

Economics

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Japan Weekly

Interim report

- **We became more pessimistic this week** — Our assessment of the economic impacts from the earthquake and ensuing events has been gradually turning for the worse this week as we come to realize how severely Japan's supply capacity has been damaged.
- **Power supply will be the key** — The power supply reduction due to the nuclear power plant shutoffs could prolong the negative impact on production. Using TEPCO electricity supply and sales volume data, we calculate how much power supply to companies (in areas supplied by TEPCO) would be reduced under three scenarios. Our calculations produce the following results: a worst-case scenario of a 54% reduction, a base-case scenario of 20%, and a best-case scenario of 7%.
- **Damage to tangible assets is ¥10trn or higher** — We think damage to housing and infrastructure is, at minimum, similar to and probably larger than that of the 1995 Kobe earthquake. Some of the damage will likely generate reconstruction demand and bolster economic activities going forward. However, the negative impact from supply constraints is unlikely to be fully offset by reconstruction demand within this year.
- **BoJ may underwrite government debt directly** — Today's *Sankei Shimbun* reported that the government will issue ¥10trn in construction bonds and that the BoJ will underwrite all of this. If this happens, it would be the first direct underwriting of government debt by the central bank since World War Two.

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Interim report

Kiichi Murashima

Our assessment of the economic impacts from the earthquake and ensuing events has been gradually turning for the worse this week as we come to realize how severely Japan's supply capacity has been damaged. Here is our latest, though still interim, view.

The Eastern Japan earthquake which hit northeastern Japan is already strongly depressing economic activities via outages at production facilities in devastated areas, limited power supply due to the shutdown of nuclear power plants, and parts-supply shortages in areas not directly affected.

Factories in a broad area have already stopped operations, and this will likely have a material impact on macroeconomic indicators. The four prefectures (Iwate, Miyagi, Fukushima and Ibaraki) hardest hit by the earthquake/tsunami combined account for 6.2% of nationwide gross production (Figure 1). In manufacturing production, the four prefectures account for 7.2%. If we assume that production in these prefectures is down by an average of 20%-40% through the end of March, Japan's industrial production for the month would be dragged down by 1.0%-2.0%. But more importantly, adverse effects have spread to other areas because of a parts supply shortage and power supply reduction, which should mean a significantly larger harmful impact than we currently estimate. The Ministry of Economy, Trade and Industry projected that the production index will increase 1.9% MoM in March, but now that the situation has changed drastically, it seems likely that production will actually decrease. Also, it appears unlikely that production will normalize in April and beyond.

Figure 1. Economic scale (gross prefectural production) of four prefectures hit hardest (F2007, ¥trn)

	Gross prefectural production	(share)	Manufacturing	
				(share)
Iwate	4.5	0.9%	0.8	0.7%
Miyagi	8.3	1.6%	1.2	1.1%
Fukushima	7.9	1.5%	2.2	2.0%
Ibaraki	11.6	2.2%	3.8	3.4%
Total	32.3	6.2%	8.0	7.2%
Nationwide	520.2	100.0%	110.4	100.0%

Source: Cabinet Office, Citi Investment Research and Analysis.

Figure 2. Estimation of damage suffered by particularly hard-hit areas (housing)

	Population	Number of households	Total damage (¥100mn)
Iwate, Rikuzentakata city	23,000	7,667	767~2,300
Miyagi, Kesenuma city	74,000	26,000	2,600~7,800
Onagawa city	10,000	3,333	333~1,000
Fukushima, Minamisoma city	70,000	23,000	2,300~6,900
Total	177,000	60,000	6,000~18,000

Note: Where the number of people per household, we assume 3. We assume ¥10mn-¥30mn in damage per house.

Sources: Nikkei, Citi Investment Research and Analysis.

In particular, the power supply reduction due to the nuclear power plant shutoffs could prolong the negative impact on production, in our view. Figure 3 is a breakdown of TEPCO's electricity supply by power source. In FY2009, supply totaled 304.5bn kWh, including 80.9bn kWh from nuclear plants. The suspended Fukushima 1 (Dai-Ichi) and Fukushima 2 (Dai-Ni) nuclear plants generated 65.8bn kWh (reactors No. 4-6 at Fukushima 1 were undergoing periodic maintenance). Supply from thermal plants in FY2009 totaled 161.1bn kWh. TEPCO says approximately 17% of thermal capacity is down due to the earthquake. Figure 4 breaks down TEPCO's sales volume for FY09. 96.1bn kWh was consumed by the residential sector for lighting (although this also

includes certain other users like convenience stores). We believe the remainder of sales were to companies.

Figure 3. TEPCO power supply breakdown (100mn kWh)

FY	Total							
		Nuclear				Thermal	Hydro	Others
		Fukushima 1	Fukushima 2	Kashiwazaki	Kariwa			
2005	3,134	1,007	262	231	515	1,573	117	437
2006	3,127	1,125	283	293	549	1,456	129	417
2007	3,231	683	295	271	116	1,931	121	497
2008	3,142	663	338	325	0	1,826	107	545
2009	3,045	809	330	328	151	1,611	101	523

Source: TEPCO, Federation of Electric Power Companies of Japan, Citi Investment Research and Analysis.

Next, we calculate how much electricity supply to companies (in the area serviced by TEPCO) would be reduced under worst-case, base-case, and best-case scenarios (see Figure 5). The electricity supply/demand debate is likely to heat up as the summer demand peak approaches; we do not consider this seasonality but rather look at demand on a full-year basis. Our calculations are based on rough assumptions as we believe it is necessary to cover a wide range of possibilities.

Worst-case scenario: TEPCO suspends operations at all nuclear plants (including Kashiwazaki Kariwa, which currently is partly operating), reducing capacity by 80.9bn kWh. Operations cannot be restarted at thermal power plants that are currently down (161.1bn kWh x 17%). Residential lighting demand declines 10%. In this case, we calculate that, versus FY2009, electricity supply to companies would fall by 98.7bn kWh or 54%.

Figure 4. TEPCO electricity sales volume breakdown (100mn kWh)

FY	Total			
	Electric light	Electric power	Specific	scale demand
2005	952	135		1,800
2006	932	126		1,818
2007	976	128		1,870
2008	961	119		1,810
2009	961	114		1,727

Figure 5. Industry supply shortage under three scenarios (100mn kWh)

	Assumptions	Power supply reduction to industry (vs. normal)
Worst-case scenario	<ul style="list-style-type: none"> Suspend operations at all nuclear plants (including Kashiwazaki Kariwa) Thermal power plants that are currently down cannot restart Residential lighting demand declines 10% 	987 (down 54%)
Base-case scenario	<ul style="list-style-type: none"> Kashiwazaki Kariwa nuclear plant continues to operate at the current rate but others remain suspended Operations at suspended thermal plants return to normal quickly Residential electricity demand declines 30% 	370 (down 20%)
Best-case scenario	<ul style="list-style-type: none"> Output at Kashiwazaki Kariwa increases to 30,000GWh but others remain suspended Operations at suspended thermal plants return to normal quickly Imports and alternative energy provides 10,000GWh Residential electricity demand declines 30% 	121 (down 7%)

Source: TEPCO, Citi Investment Research and Analysis.

Source: Citi Investment Research and Analysis.

Base-case scenario: The Kashiwazaki Kariwa plant continues to operate but operations at other nuclear plants remain suspended. Operations at thermal

plants return to normal quickly. Residential electricity demand declines 30%. In this case, we calculate that electricity supply to companies would fall by 37bn kWh or 20%.

Best-case scenario: Output at Kashiwazaki Kariwa doubles to 30bn kWh but operations at other nuclear plans remain suspended. Operations at thermal plants return to normal quickly. Residential electricity demand declines 30%. In addition, imports and alternative energy provide 10bn kWh. In this case, we calculate that electricity supply to companies would fall by 12.1bn kWh or 7%.

TEPCO supplies 32.4% of Japan's electricity (as of FY2009) and a reduction of these levels would have a nationwide impact. Only in our best-case scenario, we believe companies would be able to offset the loss of power supply.

Meanwhile, it is difficult to gauge how much damage was done to housing and infrastructure (roads, railroads and so on) accurately, but we suspect it is at minimum similar to, and probably larger than, that of the 1995 Kobe earthquake (Figure 6). The assumptions for our rough estimate are as follows. Please see Figure 2 regarding housing damage, the population reported by the media, and the number of households in some stricken areas. If we assume that about 60,000 houses suffered ¥10mn-¥30mn damage per house, this alone comes to a total of ¥0.6-¥1.8trn. Moreover, this number most likely reflects only a portion of damaged houses, and we believe the overall damage could easily reach several trillion yen. Roughly speaking, combined with damage to infrastructure (roads, railroads, ports, and so forth) and power plants, the total damage could go as high as ¥10tn or more.

Figure 6. Damage to tangible assets suffered in the 1995 Kobe earthquake (¥100mil)

Building	58,000
Railroad	4,070
Highway	6,000
Public civil engineering facility (ex. highway)	3,215
Port	10,400
Educational facility	2,524
Agriculture, forestry and fishery	975
Gas and electricity	2,510
Commerce and industry	6,300
Others	1,066
Total	95,060

Figure 7. GDP estimation (% , QoQ for quarterly data)

		Our previous forecast	Estimation reflecting the earthquake damage
2011	1Q	0.4	0.2
	2Q	0.6	-0.3
	3Q	0.6	1.6
	4Q	0.5	1.1
	1Q	0.6	0.6
	2Q	0.4	0.4
CY			
2011		1.7	1.4
2012		1.9	2.6
FY			
2010		2.9	2.9
2011		1.9	1.8
2012		1.8	2.1

Sources: The Japan Civil Engineering Consultants Association, Earthquake Disaster Literature, Citi Investment Research and Analysis.

Source: Citi Investment Research and Analysis.

Some of the damage will likely generate reconstruction demand and bolster economic activities going forward. However, given that some areas may have been too badly damaged to be rebuilt, actual construction demand may be far smaller than damage. Assuming restoration demand of ¥1trn in 2011 H2, ¥1.3trn in 2012 H1, and ¥0.6trn in 2012 H2 (about ¥3trn in total), and taking into account the negative impact on near-term growth above (assumed to continue into 2011 Q3), we estimate GDP growth rates (Figure 4). The results of this estimate suggest that GDP growth could be significantly lower than our previous forecast in 2011 H1, and we expect negative growth in Q2. Meanwhile,

growth in H2 could be higher than previously expected as reconstruction demand materializes and power supply also normalizes. However, in our new estimate GDP growth in 2011 would be lower than under our previous forecast, meaning that the negative impact from supply constraints are unlikely to be fully offset within this year.

Finance Minister Yoshihiko Noda has said that the size of a supplementary budget for the Eastern Japan earthquake “will have to be larger than that for the Great Hanshin Earthquake although we do not have a concrete figure in mind yet.” It is also reported that the DPJ’s policy research council official mentioned the size of “more than ¥10tn.” These comments are generally consistent with our estimation that the damage by the latest disaster (especially of buildings and plants) is at least comparable to that caused by the Kobe earthquake. In the case of the Kobe earthquake, a total of some ¥3.4trn was provided for countermeasures in the form of a second supplementary budget in fiscal 1994 and the first and second such budgets in fiscal 1995. The fact that the government has and will have resources from reserve funds in the fiscal 2010 budget (¥200bn left) and such funds for economic crisis/regional revitalization and reserve funds in the fiscal 2011 budget (¥810bn and ¥350bn, respectively) alone suggests that quite a substantial extra budget will likely be compiled.

We cannot fully deny the possibility that an extra budget will add upward pressure on long-term interest rates due to concerns over further deterioration in fiscal conditions. However, today’s *Sankei Shimbun* reported that the government will issue ¥10 trillion in construction Bonds and that the BoJ will underwrite all of this. If this happens, it would be the first direct underwriting of government debt by the central bank since World War Two.

Economic Indicators

Economic Indicators

Mar. 22 (Tue) 1:30 p.m. Tokyo Time	All Industry Activity Index (Jan)	Forecast: 2.8% Mo.-Mo.; 1.6% Yr.-Yr. Previous: -0.2% Mo.-Mo.; 1.9% Yr.-Yr.
	Given the actual January tertiary industry activity index (+2.1% MoM) and actual industrial production data (+1.3% MoM), the all industry activity index in January probably rose by 2.8% MoM after a drop for a fifth consecutive month. We expect that the construction industry activity index in January will increase by 1.2% MoM after -0.1% MoM the previous month. The government services etc. index should remain at the same level from one month ago for a second consecutive month. Based on these estimates, the average level of January and February all industry activity indexes would be about 2.6% higher than the fourth-quarter average.	
Mar. 24 (Thu) 8:50 a.m. Tokyo Time	Customs-Clearance Trade Balance (Feb)	Forecast: ¥1150.0 Billion NSA; ¥1009.4 Billion SA Previous: ¥647.3 Billion NSA; ¥191.8 Billion SA
	Our February trade balance forecast is ¥1150.0bn before seasonal adjustment and ¥1009.4bn on a seasonally adjusted basis. Growth in the yen value of exports in February likely picked up to +13.6% YoY from +1.4% YoY in January. Growth in the volume of exports probably rose by 11.8% year on year (2.3% in January). Real exports (the seasonally adjusted nominal export value divided by the seasonally adjusted export price index) likely rose by 6.6% month on month after +0.7% MoM in January. If this estimate is accurate, the average level of January and February real exports would be about 7.0% higher than the fourth quarter average. Meanwhile, growth in the yen value of imports in February likely increased by 4.3% YoY following +12.5% YoY in January. Growth in the volume of imports probably rose by 2.9% year on year (+11.2% in January). Real imports (the seasonally adjusted nominal import value divided by the seasonally adjusted import price index) probably declined by 7.6% MoM after +6.0% MoM in January. Our forecast would place the average level of January and February real imports 3.2% higher than the fourth quarter average.	
Mar. 25 (Fri) 8:30 a.m. Tokyo Time	Nationwide Consumer Prices, Overall (Feb)	Forecast: 0.0% Yr.-Yr.; 0.1% SA Mo.-Mo. Previous: 0.0% Yr.-Yr.; 0.0% SA Mo.-Mo.
	Excluding Fresh Food (Feb)	Forecast: -0.3% Yr.-Yr.; 0.0% SA Mo.-Mo. Previous: -0.2% Yr.-Yr.; 0.0% SA Mo.-Mo.
	Excluding Food (Excl. Alcoholic Beverages) and Energy (Feb)	Forecast: -0.7% Yr.-Yr.; 0.0% SA Mo.-Mo. Previous: -0.6% Yr.-Yr.; 0.0% SA Mo.-Mo.
	The nationwide core CPI (CPI excluding fresh food) likely declined 0.3% YoY after -0.2% YoY in January. Ten special factors (electricity, gas, communications, rice, petroleum products excluding propane gas, tobacco, medical services, public and private high school fees and charges for accident insurance) likely pushed up the core CPI growth by 0.20ppt after +0.24ppt in January. The contributions of electricity and gas charges were likely -0.01 and 0.04ppt in February, after 0.01 and 0.05ppt contributions the previous month, because of the fuel cost adjustment. Petroleum product prices excluding propane gas likely pushed up core CPI growth by 0.31ppt after +0.32ppt in January. The core CPI adjusted for special factors likely decreased 0.61% YoY in February, following a 0.54% year-on-year drop in January. On the other hand, the core of core CPI (CPI excluding food (excluding alcoholic beverages) and energy) probably declined by 0.7% YoY after -0.6% YoY in January.	
Mar. 25 (Fri) 8:30 a.m. Tokyo Time	Tokyo Consumer Prices, Overall (Mar)	Forecast: -0.1% Yr.-Yr.; -0.1% SA Mo.-Mo. Previous: -0.1% Yr.-Yr.; 0.1% SA Mo.-Mo.
	Excluding Fresh Food (Mar)	Forecast: -0.3% Yr.-Yr.; 0.0% SA Mo.-Mo. Previous: -0.4% Yr.-Yr.; 0.0% SA Mo.-Mo.
	Excluding Food (Excl. Alcoholic Beverages) and Energy (Mar)	Forecast: -0.3% Yr.-Yr.; -0.1% SA Mo.-Mo. Previous: -0.3% Yr.-Yr.; 0.0% SA Mo.-Mo.
	Tokyo's core CPI (CPI excluding fresh food) likely declined 0.3% YoY after -0.4% YoY in February. Ten special factors (electricity, gas, communications, rice, petroleum products excluding propane gas, tobacco, medical services, public and private high school fees and charges for accident insurance) will likely push down the core CPI growth by 0.01ppt in March, after a 0.00ppt contribution in February. The contributions of electricity and gas charges were likely -0.02 and -0.01ppt in March, after 0.00 and 0.01ppt contributions in February, because of the fuel cost adjustment. Petroleum product prices excluding propane gas will probably push up core CPI growth by 0.09ppt after +0.07ppt in February. The core CPI adjusted for these ten special factors likely decreased 0.37% YoY after -0.48% YoY in February. On the other hand, the Tokyo core of core CPI (CPI excluding food (excluding alcoholic beverages) and energy) probably declined 0.3% YoY for the third consecutive month.	

Source: METI, MoF, MIC, Citi Investment Research and Analysis.

Main Forecasts

Currency and Interest Rate Forecasts

	Current	Q1 11 Forecast	Q2 11 Forecast	Q3 11 Forecast	Q4 11 Forecast	Q1 12 Forecast	Q2 12 Forecast
Japan: Yen/US\$	83	84	84	84	85	85	85
Call money	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Long-term benchmark JGB	1.25	1.20	1.20	1.30	1.30	1.50	1.50

Source: 'Global Economic Outlook and Strategy', Citi Investment Research and Analysis (Feb. 23, 2011).

Macroeconomic and GDP Data for Fiscal 2010E-2012E (YoY %)

	2010 E	2011 E	2012 E
Real Gross Domestic Product	2.9 %	1.9 %	1.8 %
Domestic Demand	2.1 %	1.4 %	1.7 %
•Private Domestic Final Sales	1.8	1.4	2.1
••Private Consumption	1.1	0.3	1.3
••Business Investment	5.5	5.0	5.6
••Residential Investment	-0.1	5.9	1.5
•Government Consumption	1.9	0.9	0.8
•Public Investment	-7.9	-2.6	-6.3
•Inventories (Contribution) ^a	0.6	0.2	0.1
Net Exports (Contribution) ^a	1.4 %	0.6 %	0.2 %
•Exports of Goods & Services	17.9	6.2	5.1
•Imports of Goods & Services	10.7	3.8	5.7
Nominal GDP	1.0	1.1	1.4
Consumer Prices ex. Fresh Food	-0.8 %	0.2 %	0.3 %
GDP Deflator	-1.8	-0.7	-0.4
Current Balance (Yen in Trillions)	16.9	19.0	19.0
•Pct. of GDP	3.5 %	3.9 %	3.9 %
Trade Balance (Yen in Trillions)	7.7	9.3	9.3
Corporate Profits	57.5 %	20.0 %	15.0 %
General Govt. Balance (% of GDP)	-9.8	-8.1	-8.7

^a Contribution to GDP growth in percentage points. GDP: Gross Domestic Product.

E: Citi Investment Research and Analysis forecasts as of Feb.23, 2011.

Source: Economic and Social Research Institute; Ministry of Finance; Ministry of Public Management, Home Affairs, Posts and Telecommunications; Bank of Japan; Nihon Keizai Shimbun; Citi Investment Research and Analysis.

Major Economy GDP Growth Forecasts, Calendar 2010E-2012E (YoY %)

	2010 E	2011 E	2012 E
United States	2.9 %	3.1 %	3.3 %
Japan	3.9	1.7	1.9
Euro Area	1.6 %	1.7 %	1.4 %
United Kingdom	1.4	2.3	2.2
Asia	9.1 %	7.7 %	7.8 %
•People's Republic of China	10.3	9.2	9.0

E: Citi Investment Research and Analysis estimates.

Source: 'Global Economic Outlook and Strategy', Citi Investment Research and Analysis (Feb. 23, 2011).

Recent Economic Indicators (YoY % or units as indicated, ¥bn)

	Nov	Dec	Jan	Feb
PRODUCTION				
Industrial Production	5.8 %	4.9 %	4.7 %	
Shipments	8.1	5.4	3.2	
Inventories	1.9	3.7	7.3	
Private Machinery Orders, Excl. Ships and Power	11.6	-1.6	5.9	
Contracted Public Works Orders	-6.3	-18.1	-9.9	
CONSUMPTION				
Retail Sales (METI)	1.5 %	-2.1 %	0.1 %	
All Household Consumption, Nominal	-0.2	-3.2	-0.9	
New Motor Vehicle Registrations	-25.9	-22.7	-16.7	-12.4
New Housing Starts	6.8	7.5	2.7	
LABOR MARKET				
Employment	-0.1 %	0.1 %	-0.1 %	
Unemployment Rate (Level)	5.1	4.9	4.9	
Job Offers/Seekers Ratio (Level)	0.57	0.58	0.61	
New Job Offers	22.6	15.8	18.8	
Cash Earnings (5 Workers or More)	0.2	0.1	0.4	
PRICES				
Nationwide Consumer Prices	0.1 %	0.0 %	0.0 %	
•Excl. Fresh Food	-0.5	-0.4	-0.2	
Domestic Corporate Goods Prices	0.9	1.2	1.6	1.7
MONEY AND CREDIT				
Monetary Base	7.6	7.0	5.5	5.6
M2	2.6	2.3	2.3	2.4
M3	2.0	1.8	1.8	1.8
L (Broadly-defined Liquidity)	0.1	-0.1	-0.1	0.0
Bank Lending	-2.0	-2.0	-1.8	-1.8
TRADE, CAPITAL FLOWS, AND CURRENCIES				
Trade Balance, Customs Clearance Basis, SA	¥536.0	¥580.0	¥191.8	
Export Value Growth (Yen Basis)	9.1 %	12.9 %	1.4 %	
•Volume	9.2	11.5	2.3	
Import Value Growth (Yen Basis)	14.2	10.6	12.4	
•Volume	15.4	7.7	11.2	
Current Account, (SA, Billion yen)	1145.1	1518.6	1089.2	
Yen/US Dollar Spot Rate	¥84.03	¥81.51	¥82.04	¥81.68

Source: Bank of Japan, Various government and industry association statistics, Citi Investment Research and Analysis.

Net Buying and Selling of Japanese Stocks at Three Exchanges by all 58 Incorporated Securities Firms (¥bn)

	Individual			Corporate		Investment	Securities	
	Cash	Margin	Total	Financial	Nonfinancial	Trusts	Foreign	Firms
November	-512.0	-144.6	-656.6	-138.8	40.5	-10.4	420.9	367.9
December	-711.7	124.5	-587.2	-306.7	121.8	-60.3	531.6	335.7
January	-181.3	188.2	6.9	-534.1	57.5	-20.1	720.4	-239.3
February	-505.0	165.6	-339.4	-475.1	38.0	-75.5	932.2	-71.3
02/07~02/10	-113.8	5.9	-107.8	-83.0	14.0	-19.5	204.7	1.7
02/14~02/18	-269.2	-25.0	-294.2	-87.9	-4.1	-21.0	483.1	-62.2
02/21~02/25	26.4	192.8	219.2	-183.7	32.9	-43.9	10.2	-47.2
02/28~03/04	-32.3	22.4	-9.8	-91.5	11.4	-57.7	145.8	-0.4

Note: Data based on net buying by 58 major securities firms with seats on the exchanges.

Source: Tokyo Stock Exchange, Citi Investment Research and Analysis.

Appendix A-1

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