Why Krugman Is Wrong

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When Massachusetts Institute of Technology Professor Paul Krugman concluded nearly three years ago that productivity gains had played almost no role in Asia's unprecedented growth of the last three decades, he unleashed a debate that has continued unabated. Most growth in the region, said Mr. Krugman, could be accounted for by factor accumulation, particularly capital, and thus Asia's fastest growing economies would soon slow as they exhausted the benefits of such accumulation. A large number of articles have since attacked his thesis as defying common sense. I too think the noted U.S. economist is wrong, but because he based his conclusions on an accounting methodology that is hopelessly wrong.

Mr. Krugman's assertions about the sources of growth in East Asia were based on the work of another U.S. economist, Alwyn Young, who studied the growth patterns of Singapore and Hong Kong. Ironically, Mr. Krugman had criticized Mr. Young's work for lack of reliability when it appeared in 1992. He criticized Mr. Young for using a very old methodology, despite all the recent work in the area of growth, and contended that Mr. Young did not provide any empirical evidence to support his assertions.

Most of the current debate, however, has ignored Mr. Young's methodology. He used "growth accounting," a 35-year-old methodology which decomposes overall growth into the different sources, following the standard neoclassical growth framework. Only a good understanding of the limitations of Mr. Young's approach can shed light on Mr. Krugman's judgment of East Asia's growth.

According to neoclassical theory, growth essentially comes from two sources that can be isolated: factor accumulation, mainly capital and labor, and factor productivity (i.e., technological progress in the broadest sense). Neoclassical economics puts these ideas into a formula called the aggregate production function.

The production function is, however, a microeconomic concept. It depicts all combinations of inputs for producing a given amount of output. Thus it describes how a VCR or a car is made. Mr. Young, however, took this idea to the macro level, despite the fact that economists showed 30 years ago that the production function does not have this aggregate counterpart to explain growth at the national level.

Growth accounting is performed assuming the existence of such an aggregate production function. According to this method, the growth of output for the total economy equals the sum of the growth of inputs, plus the growth rate of factor productivity. Thus, the latter is computed residually as the difference between the growth of output and the growth of inputs. It is important to note that this calculation assumes that firms in the economy are profit maximizers and that the markets for labor and capital behave competitively.

This residual, according to neoclassical economics, is accounted for by a wide variety of things, from pure technical progress in the form of basic research and development, to improvements in management practices, better organization of the shop floor, organizational, managerial and marketing skills, and errors of measurement in the data used. It is, in other words, a black box that collects all those factors that affect growth other than capital and labor. In fact, it was long ago labeled a "measure of our ignorance" by Stanford economist Moses Abramovitz. This measure of productivity was, unfortunately, the one used by Messrs. Young and Krugman.

This model takes technological progress for granted. Inventions and discoveries are generally assumed to have sprouted outside the economic system being considered. Firms just choose from a shelf of techniques readily available in the public domain. In this analysis, the acquisition of knowledge is typically assumed to be costless. Time is de-emphasized by assuming instantaneous acquisition of technology. This way, technology is viewed as a "manna from heaven," a free good, the cost of which is not accounted for; technical progress is completely dissociated from the process of investment and capital accumulation. But this separating line is artificial. As we know, most technological progress is embodied in new inputs. Factor accumulation

and productivity gains cannot be split; they are two sides of a coin. In this sense, growth accounting is a meaningless exercise whose foundations are intrinsically flawed.

The growth model that was followed by Messrs. Krugman and Young assumes that capital and labor can be substituted smoothly (e.g., three workers can be substituted instantaneously for a new machine). However, in reality, inputs exhibit complementarity and interdependence (in many cases, like in the chemical sector, they have to be combined in fixed proportions). If, for example, growth is driven by the rapid accumulation of human capital, one needs equally rapid growth in physical capital just to keep up. Can we increase the size of a cake by adding extra sugar? Of course not. We will have to add more of every ingredient and in the right proportion. Likewise, can the size of the cake be increased if one becomes a better baker without adding more of the ingredients? Certainly not.

Unfortunately, when Messrs. Young and Krugman told us that productivity growth was not a part of the East Asian formula, they were simply referring to the above notion.

Can we explain the growth process of the last 30 years in East Asia by appealing to factor accumulation only, in the way conceived by Messrs. Young and Krugman? No. The countries of East Asia grew during the last three decades due to the interaction of factor accumulation--mainly embodied in capital imported from the developed countries--and technical progress in the form of efficiency gains. These two factors cannot be separated. An important part of the accumulation was for export purposes, for example the excellent airport and harbor facilities in Singapore. These investments have yielded high returns.

What one has to understand is the type of technical progress that occurred. Since the countries in the region were operating well below the technological frontier, they did not invest in basic research, but rather imported technologies from the developed countries. The capital goods imported from abroad, Mr. Krugman's

factors, embodied the technological progress that was occurring at the time. They had efficiency gains built in.

But not all the efficiency gains were imported. This process of accumulation, when efficiently carried out, requires enormous technological effort. In other words, the mastery of foreign technologies is a form of technological progress. All in all, the remarkable development of the countries in the region demonstrates the potency of externally provided capital and skills in facilitating rapid movement to international best practice. Growth accounting misses all this process, and it is not useful even as an approximation.

What can we conclude? That the application of neoclassical growth accounting to the study of East Asia's growth has very serious methodological and conceptual problems, and it is based on a series of implausible assumptions. Therefore, the results of the Young-Krugman studies must be treated with caution. It is interesting that after all the work on growth, when we discuss the extraordinary performance of the East Asian countries, we find ourselves using the 35-year-old method of growth accounting. The main merit of this work is that it has focused the attention of scholars on the East Asian growth process. However, using a very poor methodology, Messrs. Young and Krugman told us an incredible tale, and certainly did not advance our understanding of growth in Asia.