

Exam SØK3521 November 2023

All questions are worth the same marks (25%). Answer all 4 questions.

Question 1 Educational Production

- a. How can education production functions be used to explain individual's educational attainment?
- b. Appendix 1 reports individual country differences in attainment from an international average. These differences are decomposed into unaccounted and accounted for differences in terms of inputs into an educational production function.

Focus on Norway, what do the Norwegian results suggest about the (a) relative performance of the Norwegian school system and (b) what policy advice could be provided on how to improve this performance?

Question 2 Returns to Education

Consider the following Mincer wage equation:

$$\ln(w_i) = \beta_0 + \beta_1 \text{yos}_i + \varepsilon_i \quad (1)$$

Where w is wages and yos is years of schooling of individual i

- a. You estimate this on a representative sample of the working population and gain an estimate of β_1 of 0.06. Explain what this means.
- b. Can this estimate be interpreted causally? Explain your answer using relevant models and/or diagrams.

Question 3 Class Size

- a. Why might smaller classes improve educational attainment?
- b. Simple (i.e. OLS) estimates of class size effects often find that larger classes are associated with higher test scores? Why might this happen?
- c. Class size rules split up classes into smaller classes once enrolment reaches some threshold (for example once there are 25 students, the school has to provide 2 separate classes). How can these rules be used to help us understand the relationship between class size and student performance?

Question 4 Teachers

- a. What is meant by teacher effectiveness, and why could it be important to identify effective teachers?
- b. Discuss the positives and negatives to applying performance pay schemes to teachers.

Appendix A.

Table 4
Accounting for Each Country's Difference from the International Mean

	<i>Observed difference</i> (1)	<i>Unaccounted difference</i> (2)	<i>Accounted difference</i> (3)	<i>Of which: accounted for by</i>		
				<i>Family background</i> (4)	<i>School resources</i> (5)	<i>Institutions</i> (6)
Finland	44.5	31.7	12.9	2.7	-1.3	11.5
Korea	42.0	14.3	27.7	13.0	5.6	9.1
Netherlands	38.4	-8.0	46.4	-3.4	-0.3	50.1
Japan	34.0	4.4	29.6	17.5	2.9	9.2
Canada	33.0	17.4	15.6	15.9	3.2	-3.5
Belgium	29.5	-11.8	41.3	-1.2	1.4	41.0
Switzerland	26.5	27.3	-0.8	-13.2	9.5	2.9
Australia	24.5	2.1	22.4	14.0	6.6	1.7
New Zealand	24.5	17.8	6.7	16.2	-3.0	-6.4
Czech Republic	16.4	2.1	14.3	16.1	-9.0	7.2
Iceland	15.1	-11.6	26.7	29.7	4.9	-7.9
Denmark	14.1	6.0	8.1	0.4	6.5	1.2
Sweden	10.0	5.5	4.5	5.9	-1.0	-0.4
United Kingdom	8.4	-9.1	17.5	13.0	2.7	1.8
Austria	5.5	5.7	-0.2	2.1	6.1	-8.5
Ireland	3.9	-15.0	18.8	-3.3	1.6	20.5
Germany	3.5	5.4	-1.9	-4.0	-0.8	2.8
Slovak Republic	-1.0	6.3	-7.3	4.2	-18.0	6.5
Norway	-4.3	-26.4	22.1	22.1	2.1	-2.1
Luxembourg	-6.3	-10.7	4.4	-25.5	19.3	10.6
Hungary	-9.3	-18.7	9.4	4.5	-5.4	10.4
Poland	-9.5	2.5	-12.0	-11.5	-8.1	7.6
Spain	-14.1	-2.7	-11.4	-4.8	-5.4	-1.2
United States	-16.1	-14.7	-1.4	2.3	9.1	-12.9
Portugal	-33.5	23.0	-56.5	-27.0	-2.8	-26.7
Italy	-33.9	-5.5	-28.3	2.7	3.6	-34.7
Greece	-55.1	-22.1	-33.0	-4.1	-3.0	-26.0
Turkey	-75.8	-4.4	-71.5	-31.7	-17.5	-22.3
Mexico	-114.8	-10.6	-104.2	-52.7	-9.9	-41.6

Notes: Each entry shows the country's test score difference from the international mean on the PISA 2003 mathematics test, expressed in student-level standard deviations. Column 1: actual difference. Column 2: difference not accounted for by a country-level regression of the actual test score difference on the three combined input factors (family background, school resources, institutions), each of which is measured as a linear combination of individual variables using coefficient estimates from the student-level regression of Table 2, collapsed to the country level. Column 3: difference accounted for by this country-level regression. Columns 4–6: difference accounted for by family background, school resources, and institutions, respectively. By constructions, columns 2 and 3 sum to column 1, and columns 4–6 sum to column 3.

Excerpt from Woessmann (2016)