

The unfolding nuclear disaster in Japan makes any assessment of the near term outlook highly speculative. In coming weeks, as data on the extent of damage to Japan and Hawaii’s tourism industry is collected, UHERO will analyze the impact of the crisis on the near term outlook for Hawaii. In this UHERO Brief, UH economist Ilan Noy asks what research based on previous natural disasters can tell us about the likely long-run macroeconomic impact on Japan.

In the last 14 months, we have seen a spate of very large earthquakes which began with the unprecedented devastation caused by the earthquake in Haiti (1/10/10) – the most destructive natural disaster in modern history (relative to national population), continued with the unusually strong earthquake in Chile (2/27/10), to the most recent events generated by the earthquake in Sendai, Japan.

The horrific toll of this disaster is not yet clear (both in terms of fatalities and physical damage) and the nuclear crisis triggered by this event is still unfolding. Remarkably, in spite of a spate of catastrophic disasters in the last decade (the East Asian tsunami of 2004, the Kashmir earthquake of 2005, and the Sichuan earthquake in 2008 to name a few), we

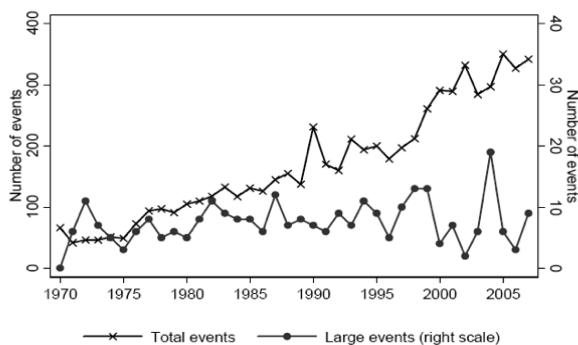
have a fairly limited knowledge of the likely macroeconomic impacts of these events.

Before discussing these impacts, however, it is useful to note that while the most widely used dataset on disasters ([EM-DAT](#)) shows that their incidence has been growing over time, this increase is probably driven by improved reporting of milder events; truly large events do not show a similar trend.

### DIRECT DAMAGE FROM NATURAL DISASTERS

Direct damages—i.e., the damage to fixed assets and capital, to raw materials and extractable natural resources, and most importantly mortality and morbidity—are typically much larger in less developed countries, and countries with a weakened institutional capacity. A comparison of the damages caused by the 2010 earthquakes in Haiti and Chile easily demonstrates this point. The dramatically different outcomes, 240,000 people dead as compared with around 500, originated at least partially from different policies, institutional arrangements, and economic conditions. This makes the Sendai earthquake unusual, since it caused very significant damage in a very prosperous country, and one that

Figure 1: Increasing Prevalence of Natural Disasters 1970 - 2007



Note: Large events refers to events which their intensity is above the mean of the normalized killed distribution  
Source: Authors' calculations based on EM-DAT.

(FIGURE TAKEN FROM [CAVALLO ET AL. 2010](#))

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is typically considered very well prepared to mitigate these events. While the final death toll is still unclear, it appears it will be quite significantly larger than the Kobe earthquake of 1995, the most fatal natural disaster to hit a developed country in many years (when about 6400 people died).

**INDIRECT DAMAGES IN THE SHORT- AND LONG-RUN**

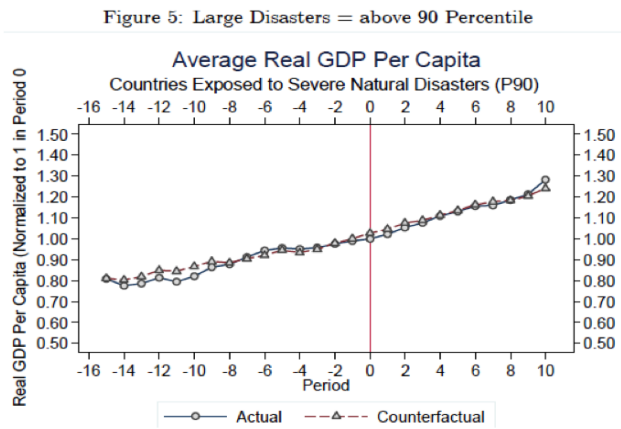
The indirect damages from a natural disaster refer to the impact on economic activity, in particular the production of goods and services, that will not take place following the disaster and because of it. These indirect damages may be caused by the direct damages to physical infrastructure (for example, the damage to the fishing fleet in the Sendai area), or because reconstruction pulls resources away from production (for example, the problems experienced by several industries as a result of rolling blackouts instituted to redirect electricity to the affected area). If significant enough, these costs can be accounted for in the aggregate by examining the overall performance of the economy, as measured through the most relevant macroeconomic variables, in particular GDP, the fiscal accounts, consumption, investment, the balance of trade and the balance of payments. Economists, remarkably, have only recently started attempting to quantify these costs and explain their magnitudes (recent surveys of this new literature

Disaster cost of estimated coefficients

Variable	(1)	(2)	(3)
	All	OECD	Developing
DDAMG-binary (big disasters)	-9.56	1.33	-9.72
DDAMG-binary (cumulative – big disasters)	-11.39	1.99	-11.68
DDAMGS	-0.96	1.58	-1.09
DDAMGS (cumulative)	-1.17	2.34	-1.33

Note: The table reports the change in GDP growth in percentage points that result from natural disasters in the short-run. Calculations are based on specifications presented in Table 4 columns 1–3. The first two rows measure the impact of an average large disaster (> mean direct damage) while the last two measure the impact of a disaster one standard deviation above the mean for direct damages. The cumulative effect is calculated based on the coefficient for the lag GDP growth as estimated in the dynamic panel.

(TABLE TAKEN FROM NOY, 2009)



(FIGURE TAKEN FROM CAVALLO ET AL., 2010)

are Cavallo and Noy, and Sharma).

As a result of several recent research projects (e.g., a World Bank project), the evidence on the short-run growth effects of disasters appears fairly clear by now. Findings in Noy (2009) are representative of this emerging consensus. Countries with higher per capita incomes, higher literacy rate, and better institutions are not only less vulnerable to the initial impact of the disaster, but their macro-economy is less affected as well (see table below). In particular, there is no evidence from recent data that even large natural disasters have any measurable adverse impact on the national economy of rich developed countries like Japan. In contrast, poorer less-developed countries do face significant short-run costs of disasters, and these can translate into significant income losses.

When compared to the research on short-run indirect impacts, the literature on the long-run effects of natural disasters is scant and its results inconclusive. The most recent attempts to evaluate the long-run impact of disasters on GDP suggest that there is no evidence of an adverse impact (if anything, a few papers argue that disasters provide an impetus for ‘creative destruction’ dynamics that lead to increased growth). For example, Cavallo et al (2010) construct counterfactual synthetic countries unaffected by disasters, and

find no significant long-run effect of disasters on per capita GDP (even for very large disasters).

### AND WHAT ABOUT JAPAN?

Given the findings described above, one can conclude that the likely indirect impacts of this horrific earthquake/tsunami event on growth in the Japanese economy will be quite minimal. The Japanese government and the Japanese people have access to large amounts of human and financial resources that can be directed toward a rapid and robust reconstruction and rebuilding of the affected region. Neither do we have any evidence to suggest that the earthquake is likely to have any enduring monetary effects.

This observation, however, does not preclude enduring regional impacts. There is almost no research on this question, but some preliminary evidence suggests that similar large natural shocks can have important regional consequences. One widely mentioned prediction is that the population of New Orleans is unlikely to recover from the dramatic exodus of people from the region after Hurricane Katrina. [Coffman](#)

[and Noy](#) argue that a similar and apparently semi-permanent decrease in population is observable for an Hawaiian island that was hit by a destructive hurricane in 1992.

In addition to these potentially permanent regional impacts, of course, this disaster may have impact on other macro-economic aggregates. The fiscal expansion that will follow this disaster will further increase the Japanese government's debt levels, but since this debt largely stays in Japan, and since households (especially credit-constrained households – see [Sawada and Shimizutani](#)) are likely to 'tighten their belts' and reduce consumption temporarily, these other affects are unlikely to be enduring as well.

One caveat is worth mentioning here: We still do not know what will be the impact of the unfolding crisis in the various nuclear reactors that have been affected. The analysis above ignored this danger, though the still present devastation in Chernobyl attests to its potentially destructive powers.

--Ilan Noy

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Originally published at [econbrowser.com](http://econbrowser.com)

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