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Human Capital and Growth: A Focus on Primary and Secondary Education in the UK

“Launch Version¹”

Nitika Bagaria, Novella Bottini and Miguel Coelho

Prepared for the Growth Commission

¹ **PRELIMINARY VERSION—Not to be quoted or cited. This paper was produced by the Growth Commission’s Secretariat to inform the thinking of the Commissioners. The analysis does not necessarily reflect the views of the Commissioners. In contrast, the proposals are those of the Growth Commission report.**

Acknowledgements

We are grateful to a large number of people for kindly submitting written or oral evidence to the Secretariat and the LSE Growth Commission. In no specific order, we are particularly grateful to Simon Burgess, Oliver Clifton-Moore, officials at the Department for Business, Innovation and Skills, Peter Dolton, Eric Hanushek Sandra McNally, Stephen Machin, David Madsen, Richard Murphy, the OECD, Olmo Silva, Anna Vignoles, Dylan Wiliam, Ludger Wößmann, and Gil Wyness. We are also thankful to Anna Valero for providing useful comments on previous versions of this paper, to Jo Cantlay and Linda Cleavelly for the logistical support.

The views expressed here do not necessarily reflect the views of the individuals or institutions mentioned above.

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Executive Summary

- Economic theory and evidence shows that in the long-run human capital is the critical input for growth. Increasing the quality and quantity of skills for those at the lower end of the ability distribution will raise both growth and equity, making it a particularly desirable policy.
- High quality teaching is the key way of improving schools' education outcomes, much more so than extra resources, higher teacher wages or class size reductions.
- While indicators of average educational outcomes in the UK tend to show significant improvements, they mask the fact that the UK has a long tail of poor (secondary) education performance compared to other countries. This holds back growth and social mobility.
- The link between children's socio-economic background and their education performance (i.e. the socio-economic gradient) is particularly steep in the UK, which helps to explain the long tail of poor achievement.
- Disadvantaged children are spread around many schools, and generally perform poorly compared to their wealthier peers even in better schools. Nevertheless, because disadvantaged children tend to be concentrated in poor areas, improving schools in those areas will lift educational outcomes of less privileged kids relative to their wealthier counterparts.
- Thus, putting better teachers in front of disadvantaged kids can go a long way in closing the gap between children from disadvantaged and non-disadvantaged backgrounds.
- Dissemination of high quality teaching through the school system depends fundamentally on school incentives:
 - Performance measures have consequences for school behaviour. Schools tend to focus on improving the attainment of particular groups of children according to incentives determined by demand and by the regulatory assessment framework;
 - There is increasing evidence that school autonomy *combined with* a strong accountability framework is associated with improved school performance. Giving schools more freedom might enable them to respond to local circumstances and become more innovative;
 - Choice and competition combined with autonomy/accountability creates improved standards. Competition by itself is likely to have small effects, especially for disadvantaged children.
- The incentives for schools to focus on the performance of children from disadvantaged backgrounds are weak:
 - Parental choice is seriously constrained by the schools' admission code. Empirical evidence suggests the ability to choose schools is mainly a prerogative of the most privileged families;

- Supply side rigidities prevent popular schools from expanding and unpopular schools from contracting or “exiting” the system, such that, in practice, schools have a guaranteed intake, regardless of their performance;
 - The achievement of disadvantaged children is too diluted in the regulator’s framework for schools inspection. Government targets aimed at addressing poor school performance (the so-called “floor targets”) are flawed as they don’t focus on the “lower tail” within schools. They fail to allow for the fact that disadvantaged children are underperforming across the vast majority of the school system, not just in underperforming schools.
- School autonomy is still limited: although the UK scores highly in autonomy compared to others and the proliferation of *academies* helps, a great number of schools still operate under constrained managerial autonomy, due to local authority restrictions.
 - There are deficiencies in teacher recruitment and training: selection into teacher training is tight at the beginning of the course but negligible thereafter. The policy direction of tightening academic entry requirements into teaching is not helpful: it restricts the quantity of recruits and has no significant impact on average teaching effectiveness.
 - The funding system is opaque and inefficient: empirical evidence suggests the resources that central government notionally targets at disadvantaged children fail to effectively reach them. The intermediation provided by local authorities using their own funding formulae is one of the main culprits.
 - UK education policy has traditionally lacked rigorous, independent evaluations. Some positive steps have been taken in this direction with the creation of the Education Endowment Foundation.
 - **Policy Recommendations:** Growth depends on improving human capital and this starts with higher quality teaching in schools. We propose a flexible system for education, which gives schools greater autonomy and the ability to grow within a national accountability framework that places a premium on radically raising the standards of the bottom ability group. Together with improved choice for parents, better quality information (across the entire distribution of achievement) and more effective incentives for teachers and schools, this will improve the quality of teaching.

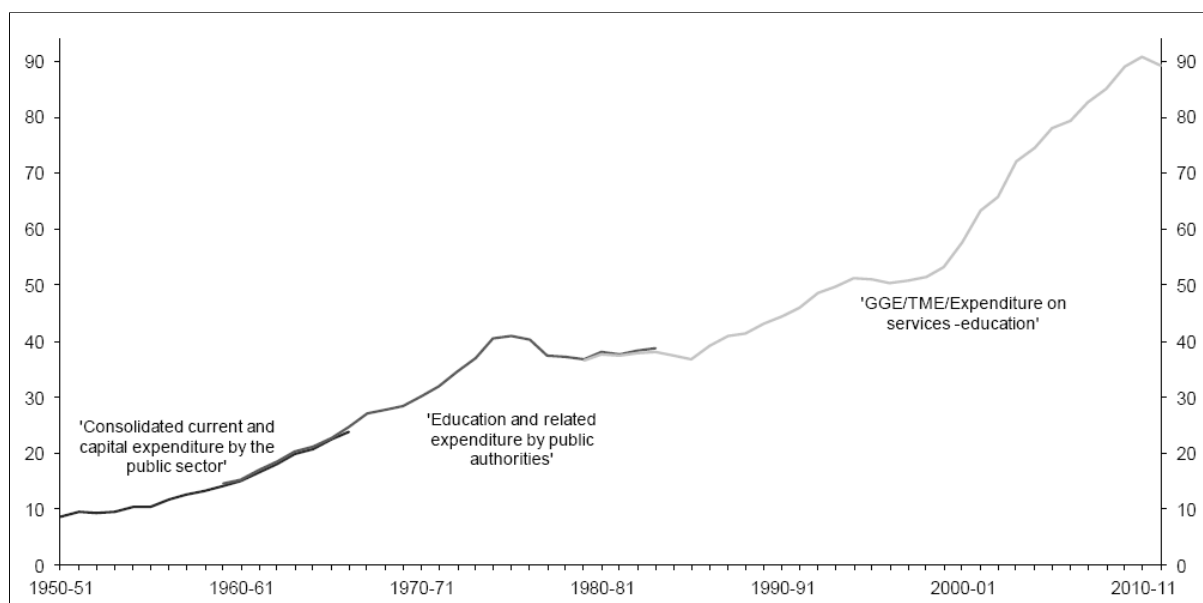
1. Human Capital in the UK

School spending per UK pupil has risen sharply over the last ten years. While national indicators of average educational outcomes show significant improvements, these indicators mask the fact that the UK is performing poorly at the lower end of the educational distribution

1.1 Educational Expenditure in the UK

Figure 1 tracks education spending per pupil in real terms in the UK since 1950. Real spending levels have increased steadily from the early 1950s to the mid-1970s. After this period of continuous increase –the longest so far - spending fell during the periods 1976-77 and 1979-80. The first half of the 1980s was characterized by flat levels of real spending, and mid-1970s levels of expenditure were only returned to in the late 1980s. As figure 1 shows the largest annual increases occurred during the 2000s. The real increase in the 11 years to 2010-11 was just over two-thirds (Bolton, 2012).

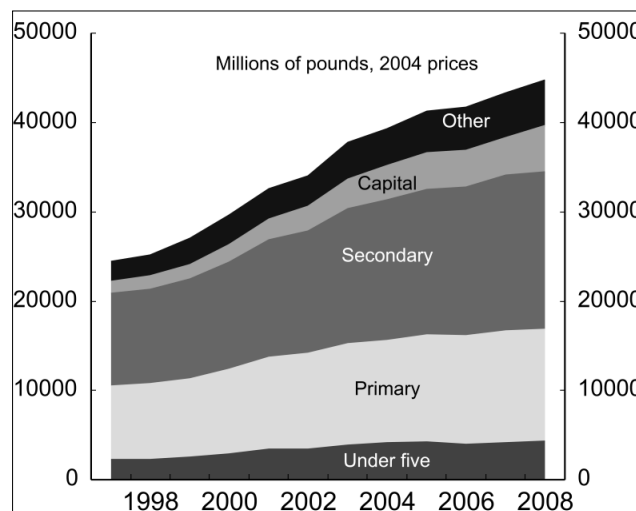
Figure 1: UK Real Public Expenditure on Education, £ 2011-12 prices



Note: Between 1950-66 the series used is the 'Consolidated current and capital expenditure by the public sector'. It excludes spending on school meals and milk. Between 1960-86 the series used is the Education in the UK series 'Education and related expenditure by public authorities'. This series includes expenditure on teacher training and the youth service. Between 1980-current, the series used are the General Government Expenditure (until 1982-83), Total Managed Expenditure (until 1987-88); expenditure is calculated on a resource basis from 2000-01.

Looking closely at the primary and secondary school sectors, we find that real spending per pupil in these sectors in the UK has increased by 4.8 per cent per annum between 1997-98 and 2009-10, leaving spending per pupil significantly above the OECD average. As Figure 2 shows, since 2000, total real school spending has increased by about 40 per cent in real terms for both primary and secondary schools.

Figure 2: Education expenditure by sector in England



Source: OECD (2012)

The increase in expenditure has partly been used to bring pupil-teacher ratios down. Pupil-teacher ratios fell from 18.6 in 1997 (for all schools) to 16.9 in 2008 yet the UK still has high primary class sizes compared with other OECD countries (McNally, 2010). Teachers' salaries are the other large determinants of variations in instructional expenditures.

1.2 Educational outcomes in the UK

In this section, we document the level of educational attainment in the UK in the recent years. Further, outcomes of different groups within the UK are compared – specifically, the educational attainment of disadvantaged children is compared to that of their wealthier counterparts. In addition, we benchmark to international comparators where possible.

Education performance in UK is commonly measured by the percentage of pupils attaining five or more GCSEs (Key Stage 4) at grades A*-C at the end of compulsory schooling. Taken at face value, national indicators suggest that performance in GCSEs has been improving. However, there is a concern that at least some of this could be due to students taking easier subjects, grade inflation or 'teaching to the test'. This prompts us to look at how UK performs internationally.

There are three international tests for evaluating performance in education²: Progress International Reading Literacy (PIRLS) that is available for the years 2001 and 2006 for pupils of about 10 years old;

² A new indicator has been recently published by the Economist Intelligent Unit: "The Learning Curve". This measure is based on the existing indexes but adopt a wider prospect by adding new criteria such as graduation rates, adult literacy and the effect of years in school on productivity. The new results don't change the ranking at the top: Finland, South Korea and Hong Kong are the best performing countries, followed by Japan and Singapore. But other countries sharply changed their ranking position. Britain, for example, gained sixth place in comparison to the PISA 2011 classification. As argued by the authors this improvement is due to the fact that the new index includes also universities where UK is a best-performing country. At the same time, this result put in light the large quality gap between compulsory and higher education and the potential negative effect for students that would not attend universities (The Economist, 2013).

the Programme for the International Student Assessment (PISA- which measures cognitive skills of 15-year olds), conducted in 2000, 2003, 2006 and 2009; and Trends in International Mathematics and Science Study (TIMSS) available in 1999, 2003 and 2007 for pupils of about age 10 and age 14 (that is, years 5 and 9 in England). The latest PIRLS results put England significantly above the international average of 10 year olds in terms of their reading abilities. But England's performance is below some major European countries (including Italy and Germany) and it has worsened since 2001. The PISA study places the UK close to the OECD average, behind strong performers such as Finland and the Netherlands in 2009. There has also been a small decline in UK performance in PISA between 2006 and 2009³ (McNally, 2010).

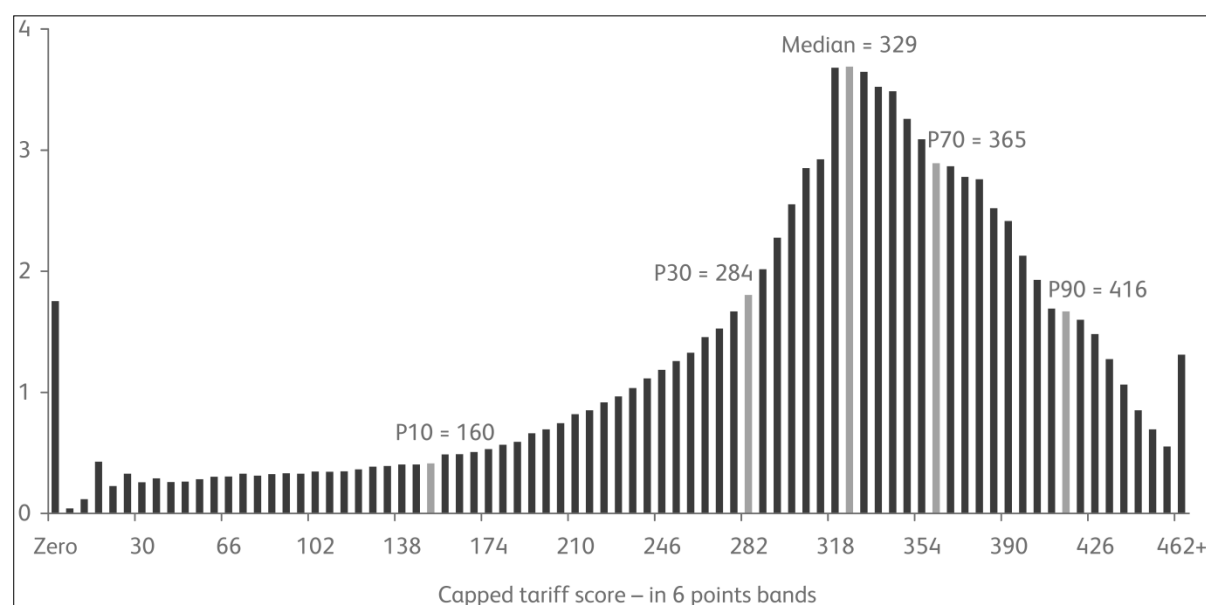
With regards to measures of secondary school performance, TIMSS is closer to what is checked in national key stage tests and more curriculum-based, while PISA measures the application of knowledge in everyday situations. In TIMSS, England is one of the highest performers and there has been an increase in test scores over time. Thus, international tests attest the improvement in overall performance at the secondary school level in the UK.

1.2.1 The UK's long tail of poor achievement

One of the most striking features of educational outcomes in the UK is the high frequency of low performers. GCSE results (key stage 4) show a 'long tail' of low achievement amongst 16 year-olds (Figure 3). This has been a persistent feature of the UK education system and a continuing policy concern. The UK also does worse than other countries in the proportion of the population aged 24-35 with upper level secondary qualifications - equivalent to GCSE passes at A*- C or above (McNally, 2012).

³ Unfortunately, PISA is not best suited for comparing trends over time because of problems the English entries in 2000 and 2003.

Figure 3: Key stage 4 (GCSE) results, England, 2008: Percentage with results in each band of total GCSE points



Source: DfE. Results are for maintained (state) schools only.

Note: Total points 'capped' by DCSF to show those from a pupil's best 8 GCSE (or equivalent) passes at age 16. The system awards 16 points for a pass at G, 22 for an F, up to 52 for an A and 56 for an A*.

This result is confirmed by the PISA data which show significant performance variability within the UK (OECD 2010). Table 1 shows the proportion of pupils at each level of performance compared to other countries. High-performing countries such as Korea and Finland have a narrower range of scores overall. The OECD finds that in the UK, the gap between the bottom performers and middle performers is bigger than the gap between the middle performers and the top performers (OECD 2010)⁴. In this respect, the UK closely mirrors the OECD average. In other words, there is a bigger gap created by students falling behind the average score than there is by students pulling away at the top.

Table 1: Percentage of students at each level of the PISA proficiency scale for reading, 2009

	Below Level 2	Level 2	Level 3	Level 4	Level 5	Level 6
United Kingdom	18	25	29	20	7	1
Key Competitors Average*	10	18	30	28	12	2
OECD Average	19	24	30	21	7	1

*Key competitors defined as Australia, Canada, Finland, Korea and Singapore. These were chosen as countries that traditionally score well on PISA and are frequently cited in comparison to UK performance.
Source: Clifton and Cook (2012) using data from OECD 2010

Of particular note in this table is the sheer volume of UK students failing to achieve basic proficiency (level 2). Around a fifth of students failed to reach basic proficiency in reading and maths, which translates to around 113,000 students in England. This group is more than twice as big as the group of students that reached the top two performance levels. Unsurprisingly, high-performing countries

⁴ The gap between the 10th percentile and the median is larger than the gap between the median and the 90th percentile.

do not just have lots of students at the highest levels, but also relatively few students at the lower levels.

A picture therefore emerges of a large pool of 'poor performers' that contributes to UK's overall weak performance in international rankings. The UK therefore faces a *two-pronged challenge* - both to stretch those at the top as well as to raise the performance of those falling behind. In terms of quantity of pupils, the latter is the bigger challenge, with around a fifth of pupils failing to get the basic skills required to succeed in life.

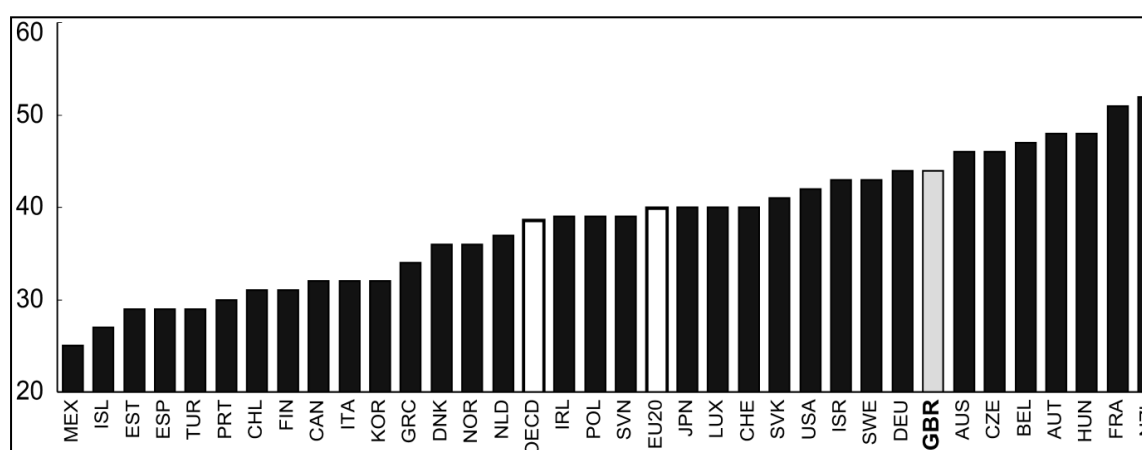
1.2.2 The socio-economic gradient in UK educational attainment

The extent to which the long tail discussed above is driven by socio-economic disadvantage is not directly discernible. The relationship between socio-economic background and educational attainment is called the socio-economic gradient of education. It is a well-established empirical fact that children from disadvantaged backgrounds are over-represented in the group of poor performers while children from wealthier families are over-represented in the group of high performers.

According to the OECD PISA 2009 results (the most recently published), 14 per cent of the variation in student performance in the UK is explained by students' socio-economic background. This is in line with the OECD average but contrasts with Canada or Japan, where the variation is 9 per cent. If we consider the wider family context (including, for example, the immigrant background or the language spoken at home) differences in family background characteristics explain 25 per cent of the differences in performance across UK students – versus 22 per cent in the typical OECD country and 19 per cent in Canada, Finland, Japan, and Korea. These numbers suggest a weaker relationship between socio-economic background and educational inequality in other OECD countries compared to the UK.

The same message from a different perspective is given by Figure 4 which measures the impact of socio-economic background on PISA scores. It shows that UK has one of the highest impacts among the OECD countries. Moreover the share of UK students from weak socioeconomic backgrounds performing well is low: the average PISA score of the worst performing 10 per cent of UK students is below the average for the same group in other OECD countries (OECD, 2012).

Figure 4: Impact of socio-economic background on PISA 2009 reading score



Source: OECD (2012)

Note: Score point difference associated with one unit increase in the PISA index of social and cultural status.

The PISA study also reports on the percentage of “resilient students” - those who come from the lower quartile of the distribution of socioeconomic background but go on to score in the top quartile of PISA test results. On this measure, the UK trails both the OECD average and key competitors, with only 6 per cent of students meeting considered “resilient” according to this criteria.

Schuetz et al. (2005) relate family background to student test scores across countries using TIMSS. Although the gradient is present in most countries, the estimated effect is higher in England than in any other country for this particular survey. Achievement gaps between children from rich and poor backgrounds are evident from a very early age and continue to widen as children grow up. As a result the achievement gap between rich and poor is really significant at age 16 in GCSE results⁵.

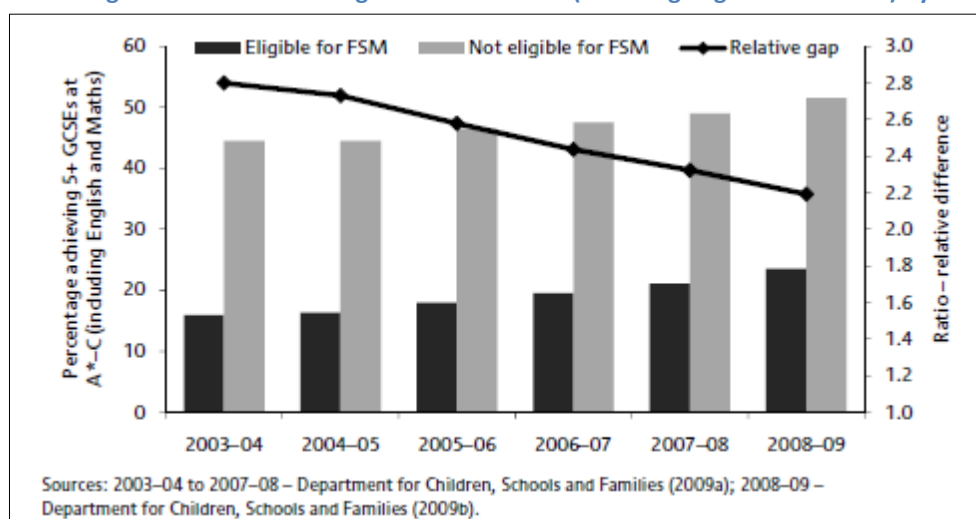
One way to analyse this pattern is to look at the school attainment of children eligible for free school meals (FSM)⁶. In 2008, while half of all children from higher-income families (not eligible for free school meals) achieved five good GCSEs (A*–C) inclusive of English and Maths, less than a quarter of FSM children achieved these grades (Figure 5). However, Figure 5 also shows that this gap has narrowed in relative terms in recent years⁷. Despite the improvement, the current achievement gap is still large and negatively impacts on later-life income and earnings inequalities with the potential risk of being passed on to future generations (Chowdry et al, 2010).

⁵ The fact that these achievement gaps are present even before school suggests that the educational system cannot take sole responsibility.

⁶ Children are classified as ‘eligible’ for FSM in administrative data only if they are both eligible for and claiming FSM. Only families with a low income and no adults in full-time paid work are eligible for FSM. A priori therefore, we would expect FSM ‘eligibility’ to identify children in the lowest income households.

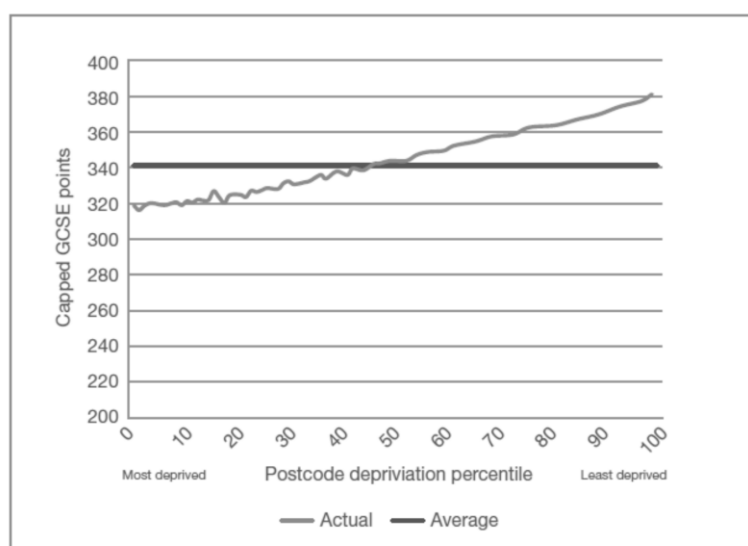
⁷ It is worth noting that only one part of this achievement reflects a real improvement in pupils’ performance owing to the ‘grade inflation’ phenomenon.

Figure 5: Percentage of children achieving 5+ GCSEs at A*–C (including English and Maths) by FSM eligibility



However, the problem is much wider and goes beyond FSM pupils. Indeed, there is a clear and consistent link between deprivation and academic achievement wherever you are on the scale (Figure 6). Those pupils living in the most disadvantaged postcodes score on average 320 points at GCSE (or the equivalent of about eight Cs), and the results gradually improve as you move towards better (least disadvantaged) postcodes. Pupils living in the wealthiest postcodes score on average 380 points or the equivalent of just over eight Bs. It is therefore not possible to identify a particular level of deprivation at which performance falls. This challenges the assumption that programmes targeted towards pupils who are eligible for free school meals will be sufficient to close the gap, as the problem is much wider than just this group of pupils⁸.

Figure 6: Capped GCSE points by postcode deprivation

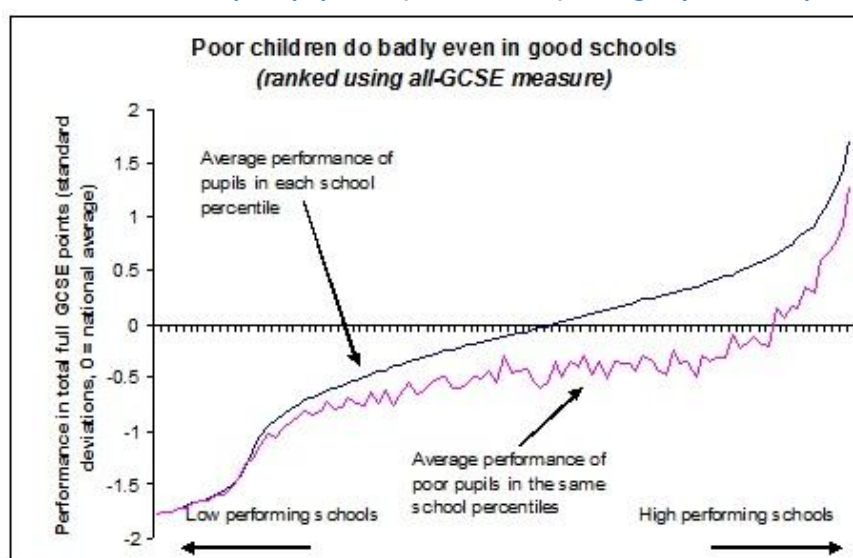


Source: Clifton and Cook (2012)

⁸ Another striking feature of the “long tail” is the higher variability in GCSE results of poorer pupils compared to wealthier pupils. The highest-achieving pupils from disadvantaged postcodes score almost as well as the highest-achieving pupils from wealthier areas (about 40 points less at GCSE). However, low-achieving pupils from disadvantaged neighbourhoods score much worse than low-achieving pupils from wealthier areas (about 120 points less at GCSE).

More importantly, in contrast with popular belief, disadvantaged children are not all concentrated in a small number of poorly performing schools (though of course, generally disadvantaged areas will tend to have larger shares of disadvantaged children than wealthier areas). Disadvantaged children are spread across the entire school system, and perform poorly compared to their wealthier peers in the vast majority of schools. Figure 7 illustrates this problem. The darker line shows the average point score for all pupils in each percentile of schools. The pink line shows the average point score only for poorer children within those schools (those living in the bottom fifth of households, as measured by the deprivation level of the postcode). While the darker line's slope increases rapidly, the pink one is flatter. In other words, the problem is not just that there are a few schools which have all the disadvantaged children in them performing poorly. The problem is also that disadvantaged children perform poorly (compared their wealthier peers) in a vast majority of schools.

Figure 7: Attainment of poor pupils vs. (within school) average by school deprivation



Source: Cook, 2012

In the next two paragraphs, we discuss what are the attributes defining that can be used to identify disadvantaged children. Low income is the attribute of disadvantage that, over the years, has attracted most attention from academics, politicians and the general public. The simple correlation between low income and poor educational outcomes (the so-called socio-economic gradient of education) is long established⁹. Income is often used as a measure of disadvantage for three main reasons: (i) the income gradient gives a measure of educational inequality in its own right; (ii) some other features of disadvantage discussed below are associated with income¹⁰; and (iii) the relationship between family income and education is one of the key drivers of intergenerational income mobility across time (e.g. Blanden, Gregg and Macmillan, 2007).

⁹Rowntree, 1901, Glennerster, 1995.

¹⁰This could be because those features are a causal driver of income; are they caused by income; or both those features and income are commonly determined by a third factor.

A multitude of possible reasons explain why the children of low income families do less well at school; some of these are causal (family income actually influences a child's educational attainment), while others are non-causal (for example, income simply acts as an indicator for many other aspects of disadvantage, such as parental education level or social class). Different studies¹¹ suggest that sustained income shocks do impact on child educational outcomes, and that low household income is likely to be one of the primary drivers behind the developmental deficits of poor children. Adults in low income families may have characteristics that negatively impact on children's educational achievement, such as poorer innate ability; a lower emphasis on educational achievement in parenting; a reduced ability to translate parenting time into educational development; or lower ambitions (Blanden and Gregg, 2004).

2. The Importance of Human Capital

Educational outcomes and human capital formation are among the most important drivers of economic growth. Theoretical models of economic growth have considered different determinants of economic growth and a range of theoretical approaches. The standard neoclassical growth model: Solow (1957) considers the output of the macro economy as a direct function of just its capital and labour (and technological level) in a given period. Augmented neoclassical growth theories, developed by Mankiw, Romer and Weil (1992), include also human capital among the factors of production: a change in the education level induces growth. However, in these models, technology, the key driver of growth rates, is exogenous. A different view comes from the 'endogenous growth' models developed by Lucas (1988), Romer (1990) and Aghion and Howitt (1998) whereby technology is now endogenous to the model. This literature stresses on the role of education in increasing the innovation capacity of the economy through developing new ideas and new technologies. Other macro-models on technological diffusion (such as Nelson and Phelps (1966), Welch (1970) and Benhabib and Spiegel (1994)) argued that education and training facilitate the adoption and implementation of new technologies with positive effect on growth and development.

Empirical analysis based in growth and development accounting models have generally shown that education accounts for a large share of economic growth and development. Growth accounting models (such as Griliches (1970) using US data; Barro and Lee (1993, 2001); Mankiw et al.(1992); Barro and Sala-i-Martin (2004) and more recently Sala-i-Martin, Doppelhofer, and Miller (2004); De La Fuente and Domenech (2006) and Cohen and Soto (2007) using cross-country data) relate educational attainment (both in growth or level) to economic growth - measured as GDP or GDP per capita; while development accounting models seek to explain cross-country differences in income levels and education's role in this¹²(see for example Lagakos et al., 2012; Gennaioli et al 2011).

Human capital has usually been measured as educational attainment, in terms of years of education. More recently, thanks to the development of new datasets, authors have been able to consider different measures, such as making a distinction between entrepreneurs/managers and worker education (Bloom and Van Reenen, 2007; 2010; La Porta and Shleifer, 2008; Syverson, 2011); or

¹¹ E.g. Steven and Schaller (2011) and Gregg et al. (2012) analyse fathers' job displacement; Dahl and Lochner (2012) examine the Earned Income Tax Credit's introduction in the US, and Milligan and Stabile (2011) study the variation in child tax benefits across time and Canadian provinces.

¹² See Hall and Jones (1999) and Caselli (2005) for a theoretical foundation.

considering the quality in education (or cognitive skills) using the PISA, TIMSS results (see Hanushek and Woessmann, 2008 for a review of these studies). These new empirical approaches confirmed the critical role of human capital in the growth and development process of countries, regions and firms.

Hanushek and Woessmann (2007) and Hanushek and Kimbo (2000) emphasise the positive effect of the quality of education, rather than quantity alone on economic growth. Hanushek and Schultz (2012) state that a one standard deviation difference on test performance (100 points on the PISA assessment) is related to a 2 percentage point difference in annual growth rates of gross domestic product per capita. OECD (2010b) estimated that UK would gain more than \$US 6 trillion by increasing its average performance by only 25 PISA points (or by $\frac{1}{4}$ standard deviation). These are obviously long-run calculations, but they do give some indication of the huge potential prize: if the UK could attain the quality of education in Germany or Australia this would put us on a path that would more than double our income per person. Following the more ambitious goal of reaching the Finland's PISA performance, the UK would record a GDP improvement of more than \$US 7 trillion or 3 times the current GDP.

The major criticism of these cross-country analyses is that they show associations between human capital and growth but not necessarily causation – i.e. they do not address issues of endogeneity: estimates of school attainment could reflect reverse causality since improved growth could lead to more schooling rather than the reverse (Bills and Klenow, 2000). Whether or not there is a casual relationship is a very important issue from a policy point of view (OECD, 2010). However, this problem is not easily solved by using standard econometric techniques since the potential instruments for education are often correlated with institutional features (Glaeser et al, 2004). Nonetheless, Hanushek and Woessman (2009) and Gennaioli et al (2011) have tried to account for the endogeneity problem using different estimation methods: although none of these approaches addresses all the critical issues, they provide some assurance that the results are not biased by any of the most obvious problematic issues (OECD, 2010b).

2.1 Human capital inequality and growth

In addition to the overall accumulation of human capital, inequality of human capital within a country is important for growth. Reducing human capital inequality practically means to improve the educational attainments of pupils at the bottom of the distribution, hence focusing on worst-performing students. OECD (2010b) estimate how GDP would improve if OECD countries addressed education inequality by ensuring all students reach a level of minimal proficiency (i.e. a PISA score of 400). Under this scenario that brings up the bottom of the distribution, the present value for UK improvement is more than 6 trillion USD or 2.7 times its current GDP.

Recent literature has pointed at human capital inequality and its influence on demographic variables to explain the negative relationship between human capital inequality and growth. De la Croix and Doepke (2003) and Moav (2005) study the link between human capital inequality and increasing fertility (with negative outcome on growth), while Castelló-Climent and Doménech (2008) focus on how human capital inequality may dampen growth by reducing life expectancy and investment in education.

Some authors analyse the effect of inequality on growth under imperfect credit markets (e.g., Galor and Zeira, 1993; Mookherjee and Ray, 2003) or at different level of country's development. Galor and Zeira (1993) show that in presence of credit markets' imperfections and indivisibilities in investment in human capital, the initial distribution of wealth affects investment in education both in the short and in the long run. With regards to development studies, Castello-Climent (2010) shows that a greater degree of human capital inequality discouraged the per capita income growth rates in most developing countries during the period 1965–2005, where the life expectancy and fertility channels seem to play a prominent role. However the effect disappears in higher income economies. Moreover he finds that the effect is stronger in the countries with access to credit's constraints.

2.2 Human capital inequality and social mobility

As discussed above, disadvantaged students, on average, perform worse than pupils from rich families. Poor educational outcomes for disadvantaged students reduce social mobility later in life, which in turn perpetuates low inter-generational social mobility¹³. Two facts help us understand the size of the problem of educational inequality. Firstly, 24 per cent of UK disadvantaged students are resilient, in the sense that they come from the 25 per cent of the socio-economically most disadvantaged students but perform much better than expected on the base of their socio-economic background (31 per cent is the average in the OECD) (OECD, 2010a). Secondly, it is also true that the odds of a young person from a family with low levels of parental education attaining higher education is at 0.61 in the UK, well above the OECD average of 0.44. This suggests that if socio-economic disadvantages were not allowed to hold back educational attainment, social mobility could be high in the UK.

A series of reports have highlighted the UK's low levels of social mobility, showing how children from poorer backgrounds struggle to gain access to university, enter professional jobs and earn decent wages (see Milburn 2012, Sutton Trust 2011, Blanden et al 2005). This, in turn, means that disadvantages can become entrenched across generations. Low levels of social mobility are rooted in wider changes to the British economy since the 1970s, following the loss of decent jobs at the bottom of the labour market, the professionalization of jobs at the top of the labour market, and an increase in income inequality, which have all combined to make it harder for people to climb the ladder of opportunity (Duncan and Murnane, 2011).

A high level of education has become more important for getting a good job over the past 30 years, meaning those families which are unable to invest in education are left further behind (Lindley and Machin 2012). Education can provide access to many opportunities later in life, and schools can help to create a level playing field for young people as they start out (Clifton and Cook, 2012). Research has identified a causal relationship between high levels of education and a number of outcomes in later life, including higher earnings (Dickson 2009), lower teenage pregnancy (Black et al 2008), healthier behaviours and a lower likelihood of serving a prison sentence (Heckman et al 2006).

¹³ It is important to remember that raising achievement alone is not enough. There also needs to be sufficient demand for these skills and qualifications in the labour market, so that young people can put their education to good use. Recent cuts to post-16 education, a weak youth labour market and the prevalence of low-quality jobs will also have to be tackled for improvements to social mobility to be realised (Lawton and Lanning 2012, Keep et al 2006). Other factors can also be important to social mobility, such as having access to social networks and inherited wealth. Raising achievement in schools is therefore just one piece of a much bigger jigsaw (Clifton and Cook, 2012).

Wide empirical evidence strongly supports the fact that education is one of the major drivers of intergenerational social mobility, particularly income mobility. The United Kingdom has recorded a fall in intergenerational mobility between the cohorts born at the end of the 1950s and those born in the 1970s. Blanden et al, (2004) argue that it was mainly due to a disproportional increase in educational opportunities biased towards individuals from better-off backgrounds.

The link between intra-generational income inequality and intergenerational social mobility is rather complex. Recent evidence (OECD, 2012) shows that higher inequality is associated with lower intergenerational mobility. First of all this can be explained by the fact that with higher wage dispersion allows for higher returns to education and this may benefit individuals whose don't have any constraint to invest in education. Secondly, if income inequality increases the severity of credit constraints, mobility decreases. Thirdly, large differences in educational outcomes raise income inequality and lower intergenerational social mobility. As discussed above, children of high-income (and better educated) parents tend to get better results than their colleagues (Blanden et al, 2007).

3. The Drivers of Educational Attainment: A Review of the Literature

In this section we will briefly discuss the factors that the economics of education has identified as driving educational attainment. A complex inter-play of factors contributes to and cause attainment gaps between advantaged and disadvantaged children. These factors include:

- Broad contextual drivers such as the socioeconomic background of a child (e.g. family income and parental education) and their knock-on effect on home learning environment;
- Pupil-level factors (e.g. having been in care at some stage, having English as another language (EAL) status, Special Educational Needs (SEN)¹⁴ status, mobility and ethnicity. These have a complex relationship with material disadvantage;
- School-level factors that determine the quality of the child's formal learning environment such as teaching, peer composition, resources and the general effectiveness of individual schools in overcoming material barriers.

Recent evidence (Kramarz, Machin and Ouazad, 2009) on the relative contributions of pupils, schools and peers shows that the variance of test scores is mostly explained by the pupil effect¹⁵. The standard deviation of pupil effects is between 4 to 5 times larger than the standard deviation of

¹⁴SEN is a multifaceted classification which brings together children with innate cognitive/learning difficulties and children who are underperforming for reasons other than their innate ability (e.g. strong negative impact of family background and/or poor teaching quality and/or unsupportive peer effects). The first sub-group is defined by a characteristic that puts it at disadvantage. The second sub-group is defined by its (poor) performance level, and may or may not be at disadvantage (depending on drivers of poor performance are family background or other factors). In that sense, SEN conflates discretionary inputs (e.g. teaching quality); non-discretionary inputs (e.g. unsupportive family background); and outputs (e.g. low attainment).

¹⁵ In this context, pupil effects consist of a range of educational experiences pupils carry with them, reflecting parental background, the quality of the schools previously attended, innate ability, etc. This research measures the relative contributions of pupils, schools and peers without restricting the analysis to observable proxies for peers' characteristics or school quality.

school effects¹⁶ - the second largest source of variance in the results. Many other studies suggest that families are much more important¹⁷ than schools and peers in explaining the variance in results (Teddle and Reynolds, 2000; Todd and Wolpin, 2007).

We now consider in more detail the literature on the key factors driving educational outcomes. We start with pupil effects, and then school and teacher effects, and peer effects. Finally, we consider the effects of expenditure.

3.1 Pupil Effects

The finding that pupil effects account for the majority of the variance in test scores implies that the influence of home environment and socioeconomic background on schooling outcomes is very important.

Even before pupils start school, there is a large gap in cognitive ability between children from high and low socio-economic backgrounds. Feinstein (2003) finds significant gaps between children from a high and low socio-economic background in an index of development. Another way to illustrate pre-school gaps is to look at vocabulary skills by gender and ethnic group at the time of school entry. Table 2 shows gaps in the vocabulary skills of five year olds in the Millennium Cohort Study (MCS).

Table 2: Age 5 Differences in Vocabulary by Gender and Ethnicity, Millennium Cohort Study

Ethnic Group	Boys	Girls
White British	55.9	56.5
Black, Caribbean	48.4*	51.0*
Black, Other	44.2*	47.2*
Bangladeshi	40.4*	41.7*
Pakistani	40.6*	40.7*
Indian	49.8*	50.3*
Chinese	41.2*	55.2
<i>Number of Children</i>	<i>4,587</i>	<i>4,452</i>

Source: McNally (2012) Notes: Based on Table 3 of Dustmann, Machin and Schonberg (2010). The vocabulary test is standardised to have mean 50 and a standard deviation of 10. A * denotes statistically significant differences relative to White British boys or girls respectively.

This illustrates that human capital acquisition is not something that begins at school and that inequality is evident even at an early stage. Breaking the link between family background and educational attainment (and improving educational attainment generally) seems to require policies

¹⁶However, any assessment of the relative merits of various policy alternatives (e.g. targeted at individual effects vs. school effects) needs to allow for that fact that school quality has an impact on multiple pupils.

¹⁷This may also explain the low attainment of disadvantaged pupils in all the school without regards to the quality level that we highlighted above.

directed at families before the start of formal schooling. This might involve close attention to the quality of early childcare and pre-school settings. However, if part of the issue is poverty and worklessness, then the policy solutions may also lie in other areas of social policy such as housing, employment benefit, childcare provision (McNally, 2012).

As discussed in section 2, low income is the attribute of disadvantage that, over the years, has attracted most attention from academics, politicians and the general public. The simple correlation between low income and poor educational outcomes (the so-called income gradient of education) has been long established¹⁸. However, the most significant social background characteristic is parental education, which has been shown to account for between a quarter and two-fifths of the deficits of low income children¹⁹. While a range of other family background characteristics (for example parents' employment status or family structure) have occasionally been linked to child attainment, the evidence of their effects, conditional on other economic circumstances is still mixed (see Box 1 for evidence on the relationship between family income and educational attainment).

¹⁸Rowntree, 1901, Glennerster, 1995.

¹⁹Gregg, Propper and Washbrook (2008). Chowdry et al., 2009 also found that differences in parental education between young people from different socioeconomic backgrounds provide a major explanation for differences in their educational attainment, and some of the evidence presented points towards the relationship being causal.

Box 1: Family income and educational attainment

Blanden (2004) gives evidence of a significant impact of family income on educational attainment in the UK. The results suggest that a reduction of one third in income from the mean increases the probability of a child getting A-C GCSEs by on average 3 to 4 percentage points, and reduces the probability of getting a degree by a similar magnitude. These results imply that the probability of a young people at the 90th percentile of the income distribution of getting a degree is 42 per cent, compared to 21 per cent for students at the 10th percentile.

The result of Gregg and Macmillan (2009) show that a unit change in the log of income predicts a gap of over one-tenth of a standard deviation in both IQ and Key Stage 1 scores. In this analysis, the magnitude of this effect is much larger than the contributions of both adverse family structures and poor parental labour market outcomes, and is also double the importance of disadvantaged local neighbourhood for IQ. Only low parental education is a more important predictor of low income children's cognitive deficits.

Chowdry et al (2009) estimate that differences in the availability of material resources for educational purposes play a key role in explaining why teenagers from poor families tend to make less progress between Key Stage 3 and Key Stage 4 than teenagers from rich families. After accounting for differences in material resources, the gap in Key Stage 4 test scores between young people from the richest and poorest fifths of their sample falls by 37 per cent compared to its value after controlling for parental education, and demographic and other family background characteristics.

Gregg et al (2012) have shown how, in England, a child's educational progress suffered if their father lost his job in the recession of the 1980s, something that did not happen for children whose parents remained in work. Similar results have been found after spikes in job losses in the United States (Ananat et al, 2011).

Dahl and Lochner (2012) estimated the effect of income on children's maths and reading achievement in the US using data from the Earned Income Tax Credit. Their estimates suggest that a \$1,000 increase in income raises combined maths and reading test scores by 6 per cent of a standard deviation in the short run. Test gains are larger for children from disadvantaged families.

3.2 School and Teacher Effects

It is well acknowledged in the theoretical and empirical literature that the key driver of school quality (defined as value added of the school) is the quality of their teaching staff. There are a large number of anecdotes about the positive impact of excellent teaching on pupil's performance. However, trying to quantify this effect is difficult, principally because of the data requirements. Slater, Davies, and Burgess, (2009) use a unique primary dataset to estimate the effect of individual teachers on student outcomes, linking over 7000 pupils to the individual teachers who taught them in each of their compulsory subjects and to the results of the exams they take at age 16. Their results suggest that being taught by a high quality (75th percentile) rather than low quality (25th percentile)

teacher adds 0.425 of a GCSE point²⁰ per subject to a given student (25 per cent of the standard deviation of GCSE points).

Rivkin et al (2005) relate the teacher quality measure to the socioeconomic gap in outcomes. They measure the gap in GCSE points between a poor and non-poor student (equal to 6.08 GCSE points) and suppose that this gap arises over 8 subjects that they both take. If the poor student had good (75th percentile) teachers for all 8 subjects and the better off student had poor (25th percentile) teachers for all 8, this would account for 3.4 GCSE points. This is a powerful effect which is not typically addressed in explaining the socio-economic educational gap.

Similar studies for the US suggest that having a teacher at the 25th percentile versus the 75th percentile of the quality distribution would imply a difference in learning attainments of roughly 0.2 standard deviations in a single year. This would induce a move of a student at the middle of the achievement distribution to the 59th percentile. The magnitude of such an effect is large relative to the estimated effects of a ten student reduction in class size, which is of 0.1-0.3 standard deviations (Hanushek and Rivkin, 2010).

The academic literature has also sought markers for high quality teachers, looking in particular at pay, teachers' experience and academic level.

There is a large literature on the impact of teacher pay. One strand investigates the effect of teacher salaries on school performance. Although initial evidence on this was mixed²¹ more recent work has mostly found different results (see Box 2 for a review of the literature). The evidence suggests that teaching staff respond to pecuniary and market incentives aimed at increasing their effort and 'output' (i.e. learning). However, it is worth making a distinction between a general increase in teachers' wages (due, for example, to a general increase in the national pay scheme) and an improvement in pay linked to geographical disparities in costs of living or teachers' outcomes. Only the latter types of interventions seem to have a positive impact on teacher's performance and pupils' achievement (Propper and Britton, 2012).

In particular evidence indicates that relative salaries and alternative employment opportunities are important influences on the attractiveness of teaching as a profession (Santiago, 2004). As OECD (2005) discussed, teachers' salaries relative to those in other occupations influence: (i) the decision to become a teacher after graduation, as graduates' career choices are associated with relative earnings in teaching and non-teaching occupations, and their likely growth over time; (ii) the decision to return to teaching after a career interruption as returning rates are generally higher among those teaching subjects that provide the fewest opportunities for employment elsewhere; and (iii) the decision to remain a teacher as, in general, the higher teachers' salaries, the fewer people leave the profession. Relative earnings seem to be less important when the decision is whether to enrol in teacher education or another college course (Hanushek and Pace, 1995). McKinsey (2007) suggested that while raising salaries in line with other graduate salaries is important, raising them above the graduate market average level would not lead to substantial further increases in the quality or quantity of applicants.

²⁰ An increase from one grade to the next, says a B to an A, is one point.

²¹ For example, Hanushek (1986) highlights that only nine out of sixty teacher salary studies found a positive effect of teacher wages on school performance

Using data on university graduates in UK, Dolton (1990) showed that increasing teacher salaries by a small amount (10 per cent) resulted in a large rise in applications (30 per cent). The “wage elastic” teacher supply could be explained by the comparatively low level of teacher’s wages. Wolter and Denzler (2003) run a similar analysis for Switzerland and they showed that since salaries were already high (116 per cent of GDP), further increases in salary had little impact on the number or quality of applicants to teaching. While starting salaries in general are high in England²², low top wages at higher career levels may discourage the more experienced teachers from remaining in the profession and also deter good graduates from starting a teaching career.

There is also a growing body of work investigating the impact of performance related pay. Whilst again there is some mixed evidence, the general consensus appears to be that performance pay for teachers does improve student attainment in a variety of settings²³.

However, a good salary is not necessarily the main or the only motivation for teaching. The status of the teaching profession, the career opportunities and the decisional power given to them are all important factors in explaining their performance. For example, Hoxby (2002b) provides evidence that school choice affects the teaching profession by increasing demand for staff with higher qualifications (especially in mathematics and science), and by requiring them higher efforts and greater independence.

While a stronger relationship between teacher experience and performance has historically been, recent studies have consistently found that the impact of experience is concentrated in the first one or two years of teaching with little impact of any additional one (Hanushek, 2008). Teachers’ education also tends not to be correlated with quality²⁴.

²² Working hours in teaching are also fairly long compared to many other OECD countries.

²³ See Box 2 for a review of the literature.

²⁴ However, some argue that the education system as a whole could benefit from a teacher’s higher education level in other forms. First, more educated teachers may increase the success of school autonomy, by providing better inputs in the curriculum design and in developing new teaching methods. Secondly, the perception of the teaching profession is linked to the anticipated level of education and training teachers are required to undertake to become teachers (Day et al, 2006).

Box 2: Teachers and Headmaster' payment incentives

The empirical and theoretical literature on the functioning of the labour market for teachers (and headmasters) has increased in recent years. Overall, it suggests that teachers and headmasters respond to monetary and market incentives aimed at increasing their effort and 'output' (i.e. learning). Using different methodologies and data, Dolton and Van Der Klaauw (1999), Hanushek (2003), Murnane and Olsen (1989, 1990), Chevalier et al (2007) show that individuals respond to (relative) wage incentives in their decision to start teaching or leave the occupation. Loeb and Page (2000) find that teacher wages are a significant determinant of their performance and decision to stay in the profession - a 10 per cent increase in teacher wages would reduce quit rates among US teachers by 3-6 per cent. Dolton et al (2011) (using a panel data on 39 countries) show how both relative and absolute levels of teacher salaries strongly impact on pupil performance. Propper and Britton (2012) provide further evidence favouring the argument that teacher wages are important for school performance in England.

There is also a growing body of work investigating the impact of performance related pay. Whilst again there is some mixed evidence, the general consensus appears to be that performance related pay for teachers does improve student attainment in a variety of settings. Examples include Lavy (2009) in Israel, Muralidharan and Sundararaman (2009) in India, Jackson (2010) in Texas, Bettinger (2010) in Ohio and Atkinson et al (2004) in England. Hanushek et al (2003) and Lavy (2002) show that teacher performance related pay schemes could effectively attract good teachers and improve their motivation with positive outcomes on pupils' attainment. Woessman (2011) use cross-country data to show that the introduction of performance related pay is significantly associated with mathematics, science, and reading achievements across countries. In particular, countries that adopt this type of teacher compensation record about one quarter standard deviations higher scores. Atkinson et al (2009) evaluate the impact of a performance-related pay scheme for teachers in England, using teacher level data matched with pupil's test scores and value-added. They show that the introduction of a payment scheme based on pupil attainment improved test scores and value added, on average by about half a grade per pupil. They also find heterogeneity across subjects, with maths teachers showing no improvement. Green, Machin and Murphy (2008) show that private schools in the UK, that are characterized by an higher education level of their staff and attract each year a lot of teachers from the state school, are used to pay a premium for teaching shortage subjects', such as maths or science. They use pay flexibility as an effective strategy to attract more and better teachers in these subjects.

Looking at teachers' decisions to stay in the profession, Lazear (2003) argues that a reduction in teacher pay in the US and Sweden has caused an adverse selection and induces highest quality teachers leaving the job; the author further suggests that linking compensation to performance would improve teacher quality and school effectiveness. Clotfelter et al (2006) report that a monetary bonus given to qualified teachers in North Carolina greatly reduced their probability of leaving high-poverty schools. This incentive was especially effective for teachers with more years of experience, who are usually associated with better pupil outcomes (Hanushek et al, 2005).

Box 2: Teachers and Headmaster' payment incentives

With regards to headmasters, Besley and Machin (2008) investigate the link between the pay and performance of school principals. They show that, in line with the evidence on pay and performance of private sector CEOs, school principals' payment is linked to publicly observable performance measures and poorly performing principals face a higher chance of being replaced. The results of Branch, Rivkin, and Hanushek (2013) show that highly effective principals increase the performance of a typical student by between two and seven months of learning in a single school year; ineffective principals lower achievement by the same amount.

Given the critical role of teacher quality on pupil's performance, recruiting and maintaining the most efficient teachers should be prioritised. The issue is how to attract and select good teachers. This is not a straightforward process since it is difficult to assess ex-ante if a candidate would be a good teacher. Qualitative research suggests that top-performing school systems manage to attract better people into the teaching profession, leading to better student outcomes. They do this by introducing highly selective teachers training, developing effective selection processes for identifying the right candidates and paying good (but not great) starting compensation. Conversely, lower-performing school systems rarely attract the right people into teaching (McKinsey, 2007). The success in attracting talented people into teaching is linked to specific country features such as history, culture and status of teaching profession. However, there are some policies that can be implemented to attract the best graduates, such as effective mechanisms for selecting teachers, good teacher training programmes, good starting compensations and increasing professional autonomy in schools. All these policies could contribute to increase the status of the teaching profession, the attractiveness of teaching as a career and hence attract the best graduates (see Box 3 for an overview of different recruitment processes).

Box 3: Recruitment Process

It is difficult to assess ex-ante if a candidate would be a good teacher, therefore it is essential to have better designed recruitment mechanisms together with effective teacher training for one or two years. For example, in 2007 Finland introduced a three-round selection process for teaching. The first round consists of a first examination designed to test numeracy, literacy and problem-solving skills. The top-scoring candidates access to the second-round which tests a wide range of the candidates' attitudes such as communication skills, willingness to learn, academic ability, and motivation for teaching and gives them access to the teachers training. In Finland all teacher training programs are Master of Education programs with duration of 4 years. After graduating from teacher training, the prospective teachers need to pass further tests at the individual schools to which they apply for teaching positions. As advocated by Ostinelli (2009), the Finnish model presents some advantages when compared to the English one. However its implementation is not straightforward.

It is important to carefully design teacher training and select graduates into those programmes. It

can be done either by controlling entry directly, or by limiting the number of places on teacher training courses, so that supply matches demand. Indeed, failing to control entry into teaching training would lead to an oversupply of candidates which, in turn, has a significant negative effect on teacher quality. Indeed if too many students are involved in these programmes, they would struggle to find jobs as a teacher once they graduate. Moreover, training quality could be affected owing to less resources and lower quality of people involved in the programme. While Singapore makes teacher training selective to manage supply, England focuses on limiting the funding for teacher training to manage supply, and ensures that all training providers meet certain general standards for the selection of the students in their courses (McKinsey, 2007).

A well-performing system must also find a way to recruit more experienced graduates. Teacher training requirements that experienced graduates must undergo training for a year create barriers since applicants would lose a year's earnings as well as having to bear the cost of their course. Creating new routes into teaching in which entrants can avoid this financial burden increases significantly the pool of potential applicants into the profession. The UK has massively diversified its recruitment process and has developed many entry points into teaching in an attempt to maximise recruitment. By 2006, there were 32 different ways to enter teaching profession in the UK, though there is some homogeneity across each route in the expectations of the skills, knowledge, and the behaviours teachers should demonstrate by the time they had completed their training. (McKinsey, 2007).

3.3 Peer Effects

Another driver of educational attainment is believed to be peers' behaviour and characteristics. This has been documented empirically (Coleman, 1966) as well as theoretically (Angrist and Lang (2004), Hoxby (2000) and Lavy and Schlosser (2011), Gould et al. (2009)). The main rationale is that group actions or attributes might influence individual decisions and outcomes. However, the estimation of peer effects is empirically challenging. Empirically, Manski (1993) highlights the pitfalls of endogenous peer selection and the difficulty of distinguishing between average school effects and peer effects.

Recent empirical evidence based on better data and better identification strategies has reached consensus that to capture peer effects, analyses should not focus on the average students but should consider pupil distributions. There is little conclusive evidence suggesting that studying with a higher ability peer group leads to better outcomes (Atkinson et al, 2008; Bradley and Taylor, 2008; Dills, 2005; Summers and Wolfe, 1977) for all pupils while the presence of low ability peer groups can decrease general outcomes (Lavy et al, 2012; Gibbons and Telhaj, 2008; Winston and Zimmerman, 2004; Zimmerman, 2003 and Handerson et al, 1978, Summers and Wolfe, 1977)²⁵. Lavy et al (2012) show that it is only the very bottom 5 per cent students that (negatively) affect average outcome and not "bad" peers in any other part of the ability distribution. They also find evidence that the presence of students in the top 5 per cent of the ability distribution does not impact average outcomes. Henderson et al (1978) show that mixing weak and strong students lowers educational attainment for higher achievers. Similar results are also found by Bradley and Taylor (2007), who use pupils moving between schools to address the problems inherent with estimating

²⁵ For a slightly different message see Carrell et al 2011.

peer effects, and find the effects of a more able peer group are stronger for low ability students than for higher ability students. On the other hand, Betts and Shkolnik (2000) find little evidence of differential effects of ability grouping for high or low ability pupils.

The negative impact of low ability students on the outcome of other students has been explained by some academics by the fact that more homogeneous groups of students might be taught more effectively (Duflo et al, 2010) or by pointing at the classroom disruption and decrease in attention paid by the teachers (Lavy et al. 2012). Some studies suggest that these general findings mask some market heterogeneity along the gender dimension by showing that girls are significantly affected from interactions with peers (Lavy et al, 2012 and Stinebrickner and Stinebrickner, 2006).

To overcome the difficulties of endogenous peer selection, a number of studies use the random allocation of accommodation within higher education in the US. Sacerdote (2001) finds that peers have an effect on grade point average. In a similar framework, Zimmerman (2003) and Winston and Zimmerman (2004) find no credible effect on the top of the SAT ability distribution, but do find evidence of a negative impact on students in the middle of the SAT distribution when grouped with students in the bottom 15 per cent of the SAT distribution.

Taking a step further, Carrell et al (2011) use a random experiment to determine whether student academic performance can indeed be improved through systematic sorting of students into peer groups. They design peer groups at the United States Air Force Academy (USAFA) and using an experimental design, sort the incoming college freshman cohorts at USAFA into these peer groups. The objective was to improve the grades of the bottom one-third of incoming students by academic ability. The actual outcomes from the experiment yielded unexpected results. For the lowest ability students there is a negative and statistically significant treatment effect; for the middle ability students, who were expected to be unaffected, there is a positive and significant treatment effect of 0.067. High ability students were unaffected by the treatment.

Finally, Gibbons and Telhaj (2008) offer an alternative interpretation of the peer effect. They suggest that peer effects may impact other factors different from school attainment such as subsequent educational decisions and may provide other immediate and long-run benefits – such as life-time friendship networks- which make schools with good peer groups desirable commodities.

3.4 How significant is expenditure?

Existing research has struggled to show a clear causal relationship between the amount that schools spend and student achievement, suggesting that how money is spent is typically much more important than how much is spent (see Hanushek, 2008 for a review of the literature).Analysing the effect of spending on reduced pupil–teacher ratios, most studies find no significant relationship with achievement.

Levacic and Vignoles (2002) find that in the British context, the impact of school resources is small. While Holmlund et al (2010) find that after controlling for the range of pupil and school-level characteristics, the estimated effect of an increase of £1,000 in average expenditure per pupil would

raise standardised test scores by about 5 per cent of a standard deviation. They find evidence of a consistently positive effect of expenditure across subjects.

The studies looking at resource effects for primary schools (Gibbons et al, 2011; Holmlund et al. 2010) find that effects are substantially higher for economically disadvantaged students. These findings are encouraging for policy because they suggest that despite large imperfections, mechanisms can be designed to ensure that disadvantaged students benefit from increasing school resources (see the discussion about the pupil premium in section 4.4). This provides some support to the recommendation for increasing targeted resources for the disadvantaged.

There is also evidence to suggest that targeted investments, which address problems in specific areas or subjects and are specifically designed for pupils with learning disadvantages, deliver larger benefits. A case in point is the 'Excellence in Cities' programme (Machin et al, 2010) and the 'Literacy Hour' policy (Machin and McNally, 2004).

4. The UK Institutional Framework

Having considered the drivers of success and failure in educational systems, we turn to a critical appraisal of the UK institutional framework, highlighting areas which are working or improving and pointing to problem areas that still need to be addressed.

4.1 Accountability

An important feature of an education system is the way in which its performance is held to account. A growing body of literature posits the key to improving education outcomes lies in altering the incentives structure, so that it promotes strong schools with high quality teachers (Hanushek, 2008; Hanushek and Woessmann, 2006, 2011a). For example, there is empirical evidence suggesting that schools that face external exit exams tend to have better results than schools that face no such exam. The same literature reports a negative link between accountability and autonomy – i.e. in the absence of central accountability frameworks, schools with greater autonomy tend to underperform (Woessman, 2012).

The UK accountability system is based on two pillars: (i) school performance (or 'league') tables, which have traditionally focused on schools' average GCSE results; and (ii) inspection reports from the statutory agency responsible for monitoring schools' performance, the Office for Standards in Education (Ofsted). Both have significant limitations.

School performance (or 'league') tables are useful tools for parents and government to evaluate school performance and educational outcomes²⁶. Allen and Burgess (2011) use seven years of pupil Census to show that using the performance tables to select schools does on average lead to better choices than choosing at random. However, test scores and value-added as published in the league tables are not an accurate measure of school quality (Kramarz, Machin and Ouazad, 2009).

²⁶ The use of benchmarking is more widespread in UK than in virtually any other OECD country (Gonand et al, 2007).

Furthermore, league tables may encourage behavioural distortions. For example, in order to improve the average exam results, individual teachers would focus their effort more towards exam preparation (“teaching to the test”); schools may also decide to develop a more selective intake approach or change the mix of subjects offered to students so that examination success is more probable. The consequences of such distortions are grade inflation, focusing on the average student’s performance and not at the entire distribution. It also distorts funding allocations within the school.

The second pillar of the accountability system is the role played by Ofsted. Recent empirical evidence suggests Ofsted’s inspections are effective in improving poor school performance (Hussein, 2012). Allen and Burgess (2012) show that schools only just failing to reach the minimum standards expected by school inspectors do indeed see an improvement in scores over the following two to three years, over and above those schools that only just make it above the threshold. The effect size is moderate to large at around 10 per cent of a pupil-level standard deviation in test scores. Moreover, this improvement occurs in core compulsory subjects which suggest that schools are not altering their subject mix.

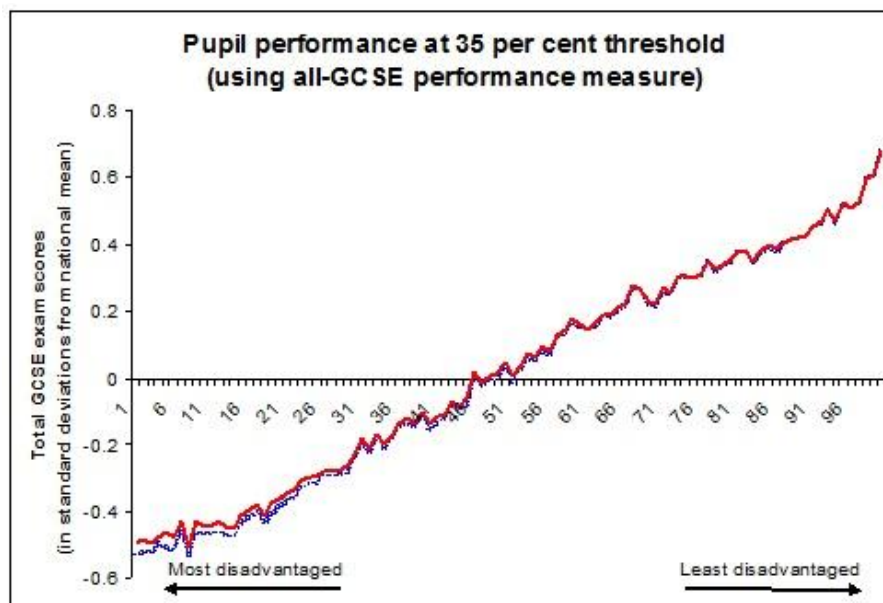
The results mentioned above, however, indicate little positive impact on lower ability pupils, with equally large effects for those in the middle and top end of the ability distribution. This raises doubts about the effectiveness of the incentives placed upon schools to improve the performance of disadvantaged children. These doubts are exacerbated by the fact that the performance of disadvantaged children appears to be diluted in the criteria Ofsted applies while judging the overall effectiveness of schools.

4.1.1 Floor targets and the Academies Act

One of the government’s flagship policies to tackle poor school quality is based on the definition of a “floor target”. This sets an expectation that a minimum of 35 per cent of children at every secondary school should get five A* to C including English and maths. A primary school will be below the floor if less than 60 per cent of pupils achieve the ‘basics’ standard of level four in both English and mathematics and fewer pupils than average make the expected levels of progress between key stage one and key stage two. Schools that fail to meet this target (and a few other criteria) are at risk of having their management replaced (the so-called “sponsor academy” conversion). Where there has been long-term underperformance, little sign of improvement and serious Ofsted concern, the Government converts schools into Academies, partnering them with a strong sponsor or outstanding school.

Unfortunately, the impact of this program on the socio-economic gradient is likely to be rather limited as is illustrated by figure 8 below. The blue line in the figure gives every 16-year-old who took GCSEs at a state school in 2010 a point score for their exam performance: 8 points for an A* down to 1 point for a G. It standardises the lot, and divides them up by the poverty of their neighbourhoods. Children in disadvantaged postcodes are at the left of the graph and the richest are at right. The red line strips out the failing schools (according to the floor target mentioned above) and assumes the children who previously attended those schools are dispersed into the rest of the school system in a way that does not damage the performance of those other schools. The resulting improvement in the gradient is very limited.

Figure 8: GCSE exam scores (pupil level performance) by neighbourhood deprivation level



Source: Cook, 2012

This is yet another reminder of the point we highlighted in section 1.2.2: the problem is not that there are a few schools which have all the disadvantaged children in them performing poorly. The problem is that disadvantaged children perform poorly (compared their wealthier peers) in a vast majority of schools.

4.1.2 Targeting symptoms, not causes

Over the years, most of central government's policy interventions have not been systematically targeted at economically disadvantaged/ FSM children but have instead focused on a number of pupil-characteristics that are (imperfectly) associated with economic disadvantage (such as Special Education Needs (SEN)²⁷ status; ethnic minorities; and low attainment)²⁸.

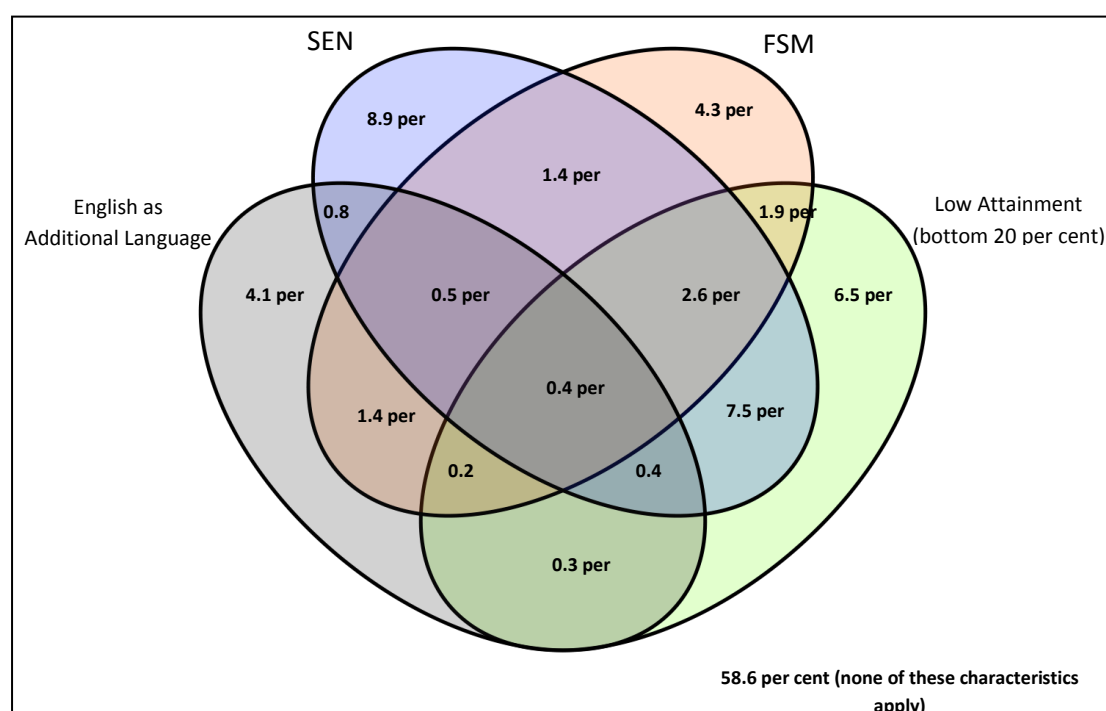
Although there are significant overlaps between these groups (see figure 9 below), there are drawbacks to this approach. First, it leaves out a multitude of cases of socio-economically disadvantaged children who are not income disadvantaged. Second, some of these groups conflate pupil deprivation with poor teaching performance (low attainment could be simply driven by poor teaching). Third, it provides mixed messages to schools and blurs their priorities - anecdotal

²⁷ SEN is a multifaceted classification which brings together children with innate cognitive/learning difficulties and children who are underperforming for reasons other than their innate ability (e.g. strong negative impact of family background and/or poor teaching quality and/or unsupportive peer effects). The first sub-group is defined by a characteristic that puts it at disadvantage. The second sub-group is defined by its (poor) performance level, and may or may not be at disadvantage. In that sense, SEN conflates discretionary inputs (e.g. teaching quality); non-discretionary inputs (e.g. unsupportive family background); and outputs (low attainment).

²⁸ Under the previous government, there were only a handful of interventions designed to directly target disadvantaged/ FSM children [e.g. apart from additional funding, there was a two year old childcare pilot; extended services subsidy and an Educational Maintenance Allowance (EMA)].

evidence suggests that schools/teachers do struggle to understand why/ how to target needs of Free School Meals (FSM) pupils compared to more visible types of need (e.g. SEN, EAL).

Figure 9: GCSE targeting symptoms - a Venn diagram

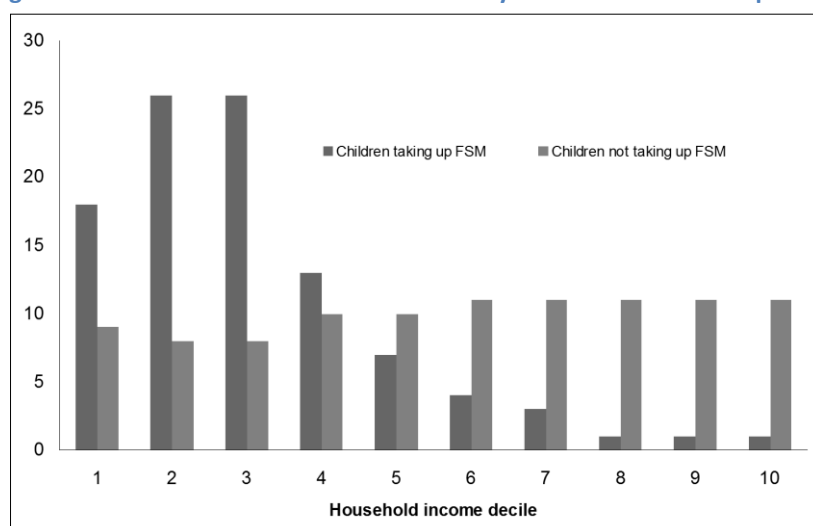


Source: Data from the 2009 National Pupil Database

4.1.3 Main measure of deprivation subject to substantial limitations

Free School Meals (FSM) status is widely used as the main measure of deprivation. The Pupil Premium is also based on this indicator. FSM is a crude indicator of parental income. Hobbs et al (2010) have examined the relationship between children's FSM 'eligibility' and equivalent net household income (Figure 10) and find that there is considerable overlap between the range of household incomes of children taking up FSM and those not taking up FSM. In other words, many children taking up FSM are in households with higher incomes than children not taking up FSM. This makes it likely that many children eligible for and claiming FSM are not in the lowest income households.

Figure 10: Distribution of household income by children's FSM take-up status



Source: Hobbs and Vignolet (2010)

Other well established limitations of the FSM measure include the fact that: a) Dropping out of FSM category could simply mean children are not claiming FSM although they would be entitled to them (which is known to be particularly significant in the later stages of secondary education); b) Changes in FSM status may reflect increases in income beyond the thresholds defining the FSM category, but not to the extent of having meaningful impacts on attainment; c) Even if reductions in the proportion claiming FSM eligibility from one year to the next reflect significant improvements in household income, we would not expect this to lead to an instant improvement in pupil attainment. The effects of earlier poverty are likely to persist; d) it is well established in the empirical literature that it is being eligible for FSM at any point in the pupil's academic career that is most strongly associated with attainment rather than the number of years a pupil is eligible.

4.1.4 Recent reforms

The government has partially addressed the issue of targeting the right groups by re-defining the target group for the Pupil Premium. From April 2012 the Pupil Premium was extended to include children who have been eligible for free school meals (FSM) at *any* point in the last 6 years.

Since January 2012, the government has also started to publish new league tables that report GCSE results by groups of pupils (*within* schools) defined by their prior attainment at key stage 2 (KS2)). Specifically, for each school the tables will report the percentage of pupils attaining at least 5 A* – C grades (including English and maths) separately for low-attaining pupils, high attaining pupils and a middle group. This is a change for the better as the main differences between schools in the performance of different group of pupils within the school will tend to emerge from variation in schools' teaching effectiveness.

However, a particular disadvantage of the new measure is that it uses very broad pupil bands. The groups are defined to cover the entire pupil population: the low attaining group are students below

the expected level (Level 4) in the KS2 tests; the middle attaining are those at the expected level, and the high attaining group comprises students above the expected level. The disadvantage is that the broad groups (about 45 per cent are counted to be in the middle) hide the significant variation in average ability within that group across schools. This implies that differences in league table performance between schools will still reflect differences in intake in addition to effectiveness - even within the group, thus partly undermining the aim of group-specific reports.

4.2 Autonomy

Schools are only as good as their teachers. Since it is hard to find good *ex-ante* predictors of teaching quality, it is likely to be important to give schools the tools and incentives to hire and reward high performing teachers, and to remove low performing ones. The case for giving schools more freedom is based on the notion this will allow them to take advantage of local knowledge to operate more efficiently and become more innovative.

Accordingly, several countries have enabled a certain proportion of state funded schools to operate with greater autonomy than the norm within the state system. The structure and rules differ between (and sometimes within) countries but they also have much in common – for example, ‘charter schools’ in the US; ‘free schools’ in Sweden and ‘academies’ in England (see Box 4 for more detail on academies). In an international context, English schools are high up in the autonomy rankings, second only to the Netherlands according to OECD (2012).

The empirical evidence (both for the UK and other countries) provides support for the hypothesis that increasing school autonomy can lead to improvements in pupil performance and might also have positive effects on neighbourhood schools (see Box 5 for a review of the literature). In the UK, recent studies that have investigated the conversion of disadvantaged schools into academies have noted an improvement in pupils’ performance compared to pupils in similar schools.

The important discussion for policy, though, is not so much whether autonomy is a good idea in general but in what spheres and contexts schools should be made more autonomous. Hanushek et al. (2011b) provide a good discussion on where ‘autonomy’ may and may not be desirable. In their view some decisions – such as hiring and budget allocations – require significant local knowledge and are more appropriately made at the school level. In contrast, where standardisation is important (for example in setting course offerings and requirements) decision should be made at a higher level²⁹. Furthermore, the impact of autonomy may vary with other elements of the schools system - for example, whether there is a strong system of accountability in place.

In the UK, community schools (which still represent a large portion of the schools system) enjoy only some autonomy³⁰ compared to the other types of school such as academies and voluntary aided schools. Localising hiring and making pay conditions more flexible would put these schools on a

²⁹In a cross-country analysis, Woessman (2003) found that school autonomy in setting educational standards and the size of the school budget was negatively related to pupil performance. The opposite was true of school autonomy in personnel management and process decisions, for example, hiring teachers and setting salaries.

³⁰The 1988 Education Reform Act gave community schools the option to become “grant-maintained” community schools where they were free from local authority control. The Act also gave community schools greater local management rights wherein schools could control their budget.

more similar footing to independent schools, academies, free schools and faith schools. It could also help overcome the problem of regional disparities in the real salary linked to the national pay scale (see Box 6 for a discussion of teacher's payment in UK).

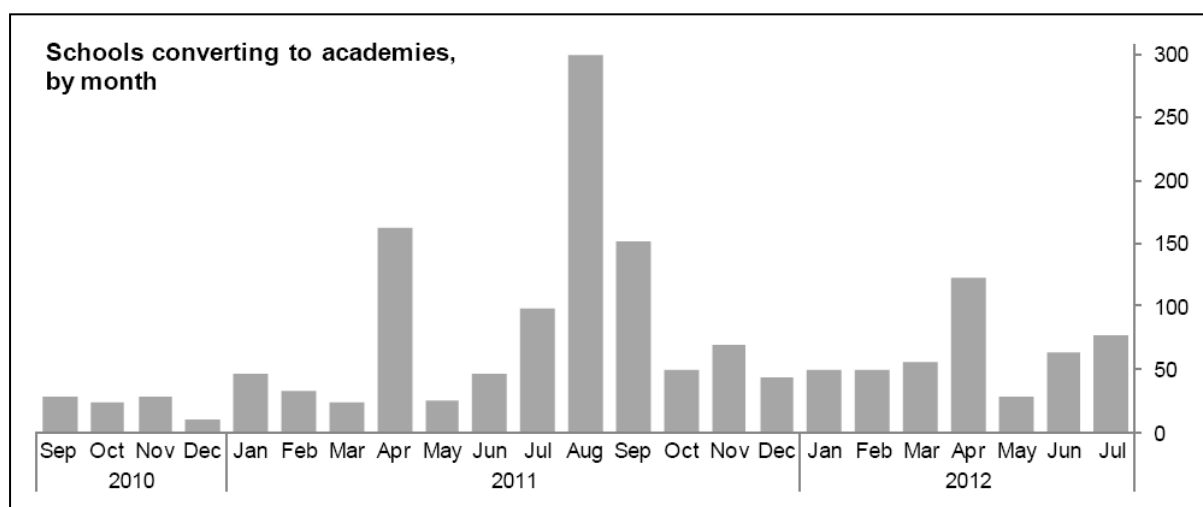
In practice, this movement towards greater school autonomy is taking place through a piecemeal *academisation* of the schools system. In the Academies Act of 2010, the coalition government specified that any primary, secondary or special school that has been rated outstanding by the Office for Standards in Education (Ofsted) should be allowed to become an academy on a fast-track route.

From November 2010, all other primary and secondary schools that wished to benefit from Academy freedoms will be able to do apply to convert, provided they work in partnership with a high performing school that will help support improvement, or another sponsor – such as larger charities or small federation of schools. Over time, the government has taken out many of the requirements from the Academy funding agreement. It has removed prescriptions on curriculum and qualifications, target setting and the production of rigid plans.

The share of academies is rapidly increasing. Figure 11 below shows the number of new converters each month. 29 schools converted in the first month of the start of the program, September 2010. Numbers remained below 50 per month for each of the next two terms. More than 150 converted at the start of the summer and autumn terms 2011, but the peak number of 300 converted during August 2011. Moreover, as shown in Table 3, the phenomenon of academies' chain is emerging since some sponsors control more than one school. For example, the Academies Enterprise Trust (AET) is the largest sponsor and administers more than 60 schools. This would raise the challenging issue – both for academics and policymakers- to identify the optimal structure of the academies' system. Drawing from the US charter's schools system could provide useful hints. For example, KIPPS one of the major US charter schools, has adapted the *franchise model* to manage its expansion. Each KIPP school pays 1 per cent of its annual revenues to the KIPPS foundations; teachers and school leaders are carefully selected and trained; KIPPS schools are subject to annual inspections on financial, academic, real estate, and legal personnel issues and schools who fail to maintain the system's quality would lose the KIPPS brand and support. However, unlike the typical business franchisor, KIPP grants its new schools considerable freedom in deciding how they will earn and keep the brand. However, the majority of charter management organisation opt for a greater control over each school and adopt a *corporate-style growth* approach that assure that each new site replicates their own standards for building design, staffing and programs (Bennett, 2008).

The government has also introduced free-schools whereby parents, teachers or non-profit organizations can set up a school enjoying the same independence as academies (Braconier, 2012).

Figure 11: Schools converting to academies, by month



Source: House of Common Library, SNSG/6233, July 2012

Table 3: Academies' chain in the UK

Sponsor	Prim, open	Prim, upcoming	Sec, open	Sec, upcoming	Total, inc schools not shown
Academies Enterprise Trust (AET)	18	15	20	12	66
E-ACT	7	3	18	1	30
Oasis	3	10	11		25
United Learning Trust (ULT)			17		21
Ormiston Trust	1		18		19
School Partnership Trust	4	6	5	3	19
Kemnal Academies Trust	9	5	2		16
ARK schools	3	1	7	1	15
Harris Federation	2	1	11	1	15
Greenwood Dale Foundation Trust	4	1	5		11
Academies Transformation Trust (ATT)	1	4		5	10

Source: Department of Education data and Guardian Datablog.

Box 4: Note on the structure and freedoms of Academies

What are Academies?

Academies are publicly-funded independent schools. They benefit from greater freedoms to innovate and raise standards. These include: a) freedom from local authority control; b) the ability to set their own pay and conditions for staff; c) freedoms around the delivery of the curriculum; and d) the ability to change the lengths of terms and school days. Head teachers are given the freedom to innovate with the curriculum, pay staff more, extend school hours and develop a personal approach to every pupil. Academy schools enjoying direct funding and full independence from central and local bureaucracy. The principles of governance are the same in academies as in maintained schools, but the governing body has greater autonomy. Academies are required to have at least two parent governors.

Funding:

Academies cannot charge fees and receive the same level of funding per pupil from the local authority as a maintained school, plus additions to cover the services that are no longer provided for them by the local authority. However, academies have greater freedom over how they use their budgets. Funding comes directly from the Education Funding Agency (EFA) rather than from local authorities.

Staffing:

When a school converts from a local authority (LA) maintained school to a new academy, staff from the predecessor school must be transferred to the new Academy school under the 1981 Transfer of Undertakings (Protection of Employment) or TUPE regulations in which case their existing terms and conditions of employment are upheld. Once open, the academy trust may consult with staff and their union representatives on changes to these terms and conditions, for example to enable the academy to operate over different term times or change the length of the school day. Thus, the governing body is able to authorize changes to the terms and conditions of employment and approve personnel practices regarding staff development and discipline.

Admission:

Academies are also required to give priority to children 'who are wholly or mainly drawn from the area' in which the school is located. This means that the majority of pupils admitted must live close to the school. All schools, whether maintained or academy are required to comply with the 'Greenwich Judgement' which requires schools to not treat pupils living outside the LA area less favourably than those living in the same LA. To simplify, the LA boundary cannot be used as the admission catchment area.

Academies will need to take part in their local coordinated admissions process, and so parents apply for places for their child in the same way as any other local school. Maintained schools which have previously selected some or all of their pupils by ability are able to continue this practice when they become academies, but schools becoming academies cannot decide to become selective schools if not previously selective. Independent selective schools joining the academies sector are not legally able to continue to select by ability. However, any school with a relevant specialism can select 10 per cent of its intake by aptitude in sport, modern foreign languages, visual arts or performing arts.

Expansion:

A little-known reform in 2011 allowed academy and voluntary aided schools to expand in size without the permission of the local authority.

Another initiative in the direction of academisation has been the creation of Free Schools, which are being set up in response to real parental demand within a local area for a greater variety of schools. The first such schools opened in September 2011. Free schools are non-profit making, independent, state-funded schools. The model is flexible: free schools may be primary or secondary schools; located in traditional school buildings or appropriate community spaces; and may be set up by a wide range of proposers.

Like academies, Free Schools are to be funded on a comparable basis to other state-funded schools. The groups running these schools cannot make a profit, and are subject to the same Ofsted inspections as state schools. Free Schools cannot be academically selective and must take part in their local coordinated admissions process.

However, free schools have additional freedoms compared to academies, a key example being that teachers in Free Schools do not necessarily need to have Qualified Teacher Status.

Box 5: School Autonomy and Educational Outcomes

Machin and Wilson (2009) provide some early evidence on academies, comparing the impact on GCSE performance for schools that turn into academies with a comparison group of similar schools. There was an improvement in the GCSE performance of schools that became academies, but it was no different from the improvement for schools in the comparison group. Wilson (2010) finds that intake into academies over the period 1997 to 2007, has consisted of a lower proportion of pupils from relatively disadvantaged backgrounds (measured by those FSM).

Machin and Veroit (2011) evaluate the schools that became academies up to 2008/09. Their main findings were: Firstly, schools that became academies started to attract higher ability students. Secondly, there was an overall improvement in performance at GCSE exams. These results were strongest for schools that have been academies for longer and for those who experienced the largest increase in their school autonomy. Thirdly, schools in the neighbourhood of academies started to perform better as well. This might either be due to more competition or the sharing of school facilities and expertise with the local community.

Gibbons and Silva (2008) investigate the effects of the emergence of the private sector in education on the performance of public-sector schools and find no evidence that a higher concentration of privately managed schools improves the performance of neighbouring public-sector schools in England. However, the authors find that certain types of state-schools (Voluntary Aided schools) which have autonomous governance and admission procedures react positively to greater competition with local schools- their students' value-added attainment score improves by about 1.6

points for each additional competitor.

The evidence for other countries is in line with the UK. Bohlmark and Lindahl (2008) look at the long-term as well as short-term effects of academies in Sweden. They find evidence of only small positive effects in the short-term, which do not persist. Other studies adopting non-experimental methods tend to produce more mixed results.

In the US, there are charter schools that are similar in mandate and autonomy to Academies in the UK. In the US, some charter schools use lotteries to allocate places when the school is oversubscribed. Abdulkadiroglu et al (2011) exploit this randomisation to estimate the impact of charter attendance on student achievement in Boston. They find that charter school attendance leads to significant increases in pupils' English language and maths scores compared to students not attending charter schools. Interestingly, they find that the highest achievement gains are for students who performed poorly before they attended the charter school.

Similarly, using data from New York City, Hoxby and Murarka (2009) find that pupils who won the lottery to attend charter schools experience significant improvements in both maths and reading scores between the third and eighth grade, compared to those pupils who lost the lottery and remain in traditional public schools.

Angrist et al (2010) evaluate the impact of a specific Charter School that is targeted at low income students that qualify for free school meals. They find significant increases in the math and reading scores in students who attend this Academy - increasing by 0.35 standard deviations and 0.12 standard deviations respectively for each year they spent enrolled at the Academy, compared to pupils not attending the Academy. Most importantly, they find that pupils with limited English proficiency, special educational needs or lower baseline scores achieve the highest gains in both scores.

The spill-over effects of charter schools in the US has been studied by Bettinger (2005) who looks at the spill-over impact of charter schools in Michigan, Hoxby (2002a) who evaluates the effect of charter schools in Michigan as well as Arizona and Booker et al. (2007) who look at the impact of charter schools in Texas. All three studies find improvements in the traditional public schools that can be attributed to the introduction of charter schools.

Box 6: Teacher's payment and autonomy in the UK

Although better remuneration and work conditions could improve the quality of the pool of teachers, in the UK teacher wages are set by Local Education Authorities (LEAs) based on guidelines issued by the central Government Department for Education. Despite the existence of four pay bands ('Inner London', 'Outer London', 'The Fringe' and 'The rest of England'); teacher wages have exhibited very little regional variation relative to private sector wages since the early 1970s. For example, the average teacher wage differential between the North East of England and Inner London is approximately 9 per cent, while the equivalent private sector wage differential is larger

than 30 per cent.

Since its formation in the 1990's, the School Teacher Review Body (STRB), an advisory board which comments on teacher conditions and pay, has frequently argued that the Department for Education should be doing more to encourage locally flexible wages. Although an increasing amount of discretion over wages has been granted to LEAs, they have almost entirely failed to utilize the option. This is likely to be due, in part, to the fact that local authorities face relatively strong national teaching unions (Zabalza et al, 1979).

Following the recommendations from the School Teachers' Review Body - that advocates more freedom to school's leader on deciding pay, in January 2013 the education secretary – Michael Gove- announced that performance-related pay for teachers will begin from September 2013. He argues that this method would reward good staff and help schools in disadvantaged area recruit and keep the best teachers (Walker, 2013).

Propper and Britton (2012) find that pay regulation reduces school performance. They also find that the response is non-convex across heterogeneous labour markets so that the losses from keeping wages too low in high cost areas outweigh the gains from over-paying in low cost areas. The average effect is relatively small. A 10 per cent increase in the local labour market wage would result in an average increase of 2 per cent in the scores attained in the high stakes exams taken by pupils at the end of compulsory schooling in England. But the number of pupils who would benefit from any gain in teacher performance, the fact that the associated gain in education will have returns over a long time period and the non-convexity in the response to wage regulation, means that the long term gains from the removal of regulation could be very large. A potential drawback of a regional payment system is that it could reduce wages in a bad performing school (for example in Newcastle) and raise them in best performing schools (such as London schools). In particular it could become tougher to attract good teachers in the urban north, where schools are weakest, if wages were regionalized according to labour market conditions. Many areas already face problems recruiting good teachers with the pay scales as they are.

4.3 School Choice and Competition

Increasing parental choice is often one of the front-runners amongst the policies proposed to promote competition and improve school outcomes (e.g. OECD, 2012). The rationale is that as schools compete to attract students, parental demands will create strong incentives for schools to improve performance.

In the UK, parents' ability to choose schools is limited. While parents can (since the 1980s) apply to any state school, schools are allowed to discriminate in case of over-subscription according to an enforced Code of Practice. The most important oversubscription criterion is usually proximity to the school. This means that some people have greater empowerment to exercise choice than others, and this tends to work against lower income families and those with difficulties in accessing and understanding school performance information provided through league tables and Ofsted reports.

There is evidence from England and other countries that many parents act on available information when they are purchasing a home (for England: see Rosenthal, 2003; Gibbons and Machin, 2003; Gibbons et al, 2013; and Burgess et al, 2009). Higher income parents move to locations with better schools and this is reflected in a high correlation between house prices and the quality of the school in the neighbourhood. The consequence is that parents from lower income households are not able to exercise meaningful choice because they cannot afford to live very close to a popular school. West and Pennell (2000) also show that higher socioeconomic households have better information about and understanding of school performance. Thus, 'school choice' as desirable as it is, is not an effective instrument for addressing attainment gaps by household background (McNally 2012).

As discussed in Section 4.2, there are some types of schools which are more autonomous from the LA and their admission criteria are not linked to residence criteria. These include faith-based schools, academies and independent schools. The ability to make effective choices is thus highly influenced by whether families can afford independent schools, have access to faith-based schooling, have children with specific aptitudes, or are able to move close to attractive LA maintained schools (Braconier, 2012).

International evidence on choice and competition is voluminous but its findings are still mixed. Evidence on competition and choice focusing specifically on the UK is very limited³¹, and mainly focused on secondary education. Gibbons, Silva, and Machin (2008) are the first (pupil-level) analysis that investigated the effects of choice and competition on academic achievement in primary schools in England. The study reports little evidence of a causal link between either choice or competition and achievement. Encouragingly, they find some positive effects of competition for children in the tail of the performance distribution, in primary schools.

4.4 Funding System

Central government provides additional funding per disadvantaged student to local authorities (equivalent to roughly £4,000 per year in 2010). LAs use their own individual funding formulas to transfer funds to schools. In 2010, on average, LAs passed through roughly £3,000 per disadvantaged student to schools, with the difference spread across all schools within the LA. A complex funding system makes it difficult for LAs to understand the share of deprivation funding in their total grants. The partial pass through may also reflect that LAs disagree with central government priorities. This may be one reason why LAs sometimes do not express support for extensive deprivation funding.

At the school level, where funding for deprivation is lower than the perceived costs the school may engage in "cream skimming": trying to dissuade disadvantaged children from admission, and recruiting more able students. The lag in receiving deprivation funding also incentivises schools not to retain disadvantaged students (Sibieta et al, 2008).

The current government introduced a "pupil premium" to help mitigate these incentive biases and make funding directly tied to the disadvantaged (DfE, 2010). In 2011/12 schools received a premium amounting to £488 per child entitled to free school meals on top of base funding and for pupils in care who had been continuously looked after for six months. The premium amount increased to £600 per pupil for 2012–13.

³¹ See Allen and Vignoles (2009) for a good review of the existing literature.

The Premium increases central government's notional funding for deprivation. But, at this stage it is still unclear whether the level of funding proposed is sufficient; whether schools will use the funds to tackle the performance of disadvantaged pupils; whether LAs will divert their grants away from deprivation funding; and whether schools will continue to "cream skim".

Recent research by the Sutton Trust also casts doubt on the impact of the premium. Less than 2 per cent in a survey³² of primary and secondary school teachers said it would be used to improve feedback between teachers and pupils and less than 1 per cent said they will introduce peer-to-peer tutoring schemes. The Trust argues that these two schemes, if implemented well, could indeed boost recipients' performance by the equivalent of an extra eight or nine months in a school year.

Similar results are obtained in a recent Ofsted survey³³ that aimed at identifying how schools were using the pupil premium to raise achievement and improve outcomes for its recipients. The qualitative survey found that in the more disadvantaged areas, only one in 10 school leaders thought it had significantly changed the way they worked. Schools often failed to disentangle the pupil premium from their main budget, and said that they were not using the funding to put in place new activity. The pupil premium funding was most commonly used to pay for teaching assistants. In summary, there seems to be a significant risk that the pupil premium will not benefit the students who need it most, and that it will be used to fund existing programmes with no real impact in terms of additionality.

Ways of alleviating this problem include making schools directly accountable for the achievement of pupil premium recipients. One particular policy option is to publish school level information on the attainment of pupils eligible for the pupil premium. This transparency and accountability may incentivise schools to use the funding to improve the attainment of the target group. The coalition government has recently taken steps in that direction, by requiring schools to publish how they spend the pupil premium on their websites and by asking Ofsted to survey how the money is spent, and introducing the performance of pupil premium eligible students in performance tables of schools. Although these initiatives are arguably going in the right direction, it is doubtful they will be strong enough to counteract the bias in incentives created by the complexity and opacity of the way in which schools are funded in the UK.

4.5 Teacher Recruitment and Training

In the UK, the prestige (or lack thereof) of the teaching profession is reflected by the fact that overall, 3.7 per cent of graduates enter teaching; the average for Russell Group universities was 2.7 per cent, and for Cambridge, Bristol, Imperial College, UCL and LSE it was less than 2 per cent, with Oxford only just over 2 per cent.

Teachers are not civil servants in the UK, but are employed directly by the individual school. In order to teach in LA maintained schools, teachers must hold Qualified Teacher Status (QTS). There are a number of different routes available. Initial Teacher Training is a complex system, involving both undergraduate and postgraduate programmes in university-led, school-centred and employment-

³² NFER Omnibus Survey February 2012.

³³ The survey, conducted by Ofsted, is based on the views of 262 school leaders gathered from additional survey questions during routine inspections and telephone interviews.

based provision. The question is how should this be set up to produce the most effective teachers who will have the greatest impact on pupil progress?

Traditionally teachers were trained either on undergraduate (BEd or BA QTS) or postgraduate (PGCE) courses run by higher education institutions. From 1994, School Centred Initial Teacher Training (SCITT) was introduced; this is a fulltime postgraduate training based in a school or a group of schools. Employment-based routes into teaching were first introduced in 1990. These are designed for qualified mature people who needed to earn a living while they were in training. They included the Graduate Teacher Programme (GTP), the Registered Teacher Programme (RTP) and the Overseas Trained Teacher Programme.

Initial teacher training, as a route to the teaching profession, plays two roles for the profession – training and selection with the emphasis typically placed on the former. Allen and Burgess (2012b) argue that selection seems to be the most important and it should be made at the point where evidence on ability is strongest. According to these authors, the final decision on who can become a teacher should be made at a stage when there is enough evidence on the candidate's teaching effectiveness i.e. after completing the training. Given that variations in teacher effects on pupil progress are very substantial, and that the future effectiveness of a potential teacher is hard to judge from their own academic record, a broader group (with a relatively low academic entry requirement) should be allowed to try out teaching. But, towards the end of the program, a much stricter probation policy should be enforced.

The Coalition Government has proposed significant changes to the teacher training landscape wherein under the current operation of selection in ITT, the selection is tight at the beginning but negligible thereafter. The current policy³⁴ direction of tightening of academic entry requirements into teaching is not helpful: it will restrict the quantity of recruits and have no impact at all on average teaching effectiveness. The key decision on final certification should be made after a significant probation period (e.g. three years), and ideally, the probation should involve classes of varying ability and year group (Allen and Burgess, 2012a).

One of the successful recruitment routes has been the Teach First Program started in 2003 in London. Teach First is a charitable organisation. Teach First introduced a training programme for graduates who can commit to teaching for two years in challenging London secondary schools. According to an early stage evaluation³⁵ by Hutchings et al. (2006), after the first two years of its operation it had been successful in recruiting star graduates.

The key attractions for potential participants were keeping career options open, gaining qualifications and making a social contribution and the prestige surrounding the programme: participants were encouraged to view themselves as a privileged group. They underwent both teacher training (in the first year) and a programme of leadership training. Qualified Teacher Status

³⁴ <http://www.publications.parliament.uk/pa/cm201012/cmselect/cmeduc/1515/1515.pdf>

³⁵ The Institute for Policy Studies in Education was commissioned by the Teacher Training Agency in 2003 to conduct an evaluation of innovative practice on the Teach First programme, with the aim of ensuring that ITT as a whole is able to benefit from innovative practice developed in the programme. The evaluation was conducted between September 2003 and September 2005, the first two years of the Teach First programme when it operated only in London.

(QTS) is normally gained at the end of the first year. Teaching in challenging London schools gave a sense of mission to the graduates.

Once teachers have been carefully recruited and trained, mechanisms for teachers, schools leaders and LAs to share best practice should be more strongly encouraged. The 'London Challenge' and the more general 'City Challenge' programmes have shown how successful this could be. The 'City Challenge' was launched in April 2008 building on the success of the London Challenge 2003-08. Its aim was to improve the educational outcomes of young people and 'to crack the associated cycle of disadvantage and underachievement' in the Black Country, Greater Manchester and London' (DfES, 2007). In particular, its goals were to reduce the number of underperforming schools, especially in English and maths; increase the number of good and outstanding schools; and improve the educational outcomes of disadvantaged children. City Challenge was based in a different approach than other government's interventions. First of all, it was built on the belief that educational problems should be addressed at local level, with Local Authorities and schools working together. Secondly it focused on all aspects of education (leadership, accountability through a better data collection; pupil's attainments; school-to-school collaboration) and involving all the parties (LAs, school leaders, teachers, parents and pupils). Thirdly it was characterized by a great flexibility that allowed modifying activities on the base of changing school's needs. Finally, there was not a single approach but the support package was bespoke for each school and agreed by schools' leaders, LAs, civil servants and the local team of Advisors. Based on the findings of a mixed methods evaluation, City challenges area achieved the majority of their initial targets. Indeed, London schools in each quintile of 2008 attainment improved significantly than in areas not included in the City Challenge programme (with the exception of the highest quintile of secondary schools). In Greater Manchester and the Black Country, the picture was less clear since only schools in the lowest quintiles of attainment (and in some other quintiles) improved significantly more than those outside City Challenge areas. The attainment of pupils eligible for Free School Meals (FSM) increased by more than the national figure in all areas (with the exception of Greater Manchester primary pupils) and the attainment gap between pupils eligible for FSM narrowed for London primary and secondary pupils, and Greater Manchester primary pupils. Also the proportion of Good and Outstanding schools increased in all three areas, despite the introduction of a more challenging Ofsted inspection framework (DfE, 2012). In addition, 'London Challenge', thanks to the high involvement of schools and their staff in the decision and implementation process, had also a positive impact on inspiring teachers already in the system and attracting new one into the profession (Brighthouse, 2007).

Additional evidence on the importance of teacher's satisfaction to attract better teachers is provided by Green, Machin and Murphy (2008). They show an increasing outflow of teachers from the state to the private schools: 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 in 2008. Moreover private schools employ more teachers with a postgraduate degree and the gap has grown over time. In the period since 2000, 60 per cent of male teachers in the private sector had a higher degree compared with 45 per cent in the state sector. Given that the wage gap between these two groups of schools is negligible (at least in non 'shortage subjects') what really matters in explaining the teachers flow are the better working conditions and in particular the higher level of satisfaction in the private schools.

4.6 Individual policies have not been properly evaluated

Evaluating educational reforms and identifying efficient policies is often difficult. Firstly, evaluations of long term labour market and social outcomes cannot be performed immediately after the programs have been initiated. Secondly, education systems are very context-specific; different countries perform well under different institutional settings. This means that policy evaluations have to be interpreted in a context-specific institutional framework.

In the UK, there has been a lack of rigorous and independent evaluation of policies implemented over the years. Even where they exist, they are not always considered in the policy-making process. The abolition of the Education Maintenance Allowance is a case in point. The Education Maintenance Allowance was launched nationally in the UK in 2004. It provided low-income 16 to 19-year-olds with payments of up to GBP 30 per week if they stay on at school or college. This policy was independently and rigorously evaluated, yet that evaluation seems to have been ignored when the policy was scrapped in 2010. The Department for Education cited research by the National Foundation for Educational Research which showed that 90 per cent of students who receive EMA would still continue with their education without the payment. However, this was a gross misrepresentation of the evaluation evidence and research. Extensive quantitative and econometric evaluations of the EMA by the Institute for Fiscal Studies (IFS) in 2005 showed that the scheme significantly improved both staying-on rates and qualifications for students from poorer backgrounds. The government had chosen to ignore this rigorous and independent evidence, and had instead argued that the abolition of EMA is justified by high levels of "deadweight".

There are nevertheless notable exceptions. The more recent and rather encouraging one is the Education Endowment Foundation (EEF), established in 2010 to look at what interventions work to overcome educational disadvantage. The EEF aims to build a rigorous evidence base of what works to raise the attainment of the lowest performing, and most disadvantaged children. It has very generous resourcing (Department for Education have given a grant of £125m over 10 years to the winner of a tender process). The creation of such an independent³⁶ organisation is a positive step towards rigorous policy evaluation and a similar approach should be encouraged more widely to inform the debate around education policy making.

There are many advantages to using this kind of platform, i.e. an independent, well-resourced organisation with a very clear remit to focus on the evidence around what works: (i) dedicated and focussed team without the distractions of the normal business of government; (ii) insulation from the demands of other government departments, to rule options out before they had a chance to be considered; (iii) insulation from "political" vetoes; iv) research continuity and strong institutional memory; and (v) ability to bring in multi-disciplinary expertise.

³⁶ The EEF has no one from DfE on the Board, there are no politicians on the board; it is an independent organisation supported by charities.

5. Policy Recommendations

5.1 Core recommendations on education

Our proposals go with the grain of the academies movement. But the system needs to deal more squarely with the UK's failure to develop the talents of disadvantaged pupils. We therefore propose some direct steps, particularly financial and non-financial incentives, to address this fundamental problem.

The 'academisation' of the school system should deepen into a 'flexible ecology', building on aspects of the higher education system (see below). There are four integral parts: greater school autonomy, strengthened central accountability (transparent information and inspection), wider parental choice and more flexibility for successful schools and their sponsors to expand.

To improve school governance, leadership and management, it must become easier for outstanding sponsored academies to grow. Ideally this operates at the school level by making physical expansion easier. But there may be spatial limitations, which is why expansion through the growth of networks of sponsored academies is also an important way to spread better practices. By the same token, it should be made easier for underperforming schools to shrink and, if they do not improve, to be taken over or, in extreme cases, closed down.

Changes to help to develop the talent of **disadvantaged pupils** include:

- Information on school performance needs to be changed to also reflect the performance of disadvantaged children within the school. Such changes should apply to league tables and targets and they should be more closely reflected in Ofsted's inspection regime. Improving the performance of disadvantaged children should be given a central role when Ofsted awards an 'outstanding' grade to a school.
- 'Floor targets' must be redesigned to become effective in addressing poor school performance and should be aligned with the guidelines defined in the framework for schools inspection. This should involve moving away from undifferentiated average performance targets (such as the current target, which requires 40 per cent of A* to C passes at GCSE level). These are 'blind' targets that distort schools' incentives to target resources and support towards those children who can more readily be expected to reach the pre-defined threshold.
- Contextual value added (school exam results adjusted for intake quality) should be published by school for pupil premium children and for the medium-performing Key Stage 2 group.

The expansion of new sponsored academies should be focused on underperforming schools serving disadvantaged children. The original programme was shown to be very successful in doing this (Machin and Vernoit, 2011). But the post-2010 academies are less focused on this group of schools.

Teacher quality needs to be improved through better conditions for both entry and exit. Teacher recruitment and training could be improved by:

- Teach First (which is renowned for its outstanding track record in recruiting high quality graduates) should expand until it becomes one of the main routes into school teaching.
- Mainstream teacher recruitment should become more concentrated in the best universities and schools, following a national recruitment process.
- The probation period for teachers should be extended in length – for example, by doubling it from two to four years.
- Policies that insist on grades, qualifications and backgrounds should be relaxed to encourage a wider range of applications to reflect the fact that teacher effectiveness is not highly correlated with crude background indicators.
- Mechanisms for teachers and schools to share best practice should be more strongly encouraged. The ‘London Challenge’ programme has shown how successful this could be.

Our proposed measures would, we believe, work together to increase the skills that are needed to make the UK economy a more competitive and dynamic place to do business and directly tackle the longstanding problem of poor intermediate and low-level skills. Together they would ensure that fewer of our children leave school ill-equipped to work in the competitive international environment that we now face. These proposals would also reduce disadvantage without compromising the achievements of other children.

5.2 Further recommendations for schools

To provide additional support for disadvantaged pupils, the criteria for receiving the pupil premium should be expanded to reflect a wider measure of disadvantage than simply free school meals. This need has now been acknowledged by making eligibility for the pupil premium dependent on whether a family has ever been eligible for free school meals in the last six years. But available databases could expand the definitions of eligibility further.

The pupil premium is planned to increase from £600 to £900 in 2014/15. We recommend that part of the premium should be given in cash to the pupils and families to provide an individual incentive. This should be conditional on improvements in performance after age 14, such as attendance and grade improvement beyond pre-agreed baseline expectations. This kind of ‘conditional cash transfer’ programme has proved to be effective in a wide variety of programmes (in welfare reform, for example, re-employment vouchers are usually more effective if the bonus is kept by the jobseeker rather than the firm). The precursor to this approach was the Educational Maintenance Allowance, which evaluations show was effective in encouraging children from disadvantaged backgrounds to remain in school. We recommend that the bursary scheme that replaced Educational Maintenance Allowance should be wrapped back into this.

More resources should be made available for programmes that provide better information to low income children and parents on the economic returns to different subjects.

In the spirit of encouraging better teaching, a more flexible system of rewards should be introduced for pay and promotion. This would include ending automatic increments; basing pay on performance and local market conditions; and extra rewards for teachers of core subjects in tough schools. We need swifter action on improved professional development and movement out of the classroom for underperforming teachers. Some of these changes are starting to happen and we expect this process to accelerate under the flexible education system that we are recommending, which should give head-teachers the incentives and capabilities to make these reforms.

UK education policy has traditionally lacked rigorous, independent evaluations. Positive steps have been taken in this direction with the creation of the Education Endowment Foundation, but much more could be done. For example, we recommend piloting the release of teacher-level information on performance (in similar vein to NHS data available on surgeons).

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