

The Generalized model for Economic Growth and Its Application

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Economic policies for sustainable growth in the world economy

1. Abstract for CP topic No. 22

My research question is: Why do countries with similar rates of saving differ in economic growth? This thesis answers this question by formulating an endogenous growth model using the Cobb-Douglas production function.

My model, called the generalized model, disaggregates the rate of saving into the retention ratio and the household saving ratio (and accordingly, financial leverage) and connects these ratios with three new parameters representing respectively a financial intermediary (net of banking cost), the decision-making of managers, and barriers to technological/regulatory/structural reform. These three financial parameters make it possible to distinguish between quantitative and qualitative investments and measure the growth rates of output, capital, the rate of technological progress, and the level of technology, each as a function of the capital-labour ratio.

The Cobb-Douglas production function assumes diminishing marginal productivity under constant returns to scale. My model, however, finds that convergence of the growth rates of capital and output occurs at a critical value of the relative share of profit (α), which may or may not be within the range of its actual values. As a result, when a given α is lower than the critical value, the situation is under diminishing returns to capital (DRC), where the rate of profit decreases with the increase in the growth rate of capital. When a given α is higher than the critical value, the situation is under increasing returns capital (IRC), where the rate of profit increases with the increase in the growth rate of capital.

Using simulation and calibration by country, the growth rate of output increases when the rate of saving, s , increases until s becomes equal to α . When s becomes higher than α the growth rate of output decreases under DRC, but increases continuously under IRC. At $s=\alpha$, the growth rate of output is maximized under DRC only if $\alpha=\text{critical } \alpha$. The differences between the DRC and IRC situations are derived by the values of the three financial parameters and financial leverage together with the values of the retention ratio and the household saving ratio. In particular, the use of household saving for qualitative investment definitely changes DRC to IRC.

Thus, it is necessary that for each country to compete, the values of the three financial parameters should not be far from their average values in a competitive world economy. The Japanese economy is an extreme case in that Japan's parameters caused DRC while the US and UK enjoy more successful values of the three financial parameters and thus IRC. If $s \gg \alpha$, the use of household saving must be more qualitative-oriented.

2. Q and A for the generalized model

Why do I present my model formulation?

The world economy may be seriously affected if one of the world's important economies falls into extreme diminishing returns to capital (with the rate of profit approaching zero in the long run). For this, policy-makers must try to make various remedial economic policies, but without definite confidence in the results. I believe that if an endogenous growth model using national accounts is formulated with financial channels, effective economic policies can be asserted with confidence in the results and the world economy can be stabilized.

What was done?

My endogenous growth model, the generalized model, clarifies the transition either from diminishing returns to capital (DRC) to increasing returns to capital (IRC) or that from IRC to DRC, using the same Cobb-Douglas production function. When investment is more technology-oriented, DRC will turn into IRC while when investment is more capital-oriented, IRC will turn into DRC.

What was learned?

Investment using undistributed profit (or the retention ratio) increases the long run growth rate of output. However, investment using household saving (or the household saving ratio) does not always increase this rate, depending on financial leverage which is defined as household saving divided by undistributed profit. Both undistributed profit and household saving need to be invested efficiently taking these facts into consideration. In the real world, the higher the household saving ratio, the lower the growth rate of output, as can be seen in Japan where household saving is invested much less efficiently than it is in other major economies (e.g., the US).

What does it mean?

Investment must be effective. This implies that qualitative/technological investment should be more than quantitative/capital investment in any industry, sector, or country. If results of a major country's behavior is far from this rule, then the growth rates of output in other countries will be influenced. This is because of the cooperative nature of the world economy. Any country under extreme DRC must remove barriers to technology and structural reform.