RIETI Highlight

2013 Special Edition 43

Special Features

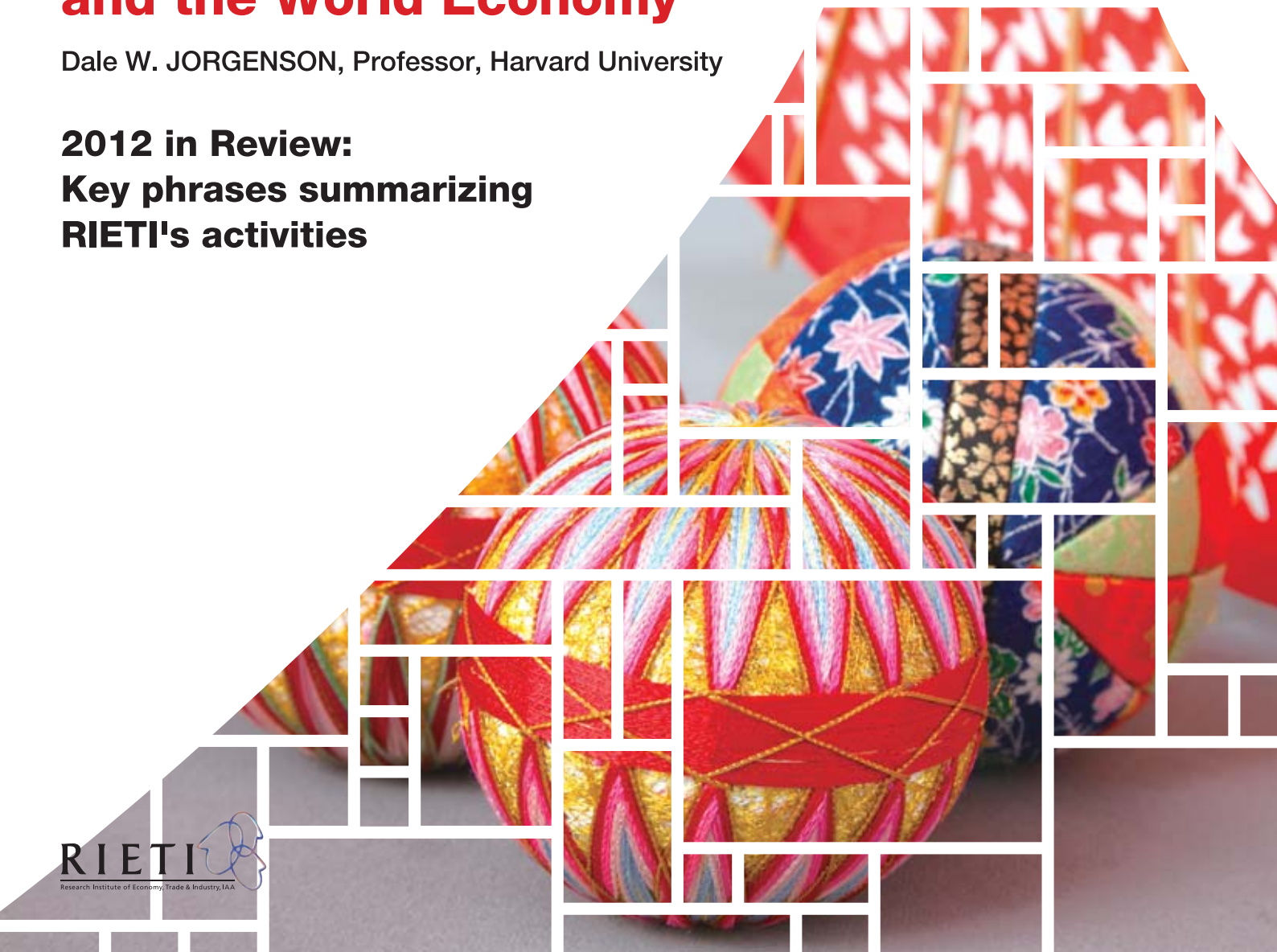
Mainstreaming Global Resilience: The lessons from the Great East Japan Earthquake and the Great Floods in Thailand

FUJITA Masahisa, President, RIETI

Japan's New Growth Strategy and the World Economy

Dale W. JORGENSON, Professor, Harvard University

2012 in Review: Key phrases summarizing RIETI's activities



RIETI
Research Institute of Economy, Trade & Industry, IAA

RIETI Highlight 2013 Special Edition 43

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Abbreviations

F : Fellow
SF: Senior Fellow
FF: Faculty Fellow

RIETI's public relations magazine "Highlight" is published quarterly, featuring RIETI's most recent activities with the objective of disseminating research outcomes to a wider audience. This special edition has been edited in English in order to reach our international readers.
In the current special edition, we will discuss our activities in FY2012 through the "five key phrases" that set RIETI apart from other research institutions. In addition, we will present our leading achievements obtained from our nine research programs.

ABOUT RIETI

The Research Institute of Economy, Trade and Industry (RIETI), an incorporated administrative agency, was founded in April 2001 as a government-affiliated policy research institute with a certain degree of independence from the administrative authorities. RIETI endeavors to analyze and research various policy issues from a medium- to long-term perspective, thereby accumulating the necessary knowledge to formulate and recommend policy options.

Message from the Chairman

I would like to take this occasion to say a few words in conjunction with the publication of the special edition of the RIETI Highlight FY 2012.

RIETI places a premium on 1) incorporating growth of the world economy, 2) developing new growth areas, and 3) creating new economic and social systems for sustainable growth in accordance with our "Three Priority Viewpoints to be kept in mind when carrying out research activities." We continued to emphasize these Three Priority Viewpoints during 2012, and actively conducted research and held symposiums with regard to such themes as quake revival, corporate competitveness, labor market, and work-life balance.

In addition to our research activities, RIETI is actively engaged in disseminating various research findings that are linked to policy making. We reinforce and improve our databases that are related to our research areas and make them available to the public. Furthermore, we enhance research collaboration with those prominent overseas research institutions characterized as a policy think tank.

In the special edition of the RIETI Highlight FY 2012, the above activities conducted in 2012 will be discussed under the title "2012 in Review: Key phrases summarizing RIETI's activities." We will accordingly introduce five key phrases starting with "Research collaboration with overseas research institutions," "Reinforcing and improving databases," "Encouraging policy discussion in a timely manner," "Policy dialogue with world leaders," and "User-friendly dissemination of research findings."

2012 has witnessed the downturn of the world economy that originated from the grave sovereign debt crisis in Europe. Despite the continued restoration efforts after the Great East Japan Earthquake, Japan's economic climate has entered a recessionary phase as a result of the slowdown of the global economy. The world economy is expected to recover gradually in 2013, but numerous ongoing risks are anticipated. We hope that this special edition of the RIETI Highlight will not only serve to spread our research activities and findings, but also act as an aid for a deeper understanding of the trend of the world economy.

NAKAJIMA Atsushi

Profile

2011-Present	Chairman, RIETI
2004-2011	Senior Managing Executive Officer & Chief Economist, Mizuho Research Institute, Ltd.
2001-2011	Regular Commentator of World Business Satellite (TV Tokyo)
2000	Chief Economist & General Manager, Research Department, Head Office, IBJ
1999	President, Banque IBJ (France) S.A.
1975	Joined Industrial Bank of Japan, Ltd. (IBJ)

Selected Publications

- *Nihon no Toppako* (Japan's Breakthrough), Tokyo Keizai Inc., 2011
- *Sekaikeizai: Rensasuru Kiki* (Global Economy: Chain-reaction Crisis), Toyo Keizai Inc., 2009
- *Chugoku Jinmingen no Chosen* (Challenge of China's Yuan), Toyo Keizai Inc., 2004
- *Nihon Keizai no Risuku Shinario* (Risk Scenarios for the Japanese Economy), Nihon Keizai Shimbun, Inc., 2004

Mainstreaming Global Resilience:
The Lessons from the Great East Japan Earthquake and the Great Floods in Thailand

FUJITA Masahisa

President & Chief Research Officer, RIETI
Professor, Konan University, Japan
Adjunct Professor, Institute of Economic Research, Kyoto University, Japan

FUJITA Masahisa is RIETI's president & chief research officer and concurrent professor at Konan University. His expertise includes urban and regional economics, regional development, spatial economics and international economics. He obtained his Ph.D. in regional science from the University of Pennsylvania in 1972. Prior to his current position, he was a professor at the Regional Science Department, University of Pennsylvania (1986–94) and a professor at the Department of Economics, University of Pennsylvania (1994–95). He is a member of the American Economic Association, the Japanese Economic Association, the Econometric Society, and the International Regional Science Association. Selected publications include *The Economics of East Asian Integration* (written with KUROSAWA Ikuo and KUMAGAI Satoru, Edward Elgar, 2011), *Economics of Agglomeration* (written with J. F. THISSE, Cambridge University Press, 2002), *The Spatial Economy* (written with P. KRUGMAN and A. VENABLES, MIT Press, 1999), *Urban Economic Theory* (Cambridge University Press, 1989), and others.

Supply Chain Disruptions Caused by the Great East Japan Earthquake

In order to build new production networks in Asia, many urgent tasks need to be completed. I would like to focus on the particular aspect of developing production networks, with lessons learned from the recent mega-disasters in Japan and Thailand.

Let me give you a brief overview of the Great East Japan Earthquake which occurred on March 11, 2011. It had a magnitude of 9.0, making it one of the strongest in history, and caused a tsunami surpassing 20 meters high, and hit several hundred kilometers of the Tohoku coastline on the eastern side of Japan. This was followed by a nuclear crisis categorized as level 7 on the International Nuclear Event Scale. Subsequently, a nationwide electricity shortage ensued and, finally, the collapse, both nationally and globally, of the industrial supply chain. That directly cost the lives of approximately 18,000 people. The economic and infrastructure damage was about $200 billion.

The direct damage induced indirect damage due to the collapse of the industrial supply chain (Figure 1). Japan's mining and manufacturing production in March was -15.5%, the biggest monthly drop in its history. Exports in April was -12% as well. The major disaster areas in Tohoku were Iwate, Miyagi, and Fukushima prefectures, in which 4.5% of the nation's population are located and account for 4% of the national GDP. Although their share of exports is just 1%, the initial damage in the disaster areas largely impacted the supply chain throughout Japan, parts of East Asia, and the rest of the world. The automobile industry, which creates its products by assembling 20,000-30,000 parts, including materials, electronics, and machinery, was the most affected sector, and it is unsurprising that it is vulnerable to supply chain disruptions.

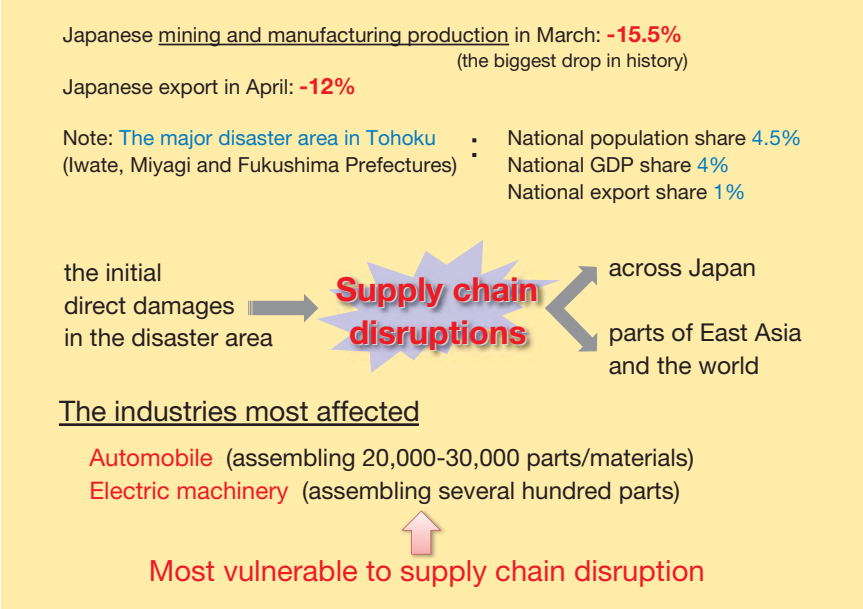


Figure 1: Direct and indirect impact of the Great East Japan Earthquake

Due to rapid progress in IT and transport technology, together with the promotion of free trade through the World Trade Organization (WTO), free trade agreements (FTAs), and economic partnership agreements (EPAs), we have seen the globalization of production, trade, and investment, as well as the local agglomeration of production and consumption in major cities throughout Asia and the world. The flow of global production occurs within a very complex network. East Asia today is called the world's production center based on this supply chain network. The disasters in the Tohoku region and Thailand caused major disruptions in the supply chain throughout Asia, affecting major industrial agglomerations including those in Manila and Shanghai.

Why is there so much agglomeration of production throughout Asia? Agglomeration occurs through a snowball effect in principle. For example, the automobile, electronic, and machinery industries have production centers, suppliers, power plants, and material centers located near Bangkok. This is one of the biggest agglomeration for industries in the Association of Southeast Asian Nations (ASEAN) region. Production in the Bangkok area uses key parts made in South Korea, Taiwan, and Japan. Of equal importance is that Bangkok not only utilizes imported materials, but also produces major parts and materials exported to other Asian countries. If Japan, South Korea, or Taiwan experiences a major disaster, production in Bangkok is affected, and if Bangkok is met with a major disaster, all other Asian countries are affected subsequently.

Key factors for agglomeration are scale economies and low transport costs. Lower transport costs encourage more concentration of production activity at a limited number of locations, and this was the background of the disruptions that we saw in 2011. For example, looking specifically at the automobile industry, a typical car is assembled from 20,000-30,000 parts. Each key part is usually produced at either one or a few locations, thus, all 20,000-30,000 parts are exchanged through a complex supply chain network that handles everything from the procurement of parts to the delivery of finished products. Moreover, in order to minimize inventory stock, each production center adopts a just-in-time procurement policy. This is very efficient under normal conditions but is vulnerable to major disasters.

Japanese Automobile Industry was Most Affected by the Earthquake

Roughly 10 million cars are produced in Japan per year, with half of those sold domestically. Japanese automakers produce 13 million cars annually overseas, which require key parts made in Japan as well. There are three agglomerations of automotive production in Japan. The main one is the Tokai region, which extends from Tokyo to Nagoya. Another agglomeration in the Kyushu region has existed since 1980 as well as a new one in the Tohoku region since 1990. In the Tohoku region, factories in the northeast suffered from the tsunami, and the central region's factories as well as the highways of the south were affected by the Great East Japan Earthquake. Some plants took more than a year and a half to recover, while others did not sustain any serious losses but were unable to continue operations because of a lack of procuring parts from elsewhere.

Looking at the automobile production index from 2008 to 2011, it appears that the Great East Japan Earthquake and the Lehman Brothers collapse affected Japan's automobile industry equally (Figure 2). Both led to a production growth rate of -50%. The automobile production trend in Tohoku is synchronized to the overall trend of automobile production in Japan. Although only the Tohoku region was directly damaged, the total Japanese automobile production growth rate fell to -50% because of supply change disruptions.

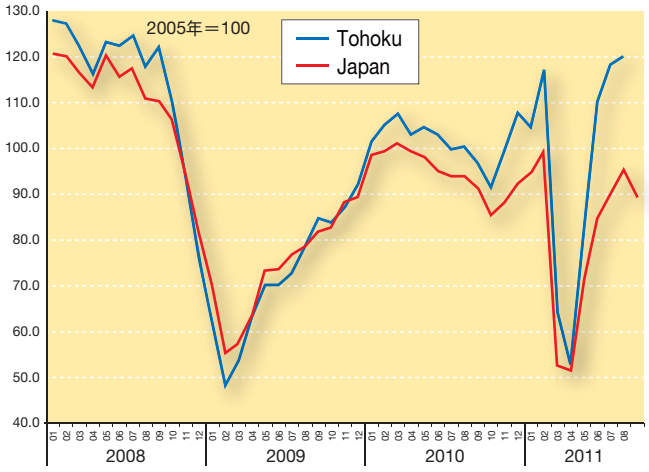
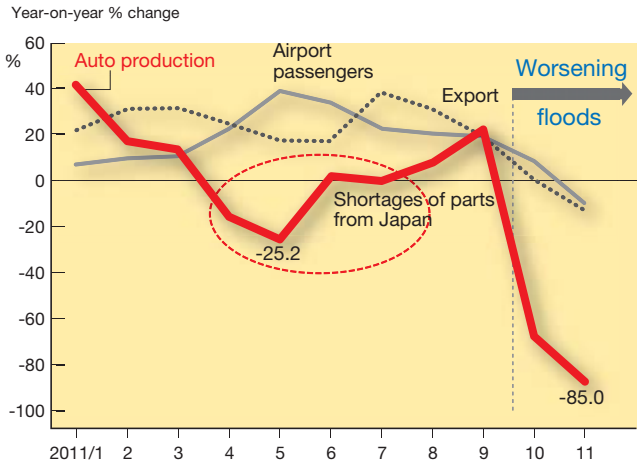


Figure 2: Index of automobile production in Tohoku and in Japan synchronization through supply chain linkages

Shifting to Thailand, great floods occurred in September 2011. The Bangkok region is one of the biggest agglomerations of automobile and electronics manufacturing in the ASEAN region. Most large Japanese electronic and automobile companies operate plants in the area and are supported by other plants that produce the most important parts. There are more than 1,300 Japanese firms in the area.

How did the Great East Japan Earthquake and the floods affect Thailand's economy? Automobile production in Thailand in May 2011 was -25% because of a shortage of parts from Japan. It slowly recovered up until September, but then dropped sharply to -85% in November because of the floods (Figure 3).



Source: Nikkei Newspapers 2011.12.29

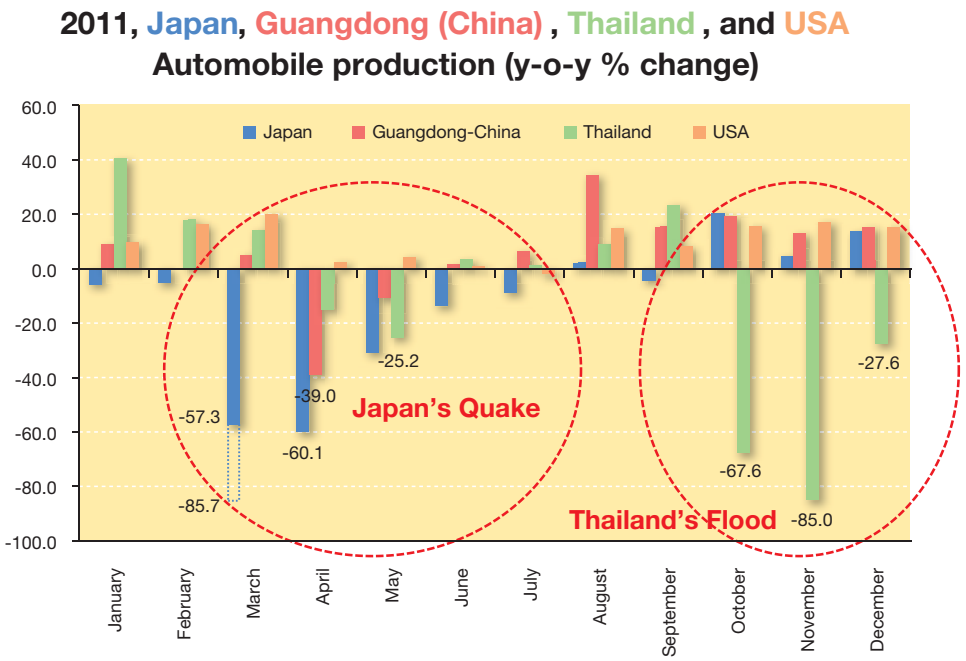
Figure 3: Impact of the Great East Japan Earthquake and floods in Thailand on Thailand's economy

Examining Global Impact of the Great East Japan Earthquake and Thailand's Floods

What was the global impact of these mega-disasters? Japan exports numerous materials and parts, as does Thailand. Thailand exports parts throughout ASEAN. Transport costs, broadly defined, are low in this region thanks to tariff agreements among other reasons. As manufacturers try to maximize economies of scale, each key part is produced in a specific country. In the case of automobile industry, Thailand specializes in frame parts, panels, electronics, interior parts, engine parts, and others. The Philippines, for example, mostly produces parts such as engine fuel systems, emissions systems, electric parts, sus-

pension parts, and manual transmissions. A disaster in any country affects the entire production system since the parts are exchanged between the countries.

We can understand the global impact of the Great East Japan Earthquake and Thailand's floods by looking at production data from Japan, the Guangdong region in China, Thailand, and the United States (Figure 4). Up until March 11, Japan's production grew normally. After the earthquake, the automobile production growth rate in Japan fell to -85.7%. Production recovered gradually but decreased suddenly in September due to the floods in Thailand. Looking at statistics from Guangdong, production growth in April was -39%, and it recovered in August but dropped significantly in September again because of the floods in Thailand. Examining Thailand, because of the Great East Japan Earthquake and the shortage of parts, the production growth rate was -25% in May. This rate recovered until September but sharply fell to -85%. Looking at the United States, the Great East Japan Earthquake caused the production growth rate to drop, with the biggest drop in July, when the growth rate turned negative. The impact of the floods in Thailand was less significant for the United States.



Source: JAMA, Statistic Bureau of Guangdong Province, TAIA, Federal Reserve Board
By courtesy of Professor HAMAGUCHI Nobuaki

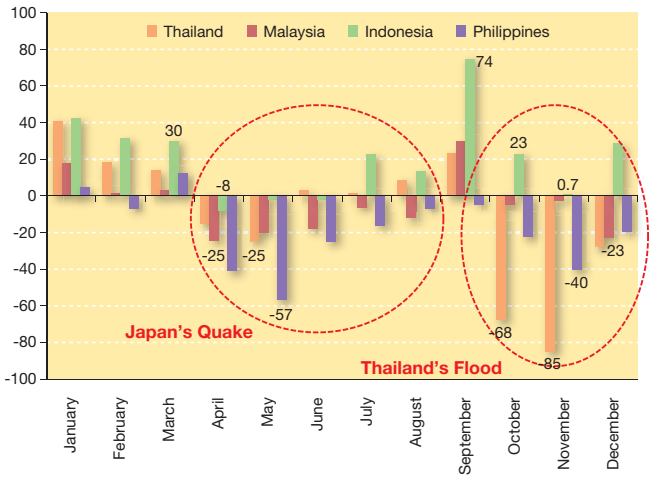
Figure 4: Global impact of the Great East Japan Earthquake and Thailand's floods

The biggest drop in the production growth rate in Japan was in March, and in China, it was in April. In Thailand, this was seen a month later, in May, and in the United States, it was in July. The greater the distance from Japan, the longer it took for the disaster to affect the country in question. This is likely because the further the distance of the production center, the more inventory stock it held.

The quake and floods affected other ASEAN countries, specifically Indonesia, Malaysia, and the Philippines (Figure 5). In Thailand, the biggest drops in production growth occurred in May and November, and in Malaysia, it was in April, at -25%, which is the same level as in Thailand. Indonesia saw strong domestic production up until last March, but its growth rate dropped off significantly and turned negative due to the Great East Japan Earthquake. It recovered strongly in September but dropped again sharply in October due to the floods. The Philippines was perhaps the country that was most impacted and suffered the most from both disasters. The Great East Japan Earthquake caused the production growth rate to drop to -57% in May, and the Thailand floods led to a drop to -40% in November. We can see that if there is a major disaster in either Japan or Thailand, all ASEAN countries are significantly affected.

This does not only affect the automobile industry. For instance, consider the weekly average prices of hard disk drives. The price of a hard disk drive is the same throughout the world in principle. On October 1, the price of a hard disk drive was about 5,000 yen. However, by the end of the month, the price had tripled. Thailand produces about 45% of the world's hard disk drives, hence the loss in production greatly impacted this industry.

2011, ASEAN automobile production (y-o-y % change)



Source: TAIA, AAM, GAIKINDO, AAP By courtesy of Professor HAMAGUCHI Nobuaki

Figure 5: **Impact of the Great East Japan Earthquake and Thailand's floods on ASEAN countries**

How Can we Enhance the Resiliency of the Global Supply Chains?

What is the solution to these issues? We need international cooperation to promote the resiliency of the global supply chains. We must first recognize that no place in the world is risk free. There is the potential that supply chains may be disrupted due to a major disaster, including human-induced ones such as conflicts. For instance, the recent political conflict between China and Japan has affected sales. Japanese automobile sales in China post-tsunami dropped by 50%, and sales post-floods dropped by 50%. Due to the current political conflict, sales have dropped by about 50%. We must consider all of the possible sources of supply chain disruptions, which can be at any node or link, from materials to consumers at any location in the world. In order to enhance the resiliency of the global supply chain, we need major international cooperation. We must use economies of scale as much as possible, but we must also disperse risk.

Automobile production tends to utilize tens of thousands of small companies that support major production networks. Because small companies are vulnerable to major disasters, group-wide cooperation is indispensable. There are many ways in which individual enterprises can enhance risk management, such as through the virtual and actual dispersion of key plants, standardization of parts and materials, diversification of supplies, and utilization of disaster insurance. Particularly in developing countries, regional cooperation, including regional or national government infrastructure improvements, is essential. Of utmost importance for these countries is to prevent urban flooding and ensure a stable electric supply. In the long run, we must decentralize the overconcentration of economic and political functions in capital cities such as Tokyo, Seoul, and Taipei. We need more resilient and nationwide systems.

International cooperation is essential to the enhancement of resiliency in developing countries. During the 1950s and 1960s, major typhoons greatly impacted production systems in Japan. Japan subsequently developed infrastructure such as water systems and electrical systems to address this due to the great assistance received from the World Bank and the International Monetary Fund among others. This same process should be carried out in major developing countries throughout the world. We also need a more comprehensive global insurance system.

A concrete example of supply chain risk mitigation is a proposal from the Thai government to develop sister industrial clusters. According to this proposal, during normal times, each production cluster will focus on its own special products. However, in the case of a major disaster, the region's sister cluster would step in to provide backup production of common parts. Such country-to-country cooperation is very important. While we compete with each other during normal times, we should cooperate in times of disasters.

There is a strong production network in East Asia. The next step for the global supply chain will be to connect South Asia and Southeast Asia to East Asia. After that, we must incorporate Africa. South Asia and Africa cannot build sufficient infrastructure to mitigate major disasters on their own. International cooperation is essential as is cooperation on innovation toward upgrading our brainpower networks. The lessons of Japan and Thailand are that we should work to move the supply chain toward higher value production and greater safety.

BBL Seminar

Brown Bag Lunch (BBL) seminars are held during lunch hours. We invite Japanese and foreign guest lecturers and provide a venue for candid exchanges of opinions on a variety of policy issues, transcending industry-government-academia boundaries.

Japan's New Growth Strategy and the World Economy

September 24, 2012

Dale W. JORGENSON

Dale W. JORGENSON, Samuel W. Morris University Professor, Harvard University

Dale W. JORGENSON is the Samuel W. Morris University Professor at Harvard University. He served as Chairman of the Department of Economics from 1994 to 1997. He is a member of the American Philosophical Society, the National Academy of Sciences, the American Academy of Arts and Sciences, and the American Association for the Advancement of Science. He was President of the American Economic Association in 2000, President of the Econometric Society in 1987, and recipient of the John Bates Clark Medal of the American Economic Association in 1971. He is the author of more than 246 articles and the author and editor of 32 books. His most recent book is *Information Technology and the American Growth Resurgence* (co-authoring with Mun S. HO and Kevin STIROH, The MIT Press, 2005). His collected papers have been published in 10 volumes by The MIT Press (1995 to 2001). He received his Ph. D. degree in economics from Harvard in 1959 and his BA in economics from Reed College in Portland, Oregon, in 1955.

Presentation

The new growth strategy was endorsed by the Cabinet of Japan on July 31, 2012. During the course of this presentation, I will discuss specifics on this strategy as well as alternative approaches worth considering. I will also discuss the growth strategy proposed by the International Monetary Fund (IMF) in the Article 4 consultations which concluded on August 1.

Challenges to be Tackled by the Japanese Economy

There are several strategic issues facing the Japanese economy at present. The Great East Japan Earthquake and the related nuclear power plant accident is an important example. There is universal admiration of the efforts by Japanese citizens, businesses, and the governments in reaction to this very difficult situation. As this topic has been discussed at great length by RIETI, today's presentation will focus more specifically on Japan's economic growth going forward. Another strategic issue facing the Japanese economy is overcoming deflation and bringing about the depreciation of the yen. We are all aware that the economic and fiscal crisis that took place in the United States beginning in 2007 and continuing through 2009 had a major, indirect impact on Japan. Japan became a safe haven for many financial investors, which led to great demand for securities denominated in yen. This in turn resulted in a very strong appreciation of the yen relative to the U.S. dollar and the euro, which caused a downturn in exports and

industrial production more severe than that of many other industrialized countries. Finally, Japan is facing the issue of a rapidly aging population along with constraints on energy. Those two issues will play the largest role in discussing Japan's new growth strategy.

When considering economic and fiscal management, overcoming deflation is a very difficult problem for the Japanese economy to address. According to IMF research, there is currently a gap between aggregate supply and demand in Japan of about 2.6% of the GDP. In other words, aggregate supply exceeds aggregate demand by 2.6%. The IMF projects that this will exert deflationary pressure through 2016, and that it will only be by 2017 when Japan will attain a 1% inflation rate. The IMF also projects a real growth rate between now and 2017 of only 1.3%. However, the nominal growth target in Japan is 3% per year for the period 2010 to 2020, and the real growth target over the same period is set at 2% per year. Questions must be asked about whether or not such targets are reasonable in the face of the well-informed IMF projections.

The IMF has a series of recommendations regarding reforms necessary to produce 2% growth per year. Such recommendations include raising the labor force participation rates of women and the elderly. The IMF points to disincentives to female labor supply in the Japanese tax system and recommends their removal. However, institutional changes that would be required to increase the female labor force participation rate would be challenging and would need to be phased in over a considerable period of time. This is something which deserves immediate consideration. In terms of promoting increased labor force participation by the elderly, reform of the pension system may be required, although this is also a difficult process. Another recommendation is raising the level of immigration, and incremental steps in the right direction are being made. Finally, the IMF also recommends opening the protected sectors and easing regulations.

Four Packages of Policy Proposals Aimed at Japan's Revival

The new growth strategy consists of four main packages of policy proposals. The first relates to energy and the environment, and its objective is to conserve energy and increase reliance on renewable energy sources. Japan has been at the forefront of energy conservation and environmental technologies ever since the energy crisis of the 1970s, and Japanese technology and expertise has found markets throughout the world as other countries begin to move toward similar standards. Emerging countries such as China and India will surely need to rely on Japanese technology and expertise for some time to come. Therefore, this appears to be a platform for a sustained comparative advantage for Japan as well as an appropriate point to focus on in policy. One example of this is that Japan has been an international leader in hybrid and electric vehicles for several decades.

An entirely different initiative in terms of energy and the environment is also worth considering, which is to provide a single electric power market throughout Japan. Japanese electric utilities have always rejected the idea of a single market. However, when Japan had to undertake severe conservation efforts in the aftermath of the nuclear accident last year, a system which is a model of inefficiency was revealed. This needs to be replaced and would require a major effort in economic organization and technology. An added advantage of a single market for electricity in addition to improved efficiency would be enabling the use of whatever forms of energy supply that evolve out of the energy debate.

The second proposal of the new growth strategy involves health and life sciences. Japan's health system is a model for the world. The results in health policy terms are impressive, and the quality of technology is high. This is another source of a sustained comparative advantage for Japan. It is important in particular to recognize that in order to realize the benefits of such an advantage, trade negotiators must incorporate the export of medical devices and drugs into the agenda for trade policy.

On a related note, another important issue is the growth of an industry which would provide institutional care for the elderly. This could also potentially act as a business opportunity for the female entrepreneurs called for under the new growth strategy. Child care is a related sector which is underdeveloped in Japan and, if expanded, will most likely result in a larger female labor force participation rate.

The third proposal of the new growth strategy involves agriculture, forestry, and fisheries. Challenges

related to this sector have so far led to a lack of progress and frustration. The result is that Japan has the highest food costs of any advanced country in the world. On top of this, the most rapidly aging labor force in the country is that of agriculture. Connections between reforms in the agricultural sector with economic growth have been noted in the new growth strategy. The removal of trade barriers would help to open up international markets for Japanese products including agricultural products.

Finally, the new growth strategy includes proposals in relation to small- and medium-sized enterprises (SMEs). In Japan, there is a challenge related to the long-term public support of SMEs through subsidized credit, which has given rise to a large number of financially unviable enterprises that are dragging down productivity and economic growth in the trade and services areas in which they operate. SMEs appear to be the source of significant employment, thus a personal proposal would be based on a prefecture of origin principle. The prefecture of origin principle suggests that if you have an SME in one part of the country and wish to open a branch of that enterprise in a different part of the country, you would be licensed to do so. This principle would potentially act to remove barriers to entry and allow capable business entrepreneurs the opportunity to expand their businesses and create new employment opportunities.

The Effects of Deregulation on Productivity Improvement

Going back to IMF recommendations mentioned earlier, there are sectors which are protected from competition by regulations mainly at the prefectural level in Japan. IMF research suggests that there is growth potential from such protected sectors. Studies on the Japan-U.S. productivity gap have helped to identify the industry sources of the productivity gap which contributes to slow economic growth in Japan. Comparisons on the level of productivity in various sectors in Japan and the United States have been conducted in order to stimulate growth potential.

In 1960, Japan's productivity relative to that of the United States was approximately 60% less. As the Japanese economy progressed, the productivity gap decreased; by 1970, it was only half of that of 1960, and by 1990, it dropped to a low of 14%. Since then, Japanese productivity has dropped, and the gap has increased to approximately 20%. In terms of the manufacturing industry, Japan closed the productivity gap with the United States by 1990. However, the non-manufacturing gap has continued to remain large between the two countries. Therefore, we now know which sectors Japan should focus on improving.

Industry contributions to the Japan-U.S. productivity gap reveal that the wholesale and retail trade productivity gap was as little as 2% in 1990 but rose to 6% by 2004. This remains the most important industry in terms of contribution to the productivity gap. Such a sector is protected by layers of regulations created by the prefectural and municipal governments. Such regulations must be addressed and can be through the use of the prefecture of origin principle. Other protected industries in Japan appear to include food, construction, agriculture, electricity, other transportation, and other services.

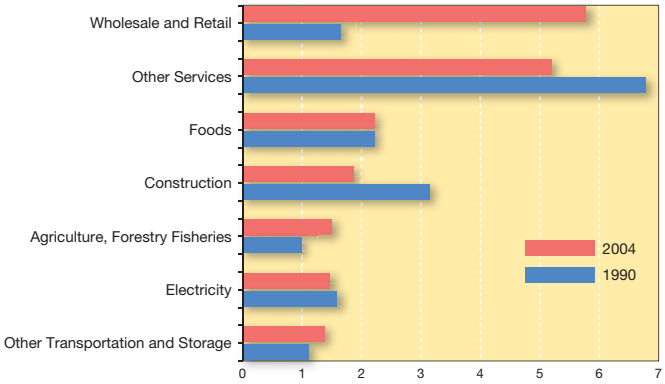
Although the Japanese economy is faced with several issues, they are not unique to Japan. Mario MONTI, the Prime Minister of Italy and a distinguished economist, prepared a report on a new strategy for the single market in 2010 for the EU. He expressed that the EU was built around the idea of a single market for goods but not for services. He added that although the services sectors account for 70% of EU GDP, the market is strongly fragmented with only 20% of the services provided in the EU having a cross-border dimension. Prime Minister Monti concluded that the productivity gap between the United States and EU area is as wide as 30%. Therefore, in the EU area as well as Japan, the trade and services sectors have been protected by efforts that were originally for the purpose of creating jobs to absorb the repatriation of millions of Japanese after World War II. Those regulations have never been changed and can now be considered a hindrance to economic productivity.

In conclusion, Japan has not overcome the problem of deflation, and therefore economic and fiscal management are still first-order problems. An initiative on the part of the Bank of Japan has come in to effect to restart quantitative easing, which is a step in the right direction. However, the time has come to deal with problems other than economic and fiscal management

mentioned in the new growth strategy. Japan would benefit from a single market for energy and combining the exploitation of new health and life science technologies with expansion of institutional facilities for the elderly. Japan would also benefit from removing barriers in order to allow successful SMEs to expand and create employment opportunities in the process and exchanging agricultural protectionism for the opening of this market to international trade negotiations.

With regard to the demographic decline, there needs to be a pension system reform and a focus on efforts to increase the labor supply of the elderly. The most promising aspect of the IMF agenda seems to be the potential benefits that would come about from opening up the protected sectors. RIETI has responded to the Great East Japan Earthquake with a program of research which has offered a range of policy alternatives which should be debated by policy makers. RIETI now has a great opportunity to create an agenda to raise Japan's potential growth rate.

Seven lagging industries and the Japan-U.S. productivity gap: Industry contributions to the productivity gap in 2004 (21.5) versus 1990 (13.9)



Comments by **KOBAYASHI Keiichiro, SF, RIETI**

There are three issues which will be covered in today's presentation. The first is how to enhance productivity growth. The second is on how to restore the sustainability of Japan's government debt. Finally, the last is on income inequality in Japan.

As Professor Jorgenson mentioned, the most important sector in terms of potential growth in Japan is the services sector. This sector accounts for approximately 75% of the GDP and hours worked, and there are great differences between each sector. The distribution services sector has rapid total factor productivity (TFP) growth, whereas the financial services sector has low TFP growth. In considering the issue of which area of innovation is most promising in terms of enhancing productivity growth, research conducted using induced innovation methods suggests that the direction of technological change is determined by the market environment. This research also indicated that an increase in the supply of skilled labor in the 1960s and 1970s enhanced innovation and skill augmenting technology. The biggest change in the market environment in recent times is that of an aging population. There is an increasing demand for nursing care services, and therefore it could be argued that innovation in nursing care services is necessary in the form of gerontology.

With regard to the government debt problems, many economists argue that Japan needs a 25%-30% consumption tax increase to sustain the debt-GDP ratio. Raising the co-payment of medical services for the elderly from 10% to 20%, along with a substantial decrease in pension benefits and a general spending cut are other suggestions which have been made. Such measures would take an incredibly long time and require the persistence of the Japanese people, and the outlook for implementation of such plans doesn't look positive.

There are several implications of income inequality. Using a neoclassical growth model including worker and capitalist agents, it is found that if the share of worker's capital stock decreases, the labor supply by workers increase, the income of workers decreases, the income of capitalists increases, and total output increases. However, an increase in total output may not be good for social welfare. It would be worth bearing this in mind when considering Japan's economic growth problems.

Reply to the Comments by **Dale W. JORGENSON**

Increased productivity growth will require an increase in entry possibilities into protected markets. This is exactly what will stimulate this technology movement to which Professor Kobayashi alluded. Japan is certainly in the position to take a leadership role here. Elimination of protection for incumbent firms in protected markets will help to encourage new technologies. Increases in labor force participation are another important factor in terms of bringing about such changes. With regard to fiscal sustainability, there are possibly daunting prospects for Japanese tax rates in the future. However, any changes will have to be discussed by policy makers.

RIETI has a database which has been created for retirement issues which is the ideal tool for investigating the potential effects of such policy changes (Japanese Study of Aging and Retirement: JSTAR). The issue of welfare is another important one. As desirable as increasing GDP would be, the basic objective is welfare. Welfare involves both market and non-market activities associated with well-being. In any policy evaluation, it would be necessary to account for welfare objectives.

Question & Answers

Q1.

Could you confirm that when you mentioned female participation, you were alluding to the possibility for female workers to increase their productivity?

A: As far as female participation is concerned, one fact is of great importance. Women who are coming out of the Japanese educational system and entering the labor market today are better educated than men. This is a fantastic opportunity for these women and the Japanese economy. This doesn't simply apply only to jobs in the services sector, but also to leadership roles that women could fill in all sectors of the economy. In order to do that, it is necessary to change the career path system. It is fundamental to address the issue of educated women.

Q2.

What is your opinion on what the government should do about declining industries and failing companies?

A: On the issue of declining firms and industries, the problem probably should be dealt with both from short-term and long-term perspectives. My impression is that of most observers, which is that Chrysler and General Motors, which were bailed out by the U.S. government, were in fact viable under the usual rules of bankruptcy. Such rules state that equity holders and bond holders are to be eliminated if they are going to lose money. If there are no equity holders and bond holders left, the company must also be eliminated. However, in the case of General Motors, this rule didn't apply. Investors were wiped out, and a very substantial part of the remainder of the business was turned over to the pension funds. This would never usually happen in bankruptcy proceedings. This is a capital error and is not the best way to go about industrial policy in relation to a viable firm. If the firm isn't viable, it must be eliminated, and examples include companies such as SAAB and Volvo. Industrial policy should be rationalized carefully, and firms which are bankrupt shouldn't be maintained on the basis of subsidy regardless of size. This is a rule to which policy makers should try to adhere, even in the face of political pressures. The U.S. government has failed to do this.

2012 in Review: Key phrases summarizing RIETI's activities

As a think-tank that conducts world-class research, RIETI not only implements its theoretical and empirical studies but also makes it as a mission to make policy proposals that are evidence based, by leveraging its strategic location of being located at the center of governmental activities, Kasumigaseki, and take full advantage of the synergy between policymakers. Furthermore, the cornerstone of RIETI's activities is based on the broad dissemination of its findings in a way that is easy to understand; calling for policy debates; and contributing to policy research at home and abroad through the collaboration with cutting-edge research that has been conducted overseas.

In the current special edition, we will talk about our activities that took place in FY2012 through the "five key phrases" that set RIETI apart from other research institutions.

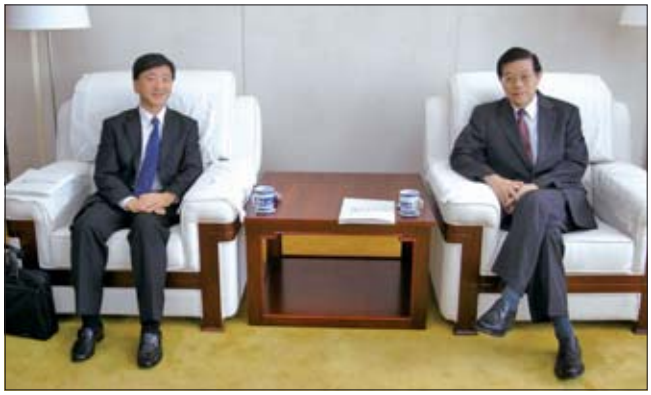
Development Research Center of the State Council: DRC*

RIETI and DRC concluded a memorandum of understanding (MOU) in 2006 and are partaking in various collaborative research activities. In research conducted with the Enterprise Research Institute, DRC, a joint paper titled, "How do Chinese industries benefit from FDI spillovers?" was put forward and was also published in the *China Economic Review*. Currently, as part of the "Study of the Creation of the Japanese Economy and Trade and Direct Investment" (Program Leader: WAKASUGI Ryuhei, FF, RIETI), RIETI and the Enterprise Research Institute, DRC are conducting joint research under the theme of "The globalization of Chinese firms." We mutually hold workshops in Japan and in China to present research findings and to exchange ideas. On August 21, 2012, a workshop was held in Beijing, followed by a meeting between the Director of DRC LI Wei and RIETI Chairman NAKAJIMA Atsushi to affirm a deepening cooperation. From September 2012 to November 2012, RIETI invited TIAN Hui, a DRC researcher, as a visiting scholar, further widening the scope of research cooperation.

Workshop in Beijing, August 21, 2012

*DRC is under the State Council of the Chinese government, and is a research institute that has been granted equal status at par with the ministerial level. Its research areas cover a wide array of topics centering on the domestic economy or industries. DRC not only boasts a high research standard and an abundance of research staff members, but also it has earned high marks at home and abroad as a research entity where its findings are directly linked to policy making through the provision of direct recommendations to the senior members of the Chinese government by going beyond the interests of each ministry while remaining neutral.

Left: RIETI Chairman NAKAJIMA Atsushi
Right: DRC Director LI Wei



Centre for Economic Policy Research: CEPR*

RIETI and CEPR started research collaboration in 2007. We have mutually held workshops in Tokyo and London. In 2012, a workshop entitled "International Finance and Corporate Finance: Japanese and European perspectives" was hosted in London. RIETI is a Japanese consortium member of CEPR's policy portal site, VoxEU.org, which is operated by consortium members mainly from Europe (France, Italy, Spain, Germany, etc.). RIETI and CEPR are making efforts to introduce and disseminate research findings to each other, for instance, by reposting columns that are published on the RIETI website onto VoxEU.org's site, and vice versa. On the following page, you will find one of the columns posted on VoxEU.org contributed by RIETI fellows.

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*CEPR is a network of over 800 economists. CEPR does not employ researchers directly, but instead appoints as Fellows and Affiliates the leading economists, who remain in their home institutions. CEPR takes no institutional positions of its own. For over two decades CEPR has played a key role in strengthening the scientific quality of economic research in Europe. In addition, CEPR has played a key role in enhancing the quality of European policy-making, by encouraging the best economists to participate in policy debates and ensuring that these debates are informed by the highest quality research. Because the Centre's research agenda arises out of highly decentralized initiatives, it is diverse and constantly evolving.

Workshop in London, March 29, 2012

At the commencement of research collaboration in 2007.
Left: RIETI President FUJITA Masahisa
Right: CEPR Founder Richard PORTES

Other exchanges with overseas research institutes

RIETI jointly hosts conferences based on themes of financial cooperation in Asia together with Korea's North East Asia Research (NEAR) and the Chinese Academy of Social Sciences (CASS).

May 24, 2012
"Japan-China-Korea (A3) Conference: Monetary and Financial Cooperation in the Region"

June 2, 2011
"A3 Triangle Initiative on Monetary and Financial Cooperation for Korea, China and Japan"

Japan-China-Korea (A3) Conference, May 24, 2012

Together with the Taiwan Institute of Economic Research (TIER) and the Korea Institute for Industrial Economics and Trade (KIET), broad themes that are common in Asia such as production networks or issues of small and medium enterprises are explored at joint workshops.

November 13, 2012
"Toward Building New Production Networks in Asia"

November 22, 2011
"Small & Medium Enterprises: Issues and Policies"

Toward Building New Production Networks in Asia
November 13, 2012

RIETI has concluded an MOU with the Council on Foreign Relations (CFR) and accepts fellows.

Impact of Localisation and Urbanisation on Productivity: Empirical analysis based on establishments data in Japan

KONISHI Yoko and SAITO Umeno Yukiko

September 10, 2012

KONISHI Yoko, F, RIETI

She received her Ph.D. in economics from Nagoya University in 2003. Before joining RIETI in 2008, she was a visiting scholar at the Department of Economics, Stanford University and an assistant professor at the Institute of Economic Research, Hitotsubashi University. She became a Postdoctoral Fellow for Research Abroad of the Japan Society for the Promotion of Science (JSPS) and a visiting scholar at the Cowles Foundation in Yale University from 2009 to 2011. Her research field is applied microeconometrics, and she is interested in the gap between empirical results and economic models due to misspecification problems.

SAITO Umeno Yukiko, F, RIETI

After receiving her Ph.D. in physics from University of Tokyo in 2002, she became a researcher at the Fujitsu Research Institute, Japan from 2002 to 2012. She joined RIETI in 2012. Her research field covers industrial organization and spatial economics. She is interested in how firms construct inter-firm relationships and how it affects firm's performance.

Since 2001 Japan has had in place an "Industrial Cluster Policy" aimed at making the most out of situating companies close together. This column looks at the benefits for firms in the same industry as well as for firms in different industries.

There have been an increasing number of empirical studies on localisation and urbanisation in recent years. Ever since Ellison and Glaeser (1997) presented their index for industrial localisation based on their theoretical model, there has been much subsequent empirical work examining the effects of agglomeration on productivity using their findings. Rosenthal and Strange (2001), for example, use the index to try to find the determinants of agglomeration focusing on knowledge spillovers, labour market pooling, and input sharing for the manufacturing industries.

Many of the existing studies use data tallied regionally by administrative units (in Japan's case, prefectures and municipalities) when measuring the degree of agglomeration. However, since the same prefecture has an area where the population is concentrated and other areas of lesser concentration, it is easy to imagine that the degree of agglomeration of establishments varies even within the same prefecture. Some establishments exist near the prefecture border. Since existing data assign a single index to all the establishments in the same prefecture in such cases, it is difficult to rule out the possibility of bias in the agglomeration indices.

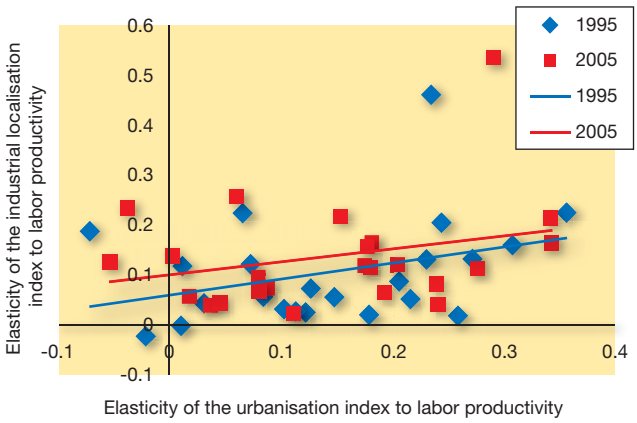
To overcome this problem, we propose a distance-based index defined for each establishment, rather than one based on data aggregated per administrative unit level, as a measurement of agglomeration using micro-location (latitude and longitude) information from the Ministry of Economy, Trade and Industry's (METI) Census of Manufactures (Konishi and Saito 2012). Our index is designed to reflect locational heterogeneity within a region as an administrative unit and avoids biases caused by spatial correlations and other problems associated with segmenting data based on administrative boundaries. More specifically, the indicators take into account the agglomeration

effect of individual establishments in relation to all others. In doing so, we have made an indicator based on distance, assuming that establishments that are located closer to one another and hire more employees will have a larger agglomeration effect. In addition, we have made two different indices—for industrial localisation-type agglomeration and urbanisation-type agglomeration—based on data from the four-digit Japan Standard Industrial Classification code (JSIC).

Using these indices, we measure the impact of these two phenomena on labour productivity for establishments with four or more employees and total factor productivity (TFP) for establishments with 30 or more employees. Figure 1 is a scatter chart showing the relationship of coefficients derived from the regression of labour productivity and the two agglomeration indices for each manufacturing industry according to the two-digit JSIC code. The vertical axis shows the elasticity of the industrial localisation index to labour productivity, while the horizontal axis indicates the elasticity of the urbanisation index to labour productivity. The elasticity tells us the percentage of increase in labour productivity per each 1% rise in the agglomeration indicator. In other words, Figure 1 is a scatter chart of two types of elasticity for each industry, and the blue dots ◆ (1995) and red dots ■ (2005) represent the industries.

Figure 1 shows that establishments with stronger agglomeration tend to have higher productivity in many industries for both localisation and urbanisation, given that the elasticity is positive in almost all industries in both indices. It also suggests that there is an upward-sloping trend in both years. For both years, the straight line represents the linear approximation of the average relationship of elasticity of both indices. This means that industries in which the urbanisation index has a stronger tendency to increase labour productivity also show a more positive effect of the localisation index on productivity (and vice versa). In addition, the fact that the straight line for 2005 lies slightly above that for 1995 suggests that the industrial localisation effect compared with urbanisation effect was slightly stronger in 2005.

Figure 1: Scatter plot of elasticity of industrial localisation and urbanisation indices to labour productivity



Meanwhile, TFP values are positively correlated with the urbanisation index, whereas TFP and the industrial localisation index are uncorrelated in most industries. As an exception, we find some industries for which both the industrial localisation and urbanisation indices are positively correlated with TFP, all of them categorised as declining industries. In some of the industries categorised as growing, no correlation is observed between TFP and agglomeration, whether urbanisation or industrial localisation. Moreover, we observed a negative impact of localisation on TFP in some growth and high-tech industries. The above results show that a promotion of an urbanisation policy is required for growth industries, while policies not only facilitating urbanisation but also deepening localisation are effective for declining industries. These findings imply that certain attributions—establishment size, industry type, etc. —can serve as a guide for the government in identifying the effective target of the cluster promotion policy.

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RESEARCH DIGEST

Research Digest is a clear and concise summary of main points and issues with policy implications that have been raised in RIETI discussion papers.

SATO Kiyotaka

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SATO Kiyotaka

SATO Kiyotaka is Professor at Department of Economics, Yokohama National University. His research interests are empirics of exchange rate regime, monetary and economic integration, and exchange rate pass-through. He obtained his Ph.D. in economics from University of Tokyo in 2001. Selected publications include: "Exchange Rate Changes and Inflation in Post-Crisis Asian Economies: VAR Analysis of the Exchange Rate Pass-Through" (with ITO Takatoshi), *Journal of Money, Credit, and Banking*, Volume 40, No.7, pp.1407-1438, 2008; "New Estimates of the Equilibrium Exchange Rate: The Case for the Chinese Renminbi" (with SHIMIZU Junko, Nagendra SHRESTHA and ZHANG Zhaoyong), *The World Economy*, 35(4), pp.419-443, 2012; and others.

The Construction and Analysis of the Industry-specific Nominal and Real Effective Exchange Rates in Japan

Ever since the Lehman Brothers collapse in 2008, as the Japanese yen continues at high levels, there has been a growing need not only to observe the bilateral exchange rate of the yen vis-à-vis the U.S. dollar but also to watch the daily exchange-rate fluctuations of the yen on an effective basis that includes the currencies of Asian countries, whose importance as trading partners is increasing. One such effort, the Research on a Currency Basket project of the RIETI International Macroeconomics Program (Program Director: ITO Takatoshi, FF, RIETI) began announcing industry-specific real effective exchange rates in July 2012. This data promises to be of use in research, policy-making, corporate activities, and a wide range of other areas. Moreover, Professor SATO Kiyotaka, Professor SHIMIZU Junko, and the others involved in preparation of the actual data, through their analyses using the vast amount of raw data on which their announced data is based such as industry-specific price indexes and foreign trade shares in major trading partner countries, have made discoveries with important implications for government policy. Among them are the factors explaining why the electrical machinery industry faces a relative depreciation of the yen on a real effective basis than other industries.

SHIMIZU Junko

Professor, Faculty of Economics, Gakushuin University, Japan

SHIMIZU Junko

SHIMIZU Junko is Professor at Faculty of Economics, Gakushuin University. She has joined at RIETI as a researcher of the project on "The Optimal Exchange Rate Regime for East Asia" since 2005 and has been in charge of calculating the Asia Monetary Unit (AMU). She also worked as a research member of ASEAN+3 Research Group in 2007, 2009 and 2010. She obtained her Ph.D. in commerce from Hitotsubashi University in 2004. Her expertise includes international finance such as international cooperation, currency basket, the exchange rate regime for East Asia, international capital flow, etc.

Selected publications include: "Global Imbalances and Currency Misalignments in Asia: An analysis with AMU" (with ITO Takatoshi and OGAWA Eiji), *The Frontiers of Economic Policy Analysis Volume 3: Globalization and International Economic Strategies* (written and edited by FUJITA Masahisa and WAKASUGI Ryuhei), Nippon Hyoronsha, 2011; *Economic Analysis of a Case for Common Basket in East Asia* (with ITO Takatoshi and OGAWA Eiji), Toyo Keizai Inc., 2007, and others.

DP:12-E-043	The Construction and Analysis of Industry-specific Effective Exchange Rates in Japan SATO Kiyotaka, SHIMIZU Junko, Nagendra SHRESTHA, ZHANG Shajuan

http://www.rieti.go.jp/en/publications/dp/12e043.pdf

DP:12-E-044	Industry-specific Real Effective Exchange Rates for Japan SATO Kiyotaka, SHIMIZU Junko, Nagendra SHRESTHA, ZHANG Shajuan

http://www.rieti.go.jp/en/publications/dp/12e044.pdf

Calculating the Nominal and Real Effective Exchange Rates of the Yen on an Industry-specific and Daily Basis

—What motivated you to study industry-specific effective exchange rates?

SHIMIZU: Our previous research on a Currency Basket project (Project Leader: OGAWA Eiji, FF, RIETI) of the RIETI International Macroeconomics Program has conducted several studies about the monetary cooperation and an optimal exchange rate system in East Asia. As part of that research, RIETI has compiled a database of Asian Monetary Units (AMU), which is a common currency basket composed of 13 East Asian currencies, and has published the data on its website (http://www.rieti.go.jp/users/amu/en/index.html) since 2005. Whenever newspapers and television broadcasts report foreign exchange rates, they normally give the exchange rate of the yen vis-à-vis the U.S. dollar. The AMU, on the other hand, is an indicator of how the yen is moving in relation to the currencies of Asian countries. Following this original indicator, we created the industry-specific effective exchange rate, which would be useful to the Japanese economy and industry.

The effective exchange rate of the yen is a value that takes the weighted average of the exchange rates between Japan and trading partners based on the share of Japan's exports to partner countries. It is used as an index for measuring Japan's international price competitiveness. Data on this effective exchange rate are published by the central banks of each country and by the Bank for International Settlements (BIS). The BIS data are the most comprehensive, as they include effective exchange rate data for many different countries. These data are monthly, however, there is a disadvantage that even when wide exchange rate fluctuations exist, the extent of these fluctuations on an effective base cannot be seen until the following month. Besides, the data are calculated using the trade weight for all industries, so they do not show us the competitiveness of individual industries.

The Federal Reserve Board (FRB) in the United States and the Bank of England (BOE), on the other hand, publish effective exchange rates for their own countries on a daily basis. If daily effective exchange rates of the yen by industry were also published, this would be useful information for many people, and that it would be even more valuable if they were industry-specific data.

SATO: After the Lehman Brothers collapse in 2008, only the yen appreciated against all other currencies. The yen has appreciated even further with the deepening of the financial crisis in Europe, reaching as high as 75.32 yen vis-à-vis the U.S. dollar at the end of October 2011, a historical high since World War II. As has been widely reported in the news, the yen's strength has dealt a severe blow to Japan's exporting companies.

There is no doubt that Japanese companies overall have been affected by the yen appreciation. It is possible, however, that the degree of impact differs across industries. Let us look, for example, at the automobile and electronics industries, two of Japan's representative export industries. While advanced countries such as the United States and Europe have long been a major export market, Japanese automobile companies have moved into countries in Asia in recent years, setting up production bases. These bases are mainly for selling vehicles locally, but engines and other core components are exported to them from Japan. With electronics, on the other hand, the increasing tendency to divide up processes within the Asian region means that parts and semi-finished products are subject to active trading within the region, while the final export destinations are in North America and Europe. Because of this difference in production and sales structures, the effective exchange rate confronting Japanese companies differs from one industry to another. Also, if the yen rate suddenly surges, a company that waits for the

monthly data to be released will not be able to keep track in timely fashion of the exchange rates it has to handle. Believing it would be good to have the data available more quickly, the decision was made to release effective exchange rates on a daily basis. Now that both nominal and real effective exchange rates are released, as industry-specific and daily data, this information will be useful for studies in a wide range of fields.

SHIMIZU: RIETI began publishing the industry-specific nominal effective exchange rates already in June 2011, and in July 2012, the industry-specific real effective exchange rates became available.

The Difficult Task of Collecting the Industry-specific Price Data of Each Country

—What did the actual work involve?

SATO: We began first with the task of calculating the nominal effective exchange rates for each industry. In so doing, we adopted eight industries in line with the industry classification widely used in Japan. These are Textiles, Chemicals, Metal and metal products, General machinery, Electrical machinery, Transport equipment, Precision instruments, and Other products. For each industry, we then calculated the weight of each trading partner, found the weighted average of exchange rates for the currencies of each partner country, and calculated the nominal effective exchange rates.

Next, we began calculating industry-specific real effective exchange rates, but here we were first faced with the enormous difficulty of obtaining price data. In order to calculate the industry-specific real effective exchange rates, we needed to obtain price data (to the extent possible, producer price indexes) using industry classifications common to all of the applicable countries.

For yen-dollar rates, it is relatively easy to obtain producer prices for the same industry classifications in Japan and the United States. The biggest trading partner of Japan, however, is not the United States but Asia. Many Asian countries have not yet reached the level of statistics-keeping normal in advanced countries. Initially, we did not know whether we would be able to obtain producer price indexes for common industrial classifications, or where we could find such data. In search of the necessary data, we scoured all of the statistical materials we could think of along with the websites of government and other agencies that might have such information for each of Japan's main trading partners, an undertaking that consumed a huge amount of time. Ultimately, we gathered the data based on a new industry classification common to each of the countries and calculated the trade (export) weights. It took us nearly a year to finish putting together real effective exchange rates for the yen. Perhaps due to the difficulty of this task, no other organization has released industry-specific real effective exchange rates up to now.

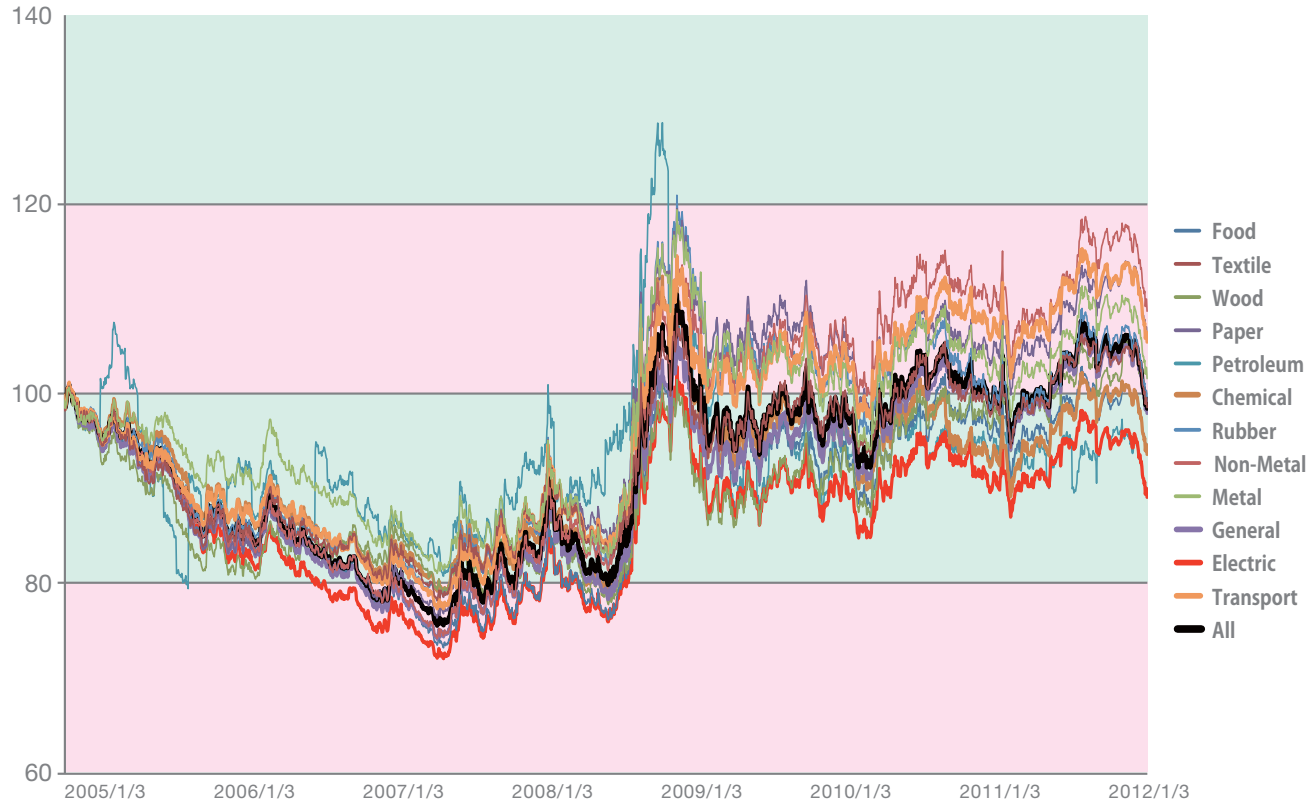
Real Effective Exchange Rates Show the Largest Industry-specific Differences

—What did you learn from your calculations of industry-specific real effective exchange rates?

SATO: As a result of our real effective exchange rate calculations, we were able to observe considerable differences in exchange rate movement in different industries. In the last few years, the nominal yen exchange rate has appreciated substantially against all currencies, but when we looked at this trend for specific industries, we confirmed that there are some industries where the real effective exchange rate has gone way up while in others it has not risen but rather stayed weak. Since the real effective exchange rates released by the BIS and others are not industry-specific rates but are averages for all industries, we could not realize such a difference across industries.

In Figure 1, let us look at the real effective exchange rates for three of Japan's representative export industries—Electrical machinery, Transport equipment, and General machinery, where an increase in the exchange rate means appreciation. We calculated the data daily, with 2005 as the benchmark year, and for the following years. Compared to the average rate for all industries (All: the black solid line), the yen has risen to rather high levels in Transport equipment (Transport), whereas in Electrical machinery (Electric) it has trended much lower than the average. In Gener-

Figure 1: Yen industry-specific real effective exchange rates



Source: Excerpted from Figure 4 in SATO, SHIMIZU, SHRESTHA, and ZHANG (2012)

al machinery (General), the rate has stayed fairly close to the average.

The real effective exchange rate is believed to reflect to a certain extent the price competitiveness of a given industry. If the data in Figure 1 are taken at face value, since the real effective exchange rates in the transport equipment industry (of which the automobile industry is representative) have trended at rather high yen rates, the price competitiveness of that industry would appear to have dropped due to the effects of the strong yen. In the electrical machinery industry, on the other hand, the yen has been at low levels in terms of the real effective exchange rate, so that even while the nominal yen rate has been high, this industry can be seen as maintaining its price competitiveness to a considerable degree compared to other industries. But is it really true that export companies in the electrical machinery industry have benefited from this high cost competitiveness as measured based on real effective exchange rates? Actually, it is possible that the interpretation I noted earlier may not be grasping the situation correctly.

We therefore conducted a simulation analysis to investigate the factors causing fluctuations in real effective exchange rates. Specifically, we analyzed the relationship of real effective exchange rates to the home country's producer prices, the weighted average of the partner country's producer prices, and nominal effective exchange rates, so that we could see which factors could explain the fluctuations in real effective exchange rates. The results of the analysis showed that the changes in the real effective exchange rate in Japan's electrical machinery industry are brought about by declines in producer prices in that industry. This is a feature of the electrical machinery industry that is not evident in other industries. The electrical machinery industry is characterized by severe price competition, not only with U.S. and European companies but also Asian companies in South Korea and Taiwan, for example. Japanese companies in this industry are making stronger efforts than those in trading partner countries to lower their own producer prices, and as a result, this can be seen as driving the real effective exchange rate of the yen lower than in other industries.

SHIMIZU: The results of this analysis are also consistent with the recent realities of Japanese electrical equipment manufacturers posting losses on their balance sheets.

SATO: In the case of the electrical machinery industry, fierce competition is not limited to export markets. Japan's electrical machinery companies are also battling overseas manufacturers for sales in the domestic market. In the automobile industry, although foreign cars have entered the Japanese market, Japanese automakers are not really engaged in fierce price competition with overseas manufacturers. Such price competition in the domestic market is driving down the producer prices in the electrical machinery industry.

SHIMIZU: Our efforts to calculate real effective exchange rates made it possible for us to conduct comparative studies of the differences among industries regarding the extent to which the yen rate has risen. It should be possible to reflect these results in major government policies, such as whether emergency measures to counter the yen strength should be weighted toward particular industries.

—What did you learn about the relationship between nominal effective exchange rates and bilateral nominal exchange rates?

SHIMIZU: Nominal effective exchange rates are weighted averages of bilateral nominal exchange rates of the yen rates for different currencies, weighted based on the share of total Japanese exports. In these calculations, the nominal effective exchange rate is therefore linked to the yen-dollar rate in proportion to the share of the U.S. market in Japanese exports. When we analyzed the actual relationship between nominal effective exchange rates and some major exchange rates, however, we found that the linkage to the yen-dollar rate was larger than the U.S. export share. More than 90% of the movement in the nominal effective exchange rate is in fact linked to the yen-dollar rate.

This is because the majority of Japan's trading partners other than the United States adopt foreign exchange policies linking their own currencies to the U.S. dollar.

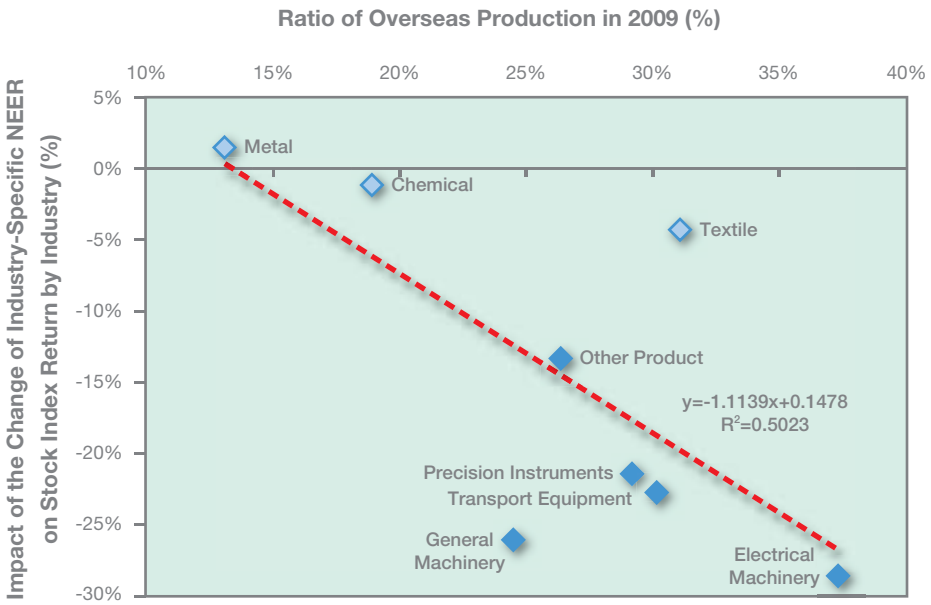
An Empirical Analysis Using Industry-specific Effective Exchange Rates: Relation of share prices to exchange rates

— Is there a difference among industries in the relation of share prices to exchange rates?

SHIMIZU: It is generally said that as the yen rises against the U.S. dollar, the Nikkei stock average drops. To see how this relationship looks in different industries, we conducted a simple regression analysis using the industry-specific stock price indexes of the Tokyo Stock Exchange and the RIETI industry-specific nominal effective exchange rates. The results showed that with the exception of a few industries, there is a negative correlation whereby when the industry-specific effective exchange rates appreciate, the industry-specific stock price indexes react by dropping; moreover, the extent of this reaction is different for each industry. This negative correlation has become greater ever since the Lehman Brothers collapse in 2008.

We then analyzed why the strength of this negative correlation between stock prices and exchange rates would differ across industries. The yen rate is thought to influence stock prices along the following two routes. The first is that in the case of dollar-denominated exports, when the yen rises, the revenue received in terms of the yen declines. The second route is the profit remittance of overseas subsidiaries. The number of companies setting up production overseas in recent years has increased. When these overseas subsidiaries of Japanese companies send back to Japan the profits they earned abroad, these are affected by the exchange rate of the yen. In particular, in recent years, the income surplus has come to make up a larger portion of Japan's current balance than the trade surplus. The greater the extent to which a company has moved its production overseas, the greater should be the negative effects of a strong yen on its profit remittance. If we plot the ratio of overseas production for each industry and the extent of impact of a strong yen on stock prices (exchange rate sensitivity of industry-specific stock price indexes) as in Figure 2, we see that the higher an industry's overseas production ratio, the greater is the negative impact of a

Figure 2: Relation between exchange rate sensitivity of industry-specific stock prices and overseas production ratio



Note 1: As measures of the impact of the change of industry-specific nominal effective exchange rates on stock index return for each industry, we used coefficients obtained by regression analysis of return exceeding the monthly TOPIX industry-specific stock price index from October 2008 to October 2011, with the rate of change of industry-specific nominal effective exchange rates as explanatory variable. The coefficients with blue markers are significant while those with light blue markers are not significant.

Note 2: Overseas production ratios are from a survey on corporate trends (fiscal 2010) by the Cabinet Office of the Japanese government.

strong yen on its stock price.

Ever since the Plaza Accord, Japanese companies have actively proceeded with overseas production as a way of coping with a strong yen. As a result, the ratio of overseas production has grown, but this relationship shows how the earnings of overseas subsidiaries are also subject to foreign exchange risks.

Further Expanding the Industry-specific Real Effective Exchange Rates Data

—What are your research themes for the future?

SATO: In this project, we put together industry-specific real effective exchange rates for Japan. Using the same methodology, we would like to compile industry-specific real effective exchange rates for Asian countries, the United States, and European countries. We have already begun to work on compiling such rates for China and South Korea. As our next task, we want to compare the industry-specific real effective exchange rates for Japan, China, and South Korea and summarize the results of the analysis in an academic paper.

China, for example, has posted large trade surpluses with the United States, causing serious trade friction between the two countries. The exchange rate of the renminbi versus the U.S. dollar is frequently cited as a problem, with the United States strongly urging China to let the renminbi appreciate against the U.S. dollar. By calculating the industry-specific real effective exchange rate of the renminbi and publishing this rate for the electrical machinery industry, which is China's biggest export industry, we will make it possible to verify the international price-competitiveness of China in that industry. This should be valuable data in considering the trade relationship between the United States and China.

In South Korea, meanwhile, the nominal exchange rate of the won has depreciated sharply ever since the Lehman Brothers collapse in September 2008. A large depreciation of the won has given Korean companies a price advantage against which Japanese companies cannot compete. Calculating the industry-specific real effective exchange rates should enable us to investigate the price-competitiveness of Korean companies.

After completing these studies for Japan, China, and South Korea, we plan to go on to calculate the industry-specific real effective exchange rates for other countries in Asia, the United States, and European countries. It is hoped that the data on industry-specific nominal and real effective exchange rates will be utilized as a analytical tool of other researchers, not only in Japan but also overseas, contributing broadly to management strategy and policy making.

COLUMN

Raising Minimum Wages Would Deprive the Youth of Employment Opportunities

KAWAGUCHI Daiji, FF, RIETI

Following the 2007 amendment to the Minimum Wage Act, regional minimum wage rates have been consistently on the rise across Japan. The average minimum hourly wage rate increased from 668 yen in 2005 to 737 yen in 2011, rising approximately 10% over the years. The government's intention is to address the problem of the working poor by raising minimum wages. However, concerns are being raised over the potential negative impact of higher minimum wages on the employment of low-skilled workers, particularly, teenage workers who are presumably inexperienced and unskilled. In an attempt to verify the relevance of these concerns, MORI Yuko, researcher at the Japan Society for the Promotion of Science, and KAWAGUCHI Daiji, FF, RIETI examined the impact of higher minimum wages on the employment rate of men and women aged 16-19 using data from 2007-2010, and reported their findings at the recent RIETI Workshop on Minimum Wage Reform.

Higher Minimum Wages Mean Lower Employment Rates for Teenagers

Our analysis found that a 10% hike in the regional minimum wages would lower the employment rate of men and women aged 16-19 by a minimum of 5.3 percentage points. This is a significant figure considering the fact that their average employment rate during the period 2006-2010 was about 17%.

The relationship between the degree of increase in the minimum wage rates and changes in the employment rate for men and women in their teens is shown in the graph below:

Changes in minimum wages and those in employment rates in 2007-2010

The horizontal axis represents the differences in the natural logarithmic values of minimum wage rates between 2007 and 2010. A value of approximately 0.1 on the axis, corresponding to Tokyo and Kanagawa, means that the minimum wages in these two prefectures were raised by approximately 10% over the three-year period. The greater minimum wage hikes in Tokyo and Kanagawa relative to other prefectures are due to institutional factors. The new Minimum Wage Act as amended and enacted in 2007 calls for rectifying the situation where the amount of minimum wages falls below that of livelihood protection benefits. Since livelihood protection includes housing assistance, it thus reflects housing costs that vary significantly across regions. Therefore, in regions where housing costs are higher, the reverse gap between minimum wages and livelihood protection benefits was larger, requiring a greater hike to rectify the situation. Besides Tokyo and Kanagawa, some other prefectures show a relatively large hike in minimum wage rates. Prior to the law revision, the reversal between minimum wages and livelihood protection benefits had been conspicuous in

these prefectures.

The vertical axis measures percentage point changes in the employment rate for men and women aged 16-19 between 2007 and 2010. The graph shows that the employment rate dropped by approximately five percentage points for those in Tokyo and Kanagawa. We can also see that the degree by which the minimum wage was raised and the degree of changes in the employment rate for men and women of this particular age group, measured along the horizontal and vertical axes respectively, were generally in an inverse relationship.

The period 2007-2010 witnessed the occurrence of the global financial crisis that had a significant negative impact on the labor market, and the magnitude of the impact might have been different across regions. Thus, we conducted analysis after controlling for the impact of business fluctuations, using the unemployment rate of men aged 30-59—which is not directly affected by an increase in minimum wage rates but reflects the overall condition of the labor market—as the indicator of the business cycle. As aforementioned, our analysis found that the employment rate of men and women aged 16-19 would decrease by a minimum of 5.3 percentage points when minimum wages are raised by 10%. We also controlled for regional differences in school enrollment rates for those aged 16-19, but there was no significant change in the findings.

Japan Should Introduce Refundable Tax Credits

Attention must be drawn to the fact that addressing the problem of the working poor by means of raising minimum wages comes at the cost of depriving men and women in their teens of employment opportunities. The Japanese government suggests the need to raise minimum wages by pointing out that the nation's minimum-to-average wage ratio is low relative to other member countries of the Organisation for Economic Co-operation and Development (OECD). However, we must not forget that many OECD countries—most conspicuously advanced economies in Europe—are facing the serious problem of youth unemployment. In order to solve this problem, the OECD calls on the governments of countries concerned to "ensure that minimum wages are not set at levels that discourage employers from hiring inexperienced and low-skilled young people" (in its news released published ahead of the Group of 20 Labor and Employment Ministers' Meeting held in Mexico in May 2012). Japan must listen to this call.

Of course, teenage men and women are not alone in being affected by changes in minimum wages. There must be some workers who retain their work and have their wages increased as a result of a minimum wage hike. And if they are members of poor households, raising minimum wages can serve as an effective poverty reduction measure. However, in order to draw a conclusion on that possibility, it is necessary to conduct further empirical analysis rather than simply discussing the possibility.

When we warn against raising minimum wages, many people may think that we are trying to negate the need for measures to help the working poor. But that would be a total misunderstanding. The question is what approach to take to help them. One way to provide effective wage subsidies to workers in poor households is to offer refundable tax credits. The United States and the United Kingdom have a system to provide such credits, and both are beginning to see some positive results. In a nutshell, a refundable tax credit system is to subsidize wages for workers in poor households at the cost of other taxpayers. Being subsidies for wages, i.e., compensation for work, refundable tax credits does not create a disincentive for work, a typical side effect of livelihood protection benefits. However, Japan must clear a series of tough hurdles to pave the way for introducing the system. Specifically, it needs to secure necessary financial resources, introduce taxpayer identification numbers, and reform the tax system in such a way to designate household income as the basis for taxation and tax credits. Furthermore, attention must be paid to the possibility that the introduction of the tax credit system or wage subsidies may increase the supply of the low-skilled workforce and lead to declines in overall wage levels. Even though the tax credit system involves all of these difficulties, solving the problem of the working poor, which is a national issue, solely by raising minimum wages or at the cost of employers is not a viable option, given the expected side effects discussed above. Although it has a long way to go, Japan must face squarely and address the problem of the working poor by introducing the tax credit system.

COLUMN

How Should Japan Address Socio-economic Inequality and Poverty?

NAKATA Daigo, F, RIETI

While income inequality and poverty have been subject to extensive media coverage and debate, public awareness of the problems has not increased in a comparable fashion. Japan used to be called a "society of 100 million middle class people," a cliché referring to the phenomenon of the vast majority of the Japanese population identifying themselves as belonging to the middle class. Actually, this phenomenon is continuing today. The 2012 Public Opinion Survey on the Life of the People[*1] conducted by the Cabinet Office found that 92.3% of the respondents considered themselves as belonging to the middle class in terms of living standards.

The Annual Health, Labour and Welfare Report 2011-2012[*2] released in August 2012 introduces the outcome of the Public Opinion Survey on the Life of the People,[*3] conducted using a questionnaire that ensures comparability with other data for the International Social Survey Programme (ISSP).[*4] While 71.5% of the respondents to the survey find the current level of income inequality in Japan to be too high, this percentage is the lowest among advanced countries.

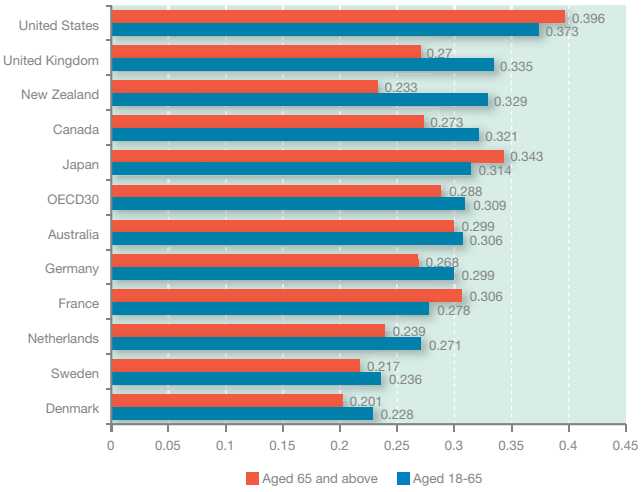
Does this mean that income inequality and poverty in Japan are not so serious?

Failure of Income Redistribution as Evident from Data

Needless to say, Japan is an advanced country. It is thus presumed that it has a well-developed social security system. Indeed, taxes are imposed in such a manner to facilitate the redistribution of wealth. That is, Japan has in place a mechanism designed to ensure a degree of fairness even if income inequality widens due to economic fluctuations or changes in the demographic structure. In reality, however, it is highly suspected that this mechanism may not be functioning properly.

An international comparison of income inequality, measured by the Gini coefficient (in which 0 corresponds to perfect equality and 1 to perfect inequality) based on data provided by the Organisation for Economic Co-operation and Development (OECD), shows that Japan exceeds the average for the OECD countries in the level of income inequality for those aged above 65 as well as for those aged 18-65 (see Figure 1). Furthermore, the degree of income inequality for the former age group is greater than that for the latter, contrary to the general tendency for income inequality to decrease in old age as a result of retirement and thanks to pension and other income security benefits.

Figure 1: Gini coefficient of OECD countries



Source: Created by the author based on OECD (2008)

Then, how does Japan compare in the poverty rate, an indicator related to inequality (see Figure 2)? According to the aforementioned international comparison made by the OECD, Japan's relative poverty rate—the percentage of people with income equal to or below 50% of the median income—is one of the highest among advanced economies. In particular, in the relative poverty rate for single-parent households, Japan ranks the worst among advanced economies at 58.7%, 11.2 percentage points higher than that of the United States, the second worst. It is obvious that Japan's social security policy is failing as an income redistribution mechanism.

Figure 2: Relative poverty rates (%) of OECD countries

Country	Relative poverty rates for total population	Households with children (Aged 18-65)			Aged 65+	Aged 66-75	Aged 75+
		Total	One Adult	Two or more Adult			
Australia	12.4	10.1	38.3	6.5	26.9	26.1	28.3
Canada	12.0	12.6	44.7	9.3	5.9	5.2	6.8
Denmark	5.3	2.2	6.8	2.0	10.0	6.9	13.7
France	7.1	6.9	19.3	5.8	8.8	7.2	10.6
Germany	11.0	12.1	41.5	8.6	8.4	6.5	11.1
Japan	14.9	12.5	58.7	10.5	22.0	19.4	25.4
Netherlands	7.7	9.3	39.0	6.3	2.1	2.2	2.0
New Zealand	10.8	12.5	39.1	9.4	1.5	1.6	1.4
Sweden	5.3	3.6	7.9	2.8	6.2	3.4	9.8
United Kingdom	8.3	8.9	23.7	6.1	10.3	8.5	12.6
United States	17.1	17.6	47.5	13.6	22.4	20.0	27.4
OECD30	10.6	10.6	30.8	5.4	13.5	11.7	16.1

Source: Created by the author based on OECD (2008)

Efficient Social Security System Needed

A natural policy response to such circumstances is to increase social security benefits and strengthen the redistributive function of taxes. This, however, is not an easy policy option for Japan, a country with general government debt amounting to more than 1,024 trillion yen. Furthermore, as we all know, this is a country where the legislative branch of the government had to struggle so hard to secure a future increase in the consumption tax rate. Given all of these odds, the aforesaid policy option is impossible. But then, what other option is left for Japan? The answer to this question is nothing extraordinary other than finding an efficient combination of social security benefits and taxes.

Building an efficient social security system involves the following two prerequisites. First, it is necessary to define precisely the primary beneficiaries of social security benefits and wealth redistribution. Second, it is necessary to bring out self-help efforts as much as reasonably possible and strike a fair balance with public support. Without fulfilling these prerequisites, no constructive discussion can be made on the designing of a social security system.

In order to achieve that end, it is crucial to conduct comprehensive statistical surveys of Japanese households and individuals on a continuous basis. In particular, such surveys must be conducted as panel surveys to allow a longitudinal observation of the same sample of households or individuals, with questionnaires designed to investigate all aspects of people's lives, including not only economic conditions such as income and assets but also individuals' bonds with their families and society at large as well as health conditions. Surveying various aspects of people's lives will enable us to identify the attributes of households in poverty. Being a single-mother household or an elderly-only one does not automatically make it impoverished. It may be the case that the addition of another specific factor—disease, unemployment, poor education, or family problems—serves as a decisive blow that definitely pushes such households into poverty. By analyzing various factors holistically, we can obtain information necessary to determine the quality and quantity of support needed.

It is also important to carry out surveys on a continuous basis. For instance, even if an individual's health condition does not cause the individual to leave or quit a job at one point of time, diachronic changes in the health condition subsequent may do so at a later point of time. Also, even among those who have just started receiving equally low amounts of pension benefits, some would seek to re-enter the labor market while others would choose to live on welfare. Such differences in choices may be attributable to changes in their respective health conditions and cognitive abilities. In order to bring out self-help efforts reasonably, the influence of all of these factors must be taken into account.

JSTAR and its Utilization

This article is intended to highlight the importance of accurate statistical surveys to enable the government to formulate policy firmly based on the actual status of inequality and poverty. However, what has been discussed to this point is nothing new. Since the time of Charles BOOTH (1840-1916) and Benjamin Seebohm ROWNTREE (1871-1954), British sociologists who pioneered modern poverty research, seeking to understand scientifically and quantitatively the kinds of people suffering from poverty and the support needed has always been the orthodox way of poverty research. What we need to do is to pursue this endeavor by mobilizing the currently available resources and at an academically rigorous level by today's standards.

Conducting such a longitudinal follow-up survey (or panel data survey) of households requires the input of enormous financial and human resources. In the United States, efforts were launched in the 1990s and various kinds of panel data—collected and accumulated over the years by utilizing rich research resources—have contributed significantly to the government's policy-making. In Japan, similar efforts are being undertaken by such institutions as the Institute of Research on

Household Economics, Keio University, and Osaka University. At RIETI, we are conducting the Japanese Study of Aging and Retirement (JSTAR), a panel data survey of middle-aged and elderly people in Japan, in collaboration with Hitotsubashi University and the University of Tokyo. Furthermore, the micro-data collected in the JSTAR survey are being made available, after appropriate masking is done to ensure the confidentiality of personally identifiable information, to researchers all around the world for use in academic research. Currently, data collected in the first and second waves of the JSTAR survey are available, and many Japanese and overseas researchers, including myself, are conducting research utilizing them. I have just recently published the findings of my JSTAR data-based research on the relationship between poverty and labor supply (Nakata, 2012). It is hoped that many more research findings will be accumulated to contribute to the formation of tax and social security policies in Japan.

Footnotes

1. http://www8.cao.go.jp/survey/h24/h24-life/index.html (Japanese only)
2. http://www.mhlw.go.jp/wp/hakusyo/kousei/12/ (Japanese only)
3. http://www.mhlw.go.jp/stf/houdou/2r9852000002i9cr.html (Japanese only)
4. http://www.issp.org/

COLUMN

Exchange Rate Pass-Through in the Japanese Electronics Industry

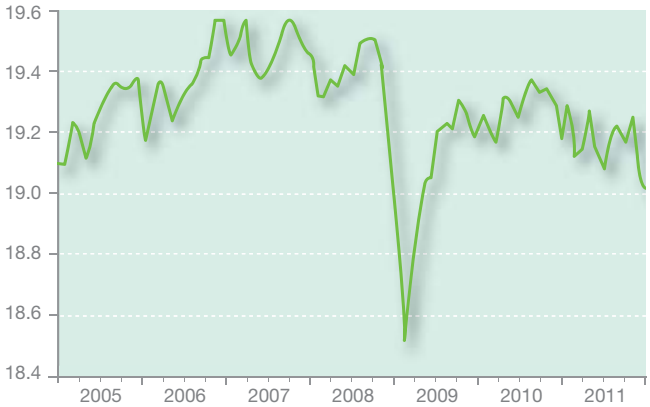
Willem THORBECKE, SF, RIETI

The value of Japan's electronics exports has exceeded $100 billion every year since 1993. Before the Global Financial Crisis, almost 20% of Japan's exports were electronics goods. How have these exports been affected by the floods, earthquakes, and macroeconomic shocks that have roiled Japan in recent years?

Electronics Exports within East Asian Production Networks

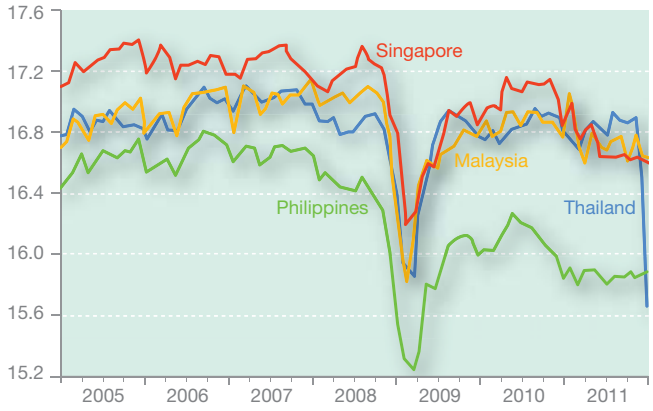
Many Japanese electronics exports take place within East Asian production networks. Figure 1a shows the value of Japanese electronics parts and components exports to the primary Asian supply chain economies (China, Malaysia, the Philippines, Singapore, South Korea, Taiwan, and Thailand). The figure shows that the value of exports fell logarithmically by 100% between the collapse of Lehman Brothers in September 2008 and the trough in January 2009. It also shows that the value of exports averaged about 25% below its pre-crisis level, even three and a half years after the Lehman Brothers shock. Furthermore, the figure shows that exports only declined 7% following the March 2011 Great East Japan Earthquake and regained its pre-quake level by June 2011. Figure 1b looks at the ASEAN countries. The figure shows that the decline associated with the 2011 Thailand floods has been limited largely to exports to Thailand, and that the value of exports to other supply chain countries has not been affected.

Figure 1a: Value of Japanese electronic parts and components exports to East Asia



(Note) Electronic parts and components exports come from HS 8540-8542. East Asia includes China, Malaysia, the Philippines, South Korea, Singapore, Taiwan, and Thailand.
(Source) Trade Statistics of Japan.

Figure 1b: Value of Japanese electronic parts and components exports to ASEAN Countries



(Note) Electronic parts and components exports come from HS 8540-8542.
(Source) Trade Statistics of Japan.

Figure 2 examines the volume of electronic parts and components exports to ASEAN, China, and the newly industrialized economies (NIEs) (i.e., South Korea and Taiwan). The volume fell logarithmically by 88% between August 2008 and January 2009. It recovered quickly, though, and by 2010 had surpassed its pre-crisis level.

Figure 2: Volume of Japanese electronic parts and components exports to East Asia

(Note) Electronic parts and components exports come from HS 8540-8542. Value data are deflated using the export price index for Japanese electronic components and devices obtained from the Bank of Japan. East Asia includes China, Malaysia, the Philippines, South Korea, Singapore, Taiwan, and Thailand.
(Source) Trade Statistics of Japan, Bank of Japan, and calculations by the author.

The fact that the value of exports has not recovered to its pre-crisis level while the volume has surpassed its pre-crisis value implies that export prices have fallen. Indeed, Bank of Japan data indicate that the yen price of electronic components and devices (ECD) exports has fallen by 56% between January 2005 and November 2011.

Exchange Rate Changes and Export Prices for Electronics Goods

Ongoing work at RIETI that I am engaged in indicates that ECD export prices in the short run respond essentially one-for-one to changes in exchange rates. This finding implies that the 28% appreciation of the yen between June 2007 and the end of 2011 caused the yen price of ECD exports to fall by 28%.

A difficulty with interpreting this result is that trade in East Asian production networks is often invoiced in dollars. It is possible that Japanese multinational companies (MNCs) allow the yen prices of parts and components to vary one-for-one with changes in the exchange rate, but then adjust import prices when selling the assembled finished goods in the final markets. For instance, if a Japanese company assembles a computer in China using parts and components from Japan and sells the final product in Europe, it may not adjust the dollar prices of parts and components shipped to China but may adjust the euro price of the computer sold in Europe to reflect exchange rate changes.

One way to test whether Japanese firms can pass through exchange rate changes for final electronics exports produced in production networks is to examine whether they can pass through exchange rate changes for final electronic goods produced in Japan. These final goods from Japan tend to be sophisticated, knowledge-intensive products produced by skilled workers. On the other hand, the final goods produced by Japanese MNCs in supply chain countries like China tend to be lower-end, unskilled labor-intensive products. If Japanese firms do not have pricing power over the higher-end goods produced in Japan, they are unlikely to have pricing power over the more homogeneous goods assembled in lower wage countries.

Empirical results indicate that Japanese information and communication equipment (ICE) producers can only pass through less than 20% of exchange rate changes into import prices in the importing countries' currencies and have to absorb the rest in their own markups. This finding indicates that the 28% appreciation of the yen between June 2007 and the end of 2011 caused the yen price of ICE exports to fall by 22%. Yen export prices for ICE goods fell 20% more than yen costs over this period. Thus, the strong yen has severely squeezed profit margins for electronics firms in recent years.

"Trade in the Current Economic Crisis"

Pascal LAMY (Director-General, the World Trade Organization)

Director-General Pascal LAMY addresses the challenges that countries and indeed, the multilateral trading system, are facing in the current economic climate. He touches on issues related to the global slowdown, the fight against protectionism and identifies some of the areas where research institutes such as RIETI can best contribute to the international trade discourse.

Pascal LAMY is the fifth Director-General of the WTO. His appointment took effect on September 1, 2005 for a four-year term. In April 2009 WTO members reappointed him for a second four-year term, starting on September 1, 2009.
He began his career in the French civil service at the Inspection Générale des finances and at the Treasury. He then became an advisor to the Finance Minister Jacques DELORS, and subsequently to Prime Minister Pierre MAUROY. In Brussels from 1985 to 1994, he was Chief of staff for the President of the European Commission, Jacques DELORS, and his representative as Sherpa in the G7. In November 1994, he joined the team in charge of rescuing Credit Lyonnais, and later became CEO of the bank until its privatisation in 1999. Between 1999 and 2004, he was Commissioner for Trade at the European Commission under Romano PRODI.

We Live in an Interdependent Economic World

We are only one day away from the International Monetary Fund (IMF) meetings in Tokyo, and we are still currently experiencing an economic crisis. We are also aware that it will take an unknown number of years before returning to a pre-crisis growth pattern. This issue adds to the economic transformation challenges which existed prior to the crisis. Previous theories and assumptions which governed the way in which we looked at trade at the beginning of the 20th century now probably need to be recalibrated in order to adjust to the new realities of trade. Research institutes such as RIETI are crucial in helping us all to understand the new patterns of trade in the world.

Last month, the World Trade Organization (WTO) revised its projections for trade growth volumes from its spring forecast of 3.7% growth in trade volumes this year. However, this figure had to be downgraded, larger than expected, to 2.5%. In recent times, there have been signs from the European and U.S. sides that good news may exist for improvement in economic conditions in the future. However, it appears that economic growth is currently slowing down in developing countries as a result of the slowdown of the large export markets of Europe and the United States. Meanwhile, it seems that Japan is still looking for a path back to economic growth which would resemble what existed 10 to 15 years ago.

This confirms what has already been known for some time, which is that we now live in a totally connected and globalized interdependent economic world. It appears that no country or region is immune from a global financial crisis anymore. We also know that, for this same reason, actions taken in one country or region have direct implications on all other countries or regions. This knowledge of interdependence must govern how we collectively craft global trade

BBL Seminar

Brown Bag Lunch (BBL) seminars are held during lunch hours. We invite Japanese and foreign guest lecturers and provide a venue for candid exchanges of opinions on a variety of policy issues, transcending industry-government-academia boundaries.

or economic policies in the future. Our approach to global governance must be better attuned to these intricate economic webs, and we must be more resolute in looking at the economy from a global perspective hereafter. Looking at the economic and trade side, it is obvious that the rising weight of influence of emerging economies has shifted the balance of power. This clearly implies a number of transitions to which we have not yet adjusted. Certainly, classic concepts of sovereignty are seriously challenged by the realities of interdependence. Although some consider this a problem, it is perhaps better to think of it as an opportunity to look at the real shaping factors of trade. Current political and trade-related public discourse taking place reflects that shaping factors of trade are being discussed and examined seriously. In the early years of the economic crisis, we know that Asian markets reacted with flexibility. It became clear that keeping markets open and goods and services flowing was a good strategy. Even so, countries in Asia have not been exempt from the present global financial turmoil. Numbers on Japanese external trade and exports have been affected quite substantially, and China's merchandise trade flows have also started to slow down, demonstrating this point.

Protectionism Doesn't Protect Jobs in Today's World of Global Value Chains

One element which will continue to impact growth in the Asian region is the danger of protectionist policies in Asia's export markets. Since the beginning of the economic crisis, the WTO and the Organisation for Economic Co-operation and Development (OECD) have continued to track trade policy development worldwide. Findings and analytical conclusions are reported to the G20, and the reality is that although there hasn't been a big wave of protectionism, there has been a continued accumulation of small measures in some countries which can represent a potential danger to the flow of world trade. Roughly speaking, 2%-3% of world trade has been affected by these protectionist measures over the last five years. The biggest concern is that very little of the measures that have accumulated during this period have been removed. This is a serious matter, as it is known that in today's world of global value chains, protectionism doesn't protect jobs. In a world where the import content of exports has moved from 20% 20 years ago to 40% today, it is increasingly obvious that the competitiveness of exports depends on those imports. Protecting trade, resulting in slowing imports, is a recipe for deterioration of the competitiveness of one's economy, and therefore is an important issue which must be addressed.

Not only the flows of trade, but also its nature has been changing recently. Technology now allows for a considerable reduction of the cost of distance, which favors value-added. As a result of this, an initiative was taken a few years ago to try to promote measuring trade in value-added rather than cost numbers. This has worked well, and in mid-December, the WTO will unveil the first batch of world trade numbers measured in value-added for about 40-50 countries, representing the bulk of international trade. This will help us better understand the multi-localization of production, and provide a fresh, more accurate look at current world trade trends. The stage which we are now reaching will help us to see the real challenges of trade in the 21st century. The WTO's mission is still to open trade, although achieving this depends on knowing precisely which challenges need to be faced.

If we accept what it takes to form a realistic view of how trade operates in today's world, leaving aside the current economic crisis, we have to derive a system on different levels of importance of the obstacles which need to be overcome. One example is that of tariff and non-tariff barriers. The General Agreement on Tariffs and Trade (GATT) and the WTO have been mostly focusing on eliminating tariff barriers on imports. However, we now know that trading businesses tend to put less importance on tariffs in relative terms and more importance on non-tariff measures. If the WTO agenda has to adjust to a new topography between tariff and non-tariff measures, it will entail a number of significant changes. Another example is export restrictions. It is apparent that access to natural resources is becoming more and more of a problem in some industries, and this needs to be investigated.

However, it is clear that at present the WTO and GATT focus more resources on import restrictions. Based on these examples, it is safe to say that the WTO needs to focus more of its attention as a function of the changes which have intervened in the global economy.

Even though it may be important to make changes in the WTO, it shouldn't be necessary to reshape the whole WTO agenda. As the Doha Development Round hasn't been concluded for mostly geopolitical reasons, some academic views are that the WTO should start from the beginning again. However, this academic approach doesn't seem to have much political relevance. The reality is that, at some point in the future, the WTO will likely have to combine issues which were identified as major trade opening ones in relation to the Doha Round with new issues such as government procurement and non-tariff barriers. With this in mind, it is helpful and stimulating to have discussion and debate such as this prior to making definite decisions.

Question & Answers

Q1.

Non-tariff measures are an area of great concern. In addition to the issue of tariffs, many other issues exist, such as those of innovation, subsidies, technological standards, as well as the transfer of technology. The people involved in establishing trade policies in relation to these issues face major challenges. Given the current situation, the question is if the WTO can deal with these issues well. In my organization (JETRO), the consensus is that this task probably cannot be achieved by the WTO alone. Rather, it is believed that the Trans-Pacific Partnership (TPP) would be in a better position to do so. What is your opinion on this issue?

A: With regard to rules and discipline in the WTO in areas which matter to trade in the 21st century, this is an important and relevant topic. Using the example of subsidies, there are rules on this in the WTO. A full Agreement on Subsidies and Countervailing Measures (ASCM) agreement is in place, which creates discipline and establishes which subsidies are WTO compliant or not. The level of discipline is what was agreed on approximately 20 years ago, and since then many things may have changed. Therefore, the question remains as to whether such agreements need to be revisited and revised or not. Furthermore, several ongoing disputes within the WTO are in relation to interpretation of the subsidies agreement currently in use. Rules also exist in the WTO in relation to non-tariff measures. Agreements exist which establish the right of members to protect the health and safety of their populations without unduly distorting trade. Disputes regarding non-tariff measures also exist within the WTO. The problem seems to lie less in the growing number of non-tariff measures, but in their discrepancies and whether or not the WTO should have a role in harmonizing standards.

In reference to the TPP, there is not much to comment on as it is still in development. It is seen as something which will either lead to improved multilateralism, or something which will scatter the level playing field in relation to regulatory issues. One of the criteria which will help to decide whether the TPP can really promote trade is whether or not there is new market access as a result of this negotiation. One of the reasons for creating bilateral agreements is meant to be based on the notion that increasing market access is easier in bilateral as opposed to multilateral agreements. It remains to be seen whether increased market access in a TPP will validate this notion or not.

Q2.

At present, the IMF-World Bank conference is taking place in Japan in which about 10,000 business people are joining. This type of opportunity takes place once a year. In contrast, in the case of WTO, Ministerial meetings are held once every two years, and it could be inferred that the WTO is keeping its distance from industries. It could also be believed that industrial communities are having serious doubts and concerns in terms of the WTO's quickness in responding to issues and narrow view on issues with which they deal. It is necessary to achieve a closer relationship between the WTO and industries in order to have success in future negotiations and strengthen the role of the

WTO. Do you think in the future it would be necessary to create an organization that both works for industries and supports the WTO?

A: The WTO is an inter-governmental organization. The members of the organization are sovereign nation states, who accept or decline entering into binding legal commitments which take the form of treaties. Furthermore, the WTO is a global organization unlike the OECD for example. This will not change. Governments, diplomats, and negotiators operate within the WTO. However, business components also exist. The WTO has quite permanent working relationships with global businesses and organizations such as the International Chamber of Commerce (ICC) and the World Economic Forum (WEF). The WTO has several relationships of this kind, although they are not institutionalized. The reason is because governments want to keep a monopoly on trade negotiations. In the WTO, there are no business-state disputes as there are in some regional agreements such as the North American Free Trade Agreement (NAFTA). The WTO is both an organization and an institution. When negotiating, the WTO is an organization, and when litigating, the WTO is an institution. An international organization is member-driven, whereas an institution is member-driving.

Q3.

Please discuss your evaluation or concerns with regard to dispute resolution mechanisms.

A: In terms of dispute settlements, it seems that the current system works extremely well. The number of countries participating in the WTO is growing, and discretions which existed in the past now occur at a much lower rate. In fact, half of the cases which we have now involve developing countries litigating against each other. With regard to impact assessment, over 95% of determinations made by panels have been implemented. This is a much higher ratio of implementation than many national systems. The duration of litigation is also on average less than two years from its beginning to final determination. This is much faster than most national litigation systems. The only problem is that litigation initiatives taken by WTO members are gradually increasing in cost. Therefore, the complexity of cases has to be carefully observed. This year, the WTO has had a surge in disputes, which are consuming significant financial resources. Given that the WTO has extreme confidentiality rules and strict deadlines, this issue represents a significant management issue.

Q4.

What is the biggest lesson you have learned from your experience as Director-General of the WTO?

A: It may be a little too soon to comment accurately on this. However, I have learned much so far and am still continuing to do so. One of the privileges of this job is that, at 65 years old, you can keep learning every day. This has its price in terms of frustration in the difficulty involved in getting things done, but I have had the benefit of working with three major systems in my career. I learned that governing styles differ depending on the environment. I also learned that there is a very important component of what can be done at the international level, which lies in heading international organizations with excellent expertise. That is the real comparative advantage of organizations like the WTO. Also, I learned the extreme viscosity of international decision-making systems. Although it is difficult to have 157 members agree on one point, the WTO generally doesn't have problems with reaching a consensus. The reason why the Doha Round has not concluded has nothing to do with the fact that the WTO has 157 members. In actual fact, if an agreement could be reached between the EU, the United States, China, India, Brazil, Japan, and Australia, it would be possible to reach a consensus for all 157 member states. The reason why the Doha Round has not been concluded is because a consensus is necessary among the aforementioned seven member states. There is still a large gap between the knowledge and necessity to agree on global rules, and the capacity for governments to do so. The reason is because governments are local in nature and responsible for domestic issues. There is no such thing as a global constituency. What I learned is that the issue of how to address this problem is still very much with us at present. This time of economic crisis has not helped mobilize political energy from governments into these international issues, and is likely to remain a significant problem for the future.

RESEARCH DIGEST

Research Digest is a clear and concise summary of main points and issues with policy implications that have been raised in RIETI discussion papers.

UESUGI Iichiro

UESUGI Iichiro is FF at RIETI and concurrent Associate Professor at Institute of Economic Research, Hitotsubashi University. He obtained his Ph.D. in economics from University of California, San Diego in 2000. He specializes in financial intermediation, small businesses, interfirm networks, and Japanese economy.
Selected publications include: "The Effectiveness of Public Credit Guarantees in the Japanese Loan Market" (with SAKAI Koji and Guy M. YAMASHIRO), *Journal of the Japanese and International Economies*, Vol.24, No.4, pp.457-480, 2010; "Firm Age and the Evolution of Borrowing Costs: Evidence from Japanese Small Firms" (with SAKAI Koji and WATANABE Tsutomu) *Journal of Banking and Finance*, Vol. 34, No. 8, pp.1970-1981, 2010.

Natural Disasters and Firm Dynamics

A key to restoration and rebuilding after the Great East Japan Earthquake is the rebirth and rebuilding of industries in the areas affected by the disaster. The question is how to go about revitalizing companies in the disaster areas? In searching for ways to that end, it is essential to obtain a grasp of the impact of such a disaster on corporate activities.

The Great Hanshin-Awaji Earthquake in 1995 is important from this standpoint. Analyzing its impact on corporate activities (referred to as "firm dynamics") should give us useful clues on how to revive industries following the Great East Japan Earthquake.

A research group led by Faculty Fellow UESUGI Iichiro, making use of corporate data compiled by Teikoku Databank, Ltd., analyzed trends in corporate bankruptcies, relocations, and capital investment in the area impacted by the Great Hanshin-Awaji Earthquake. From this analysis many insights were gained, including that (1) the bankruptcy rate inside the affected area was lower than that outside the area; (2) following the quake, the rate of corporate relocations from the affected area rose sharply; and (3) capital investment in the affected area did not grow immediately after the quake but instead a year later. The research results are compiled and published as RIETI's Policy Discussion Paper series PDP 12-P-001.

—What kinds of issues did you have in mind when you undertook this research project?

UESUGI: The Great East Japan Earthquake involved not only the quake itself but also a multiple tsunami and a nuclear power plant accident, causing the most destructive human and property damage since World War II. Realizing the immense difficulties faced by the affected areas, I had a strong desire to contribute as an economist to the recovery and rebuilding efforts. Around that time, RIETI President FUJITA Masahisa requested me to take up a research project related to earthquake disasters, and I became involved in this project.

Looking for Clues from the Great Hanshin-Awaji Earthquake on How to Rebuild Industry after the Great East Japan Earthquake

—Why did you decide to analyze the Great Hanshin-Awaji Earthquake instead of the Great East Japan Earthquake?

UESUGI: The rebuilding of local industry is necessary for recovery in the affected areas. Efforts by the individual companies are of utmost importance, but support by government measures from infrastructure provision to deregulation so as to create demand is also essential. We asked subsequently what should be done so that effective government policies may be devised and implemented. To answer that question, we needed knowledge concerning three points: (1) how the business environment has been changed by the disasters, (2) what action companies have taken to address those changes, and (3) the factors hindering corporate activities. A year after the Great East Japan Earthquake, however, such data has yet to be compiled. Without it, we could not gain sufficient insight.

As such, we decided to focus on the Great Hanshin-Awaji Earthquake that occurred on January 17, 1995.

PDP: 12-P-001 | Natural Disasters and Firm Dynamics
UESUGI Iichiro
http://www.rieti.go.jp/jp/publications/pdp/12p001.pdf

Enough time has passed since that event so that a fair amount of data has been compiled, which can be used for carrying out economic analysis. If we can clarify how firm dynamics changed after that quake, we should be able to obtain clues for rebuilding industry in the areas affected by the Great East Japan Earthquake.

—Was there any prior research in this area?

UESUGI: While searching for papers, we found a number of prior studies estimating the cost of damage to industry from the disasters, but we could not find any examples using company-level data to conduct detailed analyses of the medium-term changes in firm dynamics. This means that there is much significance to clarifying the impact of the disasters using micro-level corporate data.

Impact on Bankruptcies, Relocation, and Capital Investment Analyzed Using Corporate Data

— How did you handle the research?

UESUGI: This study was part of RIETI's Research on Efficient Corporate Financing and Inter-firm Networks project, which is being carried out by 15 participants including myself as the project leader. Our study was conducted by me and six other members: UCHIDA Hirofumi (Kobe University), UCHINO Taisuke (RIETI), ONO Arito (Mizuho Research Institute), HAZAMA Makoto (Hitotsubashi University Graduate School of Economics), HOSONO Kaoru (Gakushuin University), and MIYAKAWA Daisuke (Development Bank of Japan).

In the early stages, we met around once a month to discuss the framing of issues and research methodologies. As a result of these discussions, after clarifying the differences between the Hanshin and East Japan disasters, we decided to analyze three aspects of the Hanshin quake: (1) its impact on the continued existence or bankruptcy of companies, (2) the impact on company relocation, and (3) corporate capital investment after the disaster. Focusing particularly on the role of financial institutions, we investigated whether the bankruptcy, relocation, and fixed assets recovery by the affected companies were impacted if the financial institutions themselves suffered damage in the quake.

We spent time analyzing the data, and I wrote up the results, presenting them on September 18, 2011 at a special session of the Japan Society of Monetary Economics on "The Great East Japan Earthquake and Small Business Lending." This paper, the joint work of the seven authors, was then completed with a different title along with significant revisions to the contents and published as PDP 12-P-001.

—What kind of data did you use in the research?

UESUGI: Teikoku Databank stores a vast amount of corporate data on more than one million companies. We used a dataset created as part of a joint project by Hitotsubashi University and Teikoku Databank based on the Teikoku database. As of 1994, the project had compiled information on approximately 94,000 firms, of which around 19,000 were located in the area affected by the Great Hanshin-Awaji Earthquake. Additional use of financial data was possible for around 12,000 firms (of which around 2,000 were in the affected area), and they were the starting point for our analysis of bankruptcies and capital investment. Since we did not need detailed financial data to analyze relocation, all of the approximately 94,000 firms in the database were used as our basic sample.

The actual number of sample firms differed, however, for such reasons as the availability of variables used for each analysis. Estimating capital investment functions, in particular, the variables for fixed assets and so on, required data for both the current year and the previous year as well, so the number of sample firms used was about 8,500.

High Bankruptcy Rate among Quake-affected Firms with Banks in the Affected Areas

—What kinds of insights did you obtain from your analysis of bankruptcies?

UESUGI: It is generally assumed that when there is a devastating earthquake, the number of bankruptcies

rises. Among the factors for this are that companies become unable to stay in business due to damage to fixed assets such as factories, shops, and machinery as well as to their inventories, and the business activities of their clients stagnate, making it difficult for them to conduct sales and procure goods. Upon investigating whether bankruptcies actually rose due to the earthquake disaster, we discovered that the failure rate of companies in the affected area was always lower than for those outside the area. The rate was consistently between 0.3 and 0.9 percentage points lower in the former compared to the latter.

It is possible, however, that in evaluating the impact of a quake disaster on bankruptcies, more can be learned from looking at the changes than from the level of bankruptcies. Using only the bankruptcy rates prior to the quake as our benchmark, starting from 1991, we tried to compare the changes in bankruptcy rates thereafter inside and outside the affected areas, but again found that the rates in the former were more often lower than the latter.

—What did your analysis reveal?

UESUGI: We found three noteworthy points. The first is that the bankruptcy rate was not meaningfully affected by the degree of damage suffered. Bankruptcies did not increase and a greater degree of damage from the disaster did not necessarily lead to bankruptcy, apparently due to the use of credit guarantee programs and other support measures for quake-affected firms.

Second, damage to a firm's financial institution increased the likelihood of bankruptcy, regardless of whether the firm was inside or outside the affected area. This trend in particular did not appear before the quake but instead after it. For firms located in the disaster area, it seems that the bankruptcy rate went up for such reasons as the inability of their banks to provide funds when the bank itself suffered damage in the quake.

Third, when comparing the absolute values of marginal effect for the capital adequacy ratio, return on assets, and cash to debt ratio inside and outside the disaster area, we did not find that the figures inside the affected area were larger than those outside the area. We assumed that, due to the quake, uncertainties would increase and the effect of companies' soundness on bankruptcy rates would grow, but in reality that was not necessarily the case.

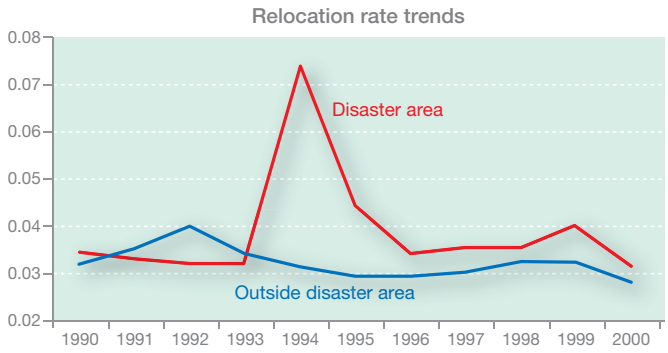
The Disaster Increased Company Relocation, but Mostly to the Near Vicinity

— In what ways did the disaster impact company relocation?

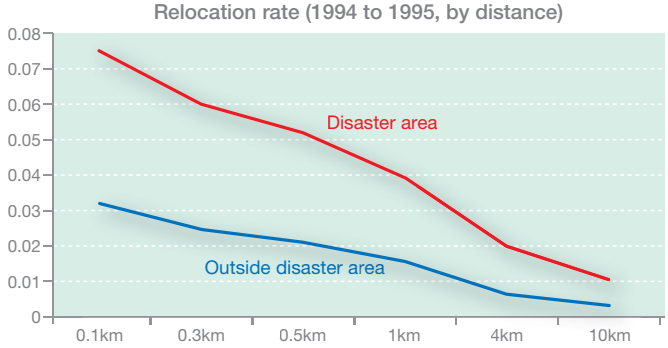
UESUGI: When a disaster strikes, some companies are forced to relocate to another area. We investigated the extent to which the quake increased the number of companies relocating and the factors causing them to do so. We also analyzed the impact on industry agglomeration relocation before and after the quake, and how the performance of industry agglomerations and individual companies changed after the quake.

When comparing the relocation rates inside and outside the disaster area, we found a large increase in the relocation rates of companies in the disaster area after the quake, well above the corporate relocation rates outside the area during the same period (Figure 1). The relocation rate from 1994 to 1995 was 7.4% inside the disaster area and just 3.1% outside.

Figure 1: Relocation rate



Note 1: Relocation rate is the number of companies relocating during the period from year *t* to *t+1* divided by the total number of companies in a year.
Note 2: Relocation is defined as movement of the head office by 0.1km or more.



Note 1: Relocation is defined as movement of the head office by 0.1km or more.

It must be noted carefully, though, that many companies relocated over short distances. Using a longer minimum distance in the definition of relocation would have lowered the relocation rate greatly. Short-distance

moves cannot really be considered as relocation and are not regarded as separation from the industry agglomeration. The relocation distance must therefore be looked at carefully, especially when talking about the impact of relocation on industry agglomerations.

—What changes were observed in industry agglomerations in the disaster area?

UESUGI: The area affected by the Great Hanshin-Awaji Earthquake includes heavily populated regions such as Kobe, which contains many industry agglomerations. Figure 2 shows the results of calculating the degree of industrial agglomeration in each of the districts based on office and company statistics for 1994 and selecting the top 10 districts and industries. Nagata-ku in Kobe is home to rubber and leather goods manufacturers, Chuo-ku hosts water transport industry and transport-related service industry companies, and Nishinomiya has many companies producing Japanese sake and other beverages.

Figure 2: **Districts and industries with a high degree of agglomeration in the disaster area prior to the quake (top 10 districts and industries)***

	Great Hanshin-Awaji Earthquake		
Rank	District	Industry	1994 Level
1	Nagata-ku	Rubber products manufacturing	0.0550
2	Higashinada-ku	Heat supply	0.0346
3	Nagata-ku	Leather, leather goods, fur manufacturing	0.0305
4	Chuo-ku	Water transport	0.0292
5	Chuo-ku	Transport-related services	0.0286
6	Amagasaki-shi	Technology R&D	0.0229
7	Itami-shi	Air transport	0.0229
8	Chuo-ku	Government, economics, cultural entities	0.0199
9	Toyonaka-shi	Heat supply	0.0188
10	Nishinomiya-shi	Beverages, tobacco, livestock feed manufacturing	0.0183

	Great East Japan Earthquake		
Rank	District	Industry	2009 Level
1	Hachinohe-shi	Fisheries (except aquaculture)	0.0244
2	Aoba-ku	Electrical	0.0204
3	Kesennuma-shi	Fisheries (except aquaculture)	0.0196
4	Aoba-ku	Ancillary financial services, etc.	0.0186
5	Aoba-ku	Health and sanitation	0.0165
6	Aoba-ku	School education	0.0148
7	Iwaki-shi	Fisheries (except aquaculture)	0.0134
8	Miyako-shi	Fisheries (except aquaculture)	0.0130
9	Miyako-shi	Aquaculture	0.0122
10	Aoba-ku	Broadcasting	0.0121

Note: Percentage of employees in industry *j* in district *r* out of the total number of employees nationwide in industry *j*

Data: From the editions for each year of the Establishment and Enterprise Census and Economic Census published by the Statistics Bureau, Ministry of Internal Affairs and Communications

By investigating the kinds of changes the disaster caused in districts and industries with high degrees of agglomeration, we observed that the higher the degree of industrial agglomeration in 1994, the greater the degree of its drop through 1996. This result would seem to indicate that the more heavily concentrated the districts and industries were in the disaster area, the greater the tendency for such agglomeration to be lost after the disaster.

We also analyzed the kinds of subsequent performance differences emerging between the companies in the disaster area that relocated and those that did not, but the results we obtained showed no significant effects on performance.

One Year after the Quake, Capital Investment by Affected Companies Grew

—What features did you find in capital investment trends by firms affected by the disaster?

UESUGI: In the case of companies before the quake operating with optimal capital stock and with no change in the business environment after the quake, it would be expected for them to increase their capital investment immediately, and in proportion to the extent of damage to their fixed assets. Many companies, however, faced funding constraints, and the amount of increased capital investment for recovering damaged fixed assets would likely differ from one company to another.

We therefore compared companies inside and outside the disaster area from 1993 to 1999 regarding how their capital investment trended before and after the quake, and how each item on their balance sheet changed in relation to changes in fixed assets. Up to 1995 when the earthquake struck, capital investment both inside and outside the disaster affected area had continued to decline, with the average falling to negative territory in 1995. Then in 1996, while capital investment by firms in the disaster area rose, it continued to trend negative among companies outside the area.

What these trends suggest is that companies that suffered damage to their fixed assets or other damage spent more aggressively than companies outside the affected area, not immediately after the quake but from 1995 to 1996. Looking at the financing patterns of quake-affected firms in 1996, they dealt with the in-

crease in fixed assets by dipping into their savings to a limited extent through borrowing and raising capitalization. There was a clear difference between firms in the affected area, which increased their borrowing, and those outside the area, whose borrowing declined.

As for the funding constraints owing to damage to a company's bank, not all of the companies in the sample were impacted. However, if we limit the sample to companies in the disaster area whose collateral value appears to have suffered from the damage to their fixed assets, this had the effect of reducing the amount of increase in their capital investment.

— How do you think the insights gained from this research can be used for recovery and rebuilding from the Great East Japan Earthquake?

UESUGI: It is true that there are major differences between the Great East Japan Earthquake and the Great Hanshin-Awaji Earthquake. The East Japan disaster caused widespread damage over areas of relatively low population, whereas the Hanshin quake was a direct hit on a heavily populated area. Another big difference is the nuclear plant accident that accompanied the East Japan disaster. There are also differences in the business performance of companies in the affected areas up to the time of the disasters.

Still, much of the insight obtained in this research can be used in the recovery and rebuilding efforts following the Great East Japan Earthquake. One important thing we learned, for example, is that firms doing business with financial institutions located in a disaster affected area tend to have higher bankruptcy rates. The Great Hanshin-Awaji Earthquake hit an area with many city banks and other financial institutions that were potential suppliers of funding, and would seem to have had weaker funding constraints than other areas. In spite of this situation, our studies indicated that there were funding constraints mainly due to the lending side. On the other hand, the areas affected by the Great East Japan Earthquake had fewer potential funding suppliers, so that the firms in need of borrowing may face much stronger funding constraints than those at the time of the Hanshin disaster. Considering this situation, we believe there is a particular need this time for public capital injections and other government measures to maintain the soundness of affected financial institutions so that companies can readily receive funding from their banks.

What needs to be kept in mind at the same time is that the average business performance of companies hit by the Great East Japan Earthquake was below that of the nationwide average. This is a major difference from the Great Hanshin-Awaji Earthquake, where the affected companies had been enjoying business performance at the same level as that of the national average. In disaster areas, it is very important to achieve the recovery and rebuilding of highly profitable companies. I believe we have to be careful, however, about blindly handing out new loans to companies without closely examining the likelihood of repayment. This could end up worsening the problem of providing funds even to those to whom they should not be provided.

— What are your insights regarding relocation?

UESUGI: In the case of the Great Hanshin-Awaji Earthquake, the relocation rate went up, but most of the relocations were over short distances. In contrast, it appears that the Great East Japan Earthquake will force many companies to move longer distances away, such as those that were located in areas where tsunami damage is expected again in the future, or in areas that had to be evacuated due to the nuclear plant accident. In such cases where it is difficult to obtain the external benefits of industry agglomerations, it will be necessary to discuss the needs of those companies and whether any effective policy measures can be taken. What may be necessary for the companies relocating far away are aggressive steps to create mechanisms for maintaining their existing clients while developing new ones.

— What kind of research do you plan to undertake in the future?

UESUGI: I would like to focus on the changes in firm dynamics due to the Great East Japan Earthquake, including the impact on the efficiency of the Japanese economy as a whole. Of particular interest here is company relocation. It is expected that this disaster will cause many companies to move away from their agglomerations. I would like to analyze the resulting changes in their performance, and whether they are maintaining their relationships with their existing clients. In the case of the Great Hanshin-Awaji Earthquake, we did not have detailed company data that included client information, but we are now able to utilize the Teikoku Databank data. By analyzing in detail the changes in the activities of relocating companies, we should be able to obtain insights of use for the rebuilding efforts.

INTRODUCTION OF THE 9 RESEARCH PROGRAMS

Under the third medium-term plan (FY 2011 to FY 2015), RIETI makes it its mission to undertake theoretical and empirical research to create a grand design for putting the Japanese economy on a growth path and solidifying sustainable growth in the future. Thus nine Research Programs have been established, with each Program representing a set of interrelated policies, altogether they will cover a broad range of policy areas.

In the current special edition, we will introduce you our leading research achievements from the nine research programs.

Research Programs

- #01 Trade and Investment
- #02 International Macroeconomics
- #03 Regional Economies
- #04 Technology and Innovation
- #05 Raising Industrial and Firm Productivity
- #06 New Industrial Policy
- #07 Human Capital
- #08 Social Security, Taxation, and Public Finance
- #09 Policy History and Policy Assessment

#01

International Trade and Investment

Program Director: WAKASUGI Ryuhei, FF, RIETI

The growth of Japan's economy is inseparable from changes in the global economy. This program, focusing on the relationship between the globalization of firms (i.e., exports and overseas production) and growth of the Japanese economy, will study R&D and innovation of globalizing firms, international technology transfer, employment, and industrial clusters from theoretical and empirical perspectives, together with studying international trade and investment rules (i.e., the WTO and regional trade agreements) empirically and from both legal and institutional perspectives. Furthermore, it also will study the impacts on firms and industries of the external shock of the Great East Japan Earthquake, changes in production networks and the structure of trade following recovery, and the effects of restrictive energy and material supply on structural changes in the Japanese economy.

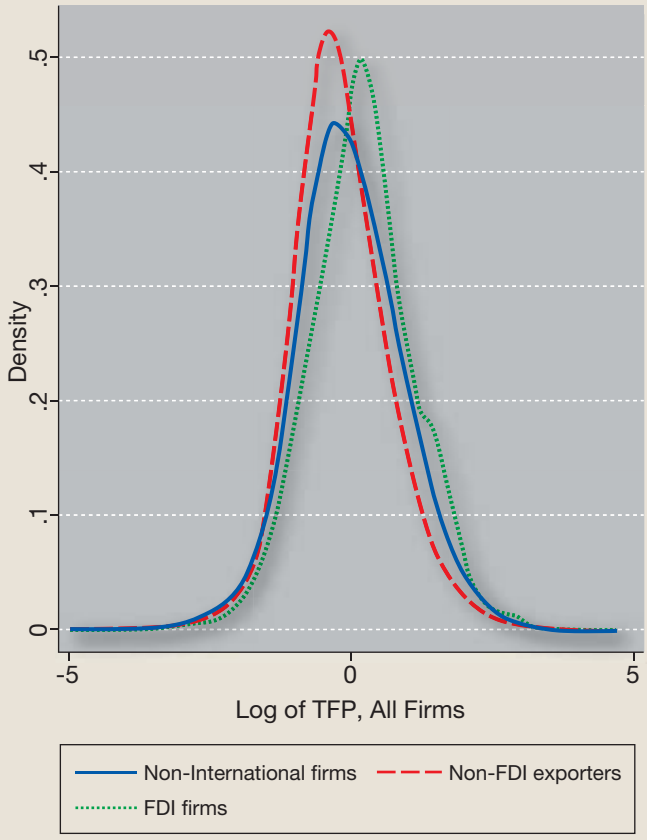
Introduction of Discussion Papers (DPs) published under the Program

DP Title: Effects of Ownership on Exports and FDI: Evidence from Chinese firms

Author(s)	WAKASUGI Ryuhei (RIETI) Hongyong ZHANG (Kyoto University)
Release Date	September 2012
Research Project	Study of the Creation of the Japanese Economy and Trade and Direct Investment
DP No.	12-E-058
URL	http://www.rieti.go.jp/en/publications/dp/12e058.pdf

The standard model in the literature indicates that heterogeneity in productivity and fixed costs is the key in determining firms' internationalization. However, few studies have considered the effect of ownership structure on firms' exporting and foreign direct investment (FDI). This study examines how differences in productivity and ownership structure affect the exporting and FDI of Chinese firms with different types of ownership: privately owned firms, state-owned enterprises (SOE), and foreign affiliates. Using our original dataset of Chinese firms, our statistical estimations yield several new findings. We find that privately-held and SOE firms must be highly productive to engage successfully in both exporting and FDI, whereas foreign-owned firms need relatively little productivity to be successful exporters and foreign direct investors. We also find that the interaction between the mode of ownership and experience with exporting and FDI has heterogeneous effects on expanding FDI. For privately-owned and state-owned Chinese firms, experience with exporting and FDI has a stronger effect on expanding FDI than on foreign-owned firms.

Figure: Probability density function of Chinese firms



DP Title The Effects of FDI on Domestic Employment and Workforce Composition

Author(s)	TANAKA Ayumu (RIETI)
Release Date	October 2012
Research Project	Study of the Creation of the Japanese Economy and Trade and Direct Investment
DP No.	12-E-069
URL	http://www.rieti.go.jp/en/publications/dp/12e069.pdf

This study uses propensity score matching techniques to examine the effects on domestic employment of Japanese manufacturing, wholesale, and service sector firms that initiated foreign direct investment (FDI) during 2003-2005. Results reveal that, in all three sectors, employment growth was higher among firms that initiated FDI than those that remained exclusively domestic. Moreover, manufacturing firms experienced higher growth in the share of non-regular workers. In addition, empirical results indicate that FDI's positive employment effects were accompanied by positive impacts on overall sales and/or exports. Positive impacts on export sales in manufacturing and wholesale sectors and on overall sales in manufacturing and services sectors were found.

Table: Averages of the effects of foreign direct investment three years after initiation

	Employment Growth	Share of Non-regular Workers	Sales Growth	Export Growth
Manufacturing	12.6%	1.6%	8%	122%
Wholesale	9.5%	No	No	119%
Services	9.5%※	No	18%	No

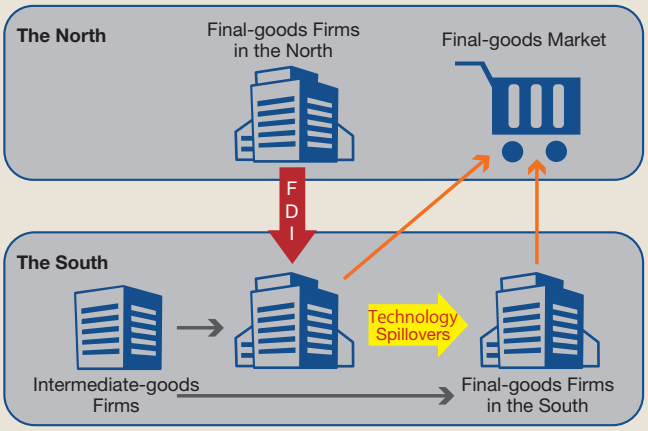
Note) Statistical significance varies depending on the analytical method

DP Title Strategic Foreign Direct Investment in Vertically Related Markets

Author(s)	ISHIKAWA Jota (RIETI) HORIUCHI Eiji (Teikyo University)
Release Date	March 2012
Research Project	Economic Analysis of Technology in the Global Economy
DP No.	12-E-014
URL	http://www.rieti.go.jp/en/publications/dp/12e014.pdf

By using a simple North-South trade model with vertically related markets, this paper draws our attention to previously unidentified effects of foreign direct investment (FDI), namely that a North downstream firm affects the pricing behavior of an input supplier through technology spillovers and market integration led by FDI. Whether the North firm strategically undertakes FDI in the presence of technology spillovers depends on the South firm's capacity to absorb the North's technology. When capacity is not very high, the North firm could actually gain from technology spillovers to the South firm. FDI may benefit all producers and consumers. We also explore the South's policy measures to attract FDI. Our analysis suggests that the South's very tight intellectual property rights (IPR) protection may benefit neither side.

Figure: Market structure



#02

International Macroeconomics

Program Director: ITO Takatoshi, FF, RIETI

Amid rapidly advancing globalization, there is a need to consider how the Japanese economy should take on growth in emerging markets and realize balanced, sustainable growth within Asia. In addition to studying institutional infrastructures such as the role of a currency basket in the Asia region, this program also will analyze various issues related to exchange-rate pass-through and the choice of invoice currencies from both macroeconomic and corporate-level perspectives. Furthermore, it also will advance research spanning fields such as international trade and macroeconomics, international finance, macro finance, corporate foreign-exchange risk management, and corporate finance. This program will endeavor to propose ideal macroeconomic policies for fiscal reconstruction, particularly their influence on exchange rates, as well as analyze the long-term deflationary mechanism and explore ways of overcoming it.

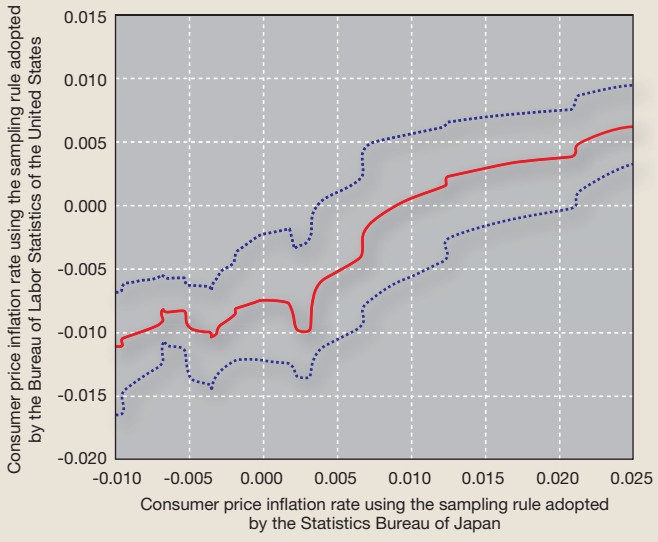
Introduction of Discussion Papers (DPs) published under the Program

DP Title How Fast Are Prices in Japan Falling?

Author(s)	IMAI Satoshi (Statistics Bureau of Japan) SHIMIZU Chihiro (Reitaku University) WATANABE Tsutomu (RIETI)
Release Date	November 2012
Research Project	Long-term Deflation in Japan: Its causes and policy implications
DP No.	12-E-075
URL	http://www.rieti.go.jp/en/publications/dp/12e075.pdf

The consumer price inflation rate in Japan has been below zero since the mid-1990s. However, despite the presence of a substantial output gap, the rate of deflation has been much smaller than that observed in the United States during the Great Depression. Given this, doubts have been raised regarding the accuracy of Japan's official inflation estimates. Against this backdrop, the purpose of this paper is to investigate to what extent estimates of the inflation rate depend on the methodology adopted. Our specific focus is on how inflation estimates depend on the method of outlets, products, and price sampling employed. For the analysis, we use daily scanner data on prices and quantities for all products sold at about 200 supermarkets over the last 10 years. We regard this dataset as the "universe" and send out (virtual) price collectors to conduct sampling following more than 60 different sampling rules. We find that the officially released outcome can be reproduced when employing a sampling rule similar to the one adopted by the Statistics Bureau of Japan. However, we obtain numbers quite different from the official ones when we employ different rules. The largest rate of deflation we find using a particular rule is about one percent per year, which is twice as large as the official number, suggesting the presence of substantial upward bias in the official inflation rate. Nonetheless, our results show that the rate of deflation over the last decade is still small relative to that in the United States during the Great Depression, indicating that Japan's deflation is moderate.

Figure: Consumer price inflation rate using different sampling rules

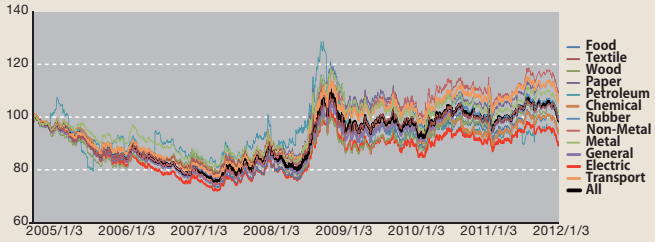


DP Title Industry-specific Real Effective Exchange Rates for Japan

Author(s)	SATO Kiyotaka (Yokohama National University) SHIMIZU Junko (Gakushuin University) Nagendra SHRESTHA (Yokohama National University) Shajuan ZHANG (Yokohama National University)
Release Date	July 2012
Research Project	Research on a Currency Basket
DP No.	12-E-044
URL	http://www.rieti.go.jp/en/publications/dp/12e044.pdf

In considering the empirical importance of the exchange rate on exporters' price competitiveness and producer profits in specific industries, the industry-specific real effective exchange rate (REER) is far more useful than the aggregate REER published by the International Monetary Fund (IMF) and the Bank for International Settlements (BIS). The novelty of this study is to construct a new dataset of the industry-specific REER of the yen on a daily basis from 2005 to the present to provide a better indicator for the international price competitiveness of Japanese exporters. By conducting simulation analysis, we show whether recent fluctuations of the REER have been driven by various factors such as domestic and foreign price changes. By running a near-vector autoregression (VAR) estimation with block exogeneity, we demonstrate that Japanese exports of major machinery industries are affected not by the nominal exchange rate shock but by the world output fluctuations and the domestic price changes in Japan.

Figure: Industry-specific real effective exchange rates January 3, 2005 – March 2, 2012



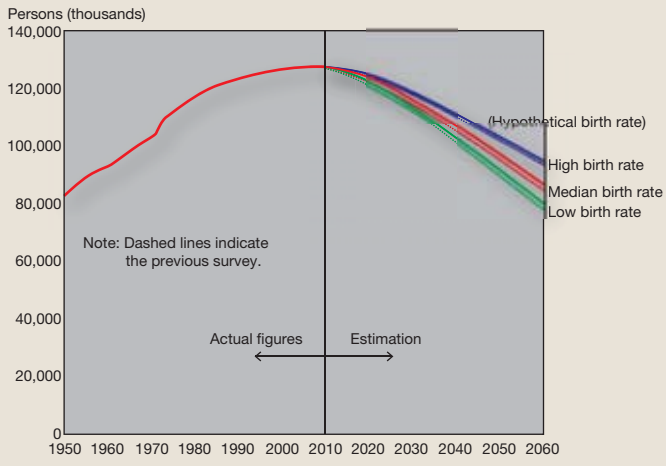
Source) Based on author's calculation

DP Title Demographic Change and Directed Technological Change

Author(s)	KOBAYASHI Keiichiro (RIETI)
Release Date	September 2012
Research Project	Research on Macroeconomic Policies Focused on Fiscal Reconstruction and Similar Measures
DP No.	12-E-053
URL	http://www.rieti.go.jp/en/publications/dp/12e053.pdf

In this paper, we analyze the implications of demographic change, i.e., the aging of society, on the direction of technological change and the rate of economic growth. Taking demographic change as an exogenous event, the simple variant of Acemoglu's theory of directed technical change implies that (1) the elderly-care related technology must be a promising area of innovation and (2) the optimal growth rate must be lower in aging societies than in young ones, suggesting that the slowdown of economic growth may be an optimal response of the economy to population aging. The analytical framework is simple and robust such that this model can be used to assess various policy options concerning the demographic change in Japan and other countries.

Figure: Demographic transition—Estimation using the median, high, and low birth rates (median death rate)



#03

Regional Economies

Program Leader: HAMAGUCHI Nobuaki, FF, RIETI

This program will study urban, rural, and industrial growth viewing the regions of Japan in the context of the global economy, and using this to develop policy recommendations and other outputs. Specifically, it will analyze, both theoretically and empirically, matters such as formation of domestic and international regional systems through market mechanisms, the mechanisms of enterprise clustering, and the relationship between economic growth and urbanization, considering regional policies that would be desirable from the perspectives of national economic growth and maximizing policy effects, and also researching the optimal sizes of regional blocs and communities. Additional study will look at the ideal forms of the supply chains of Japanese firms and the recovery of areas affected by the Great East Japan Earthquake. Furthermore, the ideal management strategies for outstanding small and medium-sized enterprises utilizing regional resources and other advantages will be studied as well.

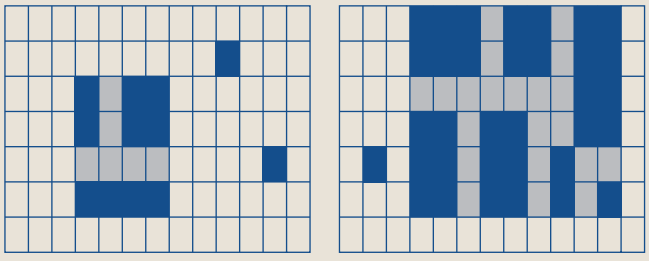
Introduction of Discussion Papers (DPs) published under the Program

DP Title: Analysis of Industrial Agglomeration Patterns: An application to manufacturing industries in Japan

Author(s)	MORI Tomoya (RIETI) Tony E. SMITH (University of Pennsylvania)
Release Date	January 2012
Research Project	Formation of Economic Agglomerations and the Emergence of Order in their Spatial Patterns: Theory, evidence, and policy implications
DP No.	12-E-006
URL	http://www.rieti.go.jp/en/publications/dp/12e006.pdf

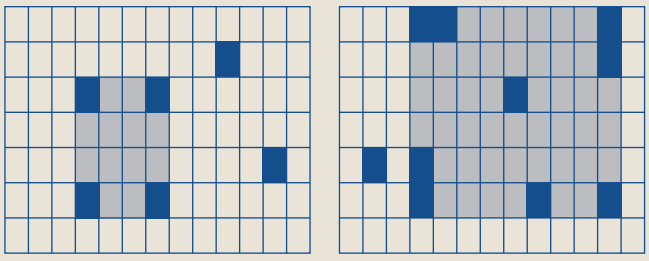
The standard approach to studying industrial agglomeration is to construct summary measures of the "degree of agglomeration" within each industry and to test for significant agglomeration with respect to some appropriate reference measures. But such summary measures often fail to distinguish between industries that exhibit substantially different spatial patterns of agglomeration. In a previous paper, a cluster-detection procedure was developed that yields a more detailed spatial representation of agglomeration patterns (Mori and Smith [28]). This methodology is applied here to the case of manufacturing industries in Japan, and is shown to yield a rich variety of agglomeration patterns. In addition, to analyze such patterns in a more quantitative way, a new set of measures is developed that focuses on both the global extent and local density of agglomeration patterns. Here, it is shown for the case of Japan that these measures provide a useful classification of pattern types that reflect a number of theoretical findings in the New Economic Geography.

Figure: Classifications of agglomeration patterns



(a) Globally confined and locally dense

(b) Globally dispersed and locally dense



(c) Globally confined and locally sparse

(d) Globally dispersed and locally sparse

DP Title Japan and Economic Integration in East Asia: Post-disaster scenario

Author(s)	FUJITA Masahisa (RIETI) HAMAGUCHI Nobuaki (RIETI)
Release Date	December 2011
Research Project	Studies on the Structure of Japanese Economic Space and Japanese Supply Chains Sustaining Growth under Globalization and Disaster Risks
DP No.	11-E-079
URL	http://www.rieti.go.jp/en/publications/dp/11e079.pdf

As regional integration proceeds in East Asia, intermediate goods production of advanced technology has been locked in Japan despite the dispersion forces of high factor costs. However, the disastrous earthquake in 2011 may have revealed supply chain disruption risk as another dispersion force. We analyze how these dispersion forces affect the specialization in intermediate goods production of Japan and discuss future competitive challenges for the Japanese economy under deindustrialization from the spatial economics viewpoint.

Table: Agglomeration and Dispersion in Japan

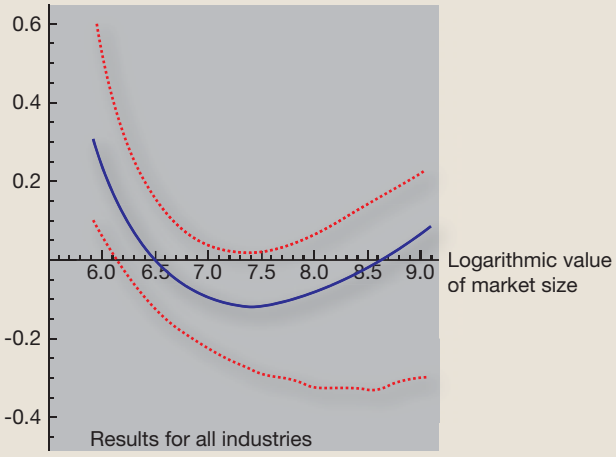
Agglomeration forces	Dispersion forces
● High labor productivity ● Efficient infrastructure ● Domestic market scale ● Accessibility to intermediate goods/materials ● Strong research & development	● Labor cost ● Land cost ● Strong yen ● Lagging behind in free trade agreements ● Declining birth rate and aging ● Declining population
	<After the Great East Japan Earthquake> ● Risk of supply chain disruptions ● Electricity shortage

DP Title Market Size and Entrepreneurship

Author(s)	SATO Yasuhiro (Osaka University) TABUCHI Takatoshi (RIETI) YAMAMOTO Kazuhiro (Osaka University)
Release Date	January 2012
Research Project	Theory and Empirics of Urban Growth and Spatial Structure
DP No.	12-E-002
URL	http://www.rieti.go.jp/en/publications/dp/12e002.pdf

In order to examine the impacts of market size on entrepreneurship, we estimate a monopolistic competition model that involves the workers' decisions to pursue entrepreneurship by using data on Japanese prefectures. Our results show that a larger market size in terms of population density leads to a higher incentive for individuals to become entrepreneurs. A 10% increase in the population density increases the share of people who wish to become entrepreneurs by approximately 1%. In contrast, such a positive effect on the self-employment rate is observed only for prefectures with very high or very low densities. The self-employment ratio is negatively associated with population density in prefectures with medium densities.

Figure: Elasticities of entrepreneurship for market size



#04

Technology and Innovation

Program Director: NAGAOKA Sadao, FF, RIETI

The sources of innovation are the creation of new knowledge and its exploitation to solve real-world problems. This program will develop original data on innovation process with a view toward improving our understanding of such processes, including the surveys of inventors in Japan, North America, and Europe, and will conduct analysis from a global perspective so as to contribute to evidence-based policy formation conducive to technology development and innovation. Specifically, the program will analyze a broad range of issues, such as an assessment of intellectual property systems such as patent systems, knowledge transfer and mobility of people across organizations, university-industry cooperation, technical standards for innovation, collaboration in innovation, corporate organization and industrial organization to promote innovation, and international comparison of entrepreneurship.

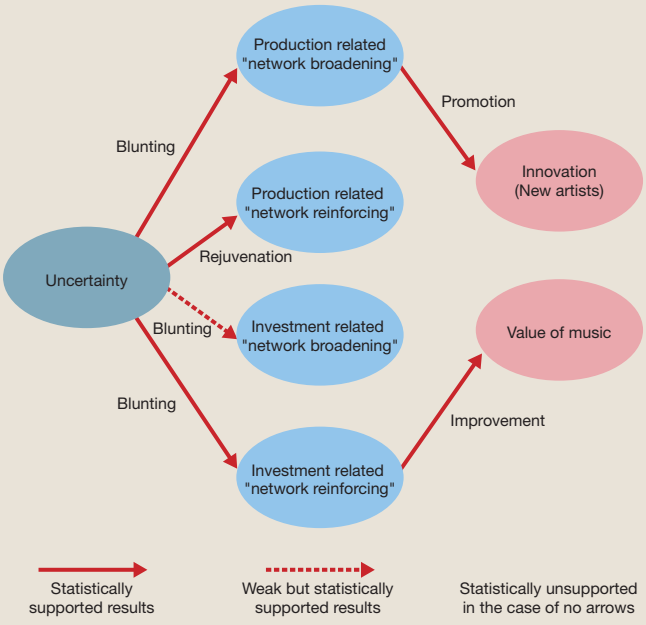
Introduction of Discussion Papers (DPs) published under the Program

DP Title: Network Broadening and Reinforcing for Facilitating Innovation: Value creation networks in the Japanese music industry

Author(s)	INOUE Tatsuhiko (RIETI) NAGAYAMA Susumu (RIETI)
Release Date	November 2012
Research Project	Research on the Interactions Between the Business Strategies of Excellent Small and Medium Enterprises (SMEs) and their External Environment
DP No.	12-J-035
URL	http://www.rieti.go.jp/jp/publications/dp/12j035.pdf

This study shows empirical research regarding the value creation network as it relates to facilitating product innovation. What kind of influence does "network broadening" with new players or "network reinforcing" with existing players have on value creation and innovation generation? Furthermore, what kind of environmental change causes network reinforcing and network broadening? This paper attempts a network analysis of the Japanese music industry; a case considered to be at the forefront even in the contents industry, which has been receiving attention in recent years from movements such as the Cool Japan policy. We gave particular attention to the value creation network consisting of multiple players, each of whom possesses varying business models. Due to the differences in the method of revenue generation, it is predicted that, given the environmental uncertainty, relationship building would vary. The result shows that because of factors such as the differences in business models between music production related factors and the investment related factors in shared copyright, there are contrasting relationship building patterns in a context of environmental uncertainty. In addition, the study indicates that product innovation is stimulated through network broadening by the production related factors and that value creation is prompted by network reinforcing of investment related factors.

Figure: Overall picture of the results of statistical analysis

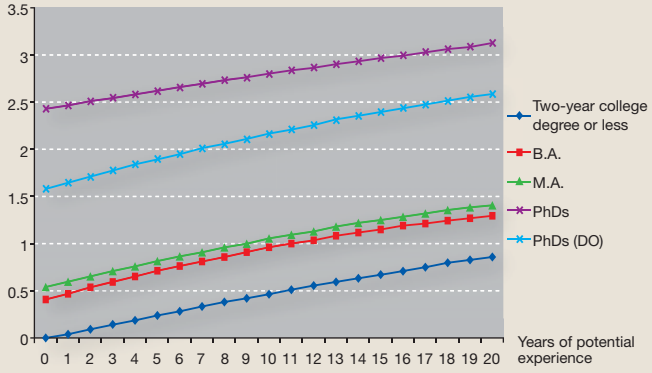


DP Title Life-cycle Productivity of Industrial Inventors: Education and other determinants

Author(s)	ONISHI Koichiro (Osaka Institute of Technology) NAGAOKA Sadao (RIETI)
Release Date	September 2012
Research Project	Research on Innovation Process and its Institutional Infrastructure Based on Micro Data
DP No.	12-E-059
URL	http://www.rieti.go.jp/en/publications/dp/12e059.pdf

This paper analyzes the life-cycle inventive productivity of Japanese industrial inventors, based on panel data of 1,731 inventors matched with firm data. We focus on two issues: whether inventors with PhD degrees perform better, even taking into account the late start in their business careers, and if those with PhD degrees based only on dissertation (PhDs (DO)), for which a university performs only a certification function, are similarly as productive as the regular PhD holders. Our main findings are the following. Inventors with regular PhD degrees have significantly higher annual productivity than those with other education levels in terms of both patent and forward citation counts, and they can easily compensate for the late start in their business careers. This is the case even after controlling for workplace, research stage, and inventor ability. PhDs (DO) also have high patent productivity (rising more rapidly with experience), although their level is lower than that of regular PhD holders. They work in independent laboratories and in projects involving basic research as frequently as do the regular PhD holders. Furthermore, the exits of PhDs (DO) from inventions are significantly late even when controlling for project type and inventor ability, so that they work longer as inventors.

Figure: Years of potential experience and inventive productivity by educational level (number of forward citations)



DP Title Determinants of Essential Intellectual Property Rights for Wireless Communications Standards: Manufacturing firms vs. non-manufacturing patentees

Author(s)	Byeongwoo KANG (University of Tokyo) MOTOHASHI Kazuyuki (RIETI)
Release Date	June 2012
Research Project	Empirical Studies on the International Comparison of Open Innovation
DP No.	12-E-042
URL	http://www.rieti.go.jp/en/publications/dp/12e042.pdf

Obtaining essential intellectual property rights (IPRs) is important for innovation competition in the network industry, where technical standardization plays a critical role in development. In this study, we empirically investigate the determinants of essential IPRs for wireless communications standards by using the patent database. More specifically, we use the technological capabilities of both the firm and the patent inventor to explain the probability of its selection as an essential IPR. In addition, we compare manufacturing firms' and non-manufacturing patentees' (NMPs) technology strategies for essential IPRs. Our results indicate that manufacturing firms accumulate their technological capability in specific technology fields, whereas NMPs cover broader technology fields to keep their dominant position in the standardization process.

Table: Result of knowledge spillovers

Self citation of Non-self citation in backward citations?	The number of essential IPRs in backward citations? > 0	The number of essential IPRs in backward citations? = 0
No. of self citations	General : + Manufacturer : +	General : – Manufacturer : +
No. of non-self citations	General : + Manufacturer : No statistical significance	General : + Manufacturer : –

#05

Raising Industrial and Firm Productivity

Program Director: FUKAO Kyoji, FF, RIETI

The aim of this program is to measure industry- and firm-level productivity and its determinants for Japan and various East Asian countries and to conduct research on policies aimed at raising productivity. At the industry level, the program—in addition to updating and expanding the Japan Industrial Productivity (JIP) and China Industrial Productivity (CIP) databases in collaboration with Hitotsubashi University—will construct an industrial productivity database by prefecture for Japan and examine the impact of the recent earthquake on regional economies and policies for reconstruction. At the firm or establishment level, employing micro-data from government statistics and corporate financial data in Japan and abroad, the program will research the following: productivity differentials between firms, the impact of globalization, how changes in demand affect corporate performance, policies for raising productivity in the service sector, and productivity dynamics from an international perspective—including productivity differentials between Japanese, Chinese, and Korean firms—as well as other related issues.
At the industry and firm level, the program will measure investment in intangible assets such as research and development, software, in-house training, organizational structure—all of which are important sources of innovation and productivity growth—and will examine the economic effects of such investments.

Introduction of Discussion Papers (DPs) published under the Program

DP Title China's Economic Growth, Structural Change and the Lewisian Turning Point

Author(s)	FUKAO Kyoji (RIETI) Tangjun YUAN (Fudan University)
Release Date	September 2012
Research Project	East Asian Industrial Productivity Project
DP No.	12-E-056
URL	http://www.rieti.go.jp/en/publications/dp/12e056.pdf

In a country such as China, which maintains strict controls on foreign exchange and frequently intervenes in the currency market, it is not surprising that the local currency is persistently undervalued in nominal terms. Normally, one would expect such a policy of deliberate currency undervaluation to result in a sharp rise in domestic prices, with abnormally low prices reversed not through an appreciation of the nominal exchange rate but through a rise in domestic prices. Why is this not occurring in China? A possible explanation is that, due to certain structural reasons, the equilibrium real exchange rate for China is considerably lower than that of other developing countries.
Taking this hypothesis as our point of departure, we examine how undervalued the Chinese yuan is in terms of purchasing power parity by comparing China's experience with other developing countries and the development process of developed countries in the past. In addition, we construct an open economy growth model with three sectors, where—similar to the Lewis growth model—there is surplus labor in the primary industry. Using this model, we analyze the relationship between the economic growth process and the level of absolute prices (real exchange rate). We show that the absolute price level will not increase until the economy reaches the Lewisian turning point. In addition, we show that in an economy like China, where there are strong barriers to the migration of labor to the manufacturing sector and where the ratio of net exports of goods and services to GDP is high, the economy will not reach the turning point until GDP per worker reaches a sufficiently high level.

DP Title Measurement of Intangible Investments by Industry and Its Role in Productivity Improvement Utilizing Comparative Studies between Japan and Korea

Author(s)	Hyunbae CHUN (Sogang University) FUKAO Kyoji (RIETI) HISA Shoichi (Yokohama City University) MIYAGAWA Tsutomu (RIETI)
Release Date	June 2012
Research Project	Study on Intangible Assets in Japan
DP No.	12-E-037
URL	http://www.rieti.go.jp/en/publications/dp/12e037.pdf

Using the Japan Industrial Productivity (JIP) database and other primary statistics, we estimate intangible investments in Japan at the industry level. Comparing our estimates with Korean ones measured by Professor Chun, intangible investment/gross value added (GVA) ratios in Japan are higher than those in Korea in many industries. However, in some service industries, Korean intangible investments are larger than their Japanese counterparts. Although intangible capital stock in 2008 was 136 trillion yen, the growth rate in intangibles became negative in some industries in Japan in the 2000s due to harsh restructuring. When we examine the impacts of intangible investments on total factor productivity (TFP) growth, we find a significant and positive effect on it in the market economy after the IT revolution. However, in the service sector, we do not find any clear evidence of the effect of intangibles. The estimation results show that the government should improve its management skills to utilize intangible assets effectively through deregulation in the service sector.

Table: Intangible investment/GVA ratio in Japan and Korea

	Japan				Korea			
	1981-1990	1991-2000	2001-2008	1981-2008	1981-1990	1991-2000	2001-2008	1981-2008
Total economy								
CI	0.75%	1.35%	2.16%	1.34%	0.39%	1.10%	1.66%	1.01%
IP	3.23%	4.09%	4.46%	3.87%	1.44%	2.29%	2.95%	2.17%
EC	2.12%	2.35%	2.30%	2.25%	1.59%	2.24%	2.03%	1.95%
Total	6.10%	7.79%	8.92%	7.46%	3.43%	5.62%	6.64%	5.13%
Manufacturing								
CI	0.64%	1.55%	2.76%	1.53%	0.24%	0.46%	1.08%	0.56%
IP	8.31%	11.41%	12.05%	10.43%	3.21%	5.46%	7.51%	5.24%
EC	2.04%	2.43%	2.51%	2.31%	2.62%	3.11%	2.92%	2.88%
Total	10.99%	15.40%	17.32%	14.26%	6.07%	9.02%	11.51%	8.68%
Service								
CI	0.77%	1.32%	1.95%	1.28%	0.55%	1.46%	1.98%	1.28%
IP	1.25%	1.78%	2.25%	1.71%	0.87%	1.18%	1.23%	1.08%
EC	2.20%	2.39%	2.30%	2.30%	1.43%	2.09%	1.76%	1.76%
Total	4.23%	5.49%	6.51%	5.29%	2.85%	4.73%	4.97%	4.13%

*CI: computerized information, IP: innovative property, EC: economic competencies

DP Title Product and Labor Market Imperfections and Scale Economies: Micro-evidence on France, Japan and the Netherlands

Author(s)	Sabien DOBBELAERE (VU University Amsterdam, Tinbergen Institute, IZA Bonn) KIYOTA Kozo (RIETI) Jacques MAIRESSE (CREST (ParisTech-ENSAE), UNU-MERIT (Maastricht University), National Bureau of Economic Research (NBER))
Release Date	April 2012
Research Project	Determinants of the Productivity Gap among Firms in Japan
DP No.	12-E-020
URL	http://www.rieti.go.jp/en/publications/dp/12e020.pdf

Allowing for three labor market settings, this paper relies on an extension of Hall's econometric framework for simultaneously estimating price-cost mark-ups and scale economies. Using an unbalanced panel of 17,653 firms over the period 1986-2001 in France, 8,725 firms over the period 1994-2006 in Japan, and 7,828 firms over the period 1993-2008 in the Netherlands, we first classify 30 comparable manufacturing industries in six distinct regimes that differ in terms of the type of competition prevailing in product and labor markets. For each of the three predominant regimes in each country, we then investigate industry differences in the estimated product and labor market imperfections and scale economies. We not only find important regime differences across the three countries, but also observe cross-country differences in the levels of product and labor market imperfections and scale economies within a particular regime.

Table: The type of competition in 30 industries in France (FR), Japan (JP) and the Netherlands (NL)

Industry	FR	JP	NL
Livestock seafood and flour products	IC-PR	IC-EB	PC-MO
Miscellaneous food and related products	IC-EB	IC-EB	IC-PR
Beverages and tobacco	IC-MO	PC-PR	IC-MO
Textiles	IC-EB	IC-PR	IC-PR
Clothing and skin goods	IC-EB	PC-PR	PC-PR
Wooden products	IC-PR	IC-EB	IC-EB
Furniture	IC-PR	IC-PR	IC-EB
Pulp, paper and paper products	IC-PR	PC-PR	PC-MO
Publishing, (re)printing	IC-EB	PC-PR	IC-MO
Chemicals	IC-PR	IC-EB	IC-EB
Organic chemical products	PC-MO	IC-PR	IC-PR
Pharmaceuticals	IC-PR	IC-PR	IC-PR
Miscellaneous chemical products	IC-PR	PC-PR	PC-PR
Plastics	IC-PR	PC-PR	IC-PR
Ceramic, stone and clay products	IC-EB	PC-PR	IC-MO
Steel	IC-EB	PC-PR	IC-PR
Metals	IC-EB	PC-PR	IC-PR
Architectural metal products	PC-PR	PC-PR	IC-EB
Other metal products	IC-EB	PC-PR	IC-PR
Special industrial machinery	IC-EB	IC-EB	IC-PR
General industrial machinery	IC-PR	PC-PR	IC-EB
Miscellaneous machinery	PC-PR	IC-PR	IC-MO
Industrial apparatus	PC-PR	IC-PR	IC-EB
Household electrical appliances	IC-PR	PC-PR	IC-PR
Other electrical machinery	IC-PR	PC-PR	IC-PR
Electronic parts and components	IC-PR	IC-PR	IC-EB
Motor vehicles	PC-PR	IC-PR	IC-PR
Other transport equipment	IC-PR	IC-PR	IC-EB
Precision instruments	IC-PR	IC-PR	IC-EB
Miscellaneous manufacturing products	IC-PR	PC-PR	IC-MO

Perfect competition (PC), Imperfect competition (IC)
Perfect competition or right-to-manage bargaining (PR), Efficient bargaining (EB), Monopsony (MO)

#06

New Industrial Policy

Program Director: OHASHI Hiroshi, FF, RIETI

Leading nations appear to have ventured into the formulation of strategies and policies that promote both their own domestic industries and companies in the global markets. This program will conduct research on formulating industrial policies in the aftermath of the Great East Japan earthquake with a view toward resolving issues being faced by the Japanese economy. It will take into consideration the roles played by product innovations, while also looking into the perspectives of, for example, environmental, energy, and resource policies, competition policy, as well as agricultural policy.

Introduction of Discussion Papers (DPs) published under the Program

DP Title Analysis of Alternative Fuel Vehicles by Disaggregated Cost Benefit

Author(s)	MANAGI Shunsuke (RIETI)
Release Date	May 2012
Research Project	Economic Analysis of Environmental, Energy, and Resource Strategies Following the Great East Japan Earthquake
DP No.	12-E-035
URL	http://www.rieti.go.jp/en/publications/dp/12e035.pdf

The future of both the automobile and the transportation industries has been of significant interest to many people. In this study, we investigate the economic validity of the diffusion of fuel cell vehicles (FCVs) and all-electric vehicles (EVs), comparing the benefit and cost for diffusion of alternative vehicles by employing cost-benefit analysis. We assume the amount of CO_2 and NOx emissions and gasoline use reduction as a benefit, by switching from internal combustion engine (ICE) vehicles to alternative vehicles; and the purchase amount, infrastructure expenses, and maintenance of alternative vehicles as a cost. We obtained data from two alternative fuel vehicles from an interview with an automobile maker in Japan. Considering uncertainties, we conducted a sensitivity analysis of the cost-benefit ratios. The scenarios used are the following: the progress of alternative vehicle production, the increase in CO_2 abatement cost, the increase in the price of gasoline, and the target year for diffusion. In summary, the results show that the diffusion of FCVs will not be economically feasible until 2110, even if their purchase cost is decreased to that of an ICE vehicle. The diffusion of EVs might be possible by 2060 depending on the increase in gasoline prices and the CO_2 abatement costs.

Table: Results of cost-benefit analysis in the case of diffusion of EVs (benefit/cost ratio)

Gasoline Price			Largest hike		Moderate hike		Constant	
Co2 Price			Hike	Constant	Hike	Constant	Hike	Constant
Ratio of decline in purchase cost	Slight decline	10 years later	0.28	0.28	0.25	0.25	0.22	0.22
		50 years later	0.76	0.69	0.6	0.53	0.43	0.37
		100 years later	1.49	0.86	1.19	0.64	0.88	0.4
	Decline to the firm's target level	10 years later	0.33	0.33	0.29	0.29	0.26	0.26
		50 years later	0.96	0.86	0.73	0.65	0.52	0.45
		100 years later	1.92	1.11	1.49	0.79	1.06	0.48
	Decline to the same level of gasoline vehicles	10 years later	0.41	0.41	0.36	0.36	0.32	0.32
		50 years later	1.32	1.19	0.97	0.86	0.66	0.57
		100 years later	2.78	1.6	2.01	1.07	1.35	0.62

Note) Red figures indicate that the benefits outweigh the costs.

Table: Results of cost-benefit analysis in the case of diffusion of FCVs

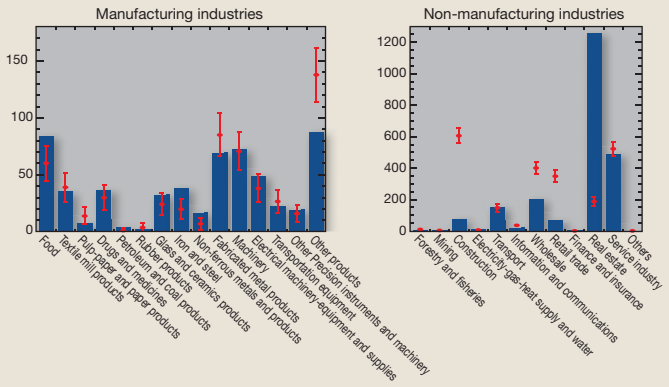
Gasoline Price			Largest hike		Moderate hike		Constant	
Co2 Price			Hike	Constant	Hike	Constant	Hike	Constant
Ratio of decline in purchase cost	Slight decline	10 years later	0.06	0.06	0.05	0.05	0.05	0.05
		50 years later	0.13	0.12	0.11	0.1	0.09	0.08
		100 years later	0.22	0.14	0.2	0.11	0.16	0.08
	Decline to the firm's target level	10 years later	0.09	0.09	0.08	0.08	0.07	0.07
		50 years later	0.2	0.18	0.17	0.15	0.13	0.11
		100 years later	0.34	0.21	0.3	0.17	0.25	0.12
	Decline to the price level of gasoline vehicles	10 years later	0.2	0.19	0.18	0.17	0.16	0.16
		50 years later	0.45	0.41	0.37	0.33	0.28	0.24
		100 years later	0.79	0.48	0.66	0.37	0.51	0.25

DP Title Distribution of Labor Productivity: Advanced small- and medium-sized firms

Author(s)	AOYAMA Hideaki (RIETI) IYETOMI Hiroshi (University of Tokyo) IKEDA Yuichi (Kyoto University) SOUMA Wataru (Nihon University) FUJIWARA Yoshi (University of Hyogo) YOSHIKAWA Hiroshi (University of Tokyo)
Release Date	July 2012
Research Project	Dynamics, Energy and Environment, and Growth of Small- and Medium-sized Enterprises
DP No.	12-J-026
URL	http://www.rieti.go.jp/jp/publications/dp/12j026.pdf

We shed light on the current status of small- and medium-sized (SMS) firms in Japan by studying their distribution of labor productivity on the basis of exhaustive financial data on one million firms. In fact, the labor productivity shows significant variance in disagreement with the prediction of the neoclassical theory. Here, we distinguish between SMS and large firms by the numbers of employees. The functional shape of the distribution of labor productivity enables us to extract SMS firms with high productivity from the main body in a simultaneous way; those advanced firms are very few, though. It is thereby an oversimplified idea that SMS firms are always of low productivity. We then find that the emergence of innovation in the non-manufacturing industry is quite different from that in the manufacturing industry. Technological revolutions take place with similar probabilities irrespective of business sectors in the manufacturing industry. On the other hand, three of the major sectors that should have led the Japanese economy,—construction, wholesale trade, and retail trade—seriously suffer from their low probability for innovation. Finally, we hope the present analysis contributes to the formulation of sound policies for the recovery of the Japanese economy.

Figure: Distribution of SMS firms with high productivity by industry (2006) compared with its expectation



DP Title Spillovers and Strategic Dynamics in Product Innovation: Some implications to innovation policy in Japan

Author(s)	ISOGAWA Daiya (University of Tokyo) OHASHI Hiroshi (RIETI)
Release Date	October 2012
Research Project	Basic Research for a New Industrial Policy
DP No.	12-J-034
URL	http://www.rieti.go.jp/jp/publications/dp/12j034.pdf

This paper estimates a dynamic oligopoly model of product innovation to evaluate an equilibrium effect of public policy on firms' innovation activities. The model considers a multi-agent Markov-Perfect Nash Equilibrium, allowing for firms' dynamic decision making on innovation activities and entry and exit. The estimation results obtained by using Japanese firm-level data on product innovation identify net positive spillovers among firms' dynamic innovation activities. Simulation exercises based on the obtained estimates indicate that, while the existing subsidies indeed encourage firms' innovation activities, they are far from optimal.

Table: Simulation result

	Distributed public subsidy (million yen)	"Effective" public subsidy among distributed amount	Ratio of innovation realization (%)	Firm value (million yen)
Current public subsidy	2417.7	1384.0	24.1	-17321.0
(standard deviation)	(0.30)	(1.67)	(0.43)	(1538.8)
Case in which no public subsidy exists			14.5	-20833.9
(standard deviation)			(0.58)	(442.7)
Difference	2417.7	1384.0	9.7	3513.0
(standard deviation)	(0.30)	(1.67)	(0.15)	(1096.1)

Note) Values are calculated as the average of the total of each market over a three-year period. This is the result of simulated analysis made under a virtual case setting of a distributed subsidy and corresponds to the current public subsidy and a case setting in which there is no public subsidy. "Effective public subsidy" is defined as the subsidy that has been distributed to firms that otherwise would not have implemented any innovation activities if public subsidy did not exist.

#07

Human Capital

Program Director: TSURU Kotaro, FF, RIETI

Amid the rapid aging of its society, intensifying global competition, and recovery from the Great East Japan Earthquake, utilizing its human resources is a significant key to Japan maintaining and strengthening its economic dynamism and increasing its growth potential, as a nation relatively lacking in natural resources. This program will carry out multifaceted, comprehensive research on measures for strengthening human capital and human resource capabilities, from a full life-cycle perspective including ideal labor market systems to increase worker incentive and ability, early childhood education through higher education, human-resources development in employment years, and utilization of elderly human resources.

Introduction of Discussion Papers (DPs) published under the Program

DP Title: Rising Wage Inequality Within Firms: Evidence from Japanese health insurance society data

Author(s)	SAITO Umeno Yukiko (RIETI) KOUNO Toshiaki (Fujitsu Research Institute)
Release Date	June 2012
Research Project	Economic Analysis of Human Resource Allocation Mechanisms Within the Firm: Insider econometrics using HR data
DP No.	12-E-039
URL	http://www.rieti.go.jp/en/publications/dp/12e039.pdf

Using a novel dataset compiled from Japanese health insurance societies covering about 1,500 firms and 15 million employees in total, we examine wage inequality within firms. Employing the mean log deviation approach to decompose overall inequality into within-firm and between-firm inequality, we find that wage inequality among male employees increased during the period we examine (FY2003-2007). Moreover, even after controlling for changes in the compositional structure of firms' employees, an increase in wage inequality within firms can be observed, which greatly contributes to the increase in overall wage inequality. These facts likely reflect the growing prevalence of performance-based wage systems.

Figure: Contribution to the change in overall wage inequality

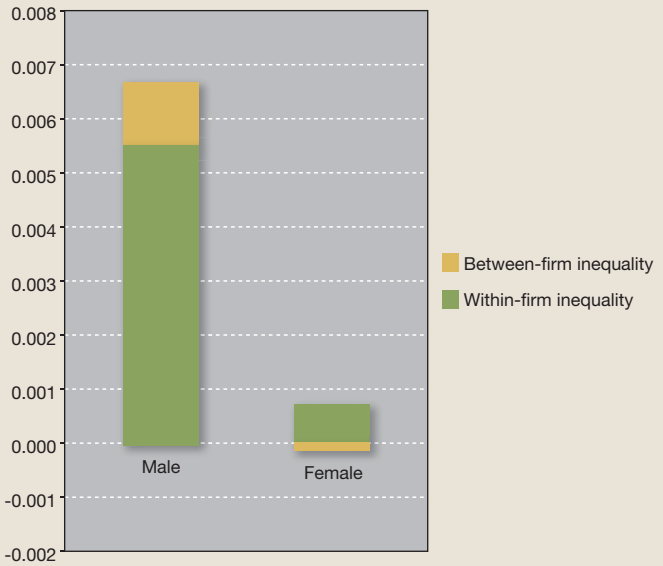
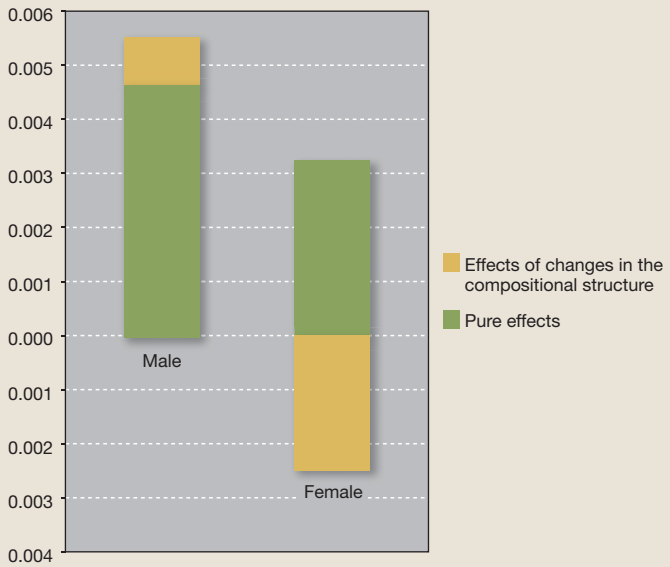


Figure: Contribution to the change in within-firm inequality



DP Title What Does a Temporary Help Service Job Offer? Empirical suggestions from a Japanese survey

Author(s)	OKUDAIRA Hiroko (Okayama University) OHTAKE Fumio (Osaka University) KUME Koichi (Nagoya University of Commerce and Business) TSURU Kotaro (RIETI)
Release Date	December 2011
Research Project	Reform of Labor Market Institutions
DP No.	11-E-077
URL	http://www.rieti.go.jp/en/publications/dp/11e077.pdf

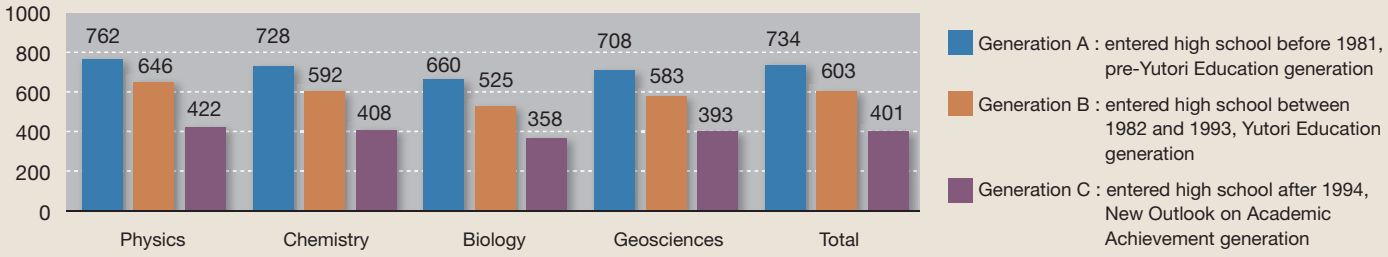
The aim of this paper is to test whether or not a temporary help service (THS) job benefits workers in Japan. By applying the average treatment effect on the treated estimation and its sensitivity tests to the Japanese survey data, we obtained the following findings. First, we observed evidence that THS work negatively impacts the probability of permanent employment in subsequent waves, when compared to directly hired part-time employment. Second, THS workers earn a significantly higher hourly wage than those originally unemployed. For those seeking permanent employment in particular, THS work provides a quick way to make a living for up to two years. We conclude that THS work in Japan has provided a means to obtaining quick earnings but has not offered a stepping-stone to permanent employment.

DP Title The Impact on Employment of Science Learning in High School: Evidence from income data of university graduates in employment

Author(s)	NISHIMURA Kazuo (RIETI) HIRATA Junichi (Ritsumeikan Asian Pacific University) YAGI Tadashi (Doshisha University) URASAKA Junko (Doshisha University)
Release Date	January 2012
Research Project	Fundamental Research for the Construction of a Vibrant Economy and Society in Japan
DP No.	12-J-001
URL	http://www.rieti.go.jp/jp/publications/dp/12j001.pdf

In this paper, we examined the impact of changes in the content of science learning on the formation of personal capacity and on the competitiveness of workers in the labor market, by analyzing data on the incomes of university graduates. In order to analyze the impact of changes in the Guidelines for the curriculum, we divided the samples into three groups according to the curriculum applied to their high school education (pre-Yutori Education generation, Yutori Education generation, New Outlook on Academic Achievement generation). Our analysis showed that the younger the sampled subject, or, to put it another way, the lesser the emphasis on subject-based learning, the greater the negative effect on learning in the science subjects, manifesting itself in a tendency for students to adopt an unfavorable view of science subjects. Moreover, our results also showed that, in every generation, physics learning contributed to an increase in income, and further implied that physics learning was also a significant factor in the formation of earning capacity.

Figure: Average income of alumni with math and science majors categorized by preferred scientific subjects (10,000 yen)



#08

Social Security, Taxation, and Public Finance

Program Director: FUKAO Mitsuhiro, FF, RIETI

Japan has to maintain its economic dynamism in the face of its rapid aging population and low fertility rate. This program will carry out multifaceted, integrated research on Japan's social security system, taxation, and public finance. The research subjects include (1) an analysis of comprehensive panel data on the elderly, (2) possible reforms to the social security and taxation systems, (3) a proposal for combining carbon taxes and investment subsidies in energy conservation, (4) optimal fiscal policy measures for reconstruction from the recent earthquake, economic recovery, and fiscal consolidation, and (5) new forms of public services, including the "third sector."

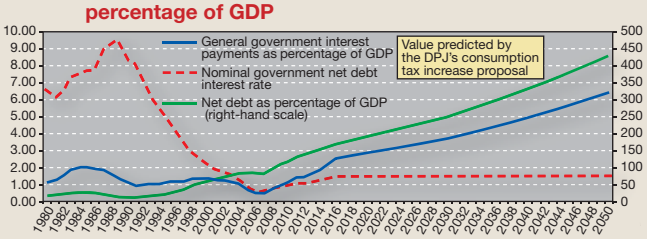
Introduction of Discussion Papers (DPs) published under the Program

DP Title The Sustainability of Budget Deficit in Japan

Author(s)	FUKAO Mitsuhiro (RIETI)
Release Date	June 2012
Research Project	Policy Mix for Fiscal Consolidation Without Harming Japan's Economic Recovery
DP No.	12-J-018
URL	http://www.rieti.go.jp/jp/publications/dp/12j018.pdf

After overviewing the performance of the Japanese economy since the end of the bubble era of the late 1980s, we estimate the potential growth rate of Japan by using a production function for its economy. We conclude that the potential growth rate is only about 0.5% due to the rapidly declining working-age population. Based on this estimate, we then provide a few scenarios for the future path of the debt-to-GDP ratio. We found that it is necessary to raise the consumption tax rate from the current 5% to at least 25% to stabilize the debt-to-GDP ratio. We also note that the net interest payments are likely to rise very rapidly in the near future because the government has depleted the benefit of declining interest rates since the 1990s. In the appendix, we analyze the effects of various monetary policy measures designed to stimulate the weak economy.

Figure: Projected general government interest payments as percentage of GDP



DP Title Option Value of Work, Health Status, and Retirement Decisions: New evidence from the Japanese Study on Aging and Retirement (JSTAR)

Author(s)	SHIMIZUTANI Satoshi (RIETI) FUJII Mayu (Hitotsubashi University) OSHIO Takashi (Hitotsubashi University)
Release Date	August 2012
Research Project	Toward a Comprehensive Resolution of the Social Security Problem: A new economics of aging
DP No.	12-E-050
URL	http://www.rieti.go.jp/en/publications/dp/12e050.pdf

This study examines retirement decisions in Japan, using the option value (OV) model proposed by Stock and Wise (1990) and examined by subsequent studies. This model assumes that individuals maximize a weighted average of utility from their labor income until retirement as well as that from their pension income afterward and determine the timing of retirement based on the OV of postponing it. Using micro-level data collected from the Japanese Study on Aging and Retirement (JSTAR), we computed the OV for each individual working in 2007 and examined its association with the retirement decisions made in 2009. We found that the probability of retirement correlates negatively with the OV and that healthier individuals are somewhat more sensitive to the OV. Furthermore, our simulations show that more generous parameters vis-à-vis eligibility for disability pension benefits slightly increase the probability of retirement, while reduced pension benefits have no significant impact.

#09

Policy History and Policy Assessment

Program Director: TAKEDA Haruhito, FF, RIETI

The objective of this program's research is to review and assess trade and industrial policy chiefly over the period from 1980 through 2000, as it looks at Japan's economy, society, and trade and industrial policies at the end of the 20th century.

At the same time the final two decades of the 20th century were a time of significant changes in Japan's economy and society, they also were a time of very major real and organizational changes in trade and industrial policy. This research will attempt to make clear how changes in trade and industrial policy at the turn of the century were effected, based on activities including assessment of the recognition of policy issues over the preceding quarter-century, choice of policy means in response, and their results. The research results are published as a series entitled "History of Japan's Trade and Industry Policy." The first volume of this twelve-volume series presents a historical overview and the remaining eleven volumes focus on trade and industry policy at each of the subordinate organs of the Ministry of International Trade and Industry. Volumes 3, 4, 5, 6, 8, 9, 10, 11 are already published as of December 2012, and the remaining volumes 1, 2, 7, 12 will be released shortly.

Introduction of Research Results under the Program

History of Japan's Trade and Industry Policy 3: Industrial Policy
Written and edited by OKAZAKI Tetsuji
April 2012

History of Japan's Trade and Industry Policy 8: Consumer Goods Industries
Written by MATSUSHIMA Shigeru
June 2012

History of Japan's Trade and Industry Policy 4: Commerce and Distribution Policy
Written and edited by ISHIHARA Takemasa
March 2011

History of Japan's Trade and Industry Policy 9: Industrial Technology Policy
Written by SAWAI Minoru
March 2011

History of Japan's Trade and Industry Policy 5: Location, Environment and Safety Policy
Written and edited by TAKEDA Haruhito
June 2011

History of Japan's Trade and Industry Policy 10: Natural Resources and Energy Policy
Written by KIKKAWA Takeo
July 2011

History of Japan's Trade and Industry Policy 6: Basic Industry Policy
Written and edited by YAMAZAKI Shiro
July 2011

History of Japan's Trade and Industry Policy 11: Intellectual Property Policy
Written and edited by NAKAYAMA Nobuhiro
October 2011

http://www.rieti.go.jp/en/

Research Institute of Economy, Trade & Industry, IAA