Featured Article

Cross-Country Variation in Adult Skills Inequality: Why Are Skill Levels and Opportunities So Unequal in Anglophone Countries?

ANDY GREEN, FRANCIS GREEN, AND NICOLA PENSIERO

This article examines cross-country variations in adult skills inequality and asks why skills in Anglophone countries are so unequal. Drawing on the Organization for Economic Cooperation and Development's recent Survey of Adult Skills and other surveys, it investigates the differences across countries and country groups in inequality in both skills opportunities and outcomes and uses pseudo-cohort analysis to establish trends over time and during the life course. The analysis shows that adults' skills in Anglophone countries, and particularly in the United States and England, tend to be more unequal than in other countries on a wide range of measures. This cannot be explained by intercohort differences, skills distributions among adult migrants, or levels and distributions of adult learning, but inequality in education levels provides a strong predictor of skills inequality among adults. Whereas research suggests that early selection drives skills inequality in compulsory schooling, certain forms of tracking, such as bifurcation into academic or apprenticeship/vocational education in upper secondary education, can have a mitigating effect.

Inequality in incomes and wealth has been rising dramatically during recent decades, not only in most developed countries but also in many developing ones (Esping-Andersen 2005). Extreme levels of inequality, such as those now appearing, represent not only a major challenge to social cohesion; they are also associated with negative social outcomes across a range of areas, from public health and well-being to social trust, political engagement, social mobility, and crime (Green et al. 2006; Wilkinson and Pickett 2009; Green and Janmaat 2011). Globalization and changes in the deep structures of modern capitalism may be responsible for much of the longer-term economic change (Piketty 2013). However, skills inequality also has a measurable effect on gaps in earnings, thus contributing to the overall levels of income inequality and their social effects (Nickel and Layard 1998; Bedard and Ferrall 2003; Damme 2014). Such disparities may also contribute directly to reducing levels of social trust, as some research has suggested (Green et al. 2006). Skills inequality probably also influences national economic perfor-

Received August 11, 2014; revised May 3, 2015; accepted June 29, 2015; electronically published September 29, 2015

Comparative Education Review, vol. 59, no. 4.

0010-4086/2015/5904-0007$10.00

mance, since countries with more unequal skills also tend to have lower average levels of skill and reduced labor productivity.[1] Skills inequality therefore deserves our attention and, arguably, more attention than it normally receives in policy debates and in the academic literature on adult skills.

This article examines cross-country patterns in adult literacy and numeracy skills inequality and the factors that explain them, along with the different patterns of inequality across groups of countries with different types of education systems. In so doing, we seek to explain why Anglophone countries, and particularly England and the United States, tend to exhibit such high levels of skills inequality.

Comparative education researchers have long been aware that national education systems vary quite substantially and that the characteristics of systems are related to differences in learning outcomes (e.g., Sadler 1897). Researchers identify countries with common and distinctive system characteristics as representing a particular type or model of education and/or training (in the sense of Weber's ideal types). Such models have been identified, for instance, for English-speaking countries, German-speaking countries, Nordic countries, Southern European countries, and so on, in much the same way that comparative political economy identifies different types of economies and welfare regimes (e.g., Esping-Andersen 1990; Hall and Soskice 2001).[2] Comparative historical analysis seeks to show how these different models (or traditions) have evolved over time, due to regional cultural and sociopolitical peculiarities and the existence of institutional arrangements that are subject to a degree of path-dependency in the ways they evolve.[3] For most of the history of comparative education, such analyses were made using primarily qualitative data and comparative historical methods of analysis. However, since the 1960s there has been a proliferation of international surveys that directly measure skills and a variety of education system characteristics and outcomes across countries. Increasingly sophisticated statistical techniques, employing multiple cross-sectional time-series data sets, are now used to explain the effects of system characteristics on learning outcomes (Hanushek and Wößmann 2010). While the methodologies of these surveys have sometimes been criticized (Goldstein 2004; Tsatsaroni and Evans 2014), direct measurements of skills are more comparable across countries, and arguably have more predictive power, than measures of educational attainment through qualifications or years of schooling (Hanushek and Wößmann 2009).

What our analysis shows is that literacy and numeracy skills inequality, both in terms of opportunities and outcomes, vary substantially across coun-

[1] Skills inequality in the nonmigrant 16- to 65-year-old population is negatively and quite strongly correlated with average levels of skills in the OECD Survey of Adult Skills data. The Pearson correlation coefficients are −.64 in case of literacy and −.78 in case of numeracy and are both significant at the .001 level.

[2] See, e.g., McLean 1990; Hall and Soskice 2001; Green et al. 2006; Mons 2007; Green 2011.

[3] See Archer 1979; Green 1990; Thelen 2004; Wiborg 2009.

tries and that skills in the Anglophone countries—and the United States and England, in particular—are characterized in general by considerably greater internal variation and inequality than those of other countries on a wide range of measures. This exceptional level of inequality cannot be explained by intercohort differences, skills distributions among adult migrants, or levels and distributions of adult learning. Instead, it is inequality in education levels that offers the strongest predictor of skills inequality among adults. In the case of England, in particular, we can see a very close relationship between skills inequality and inequalities in the outcomes of initial formal education stretching back over 50 years. Whereas most of the literature on the system effects of compulsory schooling suggest that inequality is associated across countries with early tracking, our analysis of the impact of post–lower secondary education and training suggests a somewhat different set of dynamics.

Method

We used data from the recent Organization for Economic Cooperation and Development (OECD) Survey of Adult Skills (OECD 2013b)—in conjunction with other international surveys—to analyze variations across countries and country groups in inequality in adult skills outcomes and opportunities.[4] The Survey of Adult Skills (SAS) was conducted in 25 countries and country regions in 2011–12 under the supervision of the OECD, testing samples of adults ages 16–64 for their competence in literacy, numeracy, and problem-solving skills. The survey also contains data on respondents' recent learning history, qualification levels, and parents' education levels. The International Adult Literacy Survey (IALS), the OECD predecessor to SAS, was conducted in 23 countries and country regions between 1994 and 1998 and also tested adult practical literacy and numeracy skills (OECD 2000). We compare data from IALS and SAS to assess trends in skills inequality between the two surveys and employ a quasi–cohort analysis to assess changes in skills inequality over the adult life course. A quasi–cohort analysis is also deployed using the data from SAS and data from the tests of 15-year-olds in the 2000 round of the Program for International Student Assessment (PISA). This allows us to make some assessment of changes in inequality occurring between the ages of 15 and 27 (i.e., typically from the end of lower secondary education to the end of the formal education phase).

The publicly available SAS data from 24 countries are used.[5] The countries and country regions are classified into the following seven categories based on commonalities in their political economies and education system

[4] This is sometimes referred to by the name of the overarching OECD program: Programme for the International Assessment of Adult Competencies (PIAAC).

[5] The data for Australia is not publicly available.

types: (1) Liberal (essentially the Anglophone countries and regions of England, English-speaking Canada, Ireland, Northern Ireland, and the United States), (2) Social Market (Austria, Flanders, Germany, and the Netherlands), (3) Southern European (Cyprus, France, Francophone Canada, Italy, and Spain), (4) Central and Eastern European (CEE; Czech Republic, Estonia, Poland, Russian Federation, and the Slovak Republic), (5) Nordic (Denmark, Finland, Norway, and Sweden), and (6) East Asian (Japan and South Korea).[6]

We used a three-stage analysis of the causes of the substantial variations in skills inequalities across countries. In the first stage, we assessed the effects of proximate factors that have an impact on adult skills inequalities, such as intercohort differences, the distribution of skills among adult migrants, and the effects of adult formal and nonformal learning.[7] In the second stage, we assessed how far inequalities in initial formal education and post–compulsory education and training explain differences across countries in adult skills inequalities. Finally, we analyzed our findings in light of the now-substantial literature on education system effects on skills inequality.

Inequality in Skills Outcomes

Inequality of skills outcomes (distributions) is measured here by calculating the difference in mean numeracy and literacy scores between the top and bottom quintiles for adult populations and different age groups and also by calculating skills Gini coefficients for the different groups. The latter have the merit of providing a more complete measure of inequality in distributions but do not permit tests of significance, whereas the quintile difference measure allows us to conduct significance tests. Using both kinds of measures on the SAS data, we find that adult literacy and numeracy skills in Anglophone countries tend to be widely dispersed in absolute terms and more variable than they are in other countries, particularly with respect to numeracy and among the younger age groups.

Figure 1 shows the gap between the mean scores for adult literacy and numeracy of the top and bottom quintiles for the 24 countries and country

[6] Following the practice in the comparative political economy literature, all country groups are categorized according to their common socioeconomic and education system characteristics, but in some cases, for want of an agreed political economy descriptor, they are referred to by their geographical identity. France is classified in the Southern European group because its education system shares characteristics (e.g., relative centralization) with others in Southern European countries. Japan and Korea are grouped together because they share similar education systems, and CEE countries are clustered because of the common legacy from their former Communist education systems. England and the United States are classified as Liberal but also treated as a separate group in some analyses because they stand out from other Anglophone countries in terms of the extent to which they have adopted market-oriented education policies.

[7] We use the term "adult migrants" to signify those in the country samples who migrated into the "host" country surveyed in SAS after age 18 (and to avoid the ambiguities of the term "immigrant," which is often used to denote settled migrants of different generations).

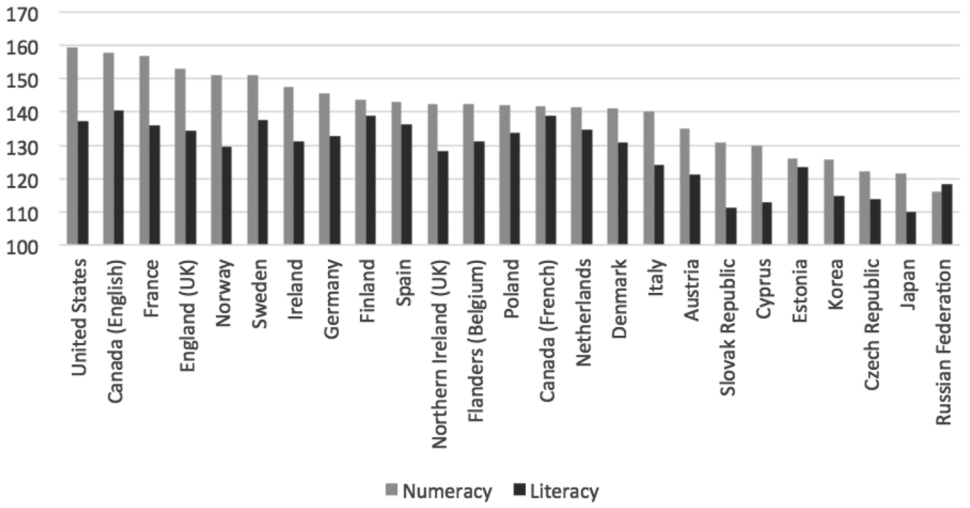

FIG. 1.—Difference between top and bottom quintiles in mean scores of adults in numeracy and literacy.

regions for which we have data in SAS. Quite large gaps are evident for most of the Liberal Anglophone countries in both literacy and numeracy. In England, for instance, the average score in numeracy of those in the lowest-scoring 20 percent is 153 points below that for the highest-scoring 20 percent, on a scale where the maximum is 500 points. The gap in literacy scores in somewhat smaller at 134.3 points. Anglophone countries tend to have larger quintile differences than other countries in both numeracy and literacy, although the differences are less marked in literacy.

The results on the numeracy tests for 16- to 65-year-olds clearly show the relative inequality of skills in Anglophone countries. On the crude rank ordering of quintile differences presented in figure 1, the United States has the highest level of inequality, followed by English-speaking Canada, with England in fourth position, and Ireland in seventh position. Among the Anglophone countries, only Northern Ireland occupies a more middling position in the country ranking. Our *t*-test analysis shows that the differences between countries separated by a few positions in the rank ordering are significant. This means that, for instance, whereas the quintile difference value for England is not significantly statistically different from that for Norway and Sweden, it is significantly different from that for France, which is adjacent in the rank ordering, and for all other countries. This would make England fourth among countries and regions in terms of numeracy inequality.

Relative inequality among the Anglophone countries is less marked in adult literacy. The *t*-test analysis shows that there is no significant dif-

ference between England, France, Germany, Ireland, the Netherlands, Poland, Spain, Sweden, the United States, and Flanders in this regard, but still all English-speaking countries bar Northern Ireland are in the top half of the national "inequality" ranking.

Figure 2 presents the average values for the interquintile differences in adult literacy and numeracy scores for the seven different groupings of countries. Although there is some variation within each country group, skills in the Liberal Anglophone country group—and particularly in England and the United States—are markedly more unequal on average, in both numeracy and literacy, than in all other groups of countries. Skills in the East Asian and Central and Eastern European countries, on the other hand, tend to be more equal, with the Nordic and Social Market countries in the middle of the range.

Relative inequality in numeracy and literacy skills in the Anglophone countries is even more pronounced among the younger 25–29 age group, especially in numeracy (see fig. 3). England and the United States top the country rank order in terms of numeracy skills inequality, with English-speaking Canada, Ireland, and Northern Ireland all in the top third. England, Sweden, and the United States are not statistically different from each other, but the skills in these countries are significantly more unequal than in all the rest. In literacy, there is no significant difference between England, Ireland, the Netherlands, Norway, Sweden, and the United States at the top end, so we can say with confidence that three of the English-speaking countries in this group are among the five countries most unequal in skills. Only Northern Ireland, among the English-speaking countries, occupies a more middling position in terms of inequality of skills.

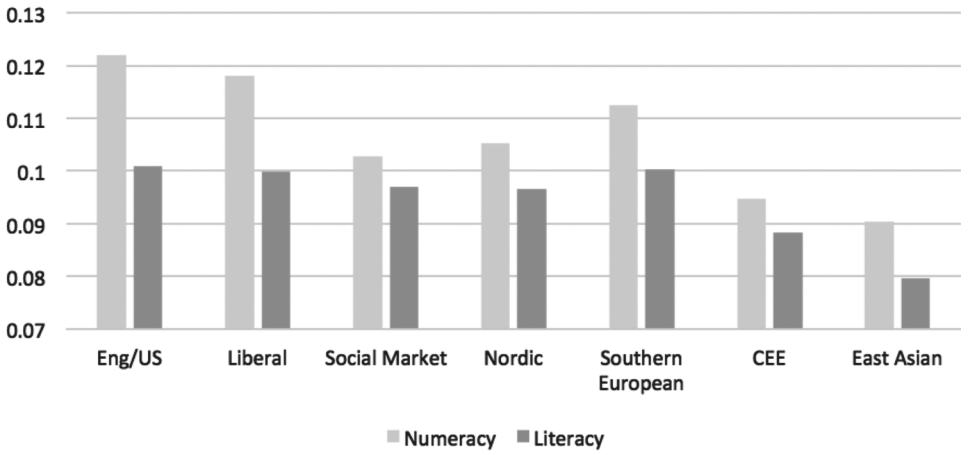

FIG. 2.—Adult numeracy and literacy distribution by country group (skills Ginis)

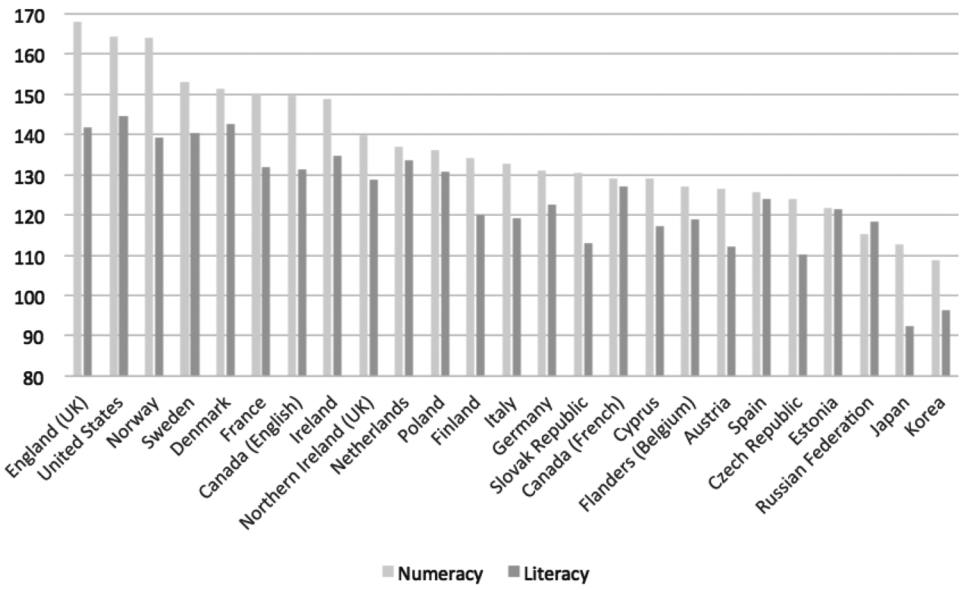

FIG. 3.—Differences between means for top and bottom quintiles in numeracy and literacy scores of 25- to 29-year-olds.

As figure 4 illustrates with the Gini measures, skills in the Anglophone countries within the 25–29 age group are, on average, more unequally distributed than in other groups of countries in both literacy and numeracy. As with the adults in general, East Asian countries have, on average, the narrowest distribution of scores in both domains, followed in this case by the CEE and the Social Market countries. The Nordic and Southern European countries are in the middle in terms of the country group ranking.

Inequality of Skills Opportunity

Inequality of skills opportunity can be defined and measured in different ways. Here we focus solely on the social origins effect—that is, how much family background influences the level of an individual's skills.[8] Ideally, family background is measured using both parental SES and parental education data, but SAS does not record parental SES, so our measure here is

[8] Family background can influence the chances of individuals acquiring skills initially—through education and training—and their opportunities later for utilizing (and possibly reinforcing) these skills. Disaggregating the effects of initial learning of skills and the reinforcement of skills through their later utilization is unfortunately beyond the scope of this article. Where the term "skills opportunities" is used in this article, we are referring primarily to the initial opportunities for acquiring skills, although we recognize that skills utilization may also affect skills levels and thus the relationship between an individual's family background and skills level.

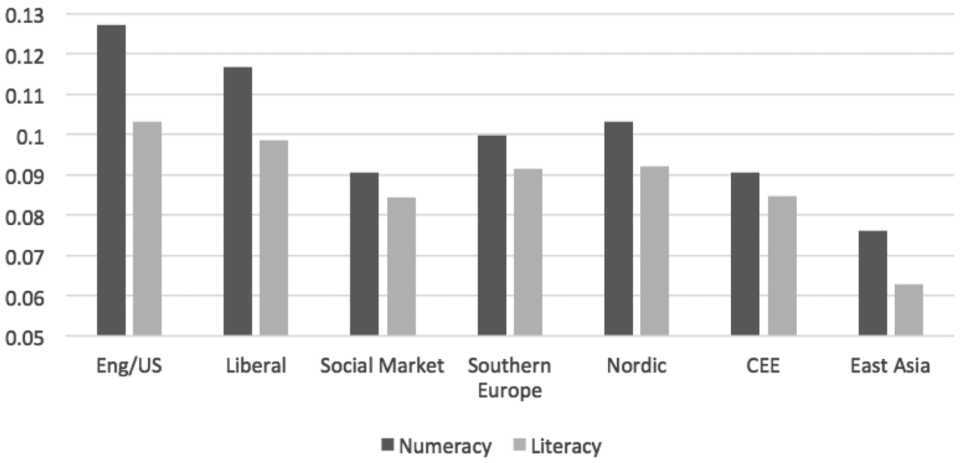

FIG. 4.—Numeracy and literacy Ginis for 25- to 29-year-olds by country group (skills Ginis)

based on parental education alone.[9] SAS records the education level of the parents of respondents according to their highest qualification held. The highest level is where one or both parents have a degree (at International Standard Classification of Education [ISCED] 5 or 6 or above).[10] The middle level is where one or both parents have a highest qualification at the upper secondary level (ISCED 3, not including 3c short and level 4). The lowest level is where neither parent has a qualification above the lower secondary level (i.e., not above ISCED 1 or 2). We are therefore able to compute a social origins gradient for literacy and numeracy skills for adults in general and for distinct age groups for each country.[11]

Figure 5 shows the social origins gradients for numeracy and literacy scores for the whole adult population from ages 16 to 65, first by country (ranked on numeracy gradients) and then by country group. The height of each bar represents the point difference in scores that can be predicted for an individual when the education level of his or her parent(s) is increased from the bottom unit to the top unit. The first thing to observe is that countries vary considerably in the degree of inequality of skills opportunity. The difference in numeracy scores between those with a parent in the top educational category and those with no parent above the bottom one ranges

[9] SAS also records data on "books in the home" of the respondents when children, as a measure of "cultural capital." Problems of recall for older respondents may make this measure unreliable, however, so we do not use it here. We acknowledge that the parental education variable has limitations as a measure of parental SES.

[10] UNESCO's International Standard Classification of Education classifies education into six levels, each with various subdivisions.

[11] The social origins "gradient" here refers to the degree to which an individual's skills levels varies by social class—as measured by parents' education level—within each country.

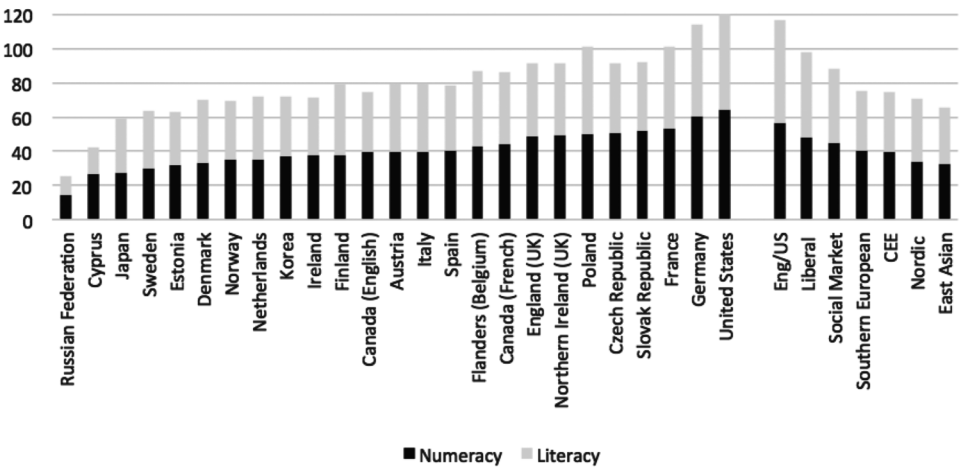

FIG. 5.—Social gradients for adult (ages 16–65) numeracy and literacy skills by country and country group.

from 14.1 points in Russia, the most egalitarian country, to 64.1 in the United States, the least. There is also considerable variation across country groups. The social origins gradient for numeracy ranges from an average of 32 points for the East Asian countries to an average of 56.3 points for England and the United States.

The Anglophone countries have, on average, the steepest social origins gradients both on numeracy and on the accumulated value for numeracy and literacy, with England and the United States at the top end, followed closely by the Social Market countries. The East Asian and Nordic countries have, on average, the flattest social origins gradients. The country group averages do mask some variations within country groups, but most of the groups are quite tightly clustered. Japan and Korea are both in the bottom third of the rank order, and the four Nordic countries are all comfortably in the bottom half. The Anglophone countries are slightly more diverse, with English-speaking Canada and Ireland just below the middle of the rank order, and England, Northern Ireland, and the United States in the top third for numeracy and the top quarter on the accumulated measure. However, the CEE countries represent a very disparate group, with Russia and Estonia having very flat gradients and the Czech Republic, Poland, and the Slovak Republic having rather steep gradients.

If we compare the gradients for older and younger age groups, we can see some different cross-country patterns emerging with the younger age group (see figs. 6 and 7, with countries ranked by the values for 16- to 24-year-olds). With the younger age group, England and the United States still

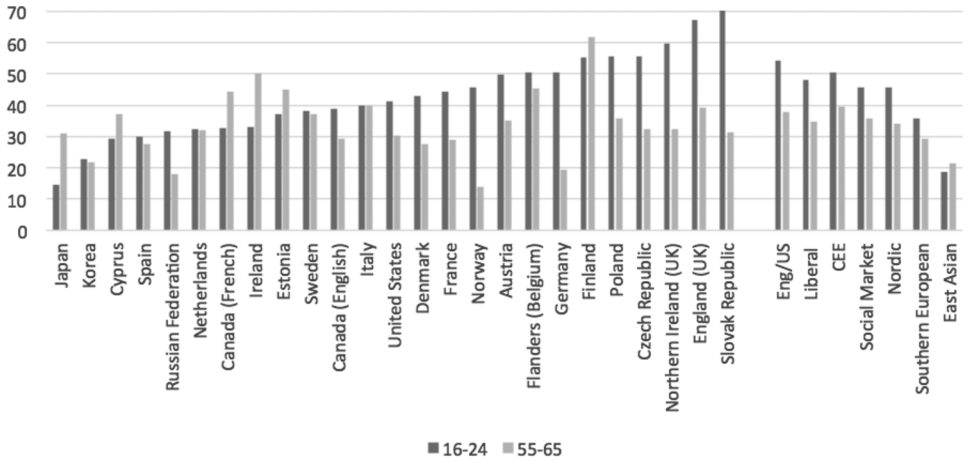

FIG. 6.—Social gradients for numeracy for younger and older age groups

have the steepest gradients of all country groups on both literacy and numeracy, because the English gradient, second only to the Slovak Republic's, is so steep. The gradient for the United States is now in the middle of the range, although this may be a statistical artifact, as we explain later. The difference between the country groups in the middle range is less marked. The CEE countries, on average, are much less egalitarian on both numeracy and literacy in the younger age group than the older one, although Russia and

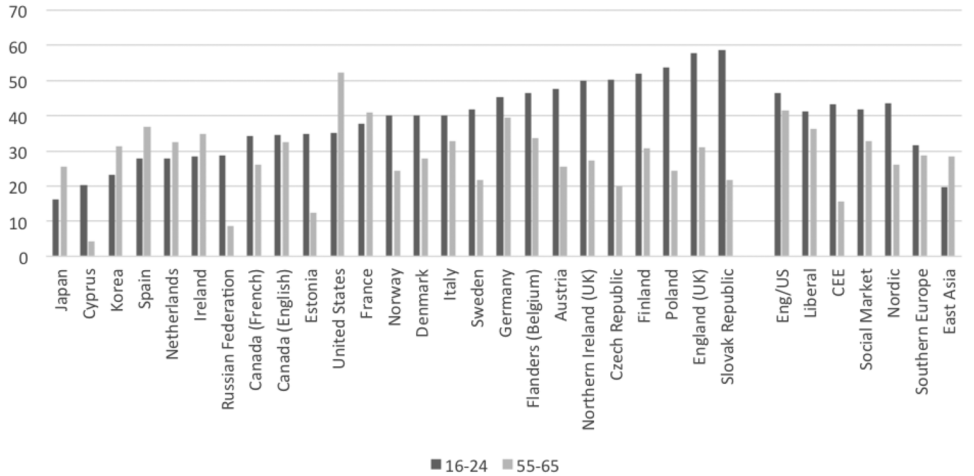

FIG. 7.—Social gradients for literacy for older and younger age groups

Estonia still have relatively flat gradients for 16- to 24-year-olds. The CEE group as a whole is now on a par with the Social Market and Anglophone countries, and with the Nordic countries, which are also markedly less egalitarian within the younger age group than the older one. The East Asian countries still have the flattest gradients for both numeracy and literacy, followed by Southern European countries, which on average have much flatter gradients among the younger age group than the older age group. These changing patterns in the rank ordering of country groups reflect variations in intercohort differences. In most countries, inequality based on social origins is much greater among the younger age group than the older one for both literacy and numeracy. Only Japan and Ireland show flatter gradients among the younger age group in both domains. Cyprus, Estonia, France, French-speaking Canada, Russia, Korea, the Netherlands, Spain, and the United States have flatter gradients in one of the two domains.

Changes in Skills Inequality over Time and during the Life Course

Differences in levels of skills inequality between age groups may be due to a number of causes. If inequality based on social origins tends to be lower among the older age groups in most countries, this may be because education systems were more egalitarian when the older generation acquired their skills than more recently when the younger age group acquired theirs. On the other hand, it could be because inequality based on social origins reduces within an age group as it grows older. Unfortunately, we do not have comparable data at different points in time to say which explanation is more plausible for explaining the difference in social origins gradients of skills among age groups. However, we can analyze over time changes and life course changes for the distributions of skills using the comparable data on literacy skills distributions in IALS (conducted in the mid-1990s) and in SAS conducted in 2011–12. The available evidence suggests that skills inequality does indeed change over time and during the life course.

In this research, we used a pseudo-cohort analysis to compare the distributions in literacy skills between the 37- to 47-year-olds in IALS (in about 1996) and the 55- to 65-year-olds in SAS (in 2011–12, who were at the age that the IALS 37- to 47-year-olds would have been 16 years later). What we found is that literacy skills inequality declines somewhat in the United States, England, Ireland—and in some other countries with relatively unequal skills—as the pseudo (cohort) ages. The opposite seems to be true for some of the more egalitarian countries like the Netherlands and the Nordic countries. This contrast may be due to the least literate individuals in very unequal countries catching up during the middle years of their lives, as circumstances (having children, promotion at work, etc.) require them to improve their skills. The same phenomenon could be responsible for

steeper social origins gradients of young people by comparison with their elders in SAS. However, it would also seem likely that there have been changes over time (period effects) in both inequalities of outcomes and those based on social origins.

We can look at the trends over time by comparing the distributions of literacy scores (measured in skill Ginis) for the same age groups in IALS and SAS for the countries included in both surveys. A mixed pattern emerges when taking the overall adult population. The six countries that had the widest distributions in IALS in the mid 1990s (which include all the Anglophone countries) had slightly narrower distributions in SAS in 2011–12. On the other hand, the eight countries with the narrowest distributions in IALS (including all the Nordics) had somewhat wider distributions some 16 years later when SAS was conducted. A similar pattern is evident with the 16- to 24-year-old age group. There is a slight narrowing of the literacy skills distribution over the period in England and in two of the other more unequal countries in IALS (Northern Ireland and the United States), 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 that have the most equal distributions in IALS (the Czech Republic, Flanders, the Netherlands, and the Nordics) experienced a slight widening of the skills distribution over the period. This suggests a slight convergence across countries in skills inequalities over time. However, there is no overall trend across countries toward a reduction in literacy skills inequalities. This trend pattern differs somewhat from the results from PISA numeracy tests for 15-year-olds in 2003 and 2009 (for a larger set of OECD countries), which shows an overall narrowing of the distribution across the OECD (OECD 2013a).

Explanations of Relative Adult Skills Inequality in Anglophone Countries

A number of quite obvious factors may explain the relatively high levels of adult skills inequality in Anglophone countries. First, if intercohort differences in skills, resulting from exceptionally rapid changes in the output of education systems, were larger in Anglophone than other countries, this would raise overall skills inequality among adults relative to other countries. Second, if Anglophone countries had a larger inflow of adult migrants than other countries, and if their skills were more polarized or skewed toward one end of the distribution, this could also increase levels of adult skills inequality relative to other countries. Finally, if access to adult learning was exceptionally unequal in Anglophone countries, this might also increase relative levels of skills inequality. All of these explanations seem quite plausible. Our analysis of the data does not show, however, that they provide an explanation.

Intercohort Differences

The SAS data show that, in most countries, younger age groups have higher average levels of literacy and numeracy skills than older age groups (OECD 2013b). Literacy skills are higher among 16- to 24-year-olds than among 55- to 65-year-olds in all countries except England and numeracy skills in all countries except England and the United States. This means that intercohort differences are contributing substantially to overall adult skills inequality in most countries. The difference in mean literacy scores between the younger and older age groups is highest in developing countries such as Estonia, Korea, and Poland, which have seen rapid improvements in initial education, and also in a few developed countries such as Japan, Finland, and the Netherlands. However, England and the United States do not fit this pattern, and the Anglophone countries as a whole are by no means exceptional in this respect. Among the Anglophone countries, only Ireland shows rapid improvement between generations. In Australia, Canada, and Northern Ireland, the intercohort gap is in the middle range, and England and the United States stand out for the fact that their younger adults have scarcely better skills than the 55- to 65-year-olds. Intercohort differences in numeracy skills show the same patterns across countries, with the older generation in England actually doing better than the younger one. Intercohort differences clearly do not explain the relatively high levels of skills inequality in Anglophone countries.

The Effects of Inequalities in Adult Migrant Skills

In most countries, where migrants are a small proportion of the total workforce, adult skills inequality will not be greatly affected whatever the distributions of skills among adult migrants. However, for the countries where the flows are more substantial—as in England, Germany, Sweden, and the United States, 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 polarized between those with high skills and those with low skills (Damme 2014). In fact, the SAS data show that in about a third of countries, the skills of migrants make no significant difference to the skills distributions of adults. In two-thirds of countries or country 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 widening inequalities in literacy skills.[12]

[12] This is to be expected because when migrants are being tested in a language that is not their native language, this will disadvantage them more in literacy tests than numeracy tests.

There are eight countries where migrant skills seem to contribute substantially to inequalities in adult literacy skills (Canada, Cyprus, Denmark, France, Germany, Poland, Spain, and Sweden). The effect is often strongest in countries where the typical migrant does not speak the language of the receiving country on arrival, which would be the case for most migrants arriving in Denmark, Germany, Sweden, or Poland, since the languages of these countries are rarely first or second languages of migrants. In these countries, migrants are therefore likely to score below the average in tests conducted in the host country language, and this will widen the distribution in tested scores. However, migrant skills do not seem to have an exceptionally strong effect on skills inequality in Anglophone countries, except in English-speaking Canada, despite the fact that these countries all have substantial flows of migrant labor relative to their populations. This is probably because many migrants to these countries have English as a first or second language and are not therefore as disadvantaged linguistically in the tests.

Differences in Access to Adult Learning

How far does unequal access to adult learning opportunities explain the variations in adult skills inequality across countries, and does it explain the relatively high level of skills inequality in the Liberal Anglophone countries? It is well known that access to adult learning is generally positively correlated with prior educational achievements (Green 1994). In most countries, participation rates in adult education and training are higher for those with higher proficiency levels (BIS 2013; OECD 2013b). There are two potential reasons for the correlation. On the supply side, it is argued that prior education raises the aptitude for learning and therefore the efficiency of training. 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 provision of remedial training might alter this relationship, but this is unlikely where private employers make the vast majority of training decisions. The net effect of the positive correlation is that access to 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 countries in SAS, skills distributions are wider in older age groups than younger ones (Green et al. 2014).

How far would this process explain the relatively high levels of skills inequalities in Anglophone countries? The SAS does allow us to investigate this to a degree, despite the lack of longitudinal data. The survey asks respondents if they have undertaken formal education or training that led to some qualification in the 12 months prior to interview.[13] It also asks re-

[13] We have included in this definition those who are categorized as students in the initial cycle of education—i.e., those who are participating in formal secondary or postsecondary education.

spondents to estimate the overall time spent over the previous 12 months in "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." From responses to these questions, we can calculate rates of adult participation in formal education and training (i.e., that leading to a qualification) and the average volumes of nonformal learning for each country. Inequality in participation in adult learning can be estimated by taking the difference between the average levels of adult learning received by those in the top and bottom quintiles of the skills distribution. We are therefore able to compare across countries the average levels and distribution of participation in formal and nonformal education and training. If the Anglophone countries have relatively high average rates of adult learning, we may assume this has some impact on average adult skills levels. If participation is particularly unequal between groups with different levels of skill, we may infer that this may be contributing to relatively high levels of adult skills inequality. A pseudo-cohort analysis can also be used to test whether there is an association across countries between inequality of participation and inequality of skills.

What we find is that average levels of participation in the two kinds of adult learning are neither exceptionally high nor particularly skewed in the Anglophone countries. Participation rates in formal adult education and training in the Anglophone countries are generally in the top of the middle of the range for the countries surveyed. The average volume of nonformal training is relatively high in the United States but in the middle range of country values for England, Ireland, and Northern Ireland (see Green et al. 2014). Inequality in participation in adult learning is more varied across the Anglophone countries. The SAS data show that inequality among the under-45 age group in formal adult education and training is relatively low in England and English-speaking Canada, high in Northern Ireland, and average in the United States and Ireland. Inequality in participation in nonformal training is average in Ireland but quite high in England, Northern Ireland, and the United States. Overall, despite the tendency toward higher inequality in nonformal training access, there is no strong pattern of exceptional inequality in access to adult learning across the Anglophone countries. Only Northern Ireland has high levels of inequality in both formal and nonformal adult learning. English-speaking countries have high levels of adult skills inequality but not particularly high levels of inequality in participation in adult learning. Is this absence of an association between the two evident across the sample of countries generally? Our analysis suggests that this may be the case.

Simple correlations at the individual level between participation in adult learning and adult skills attainment are not very helpful because causation is likely to run both ways: those with higher levels of skills are more likely to

participate in most countries and through participation are likely to become yet more skilled. Across countries there is likely to be an association between inequality of skills and inequality of participation because individuals with differential levels of skills have a differential propensity to participate, so that countries with greater skills differentials are likely to have more inequality of participation. To examine the causal effect of unequal participation on unequal skills, we ideally need to have longitudinal data so that we can see the effect of unequal participation on the skills of a cohort later on in the life course. SAS does not provide this, but we can approximate this by using pseudo cohorts. The analysis here assumes that training systems in countries show a good deal of persistence and that therefore the inequality of adult learning of the current cohort of those aged under 45 in SAS is a plausible proxy for the inequality of the past experience of the over-45 cohort. A positive correlation across countries between inequality of participation of those under 45 and inequality of skills among those over 45 would provide some evidence of a causal impact of the former on the latter.

What we find is that there is no evidence of a relationship, positive or negative, between inequality in adult learning participation and skills inequality. The data show no association between literacy skills inequality among those over 45 and inequality in either prior formal education and training or prior nonformal training. Countries that have high levels of adult learning inequality would seem to display no tendency to have high levels of skills inequality among the older cohorts.

Unequal Outcomes from Initial Education and Training

The preceding analysis has shown that numeracy and literacy skills inequalities among adults in Anglophone countries are higher than in most other countries and that this relative inequality cannot be explained by the effects of migrant skills, intercohort differences in skills, or inequality in access to adult learning activities. By a process of elimination, we are therefore left with the possibility that the relatively high level of adult skills inequality in Anglophone countries may be the result, at least in part, of skills inequalities generated in the initial education system: in other words, that inequality is due to the learning of skills occurring before age 25 during compulsory schooling and from participation in the further and higher education system. Evidence for this hypothesis is provided by the positive correlation we find between education-level inequalities and skills inequalities. The correlations are strongest for the adult population ages 16–64 as a whole, which are significant at the 5 percent level for both literacy and numeracy. But there are also positive correlations for the 25–29 age group, significant at the 10 percent level.

If we examine the education-level inequalities by country and age group, we can find similar cross-country patterns for each age group, suggesting

considerable persistence in the patterns of educational-level inequality over time in the different countries. SAS provides data on the highest level of qualification attained for each respondent (classified by ISCED levels). We may assume that the vast majority of highest qualifications were gained when the respondents were under 25 years of age, so that the education-level inequalities for each age group provide a reasonable proxy for inequalities in the qualification outputs of education systems at different points in time, going back to the period between 1951 and 1981 for the oldest age group. We reduce the sample here to include only nonmigrants since we are interested in the impact of national education systems on later skills inequality.

Figure 8 shows the education-level inequalities across countries (measured by skills Ginis) for each 10-year age group, ranked by the position for the 25–34 age group. In most countries, education-level inequalities have grown substantially less pronounced across the generations, although not apparently by much in the United States, Germany, and some of the CEE countries. In some developing or less affluent countries, such as Ireland, Northern Ireland, Korea, and Cyprus, they have reduced dramatically. Countries with small education-level inequalities relative to other countries in most age groups include Austria, Finland, Japan, and the Russian Federation. The Nordic countries and some other CEE countries (Poland and the Czech and Slovak Republics) are in the middle of the range for all age groups. Three of the Anglophone countries (England, Ireland, and North-

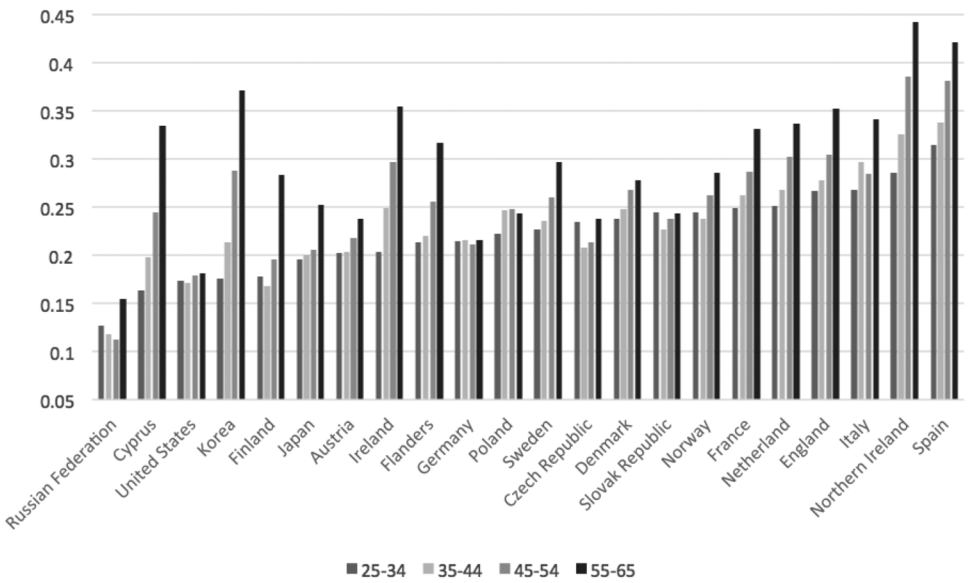

FIG. 8.—Education-level inequalities of different age groups

ern Ireland) are at the upper end of the country range for education-level inequalities in each age group (although Ireland has reached the lower half with the youngest age group). This would seem to support the contention that adult skills inequality in the Anglophone countries is driven substantially by inequalities in the outputs of the education system over many decades. But the United States appears to present an anomaly here. Education-level inequality is low relative to most other countries in all age groups. However, this may be an artifact of the way in which education levels are classified. The United States has had mass high school enrollment since the 1950s, so that even the oldest generation here were beneficiaries of this unusually inclusive pattern of enrollment. However, whereas attainment of the upper secondary level in most countries is determined by reaching a given standard, for instance by passing centralized external examinations, high school attainment in the United States is dependent on completion of the course. So the qualification level data are not strictly comparable. The United States has lower education-level inequality because the vast majority nominally achieve the middle level (upper secondary). However, this masks huge variations in the levels of skills acquired by individuals in that category.

Contribution of Different Education Phases to Skills Inequality

Most of the analyses conducted to date on the accumulation of skills inequalities in the initial education and training phases rely on surveys of skills conducted at 13, 14, and 15 years of age, such as the Trends in International Math and Science Study (TIMSS) and PISA. These studies tend to show considerable variation across countries in levels of skills inequality, both in terms of inequalities in skills opportunities and skills outcomes. Countries tend to cluster in consistent ways on the values on different measures. For instance, the data on literacy scores in PISA 2009 shows the Liberal Anglophone countries (Australia, Ireland, New Zealand, the United Kingdom, and the United States) and the Social Market countries (Austria, Belgium, France, Germany, Luxembourg, and the Netherlands) having relatively high variance in scores compared with the Nordic, East Asian, and CEE countries. The Liberal and Social Market countries also tend to have rather greater inequality of skills opportunities on average than the Nordic, East Asian, and Southern European countries (OECD 2010; Green 2011). Other studies using the TIMSS data for 1995 and 1999 show similarly strong social origins effects for the Anglophone countries. Schütz and colleagues (2008), for instance, using data on Mathematics and Science performance of 13-year-olds in TIMSS and the TIMSS-Repeat Survey, found that family background effects in Anglophone countries were generally very high, with five countries (England, Ireland, New Zealand, Scotland, and the United States) ranked in the top 13 of 54 countries, with England heading the list.

Our analysis of the SAS data suggests that inequalities in skills in Anglophone countries continue to increase after the end of lower secondary education, during the upper secondary and higher education phases. We are not able to distinguish between the skills inequality generated through the compulsory education system and inequality that emerges subsequently from the SAS data. However, for the youngest age group in SAS, at least, it is possible to explore this by comparing their skills inequalities with those of 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 27-year-olds in SAS (proxied by 25- to 29-year-olds).[14]

What the pseudo-cohort comparison shows is quite startling both with regard to inequality of outcomes and inequality of opportunities. Between ages 15 and 27, skills distributions in literacy get narrower in almost all countries, although to varying degrees. In numeracy, the distributions get narrower in about half of the countries and wider in the other half. In the East Asian countries, German-speaking countries, and most of the CEE countries, distributions narrow, whereas they get wider in all of the Anglophone countries, with England showing the largest increase in the Gini measure. Social origins gradients get steeper over the life course in most countries (excepting only Germany, Korea, and Russia), with the largest increases being in England and Northern Ireland. The United States also shows a relatively large increase. The only Anglophone country showing a more moderate increase is English-speaking Canada.

Discussion

Our analysis shows that inequality in skills outcomes (distributions) and skills opportunities (social origins effects) tend to be significantly higher in Liberal Anglophone countries than in most other countries included in SAS. The difference is particularly marked with the younger age groups and in numeracy skills. 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 skills opportunities and outcomes than other country groups, with England and the

[14] We use data in SAS for 25- to 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.

United States at the top end. These exceptional levels of skills inequality cannot be explained by intercohort differences in mean skills levels, by the effects of migrants' skills, or by participation in adult learning activities. So how can we explain this marked tendency toward inequality in skills in Anglophone countries?

One obvious answer would be that the English-speaking countries all have rather high levels of income inequality (Esping-Andersen 2005; Hills 2010). This may increase inequality in learning within the education system, as better-off families can afford to buy higher-quality provision for their children. It may also increase inequalities outside of the education system due to advantages that children in wealthier families may receive from the enhanced social and cultural resources of their homes, which can boost achievement at school and help to secure better jobs with more training later on (Bourdieu 1986).

This factor no doubt provides part of the explanation, but it is unlikely to provide all of it. Cross-country evidence suggests that there is only a weak effect of inequality in incomes on inequality in skills. Research quoted earlier (Bedard and Ferrall 2003) does show a lagged effect of skills inequality on earnings inequality, but there is little evidence of a strong causal effect running the other way. Our analysis of the SAS data shows only an insignificant correlation between income inequality and literacy and numeracy skills inequality across countries where these are measured synchronously, and it is likely that any causality runs from skills inequality to income inequality rather than the other way around (Green et al. 2014). OECD analyses of the PISA data for 15-year-olds' skills also show only a weak correlation between income inequality and inequality of education opportunity at the country level. In fact, as the OECD report on equity concludes, "the evidence suggests that, in general, cross-national differences in inequalities of performance are associated more closely with the characteristics of the education system than with underlying social inequalities or measures of economic development" (2010, 31).

So we are back with the education system. Our analysis suggests that initial education and training (that is, before age 25) provide the principal source of the differences across countries in adult skills inequality. But what is it about the Anglophone systems that produces this effect so strongly? There is now a substantial literature on compulsory education systems and skills inequality in lower secondary education that we cannot review fully here (e.g., Hanushek and Wößmann 2006, 2010; Schütz et al. 2008; OECD 2010; van de Werfhorst and Mifs 2010). However, it is worth pointing to the direction in which such an analysis leads, and a paradoxical twist our research suggests, on the dominant theory.

According to Raymond Boudon's (1974) influential "positional" theory, social stratification has both primary and secondary effects within the edu-

cation system. 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 that 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, are more likely to choose pathways that lead to higher-status qualifications than children from other social groups with the same levels of achievement. 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—that is, the more "branching-off" points—the greater the likelihood that socially differentiated aspirations and expectations, engendered from outside the education system, will structure student choices, even in a situation of ostensibly meritocratic access, so that educational opportunities and outcomes will be structured along class, race, and gender lines.[15] In the Anglophone countries, strong social origin effects may be leading to high levels of skills inequality, both through processes external to the education system and through those 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 stratification effects that are encouraged by certain characteristics of their education systems.

Liberal, Anglophone countries have always placed a high premium on diversity and choice within education and have arguably led the world in the recent wave of reforms to strengthen these characteristics (Sahlberg 2012; Green 2013). These systems typically provide a large number of branching points before and after the end of lower secondary education, whereby even school systems operating formally "comprehensive" systems pride themselves on the proliferation of the different types of school available.

The dominant position within current cross-country research on school systems and skills inequality is that more unequal outcomes are likely to occur when there is early selection to differentiated tracks and types of school, a higher proportion of entirely privately funded schools, a lack of standardization in curricula and assessment, and a federal system where funding is devolved to the regional level (e.g., Wößmann 2005; Hanushek and Wößmann 2006, 2010; Schütz et al. 2008; OECD 2010; Salverda et al. 2014). According to this research, early tracking increases inequality as combined peer effects and school effects raise aspirations among students in high-status

[15] This article has only been concerned with social class inequalities in skills, but other research has shown that these mechanisms apply equally in terms of inequalities associated with gender and ethnicity.

tracks and schools and depress aspirations among students in lower-status tracks and schools (Schütz et al. 2008; Werfhorst and Mifs 2010). Private schools promote inequality as families with high incomes are able to buy higher-quality education for their children in schools with smaller class sizes, better resources, and higher-paid teachers. Lack of standardization in curricula and assessment systems promotes inequality because school practises become more differentiated according to the social and ability composition of their intakes, thus exacerbating variation in school and peer effects across schools (Wößmann 2005; Werfhorst and Mifs 2010). Regionalized funding in state school sectors increases inequality in school quality as richer areas can spend more on education than poorer areas (for the United States, see Winkler 1993; OECD 2010).

English-speaking countries tend to exhibit most or all of these characteristics (Green et al. 2006; Sahlberg 2012; Green and Mostafa 2013). Most of them have federal education systems (New Zealand and Ireland being the only exceptions); most, except perhaps Ireland, have assiduously promoted school choice and diversity; and most have a relatively high proportion of fully private schools (OECD 2010). Many—like England, Scotland, Northern Ireland, Australia, and New Zealand—also offer a very wide range of qualifications at the upper secondary level, often provided by private bodies, and their qualification systems are therefore inevitably less standardized than those in countries with a more limited range of state-issued diplomas. These factors combined may well be driving the high level of inequality in skills opportunities and outcomes that we observe.

However, there is also a paradox here suggested by our analysis. Dual tracking in the post–lower secondary phase does not seem to be associated with the exacerbation of inequalities. The countries that reduce inequality of skills outcomes most and increase inequality of opportunity least in this phase include Austria, Belgium, and Germany, with upper secondary systems bifurcated between academic education and apprenticeship provision, as well as those such as Japan, Korea, and a number of CEE countries that have largely school-based provision with differentiated academic and vocational institutions. This suggests that the system characteristics driving inequality may be different in different phases of education. The challenge for future cross-national research on skills inequalities will be to disaggregate the effects of the different phases of lifelong learning and to understand the policies and system characteristics that have the most impact on inequality at each phase.

References

Archer, M. 1979. *The Social Origins of Educational Systems.* London: Sage.

Bedard, K., and C. Ferrall. 2003. "Wage and Test Score Dispersion: Some International Evidence." *Economics of Education Review* 22:31–44.

Boudon, R. 1974. *Education, Opportunity, and Social Inequality*. London: Wiley.
Bourdieu, P. 1986. "The Forms of Capital." In *Handbook of Theory and Research for the Sociology of Education*, ed. J. Richardson. Westport, CT: Greenwood.
Damme, D. V. 2014. "How Closely Is the Distribution of Skills Related to Countries' Overall Level of Social Inequality and Economic Prosperity?" OECD Education Working Paper no. 105, OECD, Paris.
BIS (Department of Business, Innovation, and Skills). 2013. "The International Survey of Adult Skills: Adult Literacy, Numeracy, and Problem-Solving Skills in England." BIS Research Paper no. 139, BIS, London.
Esping-Andersen, G. 1990. *The Three Worlds of Welfare Capitalism*. Princeton, NJ: Princeton University Press.
Esping-Andersen, G. 2005. "Inequality of Incomes and Opportunities." In *The New Egalitarianism*, ed. A. Giddens and P. Diamond. Cambridge: Polity.
Goldstein, H. 2004. "International Comparison of Student Attainment: Some Issues Arising from the PISA Study." *Assessment in Education: Principles, Policies and Practice* 11 (3): 319–30.
Green, A. 1990. *Education and State Formation: The Rise of Education Systems in England, France, and the USA*. London: Macmillan.
Green, A. 2011. "Lifelong Learning, Equality, and Social Cohesion." *European Journal of Education* 46 (2): 228–43.
Green, A. 2013. *Education and State Formation: Europe, East Asia, and the USA; Education, Economy and Society*. 2nd ed. Basingstoke: Palgrave Macmillan.
Green, A., F. Green, and N. Pensiero. 2014. "Why Are Literacy and Numeracy Skills in England So Unequal?: Evidence from the OECD's Survey of Adult Skills and Other International Surveys." LLAKES research paper, LLAKES.
Green, A. and T. Mostafa. 2013. "The Dynamics of Education Systems: Convergent and Divergent Trends, 1990 to 2010." In *The Dynamics and Social Consequences of Education Systems*, ed. J. G. Janmaat, M. Duru-Bellat, A. Green, and P. Mehaut. Basingstoke: Palgrave.
Green, A., J. Preston, and J. G. Janmaat. 2006. *Education, Equality, and Social Cohesion*. Basingstoke: Palgrave.
Green, F. 1994. "The Determinants of Training of Male and Female Employees, and Some Measures of Discrimination." In *The Market for Training*, ed. R. McNabb and K. Whitfield. Aldershot: Avebury.
Hall, P., and D. Soskice. 2001. *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford: Oxford University Press.
Hanushek, E., and L. Wößmann. 2006. "Does Educational Tracking Affect Performance and Inequality? Difference-in-Differences Evidence across Countries." Working Paper no. 11124, National Bureau of Economic Research, Cambridge, MA.
Hanushek, E., and L. Wößmann. 2009. "Do Better Schools Lead to More Growth? Cognitive Skills, Economic Outcomes, and Causation." IZA Discussion Paper no. 4575, Forschungsinstitut zur Zukunft der Arbeit (IZA), Bonn.
Hanushek, E., and L. Wößmann. 2010. "The Economics of International Differences in Educational Achievement." Working Paper no. 15949, National Bureau of Economic Research, Cambridge, MA.
Hills, J. 2010. "An Anatomy of Economic Inequality in the UK: Report of the National Equality Panel." Government Equalities Office, London.

McLean, M. 1990. *Britain and a Single-Market Europe: Prospects for a Common School Curriculum*. London: Kogan Page.

Mons, N. 2007. *Les Nouvelles politiques educatives*. Paris: Presses Universitaires de France.

Nickel, S., and R. Layard. 1998. *Labour Market Institutions and Economic Performance*. London: Centre for Economic Performance, LSE.

OECD. 2000. *Literacy in the Information Age: Final Report of the International Adult Literacy Survey*. Paris: OECD.

OECD. 2010. *PISA 2009 Results: Overcoming Social Background; Equity in Learning Opportunities and Outcomes*. Vol. 11. Paris: OECD.

OECD. 2013a. *PISA 2012 Results: Excellence through Equity; Giving Every Student the Chance to Succeed*. Vol. 11. Paris: OECD.

OECD. 2013b. *Skills Outlook 2013: First Results from the Survey of Adult Skills*. Paris: OECD.

Piketty, T. 2013. *Capital in the Twenty-First Century*. Cambridge, MA: Belknap.

Sadler, M. 1897. "Education in England, Wales and Ireland, France, Germany, Denmark, Belgium." Vol. 1 of *Special Reports on Educational Subjects*. Sessional Papers, Parliament, House of Commons.

Sahlberg, P. 2012. *Finnish Lessons: What Can the World Learn from Educational Change in Finland?* New York: Teachers College Press.

Salverda, W., B. Nolan, D. Checchi, I. Marx, A. McKnight, I. Tóth, and H. van de Werfhorst. 2014. *Changing Inequalities in Rich Countries: Analytical and Comparative Perspectives*. Oxford: Oxford University Press.

Schütz, G., H. Urspung, and L. Wößmann. 2008. "Education Policy and Equality of Opportunity." KYKLOS 61 (2): 279–308.

Thelen, K. 2004. *How Institutions Evolve: The Political Economy of Skills in Germany, Britain, the United States, and Japan*. Cambridge: Cambridge University Press.

Tsatsaroni, A., and J. Evans. 2014. "Adult Numeracy and the Totally Pedagogised Society: PIAAC and Other International Surveys in the Context of Global Educational Policy on Lifelong Learning." *Educational Studies in Mathematics* 87:167–86.

Van de Werfhorst, H. G., and J. B. Mifs. 2010. "Achievement Inequality and the Institutional Structure of Systems: A Comparative Perspective." *Annual Review of Sociology* 36:407–28.

Wiborg, S. 2009. *Education and Social Integration: Comprehensive Schooling in Europe*. New York: Palgrave Macmillan.

Wilkinson, R., and K. Pickett. 2009. *The Spirit Level: Why More Equal Societies Almost Always Do Better*. London: Allen Lane.

Winkler, D. 1993. "Fiscal Decentralization and Accountability: Experience in Four Countries." In *Decentralization and School Improvement*, ed. J. Hannaway and M. Carnoy. San Francisco: Jossey-Bass.

Wößmann, L. 2005. "The Effect Heterogeneity of Central Examinations: Evidence from TIMSS, TIMSS-Repeat, and PISA." *Education Economics* 13 (2): 143–69.