for FSM are left behind.
3. Pupils with special educational needs (SEN) are benefitting hugely from money spent in schools. They make significant progress in secondary school compared with their peers. Spending on teachers is particularly helpful to this group.
4. Pupils of black, Indian, Pakistani and Bangladeshi origin who were having low test results at the end of primary school are benefitting more from money spent in schools than white British, mixed and other ethnicities with similarly low test results.
5. Spending on teaching assistants improves outcomes for the least able and those eligible for free school meals and whose first language is not English, and thereby helps to narrow the achievement gap between these pupils and their peers.
6. Most pupils benefit from more money spent on learning resources such as books, software and computers, but pupils with English as additional language and some FSM pupils do not seem to benefit so much.
7. Schools where spending on supply teachers is high are damaging the progress of all their pupils.

Methodology

The study uses the National Pupil Database for 359,470 siblings who took GCSE examinations between 2007 and 2010 and matches it to schools' spending as reported by the Department of Education. It examines the effect that school spending has on pupils' test scores in English, Maths and Science in GCSE examinations at the end of compulsory schooling. This is done by estimating statistical models where the test scores at the end of compulsory schooling depend on test scores attained at the end of primary school, school expenditure, as well as school, individual and family factors. The study looks at how the productivity of spending in schools differs (1) for pupils with different levels of achievement in national tests at the end of primary school, (2) for different groups of pupils, who are targeted by school policies to receive extra support: ethnic minorities, those whose first language is not English (EAL), gifted and talented and SEN pupils. In addition, it considers how school spending affects pupils eligible for free school meals though they were not, when the research was carried out, targeted for

extra help (the pupil premium for these pupils was not introduced until 2011).

Finally, it examines the effect on girls and boys. Similar schools can have different levels of funding because of differences in local authority funding formulae and increases in funding over time. The study uses these "accidental" differences in funding levels affecting otherwise similar schools to assess the effect of additional spending in schools on learning. Family background and parental investments into their children are very important factors in determining pupil achievement. By comparing the performance of siblings the study is able to control for the effect of shared family background on pupils.

The research looks at the effect of different types of spending on teachers, teaching assistants, supply teachers, learning resources and other spending such as administration and considers which have been most effective for each of the groups of pupils mentioned above.

Findings

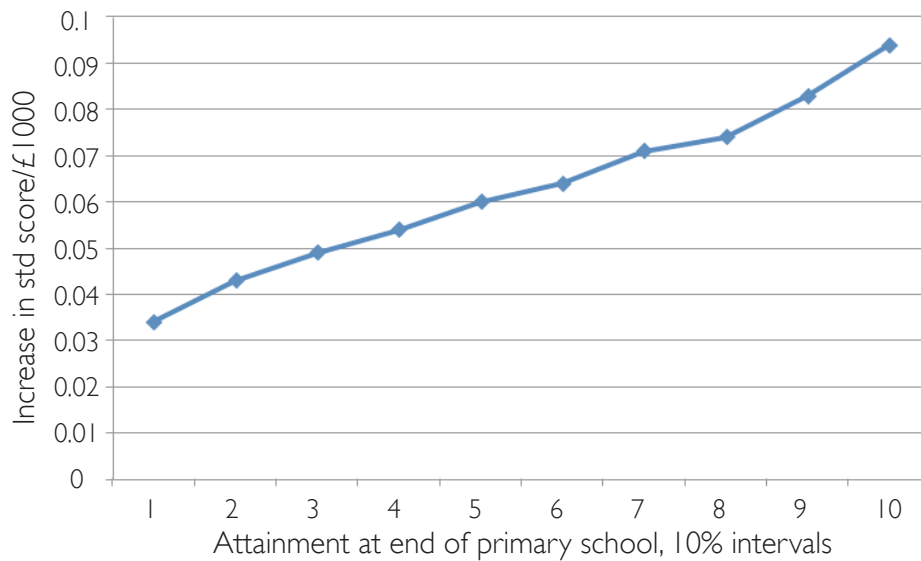
WHICH PUPILS BENEFIT MOST FROM EXTRA SPENDING?

The importance of past attainment

The chart below shows how much pupils stand to benefit from an extra £1000 expenditure per year depending on their attainment at the end of primary school, from bottom 10% through to top 10% attainers. An increase in spending of £1000 per pupil results in only a modest improvement in overall attainment ranging from 3 per cent to 9 per cent of a standard deviation in test scores. For an improvement of one grade, for example from a B to an A, an increase of 90 per cent of a standard deviation in test scores would

be required. Pupils who are doing well at the end of primary school get more out of the money than those who are lagging behind, suggesting that early investment is important if the attainment gap is to be bridged. Many researchers have highlighted the need to take into account past attainment so that comparisons between pupils are fair. For instance, the Nobel prize winner, James Heckman, showed that this is true for child development. As he put it, "skills beget skills". This study is the first to take past attainment into account in relation to school spending. It compares the progress made by different groups of pupils of the same level of past attainment.

Effect of expenditure per pupil by attainment at the end of primary school

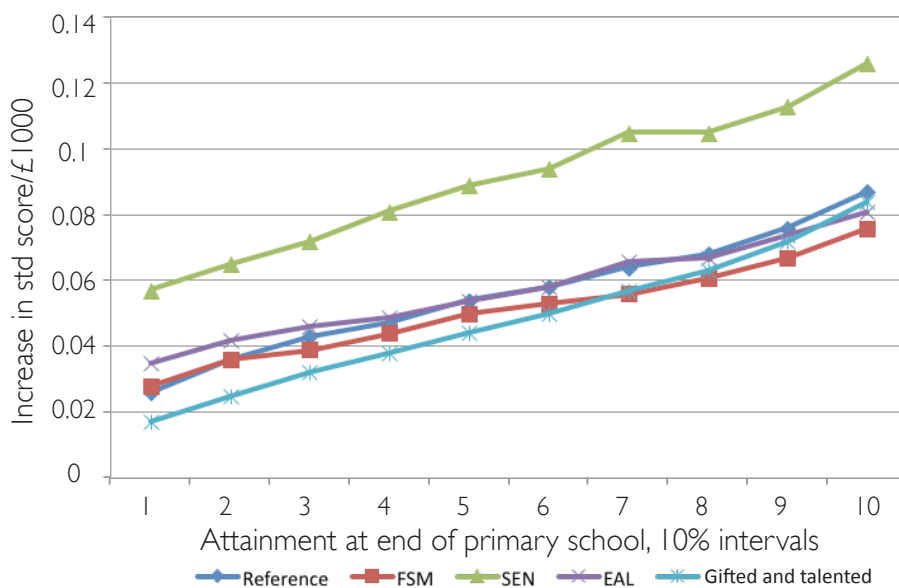


Pupils with special educational needs

The study looks at the effect of the increase in spending for each of the groups, FSM, SEN, EAL, gifted and talented and the reference group, which are pupils that do not fall into any of the categories. The chart shows the results for these groups, again differentiating by level of attainment at the end of primary school, from bottom to top 10%. The most striking result is for children with special educational needs who seem to be the group of pupils who benefit most from additional spending despite government suggestions that there are

many shortcomings in provision for these pupils and that labeling them as SEN encourages teachers to have low expectations of them. Since special schools are excluded from this study, the extra help for SEN pupils in mainstream schools appears to be more productive than that for any other group in the study. The sample includes all pupils found by schools to have special educational needs, not only those with statements. The results show that the targeting of the SEN group in schools has made a real difference to their attainment. This is true for both high and low ability SEN pupils.

Effect of expenditure per pupil by target group and past attainment decile



Pupils eligible for free school meals

Spending in schools seems to be especially productive for pupils targeted by schools policies such as SEN. But this is not true of those eligible for free school meals, who in the period covered by the research were not explicitly targeted by policies to receive extra help. Very able pupils on FSM make the least progress of any group. This is particularly true of girls. It is possible that teachers have lower expectations of FSM pupils and do not spot or encourage the academic ability of the most able pupils in this group.

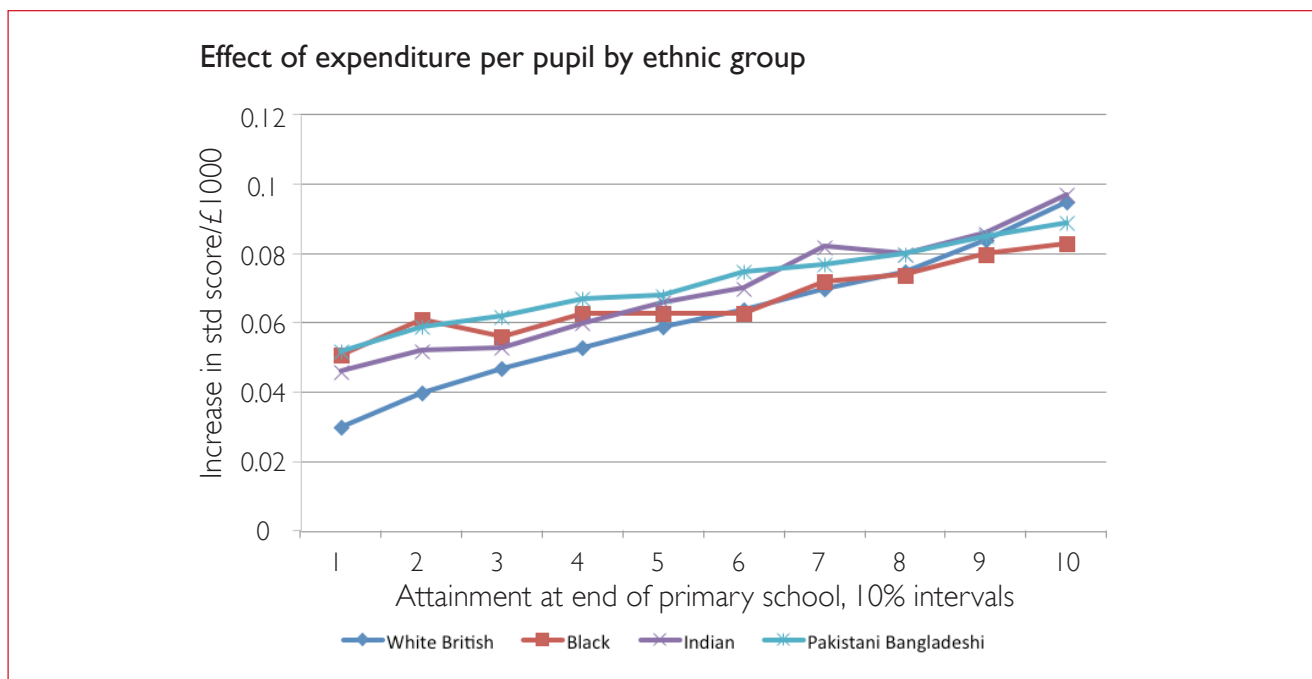
Gifted and talented pupils

These are pupils that are singled out by teachers to have either advanced academic ability or a talent in areas such as sports or music. Schools are responsible to provide challenges in lessons and opportunities for pupils to develop and demonstrate their talents. Our results show that pupils with top test scores at the end of primary school and who were included in the gifted and talented group do no better than similar pupils that were not included. The few pupils in the gifted and talented group with low past test results (presumably

pupils with sport talents etc.) do worse in their GCSEs than their similarly able peers.

Pupils from different ethnic groups

The study compares the effect of spending on White British, Black, Indian, Pakistani, Bangladeshi and Chinese pupils and finds substantial differences between White British and the rest. Except for Chinese and mixed ethnicity pupils, all the other groups tend to have a lower score at the end of primary school than White British pupils but these weaker groups catch up by the end of compulsory schooling. School spending seems to have a greater effect on Black, Pakistani and Bangladeshi children, the groups who perform worst in national tests at 11, than on White British, mixed and other ethnicity children except for the more able. Better language skills may account for some of the improvement. Those that are first generation immigrants will have been in the country longer than when their attainment is measured at the end of primary school and their English will have improved accordingly. However, able ethnic minority pupils (Black, Pakistani and Bangladeshi), like highly able FSM pupils, are falling behind.



School accountability measures such as league tables that encourage teachers to concentrate on improving the grades of children in the middle rather than those at the bottom and the top may be one explanation. The

recommended targets for schools are five A*-C grades at GCSE and some research suggests that teachers tend to focus on pupils who have the potential to score C grades.

Boys and girls

Highly able boys appear to benefit more from an increase in spending of £1,000 per pupil than girls of similar ability. However, higher spending seems to have little effect on the least able boys and girls in this group. These gender differences are similar for all groups of pupils examined in this study. Boys perform worse than girls but the more able boys catch up in secondary school. As the study takes into account shared family background, these differences are unlikely to originate in pupils' families.

WHAT TYPE OF SCHOOL SPENDING HAS MOST EFFECT ON PUPILS' PERFORMANCE?

We divided school spending into spending on teachers, education support staff, learning resources, supply teachers and other expenditure and investigated which type of spending helped each group of pupils most. Education support staff are assistants employed to release teachers from non-teaching tasks but are often used to help teachers especially with low ability children on one-on-one activities. Learning resources include books, software and other classroom equipment. Other expenditure includes the maintenance of premises, back office and energy use.

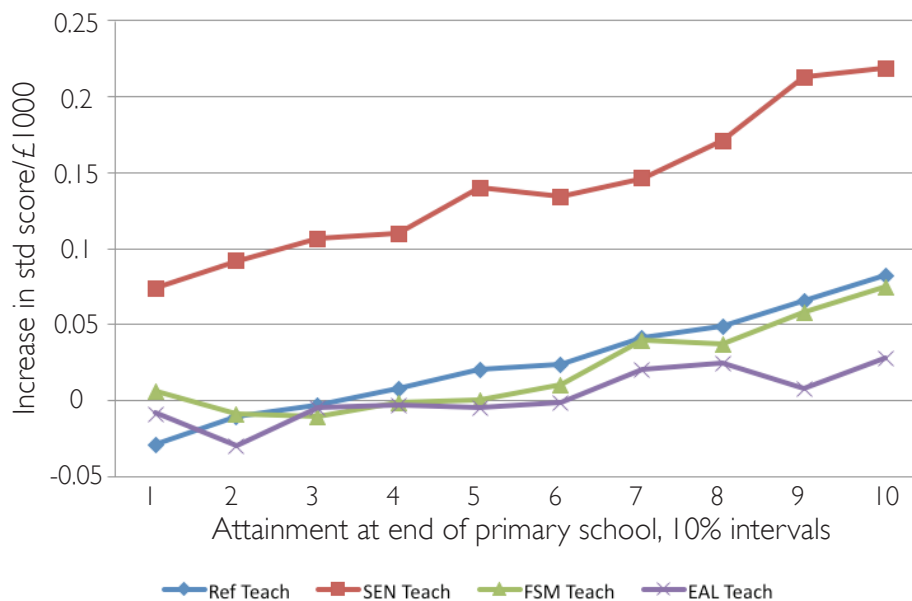
School spending at 2010 prices

Total spending per pupil (£)	4,959
Teachers (£)	2,883
Education support staff (£)	418
Learning resources (£)	323
Supply teachers (£)	105
Other spending (£)	1,499

DO TEACHERS MAKE A DIFFERENCE?

The chart on teacher spending shows how the benefits of spending an extra £1000 on teachers differ by group of pupils and past attainment. More money spent on teachers helps most pupils, and the returns again are higher for the pupils with higher scores at the end of primary school than for those with lower scores. For pupils with special educational needs spending on teachers pays big dividends. They gain more from this type of expenditure than any other group of pupils. This indicates that teachers are making an extra effort to help SEN pupils in class. Highly able children with English as their additional language, on the other hand, get a lower dividend out of spending on teachers.

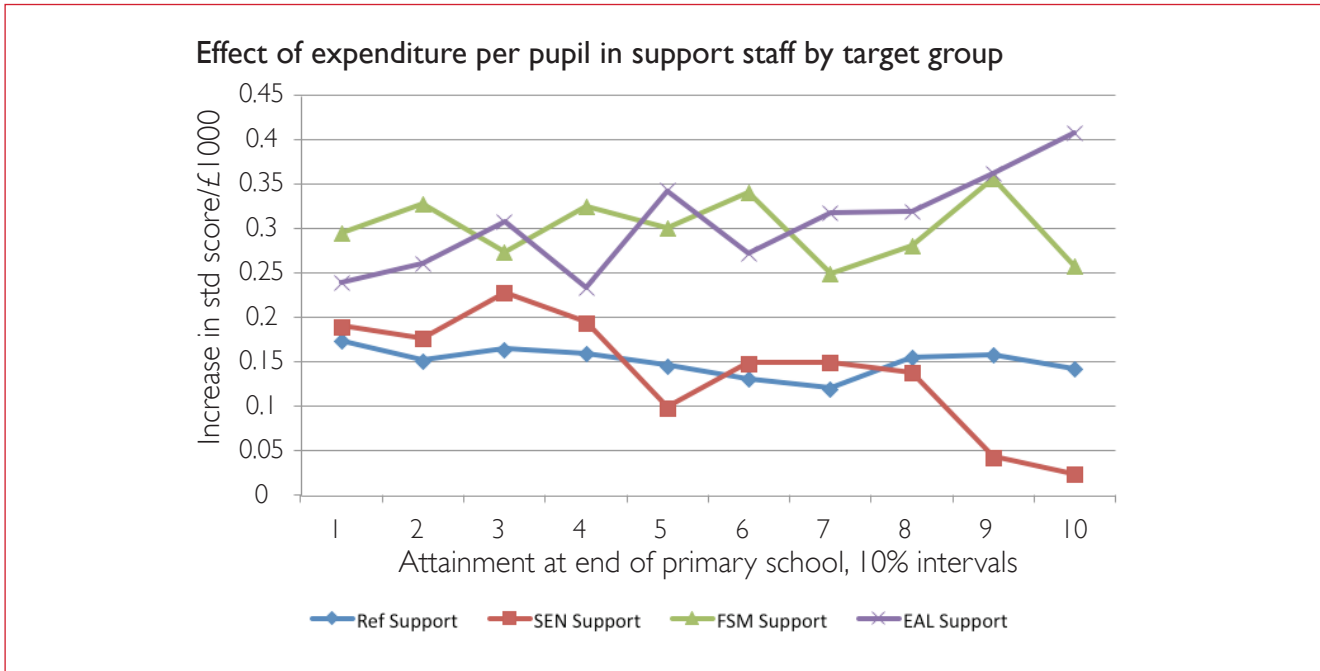
Effect of teaching expenditure per pupil by target group



DO TEACHING SUPPORT STAFF HELP PUPILS TO PROGRESS?

Spending on teaching support staff brings substantial benefits for pupils eligible for free school meals and those with English as an additional language. Other pupils also gain from this type of spending (see chart).

This suggests that these staff are used to support pupils who have been singled out for extra help, leaving teachers to deal with the rest of the class. An interesting feature is that education support staff achieve similar effects for all pupils within the various groups, regardless of their prior attainment at primary school. This means that this spending helps to close attainment gaps or at least prevents them getting larger.

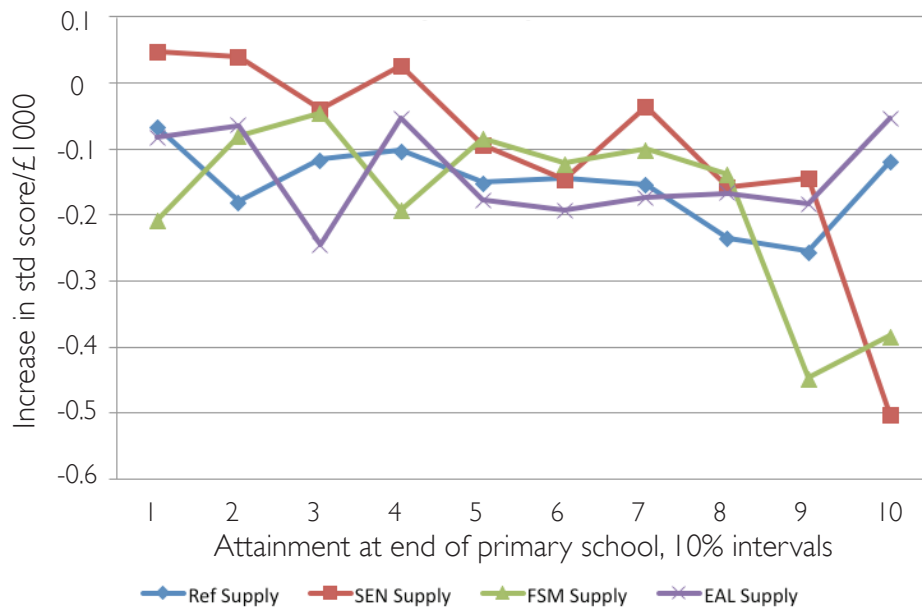


Supply teachers

We would expect that the frequent use of supply teachers – teachers hired from agencies to cover for teacher absences - hinders pupils' progress. High spending on supply teachers may mean that a school is in difficulties. It may show that teacher absenteeism is frequent or that jobs are left vacant for too long. Supply teachers may be less competent than permanent staff and their use disrupts planning and the relationship between pupil and teacher. The results indeed show a

negative effect of spending on supply teachers for all pupil groups: most pupils' progress suffers in schools where supply teachers are often used, particularly the less able (see chart). As the study takes into account school characteristics shared by siblings in the same school, the negative effects can be explained by changes in school difficulties over the years. They also indicate possible issues with the quality of supply agencies and the disruption associated with their use.

Effect of expenditure per pupil in supply teachers by target group



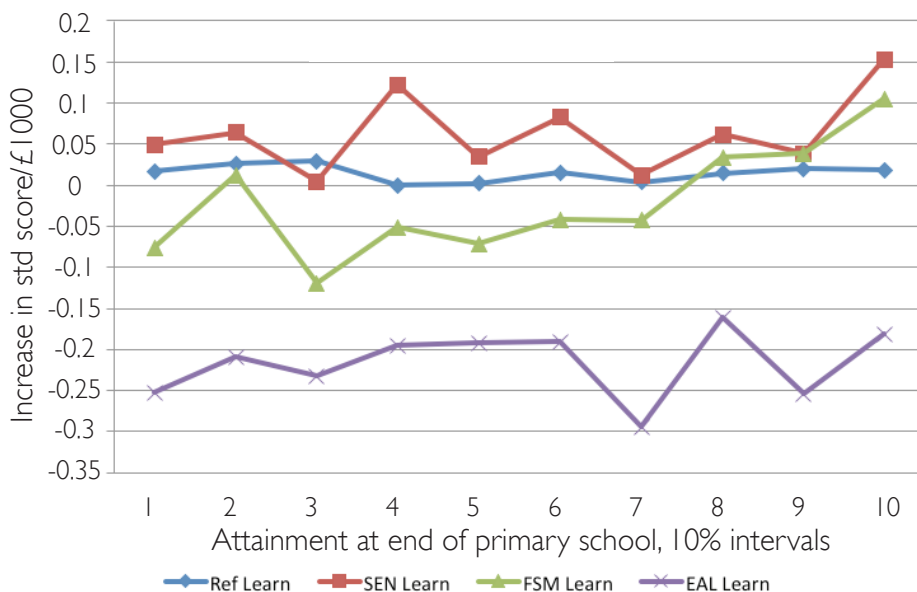
Learning resources

Spending more on learning resources has mixed effects according to the results shown in the chart. The graph seems to indicate positive effects for SEN pupils and slightly negative for FSM, but the differences are not statistically different from zero. Overall, these groups and the reference group experience, if at all, a modest positive effect. Those pupils whose first language is not English experience even negative effects. One possible reason for this result is that they may not be able to make the same use of the provided materials, e.g. those taken home, because of language barriers. EAL pupils

are also less likely to have internet access at home than other pupils (“digital divide”) and may therefore not have access to online learning tools. This may also disadvantage these groups when tasks are performed at the computer in school.

In summary, the study shows that education support staff help to narrow the gap between the low achievers, those eligible for free school meals and those with English as a second language and their more able classmates. In addition, SEN pupils benefit hugely from spending on teachers.

Effect of expenditure per pupil in learning resources by target group



Implications for policy and practice

A roundtable was held at the Nuffield Foundation to discuss the implications of the research for policy and practice. Participants included a secondary head teacher, a governors' representative, representatives of the Department of Education, Ofsted, public policy think tanks and education researchers.

During the roundtable, the following conclusions for policy and practice were drawn from the research:

- Given that spending in secondary schools is most productive for pupils who are already doing well in primary schools, the government should consider how the national funding formula might be weighted in favour of primary schools. "The catch-up of those who are behind should be between Year 2 and Year 7".
- The government should consider a higher pupil premium in primary than secondary schools.
- More evidence is needed on the effectiveness of school spending for different pupil groups in primary schools, and on the effect on these groups of spending the funds on different things.
- The best way to help low achieving pupils eligible for free school meals and those with English as an additional language is through well-trained and accountable teaching assistants, not teachers. This is most effective when assistants take these pupils out of class for one-on-one or small group sessions.
- Schools with above average spending on supply staff should look at ways of reducing their dependence on temporary teachers. Rather than relying on supply agencies for covering teacher absences, it is good practice for schools to hire their own staff to flexibly fill in for absences to keep pupil disruption to a minimum.
- Schools may have focused too much on boys from disadvantaged backgrounds and neglected able girls on free meals. This is because boys in this group are more often truant and behave badly. Girls may be in class but "quietly non-achieving".
- Pupils with special educational needs should be taught by teachers and not by education support staff if they are to realise their potential.
- Ofsted's new value for money tool is useful but some schools need more support in how they spend money. Middle leaders, in particular, do not understand how to make cost-effective decisions.
- Targeting is effective. Schools should make regular evaluations of their spending on pupils who are falling furthest behind so that they can match resources to their impact on students.

Authors and funding

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The ESRC Centre on Micro-social Change
Institute for Social and Economic Research
University of Essex
Wivenhoe Park
Colchester CO4 3SQ

T: + 44 (0)1206 872957
iser@iser.essex.ac.uk
www.iser.essex.ac.uk/misoc