



**Preparation for
Nankai Trough Earthquake**

**— Disaster Management from a Fiscal
Risk Perspective —**

Introduction

Launched in December 2017, AIG Institute is recognized as the internal R&D organization within AIG Japan Holdings. Aimed at becoming a thought leader to invoke discussions around risk management, the primary mission is to examine more effective methodologies inclusive of different perspectives beyond the insurance domain with collaboration from AIG's global network.

The objective is not to eliminate risks; rather, it is to control risks with economically rationalized measures, correctly recognize and accept residual risks. However, in Japan, there is a tendency to recognize the existence of risks without the ability for mitigation which should be the first step considered. Due to this, risk management often misunderstood as the complete elimination of risks, and the resources are posted more than the practical economic level. Additionally, risk management should be done with various majors. But, in reality, understanding the risk prevention and the associated tradeoffs are not well accepted and leading government authorities to action once the risk becomes an issue according to some information sources.

With this recognized as a known issue, AIG Institute decided to address it in its first forum by initiating discussions around the challenges observed for large natural disasters from the perspective of "financial risk".

If another earthquake in the magnitude of the Nankai Trough Earthquake occurs, the Japanese economy will stagnate and contract with decreased tax revenues generated. In conjunction with a tax decrease due to declining population, issuance of government bonds is traditionally done; however, this raises the question of how sustainable this funding approach is for recovery. If the tax rate is increased to repay the debt, the opposite effect will incur whereby recovery will be hindered shifting the burden to the next generation. In February 2017, OECD released a proposal to request the government of each nation to develop financial strategies to cope with natural disaster risks. The proposal advocates a shift from pre-event finance to post-event finance, construction and utilization of markets for risk transfer, and focus on the construction of financial risk frameworks.

To expedite this, it is also critical to develop resilient cities/towns capable of responding to natural disasters. After the Great East Japan Earthquake, increased attention to the necessity of BCP (Business Continuity Plan) and reaching a consensus of BCP in the community are required. Guidelines to design and develop DCP (District Continuity Plan) to assist organizations to strategically and immediate action post disasters, targeting wider geographical areas.

In conclusion, our intention for this forum was not to unnecessarily stir up a sense of crisis but to generate scientific and comprehensive discussions on the aforementioned challenges from researchers and practitioners. In order to make our future more resilient, it is essential for all of us to engage ourselves in understanding risk management and take positive actions. We strongly hope this report will contribute to these efforts.

“Challenges of disaster risk finance in Japan”

Mr. Shingo Nagamatsu

Professor, Faculty of Social Safety Sciences, Kansai University



Specialty: Public policy (disaster prevention, mitigation, crisis management), regional economic reconstruction. Graduated from the Department of Political Science, Faculty of Law, Chuo University, and received a Ph.D. in International Public Policy from Osaka University. After working as a researcher at the Center for the Future of Human and Disaster Prevention and a Research Fellow at the Institute of Science and Technology for Disaster Prevention, he assumed his current position. In 2015, he was a visiting researcher at the Price School of Public Policy at the University of Southern California, where he was engaged in research on disaster recovery. His major works are "Introduction to Disaster Reduction Policy Theory." In 2009, he received the Japan Society of Public Policy Award.

※You can download the materials for his speech at the web site ([link](#)).

Our theme for today is about the “to-be” model for comprehensive proactive measures based on financial risk, and my engagement in this issue of finance for disaster recovery started with the recovery process after the Great Hanshin-Awaji Earthquake.

On Page 2, the direct damage caused by the East Japan Earthquake is estimated at around 21 to 24 trillion yen. The worst estimate of the direct damage caused by Nankai Trough Earthquake is 164 trillion yen, which is seven or eight time bigger than that of the East Japan Earthquake.

The government does not say that the Nankai Trough Earthquake is likely to occur soon or it will definitely occur, but still, as one of the possibilities, we need to be prepared for what to do in case such a huge earthquake occurs. Let me move to Page 3. Like a textbook, risk finance and risk control are highlighted. Generally, proactive measures to mitigate risks are referred to as risk control, while measures to financially cover damages after disasters are referred to as risk finance. The top of this diagram is about risk control, and its bottom is about risk finance.

Risk control generally represents efforts to mitigate damages, or it even means that no actions that could cause risks would be taken. With land-use control, for example, you do not want to live in hazardous areas or you relocate to safer places, and this is one example of risk control.

As an example of risk finance measures, you can utilize insurance to transfer your risk to another party. Another example is to accept risk. If you loan cash to pool it, it is fair risk finance. My point for today is that the public sector in Japan may have too much dependence on this acceptance of risk management.

Let me elaborate on this. After the East Japan Earthquake, the government did not have insurance for risk finance. Although they partially had a reserve, basically, they used short-term loans for funding their recovery initiative. Look at the right-hand graphic on Page 5. This tells you that if you add up the general

account budget for 2011 and the special account for earthquake recovery between 2012 and 2014, the public bond amount would be 18 trillion yen, which is a half of the total. The tax income is merely 3.6 trillion yen. For the long-run, as you know, our tax has been increased as a tax increase for reconstruction and will be refunded. After discussions around earthquake recovery, this policy was determined, and I believe you now understand that we are using the cash of our future generations as the financial source for recovery, and risks are accepted by the nation of Japan. I personally see some issues with this kind of fund for recovery and would like to group them into three categories.

The first category is the expansion of sovereign risk or financial risk. As Mr. Takeda from AIG Institute addressed, I am not saying that Japan will immediately encounter economic collapse when the Nankai Trough Earthquake occurs. However, I am sure that the financial risk will be enlarged. If a disaster risk is small and can be smaller after it is distributed to all the nation, then, issuing government bonds to procure funds rather than purchasing insurance in advance for risk distribution would make more sense because the Japanese government bond is extremely inexpensive. You can borrow money with the interest rate of 0.02% to 0.03%. If you purchase insurance in advance, you will be charged with an interest rate of several percentage points. Issuing government bonds is very practical and will not be a wrong option.

But, the magnitude of the Nankai Trough Earthquake is estimated to be seven or eight times bigger than that of the East Japan Earthquake. Under such a circumstance, no one can guarantee that the government bonds would be able to be issued with the current level of low interest, and I encourage you to keep this in mind. The Reconstruction Design Council clearly recommended tax increase for reconstruction because of their concern with the potential influence to the government bond market if tax was not increased. We need to consider what we can do for the next huge earthquake in the future. We need to judge whether Japan will be able to increase its taxes or not.

The next category is about skewed allocation of resources in the process of recovery. It is generally said that the government would be more likely to intervene in recovery. According to some of my research, if more large-scale projects such as the relocation to higher lands or the adjustment of land sections are executed, the more populations of afflicted areas would be reduced. This means that ineffective recovery projects may be planned and executed.

The last category is less incentive to reduce damages even before disasters. After a disaster, the government pays more expenses for recovery and reconstruction, while it does not pay that much for proactive measures for disaster prevention. It is known that if the government issues its bonds for funding after disasters, then, the local authorities will be less incentivized to seriously make investments for disaster prevention in advance. This theory is proved by the results of research.



With all of these factors as the background, more nations around the globe are aware that their governments should distribute risk in advance rather than holding all the risk using insurance. For example, in New Zealand, for earthquake insurance, commercial reinsurance has been already leveraged. The same is true for the California Earthquake Authority. I would like draw your attention to the usage of commercial reinsurance for water damage insurance by FEMA (Federal Emergency Management Agency). In other words, among the developed nations, Japan is becoming the only country where the government bears all the risk. For closing my presentation now, I would like to raise one issue: whether the Japanese government will be able to maintain the current disaster risk finance while they domestically keep its post-disaster financial responsibility which is increasing as a trend. Thank you.

“Pre-disaster recovery plan”

Mr. Norio Maki

Professor, Disaster Prevention Research Institute, Kyoto University



He is specialized in disaster prevention plan, disaster recovery plan, and crisis management system. Graduated from the Department of Architecture, Faculty of Engineering, Kyoto University, and received a Ph.D. in Engineering. In addition to engagement in the formulation of disaster prevention strategies and regional disaster prevention plans of numerous local governments, he has been involved in local government support activities in disaster-affected areas, such as formulating and verifying the reconstruction plan of Ojiya City after the Niigata Chuetsu Earthquake in 2004, and providing information processing support for disaster response at the Iwate Prefecture Disaster Response Headquarters during the Great East Japan Earthquake in 2011. He is also conducting surveys on the post-disaster reconstruction process and housing reconstruction in Japan and abroad.

※You can download the materials for his speech at the web site ([link](#)).

Today, I would like to talk about a pre-disaster recovery plan. The first page shows comparison among the large disasters Japan has experienced so far and the predicted Nankai Trough earthquake, focusing on three disasters. For the Great East Japan Earthquake and the Great Hanshin-Awaji Earthquake, it would be fair to say that the East Japan Earthquake was three-time larger than the Hanshin-Awaji Earthquake in terms of the death toll.

If you compare these two disasters from the recovery perspective, you will find different numbers from your expectation. In the Great East Japan Earthquake, approximately four hundred thousand houses were completely or half damaged, which can be converted to around four hundred thousand households.

On the other hand, in the Hanshin-Awaji Earthquake, around four hundred and sixty thousand households were affected, so, in terms of the number of households that were completely or half damaged and required recovery, the Hanshin-Awaji Earthquake caused a bigger impact. Calculation of a direct damage amount is a challenge to us, and as reported by Professor Nagamatsu, it is said that it is somewhere between sixteen trillion to twenty-five trillion yen. The direct damage in a disaster can be measured by the amount of destroyed things. In the East Japan Earthquake, the volume of the destroyed things and waste created by the disaster was 2.12 million tons and that for the Hanshin-Awaji Earthquake was 20 million tons, which suggests that the level of recovery required for each of them is almost the same.

Based on the amount of the direct damage, the required budget for recovery is estimated as 16.3 trillion yen for the Hanshin-Awaji Earthquake including the actual budget, and 32 trillion yen for the East Japan Earthquake respectively, which can be quantified as 1.64 times of the direct damage (16.3 trillion yen for the recovery budget to the direct damage of 9.9 trillion yen for the Hanshin-Awaji Earthquake) and 1.89

times (32 trillion yen for the recovery budget to the direct damage of the 16.9 trillion yen for the East Japan Earthquake).

For the potential Nankai Trough Earthquake, if we deliberately refer to the materials released by Central Disaster Prevention Council in 2003 (not an earthquake of Class M9 but three interrelated earthquakes with 70% possibility of their occurrence in the future), the amount of the direct damage can be assumed as 60 trillion yen, and if it is multiplied by 1.64 through 1.89, the result would be the required cost that is the same as the annual budget for the nation of Japan.

Next, I would like to address if recovery projects can really contribute to the reconstruction of cities. As Professor Nagamatsu pointed out, it is possible to say that as more recovery projects are run, more people will leave their local communities. Although I would bypass the details, as the numbers of Page 3 indicate, in some of the local autonomous communities in Miyagi prefecture, the reality is that the levels of their populations returned/did not return back to the same as before the earthquake, the numbers are just for the rates of decreased or increased population, though. I would like to look at another perspective to consider the emotions of those who were afflicted to understand if the recovery projects have really contributed to their happiness.

Page 5 shows the results of the research conducted in Natori city in Miyagi prefecture where Sendai airport is located. In a nutshell, those who left the recovery project area were more satisfied by the level of recovery, according to the result of the research. The recovery project is still running and requires a long time period, such as six or seven years. It could be optionally said that leaving the area may make them happier rather than remaining and waiting for the completion of the project there.

Recovery projects require a huge amount of cash, which is a significant problem. The diagram on Page 6 illustrates a typical recovery from a disaster, as the presentation of Professor Tatano will show later.

In fact, while the population is decreasing or the economy is stable, recovery is extremely difficult. Before Hanshin-Awaji Earthquake, one of the large post-disaster recovery projects was executed after the Isewan Typhoon. Like the Sichuan earthquake in China, when the economy is growing, it will be naturally recovered, even if nothing special is done, which may not be the most appropriate way to say. But, when the economy is at its grown and stable phase like at the time of the Hanshin-Awaji Earthquake or the population is declining like at the time of the East Japan Earthquake, the recovery of the economy would be extremely hard.

With this, recovery is currently regarded as a big issue, and people have started saying that pre-event

recovery should be planned and considered. Let me proceed to Page 8. There are two patterns of pre-event recoveries. One is that recovery should be planned before disasters, and the other is that damage mitigation should be executed before disasters.

Pre-event recovery may sound new, but, actually, it has been used since some time ago. After the Hanshin-Awaji Earthquake, initiatives for that started in Tokyo or Shizuoka prefecture. However, they were not really expanded to other regions until they got attention after the East Japan Earthquake. Currently, such initiatives are being executed in Wakayama and Tokushima prefectures, for example, but, they have not made much progress yet. Page 10 shows the result of discussions with experts, including Professor Nagamatsu, as reasons for their progress being stopped.

There are three main challenges. The first challenge is the uncertainty of disasters; it is a significant issue not to be able to tell when disasters will occur. Therefore, communities or local authorities are not sufficiently incentivized to make progress. On top of this, due to large uncertainty, expected benefits are small. The third challenge is the biggest problem as Professor Nagamatsu addressed; local authorities would not be subsidized by the government for their pre-disaster recovery projects, while, they would be done so for their post-disaster recovery and reconstruction.

Effective management of such initiatives is an extremely important key for success. It is important to design a program for keeping a good balance between pre-disaster initiatives and post-disaster recovery initiatives.

For example, in the U.S., the Disaster Mitigation Act requires local authorities to develop disaster prevention plans. If they fail to do so, according to the structure of the act, the subsidies they are to receive will be partially decreased. As my last comment on Page 11, too many players for recovery are from the government. I believe that it is important for a framework that allows various types of players to be engaged in recovery to be developed. Now it is time to finish my presentation. I would like to share more details at the panel discussion later.

"Corporate BCP and continuity of local community"

Mr. Shohei Beniya

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※You can download the materials for his speech at the web site ([link](#)).

I would like to explain corporate BCP (Business Continuity Plan) and continuity of local community. We heard that at least 16 trillion yen was the amount of damage caused by the East Japan Earthquake, and it is estimated that 10 trillion yen out of it represents civilian damage. The majority of the direct damage was caused to civilians, and the government supports the afflicted areas—including civilian damage such as residential buildings—by using loans and increased taxes. I would like to mainly talk about how local companies and residents can reduce damages to them.

The first slide shows a flow of disaster prevention or BCP for Japanese companies, and I will come back to this page if I have extra time later.

Let me move to Page 3. Traditional disaster prevention plans for companies are an extension to the fire-fighting plan to protect their employees or customers from natural disasters or earthquakes. After the terrorist attack in New York on the September 11th, 2001, Japanese companies started to make business plans to continue their significant operations and managerial measures to prevent them from going bankrupt. For example, a broad range of measures such as the purchase of earthquake insurance, the installation of anti-seismic reinforcement, and the distribution of business transactions across multiple business partners, including the supply chain should be executed from the management perspective. After the East Japan Earthquake, for example, a Natto (fermented soybean) manufacturer could not produce their products because one of their business partners who manufactured the containers for the Natto had stopped its operation, or some factories in Fukushima were damaged, which made it impossible to repair trains.

That is why now more companies and people are interested in including their business partners and

communities. One of the trends after the East Japan Earthquake is that companies have been putting more effort into their BCPs. As an extension to this, multiple experts suggest that it would be important to ensure the continuity of local communities. Conceptually, this is sometimes referred to as DCP (District Continuity Plan).

Page 4 identifies why district continuity is required. Right after a disaster, flows of people and logistics will be blocked. In this situation, only locally available resources can be effectively utilized so that companies, residents, and local communities can survive. Companies and local communities share a common destiny in a way, and they need to work together as much as possible to take action and share resources for collaboration among local residents and various types of organizations.

In a small- or mid-sized company, when one employee gets seriously injured, if there is no occupational physician, then, first-aid treatment cannot be given in many cases. In some places, local doctors are partnered to provide first-aid for the entire communities.

They are also engaged in the recovery stage after a disaster. Like the East Japan Earthquake, if an entire local community is damaged by a tsunami, for example, no residents who act as consumers will remain. Even if some residents try to return to their original homes, if there is no store for shopping, it would be harder for them to return. If there is no hospital, the senior citizens cannot live there. In this sense, companies, residents, employees, and local authorities all share a common destiny. This is what I mean by “they are in the same boat.” on Page 5.

There are multiple types of recent DCPs or initiatives for local collaboration for disaster prevention. On Page 6, such types are described. The first type of initiative is led by landlords. The “Oh Maru Yu” initiative near Tokyo station is well known. (Oh of Ohtemachi, Maru of Marunouchi, and Yu of Yurakucho). The Mitsubishi Estate Company sponsors this initiative to maintain the asset values of the buildings around the station, and the secured working environment even during a disaster and this differentiates the initiative itself. In Kobe, a network of landlords works on disaster prevention for the Former Foreign Settlement.

As stated on Page 7, Mr. Sashida, a risk consultant from Tokio Marine Insurance calls this DCP a neighborhood association. Look at Page 6 again.

The second type of initiative is led by local authorities. Many parties will collaborate in much wider areas to continue social functions. One typical example is the total BCP in Tottori prefecture. Throughout Tottori, the prefecture, cities/towns/villages, welfare/medical facilities, financial institutes, and chambers of

commerce in both commercial and public sectors will collaborate, and based on commonly estimated damages, each sector will maintain their functions to protect their communities.

The same initiative is executed in Kagawa prefecture, too. This is led by the Ministry of Land, Infrastructure, Transport, and Tourism Shikoku Regional Development Bureau and Kagawa University. The third type of initiative is self-disaster prevention/CSR. Companies voluntarily provide their support for the continuity of their local areas. The last type of initiative is the institutional one. After the East Japan Earthquake, one initiative has been run to take actions to support those who have difficulties going home at transport interchanges as a part of Urban Renewal Safety Assurance Plan, while another initiative is to have local communities make their disaster prevention plans based on the Local Disaster Management Plan Program.

On Page 8, you will find a case of Kawachi Nagano city at the southern end of Osaka. An enterprise, Kawachi Nagano Gas that serves only Kawachi Nagano city recognized a risk that any disaster in the city would push their customers out to other areas. When they rebuilt their head office, they proposed to the local authority that they would open the show room on the first floor to the public so that it could be utilized as a local center for damage management in case of any disaster. Civic groups and local organizations were also involved, and public-private partnerships were established.

The new head office building is equipped with a well to supply drinking-water, emergency toilets residents can use, and benches which function as ovens to help external volunteers to cook food. When multiple parties work together, it can be regarded as a type of risk-sharing like insurance.

It is not always clear whether companies or residents are damaged by a disaster. So any party that is less damaged should offer their owned resources. For example, companies will allow their space to be used by others, and residents will offer their man-power, and local authorities can be coordinators and offer compensation if required. Everyone should do whatever they can do in a collaborative manner, which I believe is the core of DCP. In other words, an initiative where multiple parties work together to mitigate uncertainty in a local area at the time of a disaster can be regarded as DCP.

The subsequent slides mention finance, and I would like to explain them in the panel discussion later.

“Global trend of disaster risk finance”

Mr. Satoru Hiraga

President & CEO of Japan Insurance Brokers Association

*Since Mr. Hiraga unexpectedly had to cancel his participation in the forum, the text below is from an interview with him after the forum was finished.



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Keio University, Faculty of Economics. BEc.

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※You can download the materials for his speech at the web site ([link](#)).

I wanted to share “the global trend of disaster risk finance” as one of themes and challenges in risk financing that should be reviewed in Japan based on financial risks. I would like to share my views over these two points.

At the center of the discussion around the global trend of disaster risk finance, the resilience of cities amid climate change/natural disasters are found as the SDGs of the United Nations addresses. For these kinds of fields, the World Bank has been eagerly working on risk financing or investments for disaster prevention. On the first page of the presentation, you are seeing approaches for disaster risk financing recommended by the World Bank.

According to them, they have been playing an advisory role for risk financing for over fifty emerging and developing countries. As one of the recent examples, last year, they constructed a reinsurance program by combining public funds such as from the government of the United Kingdom with multiple reinsurance companies to use the parametric insurance for a natural disaster in the Philippines. They also assembled a CAT bond for the record-breaking, largest earthquakes, targeting Chile, Mexico, Columbia, and Peru.

Some developed countries have already commenced the same types of initiatives as the World Bank has been developing, as Professor Nagamatsu’s presentation indicates. The reason behind this is that the impacts that are caused by disasters to financials are becoming immense.

As you can see on Page 4 of this material, even in Japan, the impact caused by disasters to financials were exposed after the East Japan Earthquake, as some reports from the IMF or the World Bank disclose.

As a result taxes for reconstruction funding was introduced.

On Page 5, you will find the proposal from the OECD to the governments of the individual nations to develop strategies for disaster risk finance. The OECD proposed to convert post-disaster risk finance to pre-disaster risk finance and particularly encourage the expansion of the risk transfer market.

In Japan, mostly, insurance covers the risk transfer market. With some exceptions, CAT bonds have been scarcely utilized by insurers as the substitute of reinsurance. P6 shows the scale of the risk transfer market for natural disasters in Japan. It is obvious that the scale of the Nankai Trough Earthquake and the scale of the current risk transfer market are incomparable. However, it does not mean that the insurance market to absorb damages by earthquakes in Japan has been saturated. Many (re)insurers who would like to underwrite earthquake risks for Japan exist in the insurance market in London.

For example, one Japanese big enterprise leveraged reinsurance markets outside Japan such as London to purchase an earthquake insurance product over 100 billion yen. The reinsurance market in Japan is small, and customers can acquire information about the reinsurance markets mainly in London from limited sources. (This is about an arrangement of insurance by not individuals but companies.) My comment may sound judgmental, but, I still want to say that Japanese companies should be more aggressive to gain such information.

I understand that what I am going to tell you now may sound like self-promotion, but, insurance brokers are able to access the reinsurance markets such as London, make information visible, and deliver it to customers. Currently, only a few companies are doing this.

If active utilization of the risk transfer markets is a part of the global trend, in Japan, how to utilize it is an important challenge. In terms of the priorities of public aid, mutual aid, and self-help, essentially, self-help should come first, and then, mutual aid and public aid should follow that order.

One example I can identify is the “Group subsidy” that started after the East Japan Earthquake. For this, public aid of over 400 billion yen was spent. With this kind of program, mutual aid or self-help may not grow smoothly. I do not think that BCP, which is one of the measures for self-help, would be actively promoted.

If concerns are raised about financial risk due to the impact from an enormous disaster such as the Nankai Trough Earthquake, a mechanism to encourage mutual aid programs to incorporate self-help programs to reduce overall damage, and the residual risks should be solved by public aid programs. As I

said earlier, if you always depend on public aid programs, incentives to consider self-help or mutual-aid programs may not be well-produced.

On Page 7 and the subsequent pages, information of ILS (Insurance Linked Securities) is described. This is the name of a methodology used for a capital market to advance itself into any insurance risk market. However, I feel that Japan should complete the frameworks of self-help, mutual-aid, and public-aid programs to utilize ILS such as CAT bonds before they start discussions around it.

I specifically encourage companies to think of risk control such as the facilitation of earthquake resistance or BCP, as well as risk finance such as insurance or bonds, just in case if they encounter any catastrophes during their business activities.

Also, it is required to review the introduction of profit insurance to cover business interruption on top of shifting risks to insurance that covers only damages to fixed assets. Once the foundation of a self-aid program is established, then the roll-out of mutual-aid or public-aid could be more smoothly done.

Needless to say, I would like to support the development of frameworks for self-aid, mutual-aid, and public-aid programs, and on top of that, I would like to continue to strongly appeal how important it would be to introduce the concept of risk management to companies.

Panel Discussion

※You can download the materials for his speech at the web site ([link](#)).

AIG INSTITUTE: We are going to spend next seventy minutes for discussions with the guest speakers, revisiting their presentations. For the first panel discussion, we would like to refer to the discussions around financial risks. This slide show the minutes of the 35th conference of National Resilience Conference set in the Cabinet Secretariat.

Professor Matsubara of Tokyo University and who is in charge of financial policy in the conference addressed his concern with a scenario in which huge bonds preparing for largescale disasters would not be undertaken, and credit uncertainty would be caused.

He recommended that the wording should be updated to emphasize the need to review such challenges.

I am not sharing his comment to prompt fears of financial risks. The professor's comment stated that we should "review such challenges". I feel discussions about this are necessary. With this, I would like to ask each presenter to deliver additional explanations about what they could not sufficiently explain in their short presentations before the break.

MR. NAGAMATSU: In relation to the issue raised by AIG INSTITUTE, I would like to elaborate further on problems of post-event risk finance. Please take a look at Page 6. After the Great East Japan Earthquake, the Japan Government Bond rating was lowered. This can never be because of recovery after the disaster. I would say it is mainly because of expansion of the accumulated bonds. While it is not possible to foresee improvement of the financial status in Japan, it would be harder to secure funds for recovery by issuing government bond, ten or twenty years later for example, with an interest rate as low as the current rate.

When several hundreds of trillions of yen are required as the financial source for recovery, if the interest rate of the Japan Government Bond is raised by 1% or 2%, for example, the current plan for recovery will not be able to be executed. To make it worse, currently, the balance of the Government Bonds is nearly a quadrillion, and if the interest rate is raised by 1%, it solely increases constant payback of the interest, which will irrelevantly torment the finance of the nation, having nothing to do with recovery.

The problem is that no discussions about how to consider such risks have taken place. What would happen if the interest of the government bond increases? No attention would be paid to the increased interest rate, and the government bond would be issued to obtain funds for regional recovery? Or regional recovery would be compromised since such huge funds would not be able to be allocated? Such a huge

decision would be inevitable.

If the risk of increased interest becomes visible, any project like the recovery project after the East Japan Earthquake would be almost impossible. Afflicted people would not be provided with funds for enough aid, and no sufficient aid for local finances would ever be given. Finding solutions for these kinds of matters is a problem.

The second problem has been explained well. Let me add more details about the fact that incentive would not function to mitigate damage as the third problem. For example, if you have automobile insurance, then, it would function as an incentive for driving safely.

If your driver's license is upgraded to a Gold license, then, your insurance premiums will be discounted, while if you cause a car accident, your premiums will be increased. Likewise, if the status of the regular finance turns positive after disaster preventive actions are taken, that would be good, but, in reality, the results of earthquake-proofing school buildings or any other disaster preventive actions are almost completely invisible. In order to do something about this, for example, if an incentive is set up so that enacting more disaster preventive plans would make it easier to arrange insurance or fund allocation, I feel local authorities would be more active in developing their disaster prevention programs.

However, the current programs that enable funds for recovery to be allocated with lower interest rates after disasters actually reduce incentives that encourage the government to take disaster preventive actions in advance.

AIG INSTITUTE: Thank you. Professor Maki, please share your comment.

MR. MAKI: I want to show you the last slide I could not explain in my presentation. I would like to give my comments based on what Professor Nagamatsu has explained; the current recovery finance and the option not to run recovery projects due to lack of financial resources. This diagram was drawn by Doctor David Mammen according to the framework of recovery after the 9/11 attack in New York.

If you look at the approaches taken by other countries for their recovery projects, you will find three individual functions that facilitate post-disaster recovery; financial resources, a main coordinator to effectively deliver human and financial resources to afflicted people, and an operational organization that builds houses and distributes donations.

In Japan, the government and authorities procure money from tax and develop recovery plans, and the

Reconstruction Agency coordinates processes. They build houses. In developed countries, after disasters, individual NGOs will build houses. Areas are allocated to NGOs based on their capacities, and other areas that could not be allocated will be supported by their governments. It is common for many bodies to be engaged to operate recovery projects; for example, donations from the private sector would be used to construct elementary school buildings, or TV stations take initiatives. Projects are gradually allocated to each NGO based on their capabilities and areas where no one can do are assigned to the government.

In Japan, the government would cover everything, which is a little different from the rest of the world. After the East Japan Earthquake, one significantly large NGO proposed to construct temporary housings and hospitals, which I was involved in. A program to leave one area to one NGO without needing compensation from the government could have been designed right after the earthquake; construction of temporary housing and regular houses, as well as the reconstruction of a town could be left to one NPO. What can be done for recovery depends on the financial level, and it is time for us to more seriously think about the level of the government engagement to run a recovery project.

The financial source for a recovery project does not have to be tax only. Support can be from other countries, foundations, and commercial sectors, including AIG. It would be important to further activate these kinds of support.

AIG INSTITUTE: Thank you. Professor Beniya, it's your turn, please.

MR. BENIYA: Please take a look at Page 11 I could not explain. I know this forum is organized by an insurance company, but I had a little negative view about the use of commercial insurance by the government.

One of the advantages insurance offers is a tax-saving benefit. For example, if you have life insurance, you will get your insurance premium refunded after filing an income tax return or year-end adjustment.

As you see on this slide, a profitable company can book insurance premiums as an impairment expense to reduce their corporate tax. When your business is profitable, you can pay insurance premiums to be prepared for a huge amount of funds that would be temporarily required after a disaster happens, which means that you can distribute fund demands in the format of a yearly premium, while you can save tax at the same time, which is a huge advantage for companies. On the other hand, the government would not have to provide financial resources from tax, which I think is a disadvantage.

Page 10 shows one option to reserve funds every year. However, if there is a series of disasters

consecutively, the funds would deplete, while, for insurance, payment of premium every year would be advantageous since a matured refund is guaranteed regardless of when disasters occur. It is important to look at the both reserves for funds and the specifications of insurance.

In particular, what makes the Nankai Trough Earthquake more difficult is that it will surely occur in the future, but, it is very uncertain when it will occur. This means that if you start paying insurance premiums now, and the Nankai Trough Earthquake does not occur for the next twenty years, then, after that, the earthquake will be very highly likely to occur. In that case, I am not sure if such risk can really be underwritten.

Page 12 shows how important it is to keep an adequate balance between the insurance, the funds, and the damage mitigation plan (investment for disaster prevention). If a local authority has a budget of 100 billion yen, it is not about only two options (the funds or the insurance), and they can optionally make investment for prevention to mitigate damages. For example, they can initiate programs to make buildings earthquake-proof or build coastal levees. I believe the balance among these three options, the funds, the insurance, and the investment for disaster prevention is a key.

For disasters that could randomly happen in any places unidentified, insurance would be effective, but, for the earthquake that is more likely to happen in a certain area at a certain time, then, it would be effective to make intensive investment for disaster prevention. Discussions should be held to decide the best solution, considering benefits of such investment. I will refer to Pages 13 and 14 later if time allows me to do so.

AIG INSTITUTE: Thank you very much, Professor Beniya. In my presentation on behalf of Mr. Hiraga, I did not address information quoted from Marsh Broker Japan. (This was only projected on the screen. It is about the composition of an indemnity amount offered to a large enterprise.) Since we have Mr. Sato, the CEO of Marsh Broker Japan with us today, I would like to ask him to explain it.

MARSH BROKER JAPAN – MR. SATO: Good afternoon, everyone. I am Sato from Marsh Broker Japan. Mr. Hiraga, the chairman of our company and the administrative director of the Japan Insurance Brokers Association was going to come here to do his presentation with this material, but, suddenly, he had to change his schedule. I apologize for this and would like to share my comments.

Professor Nagamatsu and Professor Beniya addressed earthquake insurance. I would like to introduce a case where we offer earthquake insurance to some Japanese companies who are our customers as an option for disaster risk finance. We are designated by our Japanese commercial customers and have

direct negotiations with Japanese insurers, as well as reinsurers in London or Singapore to assemble earthquake insurance.

You see ten customers here. They are global enterprises in multiple industries such as transportation, non-manufacturing, electrical appliances manufacturing, precision machine manufacturing. You see 160 billion yen for the top company in the list and 80 billion yen for the third company, each of which indicates the amount one company paid for their earthquake insurance.

This is the limit of indemnity when an earthquake causes a loss. It covers their damaged properties and loss of their profits due to interruption of their business and operations, as well as fixed expenses. On average, the premium is calculated as 2 to 5% of the limit of indemnity. This number is calculated after the analysis of risks such as individual industry type, building structures, covered areas (distributed all over Japan or concentrated on certain areas only, for example).

A company could afford to purchase earthquake insurance that covers a loss up to 100 to 150 billion yen. There is no official statistics, but, for such a big loss, one insurance company could underwrite risks up to 10 billion yen. In order to arrange earthquake insurance of around 100 billion yen, many insurers need to be engaged.

After our customers designated us, we access the reinsurance markets in London and Singapore to start negotiations with the local reinsurers. For such negotiations, information about risks should be collected and organized, estimation documents should be prepared, and a panel of underwriting insurers should be formed with the engagement of multiple insurers, which is similar to the case when companies need to procure financial funds. For an earthquake insurance program to arrange a huge amount of money, twenty through fifty insurers may have to be engaged.

For the arrangement of earthquake insurance, it is most important to make sure how accurate information can be well-organized before it is presented to insurers. People do not want to provide negative information about risks. However, if you could actively present well-achieved improvements regardless of information about previous disasters, you would be able to acquire favorable conditions for you. Furthermore, insurers would like to have long-term relationships with customers; therefore, if you could tell them that your customers have the same idea, then, you will have more potential to manage long-term and stable earthquake insurance.

Lastly, as Professor Nagamatsu addressed, public sectors such as the New Zealand's government or the state of California actually utilize earthquake insurance as a method for disaster risk finance. For

those who are from local authorities or companies, I would suggest you to consider earthquake insurance as a method for your disaster risk finance.

AIG INSTITUTE: Mr. Sato, thank you. We have heard comments from all the guest speakers for today. If any of you have questions, please raise them.

MR. NAGAMATSU: I don't have a question but would like to give a comment. According to Professor Beniya, insurance has a tax benefit, but, to me, it is not an essential benefit. It is true that the current tax structure could incentivize companies to purchase insurance, but, even if there were no such incentive, the value of insurance itself will not be lost.

My next comment is that pre-investment would be very practical choice if the time and the place of the Nankai Trough Earthquake were certain up to some degree. However, I have two objections against it at the same time. Firstly, as recovery after the East Japan Earthquake was discussed, Level 1 and Level 2 should be considered. If an enormous earthquake such as the Nankai Trough Earthquake occurs, its level is obviously not Level 1 but Level 2, which means that damages cannot be mitigated by improving the structures of buildings, which is commonly known. In addition to this, it is said that readiness for Level 1 may not be excessive for recovery in Tohoku. That is, even if a place and a time for an earthquake could be identified, only pre-investment may not be sufficient.

Secondly, the Nankai Trough Earthquake is just scientifically estimated as the largest magnitude, but, its predicted timing may vary for several decades or even one-hundred years. Considering a potentially larger earthquake than the Nankai Trough Earthquake, there would be a limit to effective pre-investment for a targeted, specific area.

If I say that public sectors have to leverage insurance or CAT bonds, then, some people say that I may be too close to insurers. To be more open, according to Mr. Sato, the cost would be between 2 to 5%, and I agree that it is very expensive. If you issue the government bonds, you can procure financial source with an interest rate less than 1%. Considering this, that option may not be so appealing to most local authorities for now. To make it more appealing, the Japanese government has to show what they can offer. We will cover up to this, and the rest should be covered by you. If the government makes such a commitment, then, local authorities would be in a better position to think about what they can do. I think these kinds of discussions will be needed in the future.

I would like to share another perspective. I am often criticized that I am trying to help foreign companies (investors for reinsurance or CAT bond) to make profits, which results in selling valuable Japanese assets

to foreign markets. If it logically makes sense that CAT bonds could turn foreign markets more profitable, then, I think it would be a valid option for the Japanese government to purchase CAT bonds from foreign markets. If Japan has extra money but cannot find a place to make investment, then, it should be an option to purchase CAT bonds from other countries.

Pooled cash for earthquake insurance in Japan is used to purchase Japanese government bonds. However, it makes almost no profit at all. The performance of CAT bonds is generally good; therefore, a part of that pooled cash should be used to purchase foreign CAT bonds. This will bring financially positive results. It also provides a way to mutually support countries across their boundaries. I feel it is the time for us to seriously discuss these points now.

AIG INSTITUTE: Thank you. Now I would like to explain what could not be covered in Mr. Hiraga's material. This is Page 10, the last page that indicates the performance of CAT bonds. This chart shows the reasons why CAT bonds are purchased. Motivation to purchase CAT bonds is driven by their higher interest rates and independency from the markets. Investors assemble many portfolios, and most of them show high interrelationships with the markets or the interest rates. As you see from this chart, at the time of the financial crisis in the past, CAT bonds did not fluctuate like the markets. This means that their interrelationship with the markets is small, which is a part of such motivation. On the other hand, for investors, a challenge is that it is hard to identify a level of risk in natural disasters. Professor, Beniya, can you please give your comment based on Professor Nagamatsu's comments?

MR. BENIYA: I completely understand what Professor Nagamatsu said. I thought it is an interesting idea to purchase CAT bonds. Also, disaster prevention investment wants to be used for relocation to higher ground before disasters rather than after disasters. Professor Nagamatsu referred to the group subsidy program. If this program could have been used before the disaster, lots of lives could have been saved, and recovery could have been more effective.

This matches the idea of the pre-disaster recovery as Professor Maki suggested. In other words, funds as preparation for recovery, insurance, and preventive plans in advance such as pre-disaster recovery or DCP should be well-balanced in our thoughts.

AIG INSTITUTE: Thank you. Professor Maki, I have a question for you. Not many people are familiar with the word, pre-event recovery plan. Most of the questions from the audience are about that. My understanding is that DCP and the pre-disaster recovery plans overlap up to some degree. Can you please elaborate on this?

MR. MAKI: Yes. Let me use the processes of recovery after a disaster. Right after a disaster, life-saving is the first process, followed by living in shelters. Then, essential utilities will be recovered, and the affected region will be reconstructed. Professor Hayashi (from the Disaster Prevention Research Institute, Kyoto University) called them recovery of a flow, recovery of a stock. Apart from the definition of DCP, I understand that the scope of DCP and BCP can cover up to the recovery of a flow, and the subsequent reconstruction of the city is out of the scope of BCP and DCP. If the target of DCP and BCP is to reactivate the community to a certain level, then, the pre-disaster recovery targets the subsequent processes to take ten years or so to reconstruct the community. So please understand that the first half of the entire processes will be completed by BCP and DCP, while the rest will be executed by the pre-disaster recovery.

MR. NAGAMATSU: Related to this, even if a local authority combines the pre-disaster recovery and DCP, it could take an insurance-like approach. For example, a group subsidy cannot cover the losses of all companies. It also cannot cover indirect losses of sales. In terms of appropriate risk finance, an insurance-type of measure should be taken. Small- or mid-sized companies or micro enterprises do not want to buy insurance by themselves only because they cannot afford to do so. Then I think cash can be pooled in the entire region, or their local authority can take that risk, and the local government can buy CAT bonds or reinsurance. This kind of program should be able to be designed utilizing subsidy and additional aid. This kind of program can be also utilized to invite more businesses.

AIG INSTITUTE: Thank you, Professor Nagamatsu. I want to come back to the discussion about financial risk. Please take a look at this slide. This slide includes types of subsidies paid by the government to those who are afflicted, the current amount of the fund, and the predicted claim payment after the Nankai Trough Earthquake. You could regard this as the initial and typical expense that has to be paid by the government around three months after the earthquake. On the left-hand side is the financial support for disaster victims to rebuild their lives: the disaster recovery subsidy, the condolence money in case of disaster/the solatium to be paid for persons who became disabled by the disaster, and the earthquake insurance ceded to the government. The gap between the current reserve for the coverage by the government and the predicted claim payment after the Nankai Trough Earthquake would be over 20 trillion yen. I am not very confident that 20 trillion yen can be secured within three months after the earthquake. Professor Nagamatsu, can you share your view on this, please?

MR. NAGAMATSU: The sovereign risk that I referred to is about the long-term credibility of a tax structure. What AIG INSTITUTE has pointed out is about short-term liquidity risk. In case of CAT bonds, cash has been already pooled and is accessible; therefore, it is an extremely excellent method in terms of short-term procurement of funds. Also, the Japanese government reserves a fund for earthquake

insurance and manages it with the government bonds. Therefore, when they try to liquidate it, if they cannot sell the government bonds, it will be an issue. This is another challenge we need to consider.

AIG INSTITUTE: Thank you, Professor Nagamatsu. In Professor Beniya's presentation, we saw a slide about the combination of self-aid and mutual-aid: the public finance. Can you give us your comment on this?

MR. BENIYA: Like the group subsidy, as I said earlier, the structure for the government to provide subsidies to local authorities after disasters may be used as a mechanism to leverage commercial finances such as PFI for disaster prevention. In an area where the Nankai Trough Earthquake is highly likely to occur or other areas with less likelihood, according to the current program in Japan, the government will provide the same level of subsidy to their local authorities. We need to make a change to this. In areas with higher earthquake risk, more measures will want to be flexibly designed. If no subsidy is provided because any disaster has not occurred yet, then, commercial finance can be utilized, or local authorities can issue local bonds for disaster prevention that can be redeemed after disasters. In this case, when a disaster occurs, subsidies from the government can be used to redeem the local bonds when a disaster occurs. This kind of unique and interesting financial product could be designed and developed.

AIG INSTITUTE: Thank you. Let me add something to the group subsidy. This program mainly targets small- and mid-sized enterprises and is like insurance after a disaster. Since this is not a loan, enterprises do not have to return it to the government. After the East Japan Earthquake, around 450 billion yen was spent. This was commenced as a part of the SME supporting financial program after the earthquake.

I would like to introduce an estimate related to the SME-supporting financial program. In the report from the Risk Finance Review Meeting in the Cabinet Office, released in March, 2017, an estimate regarding the SME finance was included. The estimate shows a ratio of SMEs that would encounter excess debt when an earthquake directly hits the Tokyo metropolitan area. According to this, the ratio of SMEs in each industry is estimated. In the case of the manufacturing industry, 40% of SMEs would encounter excess debt.

As you know from this, SME finance would be very important. Mr. Hiraga is not with us today. But definitely he wanted to say that the development of a better program with both public finance such as the group subsidy and commercial finance such as self-aid and mutual-aid could be reviewed and considered.

Now I would like to move to DCP. This is also called regional BCP or area BCP. Let me introduce a case

of DCP in the industrial belt of Chubu area where the Toyota group is dominant. This is a report was released by the Chubu Bureau of Economy and Industry in March, 2015. In this report, you will find the result of a questionnaire that shows the levels of needs for DCP by companies and local authorities. According to this questionnaire, the needs for DCP are quite high, and 71.4% of companies regard DCP as “extremely important”.

However hard companies work to develop their BCP, in case of a wide-area disaster, if no inland, sea, or air transportation is available, nothing can be done. Considering this situation, it is understandable that the needs for DCP are so high. Also, 44.8% of the local authorities responded that DCP is “extremely important”, and 34.5% of them said “they started recognizing its necessity”. On the other hand, to the question, “Have you started any initiative?”, only 17.2% of the local authorities and 14.3% of the companies said yes. We could see the high needs for DCP and delayed initiatives at the same time. Professor Maki, your comments about such initiatives would be appreciated.

MR. MAKI: It is probably Hekinan city that works hardest in Chubu area. The other day, I visited the city to interview them about their initiative. They won the Resilience Award. It would be very important to find the best way to continue such an initiative. As long as the leaders of companies or local authorities work very hard, the initiative would function well, but, once such leaders are gone, it will be blocked.

Local authorities develop their regional disaster prevention plans based applicable laws, and that is why I think it is extremely important to clearly define a framework to allow it to continue. Hekinan city is recognized as a local government not receiving tax grants, and its financial status is pretty good, and that is why the city itself could support their initiative, but, I am not sure if this model can be applied to the rest of Japan. Most of sales of manufacturers in Japan are produced in the Chubu area. If this area does not function, no fund for recovery would be available. It is important for local areas to be able to continue their initiatives.

I live in Kyoto, and Kyoto city has its own BCP so called Kyoto BCP. This is an initiative by Kyoto to plan a Kyoto-specific way for recovery beyond the recovery of a flow as addressed a minute ago. In Kyoto, there are many tourist spots, cutting-edge companies, and universities, and in order to their recovery as the symbols of Kyoto, they designed their DCP. As Professor Beniya said, DCP should not be in a single format and has to be adjusted based on the specification of each region. In Osaka, Osaka-like DCP is required, for example. Eventually, it will be linked to the recovery sought by each area. The big challenge is that collaboration between the commercial sector and administration bodies are not always effective. A framework for better collaboration should be developed.

AIG INSTITUTE: Thank you. Professor Beniya, can you please comment on how BCP should be designed in case of wide-area disaster when a company constructs its BCP?

MR. BENIYA: My knowledge about the Chubu area is limited, but, to me, having all regional BCPs collaborating may not lead to DCP. There is no fixed definition of DCP, while it gives an impression of covering the entire region. On the other hand, collaboration of local businesses sounds like an extension of the supply chain in regular BCP for them to survive.

According to my research, in the lacquerware industry in Sabae city in Fukui prefecture or in the bag manufacturing industry in Toyoka city in Hyogo prefecture, the wholesale stores have more influence and take initiatives to develop DCP, getting competing companies to help each other. In the same type of context, I think in the Chubu area, it may be possible for the car manufacturers to accelerate it such initiatives.

Competing companies sometimes may find it difficult to take supportive actions for each other. But, the unions for the plating business in Niigata and Kanagawa prefectures effectively enable it. Those unions will not be affected by a disaster at the same time and work together to conclude a remote agreement. From the corporate BCP perspective, in fact, rather than local collaboration, remote collaboration may be more effective in some cases.

Also, many of the companies who are active about DCP are locally rooted. For example, utility service providers like Kawachi Nagano Gas and local banks such as Shiga Bank, Kyoto Bank, etc. The companies who play a role like the landlord of a neighborhood association for disaster prevention are also locally rooted. Such companies and their communities share a common destiny. I would encourage local authorities to look for companies who want to provide support at the time of a disaster, focusing on who share a common destiny with their local communities. It is ideal if DCP and company BCP are equal to each other, but, in reality, their positions are different from each other.

AIG INSTITUTE: Thank you for your comment. I feel those specifications of each area and who owns initiatives are the key. (Professor Nagamatsu has raised his hand.) Professor Nagamatsu, please give us your comment.

MR. NAGAMATSU: I have been engaged in DCP. As AIG INSTITUTE commented, companies who have their BCP would be in trouble if the local infrastructure is blocked, which is a constant issue. I want to share an interesting story about this. Over two years ago, Swiss Re and RMS jointly released a concept of a resilience bond. Even if commercial businesses in an area purchase a CAT bond and develop

disaster prevention plans, until their local infrastructure is strong enough against disasters, their risks cannot be mitigated, and they cannot reduce the cost fundraising for CAT bond. If the local authorities take disaster preventive actions, and the local commercial risks are mitigated, the cost to issue CAT bond will be also be cut, and the concept of a resilience bond includes a proposed a mechanism to return a part of the reduced cost to the local authorities.

This means that the more public projects are executed, the more financial incentives will be gained. The local businesses also can reduce their insurance premiums. Their proposal is like “killing two birds with one stone”. However, unfortunately, this resilience bond has not become so popular yet. I guess it would be hard to design a specific mechanism, but, I think it would be achievable if the Japanese government changed their perspective.

If the government can pay insurance premiums on behalf of particular areas, and disaster preventive actions are taken there, then, the insurance premiums will, in turn, lower. If this kind of mechanism gets more popular, I believe it would be very possible to provide economic incentives for DCP initiatives. I think it is the role of the government to review how they could facilitate it.

AIG INSTITUTE: Thank you for our comment. The resilience bond has disaster prevention investment and finance for risk control integrated into it. Another example of integrated disaster prevention investment and risk finance is water damage insurance in the United States.

Local authorities buy that insurance for their residents and make disaster prevention investment as the prerequisite for the insurance, which, in turn, secures the community. And then, the residents buy their own insurance. I understand that this cycle produces positive incentive. A risk-based program should be debated with commercial, financial institutes. This is what should be reviewed in Japan where financial risks exist. Many stakeholders should think of how such a challenge can be resolved. I feel these kinds of things are required now.

MR. NAGAMATSU: I agree. Discussions would be very important. The government focuses on the marginal area of disaster prevention or disaster mitigation instead on its core. I expect that more discussions can be shifted to what really should be discussed, getting support from AIG INSTITUTE. Regarding the resilience bond, if it can be incorporated into discussions about pre-disaster recovery, a mechanism to make a pre-disaster plan will be well-established.

AIG INSTITUTE: Thank you. I think this is related to disaster prevention investment started by the World Bank. I anticipate they will reflect the concepts we have been discussing today. Please let us keep

monitoring them.

We are running out of time. So please answer some questions from the audience. The first question is, "Please let us know specific case studies for pre-disaster recovery plans including livelihood rehabilitation and industrial reconstruction. Also, please advise us about what we need to keep in our mind for the development of a pre-disaster recovery plan." Professor Maki, please answer this question.

MR. MAKI: As the previous material shows, even outside Tokyo, many local authorities have their pre-disaster recovery plans. For urban planning, manuals with approaches for recovery projects or urban planning projects have been developed, but, there have not been many projects or cases to proactively execute disaster mitigation actions.

As a pioneer, Wakayama prefecture developed such manuals and has a plan to make the individual local authorities start their activities next year. In terms of livelihood rehabilitation, in Tokyo, there is a manual, so called the "Manual for Livelihood Rehabilitation". You may want to refer to this as a case study. I would like to remind you that opinions of residents or commercial businesses should be collected in advance and reflected in the disaster recovery. This is a point of pre-disaster recovery.

AIG INSTITUTE: Thank you. There is another very straightforward question about pre-disaster recovery. "How can you get money before a disaster?" I think this question is derived from a fact that the government is likely to give subsidy after a disaster. What do you think?

MR. MAKI: My answer would not be very good. It is a challenge to develop a mechanism that allows money to be given before a disaster. This is exactly the same as the theme for today. A shift from post-disaster finance to pre-disaster finance would be possible by utilizing certain financial systems such as insurance, for example. This is what I feel now based on the discussions today. This can be a research project to manage financial resources in the capital market to allocate it from post-disaster to pre-disaster. Professor Nagamatsu may have more information about this.

MR. NAGAMATSU: For the areas that are predicted to be afflicted by the Nankai Trough Earthquake, prepayment of donation could be possible. Not after the earthquake; if you could give us money, we can save lives. This kind of message would be fair enough. For example, like "benefit-your-locality" tax scheme, it would be worth requesting for donation for relocation to higher ground.

You don't have to think of something complicated like financial products. This is something you can simply do. The mutual-aid for house reconstruction in Hyogo prefecture really represents such a

mechanism. They collect money as the mutual-aid for house reconstruction and will spend it for disaster prevention investment. They may not spend it yet, but, this can be an existing case study for us.

AIG INSTITUTE: Thank you for your comment. We have only one or two more minutes left. This will be the last question. "Please let us know the factors of the recovery project and population decrease."

MR. NAGAMATSU: My research has statistically reviewed a relationship between population increase/decrease and the recovery project, but, its analysis cannot fully identify their causes. If the size of a recovery project becomes bigger, then more people would leave than those who flow into it. I think they cannot wait till the completion of a project because it takes too long.

MR. MAKI: A disaster influences people's mindset. For example, let's say a half of the population in a town had been thinking about moving out of the town even before a disaster occurred. They were just thinking about it but had not made decisions yet. After a disaster struck the town, they eventually made up their minds to leave, which is the largest factor. If you already see population decrease in an area before a disaster, you will see a sharp drop after a disaster.

AIG INSTITUTE: Thank you very much. It is time to close the panel discussion. It has been over an hour. Thank you very much for your long participation. I greatly appreciate the active discussions among the guest speakers today.

Summary

Mr. Hirokazu Tatano

Professor, Disaster Prevention Research Institute, Kyoto University



Specialty: Disaster prevention economics, planning theory, disaster risk governance. Graduated from the Department of Civil Engineering, Faculty of Engineering, Kyoto University, and received a Ph.D. in Engineering. He has been engaged in research on the method of weighing the effects of disasters on socio-economic systems, and engaged in research on methods and governance for proper planning and management of comprehensive damage mitigation measures. He is the general manager of the World Federation of Disaster Risk Reduction Research Institutes (GADRI), which is attended by 170 organizations

※You can download the materials for his speech at the web site ([link](#)).

I am Hirokazu Tatano from the Disaster Prevention Research Institute at Kyoto University. I would like to recap today's discussions. Firstly, if you refer to the material of Mr. Hiraga from the Japan Insurance Brokers Association, you can compare the Nankai Trough Earthquake against the size of insurance to fully understand how large 200 trillion yen could be against the size of the reinsurance market. For your information, 200 trillion yen is double that of the national budget. Does anyone in the audience know how much Japan's GDP is?

ONE MEMBER OF THE AUDIENCE: 540 trillion yen?

That is correct. 200 trillion yen is 40% of 500 trillion yen. Our discussions are focused on such a huge impact to finance. It is not the matter of whether the Nankai Trough Earthquake will occur or not; in case if the earthquake occurs, there is no reason to believe that financial risks will not be caused.

I heard suggestions that we should not ignore it, that we have to have debates, and those initiatives of companies, authorities, or local communities are sufficient, But what would be additionally required? Professor Nagamatsu proposed to further utilize the capital market to procure cash from more sources.

I am not sure, though, if we could spend 200 trillion yen out of the current capital market, which has a total size of 3 quadrillion yen. In any case, the government should shoulder the burden. If a part of that can be transferred, it could be a little bit helpful. What about individual companies or local communities? It has been emphasized that they heavily depend on the government. Currently, the majority of the fund for post-event recovery is from the government.

It was also reported that small- and mid-size enterprises are important. However, finances of SMEs or

group subsidies will be eventually compensated, the question is who would prepare that upfront? No one would. The re-insurance schema for earthquakes in Japan, the mutual aid insurance of the Japan Agricultural Cooperatives is 2 trillion yen, while the rest of 1.5 trillion is from commercial insurers which include commercial insurance. I do not know further details since this is only what I know, but, I assume that only 1.5 trillion yen is spent to purchase insurance. The GDP of Japan is 540 trillion yen, which makes it understandable that a very low percentage of businesses are insured. Looking at the entire picture, the entire participation rate is low.

They state that they are going to work hard for BCP, DCP, etc., but, their efforts may not be enough. It is within this context that the Nankai Trough Earthquake may occur. This is where we are now. Some of you may be from local authorities. You must be concerned.

Also, the ratio of businesses that could go bankrupt one after another has been shared. There was a comment that it could be 40% based on estimated excess debts of SMEs. No one can imagine what comes next after such a huge number of businesses fail. How could group subsidies support such businesses after a major disaster? This is what we have to challenge ourselves for.

One more thing; I do not remember exactly, but, I guess the size of the population in 2050 would be the same as that of the 1970s. In 2100, it would be almost the same as that of around 1925.

My point is that the size of the population would recede to that of over thirty years ago. If we can anticipate an increase of population, it would be good to issue government bonds for investment because the national, financial source would be bigger in the future, which justifies issuance of bond for construction. However, we are in a completely opposite situation. We need to figure out when we need to make investment while population is decreasing, considering the dynamic optimization problem. In case when population is increasing, it is optimal to seek for demand. This is about the capacity expansion problem while demand expansion is not certain. In this case, it is concluded that the capacity should be increased in stages, seeking for expansion of demand. What if demand decreases? I do not want to mimic a TV show, but, “now” is important. The optimal timing to make an investment for the first time is even before demand decreases.

Having said so, when is “now”? What should be done in advance in this situation? These questions are hard to answer. Talking about finance, it is relatively easier to consider how debts that should be paid back in the future can be passed on to future generations when the population is increasing. However, when population is decreasing, there will be many different opinions around whether such debts can really be transferred to future generations or not. Huge risks themselves are already hard to resolve, and

decreasing population makes them worse. We need to come up with solutions for the both problems.

Let me come back to the basics. Take a look at the next page. As Professor Nagamatsu addressed in the first part of his presentations, we could think of four measures for risk management. They are comprehensive measures. They are about risk control and risk financing. Risk control is more for deterrence and avoidance; do not come closer to risks or do not bring hazardous things to areas with potential risks. This is what measures for deterrence and avoidance mean. The next is mitigation. If you cannot deter risks, you need to reduce the size of the damages. This is often called mitigation.

This is a point. If you are not certain about how much you can lower the level of a risk, no discussions around insurance can be held. If you can decide up to which level a risk can be lowered, then, you only need to consider who can insure the rest of the risk.

Rare but extremely large risks that can cause huge damages will not be underwritten by insurers. It is waste of your resource if you purchase insurance for a frequent risk that would cause relatively smaller damages because interest for insurers will be added.

You want to insure less frequent risks. However, insurers do not want to underwrite a block of risks that would concurrently cause damages. Then what should we do? We should cut out risks that are likely to be underwritten, while we need to own the rest. For our owned risks, evacuation plans, BCP, or DCP should be developed as solutions, which is extremely important as discussed today.

The summary is that we need to deeply consider and be aware of these four measures. This is applicable to all businesses, authorities, or even individuals. Page 4 shows the logic behind this. When the economy is growing, then, there would be a linear growth. If a disaster happens here, like the red line indicates, there would be a sharp drop in the output. However, regardless of the drop, if investment for recovery is made, then, the growth would be regained. If the economy was optimally growing, and when it has returned to its original pace, the speed of growth will no longer change, and there will be always a gap. This is the process of recovery from a disaster, considering the normal economic growth, and I am showing this to you because this control will minimize the first drop. If we could reduce it to zero, it means that there will be no impact from the disaster.

For disaster financing, during this restoration period, the growth rate will turn higher because when dysfunctional capital has gradually recovered to a certain level, the utilization rate of other unusable but functional capital will turn higher. If this recovered capital is not available, the rest of functional capital cannot be used by even those who have survived. That is why the recovery fund is absolutely necessary.

Financing offers ways to procure such capital in advance. Or, if the capital is procured after disasters, it is considered as financial management for disaster recovery. One of the main themes for today was around this. Regardless of many discussions held under the homeland resilience plan, for example, as the previous diagram shows, how much we could stop the drop and how fast we could get it back--these two points are important. In order to enable these two points, it will be important to intelligently plan mitigation and preparation.

Let me share the results of my research. After the East Japan Earthquake, I collected questionnaires from companies. According to them, in Ibaraki prefecture, the decrease of the sales profit caused by the earthquake only (not including the tsunami) was 10 trillion, 890 billion yen, while the expenses for recovery and waste removable were one tenth of the amount. I guess this is mainly because the earthquake is the core cause of the damage, and this kind of calculation tells us that discussions around the decrease of sales profit or how much GDP will be decreased and discussions around how much damage would be caused to facilities have different levels of magnitudes.

That is, the impact from the decreased GDP by one tenth would be much bigger. If the tsunami is included, the results would be different, and the same types of disasters may not always occur. Differences in the types of industries afflicted cause different results. For example, in the materials industry or the processing and assembling industry, facilities will be damaged, and the expense for recovery occupies a bigger ratio. On the other hand, in the urban industry such as servicing or the financial industry, the dependency on facilities is less, and the damage caused by interrupted operation would be bigger.

My point is, as Professor Beniya emphasized, if BCP or DCP functions well, comprehensive measures can be executed at an earlier stage, and cost could be further reduced. Also, if financing can be effectively conducted, the restoration period could be reduced, and cost could be reduced. Recovery of facilities is important, while fund allocation and preparation for recovery is equally important, too.

I believe that you have learned today that there are many themes to study. My last comment is that it is important to think about how measures and actions can be comprehensively planned. As I said earlier, if the population were increasing, we would not have to think over what Professor Nagamatsu articulated because the cost for the government to procure government bonds is inexpensive. However, if the population is decreasing, we may have to think differently.

Since we are discussing an era when it is a little hard to live, we need to study more about the topics shared by Professor Nagamatsu because they mean something to us. I personally think that it is

meaningful to have discussions over all of these points together, and AIG Institute is the place to have such discussions.

Among many challenges, the disaster culture is important. In fact, Japanese people do not correctly perceive disasters and risks. They will respond to what has happened, but, they do not have much thoughts about the level of mitigation, estimating the total size of a risk, as well as where such a risk should be transferred.

But, it is the time now when we cannot avoid thinking about it. It is the time when individual players should think of the actions that they have to take. The interesting schema introduced in one of the previous presentations has been implemented in Spain. It was suggested today that businesses can get together into a group to utilize insurance, for example, as a measure for financing, which may help all the measures discussed so far to be organized as a comprehensive solution. I felt we had very interesting discussions. Thank you for listening to my impression rather than general comments.



Details

Date & Time	30 Jan, 2018 15:00~17:40 (Doors open at 14:30)
Venue	Grand Front Osaka Tower B 37F Seminar Room

Program

15:00	Opening Remark and Introduction of AIG Institute	AIG Institute
15:05	Agenda Explanation	AIG Institute
15:15	Presentation - Challenges of Disaster Risk Finance in Japan - Pre-disaster recovery Plan - Corporate BCP and continuity of local community - Global trend of disaster risk finance	Shingo Nagamatsu, Professor, Faculty of Social Safety Sciences, Kansai University Norio Maki, Professor, Disaster Prevention Research Institute, Kyoto University Shohei Beniya, Associate Professor, University of Hyogo Satoru Hiraga, President & CEO, Japan Insurance Brokers Association
16:00	Break	
16:10	Panel Discussion - Panelists - Moderator	Above 4 presenters Kazuya Hattori, Executive Fellow, AIG Institute
17:20	Discussion Summary	Hirokazu Tatano, Professor, Disaster Prevention Research Institute, Kyoto University
17:40	Closing Remark	AIG Institute



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