

Key to Longer-term Economic Recovery: Productivity Improvement by Technological Innovation

– Productivity Data Show Importance of Supply Side –

By Naoyuki HARAOKA

Short-term business fluctuations are apt to draw attention amid the global financial crisis. Countries hit by the financial crisis are trying to expand short-term effective demand by taking Keynesian policies in a bid to overcome economic slowdowns. It appears such macroeconomic policies are being pursued by many governments. Of course, it is only natural to rely on such policies to cut off a global deflationary spiral temporarily. However, attention should be paid not only to the demand side but also to the supply side to help the global economy take a true recovery path in a medium- to long-range perspective. This is because the supply side's growth potential could decline if left to follow trends of demand.

If effective demand falls due to the financial crisis, even though temporarily, and the fall continues for a certain period of time, the supply side will curb production to a level commensurate with that of shrunken demand. As a result, employment and investment will be reduced to levels matching the fallen growth potential. And the whole economy will quickly fall into balanced contraction (*Chart 1*). If the economy is trapped into such a situation, no early recovery can be expected even if the government takes such Keynesian policies as a massive increase in public works spending. Accordingly, before the economy falls into such an unfavorable situation, structural reforms are required, in parallel with demand-side policies, to prevent the supply side from losing its growth potential.

Productivity statistics to be referred to hereafter tell of the level of health of the supply side in a country and of the level of its resistance against such shocks as a financial crisis. These statistics come from the Japan Industrial Productivity (JIP) Database, which was developed jointly by the Research Institute of Economy, Trade and Industry (RIETI), an organization affiliated with the Ministry of Economy, Trade and Industry, and Hitotsubashi University's Institute of Economic Research. (Details of the data can be found on RIETI's website). The database provides statistics to compile time-series

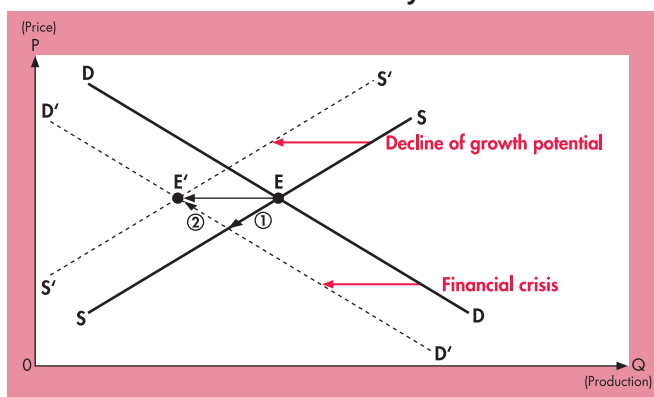
data on industry-wise total-factor productivity (TFP), or the extent of contribution of technological innovation to economic growth. TFP is interpreted to be pure technological progress not caused by the input of capital and labor that are key factors for production.

The supply side's growth potential, as mentioned earlier, can be shown as a summation of increases in the working population, capital input and the TFP that is technological progress. The level of growth potential depends on levels of future potential for those three factors. Moreover, an increase in capital input, or plant and equipment investment, is greatly affected by TFP since technological progress creates new investment opportunities. In other words, future growth potential depends on the prospect of growth in TFP. As it is impossible to forecast TFP growth, there is no other way but to estimate it through an analysis of the extent of its contribution to economic growth in the past.

Economists Dale Jorgenson and Kazuyuki Motohashi made such an analysis in 2003 on GDP growth rates in Japan and the United States, as shown in *Chart 2*. A remarkable difference can be seen between the two countries. Labor input greatly contributed to economic growth in the United States, particularly in recent years, while it worked negatively in Japan. This indicates that Japan, hit by its aging population and declining birthrate, achieved economic growth through corporate streamlining efforts while boosting its unemployment rate to a relatively high level. The analysis by Jorgenson and Motohashi breaks down the factor of capital input into information technology (IT), which is considered to be the core of TFP and technological innovation, and into non-IT fields. No major difference can be found in the extent of contribution by IT capital input between Japan and the United States. The figures indicate a greater contribution in Japan than in the United States, which is believed to have benefited most from the IT revolution.

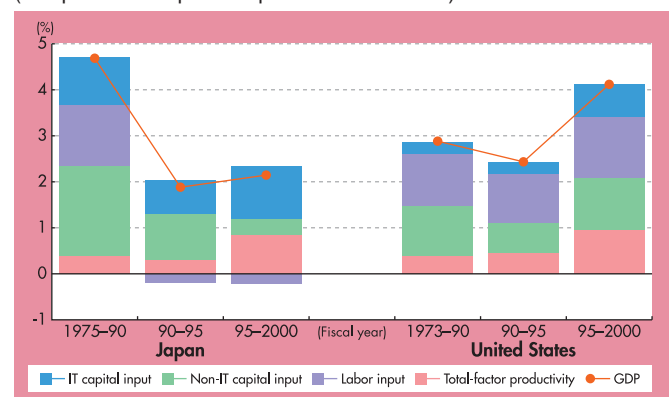
There is another indicator that shows the soundness of the sup-

CHART 1
Simultaneous contraction of aggregate supply/
demand that could be caused by financial crisis



Source : Compiled by author

CHART 2
Breakdown of factors in GDP growth
(comparison of input in Japan & United States)



Source : Empirical analysis of IT innovation, Jorgenson & Motobashi (2003), RIETI economic policy analysis series

TABLE 1

Trends in asset efficiency in Japan's manufacturing industry

Fiscal year	Sales (¥1 billion)	Total assets (¥1 billion)	Asset efficiency (sales/total assets)
2002	246,848.5	263,264.1	0.94
2003	257,030.2	274,400.7	0.94
2004	281,174.6	290,860.1	0.97
2005	290,533.2	295,935.4	0.98
2006	310,049.1	307,966.4	1.01

Source: Compiled from "Basic Survey of Japanese Business Structure & Activities" by Ministry of Economy, Trade & Industry

TABLE 2

International comparison of total-factor productivity (based on standard of 1 for Japan)

	China	South Korea	Taiwan	United States	Japan
	1982–00	1984–00	1981–99	1980–00	1980–00
1980 level	0.50	0.81	0.64	1.04	1.00
2000 level	0.66	0.83	0.93	1.08	1.00
Average annual growth rate	2.04%	0.60%	2.44%	0.61%	0.42%

Source: "Benchmarking industrial competitiveness by international comparison of productivity," RIETI column, by Kazuyuki Motohashi

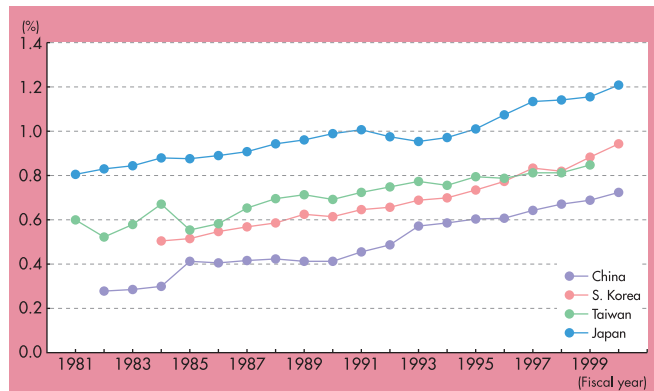
ply side. It is asset efficiency – sales divided by total assets. This indicates the efficiency of production. As *Table 1* shows, Japan's manufacturing industry saw the indicator rise from 0.94 in fiscal 2002 to 1.01 in fiscal 2006. This implies that while contribution to economic growth in terms of a rise in the labor population turns negative due to the declining birthrate, other factors such as technological innovation and asset efficiency exert positive effects on Japan's growth potential as long as recent trends can be maintained. However, there are several worrisome factors. One is that the average annual growth of Japan's TFP is at the lowest level of only 0.42% as compared with such figures for China, South Korea, Taiwan and the United States (*Table 2*). Such growth differentials helped other Asian economies close in on Japan in terms of TFP in 2000. Moreover, the United States tops Japan in the 2000 level of TFP, although the margin is small (the US figure at 1.08 against the standard figure of 1 for Japan.)

Secondly, Japan's TFP varies between industrial sectors. Its electronics industry consistently overpowers other Asian economies in TFP, maintaining a high level of growth (*Chart 3*). But Japan's non-manufacturing-sector TFP growth remains low. According to an article, "Productivity and economic growth in Japan – an empirical analysis at industry and corporate levels, based on the JIP Database," Japan's financial and service-for-business industries achieved an average annual growth of 0.45% in TFP between 1995 and 2004, far lower than about 1% for the United States. The article, co-authored by economists Kyoji Fukao and Tsutomu Miyagawa, shows Japan's commerce and transport industries marked a marginal decline in TFP during the same period, in sharp contrast with the US growth of nearly 3%. So, how to improve productivity in the nonmanufacturing sector is a major challenge for the Japanese economy.

Finally, if entrepreneurship is to be considered as one of elements for working out TFP, it is a matter of concern that no major difference can be seen in the ratios of business startups and closedowns in recent years in Japan. According to the Fukao/Miyagawa article

CHART 3

International comparison of total-factor productivity in electronics industry



Source: "Benchmarking industrial competitiveness by international comparison of productivity," RIETI column, by Kazuyuki Motohashi

mentioned earlier, Japan's business startup rate was about 5% as of 2000 on an all-industry basis, and the closedown rate came to 4.5%, posing no major difference between them. In contrast, the US business startup rate topped the 14% mark as of 1997 – the latest year available in the article – compared with the closedown rate of around 12%. How to activate entrepreneurship is another major challenge for Japan.

In summing up, growth potential on the part of the supply side in the United States, Japan and the rest of Asia is relatively healthy as a whole, although those countries were hard hit by the global financial crisis. I believe the global economy can return to a sound recovery track in a relatively short period as long as temporary demand is created under Keynesian policies. I expect the United States, notably, to display entrepreneurship and actively promote innovation.

I am cautiously optimistic about the Japanese economy as is the case for the global economy. But structural reforms on the part of the supply side will remain important. For example, the low level of the nonmanufacturing sector's TFP indicates that the sector, as a key IT-user industry, may not have fully utilized technology that plays the core part of present-day technological innovation. Some people say that businesses should better adopt a networking and horizontal type of organization for more effective use of IT. Others call for establishing the post of chief information officer (CIO) to better control corporate information and expertise. In addition, there are calls for introducing a proper competition mechanism in the public service sector through regulatory reforms. The advanced use of IT in such business fields as retail accelerated the pace of improvement of productivity in the United States in the 1990s. I believe reforms should be accelerated to help promote such advanced use of IT.

Meanwhile, universities, which are the basic infrastructure for inspiring creativity, should remove the fence dividing science and humanities courses and encourage students' freewheeling thinking for intellectual stimulation to activate entrepreneurship. Japan needs to nurture mediators, such as consultants and lawyers, who will act between the business and academic communities to turn fresh ideas created on campus into practice on a commercial base.

In conclusion, I believe that Keynesian policies of demand stimulation alone are not enough and that structural reforms on the part of the supply side still remain important to overcome the global financial crisis and put the economy onto a truly stable path. **JS**

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