

ECON-A4000 - Economics of Global Challenges

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Return method: through mycourses by the deadline

Problem Set III: Question 2

In Lecture 9, we discussed The Golden Age where the output per capita $y = Y/L$ was growing rapidly throughout the period. Then, I introduced the production function to analyze the sources of growth: total factor productivity A , capital per capita k , and labor productivity h .

Consider the following information:¹

	y	k	h	$k^\alpha h^{1-\alpha}$	A
US	1	1	1	1	1
Canada	.76	1.02	.98	.99	.77
Japan	.74	1.37	.87	1	.73
Finland	.71	1.14	.89	.96	.74
Great Britain	.7	.80	.82	.81	.87

This is exactly as in the lecture: (y, k, h, A) for the US are normalized to unity so this country is the benchmark in the comparison that follows. The calculations assume $\alpha = \frac{1}{3}$.

1. Using this data, please explain how to obtain the numbers in column A . Elaborate on its interpretation.
2. Discuss how much of the differences in y is explained by inputs (k, h) and how much by differences in technologies A .

¹Obtained from Weil, D.N., *Economic Growth*, Pearson/Addison Wesley, Boston 2005 (s. 189):

3. We often think that (y, k, h) can be measured and that A is more difficult to measure and thereby obtained as a residual (i.e., it captures all else not explained by observables). However, even (k, h) can be difficult to measure. Let us see if the measurement errors could explain why A in Finland lags behind so much of the US level. Consider the following change in the data for Finland:

	y	k	h	$k^\alpha h^{1-\alpha}$	A
Finland	.71	?	?	?	.87

That is, we lifted A to the same level as in the Great Britain. What must be the joint contribution of the inputs, $k^\alpha h^{1-\alpha}$, in this situation? Suppose capital in Finland has the value 1.14 as before. How large should h be now? Comparing to the other countries, does a measurement error of this size seem plausible?