Growth and the Returns to Capital (Adapted from Midterm 1, Fall 2014)

1. **Managing a Hedge Fund.** A delegation from Oceania is in New York to meet with your Hedge Fund (``Solow Capital Management'') seeking your advice with regards to making Oceania a more attractive destination for capital investment. Use our Growth Model (with population and total factor productivity growth) to analyze the following situation.

   Some data about Oceania:

   - In 2004, its capital to output ratio was 1.5. As of 2014, its capital to output ratio is 2.5.

   - Its national savings rate is 25 percent; capital's share of income is 33 percent; and the depreciation rate of the capital stock is 5 percent.

   - Its labor force (n) has been growing 3 percent per year over the past 10 years. McKinsey & Company estimates that technological progress (g) has grown 2 percent per year over the past 10 years. Assuming that there are no changes in the economic environment, these trends are expected to continue into the indefinite future.

   a. After a brief presentation by the delegation, a fellow portfolio manager in the room quickly says, ``the growth potential for Oceania is limited; the data suggests Oceania is on its balanced growth path'' Is this country on its balanced growth path. Please explain why or why not.

Yes it is... What makes this hard is the following...

A balanced growth path is where Y and K are growing at the same rate. But the data provided <u>does</u> <u>not</u> <u>reveal</u> if this is the case or not.

Well, an <u>implication</u> of balanced growth is that the ratio of $\frac{Y}{K} = \left(\frac{n + g + \delta}{s} \right)$ which we have data. AND we are told $\frac{K}{Y}$, thus know $\frac{Y}{K}$. $\longrightarrow$

(a) Continued

So the strategy is to check if Ocreawa's ~~capita~~ k/y ratio is <u>consistent</u> with balanced growth.

$$n \left(\text{labor force growth} \right) = 3\%$$

$$g \left(\text{Tech. Progress} \right) = 2\%$$

$$\delta \left(\text{depreciation} \right) = 5\%$$

$$s \left(\text{savings rate} \right) = 25\%$$

$$\frac{k}{y} = \frac{s}{n+g+\delta} = \frac{25}{3+2+5} = \frac{25}{10}$$

$$\text{✦ Prediction of Model} = = 2.5$$

$$\text{✦ DATA, } \frac{k}{y} = 2.5 \qquad \text{SAME!!!}$$

This is very strong evidence that it is on the BGP.

b. In the meeting, the delegation of Oceania proposes two policies to facilitate higher returns on capital:

- Provide incentives for citizens to save a larger fraction of their income.

- Speed up the reform of legal institutions and provide incentives to encourage research and technological progress.

From the perspective of your Hedge Fund (i.e. as an owner of capital in Oceania), discuss how these two policies would affect the returns on your capital.

$$\frac{R}{P} = MPK = \alpha \frac{Y}{K} = \alpha \left(\frac{n + g + \delta}{s} \right)$$

This follows from Balanced Growth . . . .

So just interpet these policies in this context . . . →

c. From the perspective of a worker/laborer in Oceania, which policy would you prefer? Are your preferences aligned with the Hedge Funds?

This is asking about the real wage . . .

$$\frac{W}{P} = MPL = \alpha (1 - \alpha) \frac{Y}{L}$$

So we just need to figure out how these policies affect growth in Y/L

See c. continued

b. Continued

* Save More ???

⟶ Lower savings rate _lowers_ the return on capital.

Why ??? The intuition comes from Ch.3... more savings makes capital abundat in _the future_, the more capital there is, then by diminishing returns, the return on capital should decrease.

✱ Legal Institutions / Tech progress...

This is talking about "g". Faster growth raises returns on capital.....

Why ??? The intuition is that faster growth makes _your_ _capital_ _more productive in the future_ Thus the return on capital must increase!

c. Continued

So notice...

$$\underbrace{\frac{\Delta Y}{Y} - \frac{\Delta L}{L}}_{\text{Growth in } Y/L} = \frac{\Delta A}{A} + \alpha \left(\underbrace{\frac{\Delta K}{K} - \frac{\Delta L}{L}}_{\text{Growth in } K/L} \right)$$

$$= (1-\alpha)g + \alpha \left(\underbrace{n+g}_{} - n \right)$$

This comes from
Balanced growth, k
grows at $n+g$

$$= g \quad - \quad \text{After all cancelations}$$

So Growth in Y/L, W/P <u>ONLY</u> comes from growth in technological progress, Thus the policies that make the Hedge Fund Rich, ~~kxx~~ raise living standards for the workers.