Education and Inequality

EE473

- **Human capital theory** – investment in higher levels of educational attainment improves labor market outcomes through improved productivity
- **Private returns to education** – the benefits accruing to individuals from obtaining additional education. These includes higher earnings and reduced likelihood of unemployment. 'Returns' to education are causal impacts rather than associations
- **Skilled-biased technical change –** changes in technology lead to increases in the productivity which differentially favors high-skilled workers. This is in part responsible for increases in inequality as earnings for high-skilled workers rise more quickly than the earnings of lower-skilled workers
- **Social returns to education –** the benefits of an individual obtaining additional education for other members of society. These can include higher productivity, reduced impacts from crime a healthier workforce, and more civic engagement

Introduction

- We consider the extent to which educational achievement is unequally spread through the population
- We look at the implications of inequalities in education for economic and social well-being
- The analysis we present studies several dimensions of inequality in education experiences and achievement: social background; ethnicity and immigrant status; and gender

Inequalities by Social Background

- The observation that children from poorer backgrounds do worse in terms of educational outcomes has a long history
- Gaps in educational attainment between children from richer and poorer backgrounds continue to be marked at the start of the twenty-first century
- A large literature indicates that gaps in attainment emerge very early in children's lives.
  - Substantial gaps in test-score attainment are found by income group before children start school (Carneiro & Heckman, 2004; Blanden &Machin, 2008)
  - Some evidence links these differences to the sizable disparities in preschool enrolment between children from high- and low- education parental backgrounds (Mayers et al., 2004)
- Recent international surveys that test school-age children enable comparisons to be made of the strength of the influence of family background on achievement across many countries

- Figure 1 shows family background effects on test scores from an interesting recent paper by Schuetz et al. (2005) - this uses cross-country data from the Third International Mathematics and Science Study (TIMSS) from 1995 and its repeat survey from 1999
- In 53 out of 54 countries the family background effect is statistically significant and the implied gaps in test scores are large
- Unsurprisingly, these substantial gaps in test scores lead to inequality in final educational attainments – this includes a higher probability of dropping out of school and lower qualification attainment
- There is evidence that inequalities continue to grow so that parental background influences final educational outcomes even once earlier achievements are taken into account

Figure 1
Estimated effects of family background on students' test scores across countries

Family background effects are based on reported measures of the number of books at home; test scores are average mathematics and science scores from TIMSS

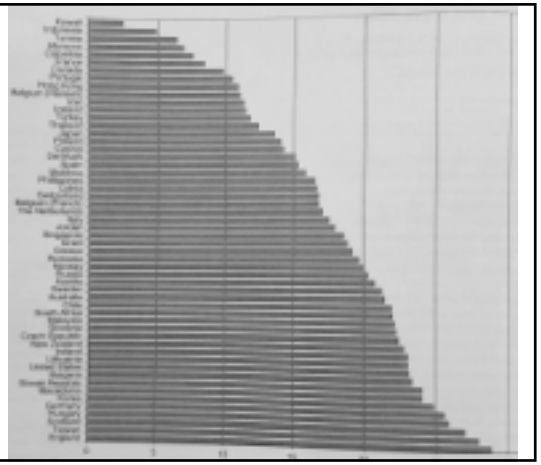


Figure 2
Comparison of students' fathers' educational level with other men of their generation

Data refer to the parent (male or female) with the highest income

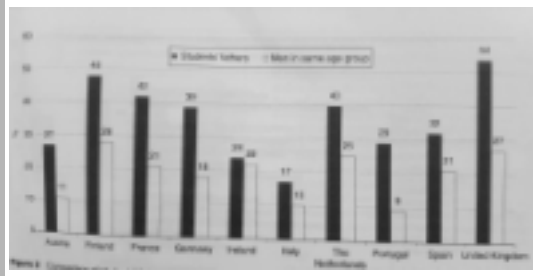


Figure 2 compares the proportions of higher-education students' fathers who have tertiary education with the proportion of all men of the same age with this level of education

- In all of the countries included fathers of university students are better educated

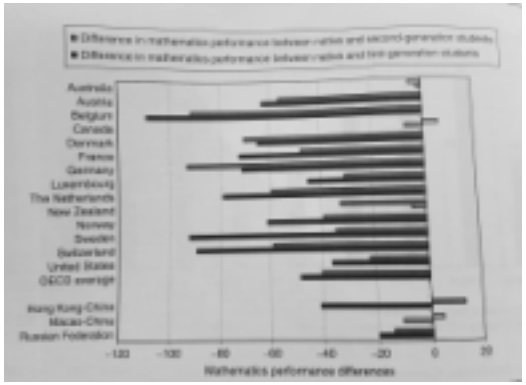
Inequalities by Race, Ethnicity, and Immigrant Status

Given the diversity of the racial and ethnic dimensions pertinent in different countries, it is difficult to provide a concise summary across countries

- Cameron and Heckman (2001) find that minority groups are actually more likely to attend college given their test scores
- Carneiro et al. (2005) have sought to investigate the time path in differences in cognitive and noncognitive skills by race – there is evidence that this gap widens somewhat with age between blacks and whites, but with gaps appearing so early; it is difficult to state that the school system is the major source of racial inequality in the US
- Platt(2007) finds substantial differences in education attainment among the UK's 16 to 24 year olds in 2001, with young people from Chinese and Indian backgrounds exceeding the performance of whites

- Figure 3 attempts this by considering the differences between mathematics test scores in the Programme for International Student Assessment (PISA) between both first- and second- generation immigrants and native students (that is third generation or higher)
- In almost all countries (Canada being the exception), natives are outperforming immigrant groups at age 13 and, in most, gaps are larger for first-generation immigrants than second-generation immigrants, this suggests assimilation
- Card (2005) looks in detail at the performance of second-generation immigrants in the US and finds that in many cases that they are outperforming whites
- Worrying exceptions to this pattern in Figure 3 are Germany and Denmark where second-generation groups appear particularly disadvantaged

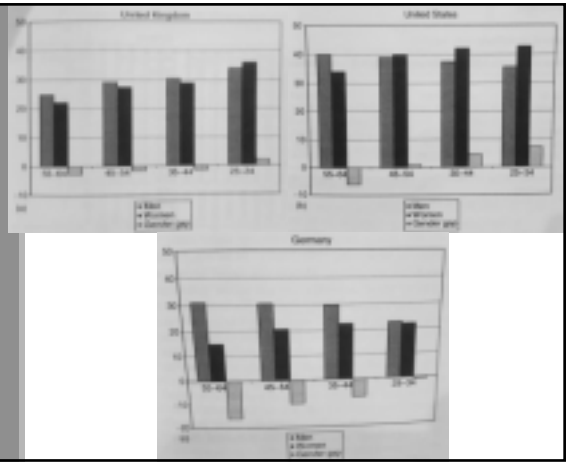
Figure 3: Differences in mathematics performance by immigrant status (2003)



Inequalities by Gender

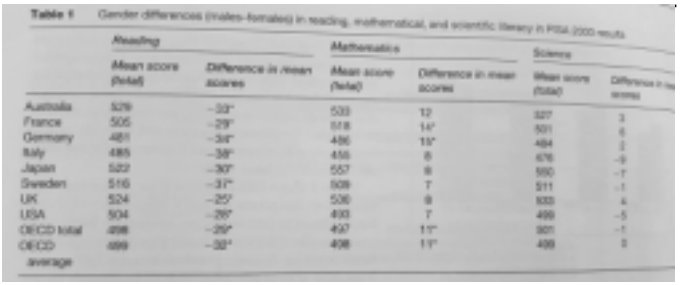
- The relative performance of women compared to men in terms of qualifications gained has improved across the world in the past three or four decades
- Jacob (2002) uses a decomposition approach to analyze why women in the US are now more likely to go to college than men
  - He finds that 90% of the attendance gap can be explained by women's higher returns to degrees and women's greater noncognitive skills
  - Noncognitive skills are measured as middle school grades, grade retention, and the number of hours spent on homework – a measure of behavior problems
  - The idea is that measures of school-based attainment will reflect effort and application once cognitive test scores are also taken into account
  - Jacob does not find any differences in cognitive scores between girls and boys conditional on other characteristics

Figure 4: Proportion of population holding tertiary education qualifications by gender and age: UK, US, and Germany



- The PISA and TIMSS surveys reveal a fairly consistent pattern of differences in test-score achievement between girls and boys
- Table 1 (taken from Dustmann, 2005), figures from PISA reveal that in the majority of OECD countries girls outperform boys in reading while boys outperform girls in mathematics. Differences in science are much less pronounced

Table 1: Gender differences (males-females) in reading, mathematical, and scientific literacy in PISA 2000 results



	Reading		Mathematics		Science	
	Mean score (total)	Difference in mean scores	Mean score (total)	Difference in mean scores	Mean score (total)	Difference in mean scores
Australia	529	–33*	533	12	527	3
France	505	–29*	518	14*	501	6
Germany	481	–34*	486	15*	484	2
Italy	485	–38*	456	6	476	–9
Japan	522	–30*	557	9	550	–7
Sweden	516	–37*	509	7	511	–1
UK	524	–25*	530	9	533	4
USA	504	–29*	493	7	499	–5
OECD total	498	–29*	497	11*	501	–1
OECD average	499	–32*	498	11*	499	0

*indicates statistically significant gender gaps

- Table 2 presents figures from a number of standardized test scores at ages 3 and 5
- In all cases, girls tend to perform better in these test scores than boys do
- In the vocabulary test, which is completed by children at both ages, the evidence is that the gap closes somewhat over the 2 years between the surveys
- This might indicate that part of girls' better performance at age 3 is due to their higher level of maturity at that age

Table 2: Gender differences in early years test scores in the Millennium Cohort Study

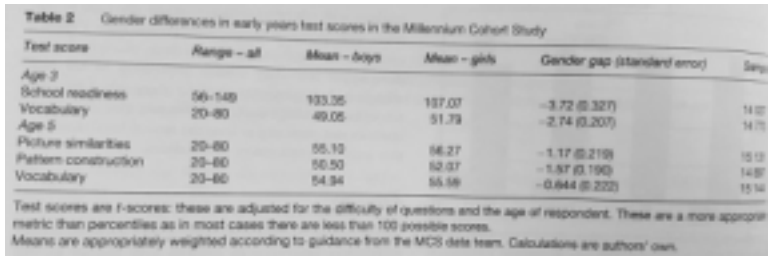


Table 2 Gender differences in early years test scores in the Millennium Cohort Study

Test score	*Range – all*	*Mean – boys*	*Mean – girls*	*Gender gap (standard error)*	*Sam*
Age 3					
School readiness	56–148	103.35	107.07	−3.72 (0.327)	14 07
Vocabulary	20–80	49.05	51.79	−2.74 (0.207)	14 71
Age 5					
Picture similarities	20–80	55.10	56.27	−1.17 (0.219)	15 13
Pattern construction	20–80	50.50	52.07	−1.57 (0.190)	14 87
Vocabulary	20–80	54.94	55.58	−0.644 (0.222)	15 14

Test scores are *t*-scores: these are adjusted for the difficulty of questions and the age of respondent. These are a more appropri metric than percentiles as in most cases there are less than 100 possible scores.
Means are appropriately weighted according to guidance from the MCS data team. Calculations are authors' own.

We can say that inequalities by family background are large, persistent, and show little sign of reducing, while the picture for race/ethnicity and gender is more positive, at least in some countries

Education and Economic Outcomes

- Higher levels of educational attainment are strongly associated with higher earnings and better employment prospects
- Table 3 shows OECD evidence on educational wage differentials that accrue to people with tertiary education levels relative to post-secondary nontertiary levels in 15 countries
  - The existence of sizable gaps in earnings is seen for all countries
  - According to these earnings differentials, acquisition of more education leads to significantly higher earnings

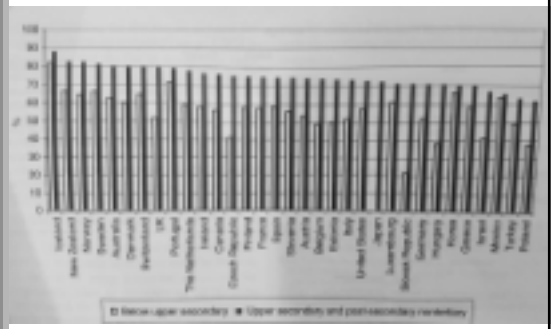
Table 3: Earnings differentials between tertiary education and post-secondary nontertiary levels of education (aged 30-44, men and women, in 2005)

Country	*Earnings differentials*
Australia	0.34
Austria	0.48
Belgium	0.34
Denmark	0.22
Finland	0.38
France	0.48
Germany	0.50
Ireland	0.59
Italy	0.43
Korea	0.48
The Netherlands	0.47
Spain	0.30
Sweden	0.22
UK	0.61
US	0.75

From table A1.9a in OECD (2007). *Education at a Glance*. Paris.

- Figure 5 compares the employment rates of those who do not complete upper secondary schools (equivalent to US high school) with employment rates for those who have high school but no college education
- Obtaining at least the typical level of education increases employment probabilities

Figure 5: Employment rates by educational attainment (2005)



Conclusion

- Education and inequality are closely related
- Education yields a private return in the labor market and there are social returns to education, it is clear that the uneven patterns of education acquisition have the potential to generate inequalities in economic and social outcomes
- Depending on how these uneven patterns of acquisition are distributed across the population, it is evident that education can have an equalizing or disequalizing effect on outcomes
- The recent experience of increased labor market inequality being linked to changing patterns of educational attainment suggests that it has, at least in this recent time period, been disequalizing and therefore had a tendency to raise inequality

Source

Brewer, Dominic and Patrick J. McEwan (2010). *Economics of Education*. New York: Elsevier