Japan's 2011 Earthquake and Tsunami: Economic Effects and Implications for the United States

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Summary

The March 11, 2011, earthquake and tsunami that occurred in Japan followed by the nuclear crisis are having a large negative impact on the economy of Japan but a lesser effect on world trade and financial markets. Japan has lost considerable physical and human capital. Physical damage has been estimated to be from $195 billion to as much as $305 billion. (Greece's GDP is $330 billion.) In excess of 23,000 persons in Japan are killed or missing, and more than 400,000 homes and other buildings have been totally or partially damaged. The negative effects of the earthquake and tsunami have been compounded by the continuing crisis at the Fukushima nuclear reactors; the resulting evacuations, radioactive contamination, and shortages of electricity; continuing aftershocks; and the extensive damage to infrastructure, homes, manufacturing plants, and other buildings.

The earthquake-related events in Japan are still unfolding, but each round of economic assessments seems more and more pessimistic. Early data indicate that the economic damage is quite severe. Japan's economy has contracted for two quarters and essentially is in recession, but it may begin to expand later in the year because of rebuilding activity. Much depends on whether the damage from the nuclear plant can be contained, the speed at which electrical capacity can be restored, and how quickly Japan's industrial base can recover. As the third-largest economy in the world, Japan's GDP at $5.5 trillion accounts for 8.7% of global GDP. The net impact of the disaster on global GDP is that it is expected to shave about a half percentage point off global economic growth with about half of that effect confined to Japan, itself.

Congressional interest on the economic side centers on humanitarian concerns, radioactive fallout reaching the United States, the impact on U.S. citizens and American companies in Japan, the effects on trade and supply chain disruptions, and increased volatility in Japanese and U.S. financial markets, interest rates, and the yen-dollar exchange rate.

The impact on U.S. imports from and exports to Japan is expected to be modest as a proportion of overall trade, but particular sectors or companies may be affected considerably. The United States already has banned imports of certain vegetables and milk from the vicinity of the damaged nuclear reactors and is monitoring other foods for radiation. Japan plays a major role in global supply chains both as a supplier of parts and as a producer of final products. In this age of just-in-time production processes, even a small disruption in the provision of a single component can wreak havoc on an entire product line. Japan's production of automobiles, semiconductors, and electronics is likely to be affected the most, but companies in the United States that rely on Japan for critical components such as electronic parts and batteries or transmissions for electrical vehicles also will be affected. Tourist travel both into and out of Japan also has been falling.

There also is concern over speculation in currency markets and repatriation of assets back to Japan that raised the value of the yen before the G-7 monetary authorities in March intervened to weaken it. Another concern is that Japan's national debt, already at 200% of GDP, will rise significantly as the government borrows to finance reconstruction. This may raise interest rates in Japan and further complicate recovery efforts or, in the worst case, trigger a sovereign debt crisis and loss of confidence in Japanese government bonds.

Legislation: H.Res. 172, S.Res. 101.

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Overview

The March 11, 2011, earthquake and tsunami that occurred in Japan followed by the nuclear crisis at the Fukushima Nuclear Complex, evacuations, and shortage of electricity are having a large negative economic impact on the country but a lesser effect on world markets. Japan has lost considerable physical and human capital. Physical damage has been estimated from $195 billion to as much as $305 billion,[1] the latter figure being nearly four times as much as Hurricane Katrina ($81 billion) and roughly equivalent to the GDP of Greece and twice that of New Zealand. In excess of 23,000 persons in Japan are killed or missing, and more than 400,000 homes and other buildings have been totally or partially damaged.[2]

The earthquake-related events in Japan are still unfolding, but each round of economic assessments seems more and more pessimistic. Early data indicate that the economic damage is quite severe. Japan's economy has contracted for two quarters and essentially is in recession, but it may begin to expand later in the year because of rebuilding activity. Much depends on whether the damage from the nuclear plant can be contained, the speed at which electrical capacity can be restored, and how quickly Japan's industrial base can recover. Economic growth in 2011 is expected to be around zero with the current range of estimates between minus 1% to plus 1%. As the third-largest economy in the world, Japan's GDP at $5.5 trillion accounts for 8.7% of global GDP.

Congressional interest on the economic side centers on humanitarian concerns, radioactive fallout reaching the United States, the impact on U.S. citizens and American companies in Japan, the effects on trade and disruptions to supply chains, and increased volatility in Japanese and U.S. financial markets, interest rates, and the yen-dollar exchange rate.

The damage from the earthquake and tsunami is being compounded by the evacuations and uncertainty from the problems at the Fukushima nuclear reactors.[3] Tokyo and northern Japan's power supply is experiencing a shortfall of as much as a third of peak capacity, and the electrical grid is experiencing a current shortage of as much as a quarter of capacity. The earthquake also damaged plants and equipment far from its epicenter. Port facilities, sensitive electronic equipment, 3,970 roads, and 71 bridges also were harmed. These were located in a wide area of the country that even reached Tokyo's northern suburbs. The human toll also has been great with 15,093 persons killed, 9,093 missing, and another 5,301 injured (as of May 17, 2011). In Miyagi and Fukushima prefectures, 1,669 public schools—69% of the total—were damaged or have collapsed.[4] Higher radiation levels have been detected in Tokyo's water supply and a ban has been placed on shipping leafy vegetables and milk from the region of the Fukushima Nuclear Complex. On April 17, 2011, The Tokyo Electric Power Company (Tepco), the owner of the nuclear plants, announced a roadmap for ending the crisis at the nuclear plants that included from three to six months just to cool the reactors and stop the radiation leakage.[5]

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[1] Japan, Ministry of Economy, Trade and Industry, *Japan's Nuclear Emergency—Update*, April 6, 2011.

[2] Data are updated daily. See Japan National Police Agency, *Damage Situation and Police Countermeasures associated with 2011Tohoku district - off the Pacific Ocean Earthquake*. http://www.npa.go.jp/archive/keibi/biki/higaijokyo_e.pdf

[3] For further information, see CRS Report R41694, *Fukushima Nuclear Crisis*, by (name redacted) and (name redacted).

[4] "Many Tohoku Schools Still Shut By Quake," *NIKKEI.com*, April 1, 2011.

[5] "TEPCO announced schedule for ending nuclear troubles," *The Denki Shimbun, The Electric Daily News*, April 19, (continued...)

Depending on how long the nation's electrical generating capacity is impaired, how long and how wide an area of evacuation because of radiation danger is continued, whether the nuclear reactors are brought under control, and how quickly alternative sources can be found for critical electronic and automotive parts whose production has been curtailed, the negative economic effects could grow. Larger companies in the affected area are being asked to reduce electricity usage by a quarter. In the cities, many street lights, neon signs, and hallway lights have been switched off. This contributes to the somber pall that has been cast over urban life.

In recent decades, Japan's growth rate has lagged behind that of the world, so it has not been a major contributor to global economic growth. The net impact of the disaster on global GDP, therefore, is expected to be relatively small (minus about one-half a percentage point) with about half of that effect confined to Japan, itself.

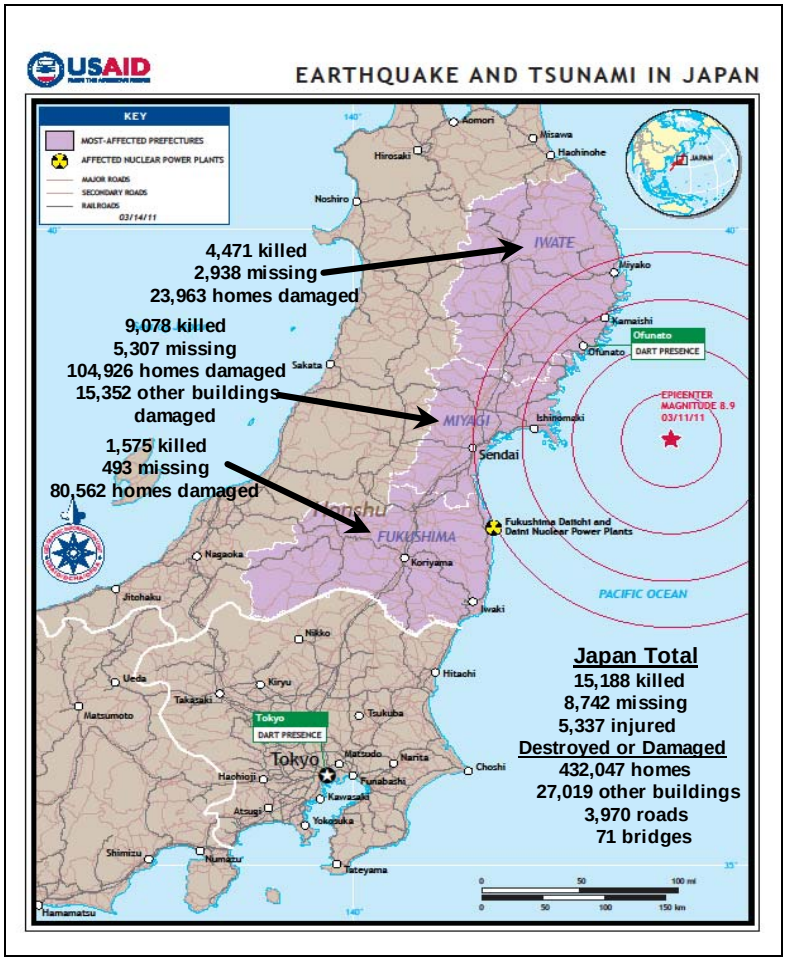
As for U.S.-Japan economic relations, it is likely that the impact of the earthquake and ensuing events on the bilateral economic relationship will be modest overall; however, the effects could be more profound in the near term and on specific sectors and firms for which trade and investment with Japan is particularly important.

(...continued)

2011, http://www.shimbun.denki.or.jp/en/news/20110419_01.html.

Figure 1. Persons Killed, Missing, and Buildings Totally or Partially Damaged

As of May 23, 2011



Source: Underlying map from U.S. AID. Casualty and damage data from Japan, National Police Agency.

Japan plays a major role in global supply chains both as a supplier of parts and as a producer of final products. In this age of just-in-time production processes, even a small disruption in the provision of a single component can wreak havoc on an entire product line. Japan's production of automobiles, semiconductors, and electronics is likely to be affected the most, but companies in the United States that rely on Japan for critical components such as electronic parts and batteries or transmissions for electrical vehicles also will be affected. Tourist arrivals from Japan also are expected to fall as will the number of Americans visiting Japan.

U.S. imports from and exports to Japan had been temporarily slowed because of shipping bottlenecks and the nature of the disaster. In the medium term, a slowdown in growth in Japan is likely to reduce U.S. exports there, but eventually rebuilding will require large amounts of construction supplies. If imports of certain products from Japan become scarce, China, South Korea, or other nations may gain at Japan's expense. Trade data for Japan are presented in the Appendix to this report.

Figure 2. A Tug Boat among Debris in Ofunato, Japan

Source: U.S. Navy photo by Mass Communication Specialist 1st Class Matthew M. Bradley.

Currently, it appears that radioactive contamination of seafood from the recent nuclear disaster in Japan is not a food safety problem for consumers in the United States.[6] The U.S. Food and Drug Administration has banned imports of spinach and *kakina* from the four Japanese prefectures of Fukushima, Ibaraki, Tochigi, and Gunma and milk from Fukushima prefecture only. All milk and milk products and vegetables and fruits produced or manufactured from the four Japanese prefectures affected are to be detained upon entry into the United States and not allowed to enter the U.S. food supply unless shown to be free from radionuclide contamination.[7] The European Union, Australia, China, Hong Kong, Taiwan, South Korea, Philippines, Singapore, India, Brazil, and Canada have required increased surveillance of food products from Japan. Some have banned food from the prefectures most affected. At many Chinese ports, Japanese ships with food cargo are being denied customs inspections.[8]

[6] CRS Report R41751, *Effects of Radiation from Fukushima Daiichi on the U.S. Marine Environment*, by (name reda cted) and (name redacted).

[7] U.S. Food and Drug Administration, *What Is FDA Doing to Ensure the Safety of Products Imported from Japan?*, Radiation Safety/Questions About Food Safety, Washington, DC, updated March 23, 2011, http://www.fda.gov/NewsEvents/PublicHealthFocus/ucm247403.htm. For analysis, see CRS Report R41766, *Japan's 2011 Earthquake and Tsunami: Food and Agriculture Implications*, by (name redacted).

[8] "China, U.S., Other Countries Suspend, Restrict Japanese Imports Due to Radiation," *International Trade Daily: News/Import Policy*, April 19, 2011.

International shipping companies reportedly are charging higher rates for calling at Japanese ports. Premiums being required by ship owners to enter Japanese ports can be from $147,000 to $588,000.[9]

The debris washed out to sea from the tsunami is being picked up by Pacific Ocean currents and is projected to spread eastward from Japan and in about three years likely will reach the U.S. West Coast. If so, this would wash debris onto California beaches and the beaches of British Columbia, Alaska, and Baja California.[10]

Figure 3. Debris from Japan's Earthquake and Tsunami

Source: U.S. Navy Photo by Mass Communication Specialist Alexander Tidd.

The value of the yen has been increasing, prompting coordinated intervention by the G-7 countries (Group of Seven Industrial nations) to halt excessive yen appreciation. A repatriation of assets back to Japan may put upward pressure both on the yen and on U.S. interest rates if Japanese investors sell U.S. Treasury and other securities, but analysts expect that over time eventually the damage from the disaster will weaken the yen.

The questions going forward include whether Japan's debt burden will leave it unable to secure the funds needed for rebuilding; whether the disaster has fundamentally altered the Japanese economy and the competitive position of its industries relative to those in China, South Korea, and other nations; what the impact will be on energy markets and the nuclear industry in Japan

[9] "Shippers Seek Japan Premiums," *The Wall Street Journal Asia*, April 1, 2011, Internet edition.

[10] CRS Report R41751, *Effects of Radiation from Fukushima Daiichi on the U.S. Marine Environment*, by (name reda cted) and (name redacted).

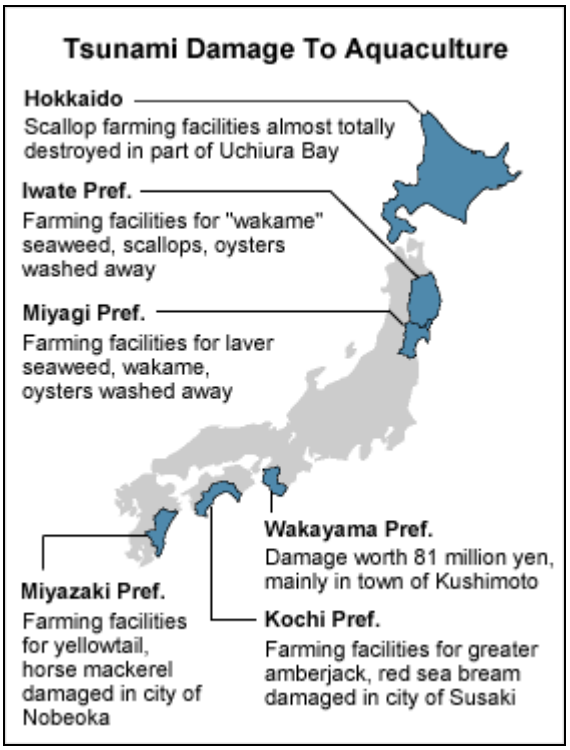
and the world; how Japan and other countries should cope with large inflows of "hot money" that can distort exchange rates; whether global supply chains can adjust to the loss of supply from Japan; and how quickly Japan can regain its economic activity and rebuild its capital stock.

Since Japan has a history of severe earthquakes, its citizens and companies have made considerable preparations and have recovered from previous disasters. The January 1995 Kobe earthquake (6.8 magnitude) hit a region that was heavily industrialized and densely populated and caused about $100 billion in damage. The immediate effect was a contraction in Japan's economy of 2.6% but a recovery that began the following month.[11] The Kobe quake, however, did not trigger a tsunami, a nuclear crisis, or severe shortages of electricity.

Economic Impact

The direct damage from Japan's earthquake and tsunami has been concentrated in the northern region of the country, some distance from Japan's industrial heartland. The financial and economic effects, however, are spreading through the Japanese economy, the East Asian region, and also may affect businesses and consumers in the United States. The effect of the record 9.0 earthquake was compounded by the ensuing tsunami that swept as far as 6 miles inland in Japan, causing widespread destruction, and that spread out across the Pacific. It caused tens of millions of dollars of damage in Hawaii, as much as $40 million in damage in California, and millions of dollars of damage primarily to harbors and boats in Oregon. As shown in **Figure 4**, the tsunami also destroyed or damaged aquaculture facilities in prefectures quite distant from the epicenter. The damage, furthermore, has been compounded by the nuclear contamination from the Fukushima Daiichi Nuclear Plant plus a shortage of gasoline and of electricity that has caused rolling blackouts in Japan's industrial centers. In mid-April, Japan's oil refining capacity was basically restored.

Figure 4.Tsunami Damage to Seafood Cultivation in Japan



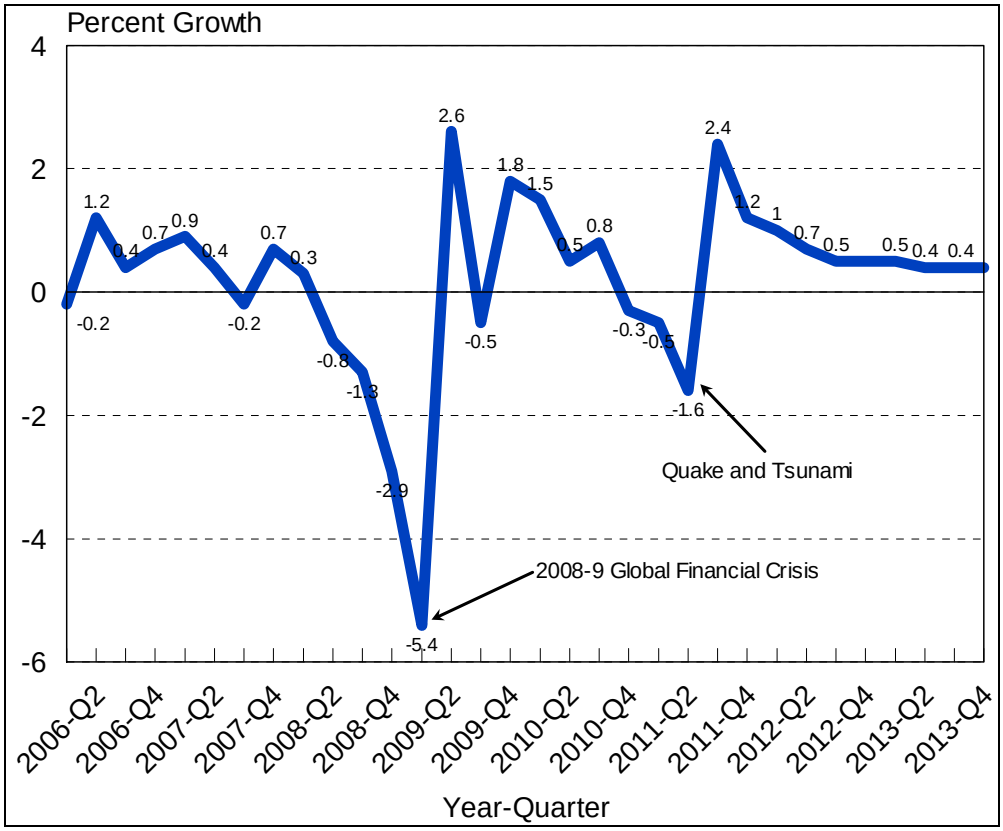
Source: NIKKEI.com

Japan's economic growth, already anemic because of the global recession in 2008-2009, is expected to drop into negative territory for a quarter or two but turn positive again as the crisis passes and rebuilding commences. As the extent of the damage becomes more apparent, forecasts for Japan's economic growth are becoming more and more pessimistic. Initial expectations were

[11] Kyohei Morita and Yuichiro Nagai, *Japan Economic Focus, Economic implications of earthquake*, Barclays Capital, Japan Economic Research, March 15, 2011.

that the disaster would shave 0.2 to 0.5 percentage points off total GDP growth in 2011, but that growth still would be around 1%. By March 23, an estimate by IHS Global Insight was for growth in 2011 to be 0.5%, then by May 9, the projected growth was 0.0% with reconstruction in 2012 increasing the rate to about 3.6%.[12] (See **Figure 5**.) Morgan Stanley, however, expects a short and deep recession in Japan with the economy shrinking by 1% to 3% in 2011 and a reduction in global growth of about 0.5 percentage points.[13] The Economist Intelligence Unit sees a recovery from the recession in the first and second quarters of 2011 for an overall 2011 growth rate of 1.0%.[14]

Figure 5. Japan's Quarterly Growth Rate in Real GDP



Source: CRS. Underlying data from IHS Global Insight. Japan—Interim Quarterly Forecast, updated April 14, 2011.

Manufacturing

Typically, the negative effects of a natural disaster are large immediately after the event and are mostly concentrated in the region of the disaster. In Japan's case, however, the negative impact is greater because the estimated $309 billion (5.7% of GDP and less than 2% of capital stock)[15] or

[12] IHS Global Insight, *Japan: Japan—Interim Annual Forecast*, May 9, 2011.

[13] Morgan Stanley MUFG, *Tohoku Earthquake: First Assessment*, Japan Research, New York, NY, March 22, 2011, p. 6.

[14] Economist Intelligence Unit, *Japan Economy: EIU's Latest Assumptions*, May 19, 2011.

[15] World Bank, *East Asia and Pacific Economic Update 2011*, The Recent Earthquake and Tsunami in Japan: (continued...)

more in damage from the combination of the earthquake and tsunami is being compounded by the evacuations and uncertainty from the problems at the Fukushima nuclear reactors, the shortfall in electricity, and a scarcity of gasoline that is gradually being remedied.

In addition to the nuclear plants destroyed, other generating plants are expected to remain offline until repairs are made and safety ensured. Of Tokyo Electric Power Company's 17 nuclear reactors, 13 are currently off line as are 4 nuclear plants belonging to another company servicing the same region. Even the plants not damaged extensively are not expected to come back on line until after August 2011. This has caused serious shortages of electricity in northeastern Japan that still remain despite the darkened street lights in Tokyo, more self-generating capacity being installed in factories, a rush on purchases of solar cells, and emergency generating capacity being shipped in from other countries. Japan's situation also is unusual because when the first electrical generators were imported, the German generators installed in Tokyo and points east produced electricity of 50 hertz while the American generators in Kyoto and west produced current of 60 hertz. Presently, only 1,000 megawatts exist in capacity to convert the electricity in the west to that in the east.[16] The electricity shortage has caused rolling blackouts lasting as long as three to four hours at a time that has disrupted Japan's production capacity in its industrial heartland farther south in the Tokyo-Osaka corridor. While the visual images mainly have been of the tsunami and its aftermath, the earthquake also damaged plants and equipment far from its epicenter. Port facilities,[17] sensitive electronic equipment, 3,970 roads, and 71 bridges also were harmed. These were located in a wide area of the country that even reached Tokyo's northern suburbs.[18]

In addition to the casualties, the toll on life also has been great. An estimated 140,000 people have been evacuated from the affected areas and 117,085 people were still living in evacuation shelters as of May 10, 2011. The 6,000 homes still standing after the quake and tsunami but without electricity are expected to have power restored by the end of May, and 77,500 homes are still without water (as of May 6).[19]

The three prefectures in eastern Tohoku that took the brunt of the earthquake and tsunami account for about 6% to 7% of Japan's GDP. The city of Sendai, with a population of roughly 1 million, is in the middle of an agricultural region, but it still has a considerable number of industrial facilities. The villages most damaged by the tsunami were engaged primarily in fishing, but manufacturing accounts for about a quarter of production in the region,[20] and plants in the most severely damaged areas supply parts and products used in manufacturing elsewhere in Japan. As of March 16, 2011, all 12 automakers in Japan reportedly had temporarily stopped production at some plants. Companies such as Hitachi (equipment for power plants), Renesas Electronics (semiconductors), NEC (electronics), Sony (electronics), and Fujitsu (computers) also had suspended operations at certain plants in the affected area.[21] Japan also supplies parts for

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Implications for East Asia, Washington, DC, March 21, 2011, http://siteresources.worldbank.org/INTEAPHALFYEARLYUPDATE/Resources/550192-1300567391916/EAP_Update_March2011_japan.pdf.

[16] Paul J. Scalise, "Looming Electricity Crisis," *The Oriental Economist Report*, vol. 79, no. 4 (April 2011), p. 8.

[17] Kesennuma and Ishonomaki ports are not operating.

[18] Roads in Tokyo (16 roads) and in neighboring prefectures of Saitama (155) and Chiba (278) also were damaged.

[19] "Supply-Chain Woes Persist 2 Months After Quake," *Nikkei.com*, May 11, 2011.

[20] Kyohei Morita and Yuichiro Nagai, *Economic Implications of Earthquake*, op. cit.

[21] "Production Bases Destroyed by Quake. Manufacturers' Plants, Distribution Facilities in Tohoku, Northern Kanto (continued...)

manufacturing in China, South Korea, and other Asian countries. As of March 25, Japanese oil refiners had restored capacity in three of the six refineries that had halted production. The refineries restarted accounted for 17% of Japan's domestic capacity and left 14% of refining capacity still down. However, since other refineries had been operating at below capacity, some production is expected to be covered by other plants.[22]

Some Business Disruptions

- A Hitachi factory north of Tokyo that makes 60% of the world's supply of airflow sensors was shut down. This caused General Motors to shut a plant in Shreveport, LA, for a week and Peugeot-Citroen to cut back production at most of its European plants.
- Two Japanese plants accounting for 25% of the world's supply of silicon wafers for computer chips were closed.
- IHI Corp. is restarting full production at its plant in Soma, Fukushima Prefecture. The plant supplies parts to General Electric for aircraft engines that are used in Boeing airplanes.
- Renesas Electronics suspended output at a key semiconductor plant. Renesas holds a market-leading global share of 30% in microcontrollers. This is affecting manufacturers of mobile phones, home appliances, and elevators.
- A Toshiba plant making liquid crystal displays was damaged.
- Texas Instruments had to close a factory in Japan (until September 2011) accounting for about 10% of its revenues.
- Sony Corp. temporarily closed seven damaged plants making high definition magnetic tapes, digital video discs, lithium batteries, semiconductor lasers, and optical devices. The company also suspended operations in three other plants because of electricity shortages.
- Hitachi Vehicle Energy, Ltd. announced it intended to resume production on March 28 of lithium ion car batteries at its Ibaraki prefecture facility.
- Nippon Chemi-Con Corp., the largest producer of aluminum electrolytic capacitors used in everything from computers to industrial equipment, had four Japanese factories down. It intended to boost production at 10 overseas bases, including factories in Indonesia, Malaysia, and China.
- Nihon Dempa Kogyo, the second-largest maker of quartz components (with a roughly 20% share of the global market), is turning to operations in Malaysia and elsewhere to compensate for damage at its plant in northern Japan which assembles components for automotive applications.
- Nissan in Japan is considering importing engines from its plant in Tennessee because its engine factory in Fukushima prefecture has been damaged.
- Japan's major automakers are expected to produce about 400,000 fewer vehicles domestically as a result of the earthquake and tsunami.
- Delta Airlines, the largest foreign carrier in Japan, is cutting capacity to and through its Tokyo hub by 15% to 20% through May and expects the crisis in Japan to reduce profits in 2011 by $250 million to $400 million.

Sources: Various news articles and press releases.

Financial and Currency Markets

For the U.S. economy, the disaster in Japan came on top of the turmoil in the Middle East, rising oil and food prices, and a weak recovery with unemployment hovering at 9%. It has added new uncertainty to markets already under stress. The first effects have been financial as values on

(...continued)

Hit Hard," *Yomiuri Shimbun*, March 16, 2011.

[22] "Quake-Hit Refiners Restoring Fuel Supply," *Nikkei.com*, March 25, 2011.

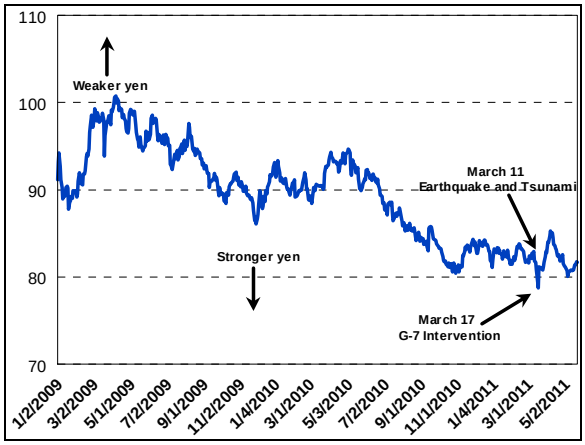
stock markets dropped and paper values shrunk. Equity markets, however, have been recovering as the impact of a disaster is factored into risk calculations and the economic effects become more clear. Still the situation in Japan has added to instability in financial markets in the United States and the world.

The value of the yen and interest rates also are being affected. Investors, hedge funds, and speculators have bought yen in anticipation that Japan's wealth holders, insurance companies, and possibly the government will have to repatriate overseas investments in order to finance insurance payouts and rebuilding. The value of the yen (83.8 yen per dollar on February 15, 2011, and 122 yen per dollar less than four years ago) touched a record 76.25 yen per dollar on March 17 before retreating to the 80 yen level after the Group of Seven (G-7) Industrial Nations agreed to "cooperate as appropriate" to address excessive and volatile movements in the foreign exchange market (in other words, to intervene to weaken the value of the yen). This decision was made by monetary authorities in Japan, the United States, the eurozone, Canada, and Britain.[23] Since then the yen has been regaining strength and on May 20 was 81.7 yen per dollar. Japan's Ministry of Finance has argued that Japan's life and casualty insurers already have secured considerable funding and intend to tap domestic markets rather than repatriating funds from overseas and that the strength of the yen was due to speculation.[24] Any yen appreciation that does occur would make Japanese exports less competitive in U.S. markets and U.S. exports more competitive in Japanese markets. In addition, since China's yuan has been linked closely to the value of the dollar, Chinese exporters are likely to gain further price competitiveness relative to those from Japan.

Approximately a quarter of developing East Asia's long-term debt is denominated in yen. For China, 8% of its external government debt is in yen. The figure for Thailand is about 60%, for Vietnam about 35%, for the Philippines about 32%, and for Indonesia about 30%. A 1% appreciation in the value of the yen translates into a $250 million increase in annual debt servicing on yen-denominated securities by East Asia's developing countries.[25]

Figure 6.Yen/Dollar Exchange Rate

(yen per dollar)



Source: CRS. Underlying data from PACIFIC Exchange Rate Service.

Another question deals with the impact on U.S. interest rates and how they might be affected by changes in capital flows to and from Japan. Japanese investors are major private foreign holders of U.S. Treasury securities that finance the U.S. national debt, and their importance has soared over the last few years. At the end of March 2011, Japanese residents held $908 billion in U.S. securities. At one time, Japanese investors were the largest foreign holders of U.S. Treasury securities, but

[23] Dan Milmo, "G7 rallies behind Japan in bid to curb soaring yen," *The Guardian*, March 18, 2011, http://www.guardian.co.uk/business/2011/mar/18/g7-japan-curb-soaring-yen-intervention.

[24] From an internal report by Medley Global Advisors, March 16, 2011.

[25] World Bank, The Recent Earthquake and Tsunami in Japan: Implications for East Asia, March 21, 2011, op. cit.

beginning in September 2008, residents in China surpassed them and, as of the end of March 2011, held $1,145 billion in U.S. Treasury securities.[26] Japanese holdings of U.S. Treasury securities underscore the debtor/creditor link between the United States and Japan. As the U.S. government continues to incur budget deficits and maintains a low national savings rate, the United States has had to rely increasingly on foreign creditors to finance the rising national debt. Some analysts have suggested that Japanese private and government investors in U.S. Treasury securities may have to slow down or diminish their holdings to finance reconstruction operations in Japan. Such a move could increase the interest rates that the U.S. government must pay to finance its debt. Other analysts have suggested such an impact would be limited as Japan should have sufficient domestic capital to cover the extra expenses. As the disaster developed, the flight to the safety of U.S. Treasury securities by investors all over the world more than offset any repatriation of funds back to Japan.

The Bank of Japan has been injecting funds into the banking system to ensure that there would be no shortage of cash or funds to lend and no spikes in Japan's interest rates. As of March 17, the bank had made liquidity injections of $418 billion (33 trillion yen) into financial markets. This far exceeded the 4.5 trillion yen injected after the collapse of Lehman Brothers in 2008.[27]

Figure 7. A Damaged Water Pipe Shoots into the Air, Hachinohe, Japan

Source: U.S. Navy photo by Chief Mass Communication Specialist Daniel Sanford.

[26] U.S. Department of the Treasury, http://www.ustreas.gov/tic/.

[27] Ibid.

In Japan, a concern is that the public debt, at about 200% of GDP, has become so high that borrowing to finance reconstruction could trigger a loss of confidence in the ability of the Japanese government to repay its debts. In such a case, Japan could face a sovereign debt crisis similar to that faced by Greece. Prior to the earthquake, in January 2011, Standard & Poor's, the credit ratings agency, had already downgraded Japan's long-term sovereign debt to AA- from AA. This is three levels below the highest possible rating. This was S&P's first downgrade of Japanese government debt since 2002.[28] When Greece faced a sovereign crisis in 2010, its national debt was 123% of GDP. In Japan's case, however, 95% of its national debt is owned by Japanese citizens, not foreign hedge and other funds. According to one analyst, it is unlikely that those citizens would dump their bond holdings if the government takes on more debt to rebuild the area struck by the earthquake and tsunami. Financially, Japan's government appears to have more maneuvering room than might seem apparent by the debt ratios.[29]

On May 2, 2011, the first FY2011 supplementary budget bill for recovery and reconstruction from what the Japanese government is calling the Great East Japan Earthquake passed the Diet. The budget totaling 4.0 trillion yen ($49 billion) is to be financed by using a part of the contingency funds meant for economic crises, diverting basic pension funds, reviewing highway toll rates and other means. The government and a union representing central government employees have agreed to cut monthly salaries by 5% to 10% and bonuses by 10% to help secure funds for reconstruction.[30] The funds in the bill are to be used for reconstructing roads and fishing ports, disposing of debris, constructing temporary housing, and other purposes.[31]

A key goal of the government is to build temporary housing for the thousands still in shelters. An estimated 30,000 homes are to be completed by the end of May 2011. By the end of August, it is hoped that temporary housing will be available for everyone who needs it, and evacuation shelters can be closed.[32]

Most insurance payments are expected to be borne primarily by Japanese insurance companies and their government. Insurance companies everywhere, however, pass some of their risk exposure onto global reinsurance providers. One estimate values the insured damage from the earthquake and subsequent fires at $11 billion to $21 billion. The damage from the tsunami added another $8 billion to $9.7 billion for a combined total of approximately $20 billion to $30 billion.[33] Even property insurance claims of $50 billion, however, would be equivalent only to about 10% of Japan's insurance premium income and less than 1% of insurance company assets.[34] Not included are insured production losses and claims related to nuclear contamination. Japanese insurers jointly own a reinsurer, the Japan Earthquake Reinsurance Company, which in turn is

[28] Hiroko Tabuchi and Bettina Wassener, "S.&P. Downgrades Japan as Debt Concerns Spread," *The New York Times*, January 27, 2011, Internet edition. Moody's gives Japanese government debt a similar rating.

[29] Marcus Noland, *Will the Crisis Create a New Japan?*, Peterson Institute for International Economics, op-ed, *Washington Post*, March 16, 2011.

[30] "5-10% Salary Cuts Agreed For Central Government Employees," *Nikkei.com*, May 23, 2011.

[31] Tokyo Foreign Press Center Japan Online, "Overview of and Recovery from the Great East Japan Earthquake (Part 8)," May 13, 2011.

[32] "Key Highway Set to Reopen in Sept; Shelters to Close by Aug," *Nikkei.com*, May 20, 2011.

[33] AIR Worldwide, AIR Worldwide Updates Estimate of Insured Losses from the Mw 9.0 Tohoku Earthquake Based on Detailed Analysis of Ground Motion and Tsunami Footprint, Press Release, Boston, MA, March 25, 2011, http://www.air-worldwide.com/NewsAndEventsItem.aspx?id=20437.

[34] International Monetary Fund, Global Markets Analysis Division, Monetary and Capital Markets Division, *Global Markets Monitor*, Washington, DC, March 17, 2011.

backstopped by the Japanese government. Ultimately, the government stands as the insurer of last resort in the case of earthquakes. As for individual homeowners, most tend not to carry earthquake or flood insurance. Household rebuilding, therefore, is likely to come out of household savings, some of which has been invested overseas.

As of April 6, 2011, earthquake insurance payments stemming from the March 11 quake reached 33.4 billion yen (about $402 million) on 31,627 cases. Most of these payments were for damage in the Tokyo area because the amounts for payments for the devastation in the areas around Sendai worst hit by the quake were yet to be determined.[35]

Figure 8. Aerial View of Minato, Japan, a Week After the Tsunami

Source: U.S. Marine Corps photo by Lance Cpl. Ethan Johnson.

Implications for the U.S.-Japan Economic Relationship

The U.S.-Japan economic relationship is very strong and mutually advantageous. The two economies are integrated via trade in goods and services—they are important markets for each other's exports and important sources of imports. Japan and the United States are also connected via capital flows. Japan is a major foreign source of financing of the U.S. national debt and will likely remain so for the foreseeable future, as the mounting U.S. debt needs to be financed and the

[35] "Quake Insurance Payments Hit Y33.4 bn," *NIKKEI.com*, April 6, 2011.

stock of U.S. domestic savings remains insufficient to meet the demand. Japan is also a significant source of foreign private portfolio and direct investment in the United States, and the United States is the origin of much of the foreign investment in Japan.

Japan and the United States remain important trading partners to one another; however, their relative importance has declined over the years as other trading partners have increased their importance. In 1996, Japan accounted for 10.8% of U.S. exports and 14.8% of imports, but for only 4.7% of U.S. exports and 6.3% of U.S imports by 2010. In 1996, the United States accounted for 27.2% % of Japanese exports and 22.7% of Japanese imports, but for only 15.4% of Japanese exports and 9.7% of Japanese imports by 2010. The diminished importance has been the result in part of the development of international production networks and the segmentation of production processes across countries giving rise to China as a important trading partner for both the United States and Japan.

An important factor in determining the volume of trade flows is the relative growth rates in each of the trading partners. For example, in 2009, both U.S. exports to Japan and imports from Japan declined substantially, reflecting the effects of the global economic downturn. The crisis was particularly hard on a Japan that was trying to recover from more than a decade and a half of economic stagnation. In 2010, U.S.-Japan trade showed signs of recovery as both the U.S. and Japanese economies grew, 2.9% and 4.0%, respectively.[36] If, as expected, the Japanese economy experiences slower economic growth as a result of the earthquake-related crisis, U.S. exports could decline, depending on the extent of the impact. A major portion of U.S. exports to Japan consists of optical and medical equipment; computers and components; semiconductors; and agricultural products, such as meat and wheat. Many economists expect Japanese economic growth to rise as the country begins to recover from the damage.[37]

Increasingly, international trade results from the segmentation of production processes that take place within transnational supply chains. On the one hand, such transnational production networks can result in more efficient production and lower costs; on the other hand, any disruptions within the chain can halt production down the line. One possible, albeit incomplete, indicator of the role of supply chains in U.S.-Japan trade is the amount of that trade that is in intermediate goods—that is goods that are used in the making of final goods. In 2010, 55.3% of U.S. exports were in intermediate goods (capital goods, except automotive; industrial supplies and materials); 48.9% of U.S. imports from Japan were in intermediate goods.

Some sectors of U.S.-Japan trade are likely to be affected. For example, close to 35% of U.S. imports from Japan in 2010 consisted of passenger cars and auto parts. Some Japanese auto manufacturers, such as Toyota Motor Corp., have assembly operations in the immediate vicinity of the earthquake. Other manufacturers who may not be directly located in the earthquake area have been affected by power outages and other effects of the disaster and have had to curtail operations, reducing output. Japanese auto manufacturers have also been adversely affected by disruption of operations of parts suppliers.[38]

[36] Economist Intelligence Unit.

[37] According to one estimate, Japan's GDP growth could be reduced by 0.3% resulting in no growth for the current quarter. Global Insight. *Japan's March 2011 Earthquake: Disruption, Risks and Outlook*, March 16, 2011. Another estimate puts the loss at 0.5% GDP. Standard Charted Research, *Japan—Assessing the Impact* ,March 15, 2011.

[38] *Automotive News*, March 14, 2011.

In addition, U.S.-based auto manufacturers may also be affected by the problems in Japan. Some Japanese-owned companies in the United States have had to curtail operations because they cannot obtain parts from Japan. For example, some models assembled in the United States by Toyota, Mitsubishi, Nissan, and Mazda import engines and/or transmissions from Japan.[39] Also, some U.S.-name plate manufacturers have been affected. For example, Ford Motor Co. depends on imports of Japanese-made memory chips and batteries. In addition, a significant portion of U.S. imports from Japan are in machinery (20.6%), including printers and computers, and electrical machinery (15.2%), including semiconductors, shipments of which could be interrupted because of the crisis. The full extent of the effects of the problems in Japan is yet to be determined.[40]

In 2010, Japanese suppliers accounted for more than one-fifth of global semiconductor production, and companies headquartered in Japan generated $63.3 billion in microchip revenue. This represented 20.8% of the worldwide market. Not all of the actual production, however, is located in Japan.[41]

Tourism also is likely to be affected. Hawaii already has experienced cancellations of tours from Japan. Japanese tourists accounted for $1.9 billion in revenue in Hawaii, 18% of tourist arrivals there, and numbered second only to arrivals from other parts of the United States.[42] For the United States as a whole, about 3.5 million tourists from Japan arrived in 2010, placing Japan in fourth place after Canada, Mexico, and the United Kingdom.[43]

The Obama Administration has engaged in discussions with Japan regarding the possibility of Japan joining negotiations to establish the Trans-Pacific Partnership (TPP) Initiative. Before the March 11 earthquake, the government of Prime Minister Kan indicated it would make a decision on TPP by this June. However, some members of the Japanese Diet have indicated that that decision may have to be delayed as a result of the disaster.[44]

In addition to trade, an important U.S.-Japan economic link is foreign direct investments (FDI), that is, investments in plants, firms, and real estate that signify a long-term commitment:

- In 2009, the U.S. investors had $103.6 billion in foreign direct investments in Japan. The largest investments were in non-depository financial institutions, including insurance, at $49.3 billion (48.2%). Another $16.9 billion (16.3%) were in various aspects of manufacturing and $8.2 billion (7.9%) were in wholesale trade.
- In 2009, Japanese investors had $271.9 billion in FDI in the United States. $81.7 billion (30.0%) of the investments were in manufacturing, including $35.6 billion

[39] National Highway Administration, http://www.nhtsa.gov.

[40] *Automotive News*, March 15, 2011.

[41] E-mail communication from Dale Ford, Senior Vice President, Market Intelligence, IHS iSuppli company. March 17, 2011.

[42] "Japan crisis 'terrible' for Hawaii tourism," *UPI.com*, March 17, 2011.

[43] U.S. Department of Commerce, International Trade Administration, *Table C - Section 5: United Kingdom, Japan, S. Korea, PRC (EXCL Hong Kong), ROC(Taiwan) Non-Resident Visitation to the U.S. By world region/country of residence 2010*, 2010 Monthly Tourism Statistics, Washington, DC, Data through November 2010, http://tinet.ita.doc.gov/view/m-2010-I-001/table5.html.

[44] *Washington Trade Daily*, March 25, 2011.

in the transportation equipment (including passenger car production), and $119.4 billion were in wholesale trade.

Many of these foreign direct investments generate trade and employment:

- In 2008 (latest data available), U.S. companies had 946 affiliates in Japan that employed 585.3 thousand employees. Of that number, 752 firms were majority-owned affiliates that employed 296.5 thousand employees. The majority-owned affiliates accounted for $11.8 billion in U.S. exports to and $1.5 billion in U.S. imports from Japan.
- In 2008, Japanese affiliated companies in the United States employed 741.7 thousand employees in the United States. They accounted for $60.1 billion in U.S. exports and $183.8 billion in U.S. imports.

Agriculture and Food[45]

The widespread devastation from the March 2011 earthquake and tsunami affected many agricultural and fishery areas in Japan. Japan's assessment of the damages to the fisheries, agriculture, and forestry sectors from the March 2011 earthquake is currently estimated at $21.5 billion.[46] Of this estimated total, $11.0 billion is attributed to losses in Japan's fisheries sector, along with $9.1 billion in damages to agricultural lands and crops, and another $1.4 billion in damages to forested lands and facilities.

Damages to agricultural crops, land, and facilities have been reported in several prefectures, including Aomori, Iwate, Miyagi, Akita, Yamagata, Fukushima, Ibaraki, Tochigi, Gunma, Saitama, Chiba, Kanagawa, Yamanashi, Nagano, Niigata, and Mie, among others.[47] Damages to the agriculture sector cover nearly 4,700 farmland areas and about 16,400 food facilities. Among fisheries, "catastrophic damages" to fish vessels and harbor facilities have been reported in Iwate, Miyagi, and Fukushima prefectures; other damages to fishing vessels and harbor facilities were also reported in Hokkaido, Aomori, Ibaraki, Chiba, Kanagawa, Shizuoka, Aichi, Mie, Wakayama, Tokushima, Kochi, Oita, Miyazaki, Kagoshima, and Okinawa prefectures, and in Tokyo Metropolitan.[48] Damages to aquaculture facilities were reported in Toyama, Ishikawa, Shizuoka, and Tottori prefectures. Damages to the fisheries sector cover damage to more than 20,700 fishing vessels and 319 fishery harbor facilities.

A compilation by USDA of cropland production statistics in the five coastal prefectures—Aomori, Iwate, Miyagi, Fukushima, and Ibaraki—indicate the importance of these prefectures to Japan's agricultural sector.[49] USDA's summary, using 2007 production data, shows that these five

[45] Prepared by (name redacted), Specialist in Agricultural Policy. Contact her for more background information and for full references on all cited data and official statements. For further analysis, see CRS Report R41766, *Japan's 2011 Earthquake and Tsunami: Food and Agriculture Implications*, by (name redacted).

[46] MAFF, "The Damages caused by the Great East Japan Earthquake and Actions taken by Ministry of Agriculture, Forestry and Fisheries," May 16, 2011, http://www.maff.go.jp/e/quake/press_110511-1.html. Reported at 1,752.2 billion yen.

[47] MAFF, "The Damages caused by the Great East Japan Earthquake and Actions taken by Ministry of Agriculture, Forestry and Fisheries," May 16, 2011, http://www.maff.go.jp/e/quake/press_110511-1.html.

[48] Ibid.

[49] USDA, Economic Research Service (ERS), "Japan: Current Issues in Japanese Agriculture," Table 1. (continued...)

prefectures account for about one-fifth of Japan's total marine fisheries and aquaculture production by volume, and 17% of all agricultural output by volume. These areas also account for similar shares of the nation's rice, soybeans, vegetables, and livestock production, and also house 19% of Japan's hog production, about one-tenth of all cattle and dairy herds, and about one-fifth of its poultry flocks.

Japan's agricultural and fisheries industries account for a small share (less than 2%) of its total yearly GDP; however, these industries remain an important aspect of the country's overall economy and governmental policies. Agricultural output, measured at the farm level, totals about $70 billion annually.[50] The value of Japan's fisheries accounts for another $14 billion.[51] Principal food commodities produced in Japan include fish and seafood, rice, vegetables, fruits and nuts, and dairy and poultry products.[52] Japan remains a net food importer. Imports of agricultural and fisheries products totaled $59.3 billion in 2010.[53] Nearly half of the value of Japan's food imports consisted of fish and meat products. Other imports include grains and bakery goods (23% of total value), and vegetables and fruits (8%). The United States was the leading supplier, accounting for about one fourth of food imports ($14.1 billion in 2010). Japan's food exports totaled $4.7 billion in 2010. Leading Japanese food exports included fish and other animal products (about 40%); processed foods, bakery products, and grains (about 15%); beverages (8%); and other miscellaneous products.

The Japanese government has been monitoring possible radioactive contamination of plant and animal products and tap water in some of the coastal prefectures as well as southern prefectures near the disabled Fukushima Daiichi Nuclear Plant. Testing has been conducted nearly daily since March 19, 2011, to detect possible radioactive contaminants on a wide range of plant and animal products, including fish.[54] Testing for radioactive contaminants in foods is ongoing and spans many adjacent prefectures.

The Japanese government has taken action to restrict the distribution of potentially contaminated foods. Starting in late March 2011, Japan's Ministry of Health, Labour and Welfare made a series of announcements restricting the distribution and consumption of foods produced in certain prefectures, including "non-head type leafy vegetables and head type leafy vegetables" (such as spinach, komatsuna, cabbages) and any "flowerhead brassicas" (broccoli, cauliflower),[55] and restrictions on spinach and kakina (a leafy vegetable), fresh raw milk,[56] certain shitake

(...continued)

http://www.ers.usda.gov/Briefing/Japan/currentissues.htm.

[50] Japan's Ministry of Agriculture, Forestry and Fisheries (MAFF), *84th Statistical Yearbook* (2008-2009), http://www.maff.go.jp/%20e/tokei/kikaku/nenji_e/index.html; MAFF, "Summary of Agricultural Production," http://www.maff.go.jp/e/tokei/kikaku/nenji_e/pdf/n0030e.pdf. Converted from yen to dollars (2007). By comparison, the farm value of U.S. agricultural products sold is about $300 billion (Source: USDA, *Census of Agriculture*, 2007).

[51] Ibid. MAFF, "Summary of Fishery Production," http://www.maff.go.jp/e/tokei/kikaku/nenji_e/pdf/n0031e.pdf.

[52] FAOSTAT Production, http://faostat.fao.org/site/339/default.aspx.

[53] Global Trade Atlas, http://www.gtis.com/gta/. Harmonized System (HS) codes in chapters 01-22. Excludes food waste (HS 23) and tobacco products (HS 24).

[54] Reports are posted by Japan's Ministry of Health, Labour and Welfare (MHLW), "Information about 2011 Tohoku-Pacific Ocean Earthquake," http://www.mhlw.go.jp/english/topics/2011eq/index.html.

[55] MLHW, "Restriction of distribution and/or consumption of foods concerned in Fukushima and Ibaraki Prefectures," March 23, 2011, http://www.mhlw.go.jp/stf/houdou/2r98520000015wun-att/2r98520000015xym.pdf.

[56] MLHW, "Handling Monitoring of Radioactive Contaminants for Agricultural and Livestock Products," March 23, 2011, http://www.mhlw.go.jp/english/topics/2011eq/dl/food-110323.pdf.

mushrooms,[57] and bamboo shoots and ostrich fern.[58] Many of these restrictions were later lifted.[59] By late April, the ministry had placed restrictions on the distribution and consumption of juvenile sand lance (a marine fish of the family Ammodytidae) harvested at Fukushima prefecture.[60]

Following these reports, many countries increased their surveillance of food imports from Japan, including the European Union, Australia, China, Hong Kong, South Korea, Philippines, Singapore, India, and Canada, among others.

In the United States, the U.S. Food and Drug Administration (FDA) issued FDA issued "Import Alert 99-33" for milk, vegetables, and certain fish species (sand lance) produced or manufactured in selected Japanese prefectures.[61] This import alert has been modified several times.[62] As of May 17, 2011, FDA's Import Alert 99-33 has reduced the area of concern to three prefectures—Fukushima, Ibaraki, and Tochigi—and applies to food products from Japan across four categories.[63] FDA's Import Alert 99-33 establishes an order for "detention without physical examination" (DWPE) for specified products from specified prefectures. Accordingly, FDA's import alert detains all shipments of items subject to the alert, and places the burden upon the importer to demonstrate, through testing, that a given shipment is "not violative" and may be imported.[64] U.S. food imports are regulated by FDA, which monitors the safety of most types of food imports, and USDA's Food Safety and Inspection Service (FSIS), which regulates the safety of meat and poultry imports.[65]

Some in Congress have indicated concern that radioactive contaminated foods might enter the U.S. through its food imports.[66] Both FDA and USDA have issued formal statements regarding the current situation in Japan.[67] FDA has stated: "FDA's screening at U.S. borders will remain

[57] MLHW, "Restriction of distribution and/or consumption of log-grown Shiitake (outdoor cultivation) produced in parts of Fukushima Prefecture," April 13, 2011, http://www.mhlw.go.jp/english/topics/2011eq/dl/food-110413.pdf.

[58] MLHW, "Restriction of distribution of Bamboo shoot and Ostrich fern produced in parts of Fukushima Prefecture," May 9, 2011, http://www.mhlw.go.jp/english/topics/2011eq/dl/food-110509.pdf.

[59] MLHW, "Update of 'Request for shipment restraint and other measures' (lifting restrictions on some products)," May 16, 2011, http://www.mhlw.go.jp/english/topics/2011eq/dl/food-110420.pdf.

[60] MLHW, "Restriction of distribution and consumption of Juvenile sand lance landed at Fukushima Prefecture," April 20, 2011, http://www.mhlw.go.jp/english/topics/2011eq/dl/food-110420.pdf.

[61] FDA, "Detention Without Physical Examination of Products from Japan Due to Radionuclide Contamination," Import Alert 99-33, http://www.accessdata.fda.gov/cms_ia/importalert_621.html. All U.S. alerts for Japan are at http://www.accessdata.fda.gov/cms_ia/country_JP.html.

[62] For the most recent version see FDA's website, http://www.accessdata.fda.gov/cms_ia/importalert_621.html. This import alert was first issued on March 22, and was subsequently revised on March 25, April 12, April 15, and April 20, April 21, and May 17, 2011.

[63] FDA, "Radiation Safety," http://www.fda.gov/newsevents/publichealthfocus/ucm247403.htm#importjapan.

[64] For additional information about DWPE and FDA's authority, see CRS Report R41766, *Japan's 2011 Earthquake and Tsunami: Food and Agriculture Implications*, by (name redacted).

[65] CRS Report RL34198, *U.S. Food and Agricultural Imports: Safeguards and Selected Issues*; and CRS Report RS22600, *The Federal Food Safety System: A Primer*. In addition, USDA's Animal and Plant Health Inspection Service (APHIS) is responsible for protecting plant and animal resources from domestic and foreign pests and diseases, and the Department of Homeland Security (DHS) is responsible for coordinating agencies' food security activities, including border inspections by DHS's U.S. Customs and Border Protection (CBP).

[66] See, for example, "DeLauro Wants All Japanese Food Bound for the U.S. Tested," *CQ Health Beat*, March 23, 2001.

[67] FDA, "Radiation," http://www.fda.gov/NewsEvents/PublicHealthFocus/ucm247403.htm; and USDA, "USDA's Radiation Safety Questions and Answers," http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contented=radiation_safety_qa.html.

vigilant and will be augmented with radiation screening of shipments" and its import tracking system "has been programmed to automatically flag all shipments of FDA-regulated products from Japan." USDA has stated that "USDA and its federal partners through the Food Emergency Response Network are preparing to begin sampling, if necessary." Existing U.S. trade laws, including the Tariff Act of 1930 (19 U.S.C. 1304), generally require all imported articles to be marked with the English name of the country of origin. Various other country-of-origin labeling requirements also apply under other laws that govern FDA and USDA[68] and other USDA programs.[69] Several international organizations, including organizations within the United Nations, are monitoring international concerns over the safety of food produced in Japan.[70]

Many U.S. and international industry sources have indicated that the current situation in Japan might cause disruption in global food markets, but also have indicated the likelihood that Japanese demand for imported food might increase. Historically, Japan has been an important trading partner with the United States, and is our fourth-largest agricultural export market. It is still not clear what effect, if any, Japan's food supply and demand situation will have on world farm commodity markets and food prices.

Legislative Activity

H.Res. 172 (Honda). Expressing heartfelt condolences and support for assistance to the people of Japan and all those affected in the aftermath of the deadly earthquake and tsunamis of March 11, 2011.

S.Res. 101 (Reid) A resolution expressing the sense of the Senate relating to the March 11, 2011, earthquake and tsunami in Japan. Passed by unanimous consent in the Senate on March 14, 2011.

[68] For example, FDA requirements under the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301 et seq.); FSIS requirements under the Federal Meat Inspection Act (21 U.S.C. 601 et seq.) and the Poultry Products Inspection Act (21 U.S.C. 451 et seq.).

[69] For example, requirements under Country of Origin Labeling program and the Perishable Agricultural Commodities Act.

[70] See, for example, U.N. World Health Organization (WHO), "FAQs: Japan Nuclear Concerns"; U.N. Food and Agriculture Organization (FAO), "United Nations System Response"; U.N., "Nuclear Emergency in Japan and Food Safety Concerns"; International Food Safety Authorities Network (INFOSAN), "Information on Nuclear Accidents and Radioactive Contamination of Foods"; and Codex Alimentarius, "Codex General Standard for Contaminants and Toxins in Food and Feed," Stand. 193-1995.

Appendix.

Table A-1. Japan's Top Merchandise Exports by Market Country

(millions of current U.S. dollars)

					% Share		
Rank	**Country**	**2008**	**2009**	**2010**	**2008**	**2009**	**2010**
0	—World—	781,952.3	580,465.4	770,112.2	100.0	100.0	100.0
1	China	124,952.2	109,576.6	149,692.3	16.0	18.9	19.4
2	United States	137,306.0	93,624.2	118,798.2	17.6	16.1	15.4
3	Korea, South	59,418.2	47,217.0	62,299.1	7.6	8.1	8.1
4	Taiwan	46,033.6	36,409.8	52,474.2	5.9	6.3	6.8
5	Hong Kong	40,280.6	31,858.7	42,315.2	5.2	5.5	5.5
6	Thailand	29,491.5	22,247.9	34,235.6	3.8	3.8	4.5
7	Singapore	26,627.5	20,694.3	25,236.7	3.4	3.6	3.3
8	Germany	23,984.3	16,646.2	20,445.2	3.1	2.9	2.7
9	Malaysia	16,436.8	12,859.1	17,643.1	2.1	2.2	2.3
10	Netherlands	21,077.0	13,512.5	16,399.5	2.7	2.3	2.1

Source: Japan Customs, via *Global Trade Atlas*.

Note: Countries ranked by trade value in 2010.

Table A-2. Japan's Top Merchandise Imports From Source Countries

(millions of current U.S. dollars)

					% Share		
Rank	**Country**	**2008**	**2009**	**2010**	**2008**	**2009**	**2010**
0	—World—	762,487.7	551,787.9	692,844.6	100.0	100.0	100.0
1	China	143,657.2	122,514.5	153,370.1	18.8	22.2	22.1
2	United States	77,666.9	58,959.1	67,400.1	10.2	10.7	9.7
3	Australia	47,677.2	34,729.6	44,805.6	6.3	6.3	6.5
4	Saudi Arabia	50,840.8	29,192.0	35,890.3	6.7	5.3	5.2
5	United Arab Emirates	46,759.0	22,713.8	29,280.6	6.1	4.1	4.2
6	Korea, South	29,500.7	21,977.6	28,641.8	3.9	4.0	4.1
7	Indonesia	32,555.1	21,810.6	28,113.8	4.3	4.0	4.1
8	Taiwan	21,824.6	18,336.6	23,073.8	2.9	3.3	3.3
9	Malaysia	23,241.2	16,726.6	22,708.1	3.1	3.0	3.3
10	Qatar	26,422.4	15,924.2	21,697.0	3.5	2.9	3.1

Source: Japan Customs, via *Global Trade Atlas*.

Note: Countries ranked by import value in 2010.

Table A-3. Japan's Top Surplus Balance Countries

(millions of current U.S. dollars)

Rank	Country	2008	2009	2010
0	—World—	19,464.6	28,677.5	77,267.5
1	United States	59,639.1	34,665.0	51,398.1
2	Hong Kong	38,718.8	30,760.4	40,794.9
3	Korea, South	29,917.6	25,239.4	33,657.4
4	Taiwan	24,209.0	18,073.2	29,400.4
5	Singapore	18,734.8	14,589.1	17,081.3
6	Panama	10,952.7	12,641.4	15,004.8
7	Thailand	8,678.5	6,225.0	13,210.8
8	Netherlands	17,255.2	10,055.1	12,445.4
9	United Kingdom	8,974.6	6,123.4	7,874.2
10	Mexico	6,137.0	4,037.7	5,979.6

Source: Japan Customs, via *Global Trade Atlas*.

Note: Countries ranked by 2010 balance data.

Table A-4. Japan's Top Deficit Balance Countries

(millions of current U.S. dollars)

Rank	Country	2008	2009	2010
1	Saudi Arabia	-42,941.6	-23,801.2	-29,407.0
2	Australia	-30,389.3	-22,548.7	-28,960.7
3	United Arab Emirates	-35,872.2	-16,222.6	-21,946.9
4	Qatar	-24,391.2	-14,295.9	-20,555.9
5	Indonesia	-19,947.6	-12,481.7	-12,192.0
6	Iran	-16,336.0	-7,655.0	-9,080.2
7	Kuwait	-13,117.7	-7,744.6	-8,870.8
8	Russia	3,112.3	-5,560.9	-8,100.3
9	Malaysia	-6,804.4	-3,867.5	-5,065.0
10	Chile	-5,166.4	-3,954.9	-4,849.5

Source: Japan Customs, via *Global Trade Atlas*.

Note: Countries ranked by 2010 balance values.

Table A-5. World Top Five Exporting and Importing Countries

(Merchandise trade, all commodities, calendar years 2008-2010)

Top Five Reporting Countries' Exports with World, Ranked by 2010 Exports

	Millions of Current U.S. Dollars			% Change	% of Total
Country	**2008**	**2009**	**2010**	**2010/2009**	**2010**
World Total	15,426,934	11,794,981	12,592,915	6.8	100.0
China	1,428,319	1,201,663	1,577,941	31.3	12.5
USA	1,287,442	1,056,043	1,277,504	21.0	10.1
Germany	1,448,973	1,120,639	1,268,890	13.2	10.1
Japan	781,952	580,465	770,112	32.7	6.1
Netherlands	638,503	498,503	573,352	15.0	4.6

Top Five Reporting Countries' Imports from World, Ranked by 2010 Imports

	Millions of Current U.S. Dollars			% Change	% of Total
Country	**2008**	**2009**	**2010**	**2010/2009**	**2010**
World Total	15,950,342	12,041,608	12,854,666	6.8	100.0
USA	2,103,641	1,559,625	1,912,092	22.6	14.9
China	1,133,388	1,005,555	1,394,813	38.7	10.9
Germany	1,185,536	925,833	1,066,723	15.2	8.3
Japan	762,488	551,788	692,845	25.6	5.4
France	716,502	559,895	606,168	8.3	4.7

Source: CRS with National Trade Reporting Agencies, via *Global Trade Atlas.*

Notes: Statistics based on countries reporting as of 3/22/2011.

Table A-6. Monthly Japanese Merchandise Trade Data with Top Partner Countries

(Through April 2011, in millions of U.S. dollars)

Japanese Exports to Top Market Countries

Partner Country	**Nov. 2010**	**Dec. 2010**	**Jan. 2011**	**Feb. 2011**	**Mar. 2011**	**Apr. 2011**
—World—	65, 948	73,340	60,155	67,715	71,788	61,996
China	13,218	15,421	11,233	14,103	14,796	12,882
United States	10,544	11,642	9,110	10,320	10,143	8,066
Korea, South	5,100	5,586	5,081	5,239	6,020	5,777
Taiwan	4,322	4,755	4,017	4,348	4,779	4,430
Hong Kong	3,436	4,152	2,927	3,204	3,956	3,418
Thailand	2,979	3,213	2,838	3,051	3,185	3,120
Singapore	2,362	2,148	2,039	2,090	2,292	2,052
Panama	986	1,257	1,729	850	1,648	1,211

Japanese Exports to Top Market Countries						
Partner Country	**Nov. 2010**	**Dec. 2010**	**Jan. 2011**	**Feb. 2011**	**Mar. 2011**	**Apr. 2011**
Germany	1,888	1,968	1,682	1,882	1,966	1,763
Malaysia	1,420	1,793	1,409	1,508	1,635	1,545

Japanese Imports from Top Source Countries						
Partner Country	**Nov. 2010**	**Dec. 2010**	**Jan. 2011**	**Feb. 2011**	**Mar. 2011**	**Apr. 2011**
—World—	64,038	64,706	65,957	59,836	69,505	67,584
China	15,098	14,330	14,959	11,152	15,637	14,182
United States	6,205	5,672	5,635	5,524	6,052	6,101
Australia	4,394	4,214	4,161	3,520	4,309	4,068
Saudi Arabia	3,144	3,662	3,947	3,961	4,443	3,743
United Arab Emirates	2,577	3,124	3,116	3,183	3,310	3,607
Korea, South	2,863	2,857	2,977	2,715	3,087	3,329
Indonesia	2,457	2,712	2,671	2,645	2,941	2,708
Malaysia	2,068	2,212	2,190	2,205	2,534	2,529
Qatar	2,123	1,897	2,060	2,035	2,307	2,442
Taiwan	1,963	1,812	1,943	1,703	1,965	1,895

Japanese Balance with Top Surplus Trade Partners						
Partner Country	**Nov. 2010**	**Dec. 2010**	**Jan. 2011**	**Feb. 2011**	**Mar. 2011**	**Apr. 2011**
—World	1,911	8,634	-5,802	7,879	2,282	-5,589
Hong Kong	3,308	4,009	2,798	3,093	3,769	3,321
Korea, South	2,237	2,729	2,104	2,524	2,932	2,447
Taiwan	2,358	2,943	2,074	2,645	2,814	2,534
United States	4,339	5,970	3,475	4,796	4,091	1,965
Singapore	1,716	1,447	1,364	1,477	1,615	1,364

Japanese Balance with Top Deficit Trade Partners						
Partner Country	**Nov. 2010**	**Dec. 2010**	**Jan. 2011**	**Feb. 2011**	**Mar. 2011**	**Apr. 2011**
—World—	1,911	8,634	-5,802	7,879	2,282	-5,589
Saudi Arabia	-2,683	-2,902	-3,536	-3,378	-3,827	-3,448
Australia	-3,132	-2,900	-3,006	-2,156	-3,152	-3,321
United Arab Emirates	-1,999	-2,468	-2,652	-2,547	-2,674	-3,212
Qatar	-2,053	-1,832	-1,997	-1,944	-2,238	-2,404
China	-1,879	1,090	-3,727	2,951	-841	-1,300

Source: U.S. Department of Commerce, U.S. Census Bureau, via *Global Trade Atlas*.

Table A-7. Monthly U.S. Merchandise Trade Data With Top Partner Countries

(Through January 2011, in millions of U.S. dollars)

United States: Exports to Top Market Countries

Rank	Country	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11
0	—World—	107,789	117,596	112,948	116,990	110,243
1	Canada	21,883	22,193	20,989	20,441	20,675
2	Mexico	14,008	15,353	14,840	14,520	14,840
3	China	7,168	9,303	9,481	10,121	8,078
4	Japan	4,979	5,551	5,221	5,460	4,993
5	Germany	4,110	4,373	4,566	4,098	3,648
6	United Kingdom	3,940	4,273	3,858	4,163	4,136
7	Netherlands	3,146	3,387	3,266	3,290	3,164
8	Korea, South	3,004	3,335	3,189	3,451	3,197
9	Brazil	2,974	3,219	3,005	3,035	3,212
10	Taiwan	2,358	2,218	2,532	2,606	2,283

United States: Imports from Top Source Countries

Rank	Country	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11
0	—World—	166,372	170,119	168,850	166,398	166,274
1	China	34,999	34,820	35,116	30,802	31,350
2	Canada	22,980	23,285	22,741	24,313	24,359
3	Mexico	19,780	21,106	20,456	19,211	19,735
4	Japan	10,017	11,217	11,015	11,360	9,974
5	Germany	6,768	7,669	7,662	7,362	6,768
6	Korea, South	4,269	4,427	4,769	4,151	4,200
7	Venezuela	2,843	2,432	2,691	2,743	3,648
8	United Kingdom	3,972	4,382	4,151	4,472	3,598
9	Taiwan	3,303	3,246	3,311	3,228	3,225
10	Nigeria	2,817	2,209	2,114	2,905	3,145

United States: Top Deficit Balance Partners

Rank	Country	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11
0	—World—	-58,584	-52,523	-55,901	-49,408	-56,031
1	China	-27,831	-25,517	-25,634	-20,682	-23,271
2	Japan	-5,037	-5,666	-5,794	-5,900	-4,981
3	Mexico	-5,772	-5,753	-5,617	-4,691	-4,895

United States: Exports to Top Market Countries						
Rank	**Country**	**Sep-10**	**Oct-10**	**Nov-10**	**Dec-10**	**Jan-11**
4	Germany	-2,658	-3,296	-3,096	-3,264	-3,120
5	Ireland	-2,247	-2,711	-2,312	-2,613	-1,917
6	Saudi Arabia	-1,790	-1,398	-2,106	-1,761	-1,594
7	Canada	-1,097	-1,093	-1,752	-3,872	-3,684
8	Nigeria	-2,465	-1,844	-1,749	-2,524	-2,876
9	Russia	-1,796	-1,547	-1,667	-1,403	-2,126
10	Venezuela	-1,899	-1,231	-1,580	-1,995	-2,817

Source: U.S. Department of Commerce, U.S. Census Bureau, via *Global Trade Atlas*.

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