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# Why are Literacy and Numeracy Skills in England so Unequal?

## Evidence from the OECD's Survey of Adult Skills and other International Surveys

Andy Green, Francis Green and Nicola Pensiero

LLAKES Research Paper 47

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# Why are Literacy and Numeracy Skills in England so Unequal?

## Evidence from the OECD's Survey of Adult Skills and other International Surveys

**Andy Green, Francis Green and Nicola Pensiero**

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*Table of Contents*



*List of Figures*

## Executive Summary

The OECD's Survey of Adult Skills (SAS) recently revealed that, on average, literacy and numeracy skills in England are comparatively low among the 22 nations surveyed. Just as important, however, skills in England are very unequal. This paper investigates why numeracy and literacy skills in England's adult population are especially widely dispersed. We find that:

- In England there is a larger gap in literacy and numeracy scores between the highest and lowest achievers than in most other countries.
- The high ranking on skills inequality is especially marked among those aged 25 to 29; for this group England's high inequality is matched only by that of the United States.
- Countries with high levels of educational inequality tend to have high levels of skills inequality. Moreover, taking 10-year age groups from 25 up, we find that for each group educational inequality is among the highest in England. For example, among 45-54 year olds, only Spain and Northern Ireland are more unequal.
- The relationship between parental background and adult literacy and numeracy among those aged 16 to 24 is stronger in England than in all other countries except the Slovak Republic. England's extreme position holds, even after we control for different levels of educational achievement.

We conclude that educational inequality over several decades has underpinned England's persistent skills inequality, and that the impact of social background may be leading to high levels of skills inequality both through processes external to the education system and through those which are internal to it.

We also investigate and find no support for three possible additional explanations for England's high skills inequality:

- Inter-age group skills differences: these are low in England.
- Skills differences deriving from migration flows: the effects are small in England.
- Especially unequal adult learning: the inequality of adult learning is broadly middling in England; moreover, there is no observed tendency for countries with high inequality of adult learning to have especially unequal literacy and numeracy in their older cohorts.

## Introduction

The recent publication of the OECD's Survey of Adult Skills (SAS) generated much commentary on the relatively poor level of adult skills in England – not least for the revelation that on both literacy and numeracy young people scored no better than older generations and worse than their peers in almost all other countries (BIS, 2013; OECD, 2013). However, although it received less comment, just as important as the mean levels of literacy and numeracy, is how skills are distributed. On this dimension the news is no better, because adult skills in England are very unequal. There is a larger gap in literacy and numeracy scores between the highest and lowest achievers than in most other countries and the impact of parental background on skills attainment is stronger than in most countries. There is some evidence of a narrowing in the dispersion of skills in England over the last 16 years, but the skills of the youngest cohorts are still more unequally distributed than in almost all other countries.

These findings matter, because skills have well-known effects on labour market and wider social outcomes. Over the last quarter century the UK as a whole has experienced one of the fastest increases in wage inequality in the developed world, a change which evidence suggests is attributable, alongside institutional changes, to the evolving balance between the supply and demand for skills. Skills inequality has consequent implications both for wage and income inequality and also for the level of social trust and other societal outcomes (Mcintosh and Vignoles, 2001; Leuven et al, 2004; Wilkinson and Pickett, 2010; Green et al, 2006, 2011). It is therefore especially important to try to understand the sources of England's exceptional skills inequality.

A wide distribution of adult skills may result from a number of causes. A high level of skills inequality in the flows of young people from the initial education system, particularly if sustained over a long period, will contribute in time to a wider distribution of skills amongst adults as a whole. This may be mitigated by further learning, immediately after the compulsory phase of schooling, and there is some evidence that this occurs in a number of countries where the study of maths and the national language remains a compulsory part of the curriculum. A wide distribution of skills amongst inward migrants, or a strong skewing of their skills to the high or low

ends of the distribution, will, over time, serve to widen the distribution of skills amongst adults overall. Also there may be large inter-cohort differences in average skills levels due to changes over time in the effectiveness of the initial education system, so that mean skills levels of different generations vary substantially. Crucially for policy, adult learning may also serve to increase or mitigate the inequality of skills produced by the initial education system. Fuelling several of these factors is the way in which childhood social background impacts on the educational and skills attainments of adults.

In this paper, we examine these possibilities for England. Our main approach is to make deductions based on international comparisons of indicators of skills inequality and its potential drivers, derived from the individual data in SAS. This survey, which is based on questionnaires and skills tests administered to a representative sample of adult individuals in each country, assesses proficiency in three domains: literacy, numeracy and problem solving. Our analysis here is based on the data on literacy and numeracy only, since we also compare the results in SAS with those in the IALS and PISA surveys which do not test problem solving. We shall refer to these literacy and numeracy scores frequently with the shorthand phrase skills", but it should be noted that, in general, "skills" encompasses a broader range of domains than are covered in the SAS proficiency data, which are hard to assess directly (Green, 2013). SAS also contains ample data on the highest educational levels of respondents as well on the frequency and duration of episodes of different types of formal and non-formal adult learning they have experienced during the past year. We also have background data on the educational levels of parents of respondents, as well as on the respondents' current labour market status and incomes. These data are used in the analyses we make of the uneven participation in adult learning and how this impacts on skills inequality, and also in our analysis of the impact of social origins on skills attainment.

SAS is cross-sectional survey conducted at one point in time (2011/12). It cannot therefore tell us directly about changes over time in the generation of skills inequalities, or even about changes during the life cycle of different cohorts, since we cannot separate out the effects of changes over time. In order to test these we also make use of

earlier comparable surveys, including the International Adult Literacy Survey (IALS), conducted in the mid 1990s, and the Programme of International Student Assessment (PISA), which tested the skills of 15 year olds in 2000 and thereafter. Using these surveys in conjunction with SAS, we can compare the levels of inequality in the same age groups at different points in time. We can also construct pseudo-cohorts from samples in the different surveys to examine what happens to these cohorts over the life cycle. For instance, the 15 year olds in PISA 2000 can be compared with the 26/7 year olds in the SAS survey conducted 11/12 years later, and the 25-29 year olds in IALS can be compared with the 41-45 year olds in the SAS, conducted about 16 years later. The latter comparisons can be assumed to be quite robust since the IALS data has been re-calibrated by the OECD to be directly comparable to the SAS data. In the case of PISA and SAS our comparisons are more tentative, since the tests ask similar but not identical questions.

We find that inter-cohort differences play a negligible part in adult skills distribution in England, since the skills levels of younger age groups are much the same as for older age groups. Inward migration seems to contribute a small amount to adult skills inequality in England but no more than in most countries and rather less than in some. The role of adult learning is complex but it would not appear that it plays a greater role in exacerbating the skills inequalities amongst adults in England than in other countries. We do find, however, that the skills of countries, and of cohorts within countries, are more unequal where the education they have received is more unequal. Educational achievements have been relatively unequal in England for at least several decades. Moreover, the association of people's adult skills with their parents' social background is especially high in England. We conclude that the primary cause of adult skills inequality in England is the exceptionally unequal skills outcomes of the initial education system sustained over a long period, fuelled and supplemented by an especially strong influence from social background.

The paper has four sections. The first compares adult skills inequality across countries using different measures to capture the breadth of skills distribution across populations and the impact of social background on skills acquisition. For skills dispersal we

present the international data on the distributions of numeracy and literacy skills within each country for the 16-65 population as a whole and for different age groups within each country. Two different measures are used. A skills gini coefficient is computed which measures the distributions across the entire range of scores for each population. The gini measure is a continuous variable on a scale between 0 and 1, where 1 represents a situation where all the skills are held by one person, and 0 a situation where everyone has the same skill level. It is the most widely used measure of inequality but cannot be used to test the significance of differences between values. We also use a measure of the difference in the mean level of skills of the top and bottom quintiles of the skills distribution in a given population. This provides a more simply understood measure of the gaps in skills attainment and can also be used to conduct tests for the significance of differences in measured inequality between England and other countries. We also briefly investigate the differences across countries in one aspect of inequality of opportunity represented by the impact of social origins on the level of individual skills attainment. Levels of parental education are used as the social background variable to compute the social gradients.

The second section briefly considers two of the factors which may be responsible for the exceptionally high level of adult skills inequality in England. We look first at the role of inter-cohort differences in skills levels and ask how far these contribute to widening the overall distributions of skills in England, relative to other countries. This is done by comparing the mean skills levels of each age group within a given country. Secondly, we look at the effects of the skills distributions of adult migrants and whether these are increasing adult skills inequality in England more than in other countries. This is achieved by comparing inequality in a given population with migrants included with the same with the migrants excluded.

The third section carries out an analysis of the impact of adult learning on adult skills inequality. We use three separate indicators of adult learning: participation in formal education and training, the volume of non-formal training, and experience of a learning environment at work. We first examine whether adult learning is especially high and particularly unequal in England. Second, we focus on skills inequality in the over 45s

populations. We make an assumption that there is some persistence in training systems. We proxy the adult learning inequality they received by the adult learning inequality of the current under-45s cohort. We then examine whether countries with high skills inequality for this cohort also had high adult learning inequality.

The fourth section looks at the impact of initial education on later adult skills inequalities. We first compare across countries the inequalities in education levels of respondents within different age bands. SAS measures the education level of respondents in terms of the ISCED level of their highest qualification. We assume that the vast majority of highest qualifications are attained by individuals when they are young – i.e. prior to age 25 – and that the measure therefore proxies for inequality in the initial education system at different points in time. We then correlate the inequalities in education levels with the inequalities in skills to show that it is education level inequalities which are one of the primary drivers of adult skills inequalities. Lastly, we make a preliminary assessment of how far initial post-compulsory education and training contributes to increasing or decreasing skills inequalities in different countries. This is done by comparing across countries the relative inequality of skills amongst 15 year olds in PISA 2000 and the relative inequality of skills amongst 25 - 29 year olds in SAS.

The fifth section concludes with the overall findings of the paper and suggests where further research needs to be done. Our analysis shows that the exceptional levels of skills inequality in England cannot be explained by inter-cohort differences in mean skills levels, the effects of migrants' skills or the effects of adult learning. Two factors, however, do seem to provide an explanation, at least for England. One is the exceptional levels of inequality in the outputs of the education system over a long period. The other is the relatively strong effect in England of social background on skills attainment.

## Section One: Inequality of Skills Outcomes and Inequality of Opportunities

*Inequality of Skills Outcomes*

Adult literacy and numeracy skills in England are widely distributed in absolute terms and relative to other countries.

In absolute terms, we can see the size of the gap by comparing the average scores of the top and bottom quintiles. Scores in SAS are measured out of 500. In England the average score in numeracy of those in the lowest-scoring 20 percent is 153 points below the average score of those in the highest scoring 20 percent. The gap in literacy scores is somewhat smaller at 134.3 points.

Figures 1 and 2 for the gap between the mean scores of the top and bottom quintiles show that on the raw rankings England is more unequal than all but three other countries or regions measured in numeracy and in all but seven other countries and regions in literacy. Our t-test analysis shows that the numeracy top/bottom gap in England does not statistically differ from those in Norway or Sweden, but differences with the other countries are statistically significant. So what we can say with confidence is that England ranks equal fourth amongst countries and regions in numeracy inequality. Only France, English-speaking Canada and the USA are significantly more unequal in numeracy. T-tests also show that the literacy top/bottom gap in England does not statistically differ from those in France, Germany, Ireland, Netherlands, Poland, Spain, Sweden, US and Flanders. Thus, on literacy England shares its position with nine other countries which reach down toward the middle of the crude rank ordering; but only Finland and Canada (English- speaking and French-speaking) have greater inequality in literacy.

**Figure 1: Difference in Numeracy Means of Top and Bottom Quintiles for 16-65s**

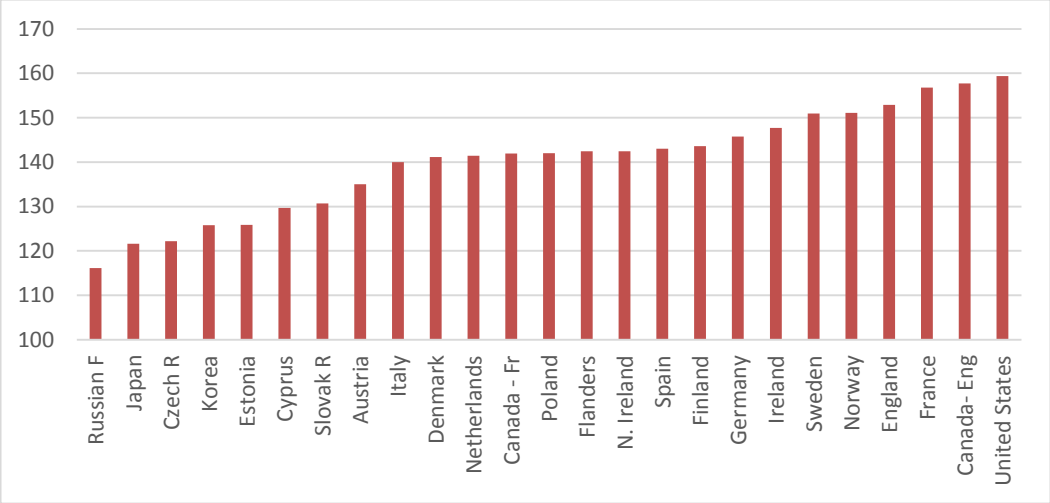
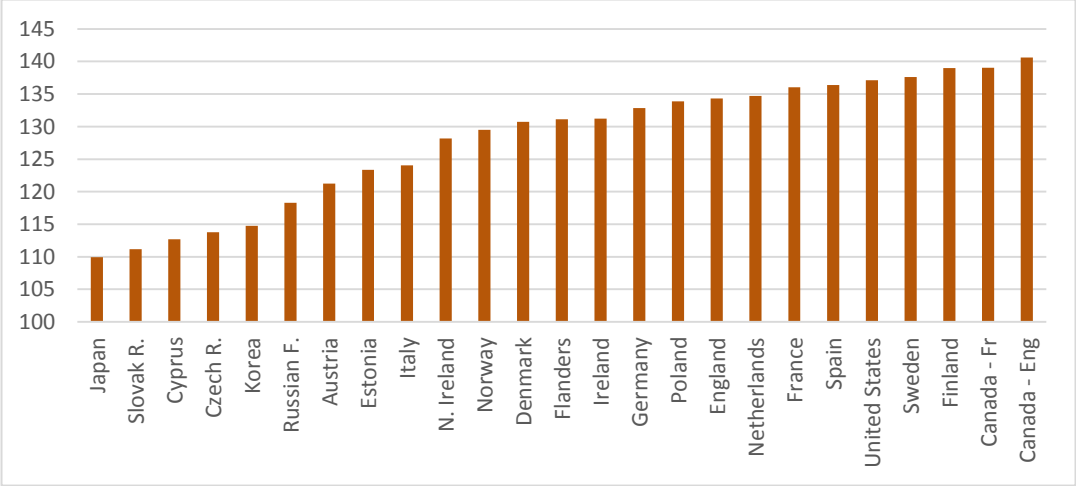



**Figure 2: Difference in Mean Literacy Scores of Top and Bottom Quintiles for 16-65s**




Inequality in adult skills can also be measured by using skills gini coefficients which capture the dispersion of scores across the whole range of scores. Here we can only report the raw rankings since it is not possible to make reliable estimates of significance with the gini measures. Nevertheless, these rankings do broadly confirm the results from the quintile difference measurements. Figures 3 and 4 below show that, as with the quintile difference measure, the only countries having more unequal skills in numeracy are the USA, France and English-speaking Canada. Inequality in literacy

skills in England is not as high as in numeracy skills. The relative position of England in terms of literacy skills is also not quite as bad as with numeracy. As on the quintile difference measure, inequality in literacy skills on the gini measure is higher than in all but 7 countries (which again include the USA, France and English-speaking Canada), which equates to a high middling position in the ranking of skills inequality. In all cases the English-speaking countries are relatively high in the rank ordering of skills inequality but England tends at least to be slightly less unequal than the USA or English-speaking Canada.

**Figure 3: Gini Coefficients for Adult Numeracy Skills Inequality**

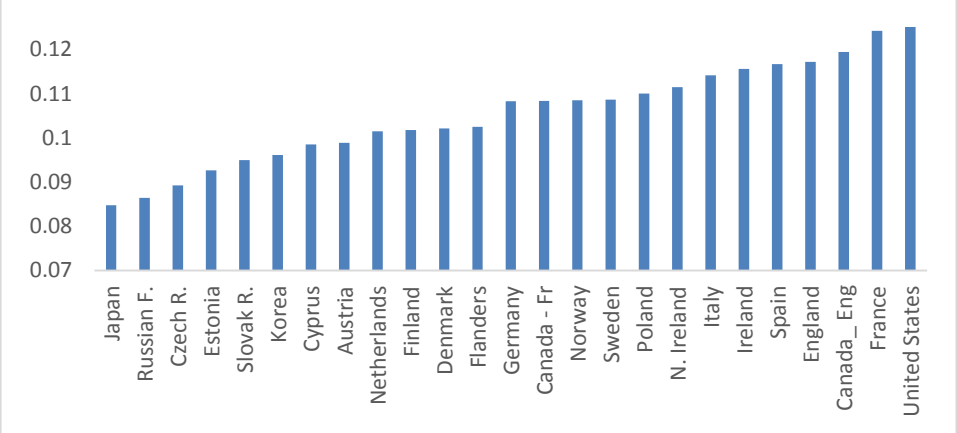
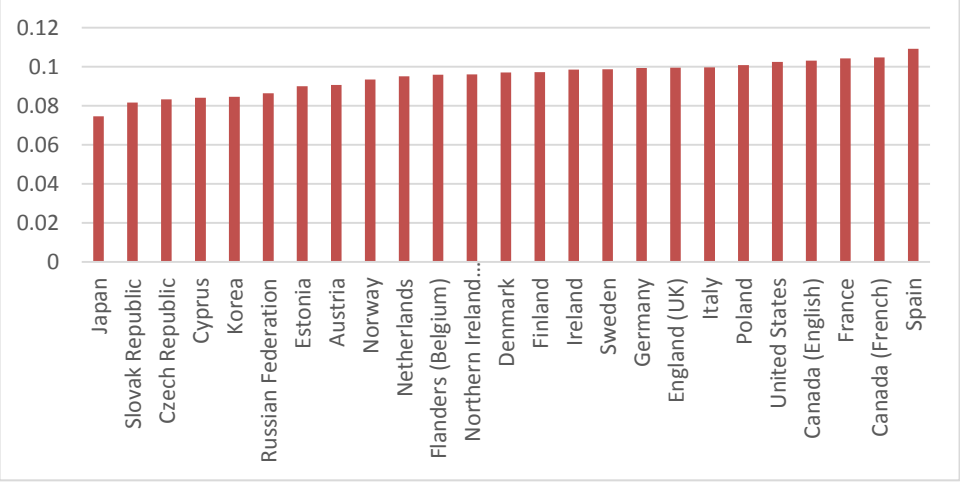



**Figure 4: Gini Coefficients for Adult Literacy Skills Inequality**



Inequality in adult skills overall in England is relatively high on both measures, although somewhat less so in literacy than in numeracy. However, the situation as regards the younger age groups is even more concerning.

For numeracy, amongst the 25-29 year olds, inequality in England inequality is higher than in all other countries on the crude rank ordering, on both measures (see Figures 5 and 6). The t-tests show that the differences are significant except between England and Norway, Sweden and the USA at the top end, so we can say that England is the most unequal along with these three other countries. For the literacy scores on the crude rank ordering England is the third most unequal on the quintile difference measure and second most unequal on the gini measure. However, the t-tests for the quintile differences show that there is no significant statistical difference between England and Ireland, Netherlands Norway, Sweden and the USA at the top end. So what we can say with confidence here is that inequality in England is as unequal as the other five most unequal countries. As with the adults, amongst the younger people in England inequality in literacy skills is lower than inequality in numeracy skills.

**Figure 5: Difference in Mean Numeracy Scores of Top and Bottom Quintiles for 25-29s**

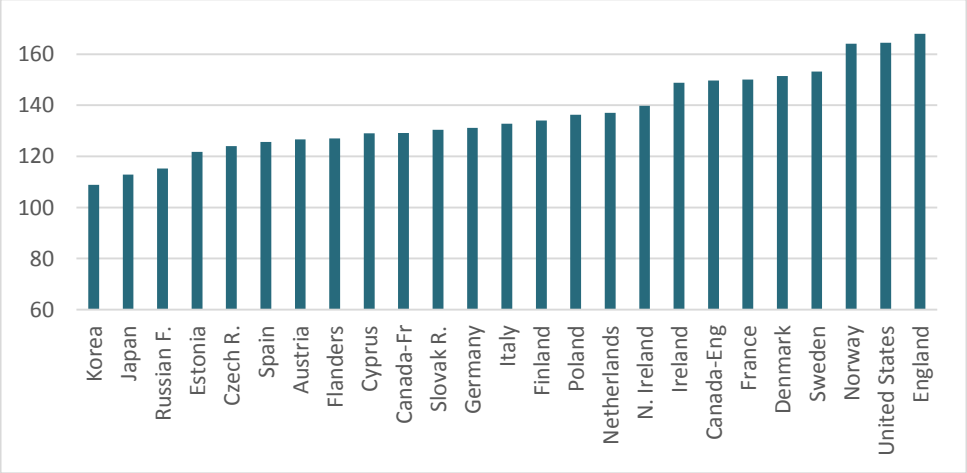
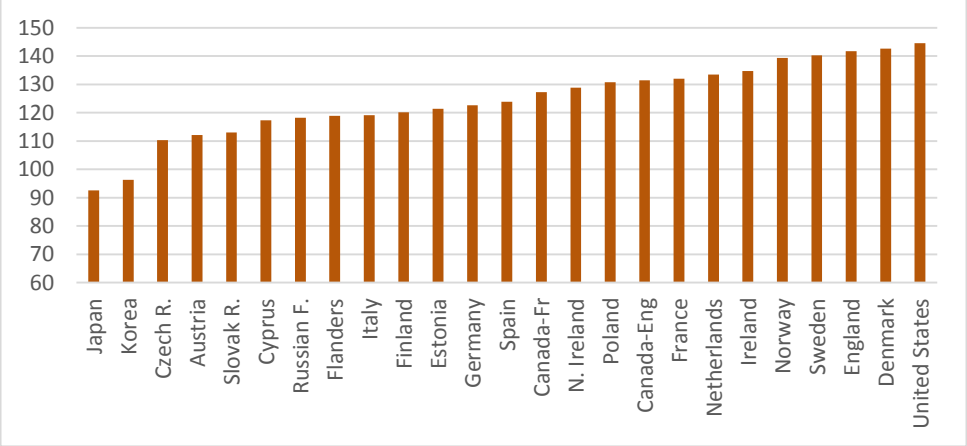


**Figure 6: Difference in Mean Literacy Scores of Top and Bottom Quintiles for 25-29s**




The gini coefficients figures in Figures 7 and 8 also show that skills inequality in England is higher amongst the older 25-29 age group than amongst the 16-24 age group. This may not seem surprising as the figures for the older age group capture the full effects of the uneven participation in higher education, since the majority who do higher education have completed by 25 years of age, whereas the younger age group contains individuals from 16-18 who have not yet been sorted between higher education participants and non-higher education participants. However, it is notable that in a number of countries and regions, the distribution of skills is no wider – or even narrower – amongst the older age group in either or both of the literacy and numeracy skills (Austria, Czech Republic, Estonia, Finland, Flanders, Germany, Italy, Japan, Korea, Netherlands, Poland, Russian Federation, Slovak Republic and Sweden). These include countries with high participation rates in upper secondary general and technical education (like the Czech Republic, Finland, Japan and Korea) and three countries with extensive apprenticeship systems (Austria, Germany and Flanders). We investigate later whether these types of programmes – which invariably include extensive periods of additional maths and national language learning – are mitigating the skills inequalities which emerge from the compulsory school systems in some countries. For now it is important simply to note that there is no such effect in England where the exceptionally high levels of skills inequality visible amongst the 16-24 year old age group is still apparent amongst 25-29 year olds. Since the periods of compulsory education for these

groups are separated by only on average 6 years, it is likely that they started from similar points in terms of inequality; thus it appears that initial post school learning is not mitigating skills inequalities generated by the school system.

**Figure 7: Numeracy Ginis for Younger Age Groups**

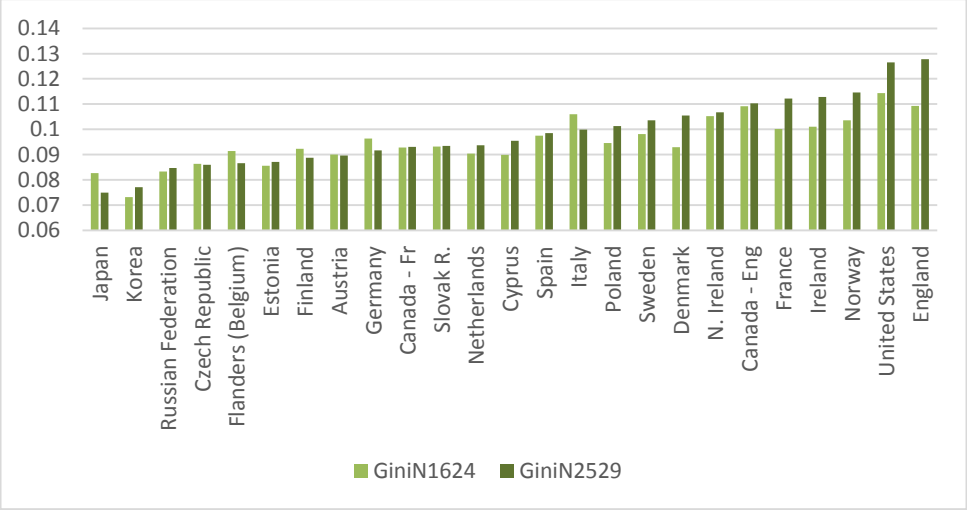
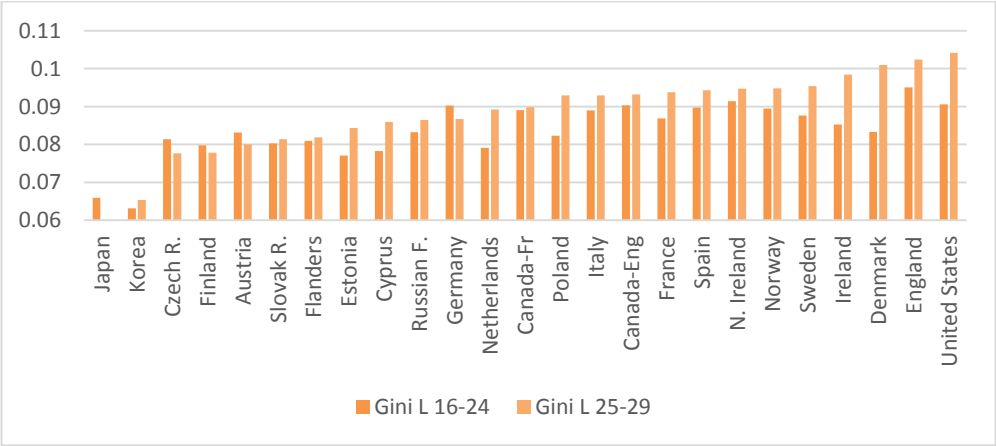



**Figure 8: Literacy Ginis for Younger Age Groups**




Inequality in literacy and numeracy skills amongst young people, taken together, is not only higher in England than in almost all other countries, barring possibly the USA. It also appears to be higher – or at least no lower – than amongst the older 55-65 year-olds in SAS (see Figure 9 for literacy). The differences are not large, and we can't be sure from the gini coefficients how significant they are, but in most countries inequality

seems to be higher in the older age groups. In England, as in the USA, the CEE countries (Russian Federation, Estonia and the Slovak Republic) and the Scandinavian countries, it appears to be higher or similar in the younger age group. The explanation for this, at least in the English case, may have to do with life course effects cancelling out period effects. When the 55-56 year olds were younger they were probably more unequal than the current younger cohorts. As we show later (see Figure 15), there appears to have been a slight drop in literacy inequality in England within the 16-24 age group during the period between 1996, when the IALS was conducted, and 2011/12 when SAS was conducted. At the same time, cohorts in England do appear to become less unequal over the life course, at least in literacy. Figure 10 compares inequality in literacy skills amongst the 37-47 year olds in IALS (in about 1996) with inequality in literacy skills within the group in SAS in 2011/12 which is at the age that the IALS 37-47 year olds would have been 16 years later (i.e. 55-65). What it shows is that literacy inequality in England declines slightly as the (pseudo-) cohort gets older, as in a number of other countries with a relatively wide skills distribution. In England, this does not seem to be due to formal or non- formal adult learning mitigating skills inequality, as we show in section four. But it may have to do with life generally having an equalising effect on literacy skills. The young people with least literacy competence may catch up with the rest to some degree as part of coping with everyday life. [1] So if younger people in England experience a greater degree of inequality in skills relative to their parents' generation than in most other countries, this may be partly because in England their parents' generation has become more equal over the years.

[1] The BIS report (BIS, 2013, p. 154) shows improvements over the early life course in mean literacy scores in England. The 25-34 and 35-44 age groups in SAS score significantly better than the 16-24 age group in IALS. This may be because of improvements amongst the low scorers.

**Figure 9: Literacy Ginis for Younger and Older Age Groups**

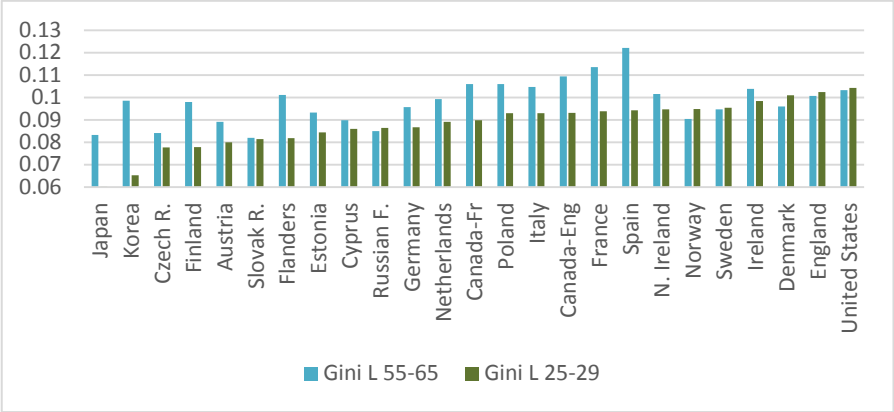
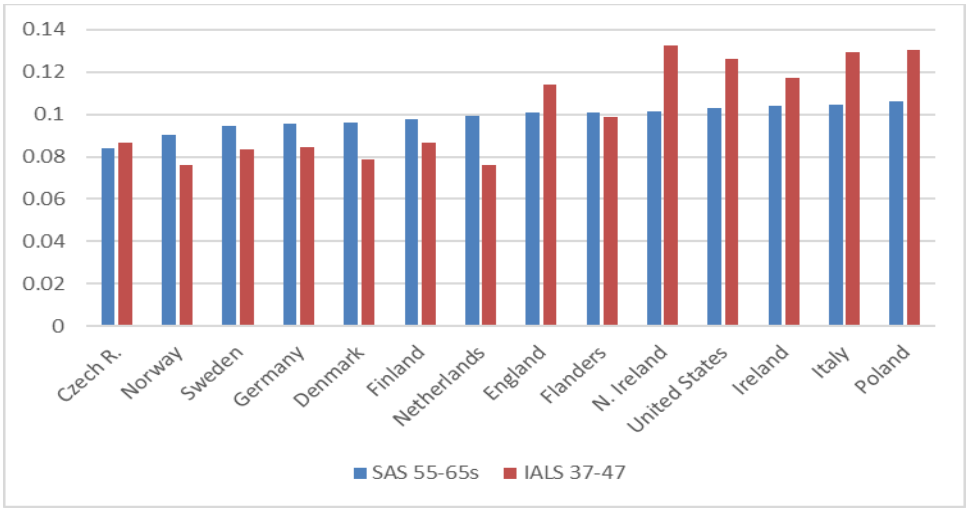



**Figure 10: Changes in Inequality over the Life Course – Comparing 37-47s in IALS and 55-65s in SAS**




*Where is the Inequality: A Long Tail of Underachievers?*

It is often argued that England has a 'long tail of underachievers' amongst those leaving the initial education system. How far is this reflected in the distribution of skills amongst adults? The histograms in Figures 11-14 do not show much evidence of this, except perhaps for literacy amongst the 25-29 year old group. Here the number of people scoring in the low 130 to 250 range is somewhat higher than the OECD country average (Figure 14). However, the same phenomenon is not replicated with numeracy

skills for young people or for adult literacy or numeracy scores generally. Adult literacy skills might be said to be slightly more polarised than is the case on the OECD average, with fewer people in England scoring at the middle levels and rather more in the higher 330-380 score range. Amongst the 25-29 year olds there are also less people scoring at the middle level than is the case for the OECD country average with, in the case of literacy a higher number scoring in lower and higher ranges. However this is not the case for adult numeracy, where England has more people scoring in the middle range than is the case for the OECD country average.

**Figure 11: Histogram for Adult Literacy**

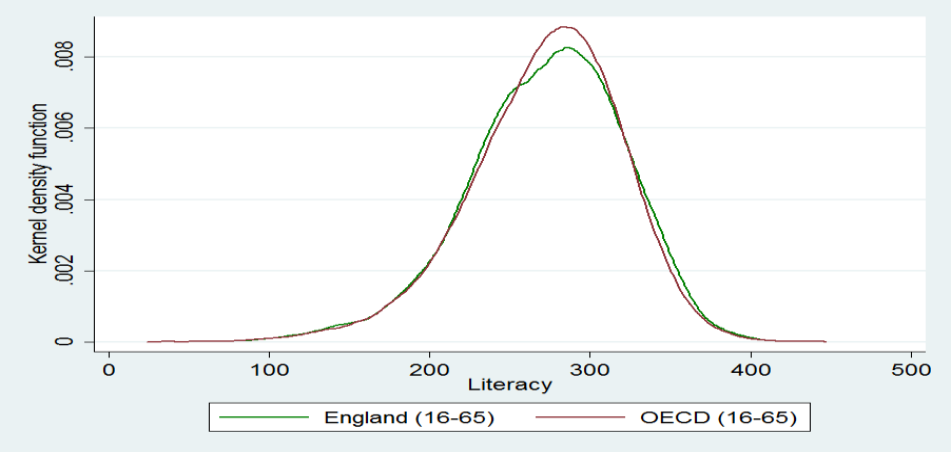



**Figure 12: Histogram for Adult Numeracy**

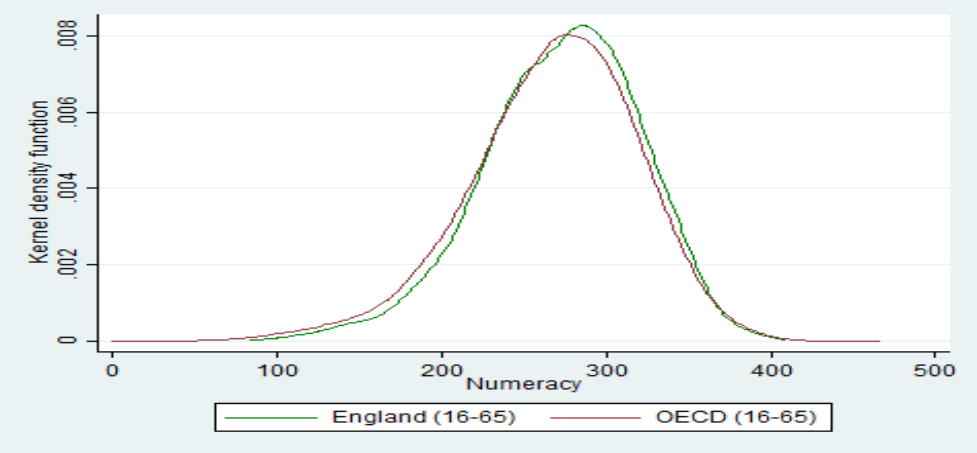


**Figure 13: Histogram for Numeracy for 25-29s**

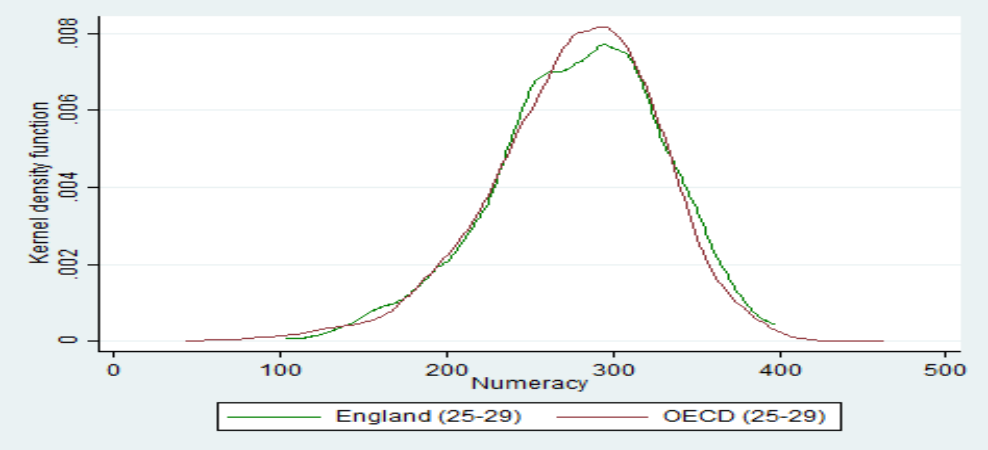
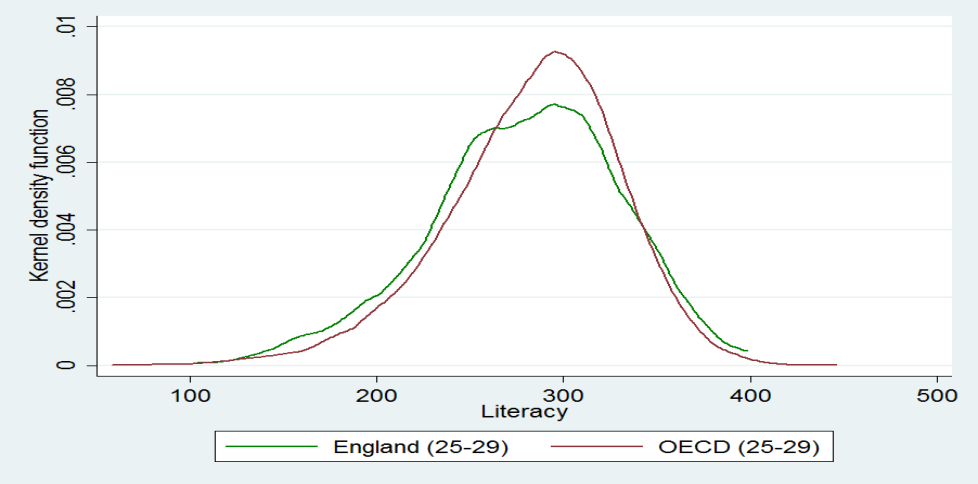



**Figure 14: Histogram for Literacy for 25-29s**




However, if we look at the proportions of respondents scoring at the different levels there does appear to be some evidence of a long tail of underachievers in England in both literacy and numeracy. The OECD divides the score range into six levels: including 'Below Level One' (which is scores between 0 and 175); Level One (between 176 and 225) and Level Five (over 376) (OECD, 2013, p.63). In the literacy tests 3.3 percent in England scored at the lowest level. This is identical to the OECD country average. However 13.1 percent in England scored at Level One which is slightly higher than the OECD country average (12.2 percent). This indicates only a slightly longer tail of underachievers than in the OECD on average. However, for numeracy the difference is larger. In England 6.4 percent score at Below Level One, compared with 5 per cent

for the OECD, and 17.8 per cent score at Level One compared with 14 percent for the OECD. For numeracy, almost a quarter (24 per cent) of adults in England scored at Level One or below, a higher proportion than the OECD average of 19 percent. Most countries had a lower proportion of adults at the lowest two numeracy levels than England and only six countries had a higher proportion (Northern Ireland, the Republic of Ireland, France, the United States, Spain and Italy). So there would appear to be a rather longer tail of underachievers than in most countries, and particularly with numeracy (See BIS, 2013).

*Changes in Skills Inequality over Time*

The analysis above suggests that skills amongst the younger age groups in England are more unequal than amongst the older age groups in numeracy and not much different in literacy. These cohort comparisons cannot, however, be used as proxies for changes over time in equality since they are based on a single cross section. Differences between generations may be due to life course effects rather than cohort or period effects. They cannot be taken as representing changes over time in the factors which are creating skills inequality. However, we can assess over time changes in literacy inequality, at least, by comparing the ginis for literacy in IALS and SAS. The IALS surveys were conducted in the mid 1990s whereas SAS was conducted in 2011/12, so there is a time lag of about 16 years between them (although the precise lag for each country varies slightly because IALS was conducted in different years in different countries). OECD have recalibrated the IALS literacy data to make it fully comparable with the SAS data, so by comparing the literacy ginis for identical age groups in the two surveys we can get an idea what has happened to the skills distribution over the period. However, we can only make the comparison for the reduced sample of countries which appear in both surveys.

The figures below rank countries by their distributions in SAS. Figure 15 for the 16-24s shows a slight narrowing of the literacy skills distribution for literacy in England over the period. There was a similar narrowing of the distribution in two of the other more unequal countries in SAS (Northern Ireland and the USA), as well as in Poland, Ireland and Italy. So the English-speaking countries here are getting somewhat less unequal within this age group over time. On the other hand, the countries which have the most

equal distributions in SAS (the Czech Republic, Finland, Flanders and the Netherlands) experienced a slight widening of the skills distribution over the period. Figure 16, showing the distributions for the adult population as a whole, displays a similar pattern. Several countries with the most unequal distributions in SAS, including England, saw declines in the ginis over the period, whereas several of the more equal countries in SAS experienced increases. So there would appear to be some convergence in the levels of inequality in different countries over time. This is supported by the fact that the variation across countries for the ginis in IALS is generally much higher than in SAS.

So the good news in England is that inequalities in literacy appear to have reduced slightly over the last 16 years. Despite this, however, the skills of younger people remain more unequal than in almost any other country.

**Figure 15: Literacy Ginis for 16-24 Year Olds in IALS and SAS**

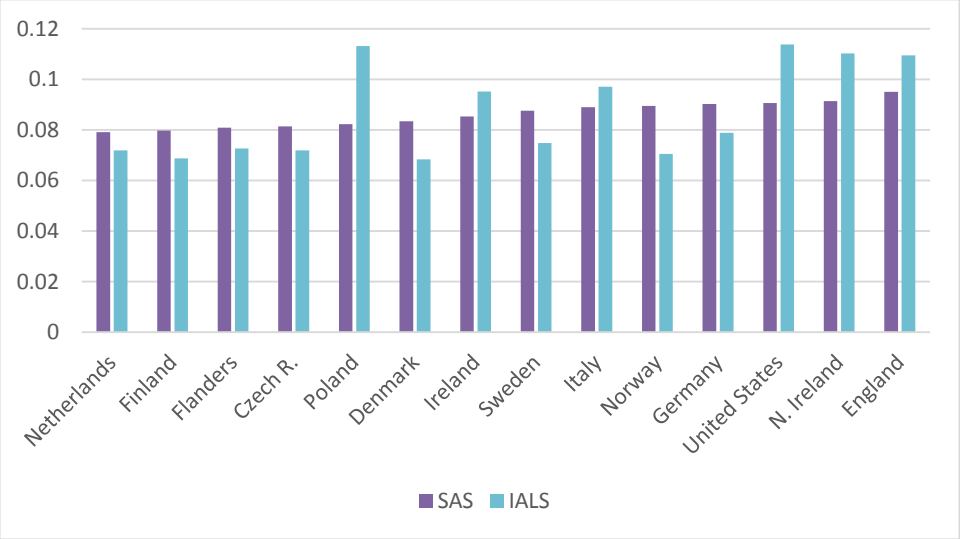
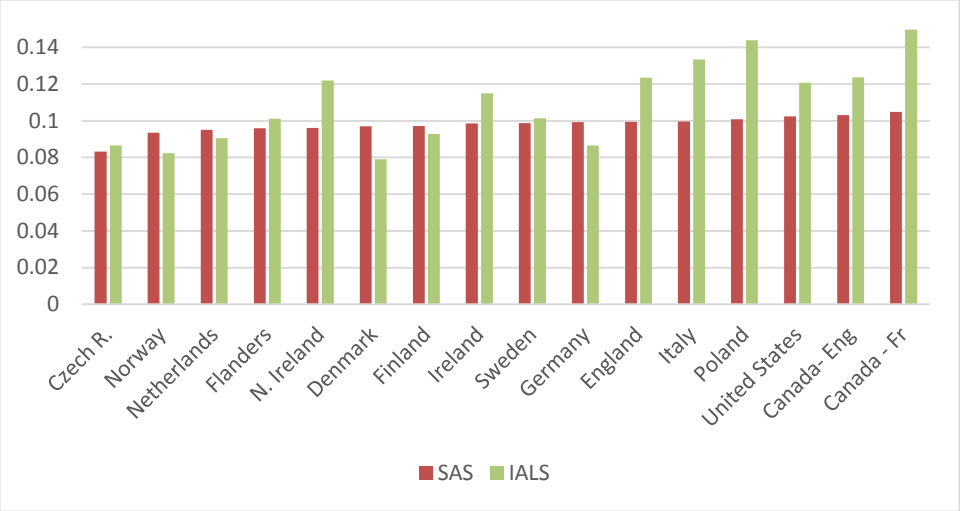


**Figure 16: Adult Literacy Ginis for IALS and SAS**




*Inequality of Opportunity*

Inequality of opportunity can be defined and measured in different ways. Here we focus solely on the social origins effect, i.e. how much family background influences the level of an individual's skills. SAS records data on the education level of the parents of respondents according to the highest qualification held by parents. The highest level is where one or both parents have a degree (at ISCED 5 or 6 or above). The middle level is where one or both parents have a highest qualification at upper secondary level (ISCED 3, not including 3c short and level 4). The lowest level is where neither parent has a qualification above lower secondary level (i.e. not above ISCED 1or 2). We are therefore able to compute a social gradient for literacy and numeracy skills for adults in general and for distinct age groups for each country.

Figures 17 to 20 represent the social gradients for the impact of parental education on individuals' literacy and numeracy for the 16-24 age group and the 55-65 age group, and both by Country Group. The height of each bar represents the point difference in scores that can be predicted for an individual when the social background of his or her parents' is increased from the bottom unit to the top unit. So, for instance, for 16-24 year olds in England increasing parental class from the bottom level to the top level

predicts an increase of 67 points in measured numeracy skills and a 58 point[2] increase in literacy skills.

**Figure 17: Social Gradients for Numeracy Skills for Younger and Older Age Groups**

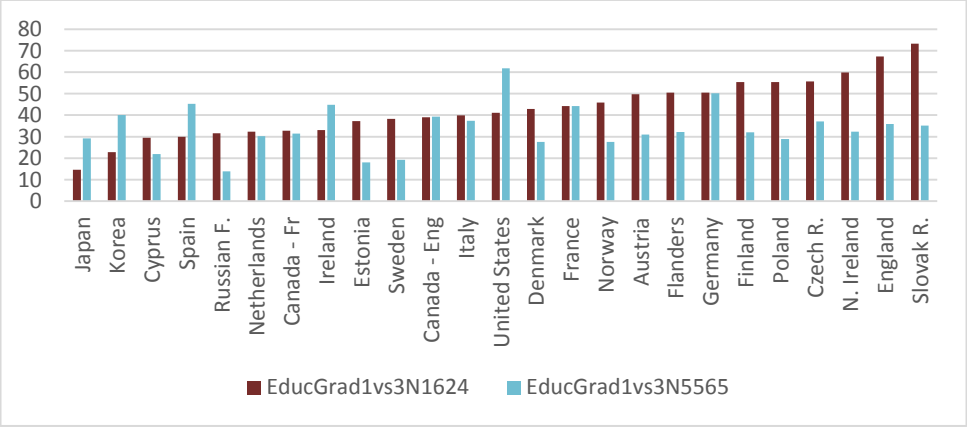
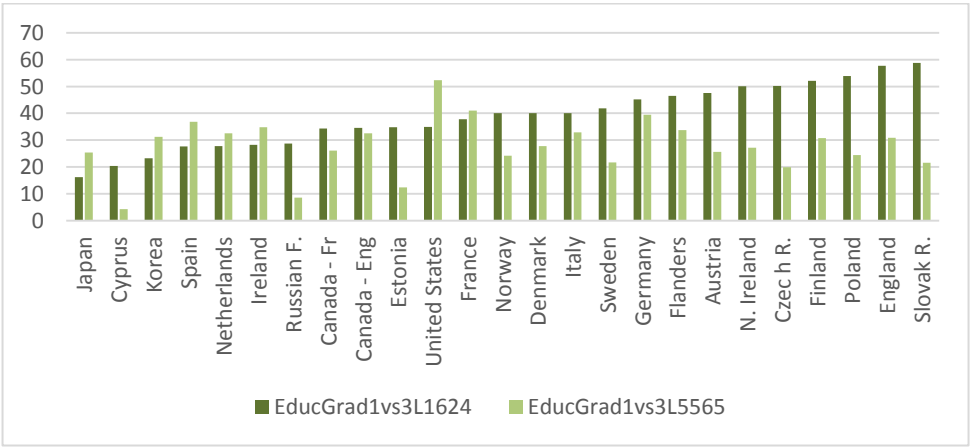



**Figure 18: Social Gradients for Literacy Skills for Younger and Older Age Groups**




[2] The standard deviation for Numeracy, age 16-24, is 46 for OECD and 50 for England. The SD for Literacy, age 16-24, is 42 for OECD and 45 for England. The social gradient for England is thus well over one standard deviation for both literacy and numeracy in England. A social gradient which is higher than one standard deviation means that the effect covers a range that includes more than 68% of the population.

**Figure 19: Social Gradient for Adult Literacy and Numeracy by Country Groups**

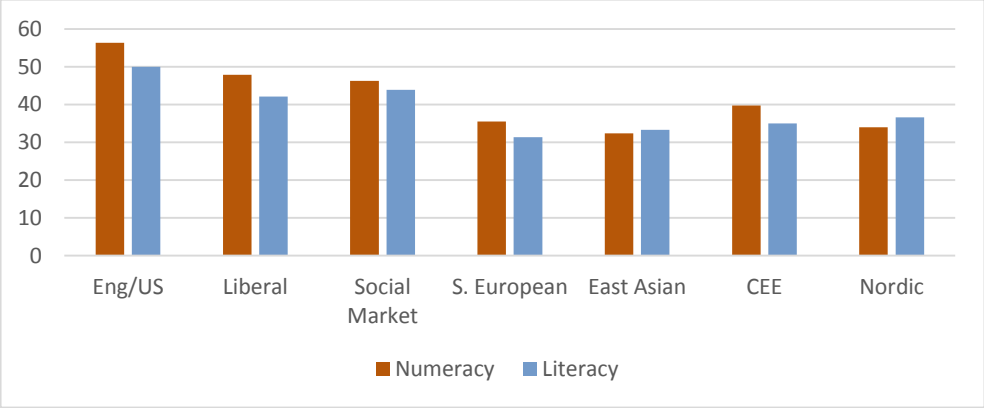
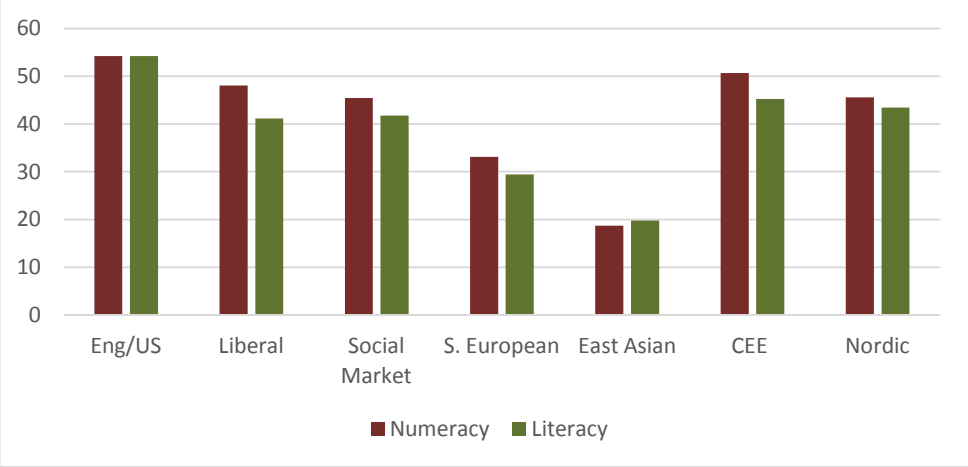



**Figure 20: Social Gradient for Numeracy and Literacy for 16-24s by Country Group**




Three comparative observations can be made about the cross-cross country values shown in the figures.

Firstly, it is clear that in England, relative to other countries, the impact of social background on literacy and numeracy skills is fairly average for the oldest age group but very high for young people. For the 16-24 age group there is only one other country, the Slovak Republic, where parental education has more influence on individual literacy and numeracy skills attainment. The impact of social background on literacy skills for this age group is twice as high in England as in the Netherlands and the impact of social background on numeracy attainment is twice as high as in Spain.

The second observation is that social gradients of skills in England are significantly steeper for younger people than for the older 55-65 group. This situation is quite typical for numeracy in a number of other countries and there are several countries where it is also true for literacy. However, in a number of countries where the social gradients for literacy and numeracy amongst 16-24 year olds are flattest (including Japan, Korea, Spain and France) that age group also has a flatter gradient than the 55-65 age group. Interestingly this group also includes the USA. There are six other countries where the social gradient for both literacy and numeracy are substantially higher for the younger age group than for the older age group (Slovak Republic, Poland, Czech Republic, Northern Ireland, Austria and Norway).

The third observation is that the social gradients for both literacy and numeracy amongst adults are relatively steep in English-speaking countries, and particularly in England and the USA. Figures 19 and 20 show the average values of the social gradients for countries in each country group. As is common practise in comparative studies of political economy (e.g. Green and Janmaat, 2001; Hall and Soskice, 2001) predominantly English-speaking countries are designated as 'liberal' and countries in north-west continental Europe are designated as 'social market'. East Asian countries here include only Japan and South Korea, and the Nordic, Southern European and Central and Eastern European (CEE) labels speak for themselves. As Figure 19 shows, it is in the Nordic, East Asian and Southern European country groups where, on average, social origins have the least impact on skills attainment amongst adult as a whole. With the younger 16-24 age group, depicted in Figure 20, the Nordic countries are less egalitarian, with similar social gradients, on average, as the Social Market countries. The Southern European countries still have relatively flat social gradients and the two East Asian countries the flattest social gradients of all, an indication perhaps that these countries still have rather meritocratic education systems. The Liberal countries are similar to the Social Market countries in the effect of social origins on adult skills, but rather higher on average than other country groups. However, with the 16-24 age group they are similar to the Nordic, CEE and Social Market country groups, and only more inegalitarian than the East Asian and Southern European groups. England and the USA stand out as having stronger social origins

effects on both literacy and numeracy skills than in all other groups, both with adults as a whole and with the 16-24 age group.

Social origins effects are of one of the drivers of inequalities of outcomes (i.e. distributions). As research on inequalities of incomes and skills has repeatedly shown, there is a close relationship across countries between social origins effects on incomes and skills (common proxies for social mobility), and distributions of incomes and skills (Esping-Andersen, 2003, 2005; Blanden et al, 2005). Countries where social origins have a greater impact on individual skills and incomes tend also to be countries where the distributions of the latter are widest. The SAS also gives evidence of this relationship.

For the adult populations there is a correlation across countries between the ginis and social gradients for both literacy ($r=0.5$, $p<0.05$) and numeracy ($r=0.55$, $p<0.005$). Figures 21 and 22 show that England is close to the regression line on both measures. Inequality for numeracy is relatively high on both the gradient and the distribution measures, with only France and the USA showing higher levels on both measures. Inequality in literacy skills is somewhat lower, both absolutely and relatively, with three countries (France, Poland and the USA) ranking higher on both measures.

**Figure 21: Social Gradients for Adult Numeracy**

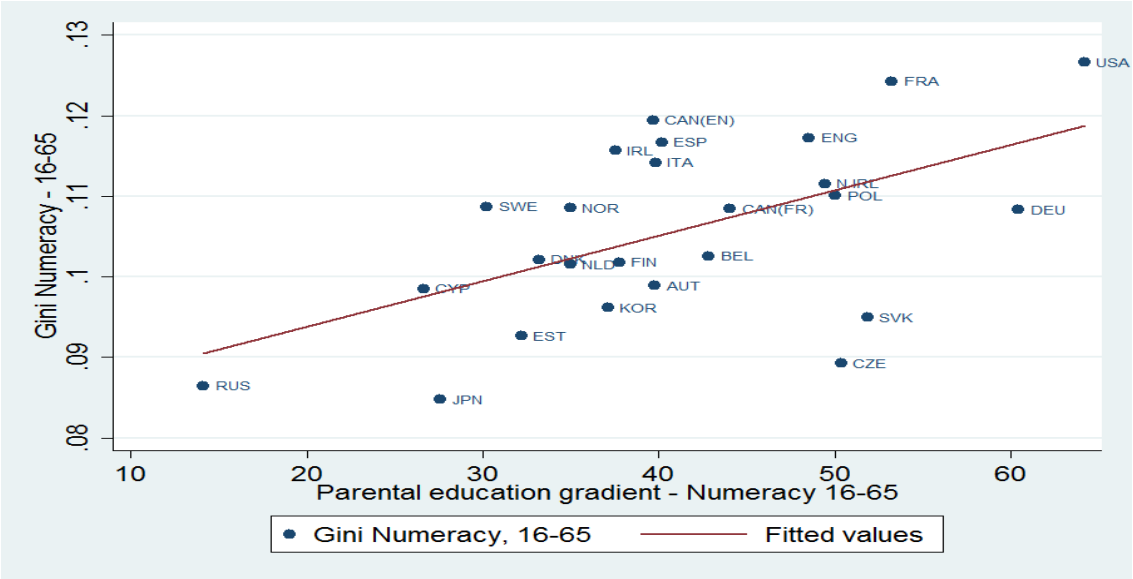
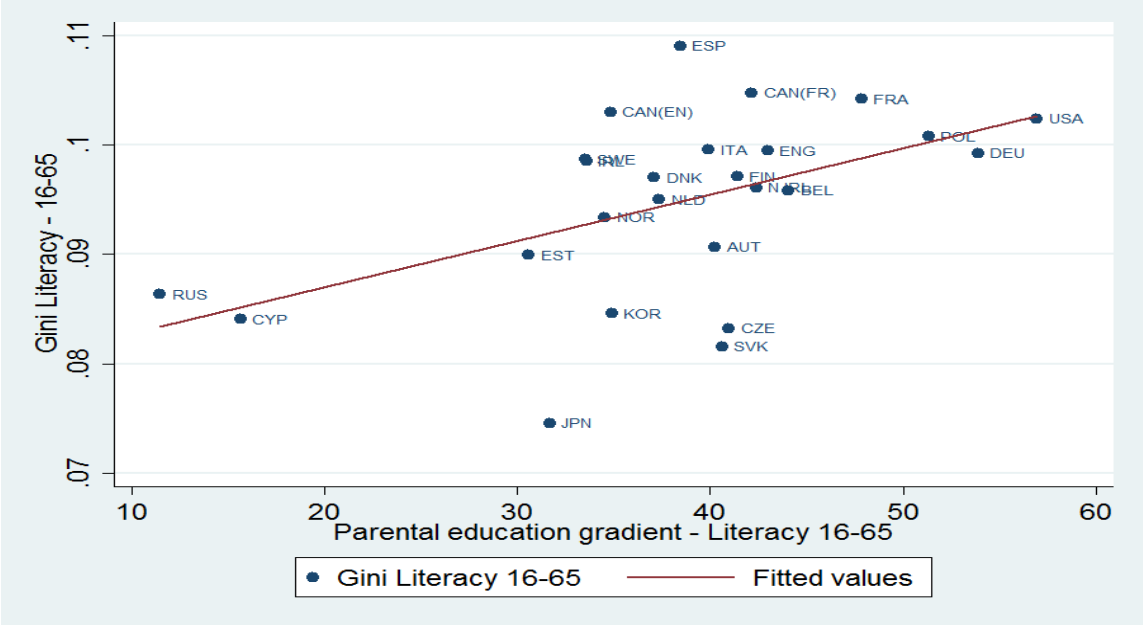


**Figure 22: Social Gradients for Adult Literacy**




As with inequality of outcomes, inequality of opportunity in England is higher amongst the younger age groups than the older age groups. Figures 23 and 24 show that relative inequality in both literacy and numeracy in England is amongst the highest in all countries both on the distribution and social gradients measures. Amongst the other countries only the USA comes close. With the younger age groups the statistical correlation between the distributions and gradients is only significant for numeracy (r=.37, p<0.1).

**Figure 23: Social Gradients for Literacy for 25-29s**

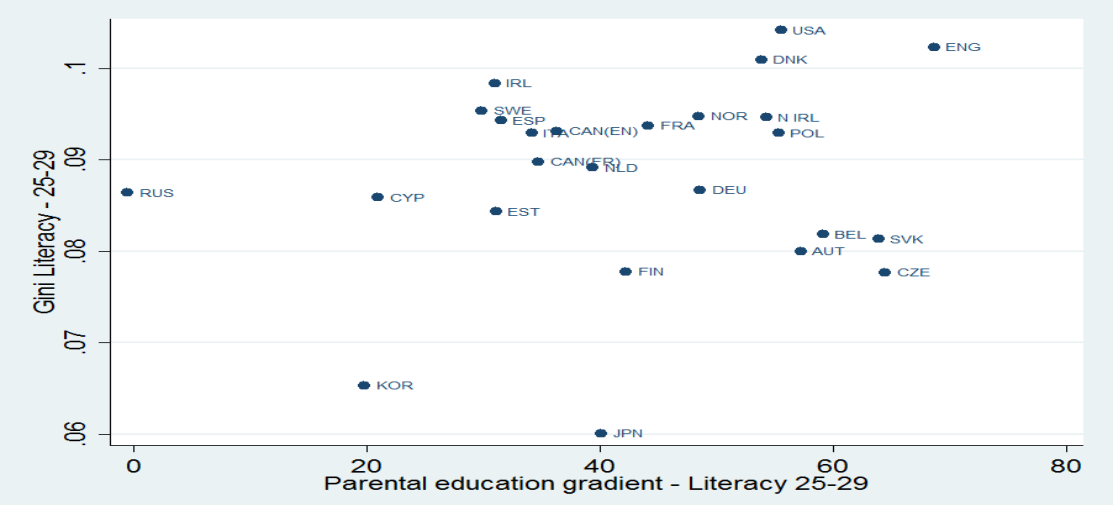
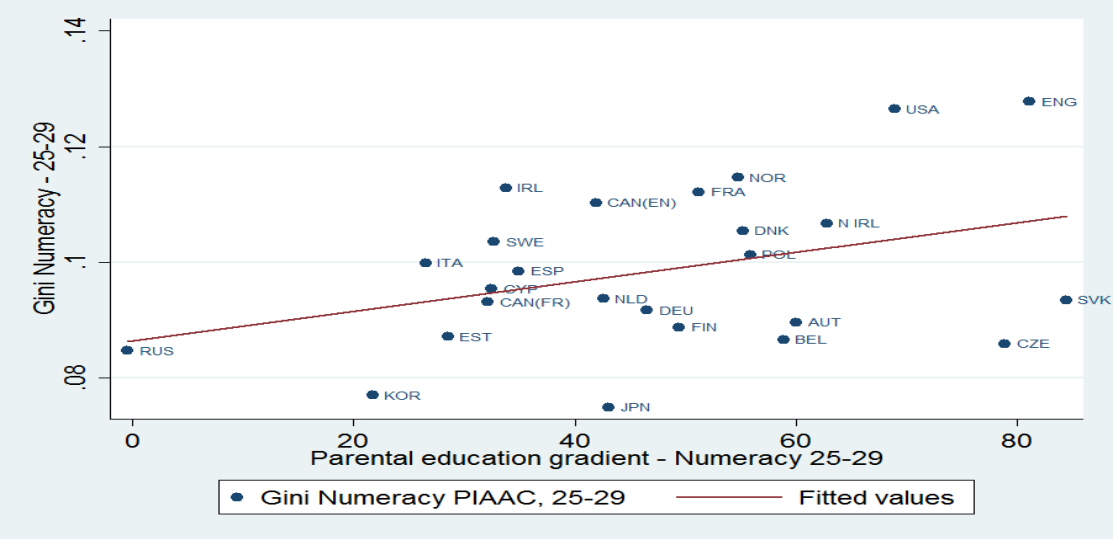


**Figure 24: Social Gradients for Numeracy for 25-29s**




Our final descriptive observation in this section is motivated by the expectation that the channel through which inequality of opportunity is linked to the unequal distribution of skills is likely to be complex. One obvious route, however, is via educational achievement. A simple picture of how social gradients are channelled through education can be derived from estimates of the impact of parental education on skills outcomes that are similar to the diagrams above except that they control for the level of educational achievement (as indicated by ISCED levels). Such an analysis is not a substitute for a full multi-level analysis of the pathways of social background effects, but it gives a first indication of how far education matters in the transmission.

Figures 25 and 26 present these conditional social gradients for adults as a whole. Unsurprisingly, as can be seen by comparison with Figures 21 and 22, the conditional gradients are rather less than the raw gradients, indicating that only some of the effect goes through social background's impact on educational achievement. Nevertheless, the associations remain substantial. Moreover, the high-ranking of England is again to be observed in the conditional social gradients of both literacy and numeracy. Taking the population as a whole, England's conditional social gradient ranks third in respect of literacy skills, and second in respect of numeracy. We return to a discussion of cultural and social influences on inequality in the conclusion of the paper.

**Figure 25: Social Gradients for Literacy Controlling for Respondent's Education**

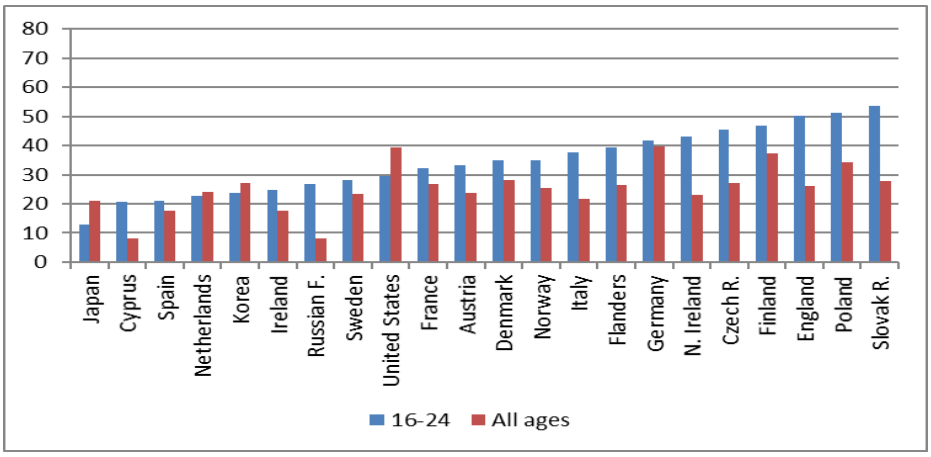
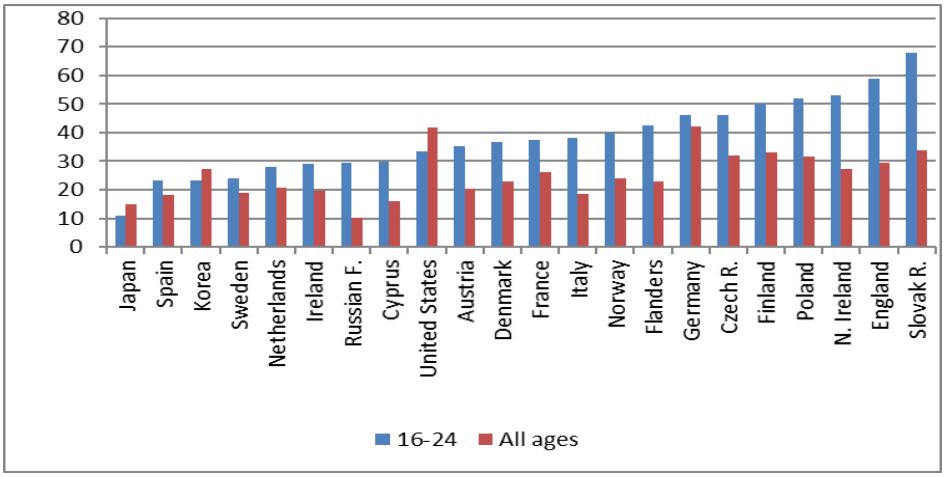



**Figure 26: Social Gradients for Numeracy Controlling for Respondent's Education**




*Conclusions*

This section has analysed skills inequality in numeracy and literacy in England, relative to other countries. We have compared levels of skills inequality for different age groups and the whole adult population and we have also attempted some assessment of changes in inequality of outcomes over time. What we can say by way of conclusion is that in England inequality in both skills outcomes and opportunities, relative to other countries, is *quite* high for the older age groups and for the adult population as a whole,

and *very* high amongst the younger age groups. This assessment applies to both literacy and numeracy, but relative inequality appears to be highest for numeracy.

## Section Two: Do Inter-Cohort Differences and Migrants Skills Help Make Adult Skills in England so Unequal Compared with Other Countries?

A number of factors may contribute towards the relatively high levels of adult skills inequality in England. We can make a provisional assessment of the some of the potential causes of this by examining the contribution of inter-cohort differences and migrant skills.

*Inter-cohort differences.* The SAS data show that in many countries younger age groups have higher average levels of literacy and numeracy skills than older age groups. This means that there will be substantial inter-cohort differences which are contributing to overall adult skills inequality. Literacy skills are higher amongst 16-24 year olds than amongst 55-65 year olds in all countries bar one, and numeracy skills in all countries bar two (See Figures 27 and 28). England is the only country where the youngest age groups perform no better than the older age group in either literacy or numeracy. This means that inter-cohort differences are not contributing to adult skills inequality in England in the way they are in most other countries. It is also notable that in the USA there is also a very small difference between the mean skills of younger and older age groups.

**Figure 27: Literacy Means by Age Group, 16-24s and 55-65s**

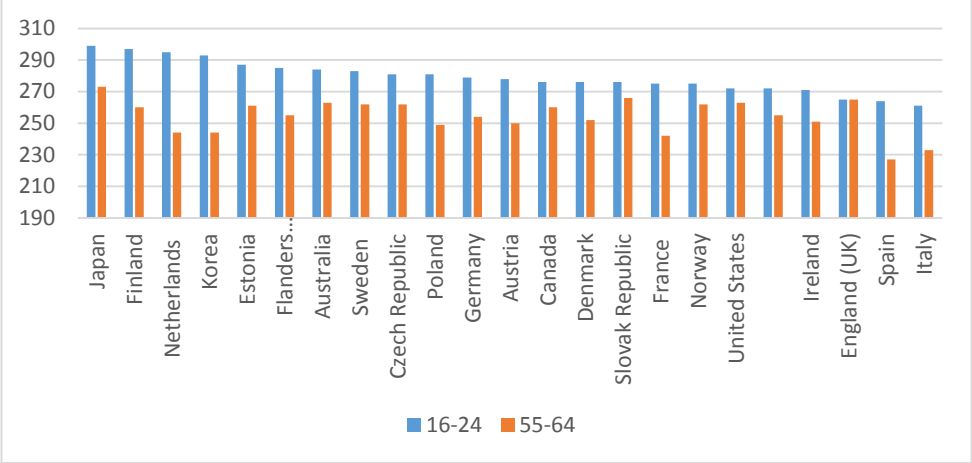
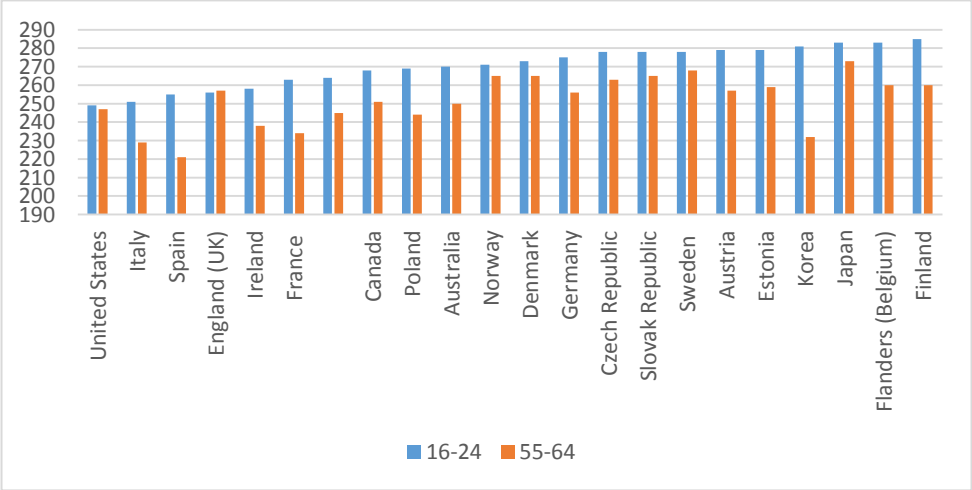


**Figure 28: Numeracy Means by Age Group, 16-24s and 55-65s**




*The Effects of Inequalities in Migrant Skills.* The skills in the adult population are not only the result of the flows of skills into labour force over time from young people leaving the education system at different times. They are also the result of over time flows of skills from adult migrants entering the labour force from abroad. SAS contains data on the skills of migrants and the age at which they migrated. Here we are only concerned with those migrating after receiving their school education abroad, since the effects of younger migrants can be assessed in the analysis of education flows from the school system.

Adult skills inequalities may be increased if there are substantial and sustained flows of migrants with more unequal distributions of skills than the native population or where their skills are concentrated at the higher or lower ends of the distribution. Alternatively they may be reduced if there are substantial and sustained flows of migrants with middle level skills or with skills distributions less polarised than in the native population. In most countries, where migrants are a small proportion of the total workforce, adult skills inequality is not going to be greatly affected whatever the distributions of skills amongst the migrants. However, in the countries where the flows are more substantial, as in England, Germany, Sweden and the US, for instance, there is often an assumption that they will make a significant difference, usually in the form of

increasing skills inequality, either because migrants are mostly low-skilled, or because they are polarised between those with high skills and those with low skills.

What the figures 29 and 30 show is that in about a third of countries or regions of countries the skills of migrants make no significant difference to skills distributions of adults. In the remaining two thirds of countries or regions they do make a difference, and in most cases this takes the form of increasing skills inequality. So in these countries the ginis for adult numeracy and literacy skills for the adult population minus the migrants are lower than for the adult population including the migrants. The difference in the case of numeracy is rather small in most cases. As might be expected, migrants make a larger contribution to increasing inequalities in literacy skills.

**Figure 29: Adults Numeracy Ginis Including and Excluding Migrants**

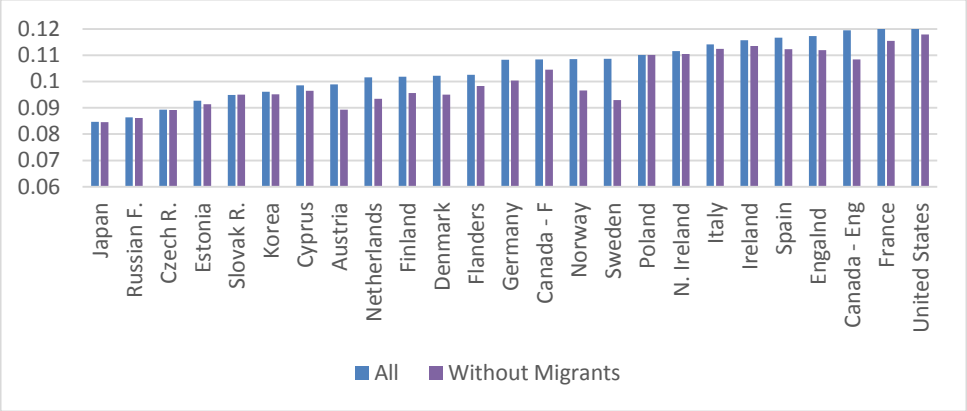
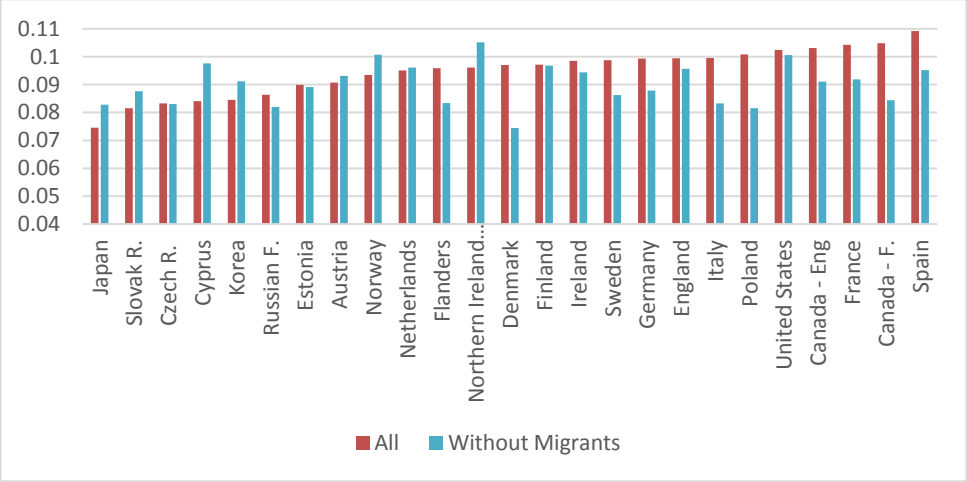



**Figure 30: Adult Literacy Ginis Including and Excluding Migrants**



There are eight countries where migrant skills seem to substantially increase inequalities in adult literacy skills (Canada, Denmark, France, Germany, Poland, Spain and Sweden). Most of these receive substantial flows of migrant labour relative to their populations. Furthermore, the national origins of migrants are typically such that they are not likely to speak the national language of the host country on arrival, and may find it hard to learn that language, particularly in the cases of Danish, Swedish and Polish, since these languages are rarely second languages for other nationals. England, however, is not one of the countries where migrant skills make much difference to literacy skills inequality. This may be because English is more widely spoken as a second language by migrants than would be the case for Danish and Swedish, for instance. In any case, what we may safely conclude from this is that although England has a relatively substantial flow of migrants, this is not the cause of its high levels of skills inequality relative to most other countries. We can further note that migrant skills are not having an exceptionally strong effect on skills inequality in other predominently English-speaking countries.

**Section Three: Is Adult Learning Part of the Explanation of Skills Inequality?**

It is well-known that adult learning is generally positively correlated with prior educational achievements (Green, 1994). This link is found in a wide variety of settings and countries. Similarly, it is noted by BIS (2013) and OECD (2013) that participation rates in education and training are higher for those with higher proficiency levels. There are two main reasons for the correlation. On the supply side it is argued that prior education raises the aptitude for learning. The demand side, however, is probably of greater significance: better educated and skilled individuals are selected into high-skilled jobs, which tend to have more requirements for additional skills and more ongoing requirements for upskilling. The main factor that might counter this positive correlation is if training has a remedial objective, to enable some to catch up if they have acquired low skills in school; but this counterbalancing is unlikely to have much force where the vast majority of training decisions are taken by private employers.

The net effect of the positive correlation is that adult learning can have a cumulative impact on skills inequalities. This cumulative effect is one of the potential explanations for the fact that, in most but not all countries skills inequality – as measured by SAS – is greater among older cohorts. If overall adult learning is a contributor to skills inequality, is this effect part of the reason why England has such high levels of skills inequality?

For this 'adult learning causes inequality' argument to be relevant, there are certain quite strong conditions. First, it must be the case that adult learning enhances the types of skills that are measured by SAS. This condition is questionable: it is possible that literacy and numeracy are core enabling skills that help the acquisition of the skill-types delivered through training at work, but that there is relatively little reverse effect, with the training itself further raising literacy and numeracy proficiency. Assuming, nevertheless, that adult learning might advance the skills that SAS measures, a second condition is that there are significant differences in the extent of inequality of adult learning, which are in practice related to skills inequality. It is not hard to see that there are likely to be differences between countries, both in their economic structures and in their institutional support for socially inclusive development, which can lead to differences in the inequality of adult learning. But are these differences associated with skills inequality in practice? Third, for the argument to be relevant, England should have an especially high degree of inequality. Given the low level of institutional support for training in the UK's liberal market economy, relative to other northern European countries where corporatist pressures and incentives are important, one might expect to find that training is more unequal in the UK than in those countries. Is that also the case in practice?

*Indicators for Adult Learning in the SAS*

The SAS data include three relevant indicators for adult learning, each of which have the potential to augment the SAS skills indicators:

- First, formal adult education: respondents reported if they had undertaken formal education or training in the 12 months prior to interview. By 'formal' in

this case is meant following a course leading to some qualification. We have included in this definition those who are categorised as students in the initial cycle of education.

- Second, non-formal training volume: respondents are asked to report whether they have participated over the previous 12 months in any of the following activities: 'courses conducted through open or distance education', 'organized sessions for on-the-job training or training by supervisors or co-workers', 'seminars or workshops', or 'courses or private lessons, not already reported'. We make no distinction here as to whether the activity was described as job-related. Respondents were then asked to estimate the overall time spent in these non-formal adult learning activities; from this we computed the average non-formal training volume per person.
- Third, Learning-At-Work: respondents reported a range of tasks required at work, included among which are three items (each with a proportion-of-time response scale) that tap the extent to which there is a learning requirement in the workplace: 'In your own job, how often do you learn new work-related things from co-workers or supervisors?', 'How often does your job involve learning-by-doing from the tasks you perform?' and 'How often does your job involve keeping up to date with new products or services?' It is assumed that respondents acquire further skills to meet these requirements, and we accordingly include an index derived from the three items. We use the 'Learning-At-Work' scale provided by OECD derived from the response scales using a basic IRT model, although closely similar findings are obtained using a simple linear average of item responses.

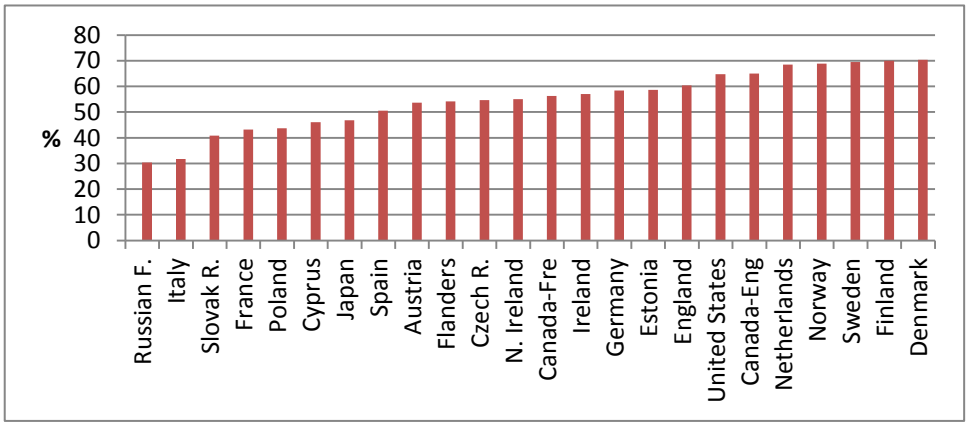
*An International Comparison of Adult Learning*

If adult learning is to play an especially important role in affecting inequality in England, it is of interest first to see whether its prevalence is especially high or low.

Figures 31, 32 and 33 show how countries compare in the extent of adult learning, using each of our three indicators. Figure 31 shows that ongoing participation in formal

adult education in England is distinctly below that of the Nordic countries and the Netherlands, but is a little higher than in many other developed nations, including Northern Ireland. Figure 32 shows that the United States has a clear lead in the volume of non-formal training, with England being in the middle ranks. Underlying this middle ranking, England, however, is distinctive in the following respect: while the participation in non-formal training is relatively high, the duration is relatively very low – the net effect being that the volume of non-formal training per person is unexceptional. The reason for the latter is that, although participation rates are fairly high, the duration of non-formal training episodes is especially low in the UK generally. Figure 33 shows rather less variation across countries in the Learning-At-Work index, again with England being in the middle of the ranks.

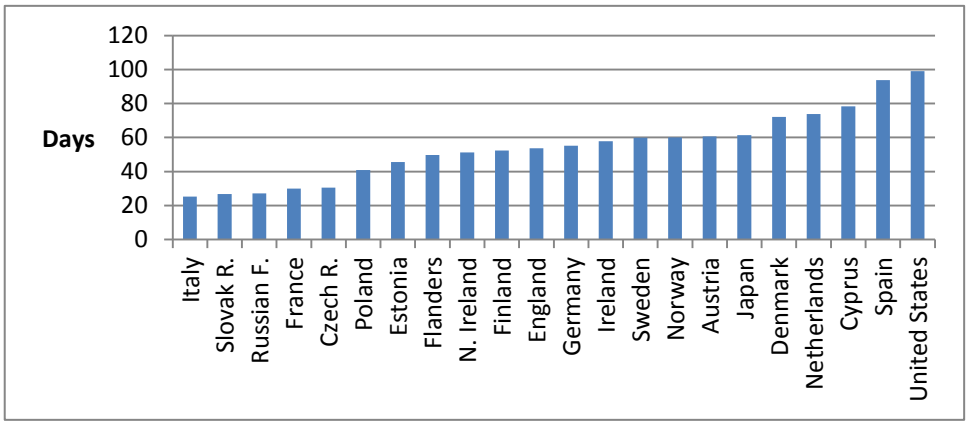
**Figure 31: Participation in Formal Education**




Note: "Participation" is defined as being a student, or participating in formal education or training courses over the previous 12 months.

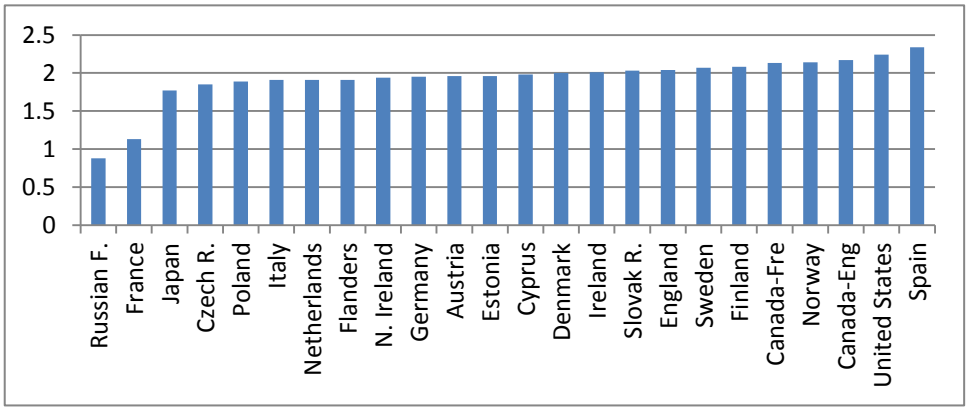
**Figure 32: Volume of Non-Formal Training Over Previous 12 months**

**(Number of days)**




Note: includes open or distance education, organised sessions for on-the-job training or training by supervisors or colleagues, seminars or workshops, and "other courses or private lessons not already reported"

**Figure 33: Learning At Work Requirement Index**




Note: applies just to those employed; index is derived from 3 items measuring learning tasks.

*Education Inequalities, Adult learning Inequalities and Skills Inequalities of Older Adults*

The average amount of adult learning in England may not be exceptional, being neither especially high or low, but could its dispersion be contributing to skills inequality being especially high in the England?

To examine this issue, we note first that any simple correlations among individuals or across nations between adult learning and skills are not very informative because the expected causation runs both ways: adult learning, while adding to the level of skill, is also affected by prior education and achieved skill. Given the absence of individual panel data, in order to get a handle on whether the SAS indicators of numeracy and literacy are in practice affected by previous adult learning it is necessary to adopt a pseudo-cohort approach.

We ask: can the skills inequality of the older cohort in the SAS data be partially explained by the adult learning that this cohort had previously experienced?[3] We pose this question as supplementary to, rather than as an alternative for, the hypothesis that the skills inequality is also related to the dispersion of prior educational achievements gained at school at an earlier stage in life. The immediate problem, however, is that there is no direct information about the prior adult learning of the older cohort (aged 45 and over) in the data. We therefore make a somewhat heroic assumption to derive a proxy for prior adult learning. We assume that nations' training systems show a good deal of persistence, and that therefore the inequality of adult learning of the current cohort of those under 45 is a plausible proxy for the inequality of the past experience of the over-45s cohort.

As our measure of the inequality of adult learning of the population below 45, we take the difference between the average levels of adult learning received by the top and bottom skill quintiles. We used both the literacy and the numeracy skill measures, thus giving two indicators of inequality for each of the three types of adult learning. For conciseness, we present only the indicators using the literacy definition, there being little difference in the patterns according to whichever indicator is used. Figures 34 to 36 show how countries are ranked. Korea and Spain stand out as by far the most unequal countries for non-formal training inequality. England is ranked 6$^{th}$. Yet, in respect of Learning-At-Work, England is unexceptionable: it is among a range of countries for which there is little difference between the top and bottom skill quintiles.

[3] In future work we intend to model these processes at the individual level, but this will also involve assumptions to estimate human capital stocks accumulated through prior learning.

As for the inequality in participation in formal adult education or training courses, in England this is among the lowest.

Overall, the inequality of adult learning in England is by no means extreme when compared to other nations, but it remains of interest to see what relationships a nation's skills inequality has with prior education and adult learning. To do so, we plot the cross-nation variation of the skills inequality of the over 45s cohort with, first, the inequality of that cohort's prior education, and, second, the inequality of its prior adult learning (as imputed from that of the current population of those under 45).

Figure 37 shows that there is, as expected, a positive relationship between the inequality of skill in the over-45s cohort and the prior education this cohort received. England, in particular, is among the highest for both literacy skills inequality and education equality. The relationship is plotted as a linear trend, and has a statistically significant coefficient.[4] Figures 38, 39 and 40 show, by contrast, that there is no obvious relationship, positive or negative, between skills inequality and the inequality of either prior non-formal training, or prior learning-at-work or prior formal adult education.

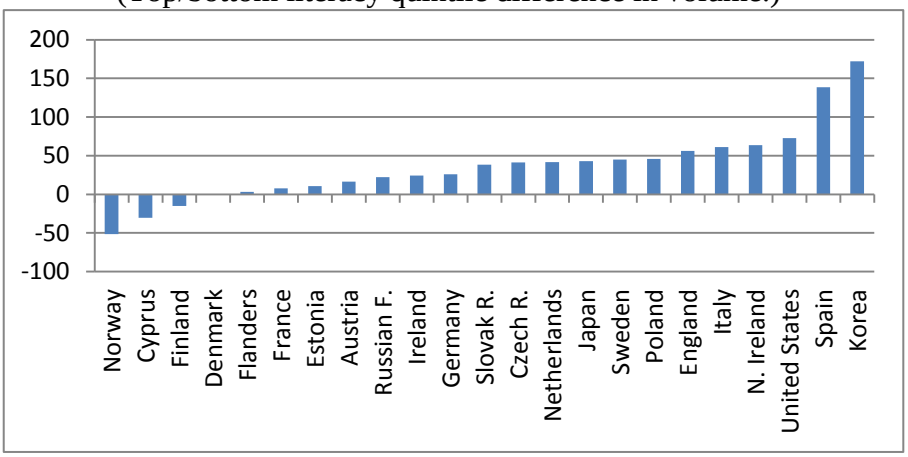
Thus the evidence does not support the possibility that we are investigating, namely whether adult learning might contribute to the understanding of why England has high skills inequality. We found no empirical support for attributing even part of the skills inequality (as measured by SAS) of older cohorts to unequal prior exposure to adult learning. While older cohorts' skills inequality is related to the inequality of the education they experienced while in full-time education some decades earlier, there is no significant cross-national link with adult learning inequality of the younger part of the population. Countries that have high levels of adult learning inequality have no tendency to have high levels of skills inequality among the older cohorts. Moreover, England is not exceptional for the inequality of adult learning which their under-45s experience.

[4] This significance is established by separate cross-nation regressions of skills inequality against education inequality and adult learning inequality (using the various definitions).

These findings do not imply that adult learning has no impact at all. On the contrary, it is likely that it does have a substantial impact on other types of skill, in particular the sorts of skill often emphasised in training courses and in practical work situations. There are many other sources of evidence that testify to the effectiveness of adult learning. It is also possible that relationships between adult learning and subsequent literacy and numeracy skills at the level of the individual, both contemporaneous and over time, may differ from those observed at the level of groups, cohorts or whole nations. Another reason for a null result might be that the adult learning of current under-45s is too loose a proxy for the adult learning that over-45s received when they were younger; this could happen especially if adult learning systems undergo radical upheaval over time. That said, we could find no evidence here that the adult learning system is a significant source for the inequality of the numeracy and literacy skills being assessed in the SAS.

**Figure 34: Non-Formal Training inequality**

(Top/bottom literacy quintile difference in volume.)[a]




a. Difference between the average volume of the top and bottom quintiles of literacy proficiency

**Figure 35: Learning-At-Work inequality**

(Top/bottom literacy quintile difference in index)

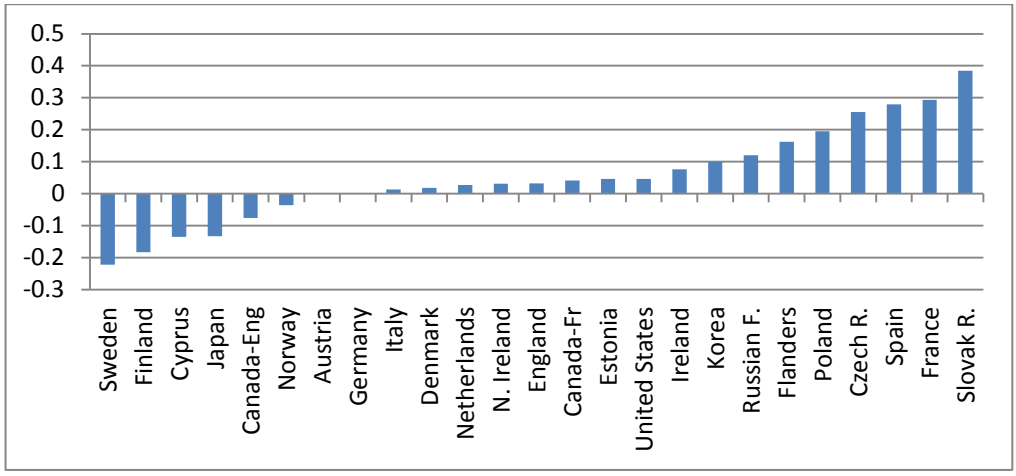



**Figure 36: Formal Adult Education inequality**

(Top/bottom literacy quintile difference in % participating)

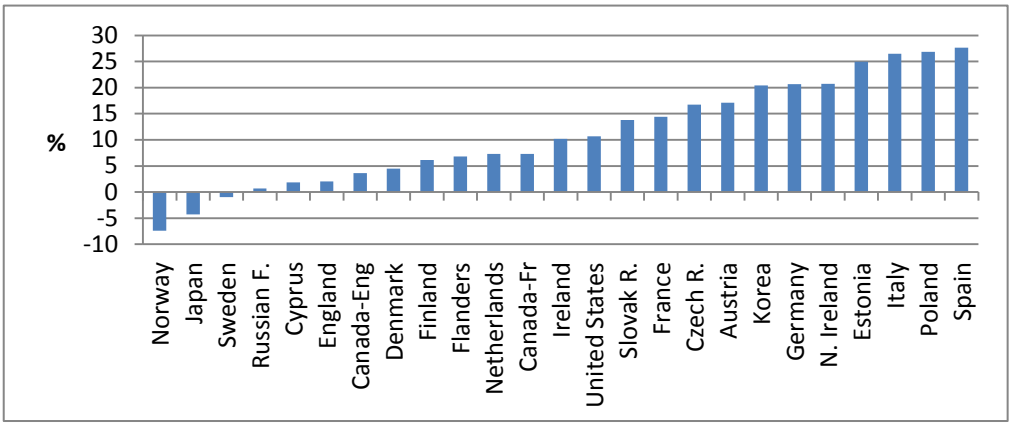


**Figure 37: Literacy Skills Inequality and Education Inequality of Over-45s Cohort**

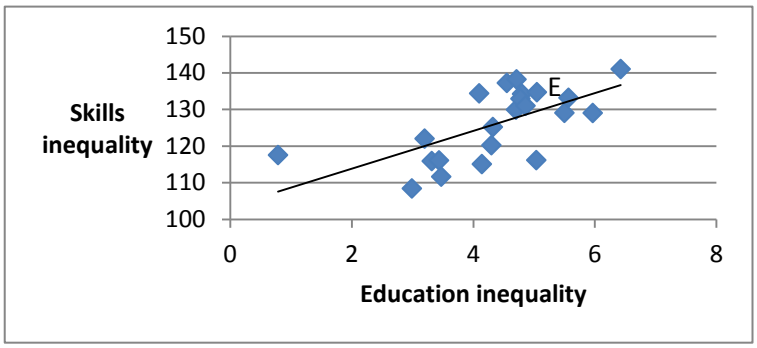



**Figure 38: Literacy Skills Inequality of Over-45s and Prior Non-Formal Training Inequality**

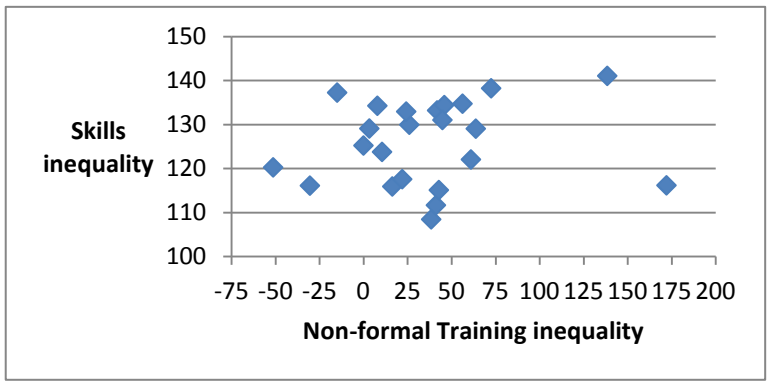



**Figure 39: Literacy Skills Inequality of Over-45s and Prior Learning-At-Work Inequality**

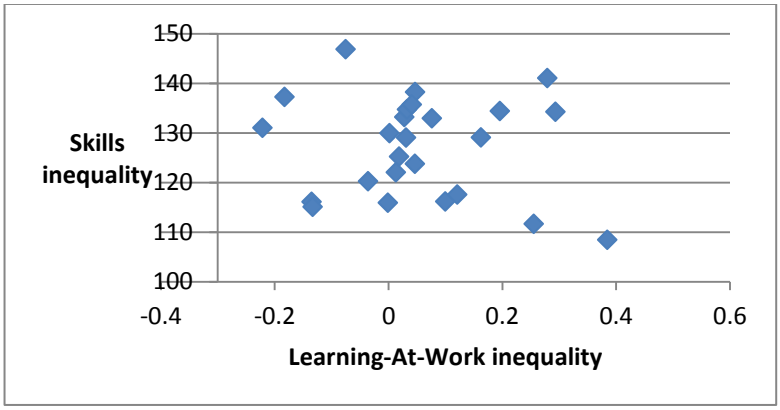
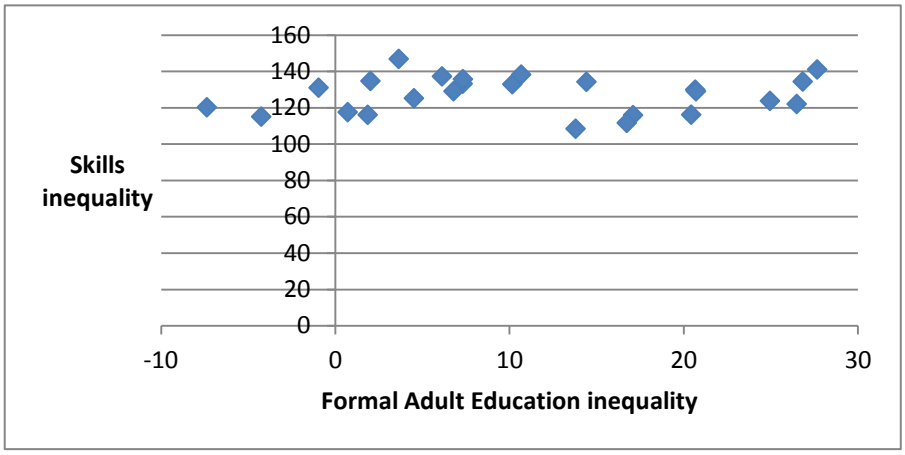


**Figure 40: Literacy Skills Inequality of Over-45s and Inequality in Prior Formal Adult Education Participation**




## Section Four: The Effects of Inequality in the Education System

The preceding analysis has shown that numeracy and literacy skills inequalities amongst adults in England are higher than in most other countries, and that this relative inequality cannot be explained by the effects of migrant skills, inter-cohort differences in skills or adult learning. The effects of migrant skills and inter-cohort differences clearly do not provide an explanation of the high levels of inequality in England relative to other countries. The effects of adult learning are more difficult to ascertain. However, our analysis above suggests that they do not provide an explanation of relative inequality either. Levels of adult learning are fairly average compared with other countries and inequalities in participation in adult learning are also at a middling level. Our regression analysis does not suggest that the inequalities in adult learning play any greater part in adult skills inequalities than in other countries.

We are therefore left with the strong possibility that the exceptional level of adult skills inequality in England may be the result, at least in part, of skills inequalities generated in the initial education system – that is due to the learning of skills which occurs before that age of 25 during compulsory schooling and from participation in the further and

higher education system. Further evidence for this is provided by the strong correlation between education level inequalities and skills inequalities. The scatterplots in Figures 41-44 show the positive correlations between the education level ginis and literacy and numeracy ginis derived from the SAS data both for the younger age group and the adult population as a whole.

**Figure 41: Correlation between Education Inequality and Adult Literacy Inequality**

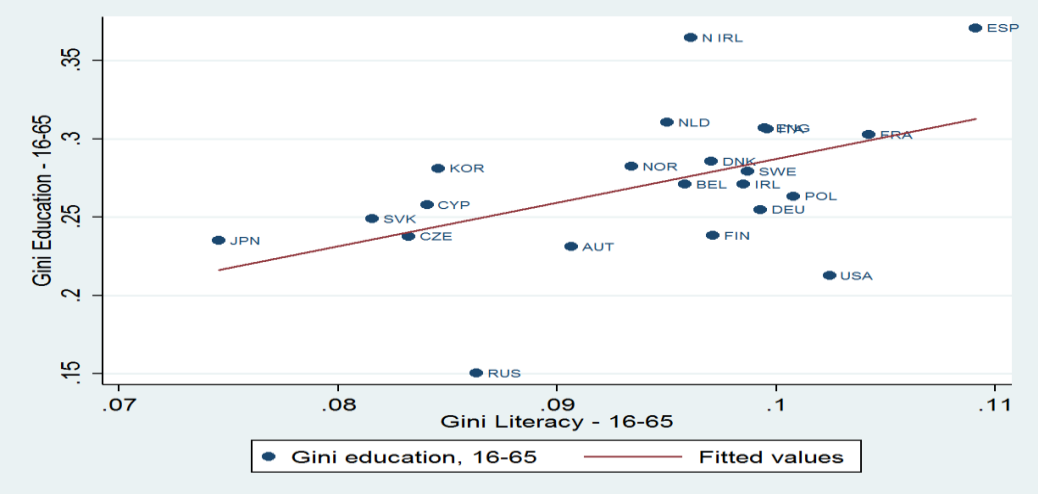



**Figure 42: Correlation between Education Inequality and Literacy Inequality for 25-29s**

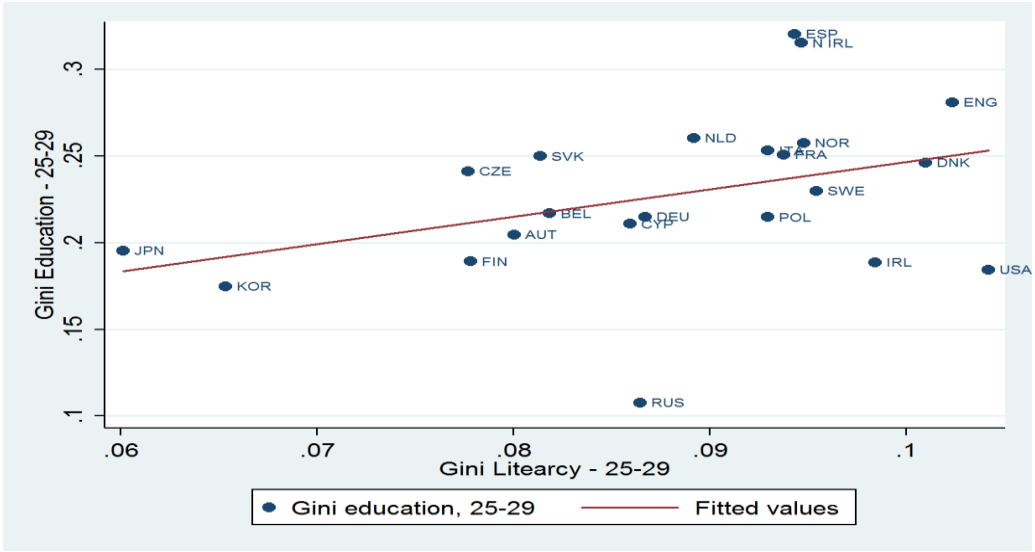


**Figure 43: Correlation between Education Inequality and Adult Numeracy Inequality**

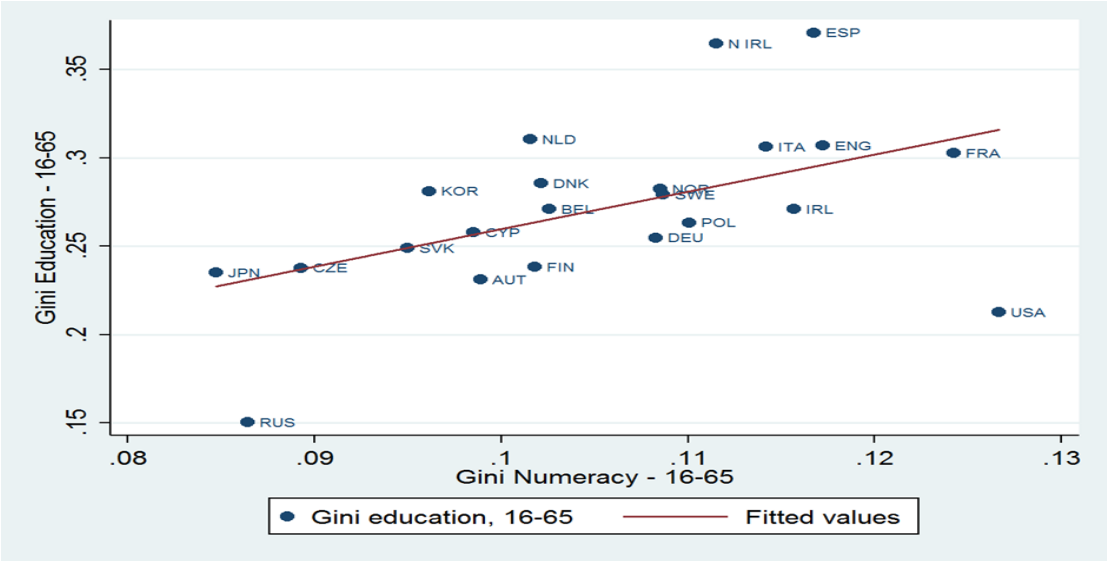
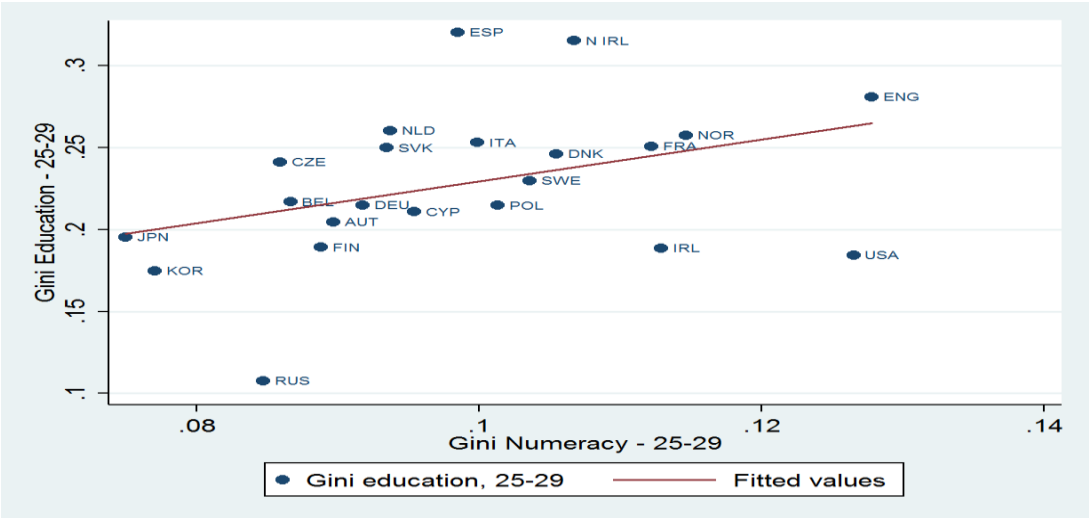



**Figure 44: Correlation Education Inequality and Numeracy Inequality for 25-20s**




| | Pearson's correlation coefficients between education level ginis and skills ginis | | | |
|---|---|---|---|---|
| | Gini Numeracy | | Gini Literacy | |
| Gini Education | 25-29 | 16-65 | 25-29 | 16-65 |
| | 0.38* | 0.5** | 0.37* | 0.49** |
| *p<0.1, **p<0.05 | | | | |

*The Effects of Persistent Inequalities in the English Education System*

The SAS data show us that (taking numeracy and literacy together) no country had more widely distributed skills amongst 25-29 year olds in 2011/12 skills than England and we can reasonably assume from our analysis that this was due in part to exceptional inequalities in the skills outputs of the education system in the preceding period. This appears to put the spotlight on what happened in education during the late 1990s and 2000s. Non-Migrant 25-29 year-olds in 2011/12 experienced most of their compulsory education and initial post-compulsory further and higher education in England during the late 1980s and the 1990s and the 2000s, i.e. between 1991 and 2007 in the case of those who were 25 in 2011/12 and between 1986 and 2002 for those who were 29 in 2011/12. However, we also know that the skills inequality in England in the SAS data is quite high, relative to other countries, amongst the older age groups as well. If, as we have shown, the inequality amongst the latter cannot be put down to the effects of adult learning or inflows of migrant skills, then the principal cause of the skills inequalities amongst these groups is also likely to be the education they experienced when they were younger. In the case of the 55 to 65 age group, for instance, this would have occurred in the years between 1951 and 1984. This begs the question of whether the exceptional levels of contemporary adult skills inequality in England is mainly the result of exceptionally unequal outputs of skills from the education system over the entire period from 1951 onwards, i.e. over the past 60 years.

We do not have data in SAS to test this directly since the survey only measures skills in 2011/12. However, we do have data on the educational levels achieved by respondents and we may assume that their highest levels of formal qualifications were, in most cases, achieved when they were aged 15-25. If we further assume that literacy and numeracy skills are closely related to these education levels, as our previous analyses show, then the education levels of different age groups give us a good proxy for the skills outputs of the education systems over time, going back in fact to 1971/12 (when the current 65 year olds were 25 years of age). By looking at the distributions of education levels for different age groups we can therefore get some idea of the trend in skills inequality originating in the school system over time. By comparing these across

countries we can see whether England does, in fact, display an exceptional inequality in the outputs of skills from the education system sustained over a long period of time.

The figures below show the distributions of educational levels amongst non-migrants (measured with gini coefficients) for different cohorts across countries. Education levels are measured in terms of the ISCED level of the highest qualification achieved. For a large proportion of respondents, and particularly for the younger ones, the highest level of education was not achieved until they were in their early to mid twenties, when they completed their first degrees. We therefore take the 25-34 age group as the first for which we can measure the full inequalities in the distributions of educational levels. Thereafter we take each 10 year age band in turn.

What Figures 45-49 show is that the gini measure of inequality in education levels is relatively high for England in each of the age groups. Within the two youngest age groups, the 25-34 year olds and the 35-44 year olds, inequality of educational levels in England was higher than in all countries and regions except Spain, Northern Ireland and Italy. Within the 45-54 year old age group, educational level inequality was higher than in all except Spain and Northern Ireland. The position for England is just one place lower on the rank ordering for the 55-65 year olds, with Northern Ireland, Spain, Korea and Ireland showing greater levels of inequality. Compared with other countries, only Spain is consistently more unequal through all the age groups than England.

**Figure 45: Educational Level Ginis for 25-34 Year-Old Non-Migrants**

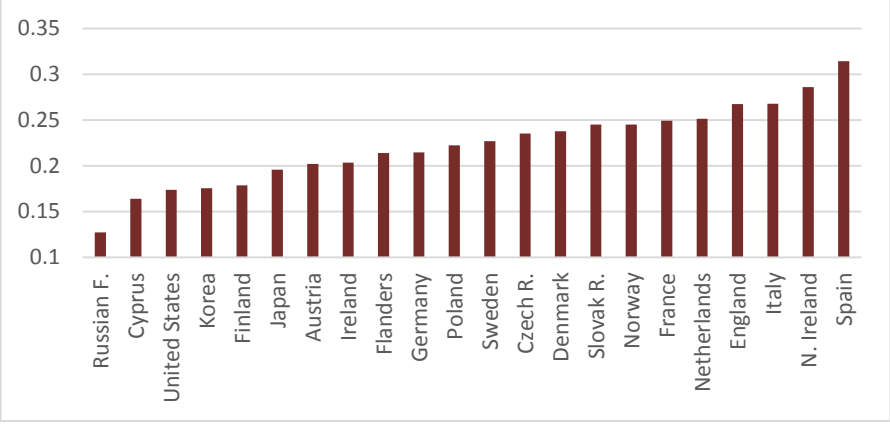


**Figure 46: Education Level Ginis for 35-44 Year-Old Non-Migrants**

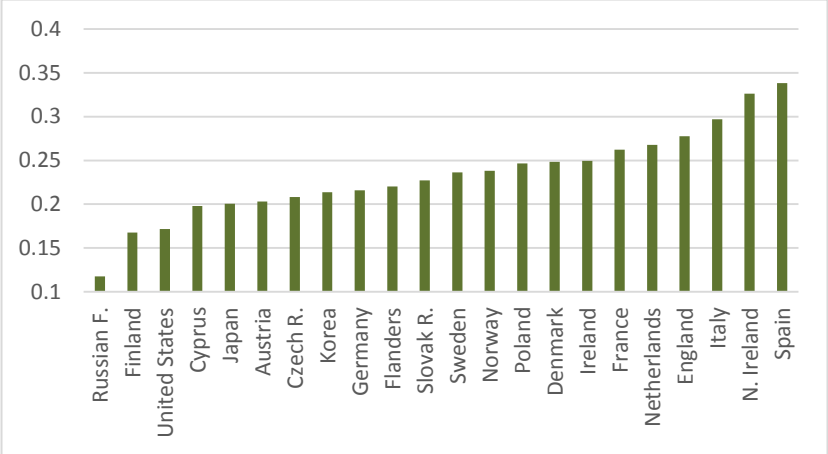



**Figure 47: Education Level Ginis for 45-54 Year-Old Non-Migrants**

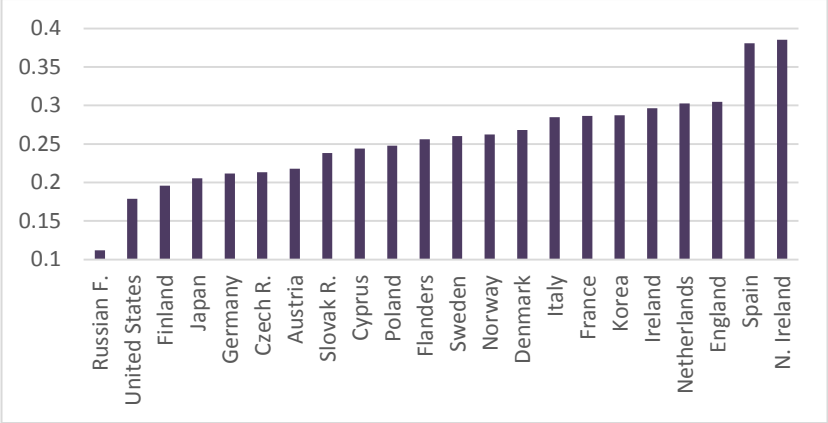
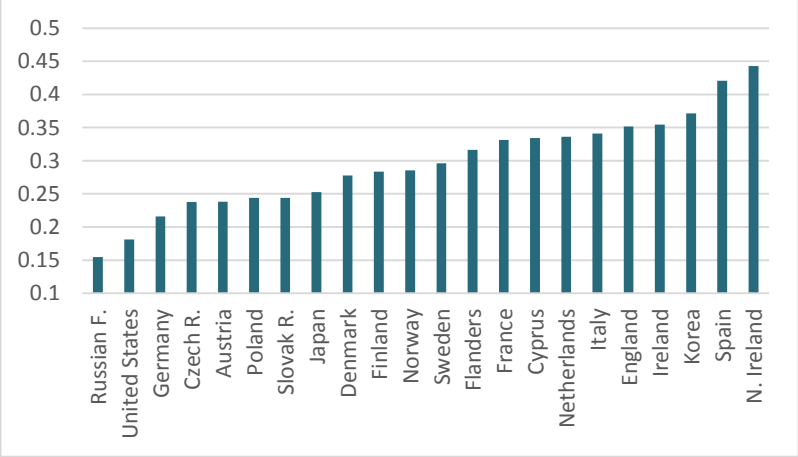



**Figure 48: Education Level Ginis for 55-65 Year-Old Non-Migrants**



The countries with the most consistently egalitarian patterns are the Russian Federation, Japan, Finland and the USA. In the latter case this is presumably because of the high proportions who have achieved high school graduation since the 1950s. However, high school graduation, which is a mark of courses completed rather than a particular standard achieved, may not be genuinely comparable to level three in other countries where graduation involves passing examinations. In terms of cumulative inequality across the age cohorts England ranks alongside Italy, with only Northern Ireland and Spain being more unequal.

**Figure 49: Accumulative Inequality in Ginis for Education Levels**

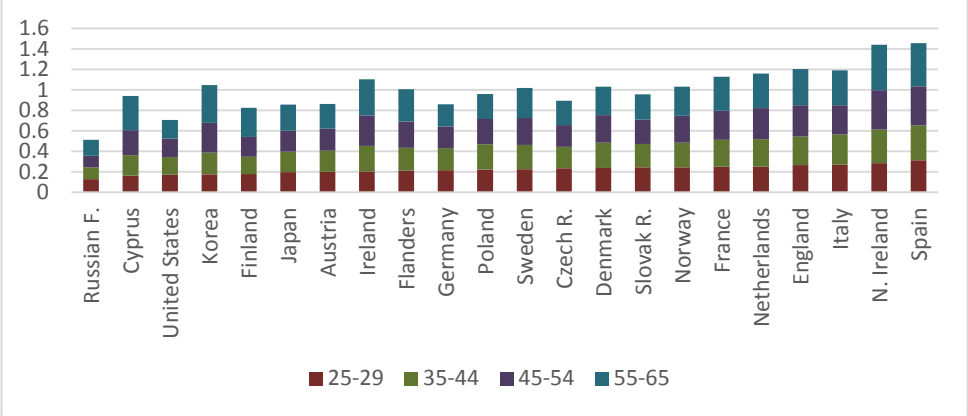



**Figure 50: Education Level Inequalities of Different Age Groups**

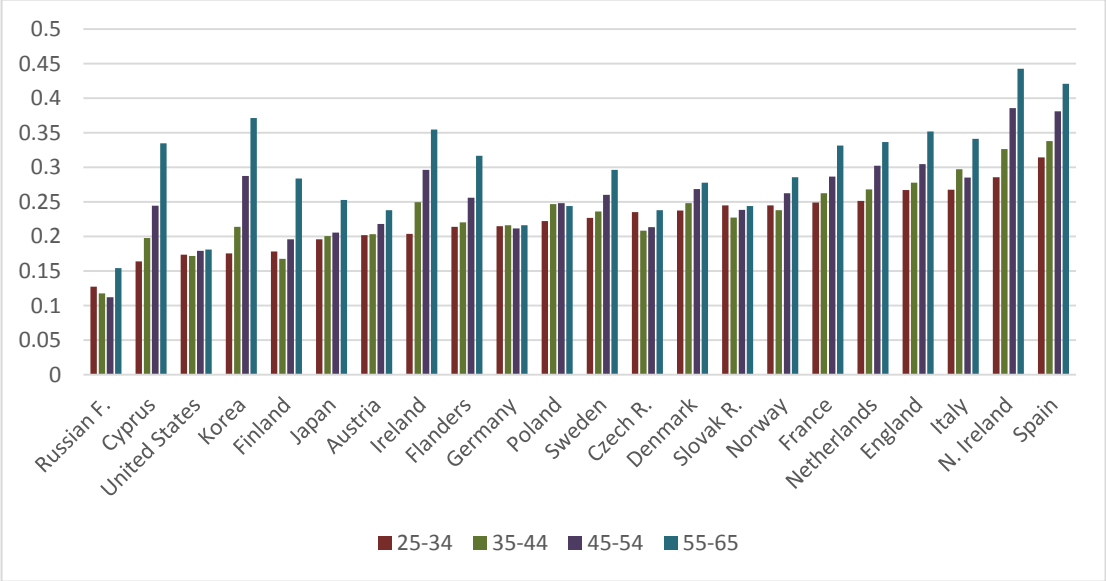


Figure 50 shows the ginis for education levels for all age groups by country. Assuming that, in the vast majority of cases, the highest level of education is achieved before the age of 25, we can take the ginis for each of the age bands in the different countries as proxies for the education system inequalities that prevailed in that country when that age group went through the education system. In other words, it provides us with a rough idea of the over time trends in education system inequalities. Looking across the countries, we can see that education system inequalities have reduced over time in most countries, including in England. This corroborates other research using time series data on education levels inequality (Ballarino et al, 2014). The only western countries where this is not the case are Germany, where the inequalities are almost identical for each age group, and the USA, where the difference between age groups (or over time) is marginal. This is perhaps, as suggested before, because high school completion rates have been relatively high since the 1950s. It can also be noted that the Central and Eastern European countries show a slightly different pattern with, in most cases, only small changes in level of inequality amongst the age bands under 65 (i.e. since the 1950s).

*Effects of initial post-compulsory education*

We are not able from the SAS data to distinguish between the skills inequality generated through the compulsory education system and that which emerges subsequently as a result of the further education and training which occurs immediately after the end of compulsory education. However, for the youngest age group in SAS, at least, it is possible to explore this by comparing their skills distributions with the skills distributions amongst 15 year olds in PISA 2000. PISA does not use exactly the same test questions as SAS but it does test skills in literacy and numeracy based on the same principles of practical competence used by the OECD in both surveys. The two surveys were conducted at an interval of 11/12 years (2000 for PISA and 2011/12 for SAS) and both purport to include nationally representative samples for the population surveyed. We therefore construct a pseudo-cohort from these two surveys using the 15 year-old sample in PISA 2000 and the 26/7 year olds in SAS. We represent this latter age group with the data in SAS for 25-29 year olds since there are too many missing values within

the 25-27 age group to allow a comparison across a wide range of countries. Because the test questions in the two surveys are not exactly the same, we cannot say precisely by how much the skills distributions of 15 year olds change over the 11/12 period. However, we can compare for each country how position in terms of skills inequality, relative to other countries, changes between the 15 year-old age group and the 26/7 year-old age group. Figures 51 and 52 plot the ginis for 15 year olds against the ginis for 25-29 year olds for literacy and numeracy. The scatterplot for numeracy shows visually that there is no association at all between inequality in maths scores at 15 and inequality aged 25-29 in numeracy. There is a weak positive association across countries between reading inequality at 15 and literacy inequality at 25-29, but this link is hardly robust: if Korea, which is an outlier having very low inequality at both ages, were removed, there would be no significant association at all. Taking the two diagrams together, it is as if there has been a shuffling of the skills inequality pack after age 15.

**Figure 51: Comparison of Inequality in Reading at 15 with Inequality of Literacy at 25-29**

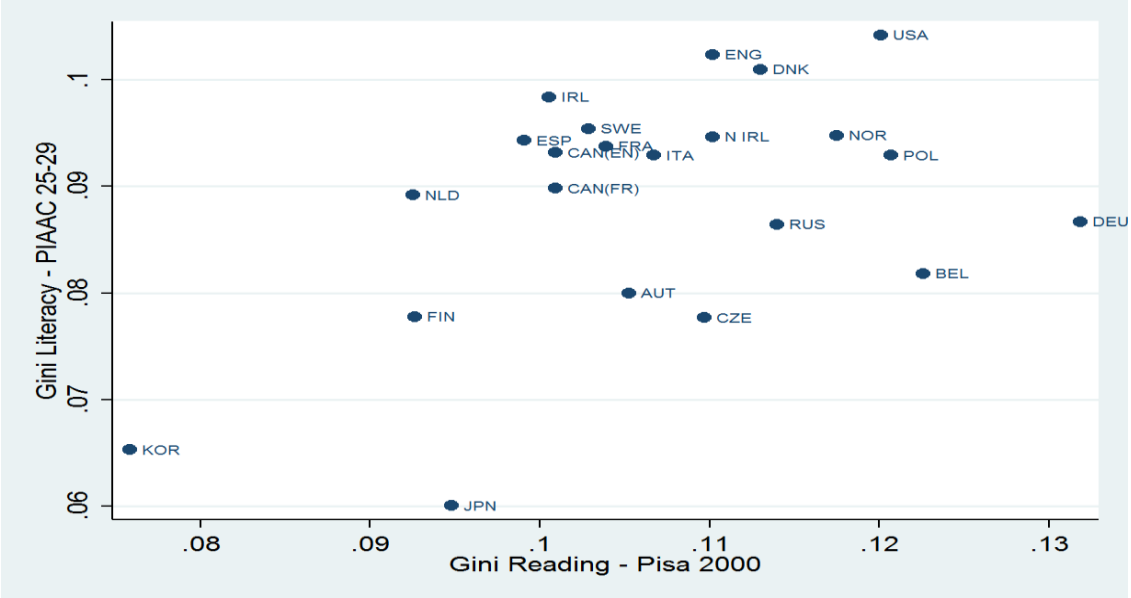
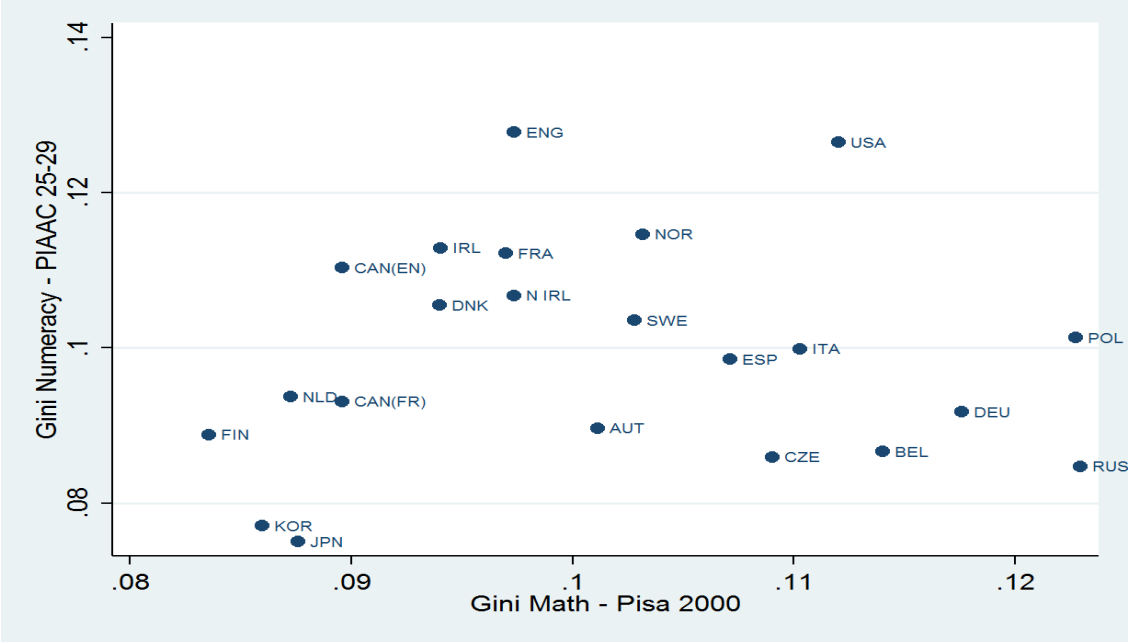


**Figure 52: Comparison of Inequality in Maths at 15 and Inequality of Numeracy at 25-29**




For England we can say that its skills inequality relative to other countries is worse for the 25-29s year-olds than for the 15 year-olds on both literacy and numeracy. This does not necessarily mean that the 15 year old cohort becomes more unequal in skills by the time they are 26/7 year olds, although the evidence we presented from the SAS data earlier, showing that skills ginis in England for 25-29s were higher than for 16-24s, suggests that there probably is an increase in inequality during the 14 years after the end of compulsory education. What the comparison of the pseudo-cohort at different points in time does show is that England's rank order position on inequality declines between age 15 and age 26/7.

By contrast there is a group of countries for which their relative position in terms of inequality is better at age 26/7 than age 15. For literacy this group includes Germany (high to low middle), Flanders (high to low middle), Czech Republic (middle to low) and Austria (middle to low). For numeracy it includes Russian Federation (from high to low), Germany and Belgium (from high to low) and Austria (from middling to lowish).

What these comparisons across the two surveys suggest is that some countries manage to mitigate relative inequality through initial further and higher education while others

do not. Skills in England become more unequally distributed during this phase, relative to other countries at least, and may well become more unequal in absolute terms. By comparison, in some other countries, such as Austria, Flanders and Germany, skills become more equally distributed, relative to other countries, and probably more equal in absolute terms.

We cannot be sure which parts of their systems cause countries to mitigate or exacerbate skills inequalities during this phase. It could have to do with how uneven, relatively, is participation in higher education. However, this would not explain why some of the countries with the least inclusive systems of higher education (like Austria and Germany) are amongst the most effective in reducing relative inequalities, while countries like England, with higher HE participation rates, are much less effective in this respect. What seems more likely to be causing the relative reductions in inequality in countries like Austria, Germany and Flanders is their common tendency towards high rates of participation in high quality apprenticeship systems. We can only speculate here, but it seems plausible that this may be because the literacy and numeracy skills of the lower achieving groups are substantially improved through the continuing learning of maths and the national language for three to four years which typically occurs with Dual System apprenticeships in these countries.

**Section Five: Conclusions and Further Research**

Our analysis shows that inequality in adult skills in England is significantly higher than in most other countries included is SAS. Its rank order position is relatively high, whether we measure skills distributions by gini coefficients or quintile differences, both in literacy and numeracy, although relative inequality is greater in numeracy. Inequality in both skills is highest in England amongst the youngest cohorts, where it is higher than in almost all other countries. Inequality of opportunity, as measured by the impact of parental education levels on skills attainments, is also high compared with that in other countries and, again, particularly so with the younger age groups. The consistency of the findings across age groups and using different measures is notable. English-speaking countries in general show some variation in terms of their rank ordering on

different measures, but they tend, on average, to manifest higher levels of inequality in opportunities and outcomes than other country groups, with England and the USA at the top end.

The exceptional levels of skills inequality in England cannot be explained by inter-cohort differences in mean skills levels, or by the effects of migrants' skills or by adult learning. Nor do these factors seem to explain the relatively high levels of skills inequality in other predominently English-speaking countries. However, two factors do seem to provide an explanation, at least for England. One is the relatively strong effect in England of social background on skills attainment. The other is the high level of inequality in the outputs of the education system over a long period.

These two factors are related. Social background impacts on adult skills through processes occurring within the education system and also through processes outside of it. As Figures 25 and 26 in Section One show, a large part of the effect is external to education, but some of it does run through education. Cultural capital is transmitted inter-generationally through the family, the neighbourhood and the school so as to reproduce inequalities in educational and skills attainment (Bourdieu, 1986). Education systems can reproduce inequalities in multiple ways. According to one influential theory, social stratification has both primary and secondary effects within the education system (Boudon, 1974). Primary effects occur as a result of the transmission of cultural capital within the family, so that children who acquire high levels of cultural capital at home achieve better in schools which value the same forms of cultural capital. Secondary effects occur as a result of children from different backgrounds making different choices within the education system, whereby children from higher status families, for instance, choose pathways which lead to higher status qualifications.

The first process tends to occur, arguably, in a similar way in all societies and education systems. However, the second process may be more conditional on the nature of the particular education system. As Boudon cogently argued, in societies structured by class and other inequalities, the greater the variety of different routes through the education system, the more the 'branching-off' points, the greater the likelihood that

differential class expectations, engendered from outside the education system, will structure student choices, even in a situation of ostensible equality of access, so that educational opportunities will be structured along class, race and gender lines. In the English case strong social background effects may be leading to high levels of skills inequality both through processes external to the education system and through those which are internal to it. In the latter case, it may be through the primary effects of stratification, working as they do in all systems. It may also be because of secondary effects and because the characteristics of the education are conducive to strong secondary effects.

Whether these two factors also explain the relatively high skills inequalities in English-speaking countries in general remains unclear. All English-speaking countries tend to have high levels of income inequality (Hills, 2010) as well as steep social gradients for skills, as we demonstrated earlier. Social background effects may be leading to relatively high skills inequality in all English-speaking countries through processes which are largely external to their education systems. But common characteristics of the education systems in these countries may also contribute to this result. Education level inequalities seem to be driving skills inequality in Northern Ireland and, to a lesser extent, the Republic of Ireland, as well as in England. However, we cannot be sure from our data that this explanation fits all English-speaking countries, since the values on education levels are absent for Australia and Canada, and since the measure of education inequalities for the USA is not really comparable.

Existing research does give some indications as to why some education systems produce more unequal outomces than others (e.g. Boudon, 1974; Hanushek and Wößmann, 2005; Schuetz et al, 2005; OECD, 2010). Further comparative research needs to be conducted to establish whether factors external to education are driving adult skills inequalities across the English-speaking countries, or whether it is mainly their education systems; and, if so, what are the characteristics of these that lend themselves to this outcome.

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NB:

The survey data was accessed on the following websites:

PISA 2000: http://pisa2000.acer.edu.au/index.php

SAS: http://www.oecd.org/site/piaac/publicdataandanalysis.htm

IALS recalibrated:
http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SurvId=4406&SurvVer=0&InstaId=15966&InstaVer=1&SDDS=4406&lang=en&db=imdb&adm=8&dis=2#a4

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