



Japan: Tragic triple disaster

On Friday, 11 March, 2011, Japan was struck by a historically severe earthquake, a devastating tsunami, and a nuclear crisis that is yet unresolved. Thousands of people have already been confirmed dead and thousands more are still missing. The impact on the lives of those affected is foremost in our minds, dwarfing the huge economic impact, the magnitude of which we attempt to estimate in this Special Report.

Short-term effects

The PMI for March, the first post-quake data-point, fell to 46.4 from 52.9. This is the lowest reading since May 2009 when the economy was just exiting from recession. The tragic triple disaster has undoubtedly caused wider short-term loss in activity, that we group into the direct impact on activity in the prefectures hit by the tsunami, the transmission via the energy supply network and (industrial) supply chains, and last but not least nation-wide effects running via economic sentiment.

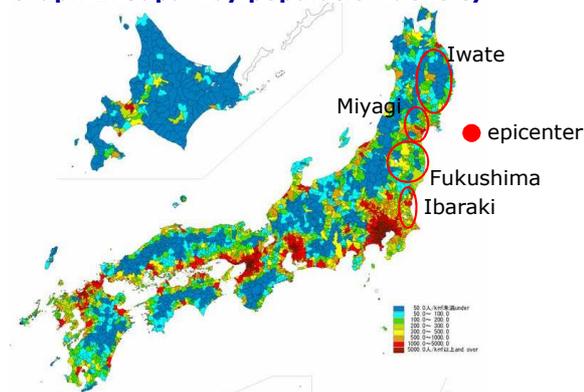
The direct impact on the east coast

The 11 March earthquake had a strength of 9.0 on the Richter scale. The epicentre was located approximately 75 km off the coast of Japan east of Oshika Peninsula, near Sendai city (Miyagi prefecture). For comparison, the 1995 Great Hanshin or Kobe earthquake recorded 7.3 on the Richter scale. Accounting for the logarithmic nature of the Richter scale that makes the Sendai earthquake 178 times stronger than the Kobe earthquake. Within minutes of the earthquake, a powerful tsunami hit Japan, driving waves of up to 23.6m high up its north-eastern coast, reaching as far as 10km inland in some areas, laying waste to an estimated 400 square km of land. The Iwate, Miyagi, Fukushima and Ibaraki prefectures were hit directly. The relatively northern location of the epicentre spared Japan's even more populous south coast, see graph 1 that shows Japanese population density by region from

dark blue (less than 50 inhabitants per square km) to dark red (more than 5,000 inhabitants per square km).

An assessment of the immediate loss of economic activity starts by looking at the volume of economic activity in these prefectures (graph 2). At 6.2% of national GDP, activity in the 4 prefectures combined is substantially smaller than that in Keihanshin that includes Kobe and suffered the consequences of the 1995 Great Hanshin earthquake. Nevertheless, assuming a one third immediate loss in activity in an area in an area accounting for 6.2% of Japanese GDP still yields a substantial loss in national economic activity of about 2%. And that takes into account only the localised activity loss. Supply chain disruptions originating in these prefectures are felt elsewhere in Japan as is the damage done to the national energy supply network, with the Fukushima nuclear threat clearly in the vanguard.

Graph 1: Japan by population density



Source: Statistics Japan (population census '09)

Graph 2: Size of the affected prefectures

	% of national total (2007)				
	Population	GDP	Primary sector	Secondary sector	Tertiary sector
Iwate	1.1	0.9	3.0	0.8	0.9
Miyagi	1.8	1.6	2.4	1.2	1.7
Fukushima	1.6	1.5	2.6	1.9	1.3
Ibaraki	2.3	2.2	4.4	3.2	1.8
Sum of above	6.8	6.2	12.4	7.0	5.7
Keihanshin	13.3	13.1	3.1	12.1	13.6
Tokyo	10.1	17.7	0.7	9.2	21.5
Japan	100	100	100	100	100

Source: Capital Economics
Keihanshin includes the Kyoto, Osaka and Hyogo prefectures

Source: Capital Economics, Rabobank

Transmission via economic linkages

Four nuclear power plants in the earthquake's area of impact (Onagawa, Fukushima Daiichi, Fukushima Daini and Tokai) have been shut down after the earthquake. Together they account for 14 out of 54 nuclear reactors in Japan, or about 8% of national electricity supply. The 6 reactors in the Fukushima Daiichi nuclear power plant –where nuclear radiation has escaped and a full scale meltdown remains a possibility– will probably be shut down permanently, resulting in a permanent loss of 11% of national nuclear energy production (about 4½% of national electricity supply). Additional damage has caused the shutdown of a grand total of about 10%-12% of national power station capacity. Rolling power outages have been used to distribute the available amount of energy, but that has also transmitted the activity loss far beyond the area of immediate impact. The Japanese government expects these power outages –and thus the resulting output losses– to last at least until the end of April. Mind you that Japan operates a dual electricity standard, which effectively implies that its Western generating surplus cannot be used to fill in for the Eastern current shortages. Hence peak demand for electricity during the hot and humid summer season may be more challenging to meet this year around when the Eastern supply network is still being repaired. Further supply chain disruptions are being felt in the car and consumer electronics industries. The supply of crucial intermediate products virtually halted as many of the factories were located in the prefectures directly affected by the Sendai earthquake and tsunami.

Knock-on effects via economic sentiment

Aftershocks and the continuing fear of a full scale nuclear disaster undoubtedly weigh heavily on economic sentiment. There are many reports of people trying to stock up in food, water and other primary necessities across the country. While this may appear to be a positive on consumption as it pushes up retail sales, it is evidently limited by store

shelves and inventories running empty.

Moreover, the negative and probably dominant effect near-term will come from consumers postponing extensive shopping plans, reducing durable consumption volumes far beyond the prefectures directly hit by the Sendai earthquake and tsunami, including the wider Tokyo / Yokohama area. This obviously also generates upward potential through the release of penned-up demand as soon as the nuclear threat diminishes and aftershocks become weaker and more infrequent.

Short-term GDP assessment

To assess the drag on quarterly GDP, we must realise that the disaster hit 11th of March, thus causing these immediate losses in activity for only 3 out of 13 weeks in 11Q1. Hence we expect a drag on the 11Q1 GDP growth rate of about ½-point. As the recovery looked set to regain some momentum the net effect would be flat growth. A further 1½%-point drag will be felt only in the 11Q2 GDP figures, assuming that the energy supply situation prevents a fast and sharp rebound of activity.

Taken together these drags in 11H1 imply that 2011 annual GDP growth will be slashed by 1½%-points-1¾%-points. With our pre-quake baseline forecast for 2011 (and 2012) GDP growth at 1½%-1¾%, that implies stagnant economic activity for the year. We're assuming that the downside potential from power outages and depressed sentiment in 11H1 is broadly offset by the upside potential from reconstruction activity and release of penned-up durable consumption demand in 11H2. In case reconstruction activity in 2011H2 provides for a stronger rebound in activity, this might reduce the drag on the annual figure by ½%-point to ¾%-point and lift the 2012 growth profile in the process through carry over.

Medium- and long-term implications

From 11H2 onwards, activity is expected to rebound as activity levels normalise and additional momentum is gained from reconstruction activity. Issues open for speculation are the

extent to which Japan's national energy supply strategy will be affected and how the government's fiscal response will be received by financial markets in terms of their appetite for Japanese government bonds.

The cost of reconstruction

The physical damage is enormous. The Japanese government on March 23rd estimated the total cost of damage to buildings, roads, and other infrastructure to be \$180bn-\$320bn, or approximately 3%-5% of national Japanese GDP. That makes it the most costly natural disaster since '65 (graph 3). Damage reconstruction will stimulate economic activity for years to come. Note, though, that this results from the way we measure economic activity, which does *not* include the destruction of physical assets, but *does* include the reconstruction of that damage. Put differently, the Japanese will be more active for years to come merely to return their economy to its pre-quake state.

Graph 3: The economic toll

	2010 \$bn	%-GDP at the time
Earthquake and tsunami, Japan (2011)	235	4.1
Kobe earthquake, Japan (1995)	200	1.9
Hurricane Katrina, US (2005)	160	1.0
Northridge earthquake, US (1994)	95	0.6
Sichuan earthquake, China (2008)	90	1.9
Irpinia earthquake, Italy (1980)	70	2.6
Hurricane Andrew, US (1992)	65	0.4
Yangtze River Floods, China (1998)	55	3.0
Great Floods, US (1993)	50	0.3
Tangshan earthquake, China (1976)	50	3.7

Source: *The Economist's* "costliest disasters since '65"

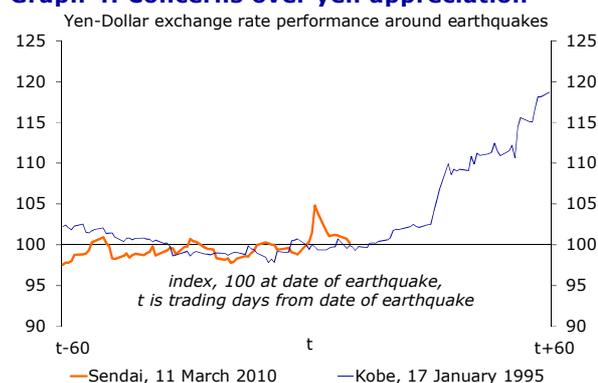
Financial market response

Stock markets immediately responded with construction firms up among heavy selling of insurance firms and car and consumer electronics producers. The Nikkei lost 17.5% in the two trading days after the earthquake before partially recovering to about 10% below its pre-quake level, with sentiment supported by substantial BoJ liquidity injections.

Foreign exchange markets saw yen buying pressure on the back of expected sales of Japanese overseas asset holdings –by (insur-

ance) firms and households alike– to finance domestic reconstruction, as occurred after the Kobe earthquake (graph 4), The net sale of international assets generates the capital inflows to compensate for the capital outflows resulting from increased imports of materials and energy necessary for reconstruction. The G7 engaged in a concerted intervention on March 17 to weaken the yen as a strong yen would constitute an undesirable extra drag on Japanese exports, already dented by domestic supply chain disruptions. With energy and reconstruction materials probably feeding import volumes going forward, net exports are already expected to subtract from GDP growth in the short term without additional yen strength.

Graph 4: Concerns over yen appreciation

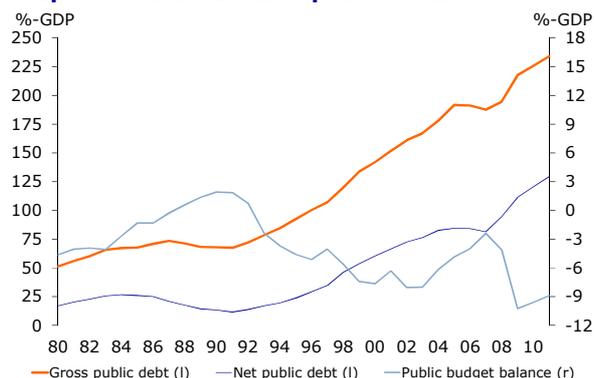


Source: Reuters EcoWin, Rabobank

As the government probably picks up the major part of the reconstruction bill, though, there was also a sharp initial jump in the price of credit insurance on Japanese government bonds (CDS-spreads up to 120bp from 80bp pre-quake). Markets are clearly concerned about further deteriorating public finances.

Fiscal consolidation resolve

That puts the finger on the sore spot as the timing of the Sendai disaster could hardly have been worse in terms of the unsustainable trajectory that public finances were already on (graph 5). Gross public debt approaches 230%-GDP, unrivalled in the industrialised world. Even net debt –at around 130%-GDP– is high by international standards, putting Japan in the same league as the likes of for

Graph 5: Unsustainable public finances

Source: International Monetary Fund, Rabobank

instance Greece and Italy, though it should be noted that Japan –in stark contrast with these two ‘public sector peers’– has been living amply within its means for decades, running a current account surplus since 1981 and boasting net foreign assets worth about 60%-GDP.

And yet the concerns are not merely about the reconstruction-related addition to gross public debt that may now result. Rather, it’s the fear of loss of political resolve to start talks about serious austerity measures needed to return public finances to a sustainable trajectory in the medium term. Instead, the Japanese government –quite understandably– is focused on restoring productive capacity and economic activity, intending for instance to free up about 2%-GDP in loans to keep firms afloat and repair earthquake and tsunami damage. Token compensation is offered within the budget in the form of for instance cuts to child allowances worth 0.05%-GDP. Suggestions that prime minister Naoto Kan was considering a proposal for a cabinet of national unity were briskly declined by the Liberal Democrat Party, the largest opposition party. Thus politicians appear to continue their political struggles where credible austerity and reform measures are called for to flank the additional spending needed to help the economy recover from the Sendai earthquake. We can only hope to be missing the grander scheme of things here or Japan risks a downgrade from the current AA rating its holds with the major rating agencies, as Japan risks a further deterioration of its

already unsustainable fiscal outlook with ageing eroding growth potential going forward. The government risks a further build-up of Japanese government bond market pressure, especially if domestic holdings are being liquidated by firms and households to finance their reconstruction bills. That said, debt finability has not yet deteriorated since the earthquake. Quite the contrary, 10-year government bond yields have even fallen to 1.20%-1.25% since, from pre-earthquake levels around 1.30%.

National energy supply

The future of the Japanese nuclear energy programme is another big issue with long-term implications. Devised to reduce reliance on imports of fossil fuels, the Fukushima nuclear disaster has reopened the nuclear energy debate in Japan (and indeed across the globe). A structural reduction in nuclear energy supply (the Fukushima plant itself accounted for 1½% of national primary energy production) requires larger imported volumes of oil, coal and LNG, structurally reducing the national savings surplus beyond what ageing is already bringing about. Structurally larger investments in for example hydro and solar energy are also conceivable, but only over time.

Conclusions

Despite the enormous human suffering brought about by the Sendai earthquake, its economic implications cannot be ignored. Activity will be substantially lower in the near term, but also rebound strongly as reconstruction starts. Japan needs to recalibrate its energy strategy. And pressure was already mounting to return public finances to a sustainable trajectory in the medium term, if only to recover some degree of fiscal space over time and be in a better position should a natural disaster of this scale strike the country again.

April 2011

Allard Bruinshoofd 0031 (0)30 – 2163272
W.A.Bruinshoofd@rn.rabobank.nl

www.rabobank.com/kennisbank