

Economic Impact of the Earthquake  
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The March 11 earthquake in Japan is a tragedy of great proportions. Thousands of lives and buildings have been lost, and it may be months before the tragic numbers are finalized. Over the past several days I have been asked by many reporters to discuss the economic impact of the earthquake. This short paper is my attempt to put together some of the important points that bear on this question.

### **Destruction and GDP**

The starting point is to recognize that the destruction of buildings, roads, and bridges *per se* does not alter GDP at all. These structures are part of the nation's capital stock, while GDP measures the flow of economic activity. That is, GDP measures the amount of production of goods and services over a period of time (quarter, year). Just as GDP statistics do not subtract the value of a newspaper when you throw it out after reading it, the statistics do not measure the destruction of houses and other structures in an earthquake.

**Overall impact on production.** What does happen is that an earthquake destroys factories and other infrastructure that produce some of the nation's economic output. So the real question in Japan is how much capability to produce output has been destroyed? The answer is: not much, despite the horrific images of towns that have been washed away.

The three prefectures that have been the hardest hit by the earthquake and tsunami produced only 4 percent of Japan's GDP in fiscal year 2007:

Iwate	0.9 percent
Miyagi	1.5 percent
Fukushima	1.5 percent

Even if a substantial amount (5 percent?, 10 percent?) of productive capacity was destroyed in these three prefectures, therefore, the impact on the national economy will be small. The reason for this outcome should be obvious from the television coverage of this tragedy: the areas hit by the earthquake and tsunami are largely rural (with the exception of the city of Sendai, which has a population of almost 1 million, but only part of which was hit by the tsunami). The fishing fleets in the villages hit by the tsunami are lost, but fishing is also a very small part of the total Japanese economy.

One of the sad consequences of the rural character of the region, with an economic focus on agriculture and fishing, is that the population is unusually old. Heartbreaking stories on the news include the inability of elderly people to escape quickly enough to avoid the tsunami.

Had this earthquake occurred close to Tokyo (which accounts for 17 percent of national GDP), the loss of productive capacity would be much larger. Luckily, the only real visible damage in the Tokyo area was a fire at the Cosmo oil refinery in Chiba. Factories and other buildings were

shaken up, and undoubtedly many factories will go through a period of inspection before going back into operation, but this should amount to only a few days of down time before production returns.

The one unknown concerns a somewhat unusual feature of Japanese manufacturing. Some obscure firms turn out to be major global suppliers of particular, highly specialized components. Should such a firm have been destroyed in the earthquake, then it would have an impact on global production of whatever the component is used for. However, at this point in time there is no information on any such examples. Given the fact that these prefectures are not major manufacturing centers, the probability of such a firm being located there is relatively low.

**Transportation.** The same conclusion of minor impact is true of domestic transportation. I have been asked if transportation might be disrupted, and thereby affect GDP. The answer is a clear no. The major expressways and rail lines are just far enough inland that they avoided the tsunami (as far as I know). To be sure, some roads and rail lines might need repair, but there has been no news of any bridges collapsing on the major expressways (unlike in the case of the Kobe earthquake in 1995) or major blockages on major through routes from debris or cracks.

The same is true of Japan's international trade. Unlike the Kobe earthquake, there are no major port facilities in the area hit by the earthquake. Sendai is a port, but a very minor one. The other towns hit appear to handle mostly fishing vessels. Even in the case of the Kobe earthquake, other port facilities were able to make up for the loss of facilities in Kobe. This time there will be no impact at all.

**Electric power.** What about the damage to the nuclear power plants and the impact of their loss on national electric power supply? Once again, the answer is that the medium term impact will be minor—despite the institution of rolling blackouts in the Tokyo area by the Tokyo Electric Power Company (TEPCO).

As of Monday, there were 4 individual nuclear reactors in serious trouble. Even if there is no nuclear disaster involving a meltdown of the cores of the reactors, the use of sea water to cool the overheated reactors implies that these facilities will have to be closed permanently.

However, Japan has a total of 54 nuclear reactors producing electricity at the present time. Therefore the 4 damaged reactors represent approximately 7 percent of total nuclear power capacity, assuming the 4 are of average size. Nuclear power, in turn, generates 34 percent of total electricity. Therefore, the 4 lost reactors represent approximately 2 percent of electric power capacity in Japan. It is difficult to believe that the national system operates so close to capacity that a 2 percent loss of capacity cannot be made up with output at other plants.

This conclusion is reinforced by the fact that peak electricity usage comes in the summer (when air conditioning is running). Surely, the national system is operating well below that peak. Apparently some plants, including some that use liquefied natural gas, operate only in the summer and the fuel supplies they use are stockpiled only close to the summer season.

Nonetheless, it should not be difficult to obtain natural gas within a week or two to expand electrical output.

This conclusion appears to be inconsistent with the behavior of TEPCO, which has instituted a series of rolling blackouts in the Tokyo area. To the extent that these blackouts continue, industrial output would be diminished to some extent as firms either keep their factories shut until power is more reliable, or at least shut down when the blackouts occur.

TEPCO has reported a number of its non-nuclear plants that are fully or partially shut down, including some in the Tokyo area. Given the less severe nature of the earthquake in the Tokyo vicinity, and the lack of a tsunami, it is difficult to imagine that this loss of power will last more than a week or so. TEPCO should be in a position to mobilize repair efforts to bring capacity back on line quickly. The company reports that it has also restored transmission lines and substations.

Therefore, the shortage of power currently affecting Tokyo should not last very long. As soon as power is available without interruption, factories will also be able to operate full time.

**Demand effect?** The other way to look at the situation in Japan is through demand for output produced. Clearly there is a drop in consumption by those people who have been affected most by the earthquake. Rather than eating in restaurants or watching movies, people are huddled in emergency shelters with no heat eating emergency food.

As painful as this situation is, the numbers relative to the entire population are thankfully small. A high estimate of people driven from their homes and huddled in shelters would be 300,000—a distressingly large number. Nonetheless, they represent 0.2 percent of the population. The fact is that, despite the unimaginable numbers and the distress of those who have been affected, Japan has a large population, most of whom will be living normal lives (or will be as soon as the electricity is back full-time in Tokyo). I do not mean to sound callous, but the reality is that the overall drop in economic demand due to the earthquake will be relatively minor.

Demand may also take a temporary hit in the Tokyo area as well (except for the panic buying of food and some other supplies) as people stay home and do not go out for entertainment and restaurant meals. But this situation should not last very long.

## **Rebuilding**

**Higher economic growth.** The longer-term story will be rebuilding from the earthquake. This raises a number of points. First, all the extra construction that takes place counts in GDP, and will help to push GDP growth up. After a couple of years, the gain from the boost to construction work may well exceed the loss of GDP due to loss of some productive capacity (as was the case in the Kobe earthquake).

The construction boost actually comes at an interesting time. Just as in the United States, the government provided fiscal stimulus during the global economic recession, but began to cut back

quickly as soon as the economy began to recover. Also, as in the U.S., there has been a debate about whether the government was withdrawing fiscal stimulus too quickly. If so, the effort to rebuild will provide both a boost in government spending and private sector investment. The final quarter of 2010 produced at least a hiccup in recovery, with a drop in GDP (probably a temporary effect due to the ending of a “cash for clunkers” type rebate to consumers buying fuel efficient cars). If the downturn were something more than a very temporary hiccup, though, the earthquake will help ensure that positive economic growth returns quickly.

**Financing the recovery.** I have been asked a number of times about whether Japan can afford the recovery, given the fact that the total amount of government debt is 200 percent of GDP. The answer is yes: Japan can absolutely finance the recovery.

Japan continues to be an economy that generates more domestic savings than are needed at home. This outcome shows up as a current-account surplus in the balance of payments, and a corresponding net outflow of capital to the rest of the world. One consequence of an excess of savings over investment is low interest rates. The government is currently able to issue government bonds at 1.2 percent interest rates. This situation is unlikely to change. Therefore, if the government needs to issue more bonds than anticipated due to earthquake-related expenses (rescue operations, emergency help to dislocated families, and reconstruction of roads and other government-maintained infrastructure) it will be able to do so without straining capital markets.

The Bank of Japan has already taken appropriate steps to help ensure this outcome. On Monday the policy board chose to keep short-term interest rates very low (0.1 percent) and to expand its asset purchase program (buying assets other than government bonds to keep other interest rates down). This is an appropriate and encouraging step.

Politics have been especially difficult in recent months in Japan. But the sense of national unity in the wake of the earthquake implies that the ruling Democratic Party of Japan will have no problem passing a supplementary budget to provide emergency help and begin the rebuilding process. It is even possible that Prime Minister Kan will survive longer than expected as prime minister if the public believes that he is doing a good job in the wake of the earthquake. (His choice to have himself and his other cabinet ministers exchange their suit jackets for zippered factory worker jackets was certainly a clever symbolic move).

The 6 percent drop in the Tokyo Stock Market on Monday might suggest greater anxiety over the overall impact of the earthquake on the economy. A better explanation is that this drop is similar to the temporary panic-driven drops that occur after tragedies in the United States as well. Once investors realize that the economic impact is not as serious as imagined from watching scenes of devastation on television, the market will recover. In contrast to the stock market, the bond market rose (implying that interest rates fell), responding to the announcement by the Bank of Japan.

In short, financing the recovery will not be a problem for either the private sector or the government. The Bank of Japan will ensure that interest rates remain low, and the continuing excess of domestic savings over domestic investment plus government deficit imply that there is no need to borrow from abroad to finance the rebuilding.

## Conclusion

The scenes from the earthquake zone have been truly horrific and the continuing saga of the nuclear power plants is frightening. The human tragedy of this earthquake and the tsunami that followed is vast. Those who have been affected deserve all our sympathy and help.

Nonetheless, there is a difference between a human tragedy and an overall economic impact. The media have generally been too eager to assume that the earthquake implies major damage to the Japanese economy or even to the U.S. economy (since Japan is one of the largest exporters in the world).

Luckily, such a conclusion is not justified for all the reasons explained here. The reality is that the Japanese economy is very large (roughly \$5 trillion), and the population is also large (127 million people). The terrible destruction affected only a small part of the economy and population. And even though people tend to think of Japan as a geographically small country (not much bigger than the states of California and Oregon), it is sufficiently large that even a huge earthquake affects only a small part of the area of the country badly enough to diminish production capacity. That fact should not diminish our distress at the human tragedy that has occurred, but must shape our understanding of the overall economic impact.

Reconstruction will take some time, perhaps several years. But once it gets underway, reconstruction will proceed with determination and speed. One of the great strengths of Japanese society is its resilience in the face of disaster. Typhoons and earthquakes are frequent occurrences, Japanese society is used to getting on with life once the crisis has passed and will do so once again.