

Transcription
“The Economic, Health, and Political Consequences of Japan's Earthquake “
held on March 22, 2011

The Economic, Health, and Political Consequences of Japan's Earthquake

6:00 pm — 7:30 pm, Tuesday, March 22, 2011

Uris Hall, Room 301 Columbia Business School

www.gsb.columbia.edu/cjeb

Panelists

David J. Brenner

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Gerald L. Curtis

Burgess Professor of Political Science, Columbia University

David E. Weinstein

Carl S. Shoup Professor of the Japanese Economy,
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Moderated by **Curtis J. Milhaupt**

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Co-sponsored by:

The Center on Japanese Economy and Business, Columbia Business School

The Weatherhead East Asian Institute, Columbia University

The Program for Economic Research, Columbia University

The Center for Japanese Legal Studies, Columbia Law School

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David Weinstein: My name is David Weinstein. I'm the Associate Director of the Center on Japanese Economy and Business, Director of the Program for Economic Research and a member of the Weatherhead East Asian Institute. All three organizations played important parts in helping us set today's event up.

I have to admit that I wish we had no need for this event. Last week was a very stressful week for me and probably for many of you. I was supposed to be in Japan last week for the Center's 25th Anniversary Conference. And as the days unfolded, I watched the situation deteriorate from an earthquake to a tsunami to a nuclear disaster. We realized that our celebration of the Center was going to turn into a wake and we had to cancel the Conference for obvious reasons.

And then as the week wore on and the nuclear uncertainty grew, my inbox began to fill up with emails from friends that sounded increasingly desperate. And so I wanted to actually just read one email that came in on Thursday from an old Japanese friend of mine, who lives just west of Tokyo.

She writes; Dear David, Serious disaster. 15,000 people have been killed and 390,000 people have been evacuated. Many people still can't get food, water and heat. Sony was closed until yesterday. Today my husband went to the Sony Atsugi plant but gave up working due to power cuts. 30-50 percent of the trains are not running. Probably the situation will continue for another month or more. The power is off three hours a day at home. We are unable to get gasoline, rice, batteries and toilet paper anywhere. TEPCO lost all functions in its six nuclear reactors in Fukushima, which

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means a shortage of approximately 20 percent of total electrical demand.

Hopeless situation. Fukushima reactors, radioactive effects are very scary. Fortunately, my two missing relatives in Miyagi Prefecture were found yesterday. I don't know the details but they said it was a narrow escape, and their relatives are still missing. We are facing the worst disaster ever, but people try to be patient and help each other. My friend Yayoi-san is trying to take in refugees from Fukushima. But I'm so shocked that earthquakes, big waves and radiation killed so many people and attack our daily lives and economy.

Communication between Japan and the US is now easier than communication within Japan. Advice from the US is very valuable. Thank you so much for your help. Fukiko.

Later that morning, I was on the phone with my wife, relaying a request to take care of the daughter of another Japanese friend in the event of a further deterioration at the Fukushima plant. It was a very scary time indeed. As I read those emails, I thought, what can I do to help? And I thought I would follow my friend's injunction that advice from the US is very valuable. That morning I started to organize today's symposium, which is my very inadequate response. My thought was that if we can harness the unique, interdisciplinary Japan knowledge at Columbia, and couple that with scientific information about the crisis, we can improve our understanding of what is unfolding and maybe help relieve some of the uncertainty of the situation.

Looking forward, the death toll will clearly be much higher than those numbers mentioned by Fukiko.

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However, there are reasons for optimism. With the restoration of electricity to all six reactors, the nuclear situation seems to have stabilized. Moreover, we've been witnessing amazing displays of heroism. The world owes enormous gratitude to the Fukushima 50, the 50 TEPCO employees who risked their lives to remain at the nuclear power plant when all seemed lost, not to mention the members of Japan's self defense forces who also put their lives in danger in a desperate bid to cool the reactors, and of course the many rescue workers and others who undoubtedly saved thousands of lives. Their stories should be an inspiration to all of us.

I'm now going to turn the floor over to my colleague Professor Curtis Milhaupt, who will introduce the speakers.

Curtis Milhaupt: Okay. Thank you very much David. Good evening everyone. I want to add my welcome to you to this special panel session on the crisis in Japan. We owe David a great deal of thanks for organizing this discussion on very short notice. In addition to the human tragedy that David very rightly emphasized, I think another very striking aspect of this crisis has been the outpouring of commentary from all over the world on an incredibly wide range of subjects, ranging from possible cultural roots of the calm response of the Japanese, to speculation about why the Yen appreciated so dramatically, to commentary about whether Japan's political weaknesses contributed to the crisis.

And I think the Spanish newspaper, El Pais even managed to work in references to tatemaye and honne in its coverage of the crisis. And I think the range of

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commentary underscores both how much we all feel touched in some way by this crisis but also the potentially very far reaching and wide ranging consequences of this event. And so tonight we're extremely fortunate to have drawn from the Columbia community this panel of experts to help us make sense of these events and to draw connections among these very dramatic events of the last ten days.

So it's my honor to introduce our panelists. I'm going to be very brief, because most of you know them already and our time is short. To my left is Professor David Brenner, Higgins Professor of Radiation Biophysics. Professor Brenner is an expert on the health effects of exposure to radiation. You know Professor David Weinstein, the Shoup Professor of Japanese Economy. David is not only an expert on the Japanese economy and financial system, but he's also done work on the effects of disasters on Japanese and other populations. And finally Gerald Curtis, Burgess Professor of Political Science, one of the world's leading commentators on Japanese politics and government.

So our panelists are each going to speak for about 15 minutes, and then we have plenty of time for questions and commentary from the audience. So David you'll lead us off please?

David Brenner: I need to offer my thanks to the organizer of this get together.

It is a very hard situation and there are a lot of rumors and, certainly in the radiation area, there's a lot of misinformation going around. I thought I would start with a very brief, three minute primer of radiation

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effects and nuclear reactors, and we'll take it from there.

The story here is nuclear fission. Nuclear fission is a process by which neutrons bombard fissile material, uranium in this case, and produce energy. So what a nuclear reactor is trying to do is to take that energy and ultimately get it into a power plant. What happens is that the nuclear reactions are taking place here in the nuclear reactor vessel, and what one does is flow water into the system. The water heats up and keeps the fuel cool and turns into steam. Steam goes into a turbine. The turbine drives a generator and we end up with power. So that's the simple story of how nuclear reactors actually work.

What is going on inside the core is the breaking up of uranium into fission products. And those fission products are radioactive. So what is radioactive? What is radioactivity? Well basically, it's the spontaneous breakup of atoms to produce energy. And that energy can be in the form of particles or waves. But ultimately it is producing ionizing radiation, and it is the radiation ultimately that is the concern here.

Let us talk about what can actually go wrong and what did go wrong in the nuclear reactor. So this is how it should be, as we saw. We have water being pumped over the nuclear fuel rods, [which] gets turned into steam and the steam ultimately goes off to the turbine. So if there's a problem, well, the first thing that happens is that there are control rods which are schematized here, they could and should and did automatically move up into the core. And as you turn the reactor off – and that actually happened, and it happened automatically--

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as soon as the earthquake hit, these control rods moved up and the reactor stopped. So everything was as it should be at that point.

But what followed were the problems, because even though the nuclear reactions have stopped there is still an enormous amount of heat in the core, and that has to be removed somehow. One still needs water flowing through the system covering up the core to prevent the core from over-heating. And that was what went wrong because there was a complete loss of all power as you know.

What then happens is the water is now not covering the fuel rods. The fuel rods actually start to heat up because they are not being cooled down. More steam than normal comes into the system because the temperature is going higher and higher, so there's too much pressure from steam here. The water and the steam also will interact with the metal casings of the fuel because we are at a much higher temperature than we should be. That high temperature makes hydrogen, simple hydrogen from the steam, and we also now have fission products from the actual core because it is uncovered. Normally the fission products would simply be absorbed in the water.

So now we have, in the environment here, steam, hydrogen and fission products. Now you have to get rid of the steam somehow, because the thing is getting higher and higher in pressure, so they in fact open valves to actually release the steam, but as they do that, the radioactive fission products come out as well. So that's a controlled release of fission products, bad thing.

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But also the hydrogen has the potential, as you know, to explode, and that has happened on several occasions in the last few days, so now you get an explosive release of hydrogen and fission products too. There are two ways that the fission products are coming out, both through controlled releases of steam and also through hydrogen explosions.

What we have now is some of these radioactive materials actually entering the environment, and there are actually many different radioactive materials. But there are really two fission products, which are dominating the health story, and these are Iodine-131 and Cesium-137, two radioactive materials.

There are four key pathways by which they will go from a radioactive cloud over the environment and into human beings. The big one – and this a very rough estimate of their relative importance – is drinking milk. What happens is the radioactive iodine in the cloud falls to the ground, cows eating grass ingest the Iodine, [which] gets concentrated ultimately in milk and if you drink the milk you will end up with radioactive iodine, which will make its way to the thyroid.

The second pathway is ingestion of other foodstuffs, largely Cesium-137, which we'll discuss a little more in a moment. Ingestion is a more direct route. It is simply foodstuffs in general falling to the ground, and one eating the foodstuffs. Radioactive material falls on an apple, you eat the apple, simple as that.

The third pathway, inhalation, is simply breathing in these various isotopes, which are in the air, and the fourth, external exposure, is where the radioactive

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materials fall to the ground or falls on your skin or on your clothes and the external radiation comes from there. So in three of these pathways the radioactive material is inside the body; it is internal exposure. Here, with external exposure, the radioactive material is outside of you, in the ground or on your person, and the radiation comes from outside.

Let me put this particular event in a little bit of context. There have been three big radioactive releases from reactors over the years: Three Mile Island in Pennsylvania in '79, Windscale in 1957 in the northwest of England, and Chernobyl in 1986. These numbers give you an indication of the relative significance of these three events. Basically this is a measure of how much radioactivity was released in the form of Iodine-131 or Cesium-137. What you can see is that Chernobyl dominates the other two by a lot. In terms of Iodine-131 Chernobyl was a quarter of a million Three Mile Islands and even more in terms of Cesium-137. Terabecquerel is just a unit of radioactivity. Just look at the relative numbers.

The first thing that everyone was asking when this whole thing started was, is this a Chernobyl situation or is it a Three Mile Island situation? Well, it was very clear right from the outset this could not be a Chernobyl situation. The sort of physical reactor that it was, was not such that the entire core could be released, which is almost what happened at Chernobyl. So we always assumed it as going to be a lot nearer Three Mile Island, and that actually turned out to be the case. Fukushima is perhaps a little more serious than Three Mile Island, although we won't know the numbers for a while yet, but I do not think it is anything like Windscale territory yet. So on a

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scale of these three, we are certainly closest to Three Mile Island.

How long will these radiation exposures last? Well, we need to think both about the physical half-life and the biological half-life of these two isotopes. The physical half-life refers to the physical decay of these materials. They are radioactive, and the half-life tells you how long it takes for half of any given material to radioactively decay away. You see Iodine-131 is actually going to decay away quite rapidly, so if there's any Iodine-131 in the environment, there will be half of it left after eight days, a quarter of it left after 16 days and an eighth of it left after 32 days. Cesium-137 on the other hand, has a very long half-life, so whatever Cesium-137 was deposited in the environment and is being deposited in the environment, that is still going to be there over generations, in fact.

The biological half-life refers to how long a radioisotope takes once it's inside your body to get outside your body, in the case of these two isotopes largely through the urine. From what you see here, for Iodine it is three months, but by which time the Iodine will have pretty well disappeared due to its short physical half-life, so this is the key for Iodine. For Cesium, it stays in your body for quite a long time, for a couple of months essentially.

What are the risks that we should be concerned about here? Well, we need to make the distinction here between those brave folks, the heroes, inside the nuclear power plant who are certainly getting high doses of radiation, and the general population who are getting low doses of radiation.

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Let us talk about the effects of low doses of radiation. Really the only significant effect that is likely to occur is a small increase in long-term cancer risks, and I mean long-term because the latency period between radiation exposure and cancer appearing is ten, twenty, thirty, fifty years. It's a lifetime essentially. We are still seeing increased risks among the A-bomb survivors who were exposed in 1945.

Just to put that in a little bit of perspective, so this is our normal lifetime risk of developing cancer, you and I, we have about a 40 percent chance that we'll end up getting cancer sometime in our life. For people in Hiroshima and Nagasaki who were about a mile away from the explosion, we know what their ultimate lifetime risk is, and it was about point three percent. So even for these people who were exposed to relatively high doses, their risk went up from 44 percent to 44.3 percent. What we are not talking about here is a scenario--a cancer risk that has doubled, or anything of that nature. The issue, of course, is we are talking about large numbers of people exposed to small risks, but we are not talking about large individual risks.

What about those folks inside the reactor? Now there is no doubt at all that they have been and are continuing to be exposed to very high doses of radiation. I mean certainly, in order to get close to the reactor to do what they were doing in the last week, and to get water inside the reactor, they had to get very close to the core, which means very high doses. What happens at a high dose is stem cells, particularly of the blood forming organs and the gastrointestinal system, are the ones that are more affected. The blood cells, for example, the functional

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blood cells running through our body are not really affected. They can do their job even when they're exposed to very high doses. But when they need to be replaced, and our lymphocytes need to be replaced on a regular basis (that is what stems cells are for), that is when the problems arise, because the stems cells are not capable then of dividing to produce new lymphocytes, platelets.

And so, at a certain time after radiation exposure, when the body is called upon to replace various cells that need replacing, it cannot do it, so the ability to replace functional cells when required is compromised. The most likely high dose outcome for those who get really high doses is what's called a hematopoietic syndrome of blood forming organs. The early symptoms are diarrhea, vomiting, nausea, and in fact, there is typically a latency period right after exposure where the patient does okay. That can be, typically, a few weeks so the folks who were exposed to high doses probably are doing okay at the moment.

But there is a crisis period a few weeks later when stem cells are required to do their work, and they cannot do their work. These are the sorts of things that are likely to happen with death, typically, in a couple of months largely due to infection, and what one does is nursing, antibiotics, perhaps stem cell growth factors, possibly bone marrow transplants.

There is another important response, which has been reported in every significant radiation incident that I know of, represented here in a case in Goiania, in Brazil in 1987. There was a case in which some radioactive material that was stolen from a hospital. It glowed in

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the dark and people cut it up and were selling it to each other, but it was very radioactive. When it was finally discovered after a little over a week, about 100,000 people came to be screened. In fact about 250 were contaminated and four died, but of interest here is of the first 60,000 people that were screened, 5,000 people actually showed symptoms that were consistent with radiation sickness, but did not have any radiation exposure, even if the symptoms they had were real.

The level of fear and panic that I am sure is happening in Japan right now, and was certainly happening in Goiania, ultimately results in symptoms, which do mimic radiation syndrome symptoms.

Let me just finish by talking a little bit about what we know of the situation right now. I put this picture in deliberately because this is the good news in fact. Here are the reactors, and here is the ocean. What you see is the wind blowing the plume towards the ocean. The wind is offshore, and the wind has been pretty consistently offshore throughout the whole story. It is ironic, with all this high-tech stuff, that what is saving us mostly is the direction of the wind, which has been offshore. Most of the radioactive material that has been emitted ultimately now either is or is going to be in the Pacific Ocean, where it is going to get so diluted that it will have no significance.

The Ministry of Culture has actually been putting out these sorts of data sheets three or four times a day now for the last few days. These are measurements of doses, dose rates in fact of different locations within a hundred kilometers of the event. We can actually now get a pretty good estimate of what is happening, what the

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doses are, what the risks are. The first few days there was no such information, and it is very pleasing that the government is producing these data.

The concern of the last few days has certainly turned to food, radioactivity in the local food. The biggest story, as we saw in an earlier slide is milk and, absolutely as expected, radioactive iodine is showing up in locally produced milk at levels which are certainly relatively high. The solution to this problem is an easy one, just simply don't sell or drink the local milk, and it did in fact take the government a little while to reach that conclusion. But it really is a short-term issue, because the half-life of Iodine-131 is eight days, so whatever radioactive Iodine-131 is admitted into the environment, it will be gone within a month or so. So as long as we don't drink the milk for a while – other dairy products will be fine.

Cesium-137 is a different story, as I mentioned, because it is going to be around for very much longer. There have been reports of local vegetables with relatively high levels of Cesium-137. The immediate solution is simply to wash it off. I mean, it is just sitting there on the surface of vegetables, but there is a longer term issue here because that Cesium-137 is going to go into the environment; it's going to go into the food chain. It's going to end up in meat and all foods over the next decades, so one is going to have to monitor the amount of Cesium-137 as we go along. I do not think there's good evidence at this point that there is going to be a serious issue here. I think most of the radioactive material that has been emitted is probably radioactive Iodine, and the amount of Cesium is probably relatively small.

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The main question I have been asked, and everyone has been asking of course: what are the likely health consequences? Let us think about a best case, and let us talk about a worse case. In terms of the workers, the 50 to 200 workers that have been inside, it is extremely likely that there are going to be fatalities among them, and they surely knew and know this as they were doing what they were doing, so they are remarkable people. I think probably nobody would have died yet, but I suspect over the coming weeks probably some will.

Let us talk about the general population. The doses are such that there should be no early radiation sickness appearing. What radiation sickness that undoubtedly we will see reported is probably of the psychosocial nature. Real all the same, but not directly radiation related.

What if the plant releases do not really increase significantly from their current levels? We keep hearing a little more good news these days that the power is on in the plants, so one might hope that there will not be any more significant releases. If that is the case, we are probably going to be faced with pretty small increases in cancer risk, certainly not more than .01 percent, one in a thousand risks to a population of perhaps 100,000 or thereabouts. Not something that we would ever be able to detect in any sort of subsequent epidemiological study.

On the other hand, if the worst comes to the worst, the plant releases increase sharply for whatever reason and the wind blows in the wrong direction, onshore-- the worst that can happen-- we are still talking about small

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increases in cancer risk, a little bigger than before. The population affected would be larger, because there would be more material that can travel further. And then we are in the possibility perhaps one could do epidemiological studies to actually look at these cancer risks in the future.

Are there any health consequences for people in the US? Well the short answer is absolutely not. It is inconceivable that the plume could possibly travel the Pacific Ocean without being completely dispersed, so the answer has to be no.

Someone who is in Japan for a few days, post the accident, should they be concerned? I do not think so. I mean even someone who was close to the evacuation zone, given what we now know about the doses, if they were there for a few days, it would be a very small risk.

Should anyone planning to travel to Japan cancel? Should anyone in Japan leave? Well, I am only answering this from the radiation perspective, and if the situation stays pretty well like it is, the answer is certainly no. But we don't know the end of the story, which is probably another week away, so a reasonable approach would be to delay a decision a week.

Should we be concerned about the Japanese food? Well, no not at this time. Over the years we will have to monitor food for Cesium-137, but I would be very surprised if it turns out to be a big issue.

Could it happen in the U.S.? Well, I have said less likely, but I do not know if that is true. What there is in this country is a very detailed station blackout plan. Station

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blackout is what happened in these nuclear power plants. All power, internal, external and emergency was lost. And there are--the NRC, Nuclear Regulatory Commission, has forced all the plants to have station blackout plans. That being said there are 23 reactors in the US of a similar age and design to the older ones that Daiichi [has].

Reactor number one, as you probably know, was built in 1971. It is extremely old. Indian Point, just up the road from here was commissioned in the mid-70s. Modern reactor designs have a lot more passive emergency cooling systems that do not require any power or human beings. I took this from a GE advertisement. That is why I put it in quotes here. “Requires no electrical power, no human intervention.” Well, yeah.

Are we prepared if something similar were to happen in the US? Well, I would say that in fact this country has actually worked very hard recently at addressing an allied problem. And that is the issue of responding to a nuclear terrorist attack, an improvised nuclear device or a dirty bomb. The scenarios are actually very similar, strikingly similar. You have a situation for a dirty bomb where most people would get very low dose radiation exposures, and perhaps a few would get high dose exposures, so the scenarios are actually quite similar. All the planning that has been going on in this country for a dirty bomb actually does apply to a reactor incident.

One of the keys that we have found is the need for individualized biodosimetry, meaning one figures out for every individual what his or her radiation exposure is. There are a lot of reasons for that. One of the big ones is an anti-panic device. If everybody in this room is told

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this is your radiation exposure, [it's] a bit different from some guy in a white coat coming on the TV, or blue coat actually, and saying don't panic. That has proven not to work and has not worked very well in Japan either. What does work is individual estimates of risk. It is important both to reassure people who did not get an exposure, and it is important to identify the people who need treatment.

In fact, a joint project between our medical center and mechanical engineering department here in Morningside over the past four or five years developed the Columbia RABiT, which stands for Rapid Automated Biodosimetry Tool, [and] is designed to do exactly that. Basically you take a finger stick of blood that you can analyze to figure out the individual radiation exposures. The throughput is 30,000 samples a day, and it works very well. It is all done with robots. So that is one of the keys to an optimal response to a large-scale radiological event: to figure out everybody's individual radiation doses.

Thank you.

David Weinstein: Well, thanks very much. I'm going to talk about something completely different, which are the economic consequences of the earthquake. Over the years I've been doing a lot of work on the economics of catastrophes, in Japan in particular. I want to spend a little time talking about the regional impacts of the catastrophe, how the earthquake is going to effect the location of production of Japan, then turn to some of the aggregate impacts on the Japanese economy. So I'll

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spend some time comparing this earthquake with the Kobe earthquake, or what's known in Japan as the Hanshin-Awaji Earthquake of 1995. And I'll talk a little bit about the implications for long- and short-run output for Japan. And then I'll end talking about some additional risk factors.

The start point for thinking about how things affect regional output in Japan, I always feel, is looking at Japanese geography. So this is a topological map of Japan. And the red dot shows you where the earthquake occurred. And the outlined cities are the cities with populations of over a million in Japan. And one of the first things that you can see is that cities tend to locate very much where there's lots of flatland and where you have access to the ocean via bays.

And this has given rise to, kind of within economics, a notion called locational fundamentals, which is the idea that most economic geography is determined by physical geography. A related point is that bigger bays and more flatland yields bigger cities and one of the big implications of this is that shocks that don't effect geography don't effect the location of production much in the long run.

And unfortunately for Japan, Japan has suffered a large number of catastrophic events in its cities, not just most recently, but also as we've seen in Kobe and then in the Second World War. And the evidence that comes out of the analyses of these events suggests that cities bounce back. So this is a graph that shows you the impact of bombing on cities in Japan during the Second World War. On this axis we have the growth rate of population in these cities.

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This is during the wartime period, and in this axis we have the growth rate in these cities in the post-war period. The size of the circles indicates the size of the pre-war populations. And what you can see very clearly is that cities that suffered the most in terms of destruction of their populations during the Second World War, so this is Hiroshima over here with about a 50 percent decline in its population, Tokyo over there, Nagasaki, etcetera, tended to grow very rapidly in the post-war period.

And what that's telling you is that, certainly for cities like Hiroshima, where you actually had to have in migration in order to affect growth, populations and industries tend to return to the same locations where they were before: that cities are very robust types of economic entities and it's very hard to find permanent effects on cities from temporary shocks.

Kobe, which suffered in the 1995 earthquake, is a case in point. We see that Kobe's population in 1990 in the census prior to the earthquake had 1.48 million; in 1995, after the earthquake, that fell by about 60,000, bounced back five years later to 1.49 million and has hovered around 1.5 million since then. So there are a couple of lessons from this and then a couple of questions.

The basic lesson is that the location of production tends not be altered by shocks that don't change physical geography. But then shocks that change physical geography, so here you can think about nuclear fallout that might make land uninhabitable as we saw in Chernobyl. Those types of shocks do have permanent impact on where people live and what is produced.

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So the first question you can ask is were there shocks that changed Japan physically? And if you think about this in term of the recent events, you can think that there were two possible types of shocks. One is reassessment of the danger of living near Fukushima’s nuclear power plants, and as we’ve just heard from Dr. Brenner, those are likely to be relatively small, at least in terms of what impacts they’re going to have on health. But the other one is land loss, and that may be significant in certain areas. And the other is what damage there will be and how long it will take to recover.

So to give you some sense about what the impacts of these shocks are likely to be, I just want to again give you a satellite photo of Japan. Here again, the red is the epicenter of the earthquake, the white dot indicates where the Fukushima reactors were. But if you want to think about this in terms of economic activity, don’t look at satellite photos during the day, look at the ones at night.

So this is the same photograph taken at night. And what you can see in these photographs is that the urban areas light up. So here’s Tokyo, Nagoya, Osaka, Kobe in this area. And again, the Kobe shock, the Kobe earthquake was right around here. And what you can see if that the earthquake occurred in a region of Japan that’s fairly remote, not a lot of light, not a lot of economic activity occurring there. And similarly you can see that the Fukushima plant is located in a region that’s largely dark; again, not a lot of light, not a lot of economic activity. So both of those things tend to mitigate the possible impacts of this disaster on the Japanese economy.

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That said, I want to spend a little time talking about Rikuzen-Takata, which is a town that was directly, or very extremely close to the epicenter of the quake. This is a NASA photograph of Rikuzen-Takata taken on March 11, 2011. I want you to pay attention to the scale here, this is one kilometer over here. So this roughly this distance is about one kilometer, about one kilometer here.

Thirteen days later, Rikuzen-Takata, looked like this. So again, this is before, you can see a beach, you can see lots of land over here. Again, this is about one kilometer here. This is what it looked like after the earthquake. And you can see that there are large chunks of a town that are simply submerged underwater. Probably over 2,000 people died in this town. It's still not quite clear. Up here you can see this line that wasn't there before-- that's the debris field that was created as the wave came inland. And again you can see that this is about two, three kilometers inland and the tsunami came in.

So certain for towns like this we may very well see some permanent effects on their ability to rebuild, simply because the land has been altered by the quake.

And now I want to kind of turn the attention to comparing the Kobe earthquake or the Hanshin quake with the Tohoku earthquake. So I got data, which is current as of 9 p.m. today, Japan time. If you look at dead or missing – and my guess is that most of the missing at this point in this quake are likely to be dead, we can see that human toll in this quake is probably going to be three to four times larger than the toll of the Hanshin quake. So 23,000 people are likely to have died. That number may go up somewhat.

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But a second impact of the quake was on Japanese capital stock. And here you can see that the Kobe earthquake hit in right outside a very large city of about 1.5 million; Rikuzen-Takata is a city of about 20,000. And the damage to buildings and structures was awesome, about a quarter of a million houses were either completely or partially destroyed, compared to much fewer houses apparently destroyed in this crisis. So again, if you want to think about why it is that so many more people died per house destroyed, again, think about a tsunami wave coming in, there that tends to both kill the occupants and destroy the house, whereas here, in Kobe a lot of people could escape from their houses when they were damaged.

Even the estimates of the total number of damaged houses, and again, most of this is occurring not in the three most effected prefectures in Japan, but in places like Ibaraki and further inland. The number of damaged houses-- not collapsed, but more minor damage -- is still much smaller than what we saw in collapsed houses in the Kobe earthquake. In terms of the impact on the economic output in those regions, if you compare Hyogo Prefecture with the three prefectures that were hit the hardest in this earthquake --Miyagi, Iwate and Fukushima -- they're roughly the same in terms of size or in terms of output. If you do a broader estimate, so now throw in Ibaraki into this earthquake and throw Osaka into the other one, then it looks a little bit smaller.

The electrical outages in the past earthquake were actually substantially larger, at least if you believe the TEPCO estimates. So this is homes without any electricity. Rolling blackouts, of course, are affecting a

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larger number of households. And then we can look at the costs: roughly, the Hanshin earthquake cost about 10 trillion yen, so about two percent of Japanese GDP, and the government rebuilding cost about five trillion yen, so that's about one percent of Japanese GDP.

So we can get some sense about what is likely to evolve over the next several months or years by asking what happened after the Hanshin quake. In that earthquake, industrial production fell about 2.6 percent in the first month, so this is for all of Japan. But then it bounced back quite rapidly, about 2.2 percent the next month in February, and one percent in March. So there was a relatively rapid recovery that occurred, with a lot of disorientation in the first month, followed by rapid increases in economic activity. If we look at the impact on aggregate growth in Japan, it's actually surprisingly hard to find an impact on aggregate growth.

The consensus, GDP forecast in the first half of January 1995 for the year, for the calendar year was 1.9 percent for 1995 and 3.1 percent in 1996. None of these people knew about the earthquake in advance. The actual GDP growth rates in '95 were 1.9 percent and 2.6 percent. So actually the forecast hit the actual growth rate dead on in that year despite the fact that we had a major earthquake in Japan.

And this is consistent with a lot of international evidence about the impacts of disasters on GDP growth. Typically, it's often extremely hard to find impacts of disaster casualties on GDP growth rates. What seems to have a bigger impact is destruction of capital stock. But even there, especially when you look at developed countries, as opposed to developing countries, where you actually

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see much bigger impacts – in developed countries we see fairly robust economies and things tend to come back relatively rapidly. One sees losses of capital stock of around one percent only being associated with drops in GDP of around point 6 percent. So again, it’s a bit of a reassuring story. Of course, we don’t know the full impact of this earthquake, but the preliminary evidence suggests that one should not be worried about a major collapse in the Japanese economy as a result of this.

So the next question you may ask is; why do you tend to observe such small impacts from these catastrophic events? The answer tends to be related to the trade-off between the negative affect on supply due to the destruction of capital. This is what the media has been focused on, which is that some factories have shut down, and that there have been breakdowns in supply chains and things like that. These are reductions in capacity. But what tends to offset that on the other side is a positive affect from demand. So suddenly in Japan you’ve got 120,000 households that have to rebuild or repair their homes. You’ve got the government that’s going to have to step in to repair its infrastructure. All of that is going to tend to cause GDP growth to rise. On the flip side, you have the supply problems.

So you can say, which one do you think is going to dominate? Well, if you’d have asked me two week earlier what Japan’s big problem was, I would have said that they’ve got underutilized capital -- capital utilization rates were around 85 percent. You had unemployment, you’re still recovering from a major financial crisis. You had a lot of plants and equipment that were running below capacity. So reductions in capacity are likely to

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have relatively small impacts on the economy when you're not using all of your capacity.

On the other hand, the low levels of aggregate demand that were also present in the Japanese economy suggest that if you increase demand that's going to tend to offset the supply side. And that's what tends to result in relatively small growth impacts from these kinds of catastrophes.

Now that doesn't mean that wealth hasn't been destroyed. It surely has. But it's telling you something about how GDP is measured and what it means for aggregate growth.

I want to close by talking a little bit about whether this time is different. We've got a couple of issues – I don't want to talk about radiation, because I think our previous speaker has talked about that. We still have some electrical power issues for Eastern Japan. It doesn't matter at all for Western Japan; west of Tokyo is fine. It's not clear how long that's going to take to resolve.

There're concerns about a fiscal crisis in Japan. Japan has a very high net debt level, about a 114 percent of GDP. But the reconstruction costs are likely to be relatively small compared to the net debt. Again, Kobe was around one percent of GDP. Even if you think this is double Kobe, it's going to be two percent of GDP. It's hard to think that that's going to be the trigger that will cause Japan's fiscal situation to collapse.

So just to conclude, catastrophic events tend to have very big short term impacts, but their long terms

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impacts tend to be quite small. That said, we'll see over the next month or so, a lot of stories about parts shortages and supply chain disruptions. But I think the conclusion is that, while the human toll is truly horrible, fortunately the aggregate economic impacts are likely to be much less severe.

Gerald Curtis:

Good evening. Let me conclude these presentations with some comments about the political and social situation. And then we'll open the floor to your questions.

First of all I would like to correct some of the misreporting that's taken place in the western media about this crisis. From some of what you see on CNN and other television stations and or read in the newspapers, the situation in Japan may be worse than Chernobyl, posing a veritable Armageddon for Japan and the world. And then you hear someone who knows what he's talking about talk and it's a very different story. So I was very grateful that David Brenner was able to join us this evening.

With regard to the politics and government performance during this crisis, there's been a lot of criticism in the press about the way the Japanese government has responded. I think that is wrong. The way the government has tried to respond to this crisis has been more open and more honest and more forthcoming with the public than has ever been true before. Think back to the way the LDP government dealt with Kobe, and then how this government has responded to a crisis so many times greater than Kobe. Mr. Edano, the chief cabinet secretary, shows up on TV at press conferences at all hours of the day and night -

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you wonder when this man ever gets any sleep - and he is conveying to the public all the facts as he knows them.

I do not believe that the government is trying to hide anything. This DPJ government, unlike the LDP governments that preceded it, has had no long-term relationship with TEPCO, the electric power utility. The DPJ has not cultivated ties with TEPCO and has not been part of the iron triangle of electric power companies, the nuclear power industry, and government regulators that grew so strong over the postwar years. But the American press conflates the government and the TEPCO. TEPCO's behavior throughout this crisis has been appalling and its leadership has been missing in action. There are brave people working for TEPCO and for TEPCO sub-contractors who are taking great risks struggling to get the problems at the Fukushima Daiichi facility under control and as we heard earlier this evening, some of them may well be in danger of dying as a result of it. These are extraordinarily brave human beings.

But TEPCO is an old line Japanese company that essentially is in a monopoly position with deep ties to the bureaucracy, to the regulators and to the former LDP government. And they're not in the habit of telling the public what they're up to. It has become all too apparent that they do not have an adequate crisis management system in place. TEPCO deserves all the criticism it has been receiving and more, but one has been more irate about TEPCO than the Prime Minister himself. He lashed out in fury at the President of TEPCO, something widely reported in the Japanese press, and more importantly, he forced TEPCO to replace its ineffective crisis management committee which Kan

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blamed for not providing timely and comprehensive information, with a joint committee with the cabinet with Kan as chairman., This means not only that the government will be in a position to oversee the actions of the committee but that the Prime Minister and his government have put themselves in a position where they will have to take responsibility for those actions. I think this is a politically bold decision for which Kan deserves some credit. It's only been ten days since this horrible incident, horrible catastrophe began. So it is no wonder that has taken a few days to get things in place and that there is widespread dissatisfaction with the inability of TEPCO and the government to get the problems at Fukushima Daiichi under control.

Nonetheless I think that government has been trying to manage the situation as best it can in an extraordinarily difficult situation. When I read in the American press articles by reporters who believe that the government is in collusion with TEPCO and who attribute the inadequacy of its response to this disaster to cultural factors or to unique features of the Japanese political and economic system, I cannot help but wonder, do they not remember hurricane Katrina? Do they not remember the Gulf oil spill? Do they not remember what we've discovered from the banking crisis about collusion between regulators and the regulator? What is this? This doesn't make any sense.

One more point about the coverage. Fortunately here in New York, we get NHK, so I have spent most of my days this past week glued to the TV screen, watching NHK. Every once in a while I switch the channel and go to one of the networks or CNN or whatever but I have depended on NHK for most of my information. Doing so,

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I've developed a new respect for NHK. If you don't understand Japanese well, even if you watch NHK you are likely to underestimate the gravity of what they are reporting. The commentators are calm, they never raise their voice, they describe the situation in what compared to the excited high pitched tones of so much of American television commentary seems dull or overly understated, that I wonder if some of these American reporters are not concluding that they're downplaying the seriousness of the situation or just not telling the truth. But you listen to what they're saying, the science commentators, the nuclear specialists on NHK, and the anchors, these are true professionals who are telling the public exactly what they know. And they're doing in the same professional way that David Brenner described to you the radiation threats this evening. I think the media, at least the NHK TV has acted with great sense of responsibility, trying to convey to the public information as it's become available and not cause panic by hyping the dangers.

Now let me get to some of the politics of this. There are short-term and long-term political consequences of this catastrophe. We know what the short-term consequences are. It's still too early to predict what the long-term consequences are. All we can say is what the long-term possibilities are.

In the days and weeks before the earthquake struck, it seemed that the government's days were limited. I did not think that Kan was going to quit, but I thought he would call an election around June after coming out with his proposal for tax and social security reform. In the meantime, the budget would be held up, because all the ancillary legislation that requires a majority in the upper

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house would not pass. The policy making process would be paralyzed. That is now history. There's not going to be an election any time soon, probably not this year. Mr. Kan is not going anywhere. For better or worse, he's the Prime Minister Japan's is going to have for months to come. And the legislation needed to implement the budget will pass.

The opposition cannot afford to have the public think it is playing politics with this crisis. And the DPJ knows it has to make some compromises to get the budget passed. So the DPJ is now saying that it is willing to consider cut backs on the childhood allowance. delay implementation of the five percent reduction in the corporate tax, and cut back on the expansion of the free highway program. They haven't gone quite far enough yet to get the LDP to agree, because the LDP wants them to eliminate the childhood allowance entirely. But I think that there will be an agreement reached and a revised budget will pass that will transfer money that was intended for these programs pre-crisis to disaster relief.

There has been media commentary about how Kan lacks in charisma, which he does. This is somewhat surprising to me, because he always was known as a persuasive speaker and skilled debater and years ago when he was minister of health he was very popular with the public. But since becoming Prime Minister, he sometimes looks too much like a deer staring into the headlights and he doesn't know quite what to say.

But I don't think we should overemphasize the importance of American style charismatic leaders for Japan. Japanese don't need a charismatic leader to pull

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the society together in quite the way the US does, because if you've watched the coverage of how people are responding around the country to what's going on in Tohoku, you are aware this is a society that is a very pulled together society in which the way people are helping each other is really quite extraordinary. So the fact that Kan falls short on charisma really isn't the issue. The more important question is does he have the ability to mobilize people in his government, both on the political side and the bureaucratic side to respond to this crisis. And that, frankly, is a question mark. The argument that he is not experienced enough to be prepared for this job is not relevant. No one can be prepared for this job, in this kind of situation. Crises show us what the inner strengths of a leader are. We have to hope that Kan and others will rise to the occasion.

But in any case, short-term you'll have political stability in the sense that this government isn't going to fall and there's not going to be an election, the local elections have been postponed, so forth and so on.

Long-term the question is simply this, will the politicians raise the political debate to a higher level, where they're dealing with really important issues and not the trivia that has dominated Japanese politics, which was all aimed at how quickly the opposition can bring down the government, which is what the opposition has been about ever since Koizumi has left office, one Prime Minister after another, one year after another, and Kan was heading in the same direction.

If they can raise the level of the debate to talk about things like how to rebuild Tohoku and so on, there's real

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opportunity here for a major change in Japanese politics, because one of the things this crisis has caused has been a change in the social psyche of Japan. Until the earthquake people were saying, there's a crisis coming and it is important take preemptive action. And a lot of people said, yes, that's really true, and then went about their business, figuring they'll worry about taking preemptive action tomorrow rather than today. Well now the crisis has come, it's not a question of preemptive action it's a question of how to respond to a crisis that has occurred.

I think that there is a good chance that the public demand on the government to rise to this occasion and to deal with fundamental issues is going to change the nature of politics. And parties that don't respond to that and look as though they're trying to go back to politics as usual are likely to suffer quite seriously at the polls when elections do take place.

Let me conclude with a comment about what this means for US-Japan relations, and Japan's relations with the world. One thing that is very important is that this crisis reminded a lot of countries how important Japan is for the world economy and more broadly. The fact that the G7 intervened to try to arrest the speculative appreciation of the yen, by joint intervention, not simply supporting intervention by the Japanese Minister of Finance, but by jointly intervening to drive the yen down, because everybody realizes, this is still the third largest economy, if no longer the second largest economy in the world, and is very important to the world economy. Japan's economic collapse is in nobody's interest.

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So I think in a curious way, it's reminded the world of Japan's importance. And on the US-Japan relationship itself, curiously, one thing that hasn't gotten almost any attention in the American media, is the large role that the American military is playing in dealing with the crisis with the rescue operation and the delivery of supplies to nearly half a million people who have been made homeless in the northeast in the Tohoku region. There are 2,000 marines who came from Okinawa to Tohoku and they're the ones who cleared enough of the runway at the Sendai Airport to be able to get planes to fly in. And they're working very closely with the self-defense forces. As you've seen on TV, the aircraft carrier Ronald Regan is actively involved in the rescue operation. Helicopters are ferrying supplies to the self-defense forces, and there is a very close relationship between the SDF and the US military. Although this is under-reported in the American press, from the commentary I hear from people in Japan, it's very much recognized and appreciated in Japan.

One of the things the Kan government has done, for which it deserves recognition is to be welcoming of foreign assistance. This is unlike in Kobe, when the Japanese government refused to have the assistance of foreign teams. Foreign Ngo's that offered to bring in dogs that can sniff out where people are trapped and so on, were told that the animals would have to be put in quarantine before they let them in the country. This government by contrast has welcomed these foreign groups. They've come from China, from South Korea, from France, from England, from Canada, from the US, and elsewhere. So I think the US-Japan relationship in a way, has been strengthened by this awful event.

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Finally, and I'll conclude on this, as I said before, I think that the psychological impact of this crisis on the Japanese has been huge. It has created a lot of fear. Everybody's afraid of radiation. You can't see it. You can't smell it. The average person does not know what the numbers measuring radiation levels mean. So of course a lot of people are fearful. But they're not panicked.

One of the things that strikes me as so extraordinary is the lack so far of a lot of anger directed against the Japanese government. People are fearful. They wish things could get better faster. But you don't have lots of Japanese trying to get out of Tokyo. The foreigners are leaving in droves, which in a sense is understandable. If you're dependant entirely on the western language press and you don't have roots in Japan, why stay? I mean, I'm sure the same would happen to foreigners in San Francisco if we had a major earthquake and tsunami there. A lot of people would leave. Interestingly, the long-term residents, foreign residents in Japan, I have a lot of friends in that category – for the most part seem not to be leaving. They're responding in the same way the Japanese are.

But there is this huge psychological impact to this major crisis. And if you think back after the second world war, the Japanese response was to – it drew this huge energy to recover and to grow. And that is the opportunity in this crisis.

The opportunity in this crisis is that there is a potential to mobilize the extraordinary strengths of the Japanese to not only rebuilt Tohoku, but to get Japan moving again. And so the question is whether there are

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politicians with the vision who can articulate this opportunity and mobilize the public. But when you look around Tohoku, you see reason for hope. There are so many young people there who are volunteers. Despite the enormity of the destruction they suffered, people generally have a positive attitude about rebuilding the region and overcoming the problems they face. I've heard from friends of mine, younger politicians in the government, in the DPJ, who are talking to young people in the LDP, and establishing groups to think through how to build a new 21st century society in this part of the country, including small compact cities with the best in medical care and high technology infrastructure and so on. There's an opportunity to have Tohoku reconstruction be the spearhead or the trigger for a new kind of mood, a new, very positive mood in Japan. And if it's combined with an opening to foreign investment, to a welcoming of foreign investment to contribute to that reconstruction, there's all kinds of opportunity.

Now, will the politicians take advantage of that? Or will they screw it up? That is the big question.

Curtis Milhaupt : That was a wonderful set of presentations, extremely informative. Having said time's limited, I want to just exercise the moderator's prerogative to ask a question, really picking up on where Gerry left off on a sort of optimistic or forward-looking note and, perhaps, could ask the panel to respond very briefly.

Thinking about how the crisis might catalyze change in the future, so for Dr. Brenner, do you think that there will be any salient lessons for, say, nuclear regulation either in the United States or internationally that can be taken from the crisis?

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For David Weinstein, you mentioned – you looked at aggregate rebound. I wonder if you have any thoughts or evidence on how substantively the nature of production might change, picking up, really, where Gerry left off since there might be a sort of new economy that develops out of the crisis.

And for Gerry – first of all, I very much agree with your comments on TEPCO. I mean, one can find an article in *The Economist* written ten years ago talking about TEPCO’s terrible safety records, history of cover-ups, its terrible corporate governance and crisis management.

So this is unfortunately not a new event. But I wonder, Gerry, one thing you didn’t mention was looking forward whether the politicians can break the link between the bureaucracy and industry that has contributed to these crises. So if I could ask for, maybe, just a brief response from each of the panelists.

David Brenner : Well, I guess in terms of the radiation – the nuclear power industry – it can go in two directions. It would not be at all surprising if there was a strong move against the use of nuclear power in any form in Japan and, potentially, in this country, too. I think the same issues face us as face the Japanese. Or it could go the other direction.

Both Japan and this country have a very aging reactor fleet, if you will, and an awful lot of reactors that were built in the 1970s both in Japan – most of the reactors that were in trouble in Japan were built in the ‘70s -- and in this country too. Indian Point is very old indeed, right round the corner.

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It is an opportunity to rebuild or rethink those reactors and maybe replace the aging reactor fleet with modern devices, which GE assures us are a lot more safe, and I am sure they are more safe. Whether they are safe enough is, of course, the big question.

David Weinstein : I think that the industry that's going to be most affected by this crisis is the nuclear power industry in Japan. The deal that Fukushima was given when it got the plant was that there were a lot of government payoffs that were given to the citizenry, not unlike what happens in the U.S. I think there's going to be a general reassessment of the risks of nuclear power.

One of the problems in terms of how you deal with this more broadly is that both nuclear and thermal power stations have their own set of problems. The carbon emissions from thermal power generates global warming. It generates pollution. That pollution kills thousands of people a year in the United States and in other countries.

Again, those deaths that occur due to the pollution are much less dramatic than the deaths due to radiation, or at least the ones that we'll see probably of the people with high levels of exposure. So they're a little below our perception horizon. Thermal also generates problems, as we saw in the Gulf, and problems associated with the support of regimes that are not necessarily pro-U.S. or even pro- their own people.

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I think one of the broad issues that we have going forward is how to price energy properly and take into account some of these really large spillovers that occur from different energy sources. But I think, for Japan in particular, it's going to be very hard for them to build that next nuclear power plant.

Gerald Curtis : So on the question of whether something were done to try to break the link between the bureaucracy and industry, as Curtis asked, well several points are made. First of all, the link has been broken in many ways, in the larger sense, between industry and the bureaucracy. It's not what it was 20 years ago. Nobody's waiting for the METI to issue administrative guidance to figure out what they should be doing.

We've got a special problem with TEPCO, which in sense, like Japan Airlines, was in a very special relationship to the government. You know that something is – at least the effort will be made to change, to reform the Tokyo electric power. One problem that – the energy distribution problem – you have these ten electric power companies around the country, so that it's not -- it's not easy to move electricity from one place to another where it's needed, which is why the Kanto area is going to be short because of this Fukushima issue.

So I think the government will try to – first of all, they're going to be insistent on some major reform of TEPCO. They'll probably try to strengthen the regulatory power over the electric power industry and somehow restructure that industry. But one of the problems this government – the politicians in this government face is they convince themselves that it's politicians who should make decisions and not bureaucrats, which is fine except

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you cannot run a government without the bureaucracy. You have to use the bureaucracy. You have to know how to mobilize bureaucratic expertise.

So the question is whether this DPJ leadership has yet figured that out. You cannot simply bash the bureaucrats and expect that things can get done. They can't. So it's really a question of whether, after a year and a half or so now in power, the DPJ has figured out a way to mobilize the bureaucracy without being captured by it.

That is not easy. But I think they're aware of the need to do that. As I said before, this crisis kind of concentrates your attention on what's important. So I'm hoping that that will happen. But we look at what's, in this country – at Obama's efforts to bring about all kinds of reforms and see where they don't go. I'm not – cannot be overly optimistic.

Curtis Milhaupt : Okay, thank you. The floor is open for questions. I've been asked to remind you that this session is being recorded. So if you ask a question, you will be recorded.

Audience 1 : First of all, terrific presentations – very, very, very helpful – from all three of you. My question is to David Weinstein. Just on the economy, in terms of this – I'm concerned about the possibility of bottlenecks because everybody – the consensus views seem to be very much in line with what you're saying, which is pretty – from the GDP standpoint, the impact is not anywhere near as bad as one might think. I'm thinking about things that really disrupt – to move, for example, bridges being washed up, not just in Tokohu, but further down the coast prefectures, close to Tokyo.

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The ability of trains, of the electricity to go for commuters to get into the city, people talking about no gasoline – no gas stations or food in the stores, so that – and also the question of – critical parts are produced in this one region. So a 10,000-part vehicle can't be made because 2,397 parts are missing. How big or how small is that sort of a problem?

David Weinstein: I think it's important to separate bottlenecks from inventory problems. If today one in ten New Yorkers decided to go out and buy a battery, there would be an enormous shortage in batteries overnight. If everyone went out – or one in ten households went out to buy toilet paper, there'd be an enormous shortage.

That happens not only with households, right – and especially during a crisis, we see households suddenly decide to stock up, right? You can have enormous fluctuations in gasoline demand if everybody decides, “You know what; I don't want to let my car gas tank go down to a quarter or empty. I need to have it at half or more.”

There's a lot of capacity in all those car gasoline tanks. That can create shortages. But they're not shortages due to bottlenecks. Similarly, firms can do the same thing, right? If you start to worry – you hear that Toshiba and SanDisk suddenly announced last week that they were going to stop producing flash memory. Then, suddenly, everybody starts buying that up to try to make sure that you have enough of it.

Now, both of those companies have reopened. I would imagine that there's going to be some alleviation. My

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guess is that, in terms of the production shortages, we will see a very high frequency of that type of disruption in the next months or so, and that's going to work its way out. The big uncertainty that I mentioned is the electrical uncertainty. So they lost a power plant. One of the issues of Japan is that the frequency of electricity of the west of Japan is not the same as that on the east of Japan.

Everything west of Tokyo is totally fine, zero problems. Everything east of Tokyo is facing difficulties due to the power plant. They don't have enough frequency converters to get the power from the west of Japan to the east. So even though Fukushima was not that much, relative to aggregate Japanese electrical power production, it was a lot relative to power production in the east. At this point, that's probably the biggest risk factor. But, again, if you look historically at what happens in these crises, the – after the initial month or two, things start to adjust.

Audience 2 : Hi, my name is John Pulliam. The question is really economic. It's from an investor standpoint. One of the big risks is the yen. The intervention back in September by the BoJ didn't work. This one works so far. But the question is at what level – say 80, 79, 78 is yen of a huge problem. And the second one is when it gets to that level where it is a huge problem, how far do you think they'll go to get it where it needs to be, where it should be?

David Weinstein: So we actually see some very similar patterns in this crisis with what happened in the Kobe crisis. Back when Kobe was struck by its earthquake, there were enormous fears that Japanese money was going to come

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back to Japan, and the yen did strengthen enormously, getting to its last post-war peak against the dollar.

We saw in the initial few days after this crisis a very similar pattern emerging when the yen broke through the 80-yen barrier and began rising on fears that there was going to be a lot of money coming back into Japan. But in both crises, again, you saw big interventions. This time, you saw coordinated, very large intervention. That has pushed the yen back, not exactly to where it was right before the crisis, but pretty close I think. It's within a couple yen of where it was.

At the early stages of the crisis, I have to admit, I was worried. I didn't know exactly what was going to happen at Fukushima. I was counting on the wind blowing the right direction. But I was worried about what would happen if the wind starts blowing the other way. As you saw in the images on television of the helicopters dropping water, it looked like it potentially could get quite bad.

But I think in the subsequent few days, it looks like the nuclear fallout issue's going to be quite limited, and I think the need to bring back huge amounts of yen into Japan is also going to be quite limited.

Audience 3 : We've heard from the Western media that the age of the population in the areas most directly affected by the earthquake and tsunami is old and that young people, for many years, have been fleeing that area anyway for the larger cities. The assumption from that is that the government may not be interested in really rebuilding those areas because who you going to rebuild it for

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when there's been so much death and destruction in an older population. Do you concur with that, David?

David Weinstein: Well, I think a lot of the rebuilding is going to come from the people themselves. So ultimately, whether you rebuild in the same area or not, you definitely want to have a roof over your head. So, certainly from an aggregate economic standpoint, whether they rebuild there or they rebuild elsewhere is hard to know.

My guess is that people tend to like the neighborhoods and the areas from which they came. We'll see, in the particularly hard hit city of Rikuzen-Takata, that's going to be a very special case. But, historically, we've seen things tend to go back. I think that elderly people, maybe elderly people especially, are averse to moving.

Audience 4 I thank you all for shedding some light and giving us some good information. It's been very frustrating. I found nhk.com on the internet, watching that news live. The contrast between that and CNN and BBC was incredible. My question is this. It does have to do with the media.

There's also been what seemed to be some kind of disparaging here in the U.S. of how the Japanese didn't have the right information, didn't know what they're doing or they're too passive or they're waiting for things to happen. But whatever that is, I think that – my question is I think that that's contributed to the relative lack of support and charitable donations for this cause because we've all talked about this. You don't see the reaction happening, “Oh, what are we going to do?”

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That’s not typically where it is. It’s more, “Gee, isn’t it terrible.” I contrast that with what happened in Haiti, for example. To the point that I read, too, a journal that I thought was pretty solid up until now, that the Japanese didn’t want help. They didn’t want charitable contributions. We’ve heard that they sent teams home that were helping the rescue effort, foreign teams. So my question is how do you feel about this?

Gerald Curtis: Well, I don’t know what the level of charitable – of contributions to the organizations that are trying to help with Tohoku are. My impression is there’s a lot going on. David, at the end, will say something about the group that’s right outside the door. But I don’t think that whatever limits there are in charitable contributions, say compared to Haiti and so on, has anything much to do with the way – with some sort of media issue.

It’s really about the assumption that Japan is a rich country and can pretty much take care of itself. This isn’t helping Haiti. So I think that’s been the big limitation. I’m not aware that the government has asked some people to leave – foreigners to leave. That may be true because those that – sadly, those that went there to try to help find people buried under the rubble – unfortunately, there’s not much for them to do. I think those groups are leaving.

But I know a lot of others are not. There’s a long-term reconstruction effort that has to take place in which, I think, you’ll see a lot of foreign people, young people, in various volunteer operations in Tohoku. So I wouldn’t think that the media issue there is all that important frankly.

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Curtis Milhaupt: Okay, well, we could continue the discussion for a long time. But we're going to close here. Let's thank our panel.

David Weinstein: So I just want to say this wouldn't have been possible without the excellent help from the Center's staff who worked, first, on the other conference and then worked round the clock on this. We want to thank the speakers.

I just want to make one announcement, which is that outside you'll see that the Japan Business Association at the Business School has organized a donation site. So if you feel like you would like to, you can go out and make a donation to the disaster relief. So again, thank you very much for coming, appreciate it.