

**Education in a Devolved Scotland:  
A Quantitative Analysis**  
Report to the Economic and Social  
Research Council, March 2013

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## 1. Introduction

Education is an area that is highly devolved in the UK, and the fact that all four constituent countries have pursued very different policies in the recent past provides a good testing ground to undertake a comparative review of the merits or otherwise of the education reforms that have taken place. There is, of course, an important policy context to such an analysis. Examining the performance of children educated in the devolved Scottish system in comparison to those educated in England, Wales and Northern Ireland has potential to offer a unique and valuable insight into the impact of Scottish devolution in a high profile area of public policy.

There are several key differences in the Scottish education system: Scotland's curriculum is non-statutory, unlike the other countries of the UK; its qualification system of Scottish Standard Grades and Highers is quite different to the system of GCSEs and A-levels in place in the rest of the UK; unlike England, Scotland's local authorities play a powerful role in school management.

When deciding whether or not to seek independence from the UK, the Scottish electorate will need to consider how a devolved Scotland has fared in educating its nation under its own terms – and hence how they might fare when taking ownership of other policy areas. In examining the key differences in attainment bearing in mind these differences, this report will help answer this question.

However, it is important to acknowledge that while there are clear differences in the way education systems work in all the countries of the UK, at the same time there are many similarities between the four countries that limit the extent to which their education systems can be truly devolved. For example, tax and benefit policies – which influence the level and distribution of spending in education, as well as the level of inequality as a whole – are decided at a UK level. This report therefore provides a contribution to the independence debate within this specific context.

The aim of the report is to assess and compare educational performance of young people in the four constituent countries of the UK and consider the implications for Scottish independence. Specifically, we use national statistics and international survey data to assess the performance of Scottish pupils relative to those in the rest of the UK. We also consider how educational performance has changed over time in each country, and whether differences arise for young people of particular age groups or at particular key stages of education. Moreover, we will consider whether devolution has allowed Scotland to perform differently from the rest of the UK in terms of the extent of inequality of educational outcomes, investigating the extent to which gaps in attainment between gender or by different income groups are more or less severe in Scotland. Alongside the analysis of educational attainment, we also review a range of policy evaluations of particular educational programmes across the UK and in Scotland (such as the Clackmannanshire project, which implemented synthetic phonics in Scotland), aiming to understand whether specific initiatives have led to different pupil outcomes, in what way, and what can be learned.

This report is structured as follows. In Section 2 we provide context with a discussion of the key differences in education policies between the UK countries, with particular emphasis on Scotland. Section 3 comprises the quantitative analysis section of the report, presenting the results of our comparative review of educational attainment using both national statistics and international survey data on pupils in Scotland, England, Northern Ireland and Wales. In Section 4 we discuss we then discuss evaluation evidence as it relates to key educational issues and the differences and similarities in educational outcomes across the different UK nations. In Section 6 we conclude with a discussion of the implications of

the results and review of evaluation considering what we can learn about the impact of Scotland's devolved education system and the implications for the independence debate.

## 2. Policy Context

In determining whether Scotland's devolved education sector has been effective it is important to understand the ways in which the country has differentiated itself from the rest of the UK in terms of its education policies. In fact, over the years, Scotland has adopted a number of different education policies compared to the rest of the UK.

Firstly, while England, Wales and Northern Ireland have a similar National Curriculum, with a set of core subjects and assessments which must be followed by law, the curriculum in Scotland is non-statutory and so is not dictated by the Government. It is also somewhat less prescriptive than that in England, Northern Ireland and Wales. The curriculum consists of a set of guidelines for teachers to follow (Ellis, 2007). This set of guidelines was recently updated (after a lengthy consultation) and launched as Scotland's new 'Curriculum for Excellence', being taught in Scottish secondary schools from 2012<sup>1</sup>. The new curriculum proposes to better connect the various stages of the curriculum from 3 to 18, making learning more continuous over school years and between subjects, and reduce over-crowding in the curriculum, which previously emphasised breadth across a range of subjects in a similar way to the Republic of Ireland. However, the new system is no more prescriptive than previously.

However, decentralization of the curriculum also has the impact that children across Scotland may have very different – and potentially unequal – experiences in the classroom. For example, in terms of pedagogy, a major initiative implemented across England was the 'national literacy and numeracy strategy' (implemented in 1997/98 and 1999/2000 respectively). Schools were instructed to implement daily 'literacy hours' and a daily 'numeracy hours' in primary school, accompanied with more focused instruction on literacy and numeracy, and a more structured framework. In Scotland, no such national strategy is in place – and instead numeracy and literacy is the concern of each Local Authority. That said, the new Scottish Survey of Literacy and Numeracy, which tests a random sample of Scottish students at different levels of schooling, aims to support the development of improvements in literacy and numeracy which were outlined in the Curriculum for Excellence.

Decentralisation is also in place in Wales, and a comparative study of the Welsh decentralized approach to numeracy versus the top-down approach of England resulting in a 'mixture of different initiatives' and meant that Welsh children did not enjoy "equality of teaching" (Jones, 2002) despite Welsh LA's appeared commitment to driving numeracy improvements.

On the other hand, Scotland's more decentralised approach to pedagogy can be seen to put education into 'the hands of practitioners' (Ellis, 2007), and has prompted some interesting initiatives. For example Clackmannanshire, a Local Authority in the North East of Scotland involved teaching children how to read using synthetic phonics. This policy was widely considered a success (as will be discussed in Section 5), and the reaction in England was to implement a national strategy based on the Clackmannanshire project.

Assessment in Scotland is also quite different to that in the rest of the UK and pupils face different incentives with regard to the duration of schooling. Assessment in England, Northern Ireland and Wales consists of exams at several key stages, with formal assessment in the form of the General Certificate of Secondary Education (GCSE) beginning in the 11<sup>th</sup> year of schooling and ending in the 12<sup>th</sup> year of schooling when pupils are 16. Pupils may

<sup>1</sup> See: <http://www.educationscotland.gov.uk/thecurriculum/whatiscurriculumforexcellence/index.asp>

then leave school or continue for another two years of study, culminating in A-level exams – with a minimum of three usually required for university entrance – at age 18. Scotland’s system is somewhat more ‘modular’ than this, with formal exams spread out over the school years. Pupils sit Scottish Standard Grades in the 10<sup>th</sup> and 11<sup>th</sup> years of schooling at age 15 and 16, meaning compulsory schooling comprises 11 years (though some pupils may even leave during the 11<sup>th</sup> year when they turn 16), rather than the 12 years of schooling required in England. Those in Scotland that elect to stay on for post-compulsory schooling sit Scottish Highers at age 17 and Highers and Advanced Highers at age 18. Able pupils at age 17 can take five Higher subjects – which would enable entry to higher education. Acceptance at university depends on the course and institution in question, but is particularly true for universities in Scotland since Scottish university courses traditionally have a duration of 4 years (in contrast to the standard 3 year courses offered at universities in the rest of the UK), meaning the loss of one year's schooling is compensated by an additional university year.

Aside from making attainment across the countries difficult to compare (as will be discussed in Section 3), the more modular Scottish system appears to offer pupils less incentive to stay on at all levels of education. Some pupils can leave during S4 – the final year of Scottish Standard Grades in Scotland, whilst in England all pupils must finish year 11 (after two years of studying for GCSEs) before they can leave. Furthermore, Scottish pupils who do stay on to do Highers can feasibly leave at age 17 (after 1 year of post-compulsory education) with some qualifications. In contrast, there are greater incentives for pupils in England, Wales and Northern Ireland to commit to two years of post-compulsory education – whilst pupils can leave at age 17 with AS-levels – the modular equivalent of one year of A-levels, these are not sufficient to gain entry to university. We will explore the impact of Scotland’s modular system on staying on rates in Section 4.

Thus, Scotland has actively differentiated itself from the rest of the UK in terms of its curriculum and assessment of its students, and in terms of its university education system. However, a number of other key differences exist between Scotland’s system and that of other UK countries, largely arising from active differentiation by policy-makers in those countries, rather than by Scottish policy-makers. Indeed, since education policy has long been decided by the constituent countries of the UK, many differences in education policy have arisen across the four countries over the years. This has made the UK a ‘natural laboratory’ for testing what works in policy (Raffe and Byrne, 2005).

For example, in terms of school type, while Scotland, alongside (most of) England and Wales, in the 1960s and 1970s collectively abolished the selective system of education that was introduced in 1945, Northern Ireland, chose to keep the grammar school system due to parental pressure in some local authorities and the election of a Conservative government in 1979 (which brought comprehensivisation plans to a halt in the Province). Under this system, children are tested at age 11 and are selected into academically elite grammar schools or other secondary schools, with about 40% of the cohort attending grammar schools.<sup>2</sup> This prompted debates about the merits of selective education versus the comprehensive model of education (whereby pupils are not selected on the basis of academic achievement or aptitude) that Scotland, England and Wales put in place.

Again in terms of school type, Local Authorities in Scotland and Wales retain control over the schooling system. By contrast, English policy has veered increasingly towards school autonomy. Schools in England are increasingly able to opt out of Local Authority control by virtue of the academies programme. This was introduced in the 1990s and was originally targeted at failing schools in deprived areas, but has since been expanded by the

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<sup>2</sup> There have been recent changes to the system in Northern Ireland, with the abolition of a centralised ‘11 Plus’ examination. However, selection still takes place on the basis of educational achievement at age 11.

Coalition government to include many more state schools; as of 1<sup>st</sup> October 2012, there were 2,373 academies open in England. The key differences between academies and the typical state school are that academies have responsibility for employing all staff, agreeing pay and conditions, freedom over most of the curriculum (except for core subjects) and all aspects of school organisation (see Wilson, 2011). These matters are largely in the hands of the Local Authorities in Scotland and Wales (with the caveat that Scotland has no official curriculum as previously discussed). Northern Ireland also differs from the rest of the UK in being largely segregated along religious lines. Most schools are strongly segregated by religion in that they have either high proportions of Protestants or of Catholics. There is also a much higher proportion of single sex schools (particularly among grammar schools) than in the rest of the UK.

A further key difference among schools in the four nations concerns educational resources. Scotland appears to set itself apart in terms of pupil teacher ratios, which are lower than Scotland compared to the rest of the UK, implying that spend per pupil is higher in Scotland. For example, the pupil:teacher ratio in Scotland was 16.3 in primary schools in 2009, versus 21.8, 19.9 and 20.8 in England, Wales and Northern Ireland. Secondary school pupil:teacher ratios are somewhat higher in all four countries, but follow the same pattern (though the Northern Irish pupil:teacher ratio for secondary schools is somewhat lower – though still above Scotland’s). Recent reports have cited a significant drop in teachers in Scotland, but this appears to have happened in conjunction with falls in pupil numbers, meaning the ratio has stayed stable<sup>3</sup>. Scotland’s more generous pupil:teacher ratio is also reflected in other data on school expenditure, although there are doubts about its reliability (CPPR, 2009).

In summary, there are a number of policies in place in Scotland that differentiate it from the rest of the UK – in particular, its decentralised curriculum and learning strategies make it quite different from England’s more nationalistic approach. This could lead us to see more inequalities in learning in Scotland if Local Authorities with a different make-up of children adopt very different approaches.

On the other hand, England’s move towards autonomy may result in even more decentralised learning in England (since academies do not have to follow the national curriculum, except for in core subjects).

Furthermore, Scotland has chosen a very different and more modular system of assessment, particularly at ages 15-18, which could result in differences in terms of educational attainment at the end of post-compulsory schooling.

However, it is important to bear in mind that, aside from differences in education policy, there are also important differences in other factors that correlate with educational attainment. Scotland is a relatively poor country compared with England and has much lower proportions of ethnic minorities (e.g. see ONS, 2002). Furthermore, while Scotland can adopt different education policies, it is not able to (greatly) implement different fiscal policies which would be needed to fund major initiatives. The labour markets of all four countries are also heavily interlinked. Therefore, we might expect there to be fewer differences in terms of educational attainment between the four nations than might be expected on the basis of their different education policies.

### 3. Data

For the purposes of this analysis we make use of data from a number of different sources.

<sup>3</sup> See <http://news.bbc.co.uk/1/hi/scotland/7960910.stm>



The first step in our analysis is to examine educational attainment at as early an age as possible, to explore the differences in early cognitive skills of children. Our earliest available data on this comes from assessments of word reading and maths in the Millennium Cohort Study (a sample of children born in 2000), administered when children are aged 7. The data come from the most recent wave of the study (wave 4) conducted over the period January – December 2008. Scores are standardised to have mean 50 and standard deviation 10.

We go on to use national datasets to explore differences in attainment of pupils in official school tests. The earliest official data we have for pupils in Scotland is from Scottish Standard Grade tests which take place when pupils are aged 15 and 16 (official data from England and Wales in the form of Key Stage 2 tests, is available at age 11, but since we have no comparable data for Scotland we exclude these results). We compare the Scottish Standard Grade test results of pupils in Scotland with the GCSE examination scores of pupils in England, Wales and Northern Ireland; tests taken when pupils are age 16. Since these examinations are not directly comparable we make use of government targets – in the case of England, Wales and Northern Ireland, the longstanding target for GCSE attainment is 5+ GCSEs at A\*-C. In Scotland, results are expressed as % of S4 roll achieving 5+ Awards at Scottish Qualifications framework (SCQF) level 4 or better.

Again using official national datasets, we examine the examination results of those staying on to do non-compulsory education (at age 18 in England, and at age 17/18 in Scotland). In Scotland we look at the % of the S4 year group achieving 5+ Awards (Higher or better), which we compare with the % of students 18 year olds with 2 or more GCE/VCE A level or equivalent in England and Northern Ireland. In Wales a slightly different but equivalent measure is used: the proportion of 18 year olds achieving Level 3 or more (equivalent to 2 or more A-levels).

For obvious reasons, we cannot always be confident about comparisons based on these official statistics – exams are taken at different ages and have different content and focus. For this reason, we bolster these comparisons by examining test results from international data sets. In this case all students will have taken exactly the same test.

We use data from an international reading test for 10 year olds (the Progress in International Reading Literacy Study, PIRLS), in which England and Scotland both participated in 2001 and 2006. Scores are standardised so that the mean across all participating countries within each dataset is 500, and the standard deviation is 100.

We also have maths test results for 10 year olds from the Trends in International Mathematics and Science Study (TIMSS). Again, England and Scotland both participated in 1995, 2003 and 2007 which gives us something of a time-series of results. We can also use TIMSS to make comparisons between the maths scores of 14 year olds in these countries.

Finally, we use test scores in the Programme for International Student Assessment (PISA) can be compared across all four countries of the UK both in 2006 and 2009, and we additionally have a longer comparison of England and Scotland for the years 2000, 2003, 2006 and 2009.

Comparability between the different data sets (and even, in some situations, over time for the same data set) is problematic because a different set of countries is used for each international data set. To ensure comparability, scores have been normalised for the countries taking part in each survey and are expressed relative to an average of 500 (with a standard deviation of 100).

## 4. Findings of Comparative Analysis

### 4.1 Early years

A first step in trying to compare the effectiveness of educational systems of countries in the UK is to examine their ‘inputs’ – i.e. the relative ability of pupils at an early stage.

In the first column of Table 1 we compare the age 7 maths and reading scores across countries, using test results from the Millennium Cohort Survey in 2008. The results have been standardized here to have a mean of 50 and a standard deviation of 10.

The scores across all four countries are very similar (especially with regard to Maths), and only a little lower for reading in Wales and Northern Ireland (a score of about 47, compared to about 50 in England and Scotland). This seems to imply that pupils in each country start their school careers with similar levels of cognitive skills. However, it may be the case that there are different levels of poverty and inequality across the UK. As it is widely known that high poverty levels are associated with lower performance in early tests of cognitive ability (e.g. Feinstein, 2003) we additionally show these findings adjusted for differences in demographics, parental education and poverty, as measured by fsm eligibility. The results of this analysis show that for reading English children perform best at age 7; though the difference between reading scores for Scottish and English children, while significant, is very small compared to Wales and Northern Ireland. In terms of maths capability at age 7, there are no significant differences between England, Wales and Northern Ireland, though Scottish children perform slightly worse.

This analysis suggests that there are small differences in cognitive maths and reading skills at age 7, though these are by no means stark.

### 4.2 Compulsory and post-compulsory education – national statistics

As described in Section 2, schooling in Scotland is quite different from that in the other two countries, with pupils studying for their first compulsory qualifications (Standard Grades) in the 10th and 11th years of schooling – with exams at age 14-16, compared to England, Wales and Northern Ireland where GCSEs are taken at age 15 and 16 in the 11<sup>th</sup> and 12<sup>th</sup> years of schooling. This, and the different examination system in place in Scotland, make comparisons of performance rather difficult.

Nevertheless, in Table 2 we present the GCSE or equivalent results for each country.

The overall indicator (5+ GCSEs at A\*-C or equivalent a longstanding government target for GCSE attainment) is at a similar level in England, Scotland and Northern Ireland. However, this has not always been the case. Figure 2 shows this measure over time for the past 15 years and indicates that while attainment in Scotland has been relatively consistent over time, attainment in England, Wales and Northern Ireland has steadily increased, so that a once large gap between Scotland and the other countries is almost non-existent. This may, of course, be due to grade inflation in other countries, rather than any indication of improving ability; in Section 4.3 we will examine international survey data for pupils at ages 10-15, which will help us to understand the causes of these gaps.

Wales continues to lag behind the other countries by this measure, since the proportion achieving this target is around 10 percentage points lower. However, we can also look at the proportion of pupils achieving GCSE or equivalent qualifications in core subjects. On this measure, the gap between countries is much less stark, and the proportion of pupils achieving GCSE maths is close in Wales and Scotland (50% and 48% of students achieving a grade A\*-C in 2006/07) but slightly higher in England and Northern Ireland (about 54% in each case). However, Scotland’s performance in maths is much better at this level – with almost 70% achieving a good GCSE in maths, versus around 60% in the other countries.



These results are relatively encouraging for a devolved Scotland – suggesting that a comparable proportion of Scottish children are achieving appropriate qualifications at compulsory age.

Next, we can look at staying on rates in the different countries; while the evidence suggests that Scottish children are reaching school leaving age with a good grounding in English and maths, it is important to know what happens next.

The results of this analysis are rather less encouraging for Scotland – though again there are considerable problems in making comparisons of staying on rates for various reasons. Table 3 shows staying-on rates for the 16 and 17 year-olds in England, Scotland, Wales and Northern Ireland. This table somewhat highlights the issues in comparing data across countries. Data presented include those in Sixth Form and FE colleges in England. Although students in FE colleges may be studying for A-level qualifications, they may also be studying for a range of vocational qualifications. Conversely, those in FE colleges in Scotland would not be studying for Highers. Furthermore at age 16, students in England would be expected to be in education (finishing GCSEs) whilst in Scotland, the majority of 16 year olds will have completed compulsory education.

Nevertheless, it is of interest to study the figures in this table. The statistics show that staying-on rates of 16 year-olds are lowest in Scotland; 76% of 16 year-olds are in full-time education of some sort in Scotland, versus 78% in Wales and Northern Ireland, and 82% in England. The picture looks somewhat bleaker for 17 year-olds (who in Scotland would be in the first or second year of post-compulsory education, and in England would be in the first year of 6<sup>th</sup> form); staying on rates for Scotland are again lowest, with 41% in either school or college in Scotland, versus 62% in Wales, 68% in Northern Ireland and 70% in England. This analysis suggests that Scotland lags very much behind in encouraging its young people to stay on in school or college.

Further data from Scotland confirms this finding; the proportion of S4 (age 15-16) pupils staying on to S5 in 2010 was 83% in Scotland. However, the proportion of S4 pupils staying on to S6 – the last year of compulsory schooling and arguably the most important for university – dropped to only 54%. As previously mentioned, the lower staying on rates in Scotland may reflect the more modular system with qualifications gained after 1 year increasing the incentive for pupils to leave school earlier. But the staying-on rates also reveal a more worrying issue – that pupils in Scotland will leave school having accumulated less years of education than those in the rest of the UK.

These findings are reflected in the A-level/Scottish Higher attainment of pupils, which again are shown in Table 2; Scotland (and Wales) lag far behind England and Northern Ireland in A-level/Higher attainment. In Scotland, this may well be a direct result of poor staying on rates.

Finally, low staying on rates and a lower rate of ‘higher attainment’ should result in lower levels of university attendance in Scotland. This is confirmed by Figure 3, which shows that university participation of Scottish domiciled students has lagged behind that of students in England, Wales and Northern Ireland for some time. This is despite the free tuition policy that has been in place in Scotland since 1999; indeed the gap between participation in England and Scotland has widened in recent years, despite large fee increases for English students.

The comparison of official data is quite problematic, particularly given the different systems in each country. However, lower staying on rates, lower rates of attainment at age 17/18 seem like potential causes for concern in Scotland, particularly since Scottish individuals appear to be less likely to go on to university. This could be cause for alarm in a devolved Scotland.

### 4.3 School performance – international data comparisons

As discussed extensively above, it is difficult to make comparisons between the four countries of the UK given the differences in their curricula and examination methods and timing (this is particularly the case for Scotland). However, there are three international surveys in which countries of the UK variously participate and which test students from each country in exactly the same way and when students are the same age.

In Table 4, we show figures for the four UK nations for the three international data sets, for all the years these surveys are available. The first two rows relate to an international reading test for 10 year olds (the Progress in International Reading Literacy Study, PIRLS), in which England and Scotland both participated in 2001 and 2006. The next rows show maths test results for 10 year olds from the Trends in International Mathematics and Science Study (TIMSS). This time, England and Scotland both participated in 1995, 2003 and 2007 giving us something of a time series. We can also use TIMSS to make comparisons between the maths scores of 14 year olds in these countries. Finally, test scores in the Programme for International Student Assessment (PISA) can be compared across England, Scotland and Northern Ireland in 2000, 2003, 2006 and 2009, with Wales present in the study from 2003 onwards.

Comparability between the data sets (and even over time for the same data set) is problematic because a different set of countries is used for each international data set. However, to ease comparisons between data sets given the different set of countries used each time, in each case, the scores have been standardised for the countries taking part in each survey and are expressed relative to an average of 500 (with a standard deviation of 100). This standardisation does not allow datasets to be compared over time, however, due to the different countries being included.

Looking first at the reading scores of 10 year olds in England and Scotland (via the PIRLS study), it is first clear that both countries out-perform the country-average, to the tune of one-third to half a standard deviation higher than the average of other countries taking part depending on the year. Comparing the two countries, we can see that English 10 year-olds performed rather better than those in Scotland in 2001 (by about 20 points), but a decrease in performance in England and an increase in Scotland meant that by 2006, the two countries were very close on this measure, with English children, at 536, scoring only 6 points more than Scottish children at 530.

Looking next at the scores of 10 year olds when it comes to maths, we can compare scores over a slightly longer time-frame using the TIMSS study. Figure 4 shows that Scotland performs somewhat poorly compared to both the country-average and England, although this has not always been the case – in fact, in 1995, England and Scotland had very similar scores. Interestingly, and similar to Figure 2, we can see that Scotland's performance has been rather stable, whilst England pulled away between 1995-2007, with pupils scoring well above the country-average in 2007. In Figure 5 we show TIMSS scores for slightly older pupils, aged 14 at the time of testing. Both England and Scotland perform more poorly at age 14 than at age 10, and both are close to the average. But again by 2007, English pupils significantly improve to outperform Scotland and exceed the average, scoring 515 points. Interestingly, the improvement of 14 year olds in the 2007 test coincides with the improvement in 10 year-olds in England that was observed four years previously, suggesting that any improvements made in England in 2003 carried through. However, it should be noted that the distance between England and Scotland for 14 year olds in 2007 is far less, at 26 points, compared with 10 year olds in 2003 where the difference is 47 points.

The third international study we can look at is the PISA study, in which all OECD countries participate. Table 4 shows maths and reading scores for 15 year olds from England, Scotland and Northern Ireland every three years between 2000 and 2009 (and Wales between

2003 and 2009). The findings highlight an important issue; Wales always lags behind the other UK nations, with the gap appearing to widen between Wales and its closest comparator in 2009 – in which Wales was 25 points behind Scotland in reading, and 28 points behind Scotland and Northern Ireland in maths. This relatively poor performance is consistent with the relatively poor performance on some national indicators described above - the general GCSE indicator (5 or more GCSEs) and 2 or more A-levels.

The results for England, Scotland and Northern Ireland, however, are consistently better than Wales and are more similar than different in both the PISA reading and maths tests; for all four years we can look at the points scores are within 15 points of each other. Figures 6 and 7 show PISA scores for England and Wales over time and it is clear from these figures that, unlike in more recent TIMSS studies, the countries performance is very similar in every year – although again there is no improvement in Scotland’s performance in the test over time. Indeed both countries’ performances declines relative to the average, so that in 2009 both are slightly below average for maths, and England is slightly below average for reading, with Scotland scoring exactly 500. Figures 8-9 show the distribution of results for 2009 maths and reading. These distributions show that the results are very close for England and Scotland for both reading and maths at all places in the distribution.

So, what might account for the rather different patterns in performance at maths between the TIMSS and PISA studies?

One potential issue that may account for the different results between studies is that the composition of survey participants may be different. For example, there is more poverty in Wales than in the rest of the UK, with 36% of Welsh children living in poverty (defined as living in households with income below 60% of the median), compared to 25% in Scotland, 26% in Northern Ireland, and 30% in the UK as a whole (The Poverty Site, 2012).

Again, we can adjust the figures to take account of the relative poverty of participants, as well as other potentially important factors. In Table 5 we present PISA results adjusted for coefficients for differences in demographics, parental education and socio-economic status. Adjusting for gender, immigration and parental education removes the difference between England (the omitted category) and Scotland and Northern Ireland. However, Wales remains rather far behind even accounting for these factors. We can also include controls for socio-economic status and home resources (i.e. books in household), which results in Scottish students performing very similarly, but consistently better than England across 3 out of 4 of the tests, though the differentials are very small and imply highly similar performances between England and Scotland on the PISA test. However, at most, this positive differential is 8 points – which is not a large difference in the context of some of the other differentials discussed above. The main insight of this exercise is that relatively poor performance in Wales is not primarily due to more disadvantaged students taking part in the PISA survey (at least, not as captured by these measures).

We can perform the same exercise using the TIMSS survey results for England and Scotland. Like the analysis above, adjusting for admittedly a poorer set of controls (comprising gender, ethnicity and books in the household) we see no substantial changes in the pattern of results, which still show large gaps between England and Scotland, in England’s favour, in 2009.

It is important to note, though, that while we can compare within countries in each international study, it is more complex to compare across studies. As the Scottish Executive note in their 2003 analysis of PISA performance, the PISA study is somewhat different to TIMSS in its measurement “*The assessments used in TIMSS were constructed on the basis of an analysis of the intended curriculum in each participating country so as to cover the core material common to the curriculum in the majority of participating countries. By comparison the assessment material used in PISA cover the range of skills and competencies that were*

*considered to be crucial to an individual's capacity to fully participate, in respect of the assessment domains, in a successful modern society (in other words, to apply their skills in 'real life' situations)."* (Scottish Executive, 2003)

Indeed, Scotland have now decided to withdraw from TIMSS and PIRLS for economic reasons, but will continue to be involved in the PISA study which they consider to be the "the key international measure of educational achievement in maths, science and reading" (Scottish Executive, 2010)

A further difference between the two studies is that the PISA study assesses pupils towards the end of schooling (when pupils are age 15), whilst the TIMSS study assesses pupils in middle primary and in early secondary school.

Nevertheless, aside from the most recent years, results from all the international studies show more similarities than differences between Scotland and the rest of the UK, which is striking given the quite different educational systems in each country. This may arise in part because of the similar cultures and shared labour markets of each country.

#### **4.4 School performance – educational inequality**

In this Section, we consider whether Scotland's differing educational system has resulted in different levels of inequality compared with the rest of the UK. We can consider two main types of inequality that are common in educational outcomes; attainment gaps by gender, or by socio-economic status.

Table 7 presents national data on GCSE/Standard grade and A-level/Higher attainment for boys and girls, with the attainment differences between both in each case presented as the attainment for boys minus the attainment for girls. As we are looking at gender differences within examination type we can be more certain of our findings.

Looking first at gender differences between pupils in early years (when they are aged 7), we can see that gender differences in reading and maths are very small in magnitude. For maths, the differences are in favour of boys and are fairly consistently small across countries. The differences for reading are slightly higher and this time are in favour of girls. Across countries, Scotland seems to be the most equal country with the gap between males and females only -0.7 points compared to -1.7 for England and Wales and -1.9 for Northern Ireland.

As pupils age and receive more years of schooling, girls in each country begin to pull away from boys in terms of performance. Interestingly, it is lowest in Scotland (5.4 percentage points) and highest in Northern Ireland (12.9 percentage points) with England and Wales' gender gaps somewhere in between. In figure 10 we plot gender gaps in GCSE/Standard Grade attainment over time, again measured as the attainment for boys minus the attainment for girls. This figure suggests that the gender attainment gap has been lower in Scotland for at least 10 years, and that while gender gaps in all four countries have been closing over the last decade, the gap has narrowed at a faster pace. While there have been improvements in performance for both boys and girls in Scotland, the result comes about because of boys improving at a faster pace.

Gender gaps are also evident when it comes to attainment in post-compulsory years, as measured by A-levels and Highers. Again these are in favour of girls and vary from 7.4 percentage points in Wales to 15 percentage points in Northern Ireland. Looking at Figure 11 we can see that the gender gaps have been increasing over time for this measure for all four countries; in each case because of girls improving their performance at a faster pace than boys. Again, however, the narrowest gaps are found in Scotland, with similar gender gaps in Wales.

Whilst these results fairly consistently show girls performing better than boys at age 15/16 and 17/18 it is notable that gaps for maths are very much smaller than gaps for English,



at age 16. It may be the case that whilst many more girls achieve 5 or more GCSEs and 2 or more A-levels, the mix of subjects they choose may be very different – thus making the results less comparable.

Again, looking at international statistics will help us understand better these gaps. In Table 8 we see severe gaps for reading at age 10 in both England and Scotland, with mixed results for maths (males outperform females in Scotland, they are level in England). Looking at results for 14/15 year olds, we again see girls outperforming boys in reading (PISA) and boys outperforming girls in maths (TIMSS and PISA) – though there are large differences in the extent to which boys outperform girls, depending on the test used (PISA gaps are far larger than TIMSS gaps). This again points to the possibility that the tests are quite different.

Nevertheless, the findings relatively consistently show large gender differences in favour of girls for reading, and vice versa for maths suggesting gender differences are not arising through girls taking a different mix of subjects.

In Table 9 we explore inequalities according to socio-economic status in each country. In this case, we use eligibility for free school meals as a proxy for socio-economic status. In tables 9 and 10 we can see that there are large inequalities in favour of those from better-off backgrounds at all levels of education – much more so than the differences between countries – and these appear to increase with age. In each case inequality in Scotland is roughly similar to that in other countries in the UK. International datasets from PISA (this time looking at differences between quartile of disadvantage) confirm this – again the differences are stark. The difference between the highest (most advantaged) quartile and the lowest is nearly 1 standard deviation according to tests in both reading and writing (although not as big in Wales). The OECD difference (shown in the last column) suggests that the UK is not unusual in facing such a high degree of inequality according to socio-economic status. However, when we consider the attention which is given to the performance differential between England and Finland (the top European performer in PISA) – and realise that this difference is only half as large (half a standard deviation) – this suggests that we should be even more concerned about large socio-economic differences within countries. This is a problem that all UK counties have in common, and suggests that there is little to differentiate Scotland, in terms of socio-economic inequality, from the rest of the UK. However, the small improvements in gender inequality in terms of GCSE results for Scotland suggest that there may be potential for Scotland to reduce gaps in terms of socio-economic status as well.

#### 4.5 Variance in attainment

Finally, we consider variation in attainment within and between schools. In Table 11 we present between and within school variances for each country using the most recent data from international datasets. These results show bigger between school variances for secondary schools in England and Northern Ireland than in the other countries, including Scotland (from the PISA 2009 dataset). In other words, pupils within schools are more similar in England and Northern Ireland than they are in the other countries – the type of school pupils go to is a highly significant predictor of their attainment. This could arise if there is more sorting or segregation of schools – as there is in Northern Ireland's selective system, and perhaps as a result of England's policies towards school autonomy<sup>4</sup>. These results show that schools in Scotland and Wales have a more heterogeneous intake.

Conversely, there is very little between school variation for 10 year olds (from both PIRLS and TIMSS at age 10) suggesting there is less sorting into primary schools across the board. This may be because there are much fewer secondary schools than there are primary

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<sup>4</sup> There may be a number of potential explanations for this, including differing school sizes in each country; residential segregation; academic selection of any kind and variation in school quality. We are unable to distinguish between these.

schools, or because of travel distance, since secondary school pupils can travel further distances than primary school pupils.

## 5. Evaluation Evidence

In the previous section we found evidence that Scotland's devolved education system has been relatively successful; pupils perform well by UK and international standards, and whilst there is evidence of inequality, this appears no more severe than in the rest of the UK.

Nevertheless, as we outlined in Section 2, there are many policies in place in the rest of the UK which have been relatively successful, and from which Scotland could potentially learn. In this Section, we look at the evidence on the success or otherwise of these policies, considering possible lessons for Scotland. We also look at the evidence on what has worked well in Scotland and hence which policies might be ripe for further investment.

We can first look at key differences in school types across the UK. Scotland's education model consists of uniform comprehensive schools under the control of local authorities. Two alternative systems are in place in the UK. Firstly, in Northern Ireland, rather than a completely comprehensive system, a 'selective system' is in place, in which pupils are tested at age 11, and placed into schools according to their attainment in these tests. Secondly, England has attempted to create more autonomous schools, away from the control of local authorities, by virtue of the academies programme.

A recent study about the selective system in Northern Ireland is by Guyon, Maurin and McNally (2012). They evaluate a change in Northern Ireland's system in which grammar schools were allowed to increase the number of pupils they could recruit (by about 15%). Their study found a strong increase in the number of students achieving good GCSEs and A-levels for the cohort of students affected by the reform – and particularly for those pupils living in the areas where the quotas were lifted. This shows that making the system *less* selective led to an increase in average performance at GCSE and A-level. The authors were able to rule out negative effects that may have arisen as a result of the quality of grammar schools becoming diluted as more pupils attended them. This suggests that (at least in the Northern Ireland context), it was useful to move away from a system where too few students gained access to the 'better' schools.

A major reform concerning the diversity of education comes in the form of the academies programme in England. Unlike the system in Northern Ireland, schools cannot select pupils based on a test of their ability, but in other respects they have a much greater degree of autonomy than other state schools. The early academies programme – in which failing schools in disadvantaged areas were replaced with brand new schools, as described in Section 2 - has been evaluated by Machin and Veroit (2011). Their study found improvements in the performance at GCSE exams of both academies and their neighbouring schools which was not accounted for simply by more able pupils attending academies. Whilst this can be seen as a positive outcome for academies, it is important to note that the academies programme has now substantially widened and more research is needed to understand the impact of the new programme. Nevertheless, it may be useful to consider the advantages and disadvantages of giving different types of autonomy to schools in Scotland, learning from the experience in other parts of the UK.

Another feature of the English system, which is a natural extension to the desire to create a more diverse system, is the availability of published school 'league tables.' Such league tables were abolished in Wales and Northern Ireland in 2001, followed by Scotland in 2003, though Scottish exam data is still published online.



Research into league tables in England has found that the information can be very unstable over time (Leckie and Goldstein, 2011) and the use of particular metrics in league tables (e.g. the proportion of pupils gaining 5 or more GCSEs) could also incentivise schools to concentrate on marginal pupils who are likely to achieve these thresholds, and away from other pupils. A further common criticism is that league tables encourage teachers to ‘teach the test’ (Muriel and Smith 2011).

Of course, when deciding whether or not to invest in the wide publication of league tables, it is important that the possibility of acting on the information in the league tables – i.e. choosing a school based on their position – is actually possible. However, in England, research has shown that the ability to actively choose a school is highly correlated with income since this will usually involve having to purchase or rent a home near a desirable school (see Burgess et al. 2009; Gibbons and Machin 2003; Gibbons et al. 2009; Machin, 2011; Rosenthal, 2003). Thus, the availability of league tables may increase inequality if they improve information to parents from higher socio-economic groups (West and Pennell 1999) and result in meaningful choice only for those that can afford to move to the catchment area of a popular school. However, improving school choice and competition may not improve educational attainment. Gibbons et al. (2008) find no relationship between the extent of school choice in an area and pupil performance and no causal relationship between measures of school competition and pupils’ educational attainment. Thus, evidence to date from England, suggests that measures to increase choice and competition are not (at least within the current institutional structure) very effective strategies for school improvement – and may exacerbate inequalities. On this basis, there is no strong case for Scotland to follow their example.

Finally, in terms of education policies adopted outside Scotland, a major initiative which took place on a national scale in England was the ‘literacy hour’. Machin and McNally (2008) evaluate the ‘literacy hour’ by comparing the reading and English skills of primary school children affected by the policy pilot, compared with a comparison group of similar pupils. The results are very positive, with the literacy hour resulting in a 2-3 percentage point improvement in the reading and English skills of primary school children affected by the introduction of the policy.

Turning now to specific policies that have been implemented in Scotland, we can consider evaluation evidence in two areas – Scotland’s relatively high school spending, and evidence on the Clackmannanshire synthetic phonics project.

As spending is often higher in schools with more disadvantaged pupils, it can be difficult to easily measure the impact of greater pupil spending. Indeed there has been no specific research relating to the impact of greater pupil spending in Scotland, in terms of its importance in raising pupil attainment. However, evidence for England shows positive effects of greater investment in schools. For example, studies by Levācić et al. (2005) and Jenkins et al. (2006) which look at the relationship between expenditure and attainment in secondary

School, taking account of the background of pupils, find a small positive effect of resources on pupil attainment.

In addition, research by Machin et al. (2004, 2010) looks at an initiative which gives schools in disadvantaged areas of England extra resources. This study also finds evidence for small average effects of additional resources for maths though not for English.

But is there an impact for all students of higher school expenditure, or does one group of pupils benefit more than others? Encouragingly, Gibbons et al, 2011 and Holmlund et al. 2010 find that effects are substantially higher for economically disadvantaged students in primary schools, while Machin et al. (2010) and Levācić et al. (2005) find that resource effects are higher for disadvantaged students in secondary schools. This would suggest that the increased resources given to schools in Scotland should help to reduce inequality among

different socio-economic groups; however in Section 4 we found evidence that inequality was similar in Scotland to the rest of the UK – though this may merely suggest that inequality would have been even worse in Scotland had pupil:teacher ratios been on a par with those in England. Additionally, there is evidence (Machin et al. (2010) and Levācić et al. (2005)) that increased funding tends to benefit high ability students from disadvantaged backgrounds, rather than poor pupils as a whole.

Finally, a major initiative that took place in Scotland, concerned synthetic phonics (in which children use magnetic letters to build up words and to help them understand how letter sounds can be blended together to pronounce the words in Scotland) was evaluated by Johnston and Watson, 2005). This research was possible because the programme was implemented as a randomized control trial in which primary school children were taught either 1) by a synthetic phonics programme, or 2) by an analytic phonics programme modelled on the methods commonly used in Scotland (the control group), or 3) by an analytic phonics plus phonological- awareness training programme. It was then possible to compare the outcomes of pupils in each group and attribute the changes in their reading ability to the various treatments. The findings of the study showed that the synthetic phonics programme led to children from lower socio-economic backgrounds performing at the same level as children from advantaged backgrounds for most of their time in primary school. It also led to boys performing better than or as well as girls. However, Ellis (2007) suggests that there were other things going on in schools in Clackmannanshire around this time (apart from the synthetic phonics programme). Therefore one needs to be careful about comparing schools in Clackmannanshire to schools in the rest of Scotland. Furthermore, the initial experimental phase lasted only for 16 weeks – after which the control group were taught to read using the same strategy.

Interestingly, and rather counter-intuitively, while the synthetic phonics method has been gradually rolled out to all schools in England following the Rose Review, the method was not rolled out in Scotland. This is largely due to Scotland's policy of having no statutory curriculum; whilst Local Authorities can roll out the programme if they choose, they are under no obligation to do so. Experience in England (with regard to the literacy and numeracy strategies) suggests that roll-out of successful policies can be a cost-effective option (see Machin and McNally, 2008) and could be tried in Scotland at either the level of Local Authorities or from the centre (although the latter would constitute a big change in policy). Nevertheless, the new Survey of Numeracy and Literacy in Scotland seems to offer evidence of a commitment towards a national education agenda in Scotland.

## 6. Conclusions

When considering whether or not Scotland should gain independence from the UK, one of the questions the people of Scotland may wish to think about is how has Scotland's devolved education system fared relative to the rest of the UK.

In this paper, we outlined the ways in which Scotland's education system – in terms of structures, policies and outcomes, differs from the rest of the UK. We then provided evidence on attainment of pupils in Scotland compared to those in the other UK nations. Finally, we presented evidence on policies in countries outside of Scotland that have been effective, and considered whether they were relevant for Scotland. We also looked at policies unique to Scotland that had worked, and what the implications might be.

We outlined a system in Scotland rather different to the rest of the UK in two major ways – the lack of statutory curriculum, which results in the majority of control and decision-

making under the control of Local Authorities; and the very different and more modular system of school assessment.

While we were unable to draw firm conclusions on the relative attainment of pupils from national statistics due to the differences in what is being assessed and when, our analysis of national statistics showed that Scotland's performance has been very stable over time (whilst in contrast, England's performance has been increasing). We also found evidence that staying on rates for the second year of post-compulsory school in Scotland are lower than in the rest of the country, as, in turn, are university participation rates. This may be a result of the more modular system of Highers, which can be completed in one year, as opposed to A-levels, which must be studied over two years, essentially requiring those taking A-levels to stay on for another year. Therefore, policy makers in Scotland should carefully assess whether the system of one-year Highers may be considered as a disincentive for students to stay on and acquire the necessary qualifications for university. Further research on this topic may be needed.

Our analysis of international test scores showed Scotland in a favourable light internationally and while there were some inconsistencies in findings depending on the survey studied, tended to show Scottish pupils performing as well if not better than other pupils in the UK on these measures.

However, we found no evidence of any improvements in Scotland in any of the tests over time – backed up by very stable performance in national assessments. Furthermore, our findings also showed deep levels of inequality in Scotland, particularly between pupils from different socio-economic groups. For example, the widely recognised PISA international student assessment survey showed that the difference between the highest (most advantaged) quartile and the lowest is nearly 1 standard deviation according to tests in both reading and writing in Scotland. This is a huge problem which devolution has been unable to solve.

While this may be cause for alarm, this is a problem that is shared by all four countries of the UK, with Scotland faring no worse in these terms than England. Furthermore, while Scotland is in charge of its education system, they are unable to raise taxes or alter many other aspects of fiscal policy, which somewhat limits the level and distribution of spending on education in Scotland. Nevertheless, policy-makers would do well to consider what steps a fully devolved Scotland could take to tackle this issue. One initiative in Scotland that was found to reduce inequality was the synthetic phonics programme. However, despite its success in one Local Authority the programme was not rolled out across Scotland due to the lack of statutory curriculum. Like other policies that have been successful in England and Northern Ireland, implementing them may require substantial changes to Scotland's education system and in particular a move away from pure Local Authority control.

In all, this report finds many more similarities than differences in terms of educational attainment across the four countries. Importantly, all four countries attain similar positions relative to the international community. This is perhaps unsurprising, given the history of education in the UK, as well as the cultural similarities and shared labour markets, and this suggests continued devolution – at least in this area, and conditional on funding – should not result in a change in outcomes relative to the rest of the UK.

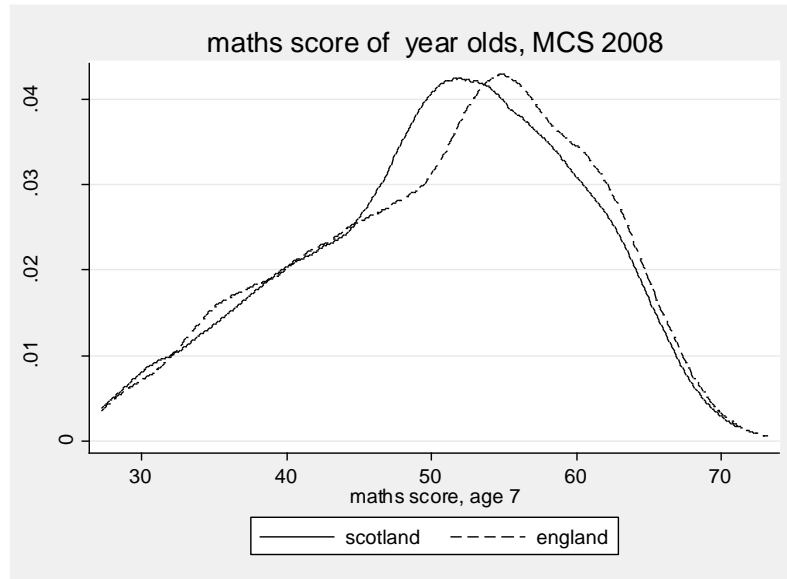
## 7. References

- Bradley, S. et al. (2001). The Effect of Competition on the Efficiency of Secondary Schools in England. *European Journal of Operational Research*, 135, 545–568.
- Bradley, S. and J. Taylor (2010). Diversity, Choice and the Quasi-market: An Empirical Analysis of Secondary Education Policy in England. *Oxford Bulletin of Economics and Statistics*, 72, 1-26.
- Brown, M. et al. (2000). Turning Our Attention from the What to the How: The National Numeracy Strategy. *British Educational Research Journal*, 26, Issue 4.
- Burgess, S., Greaves, E. et al (2009). Parental Choice of Primary School in England: What ‘Type’ of School Do Parents Choose?, The Centre for Market and Public Organisation 09/224, Department of Economics, University of Bristol, UK.
- Centre for Public Policy for Regions (CPPR) (2009). Spending on School Education, Scottish Government Budget Options, Briefing Series No1.
- Ellis, S. (2007). Policy and Research: Lessons from the Clackmannanshire Synthetic Phonics Initiative. *Journal of Early Childhood Literacy*, 7, 281-293.
- Estyn (2001). The Role of LEAs in Raising Standards of Numeracy. A Summary Report Based on LEA Inspections Conducted During 1999 and 2000. HMI for Education and Training in Wales.
- Feinstein, F. (2003). Inequality in the Early Cognitive Development of British Children in the 1970 Cohort. *Economica*, 70, 73-97.
- Gibbons S. and S. Machin (2003). Valuing English Primary Schools. *Journal of Urban Economics*, 53, 197-219.
- Gibbons, S., S. Machin, and O. Silva (2008). Competition, Choice and Pupil Achievement. *Journal of the European Economic Association*, 6, 912-947.
- Gibbons, S., S. Machin and O. Silva (2009). Valuing School Quality Using Boundary Discontinuity Regressions, SERC Discussion Paper No.0018, London School of Economics.
- Gibbons, S., S. McNally and M. Viarengo (2011). Does Additional Spending Help Urban Schools? An Evaluation Using Boundary Discontinuities? CEE Discussion Paper No.128, London School of Economics.
- Guyon, N., E. Maurin, and S. McNally (2012). The Effect of Tracking Students by Ability into Different Schools: a Natural Experiment. *Journal of Human Resources*, 47, 684-721.
- Hills, J., et al. (2010). An Anatomy of Economic Inequality in the UK: Report of the National Equality Panel, Government Equalities Office.
- Holmlund, H., S. McNally, and M. Viarengo (2010). Does Money Matter for Schools?, *Economics of Education Review*, 29, 1154-1164.
- Johnstone, R. and J. Watson (2005). The Effects of Synthetic Phonics Teaching on Reading and Spelling Attainment. Insight 17, The Scottish Executive.

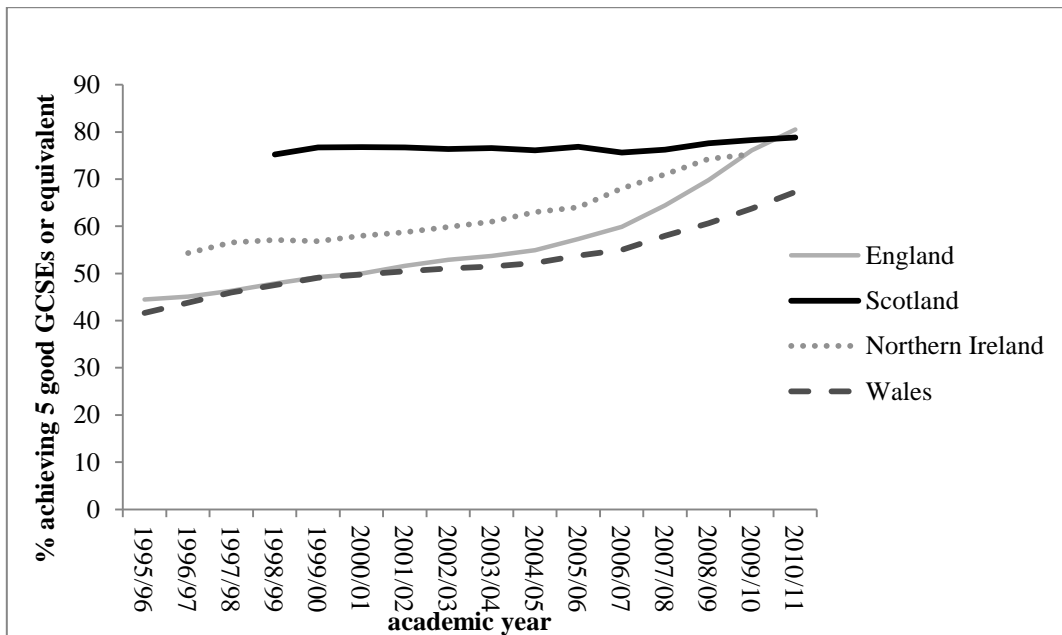
- Jones, D.V. (2002). National Numeracy Initiatives in England and Wales: A Comparative Study of Policy. *Curriculum Journal*, 13, 5-23.
- Jenkins, A, R. Levačić and A. Vignoles (2006). Estimating the Relationship between School Resources and Pupil Attainment at GCSE, Research Report RR727, Department for Education and Skills.
- Leckie, GB and H. Goldstein, (2011). A note on “The limitations of using school league tables to inform school choice, *Journal of the Royal Statistical Society: Series A*, 174, 833-836.
- Levačić, R., A. Jenkins, A. Vignoles, F. Steele and R. Allen (2005). Estimating the Relationship Between School Resources and Pupil Attainment at Key Stage 3, Research Report RR679, Department for Education and Skills.
- Machin, S. (2011). Houses and Schools: Valuation of School Quality Through the Housing Market. *Labour Economics*, 18, 723-9.
- Machin, S., and S. McNally (2008). The Literacy Hour. *Journal of Public Economics*, 92, 1141-1462.
- Machin, S. and S. McNally (2012). The Evaluation of English Education Policies. *National Institute Economic Review*, 219, R15-R25.
- Machin, S., S. McNally and C. Meghir (2010). Resources and Standards in Urban Schools. *Journal of Human Capital*, 4, 365-393.
- Machin, S., S. McNally and C. Meghir (2004). Improving Pupil Performance in English Secondary Schools: Excellence in Cities. *Journal of the European Economics Association*, 2, 396-405.
- Machin, S. and J. Veroit (2010). A Note on Academy School Policy. <http://cep.lse.ac.uk/pubs/download/pa011.pdf>
- Machin, S., and J. Veroit (2011). Changing School Autonomy: Academy Schools and Their Introduction to England’s Education. CEE Discussion Paper. No.123. London School of Economics.
- Machin, S. and A. Vignoles (2005). *What’s the Good of Education? The Economics of Education in the United Kingdom*. Princeton University Press.
- Muriel, A. and J. Smith (2011). On Educational Performance Measures. *Fiscal Studies*, 32, 187-206. Office for National Statistics (2002), Social Focus in Brief. ONS London.
- The Poverty Site (2012). <http://www.poverty.org.uk/index.htm>
- Raffe, D. and D. Byrne (2005). Policy Learning From ‘Home International’ Comparisons. *CES Briefing No. 34*, Edinburgh: Centre for Educational Sociology, University of Edinburgh.
- Rosenthal, L. (2003). The Value of Secondary School Quality. *Oxford Bulletin of Economics and Statistics*, 65, 329-355.
- Wilson, J. (2011). Are England’s Academies More Inclusive or More ‘Exclusive’? The Impact of Institutional Change on the Pupil Profile of Schools. CEE Discussion Paper. No.125. London School of Economics.
- West, A. and H. Pennell (1999). School Admissions: Increasing Equity, Accountability and Transparency. *British Journal of Education Studies*, 46, 188-200.

## 8. Figures

**Figure 1: Distribution of maths ability at age 7, MCS**



**Figure 2: GCSE or equivalent, attainment over time**



**Notes:**

England : pre-2004/05 - % of 15 year olds achieving 5 GCSEs or equiv at A\*-C; 2004/05 onwards - pupils at the end of KS4 achieving 5+ GCSEs/equivalent at A\*-C (maintained schools only)

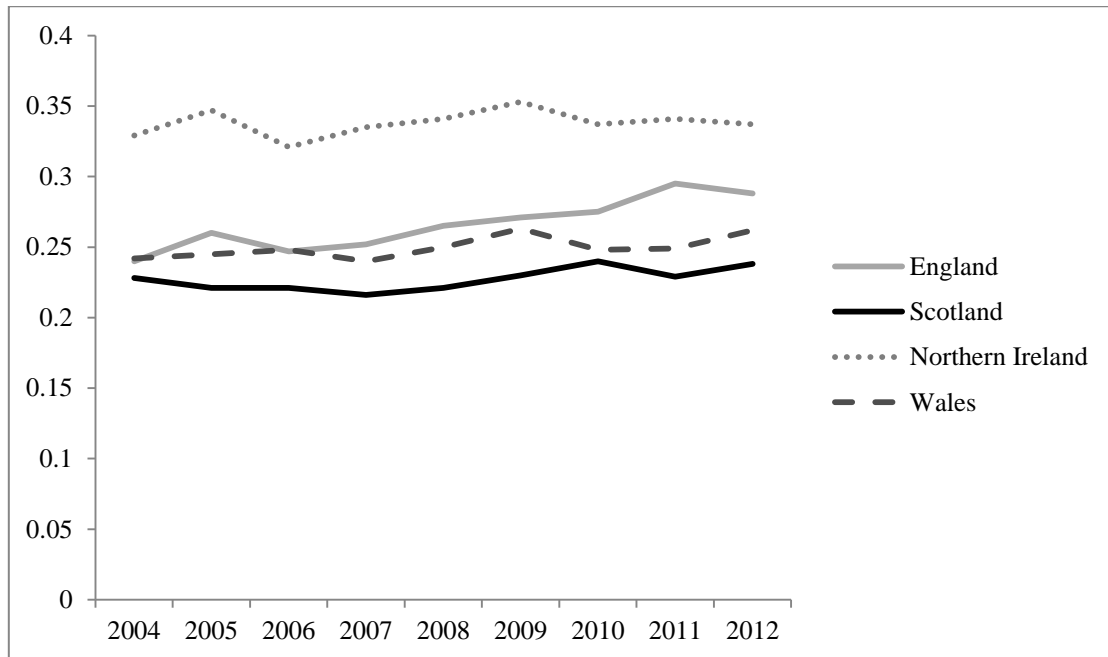
Scotland: % of S4 roll achieving 5+ Awards at SCQF level 4 or better (publicly funded secondary schools)

Wales: % of pupils aged 15 who achieved the Level 2 threshold (figures include attainment at independent schools)

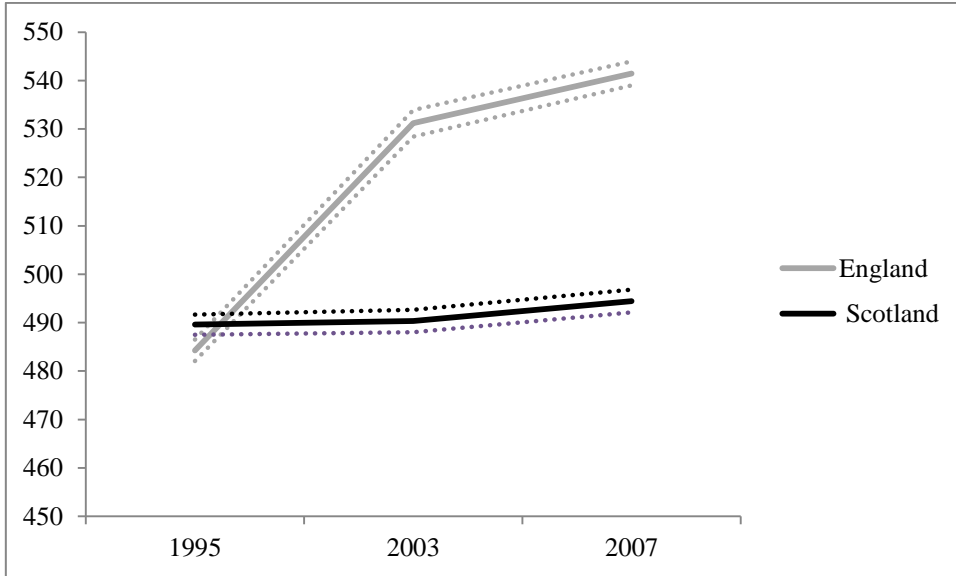
NI : pre-2004/05 - % of school-leavers achieving 5 GCSEs/equivalent at A\*-C; 2004/05 onwards - % of year 12s achieving 5+ GCSEs/equivalent at A\*-C (from all grant aided post primary schools in Northern Ireland)



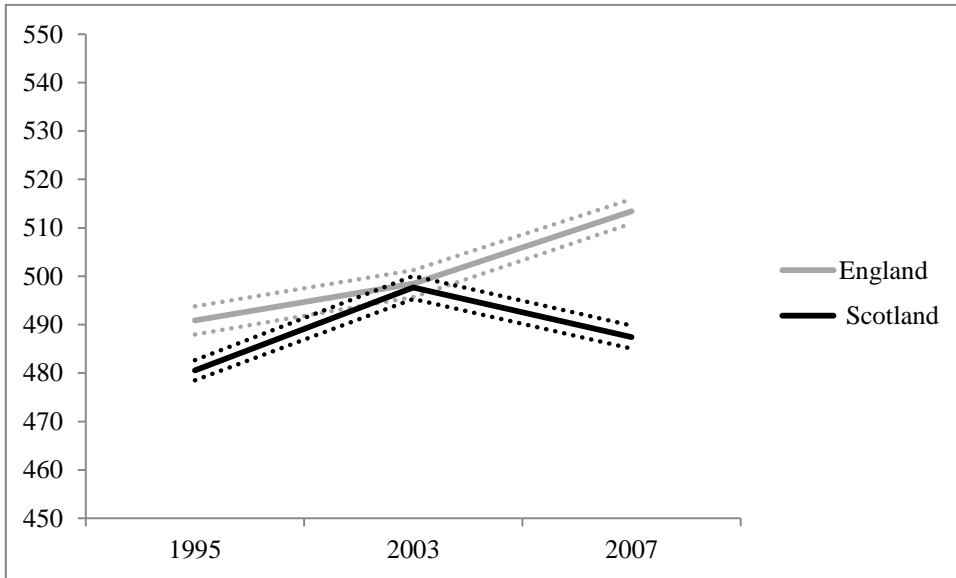
**Figure 3: Proportion of 18 year olds accepted for entry to higher education by cycle and country of domicile**



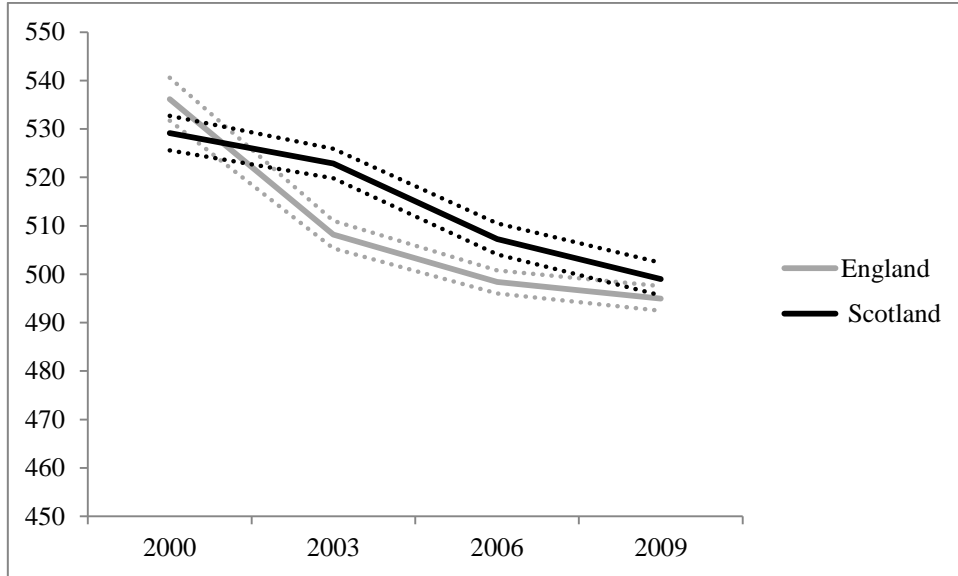
**Figure 4: TIMSS performance in maths at age 10**



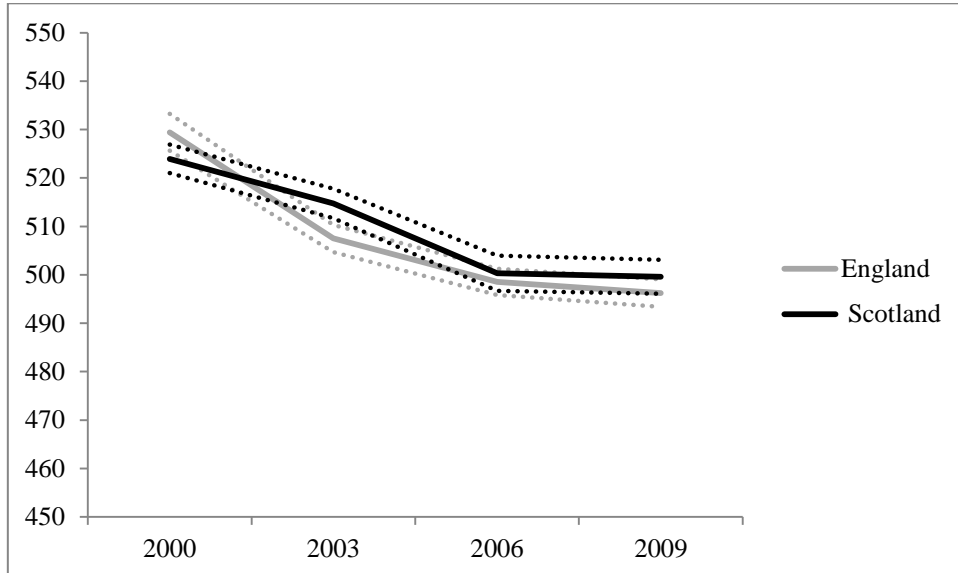
**Figure 5: TIMSS performance in maths at age 14**



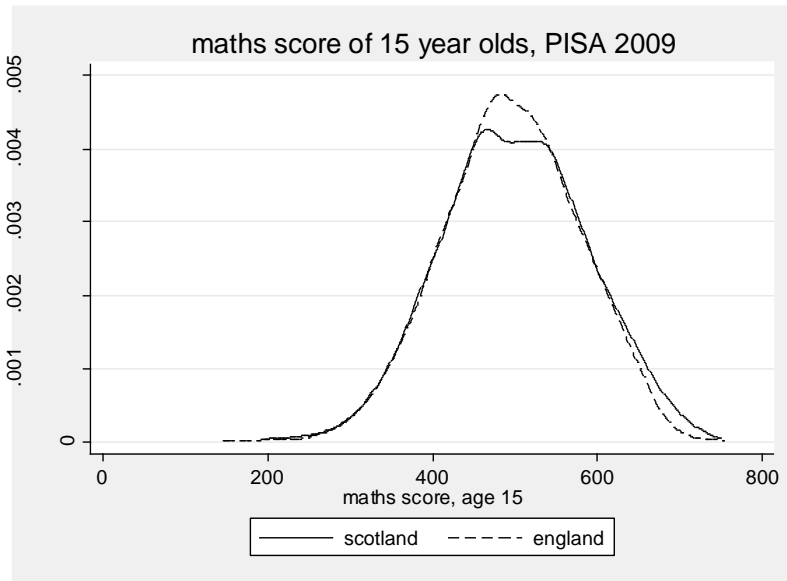
**Figure 6: PISA performance in maths, age 15**



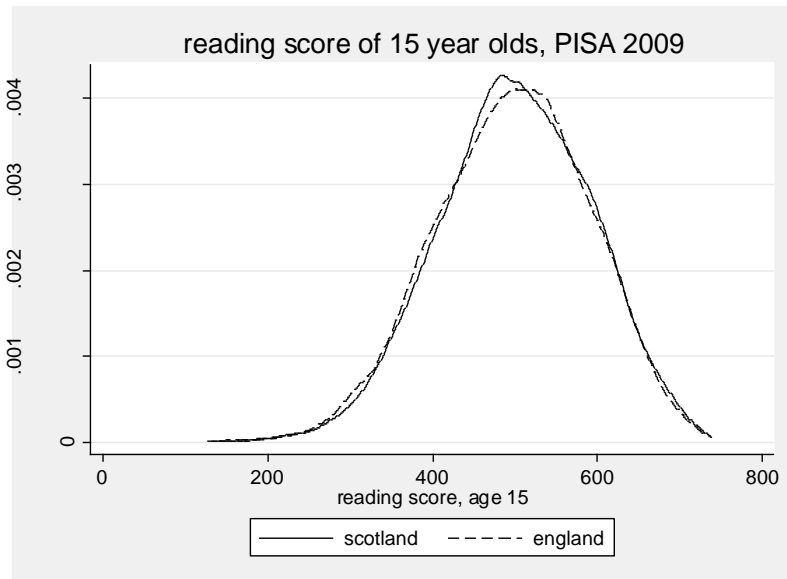
**Figure 7: PISA performance in reading, age 15**



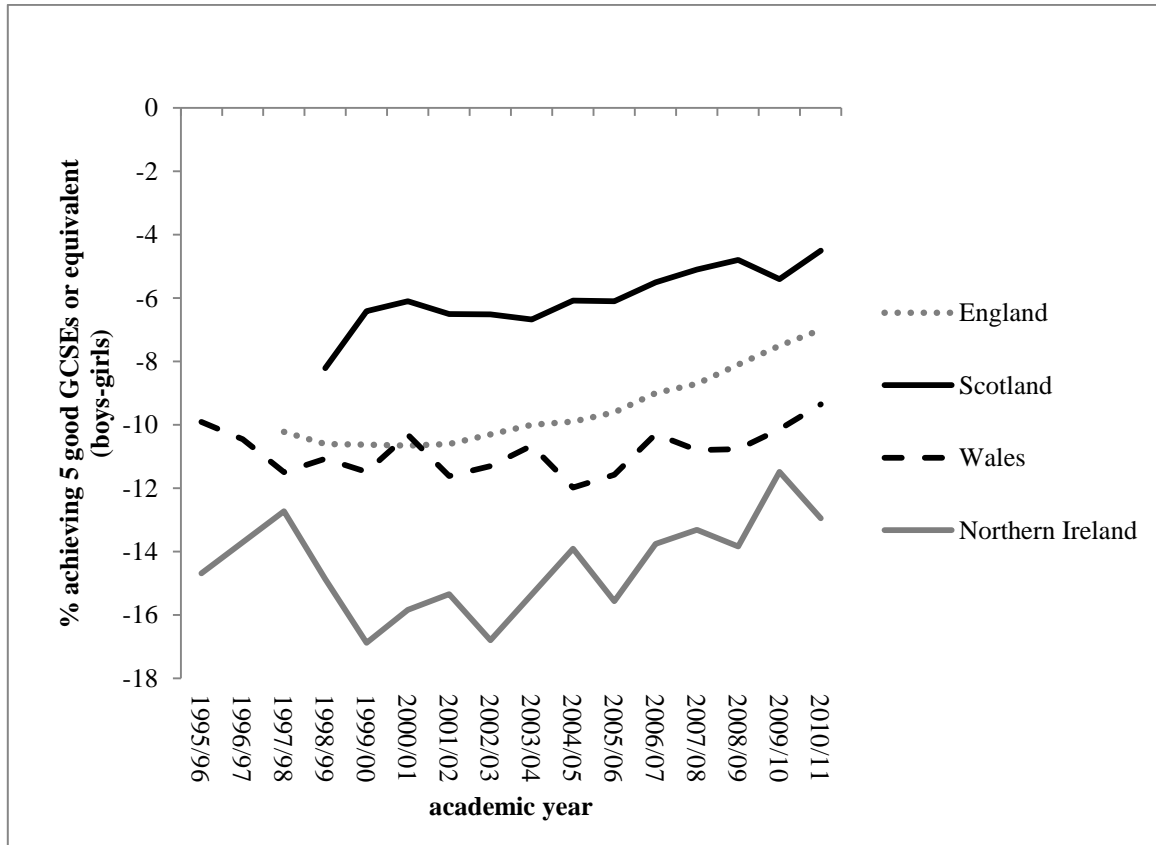
**Figure 8: Maths score of 15 year olds, PISA, 2009**



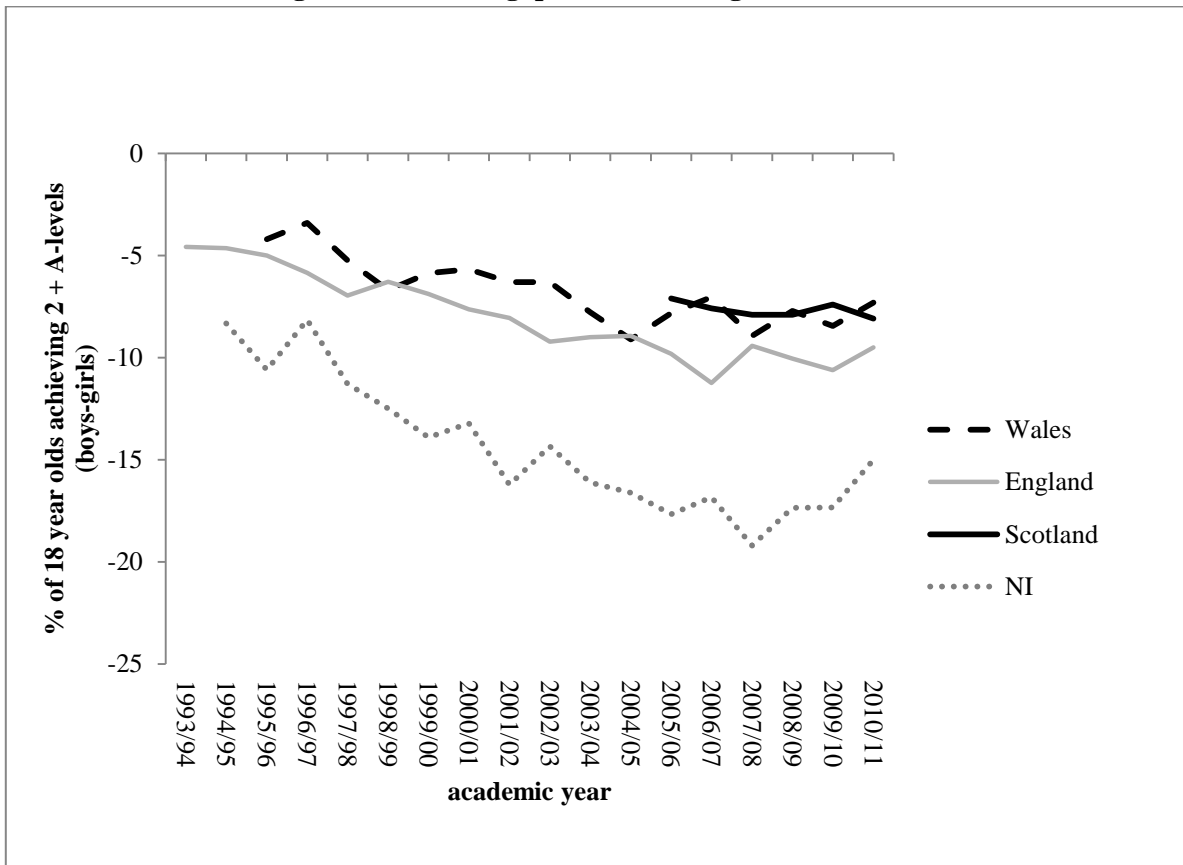
**Figure 9: Reading score of 15 year olds, PISA 2009**



**Figure 10: Gender gaps in GCSE/Standard Grade attainment**



**Figure 11: Gender gaps in A-level/Higher attainment**



## 9. Tables

**Table 1: Reading and maths test scores at age 7, MCS**

	(1) Raw scores in test	(2) Raw coefficient in each regression (compared with England)	(3) + control for demographics and parental education
<b>Reading age 7, MCS, 2008</b>			
England	50.9 (9.76)	- -	- -
Scotland	50.5 (9.43)	-0.435 (0.267)	-0.900*** (0.300)
Wales	47.3 (10.53)	-3.473*** (0.255)	-2.514*** (0.293)
Northern Ireland	47.0 (46.92)	-3.946***	-3.814***
<b>Maths age 7, MCS, 2008</b>			
England	50 (10.12)		
Scotland	49.8 (9.42)	-0.226 (0.271)	-1.440*** (0.310)
Wales	50 (9.92)	0.036 (0.249)	-0.308 (0.291)
Northern Ireland	50.4 (9.94)	0.421 (0.292)	0.032 (0.340)
<b>Controls</b>			
Gender	No	No	Yes
Ethnicity	No	No	Yes
FSM	No	No	Yes
Parental education	No	No	Yes

**Notes:** Standard errors in parentheses.

\*, \*\* and \*\*\* denote statistical significance at the 10, 5 and 1 percent level.



**Table 2: Education performance across the UK nations: national data sets**

Measure	Source	England	Wales	Scotland	Northern Ireland
5+ GCSEs A*-C or equivalent	GCSE exams or equivalent 2010/11	80.5	67.3	78.8	75.3
A*-C GCSE in Maths	GCSE exams or equivalent, 2006/07	54.6	50.0	48.3	54.7
A*-C GCSE in English	As above	60.2	58.9	69.8	62.9
% of 18 years olds with 2 or more A-levels	A-level results, 2010/11	51.8	27.1	33.2	50.2

**Table 3: Staying on rates by age**

	16-year-olds				17-year-olds			
	At school <sup>2</sup>	Full-time FE <sup>1</sup>	Government-supported training (GST)	All in full-time education and GST <sup>3</sup>	At school <sup>2</sup>	Full-time FE <sup>1</sup>	Government-supported training (GST)	All in full-time education and GST <sup>3</sup>
<b>England</b>	39	43	6	88	30	38	7	76
<b>Wales</b>	43	35	6	84	33	29	7	70
<b>Scotland<sup>4</sup></b>	61	15	..		27	14		..
<b>Northern Ireland</b>	59	19	..		50	20		..

**Notes:**

1 Including sixth form colleges in England and a small element of further education (FE) in higher education institutions in Great Britain.

2 For Scotland, includes both publicly funded and independent (non-maintained) primary, secondary and special schools. For publicly funded pupils, age is as at 31 August 2008, whereas for independent school pupils age is as at 31 December 2008. Pupils attending school and college at the same time are only shown in the schools column. Pupils leaving school in the middle of the academic year and who subsequently start a college course are shown both in the schools and further education columns.

3 Figures for Scotland are not calculated on the same basis as prior to 2004/05.

Source: Department for Education; Welsh Assembly Government; Scottish Government; Northern Ireland Department of Education

**Table 4: Educational performance across the four nations: international data sets**

Measure	Source	England	Wales	Scotland	Northern Ireland
<b>Reading score of 10 year olds</b> (average over sample of 35 countries = 500. Sd=100)	PIRLS, 2001	551	n/a	530	n/a
40 countries	PIRLS, 2006	536	n/a	530	n/a
<b>Maths score of 10 year olds</b> (average over sample of 45 countries = 500. Sd=100)	TIMSS, 1995	483	n/a	489	n/a
49 countries	TIMSS, 2003	531	n/a	490	n/a
59 countries	TIMSS, 2007	541	n/a	494	n/a
<b>Maths score of 14 year olds</b> (average over sample of 45 countries = 500. Sd=100)	TIMSS, 1995	491	n/a	481	n/a
49 countries	TIMSS, 2003	498	n/a	498	n/a
59 countries	TIMSS, 2007	513	n/a	487	n/a
<b>Maths score of 15 year olds</b> (average over sample of 43 OECD countries=500. Sd=100)	PISA, 2000	536	n/a	529	523
41 countries	PISA, 2003	508	502	523	515
57 countries	PISA, 2006	495	483	506	494
65 countries	PISA, 2009	493	471	499	493
<b>Reading score of 15 year olds</b> (average over sample of 43 OECD countries=500. Sd=100)	PISA, 2000	529	n/a	524	518
41 countries	PISA, 2003	508	500	515	517
57 countries	PISA, 2006	496	480	499	489
65 countries	PISA, 2009	495	475	500	500

**Table 5: Performance on the PISA test**

	(1) Raw coefficient in each regression	(2) + control for demographics and parental education	(3) + additional controls for resources and socio-economic status
<b>Maths, PISA 2006</b>			
Scotland	10.44*** (2.759)	5.815** (2.703)	8.217*** (2.443)
Wales	-12.20*** (3.641)	-13.33*** (3.577)	-9.436*** (3.229)
Northern Ireland	-4.780 (4.725)	-7.002 (4.572)	2.643 (4.136)
<b>Maths, PISA 2009</b>			
Scotland	6.151** (2.772)	2.691 (2.683)	9.070*** (2.359)
Wales	-21.99*** (3.672)	-23.65*** (3.525)	-17.94*** (3.105)
Northern Ireland	0.566 (4.698)	-2.009 (4.494)	3.745 (3.972)
<b>Reading, PISA 2006</b>			
Scotland	3.068 (3.153)	-1.731 (3.039)	0.691 (2.768)
Wales	-16.01*** (4.160)	-17.36*** (4.022)	-13.34*** (3.658)
Northern Ireland	-6.376 (5.399)	-8.384 (5.140)	1.928 (4.685)
<b>Reading, PISA 2009</b>			
Scotland	5.732* (3.088)	1.498 (2.995)	8.271*** (2.645)
Wales	-19.12*** (4.090)	-19.81*** (3.935)	-13.79*** (3.481)
Northern Ireland	5.748 (4.698)	3.265 (4.494)	9.210** (3.972)
Gender		Yes	Yes
Immigrant		Yes	Yes
Parental education		Yes	Yes
Books in household			Yes
Measure of economic and cultural status			Yes

**Notes:** Standard errors in parentheses. \*, \*\* and \*\*\* denote statistical significance at the 10, 5 and 1 percent level.

**Table 6: Performance on the TIMSS test**

	(1) Raw coefficient in each regression	(2) + control for demographics and parental education
<b>Maths, TIMSS 1995</b>		
Scotland, grade 4	5.310** (2.612)	11.28*** (2.551)
Scotland, grade 8	-10.30*** (2.821)	-1.031 (2.751)
<b>Maths, TIMSS 2003</b>		
Scotland, grade 4	-40.86*** (3.402)	-36.68*** (3.165)
Scotland, grade 8	-0.809 (3.413)	3.624 (3.138)
<b>Maths, TIMSS 2007</b>		
Scotland, grade 4	-47.02*** (3.206)	-43.66*** (2.963)
Scotland, grade 8	-26.00*** (3.115)	-17.53*** (2.789)
Gender		Yes
Ethnicity		Yes
Books in household		Yes

**Notes:** Standard errors in parentheses. \*, \*\* and \*\*\* denote statistical significance at the 10, 5 and 1 percent level.

**Table 7: Gender inequalities in education: National data**

		England			Wales			Scotland			Northern Ireland		
		Male	Female	M-F	Male	Female	M-F	Male	Female	M-F	Male	Female	M-F
Age 7 reading Std score	MCS, mean=50. Standard deviation=10	50.1	51.8	-1.7 (0.21)	46.6	48.2	-1.7 (0.49)	50.1	50.8	-0.7 (0.47)	46.0	47.9	-1.9 (0.56)
Age 7 Maths Std score	MCS, mean=50. Standard deviation=10	50.1	49.9	0.2 (0.22)	50.0	50.0	0 (0.45)	49.9	49.6	0.3 (0.47)	50.7	50.1	0.6 (0.54)
5+ GCSEs A*-C or equivalent	GCSE exams or equivalent, 2009/10	77.0	84.0	-7.0	62.7	72.1	-9.4	75.6	81.0	-5.4	65.4	78.3	-12.9
GCSE A*-C in English	GCSE/equivalent,06/07	52.6	67.9	-15.3	50.6	67.5	-16.9	63.9	75.9	-12	55.0	71.0	-16
GCSE A*-C in Maths	As above	53.3	56.0	-2.7	48.5	51.7	-3.2	47.7	49.0	-1.3	51.6	57.9	-6.3
% of 18 years olds with 2 or more A-levels	A-level results, 2010/11	47.3	56.8	-9.5	23.4	30.8	-7.4	29.2	37.3	-8.1	42.9	57.9	-15.0

**Table 8: Gender inequalities in education: international data**

		England			Wales			Scotland			Northern Ireland		
		Male	Female	M-F	Male	Female	M-F	Male	Female	M-F	Male	Female	M-F
<b>Reading score of 10 year olds</b> (average over sample of 40 countries = 500. Sd=100)	PIRLS, 2006	530	549	-19.0 (2.58)	--	--	--	516	538	-22.0 (2.43)	--	--	--
<b>Maths score of 10 year olds</b> (average over sample of 59 countries = 500. Sd=100)	TIMSS, 2007	542	541	0.0 (2.5)	--	--	--	499	490	9.0 (2.39)	--	--	--
<b>Maths score of 14 year olds</b> (average over sample of 59 countries = 500. Sd=100)	TIMSS, 2007	516	511	6.0 (2.54)	--	--	--	489	486	3.0 (2.4)	--	--	--
<b>Maths score of 15 year olds</b> (average over sample of 32 OECD countries=500. Sd=100)	PISA, 2009	504	483	21.0 (2.58)	481	461	21.0 (2.9)	506	492	14.0 (3.43)	501	486	16.0 (3.64)
<b>Reading score of 15 year olds</b> (average over sample of 32 OECD countries=500. Sd=100)	PISA, 2009	482	507	-25.0 (2.87)	462	489	-27.0 (3.36)	488	512	-24.0 (3.54)	485	514	-29.0 (3.99)

**Notes:** Standard errors in parentheses. Standard errors are unavailable where statistics are derived from aggregate data.



**Table 9: Socio-economic inequalities in education: national data**

		England			Wales			Scotland			Northern Ireland		
		FSM	Non-FSM	FSM-non-FSM	FSM	Non-FSM	FSM-non-FSM	FSM	Non-FSM	FSM-non-FSM	FSM	Non-FSM	FSM-non-FSM
Age 7 reading Std score	MCS, mean=50. Standard deviation=10	46.3	52.1	-5.8 (0.32)	41.4	48.7	-7.4 (0.7)	47.1	51.5	-4.4 (0.72)	42.3	47.4	-4.9 (0.83)
Age 7 Maths Std score	MCS, mean=50. Standard deviation=10	45.8	50.9	-5.1 (0.33)	46.5	50.8	-4.3 (0.66)	48.0	50.6	-2.6 (0.72)	47.2	51.2	-4.1 (0.82)
5+ GCSEs A*-C or equivalent	GCSE exams or equivalent, 2009/10	64.6	83.0	-18.4	40.9	73.5	-32.6	--	--	--	47.1	76.5	-29.4

**Notes:** Standard errors in parentheses. Standard errors are unavailable where statistics are derived from aggregate data.

**Table 10: Socio-economic inequalities in education: International data**

	PISA 2009. Performance within each quartile of socio-economic status				
	England	Wales	Scotland	NI	OECD
Maths score					
Quartile 1 (lowest)	451	438	456	450	446
Quartile 2	480	462	486	482	481
Quartile 3	505	482	510	511	507
Quartile 4 (highest)	540	515	549	545	544
Difference: Q4-Q1	89 (3.34)	76 (3.97)	93 (4.41)	95 (4.61)	98 (6.25)
Reading score					
Quartile 1 (lowest)	449	443	458	455	445
Quartile 2	482	466	488	491	479
Quartile 3	508	487	511	520	505
Quartile 4 (highest)	543	520	548	550	540
Difference: Q4-Q1	94 (3.78)	77 (4.72)	90 (4.58)	95 (5.27)	95 (5.04)

**Notes:** Standard errors in parentheses. Standard errors are unavailable where statistics are derived from aggregate data.

Table 11: Between and within school variances, international datasets

measure	source	variation		number of schools	average number of pupils per school
		between school	within school		
<b>Reading score of 10 year olds</b>	<b>PIRLS, 2006</b>				
England		23%	77%	148	27.2
Scotland		19%	81%	130	29.0
<b>Maths score of 10 year olds</b>	<b>TIMSS, 2007</b>				
England		18%	82%	143	30.2
Scotland		18%	82%	139	28.2
<b>Maths score of 14 year olds</b>	<b>TIMSS, 2007</b>				
England		52%	48%	137	29.3
Scotland		42%	58%	129	31.6
<b>Maths score of 15 year olds</b>	<b>PISA, 2009</b>				
England		35%	65%	165	24.7
Wales		19%	81%	114	24.7
Scotland		22%	78%	98	26.8
NI		57%	43%	85	25.2
<b>Reading score of 15 year olds</b>	<b>PISA, 2009</b>				
England		29%	71%	165	24.7
Wales		17%	83%	114	24.7
Scotland		18%	82%	98	26.8
NI		51%	49%	85	25.2