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E
EDUCATION

THE EDUCATION ISSUE

Academy schools
Teachers and tests

Special educational needs
Pupil performance

Boys versus girls
Well-being workshops

CentrePiece

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Editorial

Education is always a big issue in public debate. It becomes even more important at a time of crisis, when the economy is in recession, unemployment is rising rapidly and disadvantaged members of society are in danger of becoming even worse off and perhaps permanently 'scarred' by job loss or inability to join the labour market at all.

Raising the quantity and quality of skills is a key route to improving growth and increasing employment at the best of times. Now it must be a central goal – not least for the benefit of young people in their final years of compulsory education who may be downhearted by the tight labour market but, at the same time, encouraged to stay on at school and perhaps go to university.

So how is the UK's education system doing? Over a number of years, researchers at the Centre for Economic Performance (CEP) have been assessing the effectiveness of the nation's

educational policies in raising standards. A series of studies has evaluated efforts both to improve the quality of education overall and to tackle the 'long tail' of people without basic skills by giving better opportunities to low-achieving, 'hard-to-reach' children from poorer families.

This *CentrePiece* provides an overview of the most significant findings across a wide range of policies, including increased resources, the 'choice and competition' agenda and new structures such as academy schools. We also make comparisons with education systems in other countries, and take a look at teachers – both their career decisions and the impact of their expectations on pupil performance.

Research on education and skills will continue to be at the heart of CEP activities as the Centre moves into its fifth term of five-year funding from the Economic and Social Research Council (ESRC) from 2010. The grant of

£6.08 million that the Centre has recently won will take us through till 2015 – which, at 25 years, makes CEP the longest running of all ESRC's research centres.

The mission remains the same: to conduct world-class and policy-relevant research on economic performance. As well as continuing work on education, globalisation, labour markets and productivity, the Centre will launch major programmes on macroeconomic growth and on 'community', a radical new line of research that incorporates the importance of values and beliefs in shaping economic outcomes.

As always, your comments on CEP research and on this magazine are welcome. And take a look at our website (<http://cep.lse.ac.uk/>) for the latest comment on the economic crisis by CEP researchers.

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Education is a key policy instrument for addressing unemployment, rising inequality and falling intergenerational mobility, the social problems that were the focus of the first three contributions to CEP's 'big ideas' series. In the latest overview of the Centre's research, **Sandra McNally** surveys evaluations of a wide range of school policies in the UK.

Big idea

Education

Education is central to public policy debates in both developed and developing countries. These are some of the reasons why:

- First, it is well known that education is one of the best 'investments' that individuals can make: this claim is backed by extensive research on the private monetary returns to education.
- Second, education is associated with other, non-monetary benefits for individuals, such as better health and less involvement in illicit activities.
- Third, research in macroeconomics highlights the importance of the accumulation of human capital for growth and development.

As these findings suggest, economics makes many significant contributions to education research. The origins of the economics of education as a significant field are in the 1960s and 1970s with the

work of Gary Becker, Ted Schultz and Jacob Mincer (though many issues go back much further than that). In the last decade, there has been a resurgence of interest in education among economists and CEP researchers have played a central part in this work (Machin, 2008; Machin and Vignoles, 2005).

CEP is one of the founding partners of the Centre for the Economics of Education (CEE), which was set up in 1999 by the then Department for Education and Skills. The education group at CEP has made a contribution to many important policy questions as well as advancing academic research in this area.

One of the big questions addressed by our research is what works (or not) to improve school performance. More specifically, what are the consequences of various types of school policy and institutional structures for raising educational standards in schools? And do these policies and structures benefit some children more than others?

Politicians of all persuasions have put faith in the market as a means of raising



Offering parents a wider choice of schools and forcing schools to compete does not seem to be a remedy for poor standards

as



educational standards. There is much talk of the benefits of choice and competition. The idea is that with parents able to choose any school they want for their children (at least in theory) and being able to judge the performance of schools through 'league tables', schools will be under pressure to improve their performance – particularly since their funding is tied to how many pupils they have.

Whether such a policy works is an empirical question. The recent availability of detailed pupil-level data – the National Pupil Database – has made it possible for this issue to be analysed rigorously for the first time and CEP researchers have used these data, making full use of advances in econometric and spatial modelling techniques.

One CEE study evaluates whether primary schools in England that face more competition perform better than schools in less competitive situations, and whether parents who have more choice of where to send their children actually see gains for their children in terms of academic performance (Gibbons et al, 2008).

Image: Alan Lopez

The effects of higher spending have been consistently positive across all areas tested at the end of primary school

This research finds little evidence of a link between choice and achievement, and only a small positive association between competition and school performance (which is not causal). Moreover, there is some evidence that greater competition can actually be deleterious by creating 'stratification', where pupils of different abilities are less likely to be educated together.

These findings suggest that simply offering parents a wider choice of schools and forcing schools to compete does not seem to be a remedy for poor standards in education. So do more traditional 'resource-based' policies fare any better?

Over the last ten years, there has been a huge increase in investment in education. Spending on schools has increased by around 40% since 2000. There has also been a range of specific initiatives, often focusing on disadvantaged areas – for example, the 'Excellence in Cities' programme and academy schools. CEP researchers have been involved in the evaluation of these programmes as well as investigating

whether the general rise in spending has produced positive effects.

CEP's evaluation of academy schools is still in progress (see the next article in this *CentrePiece* for the initial findings). Evaluation of 'Excellence in Cities' shows an improvement in educational outcomes of secondary school pupils for a modest increase in per pupil expenditure. The effect is bigger for particular sub-groups, notably the most able pupils in schools with the highest rate of deprivation (Machin et al, 2007).

This is an example of a high profile government policy where rigorous analysis has been possible because of the ability to construct a suitable control group. The availability of good data has also made possible a thorough analysis of whether the general rise in expenditure has improved educational attainment at the end of primary school. The study shows that the effects of higher expenditure have been consistently positive across all areas tested at the end of primary school (Holmlund et al, 2008).

The magnitude of the effect suggests that the policy of increasing school spending over the past few years has been worth the investment. While this is good news for advocates of increased public spending on education, it remains the case that far too many young people leave the system with little or no qualifications. The UK also has a poor international standing with regard to young people who are classified as 'not in education, training or employment'.

Indeed, it has been difficult to help the 'hardest to reach'. Even the 'Excellence in Cities' programme was unable to do much for the attainment of low ability pupils in disadvantaged schools. Thus, how to tackle the 'long tail' of the distribution of educational attainment remains a challenging issue for the future.

Addressing these issues also requires a better understanding of the consequences of, on the one hand, different pedagogical approaches and, on the other, school structures, such as school governance and management. One example of CEP research on pedagogy is the evaluation of the 'literacy hour', which shows that this fundamental change to how literacy is taught in schools in England has raised standards at very low cost (Machin and McNally, 2008).

Research on the importance of school



structures suggests that the autonomy enjoyed by voluntary-aided schools might explain their higher performance (Gibbons and Silva, 2006). Our programme of research continues to explore these issues.

Whichever way school performance can be improved – whether by changes in resources, pedagogy or structures – we also need to know the economic value of changes in human capital. CEP and CEE researchers have contributed to measuring the value of educational qualifications in the labour market (Machin and Vignoles, 2005), and this issue has wider relevance to other CEP research programmes on macroeconomics, globalisation and productivity.

CEP researchers have also measured how parents value school performance using data on property prices (Gibbons and Machin, 2003). In this study, spatial



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Further reading

Stephen Gibbons and Stephen Machin (2003) 'Valuing English Primary Schools', *Journal of Urban Economics* 53: 197-219.

Stephen Gibbons, Stephen Machin and Olmo Silva (2008) 'Choice, Competition and Pupil Achievement', *Journal of the European Economic Association* 6(4): 912-47.

Stephen Gibbons and Olmo Silva (2006) 'Faith Primary Schools: Better Schools or Better Pupils?', CEE Discussion Paper No. 72 (<http://cee.lse.ac.uk/cee%20dps/ceedp72.pdf>).

Helena Holmlund, Sandra McNally and Martina Viarengo (2008) 'Research on the Impact of School Resources on Attainment at Key Stage 2', report to the Department for Children, Schools and Families.

Stephen Machin (2008) 'The New Economics of Education: Methods, Evidence and Policy', *Journal of Population Economics* 21: 1-19.

Stephen Machin and Sandra McNally (2008) 'The Literacy Hour', *Journal of Public Economics* 92: 1441-62.

Stephen Machin, Sandra McNally and Costas Meghir (2007) 'Resources and Standards in Urban Schools', CEE Discussion Paper No. 76 (<http://cee.lse.ac.uk/cee%20dps/ceedp76.pdf>).

Stephen Machin and Anna Vignoles (2005) *What's the Good of Education? The Economics of Education in the UK*, Princeton University Press.

modelling methods identify how much parents are willing to pay to move into the catchment area of a better performing school. The results show that parents are willing to pay sizeable amounts to 'buy in' to an area served by primary schools with higher achievement.

This work illustrates how admissions policies based on residential proximity (combined with the workings of the property market) contribute to income-based segregation in schooling. As well as being socially undesirable in itself, such segregation may be a driver of educational inequality through 'peer effects'.

As previous contributions to the 'big ideas' series show, CEP researchers have been major contributors to what is known about educational inequality and how this relates to social mobility.

The UK's 'long tail' of people with low educational attainment remains a challenging issue



How effective are academy schools in achieving improved pupil performance in GCSE exams?

Stephen Machin and **Joan Wilson** have conducted an initial evaluation.

Academy schools and pupil performance

The government's flagship education policy of academy schools represents a distinct departure from the way state education has traditionally been offered in England. Academies are publicly funded institutions that are largely run in partnership with private sector sponsors ranging from individuals to businesses and faith groups.

Unlike traditional community and voluntary-controlled state schools, academies are independent from the local authority, and are instead run by a board of school governors consisting in the main of delegates appointed by the private sector sponsor. Governors are responsible for the employment of staff and for contractually agreeing their levels of pay and conditions of service.

Originally designed to replace failing maintained secondary schools located in socially disadvantaged urban areas and characterised by a very poor track record of GCSE achievement, academies were seen as a strategy for improvement and reform in city schools. After their inception, the definitions of school academies have widened and they have begun to take on several different forms, with their coverage spreading geographically and, more recently, into the primary school stage.

In terms of deciding on the curriculum, academies are specialist schools for which the sponsor chooses the subject specialisms. National curriculum teaching in academies is only required in the core subjects of English, maths, science and information and communications technology.

In terms of management and school governance, the academy sponsors were granted autonomy in return for a capital cost contribution of the lesser of £2 million or 10% of building costs. These finances were to be put towards the remodelling of a pre-existing predecessor school or as an outlay to go towards the development of a brand new academy school.

More recently, sponsors have instead been required to set up an endowment fund of equivalent value, the payments from which go into counteracting the

effects of local deprivation on education. Sponsorship has also started to take place in public sector organisations such as universities and colleges, including city technology colleges that are converting into academies. And in a much more recent development, independent schools have been invited to become involved in partnerships with failing schools.

Following the initial announcement of the scheme in March 2000, the first academies opened in September 2002. To date, 133 academies have opened, and the government is committed to having a further 67 open or in the pipeline by the end of 2010. The overall target for the unspecified future has recently been scaled up to the establishment of 400 academies.

The academies scheme has its roots in the 1988 Education Reform Act, which set the scene for a 'quasi-market' in schooling. The major provisions of the act were to introduce the national curriculum, to establish testing and league tables, to offer local management of schools and to increase school accountability through measures such as a regular inspection regime.

The act also created both city technology colleges and grant-maintained schools, which were allowed to select up to 10% of their pupils on the basis of

Academies have improved their GCSE performance after changing status – but so have comparable schools that did not become academies

ability or aptitude. City technology colleges formed the first attempt to bring the private sector into the state sector as they are partially funded by private sector business. It is on the legislative grounds of these institutions that the academies programme is based.

As a public-private initiative, the academies programme is expected to drive up educational standards through the innovative nature of the academy culture and the expertise and experience that a private sector sponsor is presumed to bring to a school. It is argued that this will facilitate better management and governance, which in turn will lead to improvements in educational attainment.

Much media attention has focused on the performance of academy schools, with their distinct level of autonomy compared with traditional state schools often questioned as a necessary characteristic of their set-up. In a first attempt at gauging the effectiveness of academy schools in achieving improved pupil attainment, we concentrate on a sample of four cohorts of 27 academies that opened in England between the school years 2002/03 and 2005/06.

Methodologically, the impact of academy status on pupil achievement could be evaluated by looking at two identical schools (in terms of levels and trends in achievement), only one of which is given academy status (and the associated funding and autonomy). Even if they are poorly performing schools, the scope for 'mean reversion' (performance returning to the average for the local area) is the same, and a comparison of relative pupil achievement in the two schools before and after one became an academy can provide an estimate of the impact of becoming an academy on educational achievement.

The issue is finding the matched schools. In our initial study, we adopt two strategies. The first matches each academy school with the nearest performing school via a one-to-one match on pre-policy exam levels and trends in pupil achievement. The second uses all other secondary schools in the academy's local authority as a comparison group.

Looking at the final pre-policy year of GCSE performance in schools that become academies, and comparing this with exam outcomes across all years in which the academy policy was in effect, we find that

academies did improve their performance after changing status. This is the case for all four cohorts, with their improvement in GCSE performance rising between 9.6 percentage points (academies opening in 2005/06, the fourth cohort) and 14.1 percentage points (academies opening in 2003/04, the second cohort).

These improvements look less impressive when benchmarked against other poorly performing matched state schools that did not become academies but were also prone to mean reversion. This is because standards rose for the matched schools as well, by between 6 percentage points (academies opening in 2004/05, the third cohort) and 14.5 percentage points (academies opening in 2002/03, the first cohort).

Overall, these changes in GCSE performance in academies relative to matched schools are statistically indistinguishable from one another. The same pattern emerges if all state schools in the academy's local authority are used as the comparator group.

To control explicitly for pre-policy trends in GCSE scores for several years before academy status (rather than a single level, as in the above case), we make use of school-level data on GCSE performance going as far back as 1995/96. We find a pattern of no short-run effects of becoming an academy on GCSE performance when long-run differences between the academies' predecessors and matched schools are taken into account.

To conclude, the academies programme is still at too premature a stage for GCSE performance improvements to be fully appraised. The scheme is evolving rapidly and it is likely that children may need more exposure to it for there to be substantial beneficial effects on achievement. Indeed, the evidence that we present here is based on a small fraction of the future number of academy schools.

It is evident that a very important future research exercise on the role of private sector collaboration in the state school sector will be to evaluate the impact of their more widespread introduction on pupils' academic performance.



This article summarises 'Public and Private Schooling Initiatives in England' by Stephen Machin and Joan Wilson, a chapter in *School Choice International: Exploring Public-Private Partnerships* edited by Rajashri Chakrabarti and Paul E. Peterson, MIT Press, 2008.

Stephen Machin is research director of CEP and professor of economics at University College London. **Joan Wilson** is an occasional research assistant in CEP's education and skills programme and a PhD student at the Institute of Education.

The academies programme is still at too premature a stage for GCSE performance improvements to be fully appraised

Is discrimination inherent in the British teaching profession? **Stephen Gibbons** and **Arnaud Chevalier** investigate differences between the assessments that teachers give pupils and pupils' test marks to find out if teachers consistently underestimate the ability of pupils from certain backgrounds.

Assessing pupils' abilities: do teachers and tests disagree?

Family background remains one of the most powerful forces driving academic achievement and life chances in Britain. A large body of evidence shows systematic differences in achievement according to pupils' ethnic and socio-economic background. The reasons for these differences are not fully understood. But one undercurrent of opinion maintains that at least some of the differences could be due to failures or biases in the assessment system rather than any real differences in ability.

One concern is that teachers may, inadvertently or otherwise, stereotype pupils when making face-to-face assessments of their abilities. For example, they may judge individual pupils from Asian or black ethnic minorities based on preconceived notions of the average ability of Asian or black pupils. This is particularly worrying as there have been accusations of institutional racism in England's schools, particularly linked to exclusions of ethnic minorities.

There is a great deal of evidence that people engage in stereotyping or 'statistical discrimination' in all walks of life. But this should be of even more concern if it affects pupils from already disadvantaged ethnic or socio-economic groups. This might happen if, for example, teachers' assessments influence pupils' education and life trajectories through the number

and type of qualifications entered, through the feedback that teachers give pupils about their own abilities, and through academic references.

Our research looks at pupils participating in national tests at the ages of 11 and 14 in England. Because these pupils are assessed both by their teachers and by externally marked tests, we can compare the assessment that teachers give with the test marks that pupils receive in English, maths and science.

There is no reason to expect tests to

There is no evidence of institutional racism in the system of teachers' assessment of pupils



give a more accurate picture of ability than teachers' assessments or vice versa. But there is also no reason for the two methods to differ systematically according to the ethnic, gender or socio-economic group of the pupil being assessed. Evidence of this kind of divergence would suggest something is amiss in the assessment system, lending credence to the idea that stereotyping is pervasive in England's schools.

Our research is the first to look at this issue in the context of the full population of England's pupils at age 14. It is also the first to be able to take account fully of pupils' previous achievements, background characteristics, place of residence and school attended. And we do find that teachers' assessments and externally marked tests tend to diverge systematically according to the characteristics of the pupil being assessed.

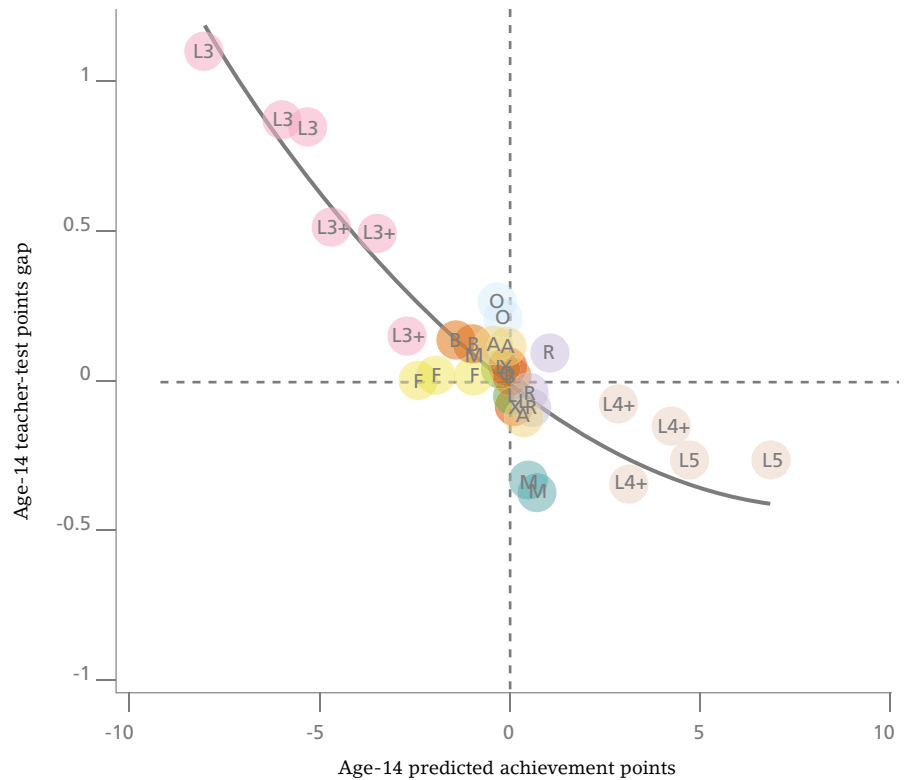
But this divergence does not happen in a way that is consistent with stories of statistical discrimination. If anything, teachers' assessments tend to work in favour of pupils who would be predicted to do relatively poorly on the basis of past assessments and the performance expectations of their demographic group.

We find, in other words, that higher ability pupils tend to be graded higher by the tests than by the teachers and low-achieving pupils better by the teachers' assessments than by the tests. Our data do not allow us to find out why this is the case. One likely explanation is that teachers (like most other people) have a tendency to extreme aversion in decision-making – that is, the tendency to go for intermediate rather than extreme decisions in the face of uncertainty.

Figure 1 demonstrates this finding: the horizontal axis plots pupils' predicted score in the tests they sit at age 14; the vertical axis plots the difference between teachers' assessments and test scores. All scores are scaled so that zero corresponds to an August-born white girl, not on free meals, with English as her first language, and who scored Level 4 on both teacher and test assessments at age 11.

Each data point has a label designating a pupil group. The L labels correspond to achievements at age 11 with L3 the lowest and L5 the highest. The other symbols are: F free meals, B black, A Asian, X mixed ethnicity, R other ethnicity, L English additional language, M male, O older (born in September)

Figure 1: The relationship between teacher-test points gaps and age-14 predicted achievement points by Key Stage 2 achievement level and different demographic, ethnic and free meal groups



- Key**
- F Free meals
 - B Black
 - A Asian
 - X Mixed ethnicity
 - R Other ethnicity
 - L English additional language
 - L3 L3+ Low test score stage 11
 - L4+ L5 Higher test score at age 11
 - M Male
 - O Older (born in September)

Higher ability pupils tend to be graded higher by the tests than by the teachers – and low-achieving pupils better by the teachers than by the tests



(birthday in September). There are three data labels of each type, corresponding to results in English, maths and science.

Data points in the top half of the figure represent pupil groups who do better in the teachers' assessments at age 14 than they do in tests. Data points in the bottom half represent pupil groups who do relatively well in the tests. Data points in the right hand side represent pupil groups who do better in both test and teacher scores. Data points on the left hand side represent lower achieving pupil groups.

The most striking feature of the figure is the obvious downward trend, with some very substantial gaps between teacher and test scores at age 14 with respect to predicted achievement. Pupils who scored towards the bottom of the distribution at age 11 (L3, L3+, top left quadrant) do relatively well on the teachers' assessments at age 14, while their peers at the top of the achievement distribution (L4+, L5, bottom right quadrant) do relatively well in the tests. The differences by free meal entitlement, ethnic group and demographics are modest in comparison although they follow the same general trend.

Should we worry about these gaps even though they do not seem to correspond to traditional views of stereotyping? And could these gaps between teachers' and test assessments have any bearing on what happens to

children in the future in terms of their academic success?

To answer these questions, we examine whether pupils who score well on teachers' assessments relative to tests are entered for more GCSEs, do better in their GCSEs, choose different GCSE subjects or are more likely to stay in education after the age of 16. In no case could we find any convincing evidence that discrepancies between teachers' and test assessment scores had any meaningful influence on any of these outcomes.

We cannot say from this research whether there are emotional effects from bad test results or teacher assessments. But evidently, pupils' academic performance does not seem to suffer in the medium term as a consequence of assessment biases or errors.

In another strand of related research, we find that pupils who are under-confident in their abilities are less likely to expect to go to university. But university graduates' lack of confidence about their scores in specific cognitive tests has little connection with how well they think they will do in their exams or their expected success in the labour market. The two studies together suggest that while academic ability matters a lot for subsequent outcomes, personal judgements about ability – whether by teachers or students themselves – do not always have a big role to play.

Although there is no evidence of

Errors in school assessments have little influence on pupils' GCSEs or decisions about education after age 16.

institutional racism in the assessment system or that standard forms of stereotyping by teachers is going on, there are nevertheless systematic differences in the way tests and teachers rate pupils of high and low abilities. This raises some questions about the overall reliability of the assessment system in England as it stands. But more importantly, the systematic discrepancies suggest it would be very unwise to move to a system that was totally reliant on one form of assessment alone, either teacher or test-based.

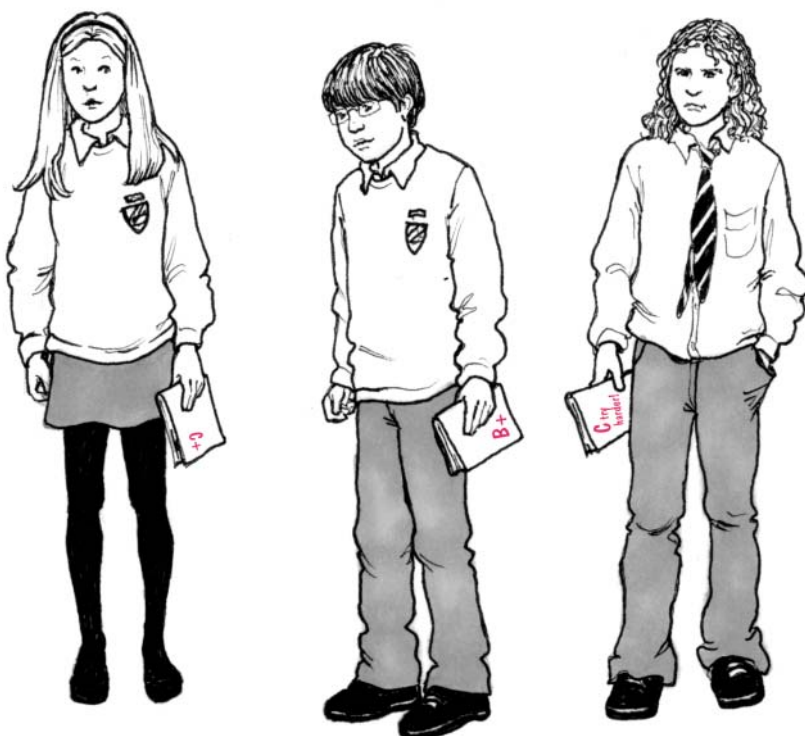
Even so, the research results suggest that it is unlikely that pupils' long-term school performance is heavily influenced by teachers' perceptions of their abilities or by any other form of bias in school assessment. Nor do these factors seem to be a big influence on pupils' decisions about staying in school after 16 or gaining the prerequisite qualifications for participation in higher education.

This article summarises 'Assessment and Age 16+ Education Participation' by Stephen Gibbons and Arnaud Chevalier, *Research Papers in Education* 23(2): 113-23 (June 2008). The research was carried out for the Widening Participation in Higher Education project funded by the ESRC's Teaching and Learning Research Programme.

The study of university graduates is 'Students' Academic Self-perception' by Arnaud Chevalier, Stephen Gibbons, Sherria Hoskins, Martin Snell and Andy Thorpe, CEE Discussion Paper No. 90 (<http://cee.lse.ac.uk/cee%20dps/ceedp90.pdf>).

Stephen Gibbons is a senior lecturer in economic geography at LSE.

Arnaud Chevalier is a senior lecturer in economics at Royal Holloway, University of London. Both are research associates in CEP's education and skills programme.



in brief...

Assessed by a teacher like me: the impact of race on pupils' grades in US elementary schools

The previous article explored systematic differences in pupils' test results and teachers' assessments in the UK. Here, **Amine Ouazad** looks at similar questions about possible bias in the context of US elementary schools.

Teachers in the United States tend to give better grades to pupils of their own race, even if these pupils have the same external test scores as their classmates. Most teachers are white and, on average, white pupils get higher assessments for a given ability level. Male teachers too tend to give better grades to male pupils, yet female teachers do not have significant gender-based perceptions.

These are some of the findings of research by Amine Ouazad on teachers' assessments in US elementary schools. The research compares subjective assessments by teachers and test scores from multiple choice questionnaires collected by the US Department of Education.

The Early Childhood Longitudinal Study is a nationally representative survey that started with about 20,000 pupils of the 1998/99 kindergarten cohort (children aged 5-6) and was followed up six times later (fall and spring of kindergarten, fall and spring of grade 1, spring of grade 3 and spring of grade 5) with assessments in English and maths.

Pupils are assessed twice each time: by their teachers and by external assessors of the US Department of Education. This makes it possible to compare subjective assessments and test scores covering the same skills. Using discrepancies between these two forms of assessments, the research establishes that teachers have substantial biases.

An African American or Hispanic pupil assessed by a white teacher is likely to be graded significantly lower than if the same pupil's ability were assessed by an African American or Hispanic teacher. (Minority teachers do not appear to be biased.) The effects of the biases are sizeable: white teachers' biases could explain up to 22% of the gap between white and minority pupils.

The research also finds that the effects of teachers'



subjective assessments are long lasting, shaping children's aspirations, their involvement in the classroom and their later performance. Ouazad argues that racial interactions are likely to explain why test score gaps between whites, African Americans and Hispanics grow between kindergarten and grade 5 (when children are aged 10-11).

Teachers also rate their pupils' behaviour and, surprisingly, this is not the main driving force behind the results. The study also provides evidence that teachers give better assessments to pupils of their own race even if they have

Teachers in the United States tend to give better grades to pupils of their own race



Policy-makers and designers of teacher training programmes should put more emphasis on diversity

the same test scores and behavioural measures as their classmates of other races. This shows that there is a racial bias over and above cognitive and behavioural differences.

Historically, before desegregation and the civil rights movement, African American pupils were more likely to be taught by a same-race teacher than nowadays. The fraction of minority teachers has fallen since then. Whites are now much more likely than African Americans and Hispanics to be taught by a teacher of the same race since a fair representation of minority teachers would require at

least tripling the number of Hispanic and African American teachers.

Trends are different for the two groups. The fraction of African American teachers has declined significantly since the 1950s: one reason is that teaching is no longer one of the best options for college-educated African Americans. But the number of Hispanic teachers has never been high: the growth of the country's Hispanic population is a relatively recent phenomenon, which has not been followed by a comparable growth in the number of Hispanic teachers.

Tripling the number of minority teachers would require more than tripling the number of recruited minority teachers. Strong political will is needed, Ouazad argues: so-called teacher 'competency' tests strongly correlate with race, even though these tests are inaccurate predictors of teaching quality.

Policy-makers should look for tests that recruit good teachers without unduly favouring any particular race. Such tests are hard to design. Quota systems are not a viable solution since they were ruled out in a 1978 decision of the US Supreme Court (*Regents of the University of California v. Bakke*).

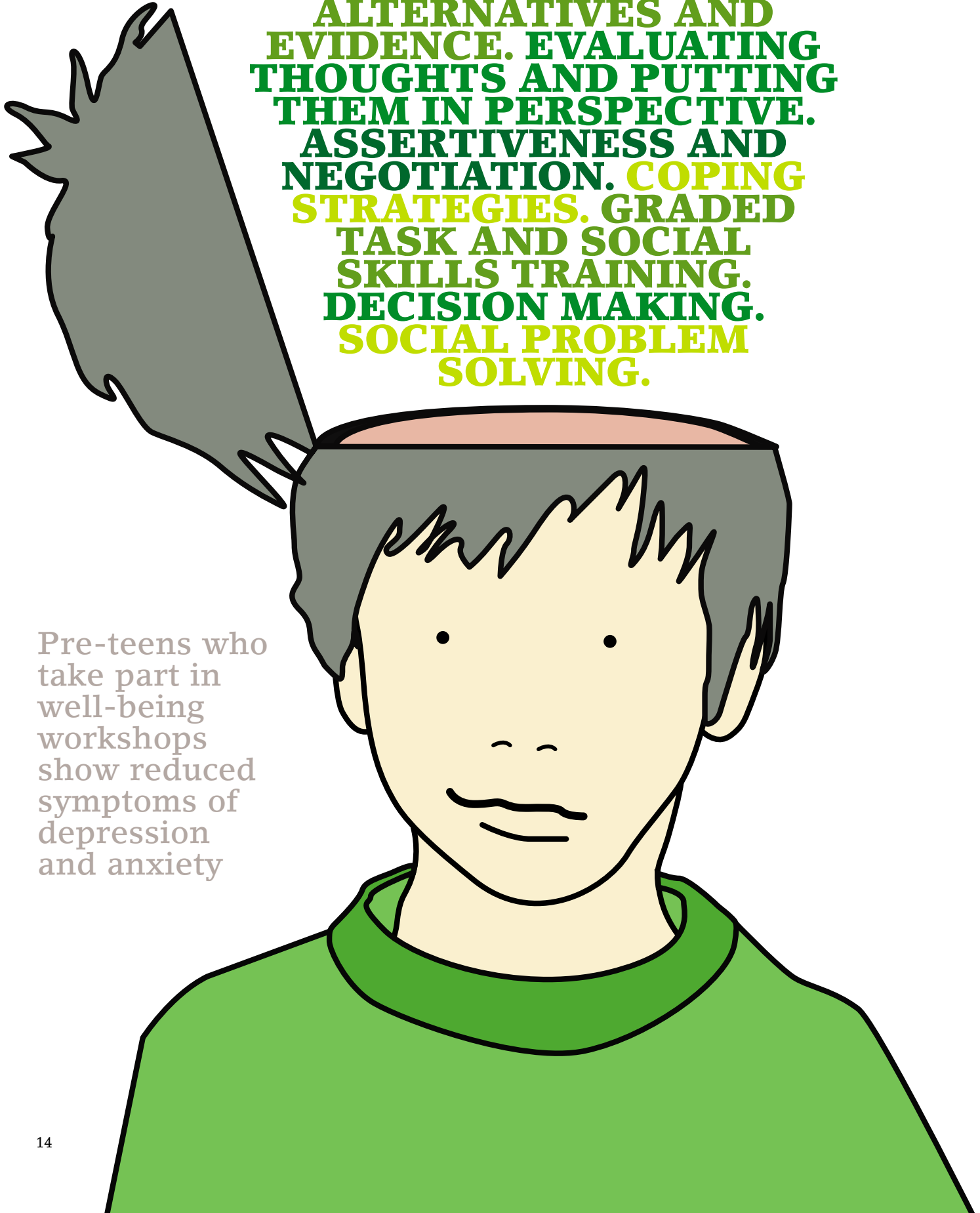
What then is the way forward? We do not live in a world where racial and gender perceptions are carved in stone: experiments in psychology suggest that beliefs about race and performance can be changed. Ouazad concludes that policy-makers and designers of teacher training programmes should put more emphasis on diversity so that racial perceptions of pupils' performance become a thing of the past.

The article summarises 'Assessed by a Teacher Like Me: Race, Gender, and Subjective Evaluations' by Amine Ouazad, CEE Discussion Paper No. 98 (<http://cee.lse.ac.uk/cee%20dps/ceedp98.pdf>).

Amine Ouazad is assistant professor of economics at INSEAD and a research associate in CEP's education and skills programme.

**THE LINK BETWEEN
THOUGHTS AND FEELINGS.
THINKING STYLES.
CHALLENGING BELIEFS.
ALTERNATIVES AND
EVIDENCE. EVALUATING
THOUGHTS AND PUTTING
THEM IN PERSPECTIVE.
ASSERTIVENESS AND
NEGOTIATION. COPING
STRATEGIES. GRADED
TASK AND SOCIAL
SKILLS TRAINING.
DECISION MAKING.
SOCIAL PROBLEM
SOLVING.**

Pre-teens who
take part in
well-being
workshops
show reduced
symptoms of
depression
and anxiety



in brief...

Promoting children's well-being

A pilot programme of well-being workshops for 11 and 12 year olds is improving their psychological health, according to an initial evaluation by **Amy Challen, Stephen Machin** and LSE colleagues.

The first interim report on a controlled trial of the 'UK Resilience Programme' – a curriculum aimed at building children's skills to help them solve problems, feel happier and behave well – finds reduced symptoms of depression and anxiety among Year 7 pupils who participate in the workshops.

The preliminary results also suggest that disadvantaged children and children with below average educational attainment in Key Stage 2 tests at age 11 gain more from the workshops. So too do children who start from a worse baseline in terms of their reported psychological health.

Since September 2007, three local authorities – South Tyneside, Manchester and Hertfordshire – have piloted the UK Resilience Programme. The first year of workshops included around 2,000 pupils across 22 schools (the 'treatment' group for the evaluation) and many more have been involved subsequently.

The programme is the UK implementation of the Penn Resiliency Program, which was developed by psychologists at the University of Pennsylvania. The programme, which is based on cognitive behavioural therapy (CBT), aims to build 'resilience' in children through teaching realistic thinking, adaptive coping skills and social problem solving.

The first interim report on the programme finds that:

- Pupils who participate in the programme have reduced symptoms of depression and anxiety – a positive short-term impact on their psychological well-being.
- These positive effects are different for different kinds of pupils. For example, they are larger for pupils who did not attain the national target levels in Key Stage 2 tests, and for pupils with worse initial symptoms of depression or anxiety.
- Pupils are generally positive about the programme. The majority report that they enjoyed the workshops and that they had learned skills that would help them solve problems, feel happier and behave well.
- Some pupils say that they have applied the skills in real life situations, and some show a good understanding of the key elements of the programme.
- The content of the programme is quite intellectually

demanding and some facilitators believe that some pupils struggle with this.

- Facilitators are extremely positive about the ideas underlying the programme and about the training they received. Most report using the skills themselves.
- Most facilitators believe that the skills could make a positive difference to pupils in various domains of their lives, including psychological well-being and peer relationships.

The positive short-term effects of the programme on children's psychological well-being are promising. Data being gathered now and next year will make it possible to evaluate its longer-term impact, including its effects on pupils' behaviour, attendance and academic attainment.

Disadvantaged and relatively low-achieving children gain more from the workshops

This article summarises 'UK Resilience Programme Evaluation: Interim Report' by Amy Challen, Stephen Machin, Philip Noden and Anne West ([http://www.dcsf.gov.uk/research/data/uploadfiles/DCSF-RR094%20\(1\).pdf](http://www.dcsf.gov.uk/research/data/uploadfiles/DCSF-RR094%20(1).pdf)). The evaluation was commissioned by the Department for Children, Schools and Families.

Amy Challen is coordinator and lead researcher on CEP's evaluation of the UK Resilience Programme. **Stephen Machin** is research director of CEP and professor of economics at University College London. **Philip Noden** is a research fellow in the education research group (ERG) at LSE. **Anne West** is director of ERG and professor of education policy at LSE.

The UK Resilience Programme is one of seven strands of work under the Local Well-being Project, an initiative launched in 2006 to test practical ways of improving both individual and community well-being and resilience in three very different areas of the UK – Hertfordshire, Manchester and South Tyneside. The project brings together the three local authorities with CEP, the Young Foundation and the Improvement and Development Agency.

Policies to improve primary education can involve increasing the resources available to schools, modifying teaching methods or introducing elements of accountability, choice and competition into education 'markets'. **Olmo Silva** reviews the latest evidence on the effectiveness of these three broad areas of intervention.

What works in primary schools?

P rimary education is central to people's lifelong learning and the economic development of their societies. Recent microeconomic evidence shows that core skills, such as literacy and numeracy, are best learned during the primary stage of education, and that there are very high returns in the labour market to these basic forms of expertise (Machin and McNally, 2004; Marcenaro et al, 2007).

Related research shows that early educational attainments are crucial determinants of future educational outcomes (Dearden et al, 2004). What's more, interventions that target the earliest stages of education are better able to counterbalance the adverse effects of poor

family background on young people's learning (Heckman, 2000).

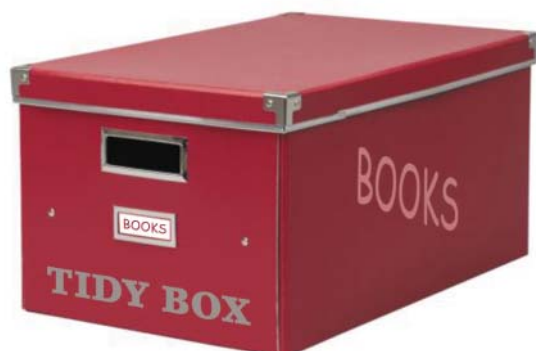
There is also macroeconomic evidence suggesting that the interaction between higher levels of education and basic skills, crystallised at the earliest stages of education, plays a prominent role in improving a country's economic prospects (Hanushek and Woessmann, 2007).

So is there room for significant improvement in primary education? OECD research (2005) indicates that while growing numbers of young people in OECD countries stay on beyond compulsory education, many still lack basic skills. The UK, for example, is still cursed by a 'long tail' of poor learners with inadequate skills: in 1995, roughly a fifth of 16-25 year olds had failed to achieve

the level of numerical and literacy skills considered necessary to 'function' in the labour market (Machin and Vignoles, 2006).

While the situation has certainly improved over the last decade, the UK still ranks in the bottom half of recent international assessments of proficiency in maths, reading, science and problem solving. This suggests that there are opportunities to enhance people's core skills by improving the quality of primary schooling, and that this will be beneficial both to individuals, by boosting their future learning and labour market prospects, and to countries, by raising the 'speed-limit' on economic growth.

The big question is how to accomplish these goals. Interventions aimed at



Improving attainment at primary level can have long lasting effects on pupils' later learning



improving primary education fall into three broad categories: those that change resources available to schools; those that modify pedagogy and teaching methods; and those that introduce elements of accountability, choice and competition into education 'markets'.

Resources

What is the evidence that 'money' works in schools? There is heated debate among economists about the effectiveness of resource-based interventions, epitomised in the *Economic Journal* of February 2003, in which two eminent experts in the field present their contrasting views (Hanushek, 2003; and Krueger, 2003).

CEP research on primary schools in England shows that the recent large increases in expenditure (40% up in real terms between 2000 and 2007) has contributed significantly to raising attainments in English, maths and science at Key Stage 2 (Holmlund et al, 2009). There is some evidence that the effects have been bigger for pupils from a disadvantaged family background (those eligible for free school meals).

Another study has examined the impact of 'Excellence in Cities Primary Extension', a resource-based intervention targeting schools in disadvantaged areas and allocating additional funds mainly on the basis of pupil numbers and level of disadvantage in the local education authority (Emmerson et al, 2004). The policy seems to have had small but positive effects on test scores at the end of primary school. Once more, these are mainly concentrated among pupils in the most disadvantaged schools.

Finally, a growing amount of resources is being devoted to promoting the use of information and communications technology (ICT) in schools. The UK government has championed ICT as a way

of modernising schools and teaching methods.

The international evidence on the effectiveness of ICT as a teaching and learning device is ambiguous, tending to find few benefits. One exception is a CEP study of the experience of primary schools in England between 1999 and 2003 (Machin et al, 2007). The findings point to a positive and sizeable impact of ICT expenditure on primary school performance in English and science, though not in maths.

The authors suggest that, for English and science, it was the joint effect of large increases in ICT funding (a more than doubling of ICT funding in some areas) with targeted investments in, for example, software improvements and teacher ICT training, that led to positive effects of ICT expenditure on educational performance.

Overall, this discussion provides some important lessons on the effectiveness of resource-based interventions:

- First, although international evidence suggests that marginal changes of resources in schools might not generally matter, the experience of England shows that substantial investments (like those analysed by Holmlund et al, 2009, and Machin et al, 2007) can produce sizeable effects.
- Second, there is evidence that resource-based interventions might produce their best outcomes if they are targeted towards the most needy, for example, towards schools in disadvantaged areas or pupils from poor family backgrounds.

Pedagogy

The 'literacy hour', which has been implemented in primary schools in England since 1996, provides a unique

example of how changes in teaching methods can improve learning. The main rationale for this policy is to try to alleviate the very low levels of reading and writing skills of children in many primary schools in England, particularly in inner cities, through more focused instruction and effective classroom management.

An evaluation of the pilot implementation of the programme carried out in 1996-98 finds larger increases in attainment in reading and writing during primary education for pupils exposed to the literacy hour than for pupils not exposed to it (Machin and McNally, 2004). The research also finds evidence that at the age of 11, boys received a greater benefit than girls, and that there are small positive effects from this 'treatment' that persist up to the age of 16. This suggests that improving primary education attainments can have long lasting effects on pupil learning.

Choice and competition

As a means of improving standards in schools, governments in many countries have recently started pursuing market-oriented policies based on accountability, incentives and increased choice and competition among schools. But what are the theoretical underpinnings of this idea?

Consider a model of school provision based on parental choice, in which schools admit pupils regardless of where they live and parental preference is the deciding factor. Advocates of this approach tend to base their claims on two standard efficiency arguments from economic theory.

According to the first argument, alternative community-based models, with local schools serving single neighbourhoods, are 'monopolistic' and the incentives for improvement or adoption of new teaching technologies



Resource-based interventions seem to produce their best outcomes when targeted towards pupils and schools in real need



may be weak. The alternative is to give parents freedom of choice, to link school finance, management incentives and teacher pay to school popularity, and so create a market incentive mechanism. Under this system, schools must adapt to meet parental demands – presumably including high educational standards – or fail and close.

The second argument is that gains arise through the reallocation of pupils to schools according to personal tastes and pedagogical needs. If every pupil can find and choose a school offering a teaching technology that educates them at least as effectively as under the community-based system, then academic achievement should improve.

What is the evidence for the effectiveness of choice and competition based policies? There is a substantial volume of quantitative evidence on this question, particularly in the US context. A survey of the international literature suggests that ‘the gains from competition are modest in scope with respect to realistic changes in levels of competition’, with many results statistically insignificant (Belfield and Levin, 2003).

CEP researchers have conducted the first pupil-level analysis of the effects of choice and competition on academic achievement in primary schools. The empirical findings reveal no significant causal association between measures of school choice and competition, and pupil achievement across the board (Gibbons et al, 2008).

Nevertheless, the authors find that state schools with more autonomous governance and admission procedures (predominantly faith voluntary-aided schools) respond positively to a greater degree of competition with other local schools. Their pupils’ ‘value-added’ attainment score improved by about 1.6

point for each additional competitor, which corresponds to 16-19 weeks of progress in English or maths.

To explain their findings, the authors argue that the institutional arrangements in autonomous voluntary-aided schools are more conducive to a focused, competitive ethos, in which the setting of targets and monitoring of performance are seen as a way to attract pupils through the promise of excellence.

Related CEP research looks at the average effect of attending a faith voluntary-aided school on educational progress during primary education in England (Gibbons and Silva, 2006a). The results suggest that although these schools tend to admit pupils with educationally advantageous backgrounds, there are no performance benefits that cannot be attributed to the sorting of pupils likely to show the fastest progress into these schools.

The findings of these two studies suggest that in England, autonomous schools tend to respond to market-type incentives by improving the performance of their pupils, although on average they do not perform better than other schools. In fact, there is potentially a tail of faith voluntary-aided schools in areas protected from competition, which behave like monopolists and have on average worse performance than other types of school.

An analysis of school choice and competition would not be complete without a brief discussion of some of the drawbacks, mainly the possibility that even if market-oriented interventions have the potential to boost pupil achievements, the gains may not be equally distributed and may come at the cost of increased segregation of pupils across schools.

Indeed, CEP analysis of this issue for primary schools in England finds that school competition tends to exacerbate

polarisation of primary schools by pupil attainment (Gibbons and Silva, 2006b). The estimates hint at a fairly large effect of school market competitiveness on stratification. So although there can be performance benefits from policies that promote competition in primary schools, they may come at the cost of increased polarisation of pupils along the lines of ability and attainment.

Finally, it is worth concluding with a cautionary remark. Analysis of school census data for several cohorts in England shows that at most 14% of the variation in pupil achievement at the end of primary education is ‘between’ schools. At the same time, differences in residential neighbourhoods can account for up to 60% of the variation in pupil attainment at the end of primary education.

Given the strong link between family resources and residential sorting, these differences mainly pick up disparities in family background. In other words, this evidence suggests that families still play a dominant role in determining young people’s educational attainments.

Overall, it seems that the most promising education interventions should try to identify the most ‘hard-to-reach’ pupils and address not only what goes on when they are at school, but more broadly tackle the disadvantages that these children carry with them when they come to school.



Families still play a dominant role in determining young people’s educational attainments



Olmo Silva is a lecturer in real estate economics and finance at LSE and a research associate in CEP's education and skills programme.

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The most promising interventions should seek to address the disadvantages that 'hard-to-reach' children bring to school



in brief...

Every child matters? The impact of 'special educational needs' programmes

There is much debate in education about remedial policies for pupils with learning difficulties. **Sandra McNally** and colleagues provide the first comprehensive evaluation of 'special educational needs' programmes, the highly decentralised policy adopted in England and intended to address the specific difficulties of each of these children.

Around one in five pupils in England benefit from 'special educational needs' (SEN) programmes. These consist of asking schools to identify pupils with learning difficulties and having them adapt teaching to their specific learning difficulties with the help of the SEN Code of Practice.

Led by a SEN coordinator, interventions are decided and conducted at school level and include one-to-one tuition and teaching assistance. The SEN team typically receives resources from the school budget to address the needs of SEN students. The amount of funding dedicated to SEN pupils is decided by the school. Overall SEN expenditure amounts to about £1,400 per SEN pupil on average (although this varies between schools). Notionally, this is about 30% of overall school funding per targeted pupil.

SEN programmes are designed to address the specific difficulties of each pupil. They are targeted at individuals, rather than whole classes or schools. But while this is potentially an attractive feature of the policy, it may also generate individual stigma and, by labelling pupils with relatively minor difficulties as 'SEN', could be counterproductive.

The second basic feature of SEN programmes is that they are largely defined at the local level by head teachers. The obvious advantage of such decentralised policies is that they can better take account of local constraints and better use local resources.

One potential issue is that the policy may become context-specific. For example, a child with significant learning difficulties may nevertheless not have access to a remedial

programme if she attends a school where there are a lot of children with learning difficulties of whom only a proportion can be funded by the SEN budget. Conversely, a child with only moderate learning difficulties may have access to a remedial programme in a school where very few have learning difficulties.

To what extent is access to SEN programmes context-specific and what is the net effect of such a highly decentralised programme on pupil performance? Our research sheds light on these fundamental issues using the National Pupil Database conducted in England each year since 2002.

First, we show that there are very significant inequalities in the probability of being labelled as SEN across children with similar learning difficulties at age 7 but attending different schools. Importantly, these differences are much less significant for pupils who achieve relatively good performance or relatively poor performance early on in primary school than for pupils in between these two extremes.

Pupils who achieve relatively good performance at age 7 are almost never labelled as SEN regardless of their school context. Similarly, pupils who achieve very poor performance at age 7 are almost always labelled as SEN regardless of their school context.

In contrast, the gap in access to SEN is very significant for pupils with moderate difficulties. These pupils are much more often labelled as SEN when they attend a 'high-context' school (where the average level of age 7 test

School context generates huge differences in access to resources for children with moderate learning difficulties early on in primary school

There is no net effect of being labelled as SEN ('special educational needs') on the performance of pupils with moderate difficulties

attainment is relatively high) than when they attend a 'low-context' school. The decentralised design of SEN policy generates significant inequalities in access to remedial resources across children with similar (moderate) difficulties at age 7.

Second, we show that, surprisingly, the specific inequality across schools in access to SEN resources for pupils with moderate difficulties early on in primary school does not generate any specific variation in academic performance at the end of primary school. In other words, the school context generates huge differences in access to SEN resources for children with moderate difficulties early on in primary school (compared with other types of children), but no difference at all in performance at the end of primary school.

This result suggests that there is no net effect of being labelled as SEN on the performance of pupils with moderate difficulties. Thus, SEN programmes do not have the desired effect of improving the attainment of targeted pupils, relative to their situation had they not been

targeted. In our study, this 'null effect' is identified for children with less serious 'special needs' (who make up a large proportion of the overall SEN population).

The analysis suggests that remedial programmes are not working for a significant proportion of children labelled as SEN. The UK government has endorsed an 'every child matters' policy agenda. Our results suggest that the means through which this is realised for vulnerable children needs to be reconsidered.

This article summarises 'Every Child Matters? An Evaluation of "Special Educational Needs" Programmes in England' by Francois Keslair, Eric Maurin and Sandra McNally, a forthcoming CEE Discussion Paper.

Francois Keslair, who is currently visiting CEP is a PhD student at the Paris School of Economics. **Eric Maurin** is a professor at the Paris School of Economics and a CEE research associate. **Sandra McNally** is director of CEP's education and skills programme and a deputy director of CEE.



Increasing numbers of teachers have been moving into the independent sector in recent years. **Richard Murphy** and colleagues examine whether this has been driven by differences in pay or differences in working conditions compared with state schools.



Going private:

the competition for independent and state school teachers

Pivate schools in Britain have a longstanding history of influence and power. Yet very little research has been done on how these schools affect the economy, especially in the labour market for teachers.

Our research looks at the differences between the two sectors and shows that there has been an increasing flow of teachers from the state sector to the private sector. This has been caused not by differences in pay but by differences in working conditions.

The private educational sector currently teaches 7.5% of pupils in England, the same proportion as in 1990. But while the share of pupils has remained constant, the share of teachers employed in private schools has been increasing and now stands at 14%. Hence the gap in terms of pupil-teacher ratios has been widening: the private sector now has an average of 9 pupils per teacher; the state sector average is 18.

Fee-paying schools not only employ more teachers per pupil but also have more teachers with a postgraduate degree. This gap has also been growing. In the period since 2000, 60% of male teachers in the private sector had a higher degree compared with 45% in the state sector.

So where is the private sector getting these teachers from? Using information from the Independent Schools Council's annual census, we find that the state sector is an increasingly important source of teachers. The net annual flow of teachers from public to private has quadrupled over the last 15 years, rising from 400 in 1993 to 1,600 last year.

These transfer rates imply that a quarter of the 48,000 teachers in



Independent schools have an average of 9 pupils per teacher; the state sector average is 18

independent schools have once worked in the state sector. This represents a substantial transfer of skills and experience from the state sector, which usually goes unnoticed.

We explore the reasons why a teacher would move from the state sector to the private sector, first looking at earnings and second at working conditions. Using data

from the Labour Force Survey and the British Household Panel Survey, we compare the average hourly wages and weekly earnings for teachers in both sectors.

We find that the hourly rate for both male and female teachers is largely the same across sectors (see Table 1). But controlling for other teacher characteristics, such as work experience, qualifications and region, female teachers in private schools are actually paid less per hour and per week than a comparable teacher in the state sector. For male teachers, there is no significant difference between the sectors.

The one group of teachers that are paid relatively more in private schools are those educated in 'shortage subjects', such as maths or science, and hence likely to teach those subjects. According to our results, male and female teachers

Table 1:

Comparing the average (mean) pay of male and female teachers in the state and independent sectors

	1996-2000		2001-2005	
	State	Independent	State	Independent
Male				
Real gross hourly wage	£13.00	£13.10	£13.90	£14.20
Real gross weekly pay	£573.90	£610.00	£634.70	£704.10
Female				
Real gross hourly wage	£11.80	£11.30	£12.70	£12.50
Real gross weekly pay	£469.00	£421.00	£517.90	£503.00

The independent school sector is gaining far more teachers from the state sector than it loses



This article summarises 'Competition for Private and State School Teachers' by Francis Green, Stephen Machin, Richard Murphy and Yu Zhu, CEE Discussion Paper No. 94 (<http://cee.lse.ac.uk/cee%20dps/ceedp94.pdf>) and *Journal of Education and Work* 21(5): 383-404 (November 2008).

Richard Murphy is a research economist in CEP's education and skills programme. **Stephen Machin** is research director of CEP and professor of economics at University College London. **Francis Green** and **Yu Zhu** are at the University of Kent at Canterbury.

educated in a shortage subject earn 15% more per week compared with their state counterparts. This premium suggests that the private schools are using their greater pay flexibility to help attract teachers in these subjects.

At the same time, over the past decade or so, the state sector has managed to reduce the gap in the proportion of teachers with a degree in a shortage subject – from 7 to 2 percentage points – through such measures as 'golden hellos' for student teachers trained to teach these subjects.

Given the absence of differences in earnings, we turn to variations in working conditions as possible explanations for the teacher flows. We find that in the late 1990s, teachers at private schools got on average 10 more days holiday per year and worked half the amount of overtime per week. These differences have diminished more recently with teachers at private schools having to do more unpaid overtime and receiving fewer holidays, while the state sector has remained constant.

We also analyse information on satisfaction with different aspects of the job. This reveals that private school teachers are more satisfied with their jobs than those in the state sector, although the difference between the two sectors has narrowed since 1997.

Over time, state school teachers have become more satisfied with their total pay and job security compared with those in the private sector. In terms of satisfaction with the work itself and hours worked, the private sector has maintained its lead although the gap has narrowed. These higher levels of satisfaction are likely to be the key elements explaining the flow of

teachers from the state sector to the private sector.

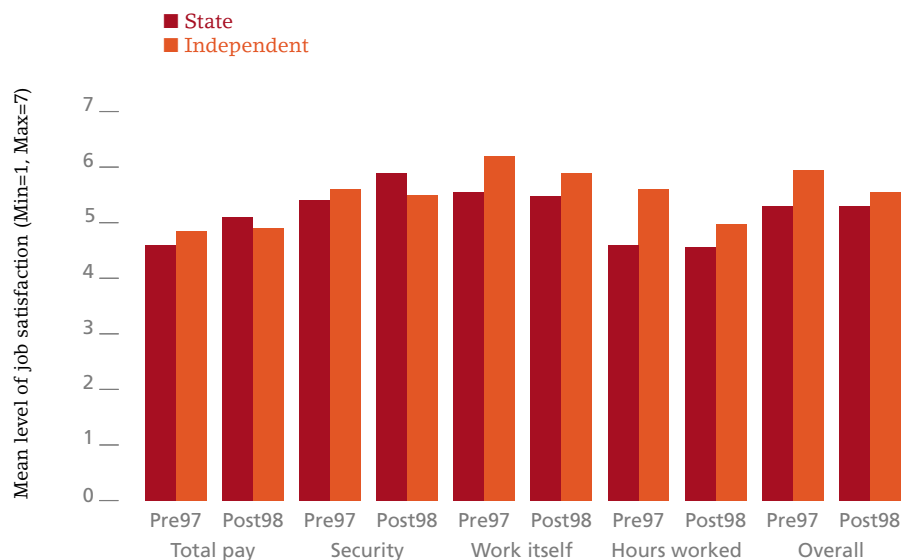
Our research shows that the state sector is a major and increasing source of supply of teachers for the independent sector. The way in which teachers are attracted is not through wages – with the possible exception of shortage subjects – but through superior working conditions.

This comes in the form of smaller classes, better infrastructure, the lack of regulation and probably the type of pupils they have to teach. It is very difficult for the state sector to compete along these lines. Although we have seen a narrowing of the differences between the two sectors, private schools still remain more attractive to some teachers in the state sector and hence the flow of teachers continues.

Teachers are attracted to the independent sector not through wages but through superior working conditions



Figure 1: Comparing the job satisfaction of teachers in the state and independent sectors



in brief...

Dropping out of school: the impact of US exit exams

What is the difference between barely passing and barely failing an exam? Technically, just mere points. But for American school children taking high school exit exams (which pupils in some states need to pass to get a regular high school diploma), it can mean the difference between graduating and dropping out, even when there are opportunities to retake the test. These are the findings of a study by **Dongshu Ou**.

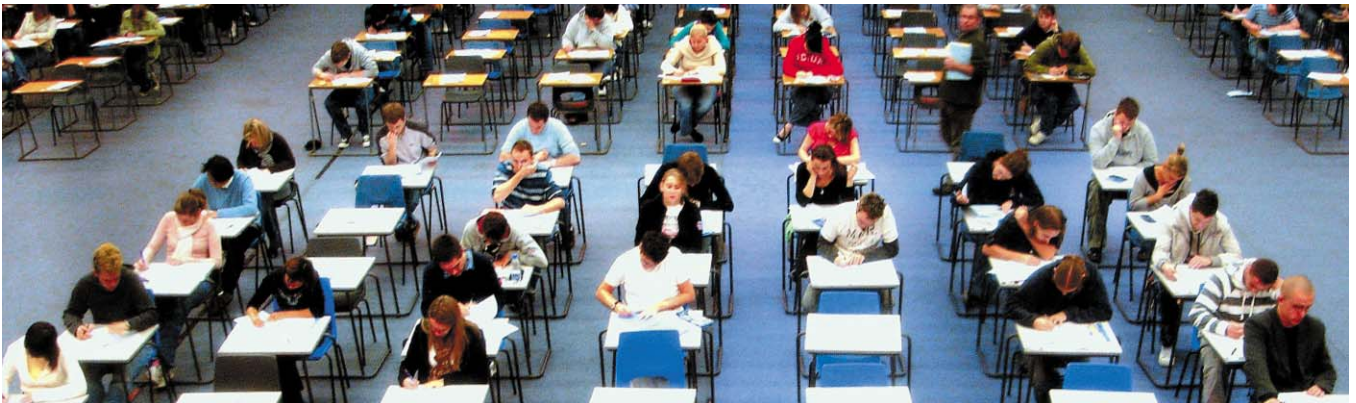


Photo: Jack Hynes

The high school exit exam is rapidly becoming a standardised assessment procedure for educational accountability in the United States. In 2007, pupils in 23 states were required to pass an exit exam to obtain their high school diplomas. By 2012, an additional three states will have the requirement.

The exams were initially introduced to verify that children leaving high school had mastered the core curriculum. But there is controversy over whether the exams stimulate pupils' motivation and enhance learning – or whether they prevent some pupils from graduating. There is also concern that the potential gain of high-stakes testing comes at the cost of increasing inequality between different social groups.

Ou's study analyses test results for pupils in their penultimate ('junior') year who took the New Jersey High School Proficiency Assessment between 2002 and 2006. Pupils have three opportunities to pass the state's maths and language arts exit exams. There is also an alternative graduation test at the end of twelfth grade (the final or 'senior' year), which pupils can take if they fail the three previous exams.

Ou finds that despite having the opportunity to retake the exam, pupils who barely failed one of the tests have a higher probability of dropping out than pupils who barely passed. This effect is especially pronounced for children from poor and minority ethnic backgrounds. Barely failing the English test also causes a more than 10% increase in the likelihood of leaving school for pupils with limited proficiency in the English language.

It seems natural that exit exams will cause some pupils to drop out. But Ou's findings point to one of the unintended consequences of the move towards test-based school accountability – the disproportionate dropout rate among disadvantaged children.

The study also highlights the importance of investing resources effectively. Pupils who barely fail the exam may drop out if they are discouraged by the result given their efforts. But they also may drop out because of the high perceived cost of preparing to retake the exam when few remedial resources are available or schools fail to provide sufficient information on the retake opportunities and alternative ways to graduate.

Ou concludes that allocating additional resources to counsel children who barely fail the exams and assist them in passing a retake (lessening the stigma of failing the exam and informing them about retake opportunities) could go a long way towards reducing their risk of dropping out. She also emphasises the need for further evaluation of the exit exam policy to provide a solid background for reforms currently under consideration in various states.

This article summarises 'To Leave or Not to Leave? A Regression Discontinuity Analysis of the Impact of Failing the High School Exit Exam' by Dongshu Ou, CEP Discussion Paper No. 907 (<http://cep.lse.ac.uk/pubs/download/dp0907.pdf>) and forthcoming in *Economics of Education Review*.

Dongshu Ou is a research economist in CEP's education and skills programme.

in brief...

Gender differences in test scores

Do boys and girls differ in their intellectual and cognitive abilities and, if so, in what way? **Stephen Machin** and **Tuomas Pekkarinen** investigate the phenomenon of 'higher variance' in boys' educational performance.

There is considerable debate about possible differences between boys and girls in terms of both their average educational performance and variability around the average.

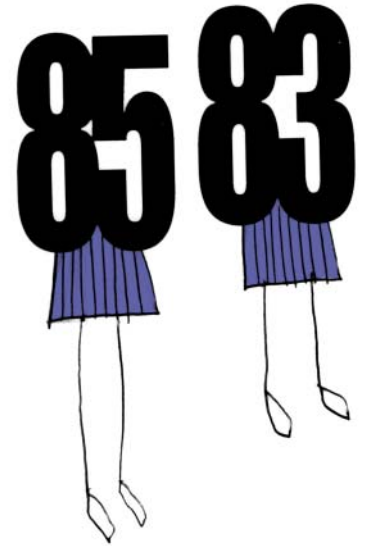
Recent cross-country research has shown that there are no systematic gender differences in average (mean) test scores (Guiso et al, 2008). But what about gender differences in the variance of test scores?

A new study by Stephen Machin and Tuomas Pekkarinen investigates whether the phenomenon of 'higher variance' is an accurate characterisation of boys' educational performance relative to girls, using data from the OECD's Programme for International Student Assessment (PISA), a survey of 15 year olds enrolled in full or part-time education in 41 industrialised countries.

The researchers analyse test scores in maths and reading by country, focusing on differences in the mean and variance of the scores. For reading, they find that the boy-girl mean difference is negative in all 41 countries, indicating that girls generally outscore boys. In 35 out of 41 countries, the boy-girl variance ratio indicates that boys' scores have greater variance than girls' scores.

For maths, the boy-girl mean difference is positive, which indicates that boys generally outscore girls. In 37 of 41 countries, the boy-girl variance ratio indicates that boys'

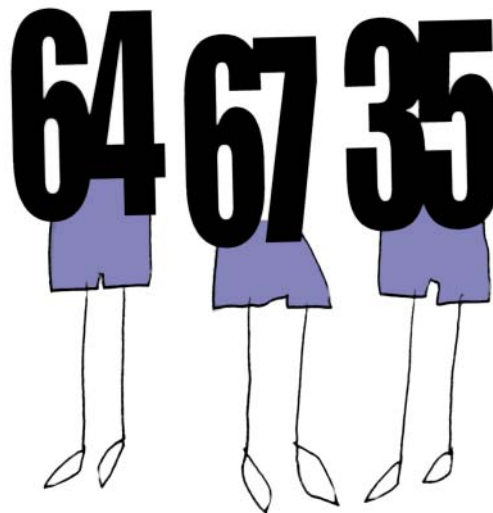
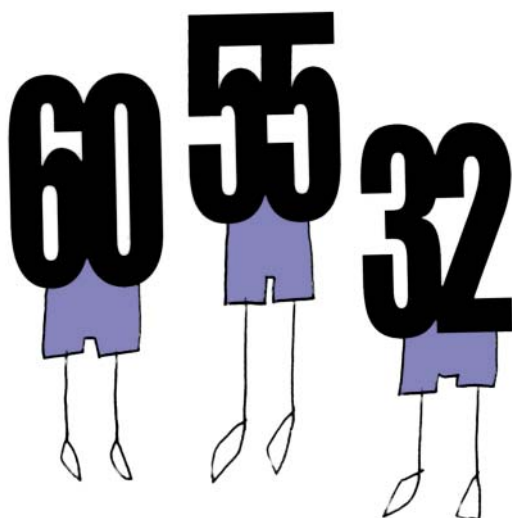
International testing results show greater variance in boys' scores than in girls' scores

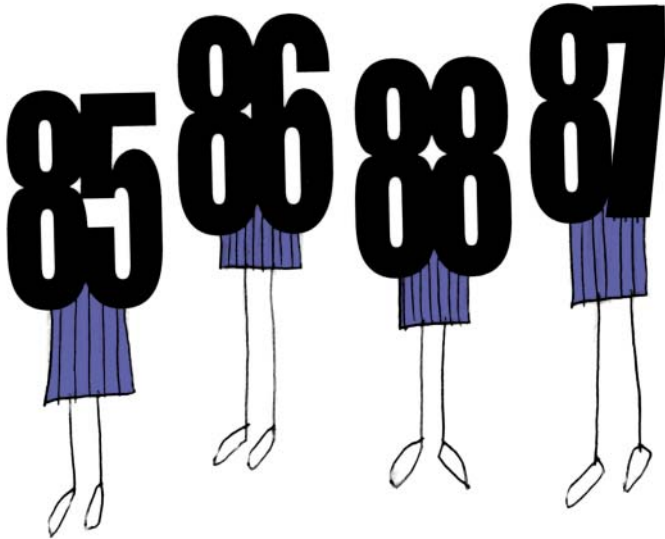


scores have greater variance than girls' scores.

There are differences for the two tests. On both the maths and reading tests, boys predominate in two of the four extreme scoring categories – low reading, high maths – while girls predominate in the high reading and low maths categories. For maths, in 35 of the 41 countries, there are more boys than girls in the top 5%. For reading, 36 of 41 countries have more girls than boys in the top 5% of scores, and 39 of 41 countries have more boys than girls in the bottom 5% of scores.

For both reading and maths tests in all 41 countries, the





The gender difference in variance is higher in countries with higher levels of test score performance

boy-girl variance ratio is positively correlated with the mean test score performance. In countries with better test score performance, the boy-girl variance ratio is significantly higher than in countries where the children score more poorly.

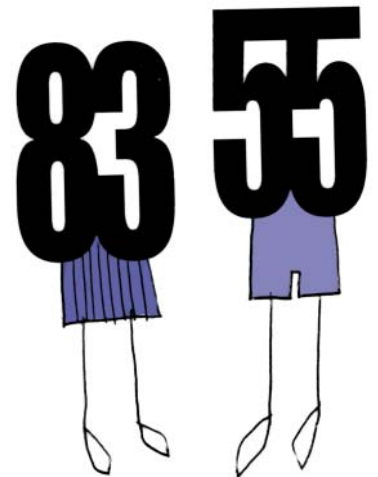
But unlike the relationship between a country's gender gap in average test scores and its outcome on an index of women's emancipation, the Gender Gap Index of the World Economic Forum (detected by Guiso et al), this study finds no relationship between the Gender Gap Index and the variance ratios for either maths or reading.

So this analysis of international test score data shows a higher variance in boys' than girls' results on maths and reading tests in most OECD countries. How this translates into educational achievement is a matter open for discussion.

Higher variability among boys is a salient feature of reading and maths test performance across the world. This difference in variance is higher in countries that have higher levels of test score performance.

Gender differences in means are easier to characterise: it is evident from the PISA data that boys do better in maths and girls do better in reading. This has a compositional effect on the variance differences. The higher boy-girl variance ratio in maths comes about because of an increased prevalence of boys in the upper part of the distribution. But the higher variance in reading is due to a greater preponderance of boys in the bottom part of the test score distribution.

Because literacy and numeracy skills are important determinants of later success in life – for example, in terms of earning higher wages or getting better jobs – these differing variances have important economic and social implications.



This article summarises 'Global Sex Differences in Test Score Variability' by Stephen Machin and Tuomas Pekkarinen, *Science* 28 November 2008: Volume 322(5906): 1331-2 (<http://www.sciencemag.org/cgi/content/full/322/5906/1331/DC1>).

The other study mentioned is: 'Culture, Gender and Math' by Luigi Guiso, Ferdinando Monte, Paola Sapienza and Luigi Zingales, *Science* 30 May 2008: Volume 320(5880): 1164-5.

Stephen Machin is research director of CEP and professor of economics at University College London. **Tuomas Pekkarinen** is a research fellow at the Helsinki School of Economics.

in brief...

Benefits of compulsory schooling

Raising the school leaving age – as the UK government is currently proposing to do – may increase regional mobility and improve the employment outcomes of the least educated segment of the population. As a consequence, the policy may help with pockets of high unemployment across the country. These are the implications of research by **Panu Pelkonen** and colleagues.

The study reviews levels of education and regional mobility across the developed world, and finds a strong positive correlation between the two. In general, the United States has the highest educated workforce, which is also highly mobile. And in Europe, there is a clear division between a more mobile and more educated Northern Europe and a less mobile and less educated Southern Europe.

In an analysis of a school reform in Norway, the research also finds a causal link between the length of compulsory schooling and regional mobility. The reform, which was implemented in different parts of the country at different times during the 1960s and 1970s, increased the minimum years of schooling by two – from seven to nine.

The researchers find that the people who benefited from longer compulsory schooling were more likely to leave their place of growing up, were more likely to be employed and commanded higher wages. On average, they were also more likely to migrate to a larger city compared with those who received shorter compulsory schooling.

The measurements in the study indicate that one additional year of compulsory schooling increases the annual rate of regional migration of individuals by 15%. The sample used in the study, which consists of middle-aged people with the lowest educational qualifications, had a 1% annual likelihood of moving from one region to another. Thus, one additional year of education would lift this to 1.15%. The size of the estimated effect is large enough to explain the observed international differences in levels of education and regional mobility.

In addition to increasing an individual's regional mobility, there are other benefits. One additional year of



Individuals who benefit from longer compulsory schooling are more likely to leave where they grew up, more likely to be in work and higher paid

compulsory schooling leads to 8% higher annual wages, and a 6% lower likelihood of not being employed in any given year. The effects are similar for men and women.

Overall, the study suggests longer compulsory schooling brings about these advantages by increasing the level of marketable skills and broadening the range of job opportunities for those who would not continue their schooling in the absence of compulsion.

Whether positive effects of a similar size as in Norway could be expected from a further increase in the school leaving age in the UK is uncertain. Work by Colm Harmon and Ian Walker has found

that previous rises in the school leaving age in the UK – from 14 to 15 in 1947 and from 15 to 16 in 1973 – have been associated with large wage returns of up to 16% per year of schooling. Regarding the effect on regional mobility, there are no existing studies for the UK.

Diminishing returns to education suggest that the effects in the UK might be smaller since the planned reform would affect older pupils than in the Norwegian reform or the earlier reforms in the UK. But there is a counter-argument: by most accounts, the average returns to education have been higher in the UK than in Norway, suggesting that the economic benefits of a later school leaving age could also be larger.

This article summarises 'Education and Mobility' by Stephen Machin, Panu Pelkonen and Kjell Salvanes, CEE Discussion Paper No. 100 (<http://cee.lse.ac.uk/cee%20dps/ceedp100.pdf>).

Stephen Machin is research director of CEP and professor of economics at University College London. **Panu Pelkonen** is a research officer at the Spatial Economics Research Centre at LSE. **Kjell Salvanes** is professor of economics at the Norwegian School of Economics and Business Administration.

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Paul Krugman is centenary professor at LSE and professor of economics and international affairs at the Woodrow Wilson School, Princeton University. In 2008 he was awarded the Nobel Prize in Economic Sciences.

Dates: Monday 8 June, Tuesday 9 June and Wednesday 10 June, 6.30-8pm each night

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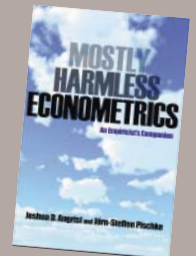
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Jörn-Steffen Pischke
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