Inequalities in Adult Skills and Why Countries Vary so Much:
The Evidence from SAS and other International Surveys.

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Skills Inequality: Why Does it Matter?

Inequality in skills is a growing concern in a world of rising levels of inequality in wealth and incomes (Piketty, 2013) because:

- Skills inequality impacts on wage inequality (Bedard and Ferrall, 2003)
- Skills and incomes inequality are associated with a host of negative social and economic consequences, including lower levels of:
  - public health and general well-being (Wilkinson and Pickett, 2009)
  - political engagement and social and political trust (Green and Janmaat, 2011)
  - economic innovation and growth (Knack and Keefer, 1997).
The Research

This research examines the variations across OECD countries in inequality in Adult Literacy and Numeracy skills.

The main source of data is the OECD’s recent Survey of Adult Skills (SAS or PIAAC) which includes 24 countries and regions.

We also make use of other similar skills surveys to assess over time trends in skills inequality and life course effects.

- Comparison with the re-calibrated IALS data on literacy skills from the mid 1990s allows us to assess trends in skills inequality and possible life course effects (using pseudo-cohorts from IALS and SAS).

- A pseudo-cohort analysis with PISA 2000 and SAS 2011/12 allows us – more tentatively – to assess what happens to skills inequality between 15 and 26 years.
The Broad Patterns across Country Groups

Means:
• The Nordic and East Asian countries generally score quite highly amongst the younger age groups on both Literacy and Numeracy (as well as some CEE countries) with Korea showing the most rapid improvement between generations.
• The English-speaking countries on average score relatively less well amongst younger people, with England, uniquely, showing no improvement across generations.

Distributions
• English-speaking countries: wide distributions of skills amongst adults and younger people.
• East Asian and CEE countries tend to have narrower skills distributions (and the Nordics somewhere in between).

Social Origins Effects
• Impact of social background tends to be high within English-speaking and social market countries and lower in East Asian, southern European and Nordic countries.
Literacy Means by Age Group, 16-24 and 55-65
Numeracy Means by Age Group, 16-24s and 55-65s
Inequality of Skills Outcomes

We compare literacy and numeracy skills distributions for adults and for different age groups.

Skills distributions measured with quintile differences (significance tests) and skills ginis.

• England and the US have a wider distribution of skills than most other countries, particularly within the younger age groups. The skills of younger people are becoming less unequal over time in both countries, but they are still more unequal than in almost all other countries.

• Other English-speaking countries have narrower distributions than England and the US but tend to be in top half of the country ranking in terms of inequality of skills outcomes.

• East Asian and CEE countries tend to have narrowest distributions for adult as a whole and young people.
The Difference in Numeracy Means for Top and Bottom Quintiles for 16-65 Year Olds
Difference between the Mean Literacy Scores of the Top and Bottom Quintiles for 25-29 Year Olds
Difference in Mean Numeracy Scores of Top and Bottom Quintiles for 25-29 Year Olds
Difference between the Mean Literacy Scores of the Top and Bottom Quintiles for 25-29 Year Olds
Inequality of Opportunity

Inequality of Opportunity is measured by the strength of effect of social background on adult skills. Social gradients are calculated using parental education levels as the measure of social background.

**Adults Overall**
- The influence of parental background on adult skills overall is highest within the English-speaking and social market countries.
- East Asian, southern European and Nordic countries have, on average, much flatter social gradients.

**16-24s**
- England and N. Ireland have quite steep social gradient but Ireland, Canada and the US have flatter gradients (although US and Canada not fully comparable).
- Social gradients are relatively moderate in Nordic countries and lowest in East Asian countries.
Social Gradients for Numeracy for Younger and Older Age Groups
Social Gradients for Literacy Skills for Younger and Older Age Groups
Over-time Trends in Adult Skills Distributions

Over-time trends in skills inequality can be gauged by comparing the distribution of literacy skills in IALS and SAS (conducted about 16 years later).

• Distributions of skills amongst adults narrowing in most countries (incl. anglos).
• Skills distributions amongst 16-24s are becoming more equal over time in some countries and most unequal in other countries.
• The most marked narrowing of skills distributions overall is within countries which had the widest distributions in the mid 1990s: ie England, N. Ireland and Poland. Nevertheless, the literacy skills ginis of the younger age groups in SAS is still higher than for the older age groups.
• Many of the countries with narrower skills distributions in the mid-1990s (Denmark, Finland, Norway, Sweden, Germany) have seen a widening of the distribution over time.
• This suggests some convergence across countries in skills inequality.
Literacy Gini for 16-24 Year Olds in IALS and SAS
Changes in Skills Inequality over the Life Course

Using a pseudo – cohort comparisons of data in IALS and SAS, we can see what happens to the distribution of skills during the lifetime of a cohort.

• In England and N. Ireland the skills gaps becomes wider as the 16-24 cohort (in IALS) reaches 34-44 (in SAS). In Denmark, Finland, Ireland and the US the gaps shrinks.

• The skills gaps within the older 37-47s cohort (in IALS) becomes narrower as the cohort reaches 55-56 (in SAS) in all English-speaking countries, unlike in many other countries.

• Post-compulsory learning maybe increasing skills gaps in England and N. Ireland in young adulthood more than in most other countries.

• But skills gaps narrow more in midlife in English-speaking countries than in most others. Our analysis shows that this is not because formal adult learning is attenuating gaps more in these countries than elsewhere, so this may be about informal learning.
Changes in Skills Inequality over the Life Course: 16-24s in IALS and 34 - 44s in SAS

[SAS 34-44] [IALS 16-24]
Changes in Skills Inequality over the Life Course – 37-47s in IALS and 55-65s in SAS
Why Are Adult Skills so unequal in English-Speaking Countries (and particularly in England, N.I and the US)?

According to our analysis, exceptional skills inequality in England, N.I. and the US, cannot be explained by:

- Inter-cohort differences in mean levels of skill
- Effects of skills of adult migrants
- Effects of adult formal and non-formal learning

The high level of inequality in adult skills in England and Northern Ireland appears to be mainly due to high level of inequality in initial education levels (achieved before 25), underpinned by a relatively strong effect of social background on skills attainment.

Social background also underpins skills inequality in the US, but here it is not clear how far this runs through education level inequality.
Adults Numeracy Gini's Including and Excluding Migrants
Adult Literacy Ginis Including and Excluding Migrants
Formal Adult Education Inequality
(Top/bottom literacy quintile difference in % participating)
Non-Formal Training Inequality
(Top/bottom literacy quintile difference in volume.)
Adult Skills Inequalities and Education Levels

• There is a significant positive correlation between adult skills inequality and initial education level inequality across countries.

• In England there has been persistent inequality in the outputs of initial education since the 1950s. Each age group shows relatively high levels of education level inequality.

• Initial education level inequality in the US does not appear particularly high. However, we think this is due to mass high school completion since the 1960s which reduces the gini for education level inequality. Completion of high school is probably not comparable to level 3 qualifications in other countries (which require meeting a certain standard).
Correlation between Education Inequality and Adult Literacy Inequality
Correlation Education Inequality and Numeracy Inequality for 25-29s

Pearson's correlation coefficients between education level gini's and skills gini's:

<table>
<thead>
<tr>
<th>Gini Education</th>
<th>Gini Numeracy</th>
<th>Gini Literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-29</td>
<td>16-65</td>
<td>25-29</td>
</tr>
<tr>
<td>0.38*</td>
<td>0.5**</td>
<td>0.37*</td>
</tr>
</tbody>
</table>

*p<0.1, **p<0.05
Education Level Inequalities (ginis) of Different Age Groups
What is Driving Education Inequality in the Anglos?

• All English-speaking countries have relatively high income inequality, so this is part of the story.
• But the correlation is relatively weak, which suggests that there are also system effects in English-speaking countries.
• These may have to do with the prevalence of neo-liberal policies on school choice and diversity, devolution of decision-making and the reintroduction of streaming.
• All such policies increase the number of branching points which is likely, as Boudon argued, to increase the secondary stratification effects as children from lower social class families are less likely to choose the prestige routes, even when equally able.
Correlation of Social Gradients and Gini for Adult Numeracy

R=0.55, p<0.005
Conclusions

• We know that social background has a strong and growing effect in E-S countries and diversified systems tend to allow social background to intrude more.

• Social origins, which are very unequal in E-S countries, are driving educational equality through both primary and secondary stratification effects:
  - family social capital assists achievement of high class children
  - children’s choices in diversified systems enhance the effect of social background.

Social origins shape school inequalities and go on to shape adult skills inequalities.
The Contribution of Upper Secondary Education and Training to Skills Inequality

Andy Green
A Difference -in-Difference Approach

• The effects of upper secondary E and T on literacy and numeracy skills inequality is estimated using a pseudo cohort derived from 15 year olds in PISA 2000 and 27 year olds in the Survey of Adult Skills, conducted 11 years later (proxied by 25-29s).

• Inequalities in skills outcomes (distributions) are measured using Skills Gini coefficients.

• Inequality of skills opportunity (the social gaps in achievement) is measured by comparing skills achievements of those with graduate parents compared to the those with parents with no more than lower secondary education.

• We find that some countries are considerably better than others in mitigating skills inequality between the ages of 15 and 27.
Change in Literacy Skills Ginis between 15 and 27
Change in Numeracy Skills Ginis between 15 and 27
HE Participation Rates and Literacy Skills Mitigation

The graph shows a relationship between the reduction in Gini between 15 and 27-literacy and the HE participation rate. The data points represent different countries, and the line indicates the predicted Gini values.
Types of Upper Secondary Education and Training System

• School-based general and vocational programs in different institutions (Czech Republic, Denmark, Estonia, France, Finland, Greece, Italy, Japan, Poland and Russia)

• Comprehensive school-based general and vocation provision in one institution (Canada; Norway; Sweden and the USA)

• Tracked School-based general education and Dual Systems of Apprenticeship (Austria, Germany, Switzerland)

• Mixed Systems (Australia, England, Northern Ireland, Ireland, Scotland, Spain and New Zealand).
Change in Skills Inequality by Education System – Literacy
Change in Skills Inequality by Education System - Numeracy
ISCED 3 Completion and Mitigation of Inequality in Numeracy Skills
What Are the Upper Secondary Education and Training System Characteristics Associated with Mitigation of Skills Inequality?
ISCED 3 Completion and Mitigation of Inequality in Literacy Skills

[Graph showing a scatter plot with countries labeled on the x-axis and PIAAC PISA gini difference on the y-axis. A trend line indicates a negative correlation between ISCED 3 completion rate and literacy skills inequality.]
The Social Mix of Vocational Programmes
Conclusions

• Higher education participation rates do not seem to have much effect on skills inequality in SAS – probably because SAS does not capture the additional skills acquired by those who attend, and because much of the inequality is in the long tail of lower achievers who do not participate.

• Upper Secondary education and training systems seem to be most responsible for changes in skills inequality between age 15 and 27.

• Dual systems of Apprenticeship seem to be best at mitigating skills inequality between ages of 15 and 27.

• Other systems (as in central and eastern European countries) with low rates of early school leaving also seem relatively successful at reducing skills inequality, whatever their other systems characteristics.

• The system characteristic most correlated with inequality mitigation is high rates of completion at the full ISCED Level 3, including type A an B qualifications and ISCED 3 C long (ie 2 years or more) qualifications.

• The extra 3 years learning maths and the national language may be helping the lower achievers to close the skills gaps.