Lecture 5: Understanding Cross-Country Income Differences

ECON 30020: Intermediate Macroeconomics

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Readings

GLS Ch. 7 (Understanding Cross-Country Income Differences)

Understanding Cross-Country Income Differences

Solow model can reproduce time series stylized facts if it is assumed that productivity grows over time

Let's now use the model to think about cross-country income differences

What explains these differences?

Hypotheses

Three hypotheses for why cross-country per-capita income differences exist (or some combination):

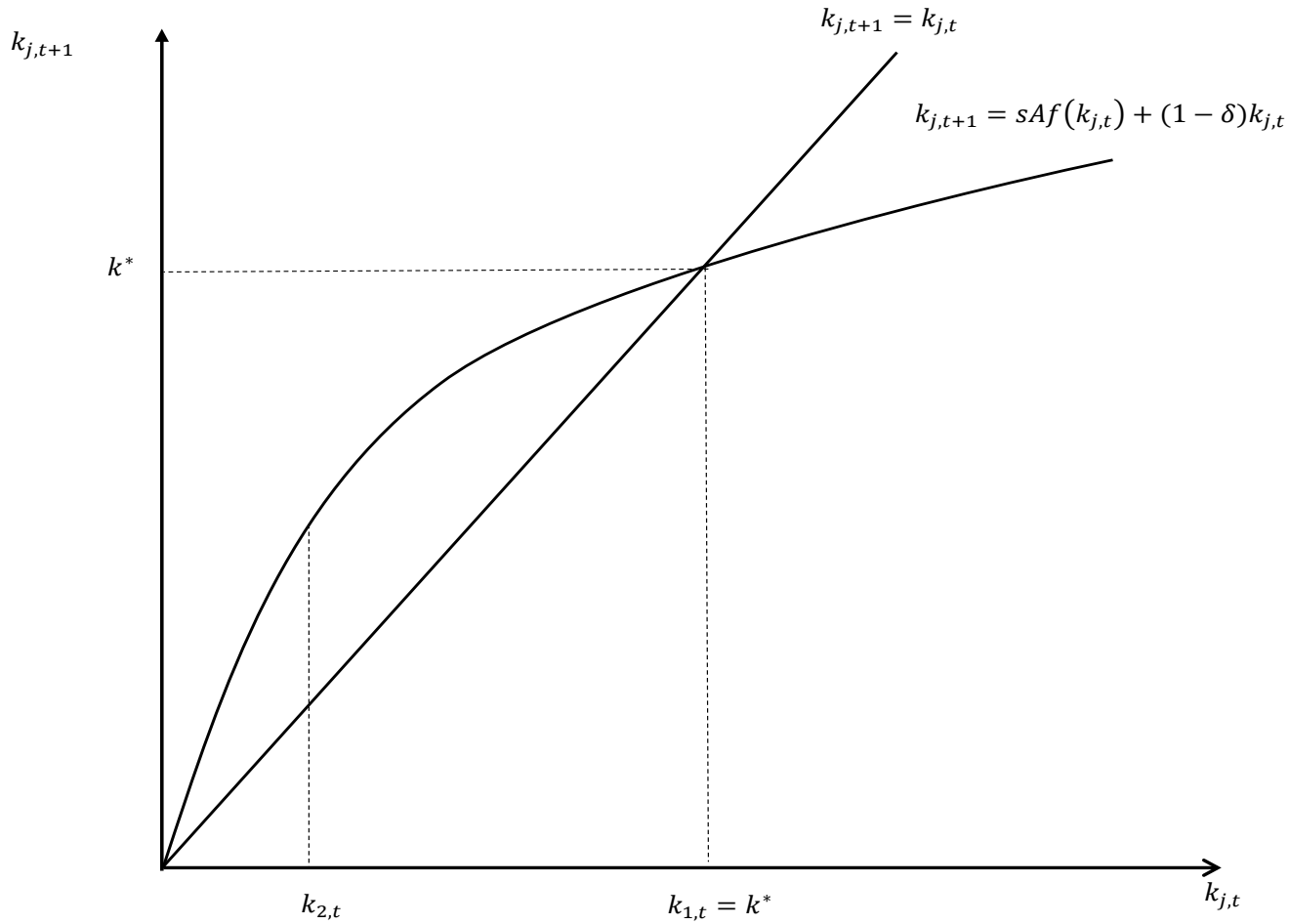
1. Countries initially endowed with different levels of capital
2. Countries have different saving rates
3. Countries have different productivity levels

Like sustained growth, most plausible explanation for cross-country income differences is productivity

Convergence

Suppose two countries are otherwise identical, and hence have the same steady state

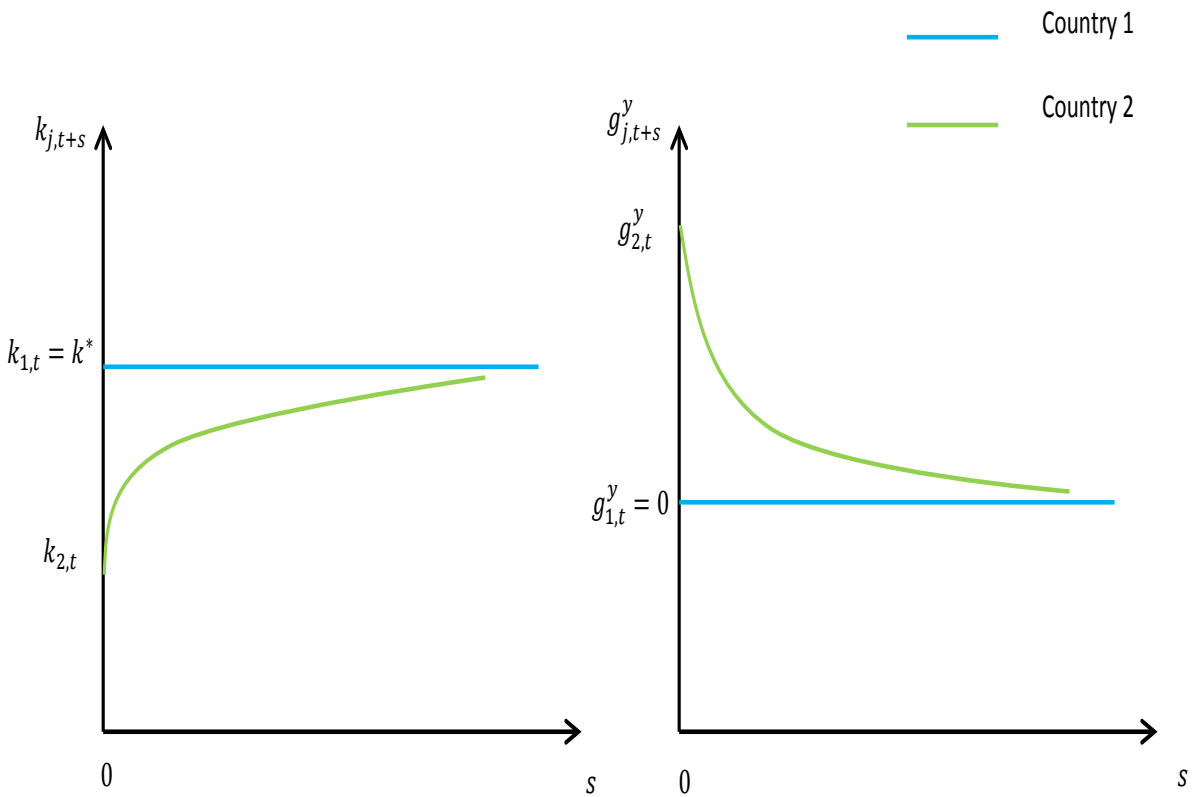
But suppose that country 2 is initially endowed with less capital – $k_{2,t} < k_{1,t} = k^*$



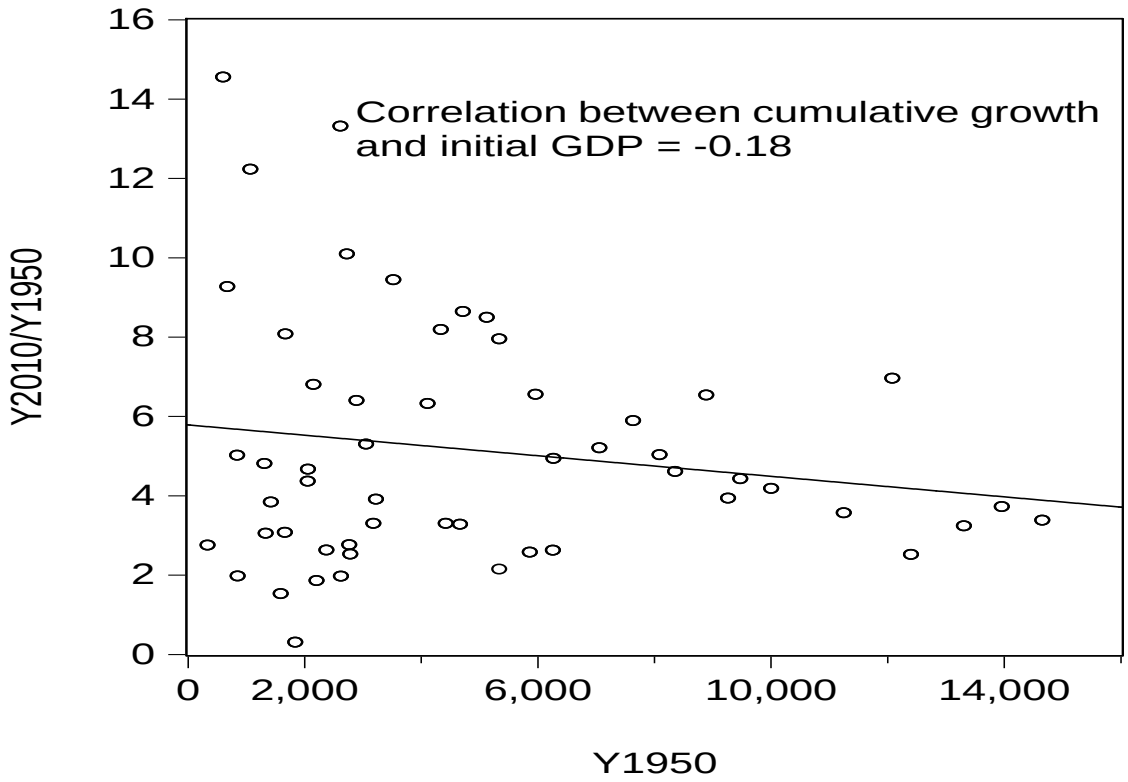
Catch Up

If country 2 is initially endowed with less capital, it should grow faster than country 1, eventually catching up

They will eventually be in the same steady state



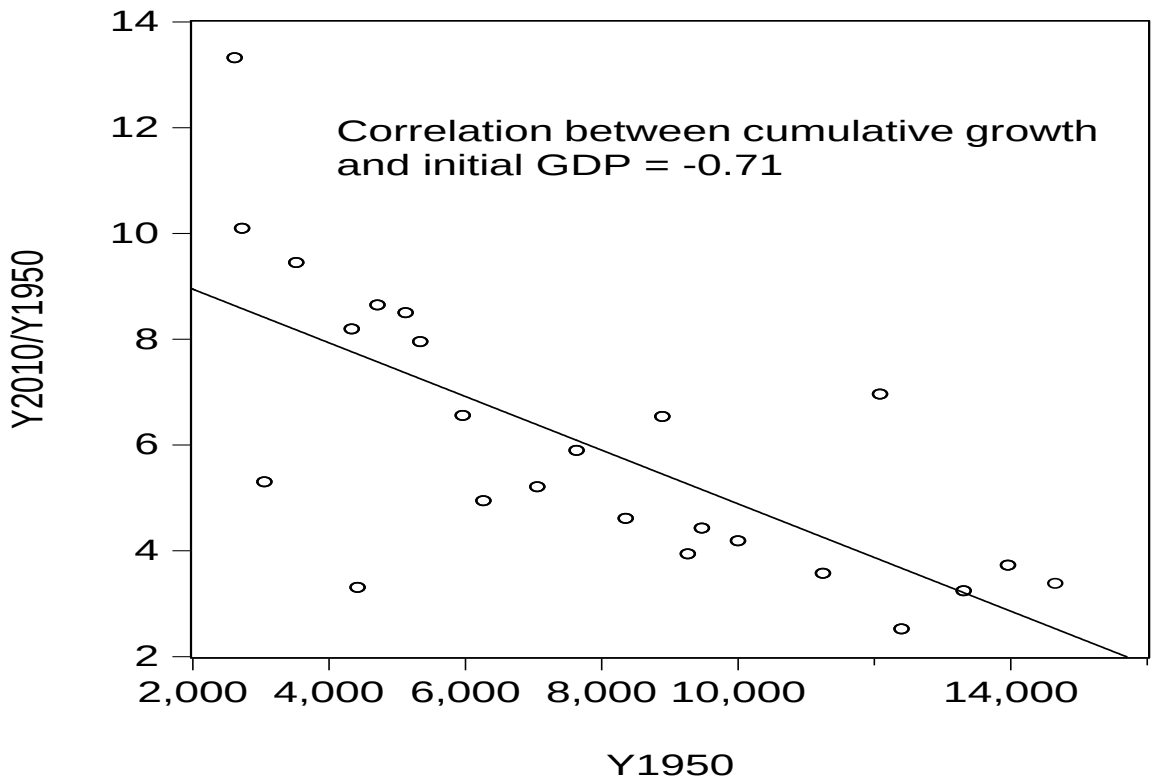
Is There Convergence in the Data?



Correlation between growth and initial GDP is weakly negative when focusing on all countries

This is inconsistent with unconditional convergence

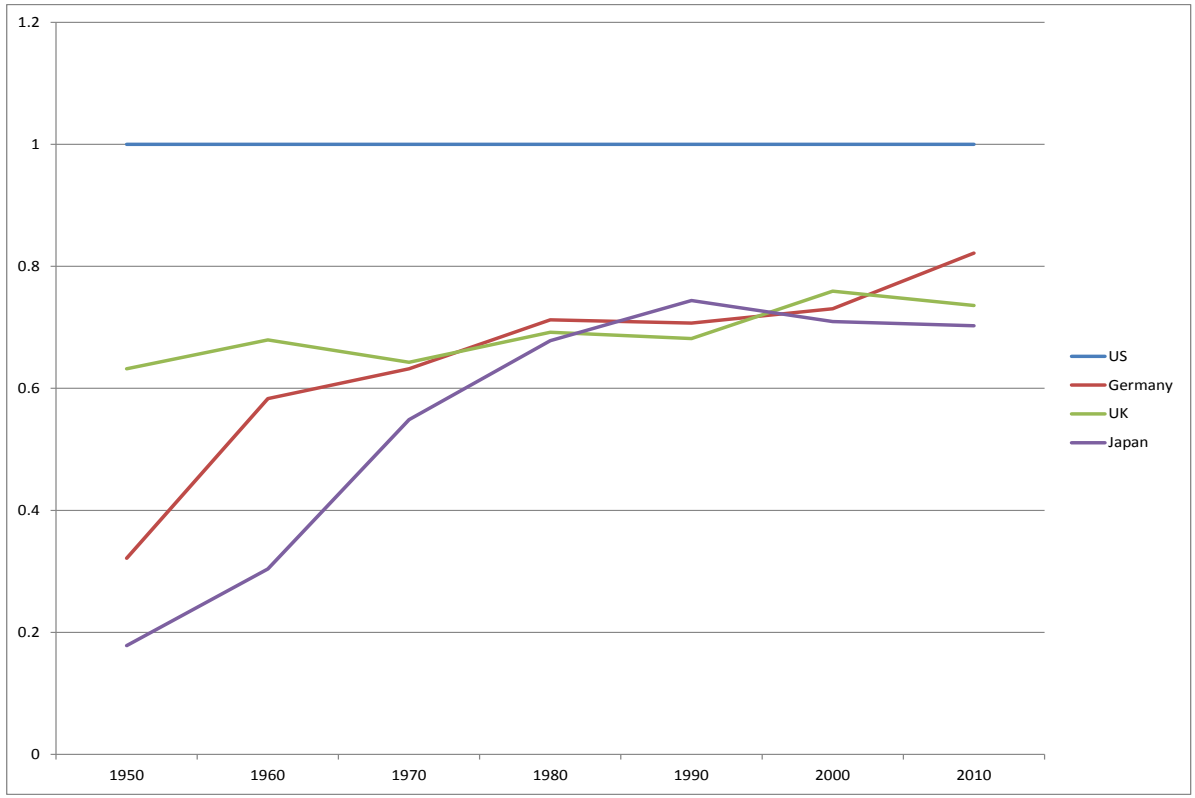
Focusing on a More Select Group of Countries



Focusing only on OECD countries (more similar) story looks more promising for convergence

Still, catch up seems too slow for initial low levels of capital to be the main story

Pseudo Natural Experiment: WWII



WWII losers (Germany and Japan) grew faster for 20-30 years than the winners (US and UK)

But don't seem to be catching up all the way to the US: conditional convergence. Countries have different steady states

Differences in s and A^*

Most countries seem to have different steady states

For simple model with Cobb-Douglas production function, relative outputs in steady state:

$$\frac{y_1^*}{y_2^*} = \left(\frac{A_1}{A_2}\right)^{\frac{1}{1-\alpha}} \left(\frac{s_1}{s_2}\right)^{\frac{\alpha}{1-\alpha}}$$

Can differences in s plausibly account for large income differences?

No (for plausible values of α)

Differences in s

Suppose A the same in both countries. Suppose country 1 is US, and country 2 is Mexico: $\frac{y_1^*}{y_2^*} \approx 4$. We have:

$$s_2 = 4^{\frac{\alpha-1}{\alpha}} s_1$$

A plausible value of $\alpha = 1/3$. Means $\frac{\alpha-1}{\alpha} = -2$

Mexican saving rate would have to be 0.0625 times US saving rate

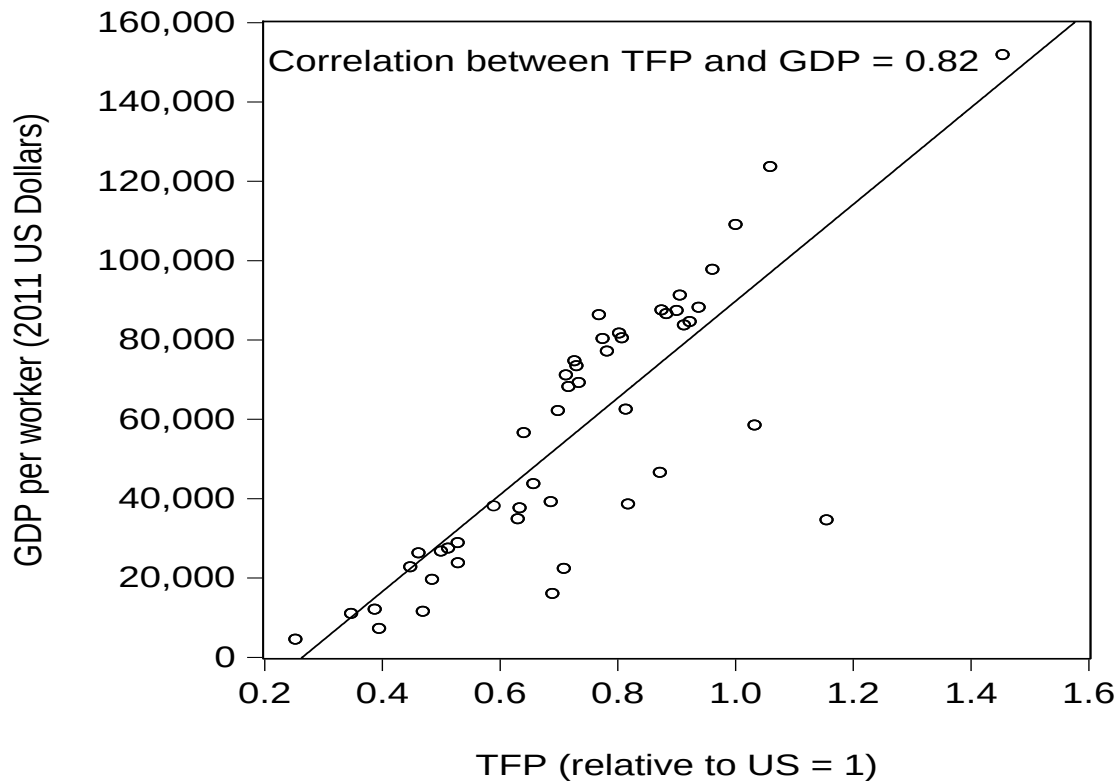
This would be something like a saving rate of one percent (or less)! Not plausible

Becomes more plausible if α is much bigger

What Could It Be?

If countries have different steady states and differences in s cannot plausibly account for this, must be differences in productivity

Seems to be backed up in data: rich countries are highly productive



Productivity is King

Productivity is what drives everything in the Solow model

Sustained growth must come from productivity

Large income differences must come from productivity

But what is productivity? Solow model doesn't say

Factors Influencing Productivity

Including but not limited to:

1. Knowledge and education (technically, should be considered human capital)
2. Climate
3. Geography
4. Institutions
5. Financial development
6. Degree of openness
7. Infrastructure

Policy Implications

If a country wants to become richer, need to focus on policies that promote productivity

Example: would giving computers (capital) to people in sub-Saharan Africa help them get rich?

- Not without the infrastructure to connect to the internet, the knowledge of how to use the computer, and the institutions to protect property rights

Also has implications when thinking about poverty within a country (e.g., UBI)