**Economic Considerations**

*by Stephanie E. Chang*

From an economic standpoint, the “921” earthquake is a major disaster that has not only caused serious damage to the economy of central Taiwan but will have national repercussions as well. The disaster region includes five cities and counties in central Taiwan, of which Nantou and Taichung counties and Taichung city were most severely hit. This region accounts for nearly five million people, or one-fourth of Taiwan’s population. It spans urban areas (Taichung) as well as remote mountainous regions and numerous rural towns. Power outage lasting for 1-2 weeks affected a much broader area, including most of central and northern Taiwan (where much of the industrial activity, as well as Taipei city, are located). In the areas of heaviest damage, agriculture and agricultural processing (e.g., tea), tourism, and wine production are important economic sectors. All of these suffered major damage to facilities. The destruction of housing stock and large displacement of population will also hinder economic recovery. Taiwan had not experienced a disaster of this scale in recent memory.

**Observations**

As of this writing, government and other agencies are still in the process of gathering data on the extent of damage caused by the earthquake. Early estimates of loss varied substantially, from NT $100 billion (US $3.1 billion) to NT $1 trillion (US $31 billion), the latter being equivalent to 10% of gross domestic product (GDP) and including both damage and business interruption. The most recent estimate is a total economic loss of NT $250 billion (US $7.8 billion). Repairs to transportation and communications infrastructure are reported at about NT $10 billion (US $31 million).

The disaster is widely anticipated to have a noticeable but not severe impact on the national economy. The central government anticipated that 1999 GDP growth would be dampened to 5.5%, as compared to a pre-disaster forecast of 5.74%. Much of the expected GDP loss appears to derive from the business interruption caused by electric power outage to central and northern Taiwan, rather than directly from damage to structures. The Taiwan Stock Exchange was closed for one week. Over 400 large companies on the Stock Exchange reported total structural and equipment damage of NT $1.9 billion (US $59 million), goods inventory loss of NT $2.1 billion (US $66 million), and sales loss of NT $7.9 billion (US $247 million). For these companies, at least, business interruption losses vastly outweighed the cost to repair or replace damage. However, it is unclear how much of the sales loss can be made up through overtime production.

One of the most significant economic issues arising from the disaster has been the impact of electric power outage on high-tech industries at the Hsinchu Science-based Industrial Park in northwestern Taiwan, often referred to as the country’s “Silicon Valley.” Taiwan is the fourth largest supplier of semiconductors in the world, accounting for 12% of world production and providing components for many large computer manufacturers in the U.S. The electronics industry, including semiconductors, makes up one-third of Taiwan’s exports, and exports are a main driver of the national economy. Power outage caused approximately 10 days’ worth of production stoppage at Hsinchu and other industrial parks. This outage would have been longer had Taipower not instituted power rationing schemes that gave priority to the industrial park at Hsinchu, along with hospitals and other critical facilities. As it was, speculation of ensuing computer components shortages led some overseas companies such as Hewlett-Packard to anticipate slight revenue losses. Global prices for some types of chips escalated. Industrial park management at Hsinchu estimated that the earthquake caused up to NT $10 billion (US $313 million) in loss to businesses at the park.

Perhaps the most important economic issue in the medium-term pertains to reconstruction finance. Taiwan, having little experience with major natural disasters, did not have a reconstruction financing system or policy in place before the earthquake. Only some 1% of property owners subscribed to earthquake insurance, which is tied to fire insurance coverage. Latest estimates indicate about NT $15.4 billion (US $480 million) in property insurance claims to date. In the aftermath of the disaster, the government has been struggling to determine appropriate financial support mechanisms, and announcements have been revised several times.

The latest package consists of a combination of grants and loans. Table 1 summarizes relief grants that are being offered by the central government to the disaster victims. Low-interest (3%) and no-interest loans with a 20-year term are being offered to households and businesses for reconstruction. The government plans to finance these measures by drawing from the postal savings deposit system, issuing new bonds, and diverting proceeds from a special lottery which had been planned to seed the new national pension system. Owners of homes that had been partially or completely destroyed are eligible to purchase public
housing on favorable terms, although this scheme is controversial in Taipei, where public housing is much in demand. In addition, the central government has been negotiating with commercial banks to urge them to forgive outstanding mortgages on damaged property. While highly contentious, it now appears that the banks have agreed to take over the mortgage debts for those persons who plan to rebuild in the same location; for others, they will defer the repayment schedule by five years. It is likely that the banking sector will suffer substantial losses as a result of the disaster. The agricultural credit cooperatives, which had already faced some financial difficulties before the earthquake, are in a particularly dire situation.

**Preliminary Conclusions**

A number of preliminary conclusions can be made regarding economic issues in the restoration process:

- In this disaster, the geographic and sectoral scope of economic disruption vastly exceeded that of direct property and human loss, largely due to lengthy electric power outage to northern Taiwan.
- Prioritization schemes for electric power restoration are possible and can be used to give priority to critical economic sectors and/or facilities.
- The counties and townships hardest hit by the disaster will require several years and substantial government assistance to recover.
- Reconstruction financing is a contentious issue and it appears that the banking industry may suffer substantial losses.
- Earthquake insurance will provide a minimal source of reconstruction finance.
- This disaster has demonstrated the need for pre-disaster planning and policy development with respect to issues of disaster relief, reconstruction finance, mitigation, and reconstruction prioritization.

**Recommendations for Short-Term Recovery**

Based on the author’s observations and discussions with professionals in Taiwan, the following short-term restoration strategies and research needs are identified:

- **Promote use of information technology to support restoration decision-making** — It appears that there exists a major gap in terms of a reliable data collection system for disaster damage and loss. The resulting lack of credible loss estimates could only cause confusion as to how much, where, and what kinds of disaster assistance are needed. New information technologies, such as the web-GIS disaster decision-support system being developed by the Office of the National Science & Technology Program for Hazards Mitigation, can potentially serve a critical role in centralizing and disseminating information about the disaster. An exchange of experience and ideas with the U.S. (and Japan) could be mutually beneficial in this regard.

- **Identify particularly vulnerable and critical economic sectors, and develop special strategies for them** — If potential bottleneck sectors in the economic recovery are identified and special assistance provided, overall recovery may be hastened.

- **Conduct research on electric power outage and associated economic impact to Hsinchu Science and Industrial Park** — Taiwan’s experience could be very instructive to the U.S. in terms of understanding the vulnerability of high-tech industries, the economic consequences of electric power outage, and possibilities for strategically prioritizing power restoration to reduce economic loss. Research on this question would have to be conducted quickly, before information disappears.

- **Conduct research on societal and economic impact and needs with reference to the current large survey being sponsored by NCREE** — Researchers in Taiwan are mobilizing a large survey effort to collect social and economic data on this disaster. The survey is scheduled to be completed in November 1999. Potentially fruitful exchanges may be made with disaster researchers in the U.S. on survey design, findings, and transferable lessons.

**Sources:** This brief report is based on numerous media sources from 9/21/99-10/8/99 (including the Asian Wall Street Journal, China News, Far East Economic Review, Financial Times, New York Times, Taiwan News, Taipei Times, and Wall Street Journal), as well as information from the National Fire Administration and discussions with academic researchers and professors. An exchange rate of US $1 = NT $32 was used in this report.