A New Start for Japan's Economy II

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Japan Center for Economic Research reexamined its long-term economic forecast, "A New Start for Japan's Economy-The Path Towards Balanced Growth to the Year 2025-", issued in January, 1999.

Further Penetration of Information Technology is Key to the Growth

In the past year, there has been a dramatic change in the Japanese economy. For our purposes of long-term economic forecasting, the following three points are particularly noteworthy. First, the Information Technology (IT) revolution has quickly picked up pace. We need to pay close attention to the effects of future advancements in IT to forecast the growth rate. Second, asset prices are being re-evaluated. Although land prices have generally continued to fall, stock prices have risen sharply -- centered on information and Internet stocks - with the expectation of further technological innovation.

The third point is the deterioration of the fiscal situation. The economic recovery in 1999 was due in large part to the support from the fiscal and monetary policy measures implemented by the government. The issuance of national government bonds has increased significantly to finance these measures. The question now is how and when we can rebuild our fiscal coffers.

As for the third point regarding the fiscal situation, we do not need to change our forecast drastically from our previous one because even then our outlook regarding fiscal outlook was very severe. In this analysis, we make another attempt at forecast the Japanese economy over the long-term, focusing on the first two points.

Economic growth can be explained by three major factors: the input of labor, the input of capital, and any technological change. We discuss economic growth -paying special attention on the IT revolution.

First we constructed new data in order to integrate technological innovation in IT into our forecast. In our past forecast, we used only aggregate capital stock (accumulated) data for a proxy for capital input. However, for this forecast, we separated the IT-related capital stock (e.g., computers) from the other capital stock, and further added investment into software to the IT related capital stock. Then we used this new series of capital stock set from 1975 to 1998 to re-plot the historical growth trends, estimating the Cobb-Douglas production function.

We made estimates with the following three scenarios. In Case 1, we accommodate for the fact that IT-related capital and other capital have different effects on output growth. Case 2 is a situation where there are economies of scale, or increasing returns. In Case 3, "externalities" exist.

"Economies of scale" and "increasing returns" refer to the phenomenon when increases in capital or labor input result in disproportionately larger increases in output. A simple example is when a factory making computers can lower their unit cost of production by engaging in mass-production. Externalities, on the other hand, exist when some producers' or consumers' behavior has effects on someone else. To give an example, let us consider the case of someone's purchasing computers. Although efficiency would already increase with someone's using his computers

separately, if they were to initiate a telecommunications network, efficiency would be enhanced even further. This extra boost to efficiency would be an externality.

By using the estimated coefficients for each of these factors, we forecast the average economic growth rate from 1995 to 2025 under a few simple assumptions, as shown in Table , Cases 1 to 3. For the calculation, we assumed the numerical values of the coefficient of capital in 2025. We also assumed that the ratio of IT-related capital stock to other capital stock would change along the same trend it had been on in the past.

According to the results of our calculations, the rate of economic growth will remain rather low, unless we significantly increase the coefficient of capital (increase capital stock at a rate higher than growth). This is because in conventional models, some of the growth had been identified as being the result of technological innovation. However, in this model it is explained as being due to the accumulation of IT-related capital. Therefore, from these calculations, while the contribution of capital accumulation has increased compared to our 1999 forecast, that of technological innovation has declined.

In the recent US as well, the coefficient of capital has been rising, particularly for the accumulated IT-related capital. However, Japan's coefficient of capital is already at a high level. At the same time, there are some concerns about a shortage of funds for investment due to a decline in the saving rate as Japanese society ages, and to the high fiscal deficit, which is showing no signs on declining. In addition, if investment levels increase, then the return on capital, which is already low from an international perspective, will fall even further. The question is whether we should pursue an investment-driven growth. The Japanese economy is caught in a dilemma at this point.

The growth in Case 1, 2, and 3 do not reach to our last forecast, 1.3%. This means that the dilemma of economic growth and low return on capital will not be solved as long as IT penetration continues only at the moderate rate, at which it has developed in the past.

Encouraging entrepreneurship

The effects of the changes resulting from the penetration of IT in society appears to be immense. The changes are now occurring in the US and we are beginning to feel them even in Japan. Technological innovations (or in Schumpeter's term "new combinations") mean a shift in the production function. The effects of information technology are far reaching, and it may be futile to try to fit a production function based on the past historical data to the forecast of future effects of IT. Moreover, there is another difficulty in this forecast that we only have data from the very recent past and not enough historical data to try to formulate a long-term economic forecast. However, the role of an economic forecast is to be a reference for making decisions on the future. We should try our best to make a reasonable guess however bold.

According to the Economic Report of the President in the US of this year, productivity has been improving since 1995 at a rate of 1% which cannot be fully explained by capital input or by the improvement in the quality of labor. Case 4 in Table outlines the scenario where we assume that Japan will experience the same kind of large-scale technological innovations that the US has experienced. Under the assumption that this happens in Japan as well, we added 1% increase in productivity over and above the trends of the past.

Only when we can assume that this kind of technological innovation, the forecast economic growth rate of the Japanese economy will be raised from the annual rate of 1.3% to 2.3%. In addition, the share of capital

investment to GDP and the return on capital will begin to approach a more acceptable level. Without a real and forceful technological innovation, the Japanese economy will not be able to break away from dilemma of low growth due to low rate of return.

What conditions should be met, then, to ensure that such technological innovation takes place? First, it is important that there is abundant activity in research and development. At the same time, the fruits of this research and development should be translated into business opportunities as soon as possible. The entrepreneurial spirit must be fully encouraged and the key to this lies in deregulation. As long as adventurous entrepreneurs can capitalize on their creativity and compete in a free market, then the superior technology will prevail.

Two-tiered stock prices promote innovation

From the data, the gap in the rates of return (marginal productivity) of IT-related and other capital is still quite substantial, although it is shrinking. This difference will drive IT-related capital to be accumulated at a faster pace than that of other capital. Economic growth will be hindered if competition is discouraged by excessive regulation or monopoly situations, as companies will be deterred from entering the industry, and the accumulation of capital will be delayed.

Here we are discussing the difference between the rate of return of IT-related equipment including software and that of the other capital. The productivity of the industry manufacturing the IT-related machinery (IT production industry) is in fact quite high, but the industries that use these products efficiently (the IT-user industry) should also have high productivity.

The point we would like to make here is that through the application of IT, traditionally established industries can also seize the chance to revitalize themselves. Some companies in the so-called ailing industries may even be able to use information technology to successfully restructure themselves.

The difference in the rates of return on capital will disappear through capital inflow and competition, when the information technology has penetrated a broad range of industrial sectors. To foresee how long the IT revolution will continue, we need to forecast the future of this differential in the rates of return. In this forecast, the gap is estimated to shrink from the current four times to 1.4 times in the year 2025.

Recently, we have noticed the "two-tiered market" whereby the stock prices of traditionally established companies have been stagnant, while those of the emerging IT industry have risen sharply. The higher level of stock prices in the IT industries would induce the vigorous investment in the sector, thus helping the economy not slide into recession. However, unrealistically high stock prices invite too large volatility and can increase the risk of new industries.