

RIETI

Highlight

2014
Special
Edition

48

Special Features

Regional Integration and Cultures in the Age of Knowledge Creation

—The Story of the Tower of Babel Revisited—
Masahisa Fujita, President, RIETI

Multilateralizing 21st Century Regionalism

Richard E. Baldwin,
Professor, International Economics,
the Graduate Institute, Geneva

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What is RIETI Highlight?

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.



Chairman's Statement

In 2013, we saw an indication of gradual improvement in the global economy. The economy in the eurozone began to pick up even as the grave debt crisis continued. The U.S. economy expanded enormously toward the year end due to a lively stock market and robust personal consumption.

The Japanese economy also grew rapidly in 2013, partly backed by the gradual improvement in the global economy, but due largely to Abenomics—a set of dynamic economic policies which include bold monetary and financial policies and growth strategies.

However, Abenomics is not a panacea for the revitalization of Japan's economy as its policies and strategies aim to support and restore the private sector's vitality. It means that only when the private sector's vitality is revived will we succeed in reinvigorating Japan's economy. Therefore, whether or not Abenomics can invigorate Japanese firms will draw full attention throughout this year.

As a policy think tank that conducts research to make policy proposals, the Research Institute of Economy, Trade and Industry (RIETI) has been implementing the third medium-term plan (fiscal 2011 to fiscal 2015). Under the plan, we place emphasis on the following Three Priority Viewpoints: i) incorporating growth of the world economy, ii) developing new growth areas, and iii) creating new economic and social systems for sustainable growth, which we invariably bear in mind when proceeding with research activities.

We continued to focus on the Three Priority Viewpoints in 2013, and actively conducted research and hosted symposiums on a variety of issues such as the quake revival, corporate competitiveness, human capital, trade and currency, and innovation, while examining overseas and domestic economic circumstances and the effects of Abenomics.

For 2014, invariably centering on the Three Priority Viewpoints, we will continuously engage in performing critical and in-depth analyses that are linked to the economy and industry. Over and above this, we will endeavor to conduct research and hold symposiums in response to trends in the economy both domestically



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)
His works are as follows: *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

and abroad, and enhance research collaborations with Japanese and foreign policy think tanks.

In our research activities, RIETI also focuses on disseminating our various research findings. We have been managing and providing databases to the public on the economy, industry, and social issues which are related to our research areas. We will constantly strive to be engaged more deeply in such activities in 2014.

In the special edition of the RIETI Highlight Vol. 48, our notable research findings and activities conducted in 2013 are unveiled and discussed under the title, "Review in 2013: Overlooking RIETI's activities and research findings"—not only our research programs but also symposiums and seminars, and popular content such as "Research Digest" and columns. We hope that this special edition will be helpful in spreading our research activities and findings and in deepening the understanding of trends in the global economy.

中島厚志

Atsushi Nakajima
Chairman, RIETI

About RIETI

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.

Keynote lecture at the 53rd European Regional Science Association Congress

Regional Integration and Cultures in the Age of Knowledge Creation —The Story of the Tower of Babel Revisited—

Masahisa Fujita

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

Palermo, Italy in August 2013, Masahisa Fujita, a leading economist in the field of spatial economics and President and Chief Research Officer of RIETI, delivered a keynote lecture entitled “Regional Integration and Cultures in the Age of Knowledge Creation—The Story of the Tower of Babel Revisited—” at the 53rd European Regional Science Association (ERSA) Congress. ERSA is the supranational association of national regional science across Europe. Its members are academics, policy professionals, and researchers who are interested in spatial economics and planning, regional and local development, and related issues. Fujita addressed that the fundamental resource in the Brain Power Society is the individual’s brain power, and that diversity would play a vital role in creation of new knowledge and development of innovation.

The purpose of my presentation is to give you an overview with regard to the importance of diversity and culture in the sustainable development of the global economy based on innovation and the creation of new knowledge throughout the world. I will speak on this in connection with the main theme of the congress of ERSA, namely, “Regional Integration: Europe, the Mediterranean and the World Economy.”

In the light of globalization concerning production and trade of traditional goods, no one would disagree that the lower the transport costs are, the greater is the efficiency. However, in the light of the development of the Brain Power Society, in which the creation of new knowledge or innovation has become the major activity of most countries and regions throughout the world, can we say that for the production and transfer of “knowledge” broadly defined, the lower the communication barriers are, the better is the outcome? In other words, is paradise for the Brain Power Society a world of effortless communication with no communication barriers?

The advantage of Europe is that so many diverse cultures, languages, and people are gathered in a relatively small region, which can enhance the development of Europe. Therefore, the motto of the European Union (EU) is “United in diversity.” In general, much as it is true that distance, space, and multiple languages erect barriers to communications, each region could develop its own unique culture and knowledge.

Why are diversity and culture important for the Brain Power Society?

The fundamental resource in the Brain Power Society is the individual’s brain power, namely, the knowledge in our brains. However, two brains that are exactly alike do not yield any synergy. Similarly, in the context of interregional and international cooperation for innovation, diversity in culture creates synergy in innovation activity.

There is an old adage that tells us, “With three ordinary persons together, splendid ideas will come out.” This can be set into practice when the three persons are different from each other in terms of their knowledge composition—new knowledge creation is attributable to the fusion of different knowledge through a common one. Despite the fact that these persons have sufficient differences in their knowledge composition when they meet for the first time, if they continue working together for too long, then their common knowledge expands relatively while the differential knowledge of each person shrinks gradually, and thus the synergy becomes increasingly less. Eventually, “after three ordinary persons meet for three years, no splendid ideas will come out.”

During the 1980s, the Japanese economy had been growing rapidly, and some people expected that the Japanese economy would surpass the U.S. economy soon and become the number one in the world. At that time, I was teaching at the Wharton School at the University



Profile

Masahisa Fujita's 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 Department of Economics, University of Pennsylvania (1994–95) and a professor at the Regional Science Department, University of Pennsylvania (1986–94). 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 Ikuo Kurosawa and Satoru Kumagai, 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.

of Pennsylvania, and people there were wondering what would be the secret of Japan's success. One answer to this is the so-called "nominication," or learning by drinking. People working in companies in Tokyo often go drinking together after work, and keep talking and communicating through sake or wine over a long evening. When Japan was in the process of catching up to the United States and European economies, I believe nominication contributed to Japan's success to a large extent.

In the early 1990s, what Japan, which became one of the top countries in terms of per capita gross domestic product (GDP), needed was a more diverse group of people for exploring the cutting edge of the knowledge frontier and innovation. On the contrary, however, too much close communication among Japanese people made them too homogeneous for the purpose of cutting edge innovation. How can we resolve the fundamental antinomy between the short-run effect and the long-run effect in knowledge cooperation? The story of the Tower of Babel might give us a clue to solve this problem.

According to the Book of Genesis in the Bible, once upon a time, somewhere in the Mesopotamian region, there was a powerful empire that spoke a single language. However, people there became too uppity and arrogant, and they started building a giant tower reaching toward heaven, thus challenging God. God became angry and confounded their language by introducing many different languages and scattered them upon all the face of the Earth, with each region speaking a different language. In terms of this story, I would like to pose a question: Was it a punishment or a blessing in disguise? Or, is it true that the world with a single culture can outweigh the world with many regions with different cultures?

In investigating this question, I pose a related question

on information communications technology (ICT). Does ICT really enhance knowledge productivity? The development of ICT, without doubt, has greatly enhanced the transfer speed of knowledge and information. On the other hand, each person has a limitation in absorbing new information and knowledge, and it is not obvious whether the development of ICT will advance or diminish the creativity of people.

Diversity and creativity —soft evidences

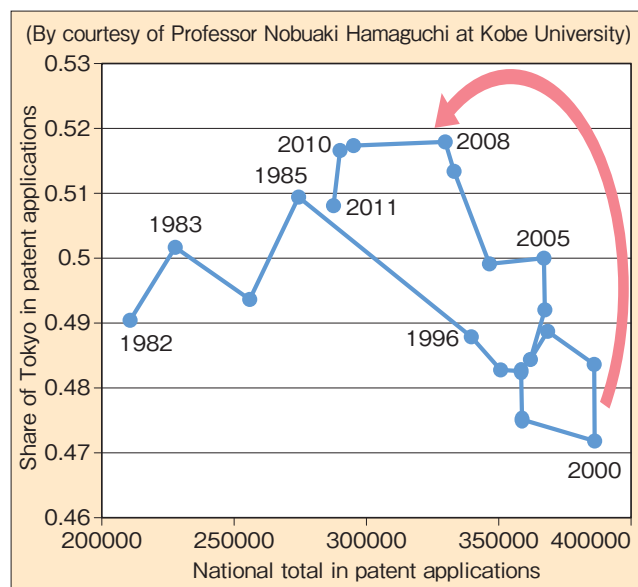
There are some soft evidences about the importance of diversity for creativity. One of them is an interesting article on Japanese culture by Yoko Tawada, an internationally renowned writer.

Tawada, who won the Akutagawa Prize and Tanizaki Prize in Japan, the most prestigious literature prizes in Japan, as well as the Lessing Prize and the Goethe Medal in Germany, was born in Tokyo but also lived in Germany for 26 years, writing both in Japanese and German. In the article, she answered, "While I was in Japan, nothing evolved from it, neither curiosity nor desire, I never thought much about my own culture; it's the difference between the two cultures that made me productive, not the Japanese culture as such."

It is interesting to compare the episode of Yoko Tawada to the effects of the shinkansen on Japan. The shinkansen opened in 1964, when the Tokyo Olympics were held, and contributed much to making Japanese culture homogeneous. Partly because of it, Japan eventually became monopolar, not only in terms of politics, business, and the economy, but also culturally dominated by Tokyo. Has the shinkansen contributed to enhancing the creativity of the Japanese society?

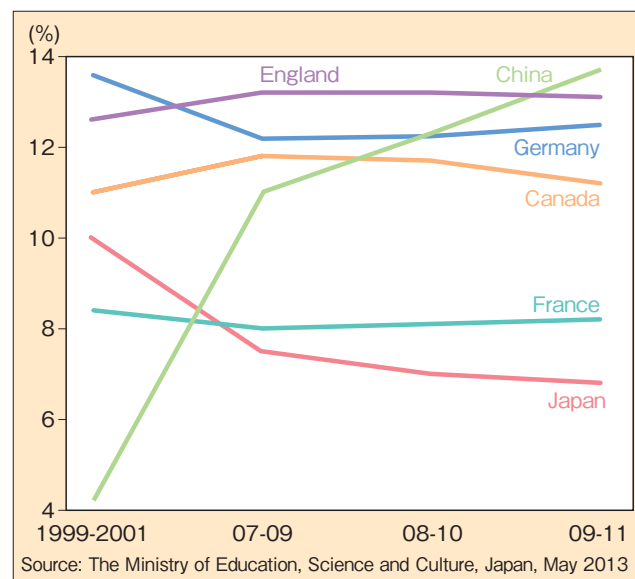
There are about 36 million people living in the Tokyo Metropolitan area, which is by far the biggest agglomeration of people in a single metropolitan area in the world. A survey shows that from 1982 to 2000, the total number of patent applications in Japan increased steadily, but since 2000, it has started decreasing steadily, while Tokyo's share in the applications kept increasing until 2008, and finally started decreasing just recently (Fig. 1). This suggests that excessive concentration of knowledge workers and cultural activities in Tokyo has been causing the Japanese people to become too homogeneous in terms of their knowledge composition, which in turn has caused the knowledge productivity of the Japanese people as a whole to decline. Indeed, the number of Japan's patent applications was at the top in the world until 2005, but it started declining in 2002. In contrast, the United States, China, and Korea have been growing rapidly in terms of patent applications. In particular, the United States surpassed Japan in 2006, and China is now at the top in 2011.

Figure 1: Tokyo concentration and patent applications in Japan



Furthermore, there is an interesting change in the share of each major country in the international papers with American co-authors (papers written under the co-authorship of Americans in the United States and non-Americans residing outside of the United States) over the last 10 years. The United States is the largest international hub of academic activities today. It is not surprising that English-speaking countries such as England and Canada have high shares. Interestingly, Germany also maintains a strong academic connection with the United States. In contrast, the Japanese academic connection with the United States has been declining relatively, indicating that the Japanese academic society is becoming relatively insular. On the other hand, the share of papers co-authored with Chinese scholars is increasing as fast as China's GDP growth (Fig. 2).

Figure 2: The share of each country in the international papers with American co-authors



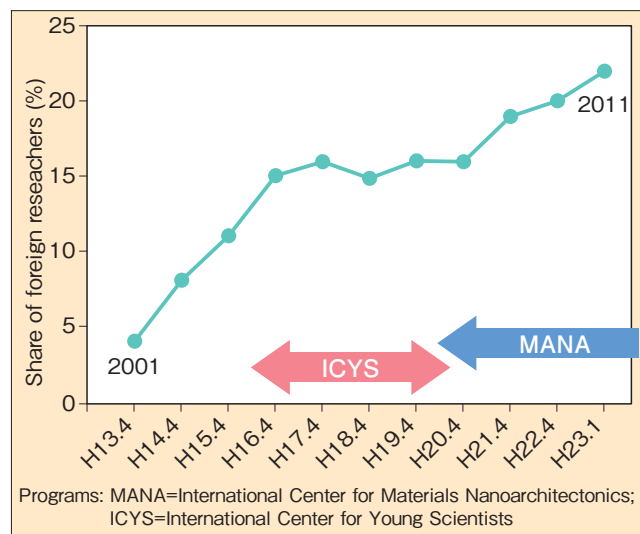
In a study by Professors Fritch and Graf from Jena University in Germany, two representative research cities in the former East and West Germany were compared. Each city has a population of about one million people with an elaborate network of research cooperation within the city or region. In comparing the cities, the links between the research institutions in each city are much denser in East Germany. According to the traditional explanation of the importance of knowledge-network density in research productivity, East German cities should have higher productivity. The actual result nevertheless is exactly the opposite. In terms of per capita patent registration, West German cities have about twice as many as that of East German cities. The dense internal linkage means the linkage with the outside world is rather weak, which is the opposite state of West German research cities. Their findings indicate that wider research cooperation can raise productivity.

Moreover, Ottaviano and Peri in a 2006 paper compared U.S. cities and concluded that, in terms of their wages, U.S.-born citizens are more productive in a culturally diversified environment. Similarly, Bellini, Ottaviano, and others compared European regions in terms of cultural diversity and economic performance. They demonstrated the positive correlation between diversity and productivity and that higher diversity brings about higher productivity.

Another good example of the importance of diversity for creativity is the data on the National Institute for Material Science (NIMS) in the research town of Tsukuba in Japan. NIMS has the largest number of foreign researchers—about 600. In 2004, NIMS was designated as a center for young researchers. Then, in 2007, it was designated as the International Center for Materials Nanoarchitectonics (MANA). Since then, NIMS has made great efforts to increase the number of

foreign researchers. The proportion of the number of foreign researchers, which, at the start of 2001, was less than 4%, now is approaching 25% (Fig. 3).

Figure 3: Share of foreign researchers at NIMS



Source: Ariga and Urao, "Productivity enhancement of a research institute through the contribution of foreign researchers," *Science & Technology Trends* No.127, January-February 2012, Ministry of Education and Science

As a result, NIMS has become one of the leading research institutions in the world in terms of citations in the field of material science. Before starting the real promotion of inviting foreign researchers, between 1994 and 2004, it was ranked 18th in terms of citations in materials science. After promoting internationalization, inviting many young foreign researchers, its ranking in terms of citations between 2007 and 2011 moved to the fourth place (Tab. 1). Furthermore, among the top 31 papers at NIMS, 24 were written collaboratively by Japanese researchers and foreign researchers. This represents a good example in showing how the diversification of knowledge workers has increased productivity in a research institution.

Table 1: World ranking in terms of citations in materials science

11 years before being designated as ICYS/MANA (Jan. 1994 to Dec. 2004)		Recent 5 years (Jan. 2007 to Jan. 2011)	
Institute	Citation	Institute	Citation
1 Max Planck Society	25739	Chin. Acad. Sci.	45576
2 Tohoku Univ.	23891	Max Planck Soc	16318
3 MIT	18568	MIT	11514
4 UC Santa Barbara	17338	NIMS	11266
5 Penn. State Univ.	15503	Natl. Univ. Singapore	11209
6 Chin. Acad. Sci.	15101	Tsing Hua Univ.	10436
7 Univ. Cambridge	14977	Tohoku Univ.	10291
8 Kyoto Univ.	13301	Georgia Tech.	9463
9 Osaka Univ.	12575	Ind. Inst. Tech.	9459
10 Russ. Acad. Sci.	12556	Univ. Manchester	9197
...			
18 NIMS	10474		

Source: Ariga and Urao, "Productivity enhancement of a research institute through the contribution of foreign researchers," *Science & Technology Trends* No.127, January-February 2012, Ministry of Education and Science

The issue of "cultural exception" is becoming a stumbling block in recent EU-U.S. trade talks. In June 2013, France successfully lobbied the EU to exclude cultural industries such as film, music, and television from the EU-U.S. trade talks. The United Nations Educational, Scientific and Cultural Organization (UNESCO) also reaffirmed the sovereign right of governments to adopt measures to protect and promote the diversity of cultural expressions. It is understandable that many countries want to protect their own cultural industries against big countries. However, the study on the global music consumption and trade since 1960 to recent years carried out by Ferreira and Waldfogel at the University of Pennsylvania shows that, contrary to growing fears about large-country dominance, substantial bias towards domestic music exists. They conjecture that the rapid development in ICT over the last half century helped the consumption of domestic music more than for foreign music. The important policy issue is how to enhance the creativity of cultural industries in each country or region, not how to protect them against foreign exports. When every country and region becomes more creative in the promotion of its own culture, the entire world would become richer culturally.

Modeling the dynamics of the Brain Power Society

My recent research work on modeling the dynamics of the Brain Power Society focuses on how the diversity of knowledge workers and the local culture develops endogenously, furthermore, how it is related with the growth rate of knowledge in the whole society and, consequently, with the growth rate of world economy. Among these questions, I concentrate on how the diversity of knowledge and local culture affects the growth rate of knowledge in the whole society.

I have conducted a joint research on the question above with Marcus Berliant at Washington University in St. Louis, and "Knowledge Creation as a Square Dance on the Hilbert Cube" is the first paper we have co-authored. The next paper represents the fusion with the endogenous growth theory and the dynamics of knowledge diversity. And recently, we extended this single-region model to a multi-region model, introducing culture and diversity in knowledge creation.

The square dance was very popular in the era of the Wild West in the United States. Square dancing in principle requires eight people. Each person dances with his/her partner and then quickly exchanges partners. There is a variety in the formations of eight persons. I have recently written three papers with Marcus Berliant. After all, we met only for three or four weeks per year. I worked with other people for the rest of time while Marcus Berliant also worked with other people. Thus, we are essentially

performing international square dancing in developing new papers, which is very typical in regional science and economics.

The figures from Peter Gordon's recent paper (2013) indicate that most people in regional science are square dancing in developing new papers. Among the papers published recently in the *Journal of Regional Science*, about 60% are collaborative papers. Moreover, among such papers published in 2010 and 2011, 45% are based on international collaboration, and about 30% are written by authors in different cities (Figs. 4 and 5). Over and above this, in the *American Economic Review* in 2012, 82% of the papers were co-authored, and in *Quarterly Journal Economics* in 2012, 88% of the papers were co-authored.

Figure 4: *Journal of Regional Science* author locations, 1959-2011 percentage of collaborative papers

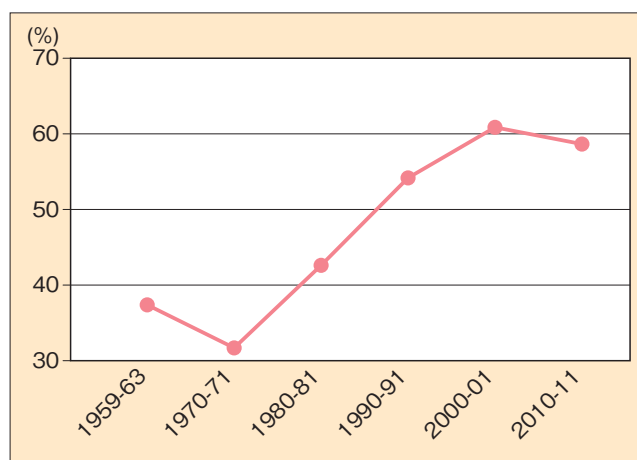
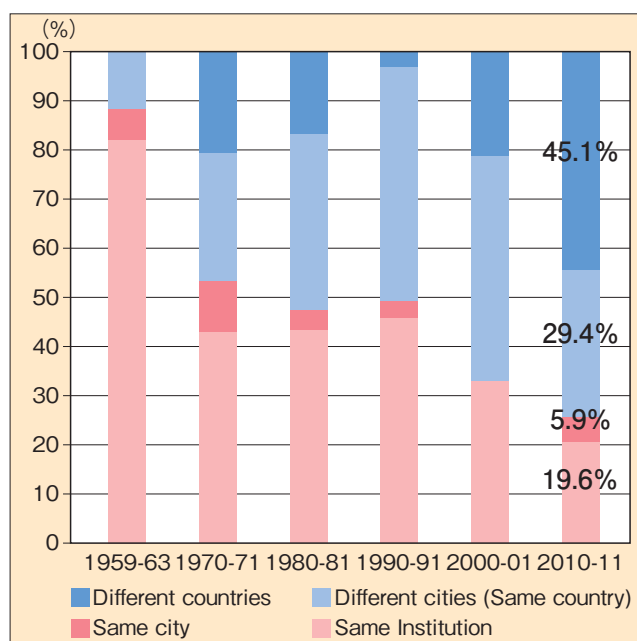


Figure 5: Types of collaboration (4 categories)



Source: Peter Gordon (2013), *Annals of Regional Science* 50, 667-84

Formalizing such an academic square dance in the real world will account for the basic idea of our culture and diversity model in the case of two regions. It is assumed that both region A (Japan) and region B (United

States) have the same number of knowledge workers or researchers. As knowledge workers and researchers in the same regions can easily communicate, intra-interaction is very dense. Because of the traveling time and cost, however, interregional research cooperation is not easy between the two regions.

Furthermore, there is much weaker knowledge transfer from region B, or the United States, to region A, or Japan, and vice versa. Few Japanese people read American newspapers and watch American television. If we take two typical persons in region A, their common knowledge is relatively large. The same applies to region B.

In contrast, if one person is taken from region A and region B respectively, then naturally their common knowledge is relatively much smaller. This means that, within each region, the common knowledge is large while internationally or interregionally differential knowledge is large. For creating incremental innovations, each region can achieve it within itself utilizing its large common knowledge. When it comes to exploring the cutting edge of the science frontier such as new biotechnology and real new software, diversity in knowledge workers is essential. In this case, international cooperation becomes very important because each region has a different culture, and there is large diversity between regions. In this way, the existence of spatial barriers in communications will contribute to enhancing the productivity of knowledge creation for the whole society.

The story of the Tower of Babel revisited

Reconsidering the story of the Tower of Babel, before the expulsion from the paradise of effortless communication, all of the 2N people were in one empire, enjoying effortless communication. In this context, so much common knowledge is being accumulated, and the capacity for absorbing common knowledge in comparison to the creativity of each person becomes relatively important. Assuming that this capacity is sufficiently large, as a consequence, the equilibrium point in the paradise of effortless communication is given in the red point in the figure, meaning much lower productivity than the bliss point.

Phase 1

God expelled 2N people from the paradise and divided them into two regions. Each region has N people and a different language. Just after the expulsion, not much happened because they still inherit the same culture. Given this situation, since the interregional cooperation decreases productivity, people in each region cooperate only internally. Furthermore, interregional knowledge

spillover is naturally weak. Therefore, sooner or later, each region develops its own culture.

■ Phase 2

In which the interregional difference in knowledge composition becomes large enough so that the productivity in the interregional cooperation becomes comparable to that in the intraregional cooperation. In the situation of Phase 2, each person in each region uses a certain proportion of time not only for intraregional knowledge cooperation, but also for interregional knowledge cooperation. Therefore, each person can accumulate both effectively large common knowledge within the same region and large differential knowledge between the two regions. As a consequence, they can gradually move upwards both in intraregional and interregional productivity.

■ Phase 3

They eventually reach the highest point in terms of the interregional productivity, which is called the “New Eden.” At this stage, every person achieves much higher knowledge productivity than in the original effortless communication paradise. Therefore, the growth rate of knowledge in the whole society at the New Eden is much higher than that in the original effortless communication paradise.

In Phase 2, interregional knowledge diversity as well as intraregional knowledge diversity increases gradually. This is because interregional interactions take place in a particular manner. Providing that, for example, Japanese economists work together with their American counterparts, the former is not working equally with every economist in the United States. In practice, American economists and Japanese economists form many different groups, such as the Harvard group, Yale group, Chicago group, Stanford group, and so forth, in which they closely work together because of group externalities. Within the same group, they enjoy strong group externalities, while intergroup externalities are relatively weak. Since all economists are divided into a large number of groups, for instance, Japanese economists also develop heterogeneity among themselves. This is why the interregional cooperation also promotes the intraregional knowledge diversity.

This example shows that, by breaking one region into two, the whole society can achieve a remarkable improvement in knowledge creation over the one region case. This can happen even when the interregional cooperation is rather costly.

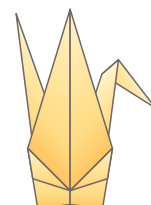
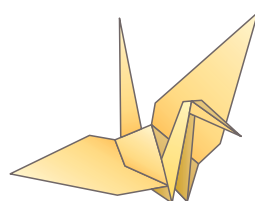
Let us recall our original question: Was the expulsion from the paradise of effortless communication to a multiregional, multilingual, and multicultural world a punishment or a blessing in disguise? The results of our model suggest that it was the latter.

Conclusion: Let hundreds of towers bloom

Are towers abhorrent to us? The tower constructed by a single empire might be no good for us. On the contrary, it is delightful to let hundreds of towers bloom all over the world, with each tower representing a unique local culture. Indeed, led by the Leaning Tower of Pisa, a countless number of wonderful towers have been built throughout the world. Animals can also build towers, and one ant species, for instance, can build an approximately 7-meter high anthill. I like the tower made of human beings, and there is such tower in Tarragona, Spain, which represents a real human collaboration. Finally, words from the epilogue of the famous book by August Lösch, *Die räumliche Ordnung der Wirtschaft* [Spatial Order of Economy] are cited here: “If everything occurred at the same time there would be no development. If everything existed in the same place there could be no particularity. Only space makes possible the particular, which then unfolds in time. Only because we are not equally near to everything; only because everything does not rush in upon us at once; only because our world is restricted, for every individual, for his people, and for mankind as a whole, can we, in our finiteness, endure at all. Space creates and protects us in this limitation. Particularly is the price of our existence.”



From the left, Prof. Roberto Lagalla of the Rector of the University of Palermo; President Fujita; Prof. Fabio Mazzola of the University of Palermo; Andrés Rodríguez-Pose, the president of ERSA for the next term



Multilateralizing 21st Century Regionalism

Richard E. Baldwin

Professor of International Economics, the Graduate Institute, Geneva

Brown Bag Lunch (BBL) seminars are held during lunch hours. RIETI invites Japanese and foreign guest lecturers and provide a venue for candid exchange of opinions on a variety of policy issues, transcending industry-government-academia boundaries. On July 4, 2013, Richard E. Baldwin, Professor of International Economics at the Graduate Institute, Geneva, gave his presentation on “Multilateralizing 21st Century Regionalism” in the seminar. A novel framework for thinking about the costs and benefits of multilateralizing various deep provisions were suggested in the presentation.

Today’s presentation will cover several key topics in relation to multilateralizing regionalism.

The first section will explain how 20th century and 21st century globalization are different and why this means that 20th century and 21st century trade are different. Following this, I will look at how and why 20th century and 21st century regional trade agreements (RTAs) are different. Finally, I come to the key point. Since 20th and 21st century RTAs are different, multilateralization of 20th and 21st century RTAs must be viewed differently. The main messages are that it is erroneous to consider multilateralizing 21st century regionalism (MR21) in the same light as multilateralizing 20th century regionalism (MR20). Having made this point, I admit immediately that I do not have all of the answers. More research is needed—specifically with regard to the legal content of the various 21st century RTAs around the world and the economic impact of the various provisions in them.

Traditional view of globalization

The standard way of understanding globalization at present is that a slow transition from a state of “no trade”—or autarky in economics jargon—to one of completely free trade. There are two key points in this traditional conceptualization of globalization. First, it is mostly about trade costs. Second, globalization can be viewed as a single process that has—with some important setbacks—been shifting the world from near-autarky before the Industrial Revolution to something approaching free trade. I assert that globalization is actually two distinct processes. The traditional view—with its focus on trade costs—was right up until the late 1980s or early 1990s. After that time, however, globalization should be considered as driven in part by a new process—although the traditional trade-cost process is still in effect.

Globalization as three cascading constraints

To explain this, it is useful to conceptualize globalization as governed by three constraints—not one. Before the Industrial Revolution, production and consumption were spatially bundled due to three types of costs: the cost of moving goods, ideas, and people. In the pre-globalized world, all three costs were very high, thus almost everything that was consumed in each village was made in the same village. This meant that the world was effectively broken down into village economies, each of which consumed almost all of its own production. The traditional view of globalization considers only the reduction in the cost of moving goods. The other two constraints also matter, but before turning to that, it is worth reminding you of the traditional globalization perspective.

First unbundling: Relaxing the transportation constraint

The first real shock came with the Steam Revolution. This produced a radical drop in the cost of transporting goods due to the development of steam-powered ships and trains. The cost of moving ideas became easier with telegraph and telephone, yet both remained extremely expensive. The cost of moving people was also still high and time-consuming. In a paper I wrote in 2006, I refer to this period in time as the “first unbundling,” that is to say, lower costs of moving goods allowed for the spatial unbundling of production and consumption. Once shipping goods over long distance became feasible, scale economies and comparative advantage reshaped the world’s economic geography. Industry concentrated in some countries and products were sold all over the world.



Professor Baldwin answered questions from seminar participants.

The separation of production and consumption, however, did not make the world flat in economic geography terms. Indeed, it was quite the opposite. Being able to sell to the world market favored firms that could achieve vast scale economies. These new industrial processes, however, were radically more complex than the old pre-globalization processes—think of the contract between a blacksmith's shop and a modern steel foundry. What this meant was that the second and third constraints became binding. In order to reduce communication and face-to-face costs, production was concentrated in factories and industrial districts. Thus, even as production dispersed globally, it clustered locally. This local clustering had very little to do with the cost of moving goods. It occurred due to the cost of moving ideas and people. In short, relaxing the transportation constraint led to a dispersion of activity internationally, but, as the communication and face-to-face constraints continued to bind, production was clustered at the sub-national level.

Second unbundling: Relaxing the communication constraint

The next big step came with a revolution in information and communications technology (ICT). This relaxed the communication constraint by radically lowering the cost of moving ideas. This, in turn, led to what I called the “second unbundling” in my 2006 paper. More directly, this meant that the factories themselves could be unbundled. Complex manufacturing processes could be broken down into several stages and organized from a distance. In other words, the ICT revolution allowed manufacturing to be offshored.

Critical differences between the first and second unbundling

The main difference between the first and second

unbundling lies in the nature of the cross-border flows. In the first unbundling, it was mostly goods crossing borders. In the second unbundling, many of the flows of goods, ideas, people, training, and investment that used to happen only inside factories now occurred across borders.

Two critical changes occurred when the ICT revolution related the second constraint. First, managerial, marketing, and technical know-how that used to

move only inside firms within a single nation was now moving internationally. This led to extremely rapid industrial growth in the handful of developing countries which received the offshored stages of production. This is why the impact of the second unbundling was so different than the first. The technology “transfers” that we always thought to be very important for development was now happening. But it was not a “transfer”—it was organized inside global value chains (GVCs), most of which were by multinational firms from the United States, Japan, and Germany. The recent sudden expansion of developing industry in such countries has come about due to the moving of ideas across borders, as opposed to how industry grew after the first unbundling. Trade was previously used for the purpose of selling goods. However, it is now more important as a means of producing goods. The second big change is that we have to start thinking of know-how as firm-specific, not nation-specific. Before the ICT revolution and the boom in offshoring manufacturing, it was convenient to think of a nation's technology as bundled together with its labor. Now that offshoring is easy, we see that a nation's technology is actually controlled by its firms, and these firms can now choose to combine their high technology with low-wage labor abroad.

Implications for trade

Now I will turn to the implications of these changes for trade. In the 20th century, goods were bought and sold across borders, and trade was relatively simple. In the 21st century, trade flows became more complex, and supply chain linkages were developed. This led to a reliance on each stage of a supply chain working smoothly and efficiently, much like a widely-dispersed factory. As tangible and intangible assets are now exchanged all over the world, property rights have become a necessity for 21st century trade. 21st century trade is clearly significantly different from 20th century

Profile

Richard Edward Baldwin has been a professor at International Economics at the Graduate Institute, Geneva since 1991, a part-time visiting research professor at the University of Oxford since 2012, Policy Director of CEPR since 2006, and Editor-in-Chief of Vox since he founded it in June 2007. He was Co-managing Editor of the journal *Economic Policy* from 2000 to 2005, and Programme Director of CEPR's International Trade programme from 1991 to 2001. Before that he was a Senior Staff Economist for the President's Council of Economic Advisors in the Bush Administration (1990-1991), on leave from Columbia University Business School where he was Associate Professor. He did his PhD in economics at MIT with Paul Krugman. He was visiting professor at MIT in 2002/03 and has taught at universities in Italy, Germany and Norway. He has also worked as consultant for the numerous governments, the European Commission, OECD, World Bank, EFTA, and USAID. The author of numerous books and articles, his research interests include international trade, globalization, regionalism, and European integration. He is a CEPR Research Fellow.



trade—not merely a continuation—as know-how and ideas are now a significant part of supply chains.

Another related yet significant factor involves the development of 20th century trade over time. In the late 1980s, production sharing and so-called “vertical specialization” trade within Europe, the United States, and Canada was common, but little of this occurred North-South. However, over the last 20 years, there has been a shift to North-South production sharing, including Asian nations. Yet, North-South production sharing has not been developing to the same degree across all sectors, and, in fact, growth in trade has mostly developed in the fields of electrical and mechanical machinery.

There are a number of factors to consider in how this understanding of 21st century trade could affect policy. Rather than considering simply one aspect of trade such as free trade agreements (FTAs), it is crucial that all trade disciplines are considered together as a package. Before starting on this line of reasoning, I should note that I believe that the case of China is quite different. A different set of rules apply to China since it can use its huge internal market as a lever to encourage offshoring even without providing legal assurances that come with deep RTAs.

Implications for trade policy

Due to its different nature—in particular its close association with production sharing—21st century trade requires different disciplines than did 20th century trade. These can be broken down into two main categories. The first is supply-chain disciplines. These are essential for connecting the geographically dispersed stages of production. They include not only liberal trade policy barriers but also excellent transportation services, guaranteed business mobility, and guaranteed communication services. Rather than thinking of supply-

chain disciplines in terms of lowering tariffs in order to sell more, thinking in terms of ensuring that each part of the chain can work smoothly and efficiently together may be more beneficial.

The second category of 21st century trade disciplines are offshoring disciplines. These refer to protection of companies’ tangible and intangible assets that they have placed abroad. This ranges from factors such as international investment to application protection of technology abroad and the local availability of business services. Looking at 21st century trade as being different from 20th century trade shows that these factors are also a part of modern trade which must be taken seriously as disciplines in their own right.

Trade policy as a package

Supply-chain and offshoring disciplines work best when packaged together. In relation to this, 21st century RTAs represent a convenient package. High-tech firms find such packages favorable and are willing to offshore some of the manufacturing jobs. In turn, developing nations that wish to join GVCs are generally willing to make certain concessions to be able to do so. Deep RTAs appear to be the solution in moving forward with 21st century multilateralizing of regionalism. The World Trade Organization (WTO) had issues with the Doha Development Agenda (DDA), and 21st century regionalism has developed consequently through the explosion of growth in bilateral investment treaties (BITs), deep RTAs, and unilateral liberalization in developing nations.

To introduce some basic statistics, the WTO database reveals that the number of RTAs began to increase significantly from around the mid-1990s. The number of related offshoring and supply-chain provisions in RTAs started to accelerate rapidly from around 1989,

and the number of BITs started to rise rapidly since around 1988. In the mid-1990s, developing countries started unilaterally lowering tariffs. This information paints a picture of 21st century regionalism as one of deep agreements, BITs, and unilateral liberalization. Developing countries have made their economies more business-friendly, although this is difficult to document prior to 2005.

Concrete examples of 21st century disciplines

In order to discuss more specifically the meaning of 21st century regionalism, the agreements which have been signed by the United States, Japan, and the European Union (EU) should be mentioned. In looking at the frequency of each provision in the United States in the WTO database, preference is clearly given to those which are both mentioned in WTO 1.0 along with having deeper RTAs in place. Examples of this include tariff cuts, Trade Related Aspects of Intellectual Property Rights (TRIPS), Trade Related Investment Measures (TRIMS), the General Agreement on Trade in Services (GATS), and public procurement. In terms of provisions which are not included in the WTO such as visa and asylum, movement of capital, and labor market regulation, there is actually a percentage of U.S. agreements which include such provisions as well. In the United States, a high percentage of bilateral agreements include the movement of capital and are legally enforceable.

Japan's RTAs in the WTO database tells a slightly different story from those of the United States. Japan has a much higher percentage of visa and asylum-related RTAs, with a similar percentage of movement of capital and investment provisions. The United States and Japan in particular use RTAs to underpin value chains. The value chains of the EU tend to be within the EU itself, and it does not have to sign such deep agreements as do Japan and the United States. As a result, it may have a much less clear interest in underpinning GVCs through RTAs, as the EU represents the ultimate RTA in itself. A pattern can be seen by investigating RTAs conducted by all countries in the world. The categories of visa and asylum, movement of capital, intellectual property rights (IPRs), investment, and competition policy have the highest rate of RTAs in the world as a whole, and it is easy to imagine that they are the most strongly related to the current GVCs.

With regard to supply-chain disciplines in RTAs, examples include customs cooperation, beyond WTO GATS liberalization, FTA of industrial goods, and visa disciplines. Examples of offshoring disciplines include TRIMS, GATS, TRIPS, competition policy, IPRs, investment, movement of capital, and the approximation of laws. As GATS is mentioned as both a supply-chain

discipline as well as an offshore discipline, it would be beneficial to research which aspect of GATS matches each discipline.

In summary, the traditional 20th century view of regionalism is that RTAs of FTAs are specifically related to tariff preferences, with a simple concept of political economy. However, 21st century regionalism is more closely related to disciplines which underpin second unbundling. Therefore, it could be argued that traditional analysis is insufficient and irrelevant for 21st century regionalism. It is now more appropriate to utilize regulation-economics as opposed to tax-economics in analyzing current 21st century regionalism. Furthermore, the basic political economy is different in 21st century regionalism than it was in 20th century regionalism. In 21st century regionalism, interest groups between countries are very diverse. Developing countries tend to aim to satisfy national industrialization strategies through FTAs, whereas in advanced economies, FTAs tend to satisfy the development of GVCs.

Multilaterizing 21st century regionalism

Having laid out the differences between the first and second unbundling and the associated types of trade and trade policy (what I called 20th century trade and 21st century trade), I turn now to the multilaterizing 21st century disciplines that are embedded in 21st century RTAs. Let us start, however, by recalling what multilateralization of 20th century RTAs involved.

Multilateralizing regionalism in the 20th century focused on extending tariff preferences, rules of origin, and rules of cumulation in order to reduce discrimination. The concept of multilateralization was to go from bilateral to multilateral agreements in gradual steps, eventually leading to worldwide free trade. 21st century RTAs still include a similar concept, but they also revolve around deeper disciplines that support global supply chains.

A key distinction between shallow and deep RTA provisions is that the latter is non-discriminatory, or at least much less obviously discriminatory. And this is by their very nature—not by policy design. At the heart of this lower degree of discrimination is the difficulty of ascertaining the nationality of companies, services, and intellectual property in today's interconnected world.

Nowadays, it is difficult to pinpoint specifically where the value-added originates or the nationality of companies. Of course, we all know that Sony Corporation is a Japanese company, but when it comes to the North American Free Trade Agreement (NAFTA), Sony USA is largely treated as a U.S. company as far as Mexico and Canada are concerned. This also applied to

capital as banks tend to operate on a multilateral scale. As a consequence, rules of origin on deep provisions are “leaky”—it is difficult to write an RTA provision on, for example, rights of establishment that limits the benefit to companies from the signing countries.

As a consequence, RTA provisions are fundamentally non-discriminatory. When two countries sign a FTA, it is not necessarily discriminatory toward other countries. In fact, such an agreement could even benefit other countries. As an example, the adoption of the euro was originally expected to lead to an increase in trade within Europe but a reduction in trade outside of the eurozone. However, the introduction of the euro led to an increase in trade both inside and outside of the eurozone as it became easier for the countries outside of the eurozone to do business with nations which all use the same currency. Rather than being discriminatory, the adoption of the euro could more accurately be described as slanted multilateral liberalization. Many 21st century RTA provisions arguably have similar features and effects.

Another aspect of multilateralizing regionalism in the 21st century is that preference margins in the real world are actually very small. In looking at the tariff preferences of the 20 largest economies in the world, a large number of them have more than half of their trade as duty free. Furthermore, when high tariffs of greater than 10% exist, they tend to be excluded from any FTA in which the country is engaged. As a result, between high tariffs being excluded from FTAs, which display no preference, and multilateralism, where no preference exists, preference margins are clearly smaller now than they were previously.

Recent estimates of trade creation and trade diversion due to RTAs have provided some interesting empirical evidence. In assessing them in relation to various trade agreements around the world, it was found that a trend of positive trade diversion exists in the majority of agreements. Of the few trade agreements which reflected negative trade diversion, the figures were very low. Only the Common Market for Eastern and Southern Africa (COMESA) and the Caribbean Community (CARICOM) agreements had high percentages for negative trade diversion, yet they also showed negative percentages for trade creation at the same time. These agreements could almost be thought of as anti-trade agreements as they reduce trade both inside and outside of the affected area.

The South African Development Community (SADC) represents an agreement which closely reflects the classic 20th century view on regionalism, where the numbers for trade creation are significantly positive and those for trade diversion are negative. This view would suggest that trade diversion is a problem issue, with trade creation being desirable. However, the state of trade diversion and trade creation in the SADC is generally

not reflected in the majority of other trade agreements. This is due to tariff preferences not being high and trade diversion and trade creation not being driven by market access. This information could be used to argue against the necessity of multilateralizing. However, based on this evidence, it may be beneficial to cease viewing FTAs simply in terms of trade diversion and trade creation. It would be ideal if this evidence could be analyzed in more detail in terms of comparing trade diversion and trade creation in individual provisions of trade agreements such as competition policy, investment, and GATS.

At present, there is a general lack of discrimination technology for deep RTA provisions. Supply-chain disciplines assure the rapid movement of goods, ideas, people, and capital, and the goal of developing nations is to foster supply-chain industrialization. Discrimination in trade agreements is not useful ordinarily. In other words, multilateralism is often embedded in deep RTAs. This is also another factor which should be considered in looking at multilateralizing 21st century regionalism. Furthermore, the origin of discrimination in RTAs is also difficult to determine for services, capital, firms, and communication. Liberalization is also often embedded in host nation regulations whose justifications exclude discrimination. As an example, if the United States were to get Colombia to change its labor laws, this would have an effect not only on the former, but also on any other nation conducting business with the latter.

More research needs to be conducted in a variety of fields. Assessing the impact of various RTA provisions on trade in goods, services, and investment through using the WTO database on provisions, the World Input Output Database (WIOD) on parts and components, and the data on foreign affiliates’ sales or employment to measure investment effects of various provisions would all be beneficial. Analysis of the WIOD could be used to see if trade in parts and components is affected by certain provisions, which in turn would provide for a better understanding of GVCs.



Another priority area would be to identify RTA provisions with negative spillovers for third nations. Perhaps there is a chance that certain investment provisions or capital provisions have discriminatory elements to them, and it would be very useful to pinpoint exactly where such provisions exist.

At this stage, it would also be good to start to search for network effects of RTAs. Most current research is on a bilateral level, although evidence shows that even bilateral agreements have an effect on a multilateral level. This, in turn, could lead to a better understanding of what could be gained from multilateralizing FTAs.

The goal of 20th century multilateralizing regionalism was to reduce discrimination. The goal of 21st century multilateralizing regionalism is to realize network externalities. At present, there are a few thousand BITs in existence. Japan itself has about 30 BITs. It would be simpler and more efficient to have only one BIT rather than several. Realizing such a network externality would lead to a more predictable environment, and it would also make it easier for developing countries to join such agreement. This entails a trade-off of determining an optimal level of harmonization and multilateralization. The downside of multilateralization is that diversity of situations and preferences between nations favor bilateral agreements instead, yet network externalities and sales economies favor multilateralization at higher-than-bilateral-level. It is essential to determine what elements should be multilateralized and to what extent. For example, if harmonization was low cost and low

gain, it would be a non-issue. However, if it is low cost and high gain, it could lead to a unilateral adoption of regional rules. As an example, the Harmonized Commodity Description and Coding System (HS) of the past meant that every country had its own system of trading classifications. Over time, it was deemed sensible and beneficial for countries to share the same classification system, thus this was developed and adopted unilaterally. This system allows for differences between countries below the six-digit level and is an example of harmonization at a certain level, which is also low cost.

In cases of harmonization with high cost and low gain, such as the legal alcohol limit for driving, it would be sensible to maintain national rules.

In turn, high gains from having regional rules would lead to hub and spoke regionalism, and high gains from global rules would result in unilateral adoption of rules at low cost, or mega-regional or global multilateralization at high cost.

In conclusion, in order to move forward with multilateralizing regionalism, finding agreement on minimum principles as in GATS, such as investment disciplines, infrastructure service openness, and deeper IPR disciplines is important. Furthermore, legal research on how different are the deep provisions in existing RTAs, and developing investment rules along with a WTO trade facilitation package for customs cooperation would also aid this process.

Question & Answer Session

Q Is there any hard empirical evidence showing that foreign direct investment and BITs are related?

A It is surprisingly difficult to show that BITs are related to foreign direct investment. Part of the problem appears to be that foreign direct investment is measured in terms of capital flows.

Q In terms of multilateralization, how important do you feel the Trans-Pacific Partnership (TPP) is? Also, what do you feel should be the guiding principles of FTA negotiations in Japan?

A Korea has signed some very deep trade agreements with the United States and the EU. The TPP could possibly look similar to those. If the TPP turns out to be multilateralized, it would surely be a success worldwide. Regarding FTA negotiations in Japan, the underlying commercial logic of GVCs is fundamentally asymmetric. With this in mind, the International Supply Chain Agreement (ISCA) seems to be a good institutional vehicle for multilateralizing FTAs in Japan and Asia.

Q You mentioned the FTA agreement between the United States and Korea as a possible template for the TPP. What is your view on the prospects of a potential Transatlantic Trade and Investment Partnership (TTIP) between the EU and the United States, particularly in the area of rules and regulations?

A Just to be clear, I actually do not think that the FTA between the United States and Korea should be used as a template. Rather, if I were to guess how I imagine a Japanese TPP would turn out, it would be similar to the U.S.-Korea FTA. Regarding the TTIP, it appears that it will not be easy to complete because a similar thing has been tried before. The EU and the United States have been discussing similar issues for about 60 years. There still has not been much of an evolution on hard issues in both the United States and Europe, unlike in Japan. I think that it is not likely that the TTIP will be completed if the TPP is not. In order for the TTIP to be successful, it would surely need the full support of people like David Cameron and Angela Merkel. Yet, it is unclear as to how much an agreement on making the TTIP would lead to regulatory convergence. There is some hope in that the globalization of production has led to a certain degree of standardization in parts and components. However, the fact that the TTIP is referred to as an agreement, rather than a partnership, is in itself revealing about its nature.

The Science of Japanese Personnel Management

—Rethinking employment systems in the era of globalization

On July 12, 2013, the international symposium entitled “The Science of Japanese Personnel Management—Rethinking employment systems in the era of globalization” was held. In order to maintain or improve competitiveness in the integrating global markets, a growing number of Japanese firms facing saturated domestic markets have been revising their personnel policies that were formed during the era of high growth. Changes in the legal environments in the areas of non-standard employment, extension of the mandatory retirement age, work-life balance, etc. are also pressing the reform. How are such changes affecting the way people work and the way workforces are being managed? Researchers from the Institute of Social Science of the University of Tokyo and RIETI have been analyzing personnel data in order to shed light on the relationship between personnel policies and the behaviors of employees and managers.



A keynote speech by Professor Edward P. Lazear

In this symposium, we shared some of our findings as well as discussed many related issues with leading economists including Edward P. Lazear, Jack Steele Parker Professor of Human Resources Management and Economics, Graduate School of Business, Stanford University, who has contributed enormously in forming the field of personnel economics, which studies employment systems quantitatively. He also delivered a keynote speech entitled “A Personnel Economics Approach to Productivity Enhancement,” in which Professor Lazear expounded on his view about correlation between productivity and personnel practices through personnel economics. Following the keynote speech, Alec R. Levenson, Senior Research Scientist, Center of Effective Organization, University of Southern California, gave his presentation concerning talent management for Japanese firms in the global market. Furthermore, Takao Kato, Professor, Colgate University / Visiting Professor, Institute of Economic Research, Hitotsubashi University, and Hideo Owan, Faculty Fellow, RIETI / Professor, Institute of Social Science, The University of Tokyo, presented findings from their research project, “Economic Analysis of Human Resource Allocation Mechanisms within the Firm: Insider econometrics using HR data” (www.rieti.go.jp/en/projects/program/pg-07/008.html). Finally,

through the panel discussion among economists from both Japan and the United States, we investigated important human resource management policy issues faced by Japanese firms and explore desirable personnel reforms.



Panelists in session

● Program ● (see: <http://www.rieti.go.jp/en/events/13071201/handout.html>)

13:00	Opening Remarks Hiroshi Ishida Director, Institute of Social Science, The University of Tokyo Welcoming Speech Makoto Ogawa Deputy Director-General for Labour and Human Resources, Economic and Industrial Policy Bureau, METI
13:15 - 14:00	Keynote Speech “A Personnel Economics Approach to Productivity Enhancement” Edward P. Lazear Jack Steele Parker Professor of Human Resources Management and Economics, Stanford University / former Chairman of the U.S. Council of Economic Advisors
14:00 - 14:20	Presentation “Global Talent Management for Japanese Companies in Developed and Emerging Markets” Alec R. Levenson Senior Research Scientist, Center of Effective Organization, University of Southern California
14:40 - 15:30	Research Report “Lessons from the Personnel Data Repository Project” Takao Kato Professor, Colgate University / Visiting Professor, Institute of Economic Research, Hitotsubashi University Hideo Owan Faculty Fellow, RIETI / Professor, Institute of Social Science, The University of Tokyo
15:30 - 15:50	Presentation “Toward the Diversity of Regular Employees Under the Polarization of the Japanese Labor Market” Kotaro Tsuru Program Director and Faculty Fellow, RIETI / Professor, Graduate School of Business & Commerce, Keio University
15:50 - 16:10	Presentation “Expanding Work Opportunities for Women and Support for Work-Life Balance: The roles of managers” Hiroki Sato Professor, Interfaculty Initiative in Information Studies and Institute of Social Science, The University of Tokyo
16:30 - 17:55	Panel Discussion “Challenges in Personnel Management for Japanese Firms in the Era of Globalization” Panelists (in alphabetical order): Edward P. Lazear Alec R. Levenson Hideo Owan Hiroki Sato Kotaro Tsuru Moderator: Daiji Kawaguchi Faculty Fellow, RIETI / Professor, Faculty of Economics, Hitotsubashi University
17:55 - 18:00	Closing Remarks Atsushi Nakajima Chairman, RIETI

Reduced policy uncertainty and the Japanese economy

Masayuki Morikawa

Vice Chairman & Vice President, RIETI



Reduced policy uncertainty can contribute to a country's economic growth. This column highlights the negative influence of policy uncertainty and political instability on the growth of Japan. A survey shows that international trade and tax policies pose the greatest uncertainty on Japanese companies. The column concludes with a discussion of the mechanism via which uncertainty affects corporate behavior.

While the effects of the “three arrows” of the Japanese Abenomics policy mix—bold monetary easing, flexible fiscal policy, and the growth strategy—have attracted worldwide attention, reduced policy uncertainty is also expected to contribute to the country's economic growth by stimulating long-term investments in the private sector.

Political stability and economic growth

When the two chambers of the parliament are controlled by different parties, or when the opposition controls the legislature under the presidential system, decision making on important policies is bound to be stalled or postponed. The recent “fiscal cliff” in the U.S. is a well-known example. In Europe, the government changes in the eurozone countries increased uncertainty over the fiscal policy, resulting in the instability of the euro. In Japan, political power was transferred from the Liberal Democratic Party (LDP) to the Democratic Party of Japan (DPJ) four years ago, but the LDP regained control through the general election in December 2012. However, the Diet had been in a flux until summer 2013. During these government changes, certain economic policies, such as those related to tax, social security, and the labor market, have fluctuated.

A series of empirical studies have shown that political instability and frequent changes in governments have a negative impact on the national economy (Aisen and Veiga 2013). According to these studies, the economic impact of political stability is quantitatively massive, far exceeding those of major growth policies, such as trade liberalization and corporate income tax cuts. Thus, there is a good possibility that the outcome of the House of Councilors election in July 2013, where the ruling coalition parties won the majority of seats, will serve as a significant driver of Japan's economic growth.

Many hurdles remain, however, and the Japanese government is faced with difficult policy decisions on a range of issues in which there are conflicts of interest among the Japanese people. In particular, it must:

- Lay out a clear path toward fiscal sustainability;
- Reform the social security system; and
- Negotiate the Trans-Pacific Partnership (TPP) and other economic partnership agreements (EPAs).

Whether or not the end to the divided Diet dispels the uncertainty over the future course of economic policies is a key determinant of the success or failure of the government's efforts to motivate companies to take positive actions.

Negative influence of policy uncertainty

Various research attempts have been made to examine the economic impact of uncertainty (Bloom 2009, Carrière-Swallow and Céspedes 2013). In particular, it has been found that policy uncertainty has a substantial negative impact on the real economy, such as the GDP, equipment investment, and employment (Baker et al. 2013).

Uncertainty about future economic policies and regulations has a significant influence on corporate management decisions with respect to medium- to long-term investment in equipment, research and development, business expansion overseas, human capital, and so forth. For instance, a country's corporate taxation rate affects the cost of capital—a key element in determining the profitability of investment. Labor market regulations—such as those for employment protection, temporary agency workers, and workers hired

on fixed-term contracts—affect the cost of employment. The social security system, which involves costs to companies in the form of employers' contributions, has a similar impact. Meanwhile, the government's policy for the TPP and other trade issues results in changes in the costs of international trade and direct investment, thereby affecting corporate decisions regarding business expansion in the global market. Since such investment is irreversible in nature and involves substantial adjustment costs, a wait-and-see strategy could be a rational choice for companies if the future course of policy is uncertain. Therefore, greater uncertainty about the future has a detrimental effect on investment and employment.

Which specific policies have created uncertainty?

However, most studies conducted to date have primarily analyzed the impact of macroeconomic uncertainty, and research delving into individual government policies and regulations has been scarce. In response to this gap in the research, we conducted an original survey of publicly listed Japanese companies to find out which specific policies have created uncertainty, the impacts of such uncertainty on management decisions, the types of management decisions that are strongly affected by uncertainty, and so forth. In what follows, I would like to outline the key points of our findings (see Morikawa 2013 for details).

■ First, we asked respondents to indicate the degree of uncertainty they feel over the future course of various types of government policies and regulations, such as tax policy, social security system, labor market regulations, corporate law and regulations, and international trade policy.

The results show that international trade policy poses the greatest uncertainty to Japanese companies, followed

sequentially by the social security system, environmental regulations, tax policy, and labor market regulations (see column (1) of Tab. 1).

■ Second, we asked to what extent their management decisions are affected by such uncertainty.

We found that uncertainty about tax policy has the greatest impact on corporate management decisions with nearly half of the respondents indicating that their management decisions are “significantly affected” by them. International trade policy and environmental regulations followed with the ratio of those “significantly affected” by their uncertainty at around 30%, and, subsequently, labor market regulations, corporate law and regulations, and social security system at around 20% (see column (2) of Tab. 1).

Mechanisms behind the negative influence of policy uncertainty

Uncertainty could affect corporate behavior in a broad range of activities, including:

- Equipment investment
- Innovation
- Mergers and acquisitions
- The hiring of new employees

Thus, we asked what type of management decisions are significantly affected by policy uncertainty. Cited by roughly two-thirds of the respondents, equipment investment is found to be most affected by uncertainty, followed by decisions regarding entry into, or withdrawal from, overseas markets; cited by nearly half of the respondents; and then decisions on the hiring of

Table 1: Economic policy and regulatory uncertainty and impact on business management (%)

		(1)High degree of uncertainty	(2)Significantly affected
1	Tax policy	13.5%	47.1%
2	Social security system	39.1%	19.7%
3	Business licensing system	7.6%	15.5%
4	Labor market regulations	11.1%	23.5%
5	Environmental regulations	15.2%	27.6%
6	Land use and zoning restrictions	4.9%	10.7%
7	Consumer protection laws and regulations	5.9%	9.7%
8	Corporate law and regulations	9.7%	22.6%
9	International trade policy	50.4%	30.2%

Source: The “Survey on the Outlook of the Japanese Economy and Economic Policy” by RIETI. The survey was conducted from February 2013 to March 2013.

Table 2: Management decisions significantly affected by policy uncertainty (%)

1	Equipment investment	65.9%
2	R&D investment	14.6%
3	ICT investment	4.5%
4	Advertizing	3.5%
5	Entry into or with drawal from overseas market	47.0%
6	Organizational restructuring (M&A, etc.)	24.0%
7	Hiring of regular full-time employees	27.5%
8	Hiring of non-regular employees	11.8%

Source: The "Survey on the Outlook of the Japanese Economy and Economic Policy" by RIETI.

permanent full-time employees and on organizational restructuring (see Tab. 2).

We then conducted a regression analysis to explain the relationship between policy uncertainty and the expected sales growth rate of companies. The dependent variable is the expected medium-term sales growth rate, and the main explanatory variable is the measure of policy uncertainty taken from the survey. After controlling for the industry characteristics and the trend growth rates of the individual companies, we found that policy uncertainty over tax policy, labor-market regulations, and environmental regulations has statistically and economically significant negative effects on the expected sales growth.

Concluding remarks

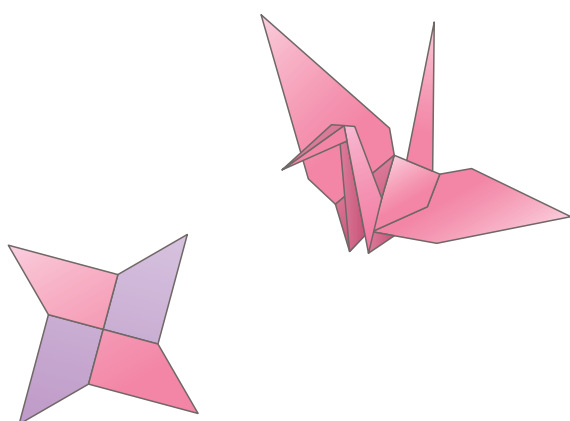
These findings suggest that the predictability of government economic policies and regulations is a critical factor in making long-term investment decisions. Improving the predictability of policies and regulations would significantly help revitalize the economy. Greater political stability will lead to the improved performance of the Japanese economy, putting an end to the prolonged stagnation

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Profile

Masayuki Morikawa is the Vice Chairman and Vice President, RIETI. He joined the then Ministry of International Trade and Industry (MITI) in 1982 and has held a variety of positions at the Ministry of Economy, Trade and Industry (METI), including as the Director of the Macroeconomic Affairs Division, Industrial Structure Policy Division and the Deputy Director-General of the Economic and Industrial Policy Bureau. He holds a Ph.D. in economics from Kyoto University. His area of expertise includes economic policy, industrial structure, and productivity analysis. His works include: "Demand Fluctuations and Productivity of Service Industries," *Economics Letters*, Vol. 117, No. 1, 256-258, 2012; "Productivity and Survival of Family Firms in Japan," *Journal of Economics and Business*, Vol. 70, November-December 2013, 111-125; "Economies of Density and Productivity in Service Industries: An Analysis of Personal Service Industries Based on Establishment-Level Data," *Review of Economics and Statistics*, Vol. 93, No.1, 2011, 179-192; "Labor Unions and Productivity: An Empirical Analysis Using Japanese Firm-Level Data," *Labour Economics*, Vol. 17, No. 6, 2010, 1030-1037. His more publications and papers are on: http://www.rieti.go.jp/users/morikawa-masayuki/index_en.html



What We Can Learn from the History of Government Debt

Arata Ito

Fellow, RIETI



Two big pieces of news about Japan's fiscal conditions made major headlines within a week in early August 2013. First, the government put forward the Medium-term Fiscal Plan on August 8, 2013. Then, on the very next day, came the Ministry of Finance's announcement that the government debt topped one quadrillion yen for the first time ever at the end of June 2013.

Many people may be starting to worry about the nation's fiscal future. As they try to decipher the government's fiscal reconstruction plan, it would be useful to have a deeper understanding of the characteristics observed in government debt trends in the past.

Government officials, such as those at the Cabinet Office and the Ministry of Finance who collect and analyze debt data over a long-term period, have in-depth knowledge about such characteristics. However, raw data and materials used for such analysis are not released to the public (Note 1), and it is not easy for ordinary people to access such data.

Thus, in a bid to be of help for those who are keenly interested in the long-term trends of the government debt, I would like to introduce some of the interesting aspects of Japan's public debt trends based on the data I have collected and compiled from various sources for research purposes.

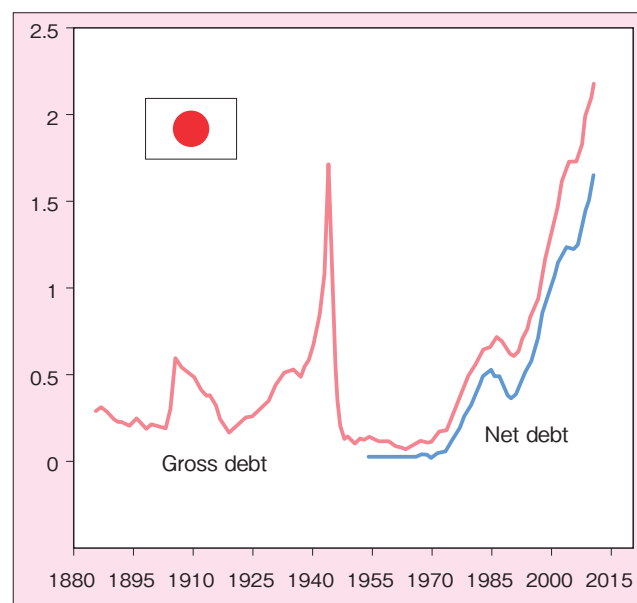
Government debt trends over the past 100 years and beyond

Figure 1 shows the changes in Japan's government debt from 1885 to 2011 as a ratio to the gross domestic product (GDP) (Note 2). Government debt includes not only that owed by the central government but also that owed by municipal governments (prefectures, cities, wards, towns, and villages) (Note 3).

The gross government debt-to-GDP ratio, which has had ups and downs over the period, has experienced three conspicuous upward trending periods, namely, the mid-1900s; from the latter half of the 1930s to the first half of the 1940s; and from the 1990s to date. The first and second uptrends were due to a temporary increase in

fiscal deficits resulting from the issuance of war bonds to finance the Russo-Japanese War and World War II respectively.

Figure 1: Government debt-to-GDP ratio



In the third and ongoing uptrend, the gross government debt-to-GDP ratio has been rising rapidly—though not as sharply as in the first two—and sustainably. This means that the rise is attributable to structural factors, namely, chronic fiscal deficits, making a striking contrast with the first two uptrends. In fiscal 2011, the ratio came close to 2.2, exceeding by far the highest record before the end of World War II, 1.7, posted in fiscal 1944.

Some scholars are critical about the use of gross debt as a measurement of the size of debt. They claim that net debt, calculated as the total amount of debt outstanding less the total value of financial assets held, should be

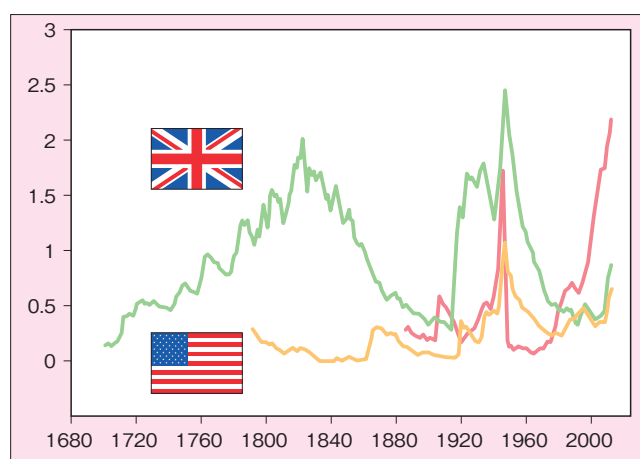
Table 1: Decomposition of changes in the debt-to-GDP ratio

Note: Figures in the table denote the per-year average during the sample period. Plus figures for the primary balance represent a deficit and minus figures show a surplus.

	Change in debt-to-GDP ratio [2]+[5]	Contribution of fiscal balance			Contribution of nominal GDP growth		
		[3]+[4]	Contribution of primary balance deficit	Contribution of debt service	[6]+[7]	Contribution of real GDP growth	Contribution of inflation
Period	[1]	[2]	[3]	[4]	[5]	[6]	[7]
1886-1905	1.1%	2.6%	1.7%	0.9%	-1.5%	-0.6%	-0.8%
1906-1916	-4.1%	-1.2%	-3.2%	2.0%	-2.9%	-1.3%	-1.7%
1917-1944	4.5%	8.5%	6.8%	1.8%	-4.0%	-0.9%	-3.1%
1945-1948	-46.3%	2.7%	2.0%	0.7%	-49.1%	6.2%	-55.2%
1949-1986	0.6%	2.1%	1.0%	1.1%	-1.5%	-0.9%	-0.6%
1987-1990	-2.0%	1.0%	-2.2%	3.2%	-3.0%	-2.4%	-0.5%
1991-2005	6.0%	6.3%	3.8%	2.5%	-0.3%	-0.9%	0.6%
2006	-0.1%	0.8%	-1.0%	1.8%	-0.9%	-2.1%	1.2%
2007-2011	7.6%	5.7%	3.7%	2.0%	2.0%	0.0%	1.9%

used as a measurement because economic entities usually hold financial assets—such as cash and deposits—as well as debt. For the purpose of comparison, both gross and net debt ratios to GDP are plotted in Figure 1. We can see that they generally follow the same trend though they differ in the level.

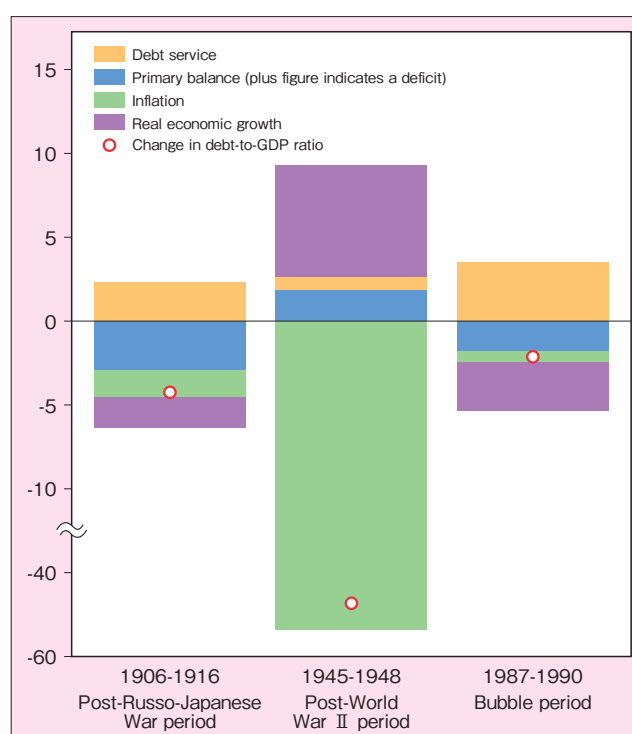
Figure 2 shows the gross government debt-to-GDP ratios of the United States, the United Kingdom, and Japan. Both the United States and the United Kingdom experienced a temporary sharp rise in the ratio during the two world wars. However, with the end of war, the upsurge was followed by a slow but steady downtrend in each case but more conspicuously in the period subsequent to the end of World War II, in which the gross government debt-to-GDP ratio eventually returned to the pre-war level in both countries. Japan also experienced a slow but steady downtrend from the latter half of the 1900s through the first half of the 1910s following the end of the Russo-Japanese War. However, the downtrend following the end of World War II was sudden and steep, a phenomenon not seen in the United States and the United Kingdom at any time over the past several hundred years of their history.

Figure 2: Government debt-to-GDP ratio of the United States and the United Kingdom

Characteristics seen in the downward trends in the government debt ratio

In Table 1, the change in the government debt ratio in each upward or downward trending period is decomposed into contributing factors. In the periods that saw a significant rise in the ratio, as indicated by a big plus figure in the second column, the government ran a large fiscal deficit without exception, providing supporting evidence for the characteristic mentioned in the preceding section. Interestingly, however, the table shows that the downward trending periods did not necessarily coincide with a fiscal surplus. Or, more precisely, it has been rather rare for them to coincide.

Needless to say, lowering the government debt ratio is one of the largest policy challenges for Japan. Looking into

Figure 3: Decomposition of changes in debt-to-GDP ratio during downward trending periods

what happened in the past downward trending periods might give us hints as to how we can and should tackle this formidable challenge. Figure 3 visually illustrates the characteristics observed in some of the downward trending periods based on the numbers in Table 1.

In the period following the Russo-Japanese War, a large primary balance surplus—i.e., current revenue less current expenditure excluding debt service—and sustained high economic growth on a nominal basis were the major contributing factors. The government back then implemented fiscal stimulus measures while, at the same time, maintaining strict discipline. This represents a successful case scenario for achieving a reduction in the government debt ratio by the best mix of fiscal reform measures and economic growth measures.

In contrast, the downtrend in the government debt ratio following the end of World War II was a result of a sudden fall in the yen's value which caused prices to soar and hence led to a sharp increase in nominal GDP growth. As indicated by the fact that the real GDP growth during this period of time was a contributing factor for an increase in the government debt-to-GDP ratio, the real economy was in a terrible state. This represents one of the worst case scenarios for reducing the government debt ratio.

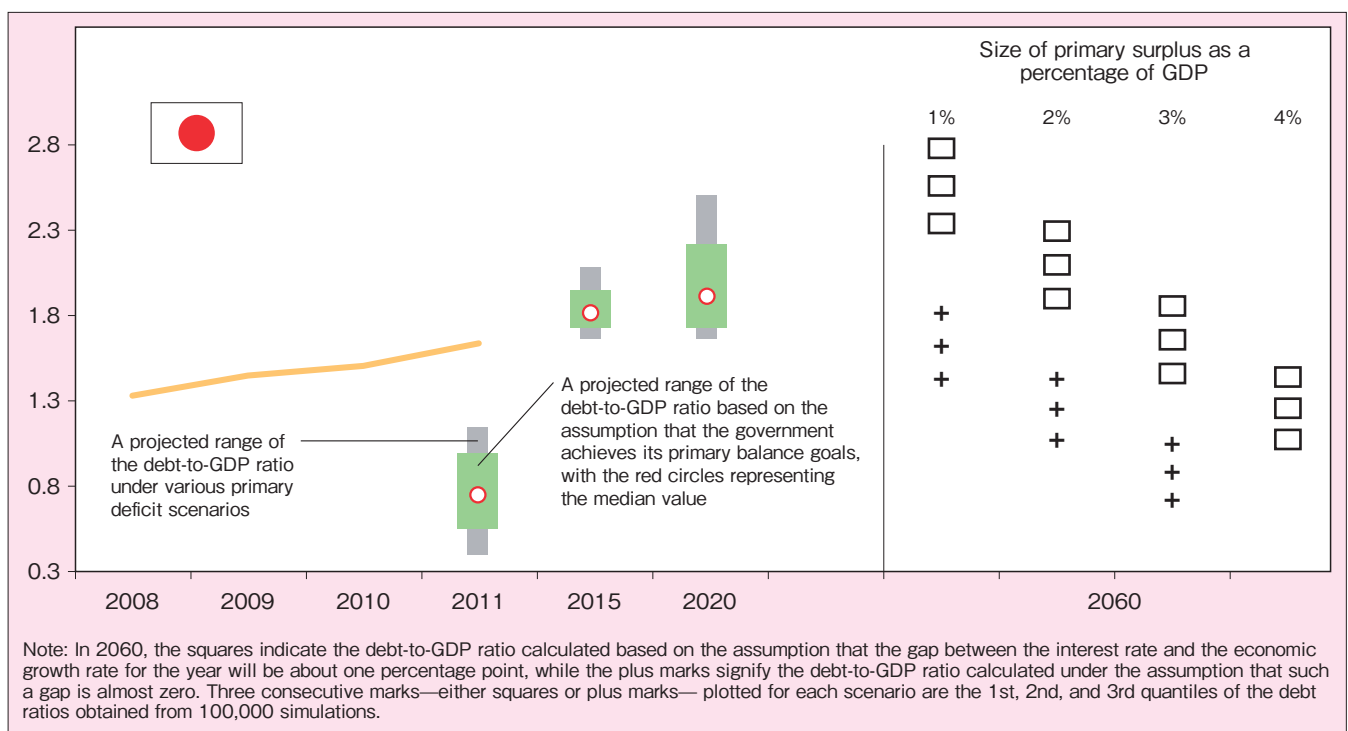
The latter half of the 1980s resembled the period following the Russo-Japanese War in that economic growth and a primary surplus were the main contributors to the decline in the government debt ratio, but the margin of decline was smaller due to a smaller primary surplus. As Table 1 shows, Japan's government debt ratio

fell only marginally in 2006. Both a marginal primary surplus that year and deflation that started in the second half of the 1990s contributed to this result.

As such, real GDP growth, inflation, and primary surplus are major contributing factors to a decline in the government debt-to-GDP ratio. If Japan is to lower the ratio, currently at a record high level, in an orthodox approach, it has no option but to make steady and continuous efforts to generate an adequate primary surplus on a sustainable basis. This is an important lesson from the history of government debt. Following the end of World War II, both the United States and the United Kingdom eventually succeeded in bringing down their high government debt ratios by making steady and continuous efforts to generate a primary surplus year after year over a long period of time.

In a bid to address the issues surrounding the first of the three contributing factors, or as a way to enhance Japan's real economic growth potential, the government of Prime Minister Shinzo Abe is vigorously promoting economic structural reform under its growth strategy dubbed as the "third arrow" of Abenomics. Meanwhile, in an attempt to end deflation and thus attain the second contributing factor, the Bank of Japan is taking bold monetary easing measures, which constitutes the "first arrow" of Abenomics. Lastly, in order to tackle problems inhibiting the achievement of a primary surplus or the third contributing factor, the government is committed to halving the primary deficit to GDP ratio by fiscal 2015 from the level in fiscal 2010 and turning the balance into a surplus by fiscal 2020, as set out in the Basic Policies for Economic and Fiscal Management and Reform

Figure 4: Future outlook on the debt-to-GDP ratio



endorsed by the Cabinet in June 2013.

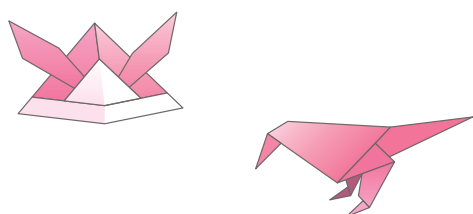
Future outlook of the government debt-to-GDP ratio

Plotted in Figure 4 are projected ranges for the net government debt-to-GDP ratio based on several different scenarios for future primary deficits. It shows that the net government debt would remain high as a ratio to GDP even if the goal of achieving a primary surplus by fiscal 2020 is fulfilled. But the pace of rise in the debt ratio would be significantly slower than that over the period from 2002 to 2011. On the other hand, if the government fails to fulfill its goal, the debt ratio may top 2.5 times.

The eventual goal of the government's fiscal policy is to decrease the government debt ratio. Suppose that the government achieves its goal of turning the primary balance into a surplus by fiscal 2020 and continues to generate a surplus in the years thereafter. Then, considering that the level of future debt ratios differs depending on the assumed difference between the interest rate payable and economic growth rate in the future, the government debt ratio would be brought below the 2011 level in 2060 provided that an annual primary surplus of at least 3.5% of GDP is to be generated over the period from the latter 2020s until 2060. Bringing the ratio further down to 1.0 would take another 30 years or more based on the most conservative scenario.

Some market participants cast doubt even on the possibility of the government achieving its goal for the first milestone period through fiscal 2015. A country's primary deficit can be decreased by an increase in tax revenue resulting from economic growth as well as by discretionary policy measures such as tax hikes and spending cuts. The latter holds the key to reducing and eventually eliminating Japan's primary deficit because, as discussed above, the ongoing increase in government debt is chronic and structural in nature.

The Medium-term Fiscal Plan is expected to be revised and finalized after Prime Minister Abe makes the final decision on whether or not to raise the consumption tax in April 2014 as scheduled. The focus of attention now is whether the Abe government can come up with a convincing set of concrete and effective measures to fundamentally change Japan's fiscal and economic structure which is chronically dependent on debt.



Notes

1. Some international organizations conduct analysis from a similar viewpoint. For instance, see the October 2012 issue of the *World Economic Outlook* by the International Monetary Fund (IMF).
2. Figure 1 does not include any graph representing the amount of debt outstanding because it is not appropriate as a measurement of the size of the debt burden as explained as follows: Consider two households A and B, each holding 20 million yen in debt, and suppose that household A earns an annual income of four million yen and household B 12 million yen. In this case, the burden of repaying the same amount of debt is much heavier for household A than for household B. As such, it is more appropriate to measure the size of the government debt in relative terms, i.e., as a ratio to GDP, rather than in terms of absolute amount.
3. In addition to debt held in the central government's general accounts and local governments' ordinary accounts, some parts of debt held in the central government's special accounts and local governments' public management business accounts are included in government debt. Specifically, debt held in those accounts classified into General Government in the System of National Accounts (SNA) is included in government debt. As for the central government, debt within the Special Account for Social Infrastructure Improvement and the Special Account for Energy Measures is treated as government debt, but debt in the Special Account for Fiscal Investment and Loan Program Funds is not included in government debt. As for municipal governments, debt in Public Management Business Accounts is counted as government debt.

Profile

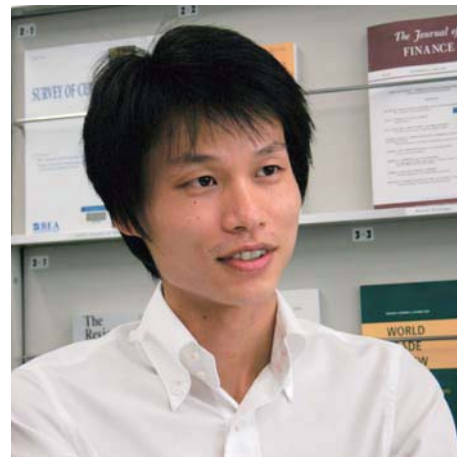
Arata Ito has been a fellow at RIETI since 2013, and:
2012 Project Academic Support Specialist, Graduate School of Economics, The University of Tokyo;
2009 Research Associate, Institute of Economic Research, Hitotsubashi University.

His works are as follows: "A New Monthly Index of Real Economic Activity in Japan," The University of Tokyo, 2012 (in Japanese); "Fiscal policy switching in Japan, the US, and the UK," (with Tsutomu Watanabe and Tomoyoshi Yabu) *Journal of the Japanese and International Economics*, Vol. 25, No. 4, 2011, 380-413; "Measuring Tax Multipliers in Japan," (with Tsutomu Watanabe and Tomoyoshi Yabu) In Ihori, Toshihiro (Ed), *Fiscal Policy and Social Security*, Keio University Press, Tokyo, 2010, 143-177 (in Japanese).

Is the negative impact of FDI real? Empirical evidence from Japan

Ayumu Tanaka

Research Associate, RIETI



Policymakers fear the negative employment effects of foreign direct investment. This column provides recent empirical evidence on FDI and domestic employment. The results show that FDI has positive effects on domestic employment. Furthermore, our new empirical research finds a non-negative relationship between Japanese firms' foreign activities and their suppliers' domestic employment.

The Japanese government is concerned about the so-called “hollowing out of manufacturing,” referring to the negative effects of FDI on domestic employment. A typical story is described below.

“Japanese firms face severe competition with firms in low-wage Asian countries such as China, Korea, and Taiwan. Many Japanese firms, therefore, establish their overseas subsidiaries in low-wage countries, which results in the manufacturing workers in Japan losing their jobs. To protect them, it is necessary for the government to subsidize Japanese firms.”

In the 2000s, the fear of hollowing out grew among policymakers for many reasons, including a strong yen and a high corporate tax rate. After the Great East Japan Earthquake in 2011, an electricity supply problem also arose due to the shutdown of the nuclear power plants, which exacerbated the fear of hollowing out.

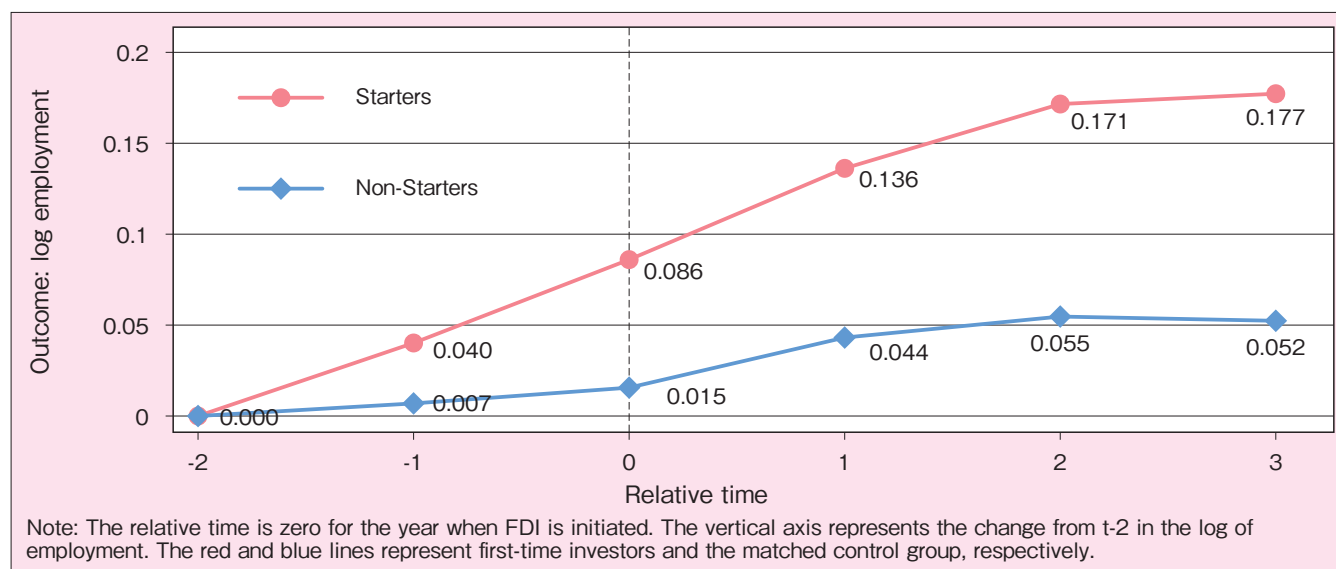
The government subsidizes firms which establish new plants inside Japan. Following the earthquake the government provided additional financial support for firms. The Ministry of Economy, Trade and Industry (METI) provided subsidies reaching approximately 300 billion yen (\$3.85 billion) to 510 firms to remain in the country.

Before examining whether these policies are adequate, we investigate whether or not FDI has a negative employment effect.

Empirical evidence from Japan

Several empirical studies investigate the employment effects of FDI and offshoring. Most studies have found either positive or non-negative employment effects (Note 1).

Figure 1: Impact of FDI on the log of employment in manufacturing (Tanaka, 2012)



My recent study examines the employment effects of FDI using comprehensive firm-level data from the Basic Survey of Japanese Business Structure and Activities (METI, 2001–2008). I compare firms that initiated FDI to those that did not using propensity score matching (PSM).

Figure 1 shows the average employment growth of FDI starters and non-starters in the Japanese manufacturing industry. The FDI starters' average employment growth rate is 17.7%, while that of the FDI non-starters is 5.1%. Therefore, the estimated average effect of FDI on employment is 12.6%.

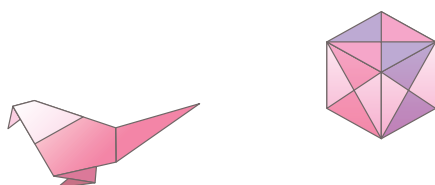
The results indicate that the impact of FDI on employment in the Japanese manufacturing industry in the 2000s was positive rather than negative. The positive employment effects of FDI are accompanied by positive effects on exports and domestic sales by the parent firms in Japan. This suggests that the relationship between domestic and overseas activities by Japanese firms is complementary.

Another study I conducted with Keiko Ito (Ito and Tanaka 2013) sheds light on the impacts of FDI on domestic suppliers. We identified the transaction relationship among Japanese firms using a database provided by Teikoku Databank and constructed a firm-level database which contains basic information on Japanese firms and their foreign subsidiaries and domestic suppliers. Our results show that, on average, Japanese firms' foreign activities are positively — or at least non-negatively — related to their domestic non-multinational suppliers' employment. This new finding implies that firms that supply their products to multinational firms can enjoy positive employment effects.

Policy implications

Empirical evidence does not support the hollowing out of manufacturing or a negative employment impact of FDI on the Japanese manufacturing industry. Rather, FDI shows positive employment effects. The implication is that policy which lowers firms' incentives to invest abroad is not adequate for increasing domestic employment.

Authors' note: Tanaka (2012) and Ito and Tanaka (2013) are outputs of a project on international trade and investment undertaken by the Research Institute of Economy, Trade and Industry (RIETI).



Note

1. Barba Navaretti et al. (2009) find such a result for Italy and France, Castellani et al. (2008) for France, Desai et al. (2009) for the U.S., Hijzen et al. (2011) for France, Yamashita and Fukao (2010) for Japan, and Wagner (2011) for Germany.

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Profile

Ayumu Tanaka has been a research associate at RIET since 2013, and was a fellow at RIETI in 2010. His works include: "Firm Productivity and the Number of FDI Destinations: Evidence from a Non-parametric Test," *Economics Letters*, Vol. 117, No.1, 1-3, 2012; "The Causal Effects of Exporting on Japanese Workers: A Firm-Level Analysis," RIETI Discussion Paper, No. 12-E-017, March 2012, 1-27; "Multinationals in the Services and Manufacturing Sectors: A Firm-level Analysis using Japanese Data," RIETI Discussion Paper, No.11-E-059, July 2011, 1-44.

Re-estimating the Rate of Deflation in Japan

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While Japan has been undergoing deflation over a long period of time, the corresponding rate has been fairly moderate—about 1% annually. This situation differs from the price plunge observed in the United States during the Great Depression before World War II, a well-known case of deflation in a developed country. Given this inexplicable phenomenon of “moderate deflation,” it is not surprising that some people overseas have been questioning the reliability of Japan’s price statistics, particularly the consumer price index (CPI).

To answer their questions squarely, Professor Watanabe, a faculty fellow, and his co-authors conducted a verification of the statistical reliability of the CPI prepared by the Ministry of Internal Affairs and Communications (MIC) through such means as trying to reproduce the CPI using an enormous volume of point-of-sale (POS) data. Furthermore, based on a comparison of the reproduced CPI with the price index calculated according to the U.S. practice, a cautious attitude is essential in the judgment as to whether or not to overcome deflation.

—The original title of the paper is “How Fast Are Prices in Japan Falling?” Could you tell us your purpose for writing this paper?

In Japan, deflation has been continuing since the mid-1990s. While this is obviously a major problem not only for Japan but also for the global economy, the CPI shows that the deflation rate has been about 1% every year, or about 2% at the highest during the most rampant periods.

Although there have been a very limited number of cases of deflation in a developed country, one such case occurred in the United States during the Great Depression in the 1930s, where an annualized 7% price plunge was observed. Compared to this, the present deflation in Japan can be considered as a moderate price decline continuing over a very long period. The fact that deflation has not been so rapid in Japan while people have claimed that the country has been suffering from a stagnant economy for more than a decade is drawing close attention among researchers and businesspersons overseas as well as domestically.

The cause of this phenomenon has been discussed for years by policymakers and researchers. Their views vary, among which there is a skeptical view regarding the reliability of Japan’s price statistics themselves, claiming that “the deflation rate is only apparently low due to the inaccuracy of the CPI calculation by the MIC.” This perspective seems to be prevalent, particularly in Europe and the United States.

Thus, while deflation in Japan has been moderate, we intend to identify whether this inexplicable phenomenon



of moderate deflation, in which there have been sluggish price falls, is attributable to statistical issues or other factors.

—What methods did you adopt to verify the reliability of the statistics?

There are two possible methods for verifying the reliability of the statistics themselves. One method is to review each data point used for the preparation of the CPI by the MIC and examine whether they

are appropriate. However, it is difficult for external researchers to access easily the details of the data and the statistics actually used for the CPI preparation. Even if such in-depth information was available, it would be difficult to determine their validity.

For the second method, we aim to prepare a price index of our own in consideration of the MIC methods for CPI preparation while using a data source that is different from that used for the CPI prepared by the MIC.

Analysis based on sales-related information amounting to 3.6 billion data entries over 10 years

—Is it challenging to prepare a new price index?

In fact, we tried to calculate the price index a few years ago, but gave up during the process. The MIC has been publishing its CPI preparation methods, but the details of each method involve many technical issues which are not described in the text. We proceeded with this task while confirming the issues step by step by contacting the MIC, but unfortunately we had to discontinue the process because the task was too complicated and time-consuming.

However, given the current situation in which researchers and businesspersons in Europe and the United States have publicly expressed their skepticism about the reliability of Japan's CPI in overseas academic meetings, we considered it beneficial for not only researchers but also policymakers to verify the reliability of Japan's CPI using data other than that used by the MIC. Thus, we continued to approach the MIC for its cooperation.

Of course, it was not certain at the start of the research

as to whether the final results would be favorable to the MIC, given the academic nature of the research. Obviously, it was not an option to carry out analyses that were biased in order to obtain the cooperation of the MIC. However, we have successfully obtained the cooperation of the relevant department of the MIC by sharing the view that “it is necessary in the first place to investigate the actual conditions.”

Mr. Imai, a co-author of the paper, is in charge of consumer price-related systems in the Statistics Bureau of the MIC. It is unusual for researchers and the person who is actually preparing the statistics to work jointly with all of their proprietary information disclosed to each other as we did in this research. In this regard, the fact that our collaboration was very successful is a valuable achievement for similar analyses in the future.

—What data did you use?

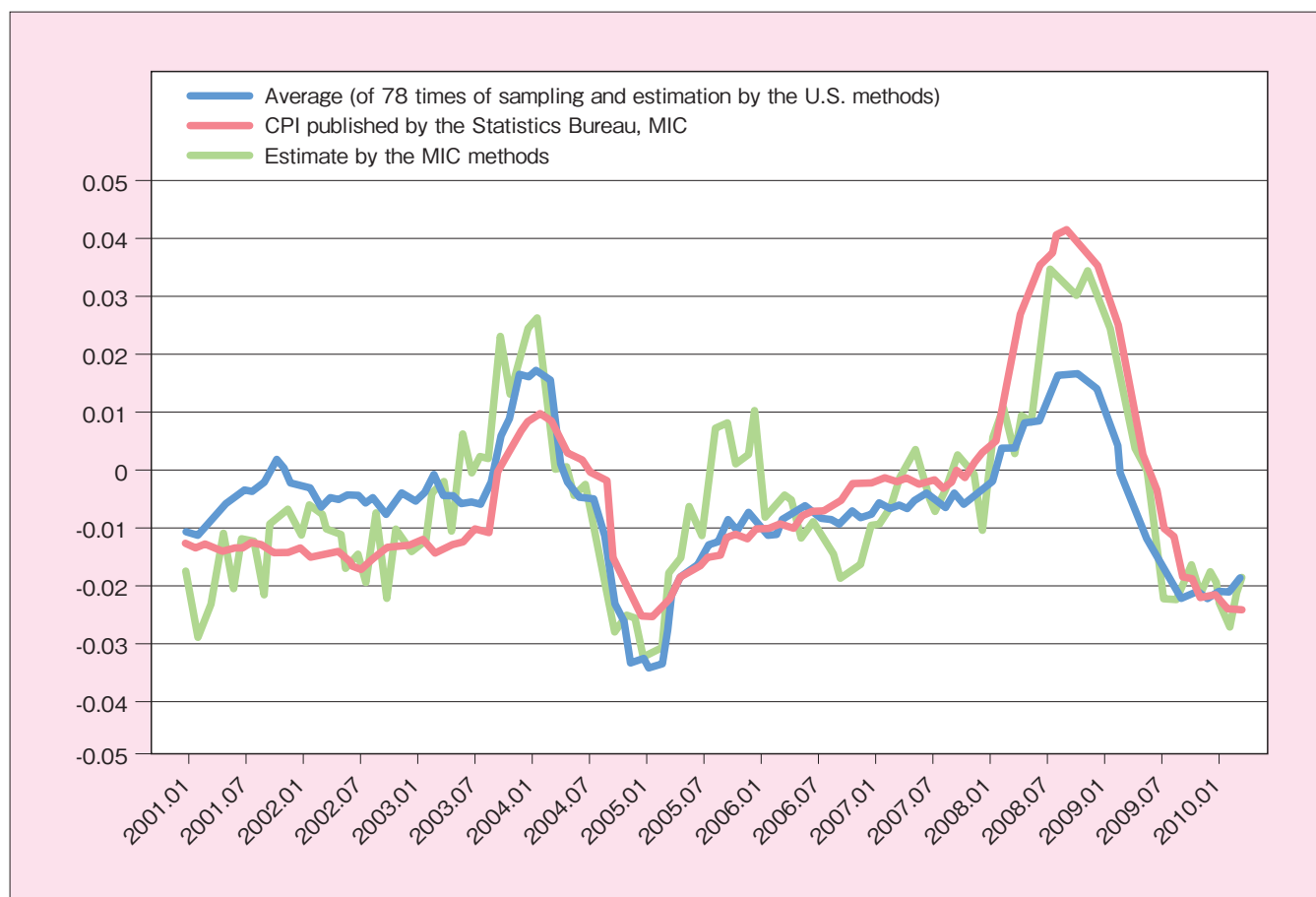
For the reproduction of the CPI, we had to collect a large volume of consumer shopping data. The POS data used in this research was jointly compiled by Nikkei Digital Media, Inc. and the University of Tokyo. This dataset is the sum of data collected on more than 200,000 commodity items sold at some 200 supermarkets across the nation between 2000 and 2010. These items mainly include food products, beverages, and other nondurable consumer goods (general merchandise such as shampoo), and the sales information was summed up through the so-called POS system.

In 2009, for instance, we surveyed 260 supermarkets and 230,000 items. The total number of data entries added up to 422 million in 2009, and reached 3.6 billion over the entire research period. However, both the number of stores and items have been partially replaced (Tab.

Table 1: Status of item replacement at the 103 stores

	Number of items sold at the 103 stores	Number of items newly released	Number of items discontinued	Proportion of items newly released	Proportion of items discontinued
2000	203,563	—	—	—	—
2001	208,164	57,526	52,925	0.276	0.254
2002	217,139	66,035	57,060	0.304	0.263
2003	206,172	51,696	62,663	0.251	0.304
2004	222,486	74,655	58,341	0.336	0.262
2005	224,705	62,158	59,939	0.277	0.267
2006	242,669	80,361	62,397	0.331	0.257
2007	254,887	78,060	65,842	0.306	0.258
2008	268,541	89,557	75,903	0.333	0.283
2009	256,824	75,495	87,212	0.294	0.340

Figure 1: Year-on-year changes in the price index estimated by the U.S. methods



1). The number of stores that continued in cooperating throughout the research period was 103, and the total number of items sold there was 203,000 in 2000, and subsequently increased to 256,000 in 2009.

Table 1 shows that approximately 30% of the items were replaced every year. In 2009, for example, 75,495 new items were added while 87,212 existing items were withdrawn. The proportion of about 30% is greater than that in foreign countries, suggesting that marketable items are being replaced every year to a considerable extent.

Some items are typically consumed over a long period of time, such as sweet adzuki-bean jelly from a long-established Japanese confectionery company, whereas others are continually being replaced with new items, such as instant noodles. Unless such replacement for each item is accurately identified in the process of price research, the resulting prices may vary widely. We also wanted to examine the degree of the impact of such replacement.

Preparing a consumer price index on our own to verify the reliability of the CPI

—Could you tell us the details of the analyses?

Using the enormous volume of data collected, we tried to reproduce the MIC's CPI in accordance with its CPI preparation methods. In parallel with this task, we also performed a total of 64 patterns of analyses based on the MIC methods while modifying these methods stepwise to determine, as a simulation, whether the results would differ depending on such modifications.

Finally, given the substantial criticism from overseas, particularly from the United States, regarding the reliability of Japan's statistics, we tried to prepare a price index using data obtained in accordance with the methods used by the U.S. Bureau of Labor Statistics (BLS), which is responsible for the country's preparation of the CPI. Mr. Imai is of course familiar with the practice of CPI preparation as an MIC official with responsibility over it, and he is also knowledgeable about the methods of the U.S. BLS. This was a great help to us in advancing the research.

—How were the results?

In the first task of reproducing the price index in accordance with the MIC methods, the CPI was prepared using a different data source that was very similar to one published by the MIC. This suggests no problem with the data and procedures used in this research in terms of the reproducibility of the CPI.

As for the second task of performing analyses while modifying the current MIC methods stepwise, although retailers such as supermarkets, for example, often hold special sales events, “special sales prices” are not included in price data unless they continue for at least eight days according to the MIC methods for calculating the CPI. Some people see this practice as a problem; therefore we made it a rule to include such prices in the price data if they continue for at least three days. The result, however, showed no significant difference compared to that of the first task.

Finally, the results of the use of the U.S. BLS methods also follows a similar trend to that resulting from the use of the MIC methods, except for the details (Fig. 1).

As shown in this graph, the annualized deflation rate in Japan is about 2% to 2.5% at the highest level even though it was estimated using different methods, and no deflation has occurred that is comparable to the 7% to 8% price plunge in the United States during the Great Depression. In short, the MIC methods for CPI preparation involve no significant statistical error.

—Where does the difference between the MIC and the U.S. methods lie?

The price index estimated using the U.S. methods (blue

line), compared with that using the MIC methods (red and green lines), shows lower prices for the most recent months although it is basically tracing a similar trend (Fig. 1). Figure 2 was created focusing on this difference.

To put it simply, the primary difference between the U.S. and the MIC methods lies in the method of sampling. According to the U.S. methods, items to be included in the price data differ for each research study because they are randomly sampled each time the research is conducted. This method of sampling is superior in that it lowers the risk of eliminating marketable items from the research, but involves certain variation in the results due to its probabilistic nature.

Let me focus on the consumer price increase rate of 1%, which was the target set by the Bank of Japan (BOJ) for its monetary policy. Supposing a 1% price increase is achieved by the MIC methods, how is the inflation rate estimated using the U.S. methods? As shown in the graph, the inflation rate based on the U.S. methods is nearly zero, or 0.1%, on average, but ranges from -0.5% to +0.5%. That is, when the inflation rate is 1% based on the MIC methods, it varies between -0.5% and +0.5% within the 80% confidence interval according to the U.S. methods.

In other words, even if a 1% price increase is estimated by the MIC methods, the probability of a price increase

Figure 2: Inflation rates by the MIC and the U.S. methods



or decrease is 50-50 according to the U.S. methods.

A cautious stance is essential in judgments or actions with regard to exit from deflation

—What policy implications can be derived from these results?

We would like to emphasize the necessity of paying heed to these differences due to the statistical methods in discussions on the inflation rate required to end deflation. As shown in Figure 2, even if the inflation rate estimated by the MIC methods is +1%, it is highly likely that the rate estimated by the U.S. methods would remain negative.

In order to ensure that price changes are positive, the inflation rate must be at least +2% when estimated using the MIC methods. At this level, the rate will be positive even if it is estimated using the U.S. methods.

Utmost care should be taken in making judgments and taking action to pull out of deflation. It is recommended that various measures to combat deflation be retracted after price changes estimated by the MIC methods reach +2%.

—The BOJ policy target was an inflation rate of 1% when this paper was written, and the target rate was raised to 2% following the start of the new government.

As suggested by the analysis results, we thought that an inflation rate of 1% as estimated by the current MIC methods was too low for the target and should be raised to 2%. We finished the paper with the hope that this would be proposed, and the target which I considered preferable was actually set by the newly-elected government and the BOJ. In this respect, their response was satisfactory.

The frequency of publishing price data should also be daily rather than monthly

—Could you tell us about your future studies?

As it is referred to as a barometer of the economy, the CPI, which was the research subject this time, is considered as a critical indicator in effectively managing economic policies. Unfortunately, the CPI published by the MIC is on a monthly basis. Thus, we tried to prepare a daily price index using the POS data in the research. By designing a system to transfer all price information collected from 300 stores to my study during the night of the same day, the “price index of yesterday” can be obtained the following day. Price information includes special sales data under this system, which, in this context, is close to the U.S. practice. As the price index has been published on the University of Tokyo website



Professor Watanabe showed a daily price index.

since May 2013 and is also linked to RIETI sites, it is possible to monitor the daily fluctuations in prices such as those in foreign exchanges.

While such data as a daily price index has also been developed by Google Inc. as well as the Massachusetts Institute of Technology (MIT) in the United States, they calculate their price indexes based on price information collected through the Internet. Our trial is primarily characterized by the fact that it is based on actual data collected from as many as 300 stores.

With a strong interest in prices, I have been studying this through various cross-sectional methods. For instance, I conducted a study on the pricing process using a typical price comparison site Kakaku.com in 2008, and analyzed price rigidity using rent data in 2009 (*1). I hope to undertake new types of studies in the future by effectively using the above-mentioned data and indicators.

Profile

Tsutomu Watanabe has been a professor at the Graduate School of Economics, the University of Tokyo since April 2011. He was a professor at the Institute of Economic Research, Hitotsubashi University from 2002 to 2011, and took up an associate professor position at the same institute from 2002 to 2011. He was also an economist at the Bank of Japan from 1982 to 1999. His expertise is in monetary policy and price dynamics. His recent works include: Satoshi Imai and Tsutomu Watanabe, “Product Downsizing and Hidden Price Increases: Evidence from Japan’s Deflationary Period,” *Asian Economic Policy Review*, Vol. 9, No. 1, 2014, 69-89; Jessie Handbury, Tsutomu Watanabe and David E. Weinstein, “How Much Do Official Price Indexes Tell Us about Inflation?” NBER Working Paper No. 19504, October 2013; Takayuki Mizuno and Tsutomu Watanabe, “Why Are Product Prices in Online Markets Not Converging?” *PLoS ONE* 8(8): e72211. doi:10.1371/journal.pone.0072211. Published 28 August 2013;

Footnote

*1 see: <http://www.rieti.go.jp/jp/publications/dp/09e044.pdf>

Cohort Size Effects on Promotion and Pay

Daiji Kawaguchi

Faculty Fellow, RIETI
Professor, Department of Economics, Hitotsubashi University

Unemployment among young people has posed a major problem to several countries. The International Labour Organization (ILO) estimates worldwide unemployment for 15-24 year olds at 12.6% for 2013, with the rate remaining above 12% through 2018. As regular full-time positions are in short supply during the economic downturn, there has been an increased proportion of non-permanent workers. Professor Kawaguchi and his co-authors have investigated how tough economic times impact the way Japanese large companies treat those who are fortunate enough to have secured regular employment with them.

In this study, the authors have carried out an econometric analysis on detailed personnel data from two large Japanese manufacturers, for the purpose of testing the relevance of tournament theory as it applies to groups of employees concurrently entering the company as new college graduates (cohorts). Results indicate that individuals in smaller entering groups enjoy relatively better chances of promotion. While conventional wisdom holds that traditional Japanese employment customs are weakening, the authors suggest that the evidence that each cohort participates in its own separate tournament indicates that some economically justifiable practices remain in place.

—Please tell us how you became involved in this line of research and the particular issues which you are trying to address.

The worldwide financial crisis of 2008 drove up unemployment among the young to levels that, despite some differences in severity from country to country, drew international concern. A young person's failure to find a job can have long-term consequences; once you get derailed, it can be difficult to get back on track. Japan, of course, has been in a long-term slump, dating back to the collapse of the bubble economy. Professor Yuji Genda and his colleagues at the University of Tokyo have been conducting research into unemployment among the young since the mid-1990s—beginning shortly after the bubble ended—and have demonstrated that, when economic conditions are ailing, higher percentages of new workers find themselves in non-permanent employment. This is knowledge that we have already acquired from prior work. So then, what about the young people who have managed to obtain a permanent position at a big firm anyway—how are they treated after they are hired? We assumed that the number of new entry workers is low in the fragile economy—that is, the cohort size is small. Does the small cohort size affect the young employees' opportunities for promotion? This question drew our attention, and we looked into it.

Who competes in the promotion contest?

—In your paper, you point out that the purpose of the paper also includes elucidating the promotion



mechanisms in Japanese firms...

Within labor economics, tournament theory is one way of conceptualizing how companies decide on whom to promote. According to the theory, you have a series of contests, where the losers drop out until only a winning group—the prize winners—remains. Since each contest is won by the superior player, this is indeed a method for evaluating relative merit. This approach also has one clear advantage: it filters out external factors such as

the state of the economy, which, when bad, can impede everyone's performance. One problem with the theory, however, is that it is not clear exactly who is competing with whom within the company. For this reason, there has not been much econometric analysis of theory as it directly relates to firms; instead, the analysis itself has typically been based on sports scenarios and other situations where the contestants are very clear, and the outcomes have been often invoked to examine business management.

Obviously, however, an analysis that applies to sports does not necessary apply to business. We therefore wanted to use actual company data to test directly the theory. We were still left with the problem of identifying the contestants in the competition. Our hypothesis was that the employees who entered at the same time would become the competitors; within a cohort, comparisons

among competitors seem to be a reasonable way to approach the issue in practice, since it eliminates performance differences that might result from more or less experience, or more or less time in on-the-job learning. Our paper presents an econometric analysis of detailed company data, toward the goal of validating our hypotheses.

—Was there any prior research that you were looking at?

The 2010 study by Kwon, Milgrom, and Hwang stimulated our research. Using personnel data from American and Swedish companies, their paper analyzed how economic conditions at hiring time affected future promotions. The results suggested that employees who entered during good times were promoted more quickly. One can think of a reason for this—compared to sluggish

Figure 1: Size of entry cohort of Manufacturing Company A (white-collar workers)

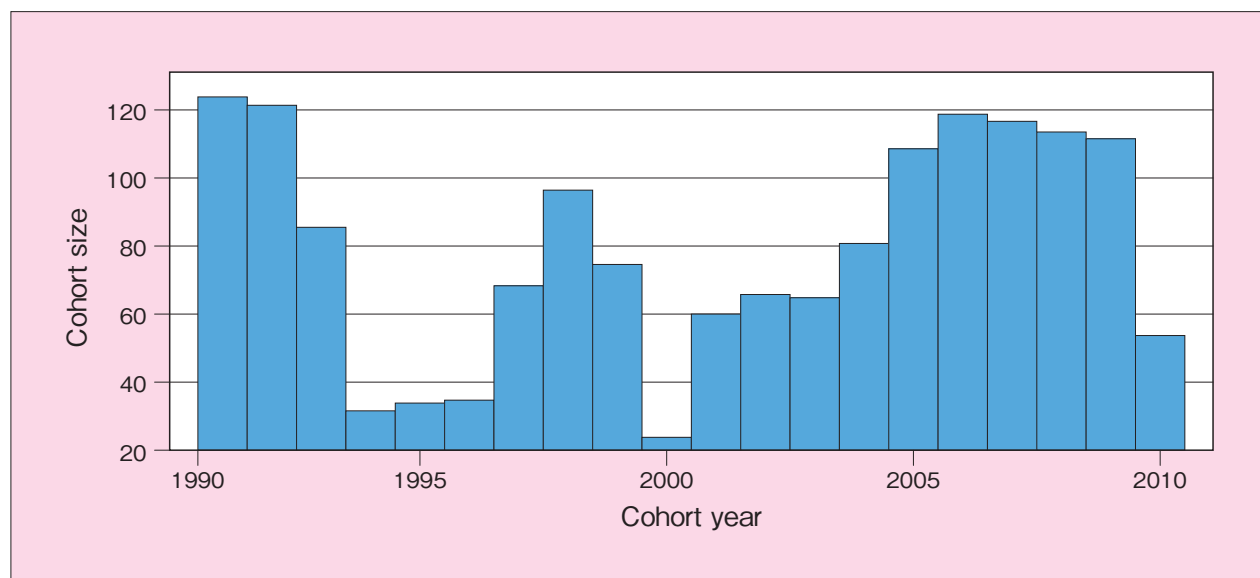
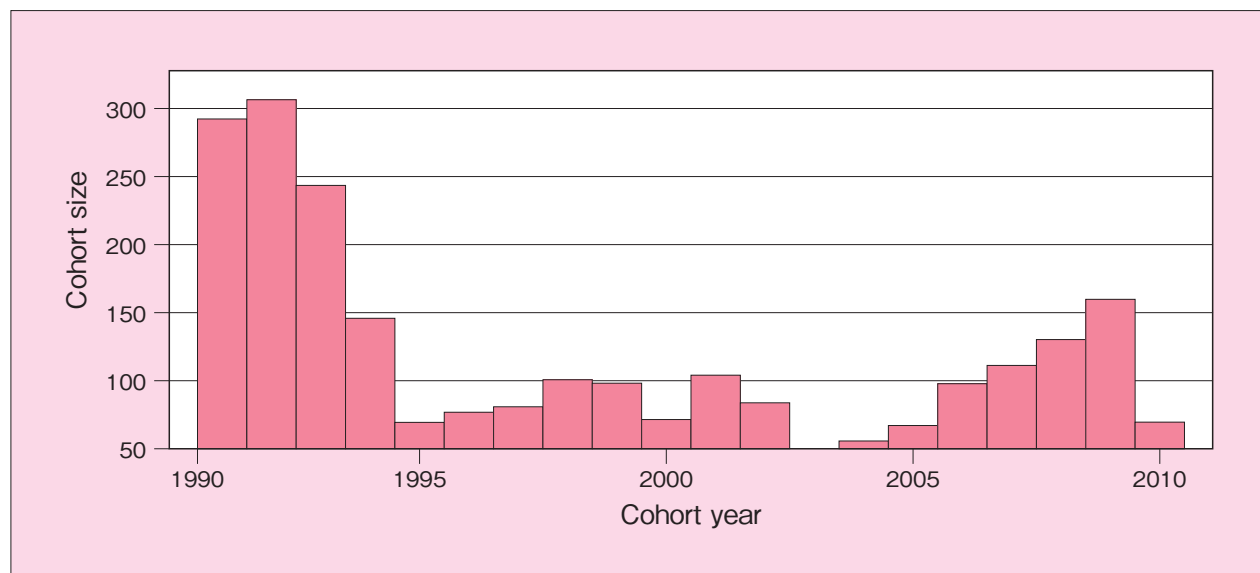


Figure 2: Size of entry cohort of Manufacturing Company B (white-collar workers)



economic times, there appears to be an increase in the number of challenging and desirable jobs within a company at good times, which could possibly bring future success. But we were skeptical of this reasoning. These results applied to the United States and Sweden, but did not seem to mesh with the circumstances of Japanese firms. In the United States and Sweden, for example, there are open and fluid labor markets for different types of work, and it is fairly easy to move from one company to another. In Japan, however, there is a tendency to stay and develop one's career within a firm. Thus, there seems to be a fundamental difference in the characteristics of the organization between the two. In the case of a Japanese firm, the availability of managerial positions—and of desirable jobs—would presumably be relatively less affected by external business circumstances and other external factors. If this is true, then what variables in particular would in fact affect the promotion rates? Our idea, as mentioned earlier, was that the cohort size—the number of new hires entering together—would have a large effect. So we set out to look at that.

Access to detailed personnel data

—In your paper, you indicated that you were able to access data that are usually off-limits. What data did you use?

We used personnel data from two large Japanese manufacturers with many employees in Japan. Both companies granted access to 20 years of detailed data—from 1991 to 2010. We were able to see how many graduates they hired each year, the ratio of both genders,

the ages of the new hires, the schools from which they graduated, and their track records over the subsequent years: qualifications, wages, and bonuses.

By looking into trends over 20 years, which is a relatively long period, we were able to take note of some distinct features—such as a rapid drop in the number of new hires that occurred in the mid-1990s (see Figs. 1 and 2).

In general, it is quite difficult to get access to this type of in-depth information. Fortunately, we received a favorable response after approaching the software company that manages the personnel information for these two companies. These two companies also gave us permission to analyze their personnel records for academic purposes. Individual names were removed from the data, of course, along with other information that would make it easy to identify the actual subjects. On our side, we also took considerable care to maintain security. In particular, after placing the data onto RIETI's servers, we never offloaded them while analyzing and arranging the dataset; we accessed and operated on them entirely through RIETI's remote access system, which was set to allow access only to authorized users working from authorized computers. We were well protected against leaks, and this is one of the reasons why we were granted access.

As I mentioned earlier, there are only a few cases—anywhere in the world—where an econometric analysis has been carried out directly on this type of personnel data. And in the few cases that do exist, data were of limited quality—data from failed companies, for example, or data obtained through business consultants

Table 1: Effect of cohort size on work qualifications

Ordered Probit Model with school dummy variables; survey of 1991–2010 college graduates in white-collar employment

Manufacturing Company A	Coefficients	Manufacturing Company B	Coefficients
Cohort Size (10 persons)	-0.0342 (0.0033)	Cohort Size (10 persons)	-0.0019 (0.0008)
Females	-0.511 (0.0432)	Females	-0.818 (0.0118)
Tenure	1.0728 (0.0081)	Tenure	0.3466 (0.0033)
(Tenure) ² /100	-2.771 (0.0392)	(Tenure) ² /100	-0.6998 (0.0215)
Pseudo R ²	0.59	Pseudo R ²	0.27
N	85539	N	81952

Note: Number in parentheses is standard deviation.



Professor Kawaguchi said that there was correlation between cohort size and promotion opportunities.

associated with the researchers. In this regard, our study is significant in that we were able to obtain and utilize comprehensive information from successful, established, ongoing companies.

Small cohort size generates opportunities for promotion

—What were the results of your analysis?

For both companies, we found that the greater cohort size had a negative effect on one's chances of promotion. This suggests that the individuals within each cohort are competing among themselves for promotion; in other words, the cohort is engaged in its own tournament. The findings also indicate that a small cohort size is advantageous to workers in terms of promotions. Under a stagnant economy, companies hire fewer new graduates, so cohort size falls—improving the prospects of those who get hired, compared to those who do not. An additional factor to consider, however, is that the better promotion rate may in part be attributable to the greater average capability of the people in the smaller cohort. Because tough economic times reduce job opportunities throughout the economy, companies have the chance to recruit relatively more capable applicants; and this may be the reason for the cohort's faster advance. For this reason, we filtered out the effect that university quality has on graduate promotion rates, such that we could better isolate the effect of cohort size itself.

For Company A, the largest cohort size—namely, the greatest number of yearly new hires during the 1991–2010 period we studied—was 124, while the smallest

was 24. According to the data, the individuals in the smallest cohort enjoyed approximately twice the chance for promotion to a given level (called “Grade 3” in our study) compared to their counterparts in the largest cohort. Moreover, each decline of one standard deviation (27.7 individuals) in the cohort size corresponded to a four-percentage point jump in the promotion rate. Results for Company B showed the same trends, although they were less pronounced. The data also show that cohort size has a bigger effect on bonuses than on wages. This finding suggests that, within Japanese firms, bonuses have the characteristics of the “tournament prizes” as posited by tournament theory.

—Why do cohorts compete internally?

In Europe and the United States—and certainly in the latter—there is a strong connection between a company's internal labor market and the economy's external labor market, as indicated by the relative frequency with which employees move from company to company. Because capable employees are readily poached by other firms, a company that wishes to retain talent needs to evaluate its employees by capability and offer promotions accordingly. In Japan, however, the labor market is much less fluid. Companies guarantee long-term employment, and workers develop knowledge and skills while traversing their careers internally. Indeed, some researchers have noted that the wage curve for Japanese companies—the curve associating wages with age—has been flattening out in recent years; in any case, the curve is still much steeper than that of American companies.

This is apparently why promotion mechanisms at Japanese companies function differently than those at U.S. companies. In particular, comparative evaluation in Japan tends to focus on people within the same cohort. By comparing within the cohort—namely, by directly comparing those individuals who have worked the same number of years—the company can more easily assess real differences in skills; the comparison, as a result, is more transparent. I would say that this approach is one of the pillars of Japanese employment practice. It is true, of course, that the Japanese economy is caught up in major changes, and that many distinctive Japanese employment practices are fading. Even so, this cohort-based evaluation approach survives, because it remains an efficient way to screen and motivate workers.

Necessity for studying trends for employees who join in mid-career

—Would you get different results if you examined different companies?

Personnel management practices might be different in companies that are heavily oriented toward merit-based appraisals—where they might put less focus on individual

cohorts. Results might also have been different if we studied companies in other types of enterprise—service companies or entertainment companies, for example.

In addition, we need to review studies focusing on companies where many employees enter in mid-career. When an individual with 10 years of experience enters the firm, for example, questions are raised; where do they get positioned in the company, and against whom are they evaluated when considering promotions. Many individuals in this category are involved in quite specialized work; therefore, many of them do not fit the picture of employees who compete within their own cohorts. In the light of this, there must be some other methods of evaluating them, and we need to elucidate them. One of the co-authors of our paper—Hideo Owan, RIETI Faculty Fellow and a professor at the University of Tokyo—is working with others on a RIETI project already underway in this area, entitled “Economic Analysis of Human Resource Allocation Mechanisms within the Firm.” We look forward to seeing their findings.

—If the likelihood of promotion is more dependent on cohort size than on differences in capability, does it seem somewhat unfair or not?

In our study, we covered people who had not been working very long at their companies. While the maximum employment length among our samples from the two companies was 20 years, the average for Company A employees was only 6.5 years, and for Company B employees, 7.6 years. This is a point which I particularly want to stress. If we were to look at people who are really building up a career and moving up into top positions, then we would expect to find that they were in competition with people hired somewhere near the same year they joined the firm, but not necessarily in the same cohort.

Importance of Consistent Macroeconomic Management

—What type of political implications do your findings suggest?

When it comes to landing a job in tough economic times, a wide gap opens up between those who are fortunate enough to find something, and those who are not. Our results suggest that the gap is even greater than we might have thought, since the fortunate job finders also enjoy above-average rates of promotion. To put it another way, hard times seem to magnify the unfairness. Companies cannot control the economy. When the external environment worsens—when the economy weakens—they have no choice but to cut down on hiring; and, as a result, it will have a heavy impact on the labor market in the short run. This in turn will bring about an increase in the number of non-permanent workers,

with negative long-term consequences for everyone involved. If we want to prevent this type of problem, we need macroeconomic policies that maintain a stable economy. As far as monetary policy is concerned, there are numerous discourses on what the goals should be. Looking to the United States, we see that the Federal Reserve Board monitors both the inflation rate and the unemployment rate when deciding on how to act. The Bank of Japan, in contrast, does not maintain clear goals with respect to labor market indicators. From my point of view, they should be giving these indicators a great deal of weight. In particular, I think policymakers need to devote serious thinking to the employment conditions for young people.

—Please let us know something about your next research topics.

In Japan, where the proportion of turnover is smaller than that in the United States, it is likely that the way a company handles its human resources would have a decisive influence on the firm’s performance. Thus, one crucial issue is to identify the standards used to decide on which employees get the important jobs. In this study, we showed that people beginning their careers at two large Japanese manufacturers, when competing for promotion, are largely in competition with the others in their own cohort. So, as a company makes decisions about promotions, where does it place the greatest weight? Presumably, the company must refer to a wide range of information when making these decisions. When considering a person for a promotion, for example, it might assess according to evaluations from superiors or use a numerical performance score which is calculated by using some specific method. Our feeling is that the quality of the school from which one graduated plays a relatively important role in the early years; but that as time goes by and the employee gains experience, the weight shifts more toward on-the-job performance. There has not yet been much research in this area, in part because the relevant data has been difficult to obtain. We think this is the topic that should be addressed next.

Profile

Daiji Kawaguchi has been a professor at the Faculty of Economics, Hitotsubashi University since 2013. He was an assistant professor at the Graduate School of Humanities and Social Sciences, University of Tsukuba from 2003 to 2005, and an assistant professor at the Institute of Social and Economic Research, Osaka University from 2002 to 2003. His recent works are as follows: Hirokatsu Asanno, Takahiro Ito and Daiji Kawaguchi, “Why Has the Fraction of Nonstandard Workers Increased? A Case Study of Japan,” *Scottish Journal of Political Economy*, Vol. 60, 2013, 360–389; Daiji Kawaguchi and Yuko Ueno, “Declining Long-Term Employment in Japan,” *Journal of the Japanese and International Economies*, Vol. 28, 2013, 19–36; Daiji Kawaguchi and Tetsushi Murao, “Who Bears the Cost of the Business Cycle? Labor-Market Institutions and Volatility of the Youth Unemployment Rate,” *IZA Journal of Labor Policy*, Vol. 10, Article 10.

INTRODUCTION OF THE RESEARCH PROGRAMS

Under the third medium-term plan (fiscal 2011 to fiscal 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. To this end, we will proceed with research activity by always keeping in mind the following three Priority Viewpoints (1. Incorporating growth of the world economy, 2. Developing new growth areas, and 3. Responding to changes in society and creating new economic and social systems for sustainable growth) on economic and industrial policies. Based on the three Priority Viewpoints, nine Research Programs have been

established. With each Research Program representing a set of interrelated policies, altogether they will cover a broad range of policy areas. Several Research Projects are to be conducted under these nine Research Programs. Depending on the progress we are able to make in the nine Research Programs or the potential necessity to explore new research areas due to changing economic conditions, we will either alter or add to our current research programs as needed.

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



Three Priority Viewpoints on economic and industrial policies:

- i. Incorporating growth of the world economy;
- ii. Developing new growth areas; and
- iii. Responding to changes in society and creating new economic and social systems for sustainable growth.



Research Process

To further improve on the quality of research, RIETI ensures that at least three discussion fora are organized for each research project through workshops and symposiums, where Japanese and foreign experts and policymakers participate to deepen the research.



International Trade and Investment

Program Director: Ryuhei Wakasugi, Faculty Fellow, 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

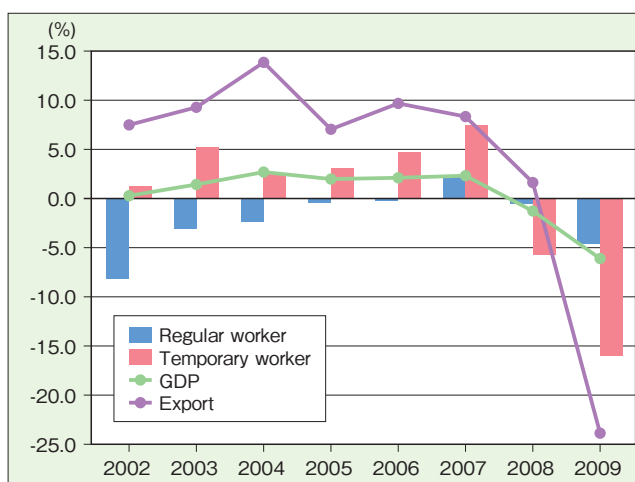
DP Title

Why Did Manufacturing Firms Increase the Number of Non-regular Workers in the 2000s? Does international trade matter?

Author(s)	Toshiyuki Matsuura (Keio University)
Release Date	April 2013
Research Project	Study of the Creation of the Japanese Economy and Trade and Direct Investment
DP No.	13-E-036
URL	www.rieti.go.jp/jp/publications/dp/13e036.pdf

This paper examines whether there is any link between export openness and the temporary workers ratio at firms. First, we investigate the effect of export openness on sales volatility using Japanese firm-level data. Next, we examine whether firms will increase the number of temporary workers as their sales volatility changes.

Figure: The growth rate of GDP, exports, regular workers and temporary workers



Source: GDP and export are obtained from the System of National Accounts (Cabinet Office), and the number of regular workers and temporary workers come from the Census of Manufacturers (METI).

Finally, we calculate to what extent changes in the temporary workers ratio are attributable to the sales volatility that is caused by exporting. We find statistically significant evidence that a foreign demand shock through exports affects the sales volatility at the firm level and that increases in the sales volatility induce the extensive use of temporary workers. Indeed, we find that those firms that incur a higher fixed employment cost make extensive use of temporary workers when the sales growth volatility rises. However, quantitative evaluation of the effects of exporting on the temporary workers ratio shows that the magnitude of these effects is quite small. We conclude that the impacts of firms' exporting status and export share on the temporary workers ratio are statistically significant but economically negligible in size. Thus, it is not appropriate to attribute the cause of increases in the temporary workers ratio to increased foreign shocks that occur because of exporting.

DP Title

On Biased Technical Change: Was technological change in Japan electricity-saving?

Author(s)	Hitoshi Sato (Fellow, RIETI)
Release Date	September 2013
Research Project	Study of the Creation of the Japanese Economy and Trade and Direct Investment
DP No.	13-E-077
URL	www.rieti.go.jp/jp/publications/dp/13e077.pdf

Since the Great East Japan Earthquake, electricity generation has declined in Japan, and electricity prices have allegedly increased. The literature on biased technical change suggests that such electricity supply constraints may induce a biased technical change. This

paper explores the extent to which the technical change in Japanese industries is biased, using a system of translog cost share equations where electricity and non-electric energy are separately treated as inputs. Using Japanese industry data over the 1973-2008 period, our findings confirm that technical change has been energy-saving but not electricity-saving in many industries, and that it tends to be labor-saving and capital-using. As a result, factor prices are much more important than technical change as a determinant of electricity's cost share.

Table: Cost share decomposition (2000–2007)

Electricity / Sectors	Change in share	Scale effect	Price effect	Technical change	Residual
Food & Beverage	0.80	0.01	−0.54	0.14	1.20
Textiles & Leather	0.40	−0.02	−0.61	0.19	0.84
Wood	0.12	0.11	−0.19	0.01	0.19
Paper	0.13	0.34	−0.69	0.25	0.22
Rubber & Plastic	−0.98	0.01	−0.52	0.20	−0.66
Chemicals	−9.39	0.10	−2.97	0.14	−6.66
Nonmetallic Mineral Products	−3.13	−0.01	−1.81	0.18	−1.48
Primary Metals	−2.42	−0.07	−1.07	−0.16	−1.12
Metal Products	−1.57	0.06	−1.43	−0.02	−0.18
Machinery	−0.25	0.06	−0.46	0.14	0.00
Electrical Products	−0.85	0.27	0.77	0.01	−1.90
Transportation Equipment	−0.15	−0.07	0.09	0.04	−0.22
Construction	−0.07	0.02	−0.16	−0.02	0.09
Wholesale & Retail	1.09	0.00	−0.07	0.30	0.86
Finance	−0.14	0.03	−0.05	−0.05	−0.07
Transportation	1.13	−0.26	0.12	0.09	1.19

Energy / Sectors	Change in share	Scale effect	Price effect	Technical change	Residual
Food & Beverage	2.71	0.02	2.06	−0.07	0.69
Textiles & Leather	1.13	−0.06	1.01	−0.03	0.21
Wood	0.77	−0.11	0.76	0.00	0.13
Paper	−0.36	−0.45	4.05	−0.56	−3.40
Rubber & Plastic	0.00	0.00	0.89	−0.20	−0.70
Chemicals	39.49	−0.48	21.20	−0.51	19.28
Nonmetallic Mineral Products	7.43	−0.02	11.10	−0.89	−2.76
Primary Metals	2.86	−0.03	6.90	−1.21	−2.81
Metal Products	0.22	−0.07	1.37	−0.24	−0.85
Machinery	0.42	0.01	0.77	−0.06	−0.30
Electrical Products	1.65	−0.07	1.91	−0.08	−0.11
Transportation Equipment	0.31	−0.05	0.53	−0.05	−0.11
Construction	1.33	0.31	1.60	−0.13	−0.45
Wholesale & Retail	2.24	−0.02	2.00	−0.39	0.65
Finance	0.26	0.00	0.27	0.00	−0.01
Transportation	13.06	1.39	21.00	−0.80	−8.53

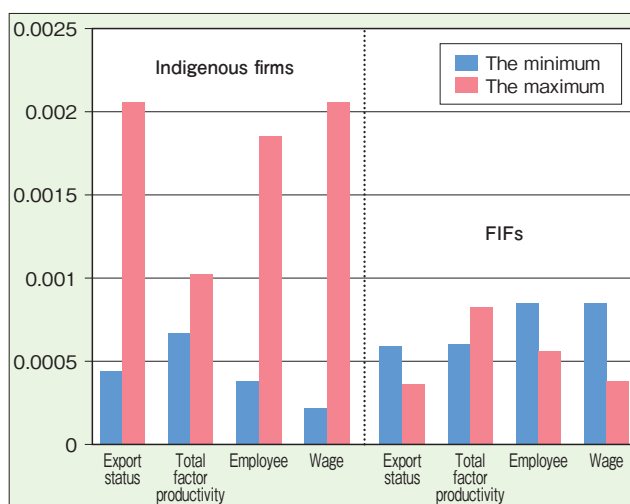
DP Title

Does Agglomeration Promote the Internationalization of Chinese Firms?

Author(s)	Banri Ito (Fellow, RIETI) Xu Zhaoyuan (ERI-DRC, State Council of China) Naomitsu Yashiro (Consulting Fellow, RIETI)
Release Date	September 2013
Research Project	Study of the Creation of the Japanese Economy and Trade and Direct Investment
DP No.	13-E-081
URL	www.rieti.go.jp/jp/publications/dp/13e081.pdf

This study empirically examines the role of agglomeration in enabling firms to begin exporting, using a large dataset of Chinese firms. Knowledge spillover caused by the agglomeration of exporters can reduce the initial cost of export, thereby lowering the “productivity cut-off” required to export. A parametric estimation of an export entry model indicates that the agglomeration of incumbent exporters contributes significantly to export participation, although its magnitude is limited. These spillover effects are generated not only by the agglomeration of exporting foreign invested firms (FIFs), but also, more importantly, by that of indigenous Chinese exporters. In fact, the agglomeration of exporting FIFs only contributes to the export entry of FIFs, yet has a negative impact on indigenous Chinese firms’ export participation.

Figure: Knowledge spillover effects of agglomeration of firms on export entry



Note: Each figure indicates marginal effects provided by the estimation of the Probit model using the number of exporting firms in the same industry and region as explanatory variables. Export status is a dummy variable that indicates whether or not to export in the previous year. Its maximum (1) indicates knowledge spillover effects by agglomeration of experienced exporters, and its minimum (0) indicates those by non-exporters.

International Macroeconomics

Program Director: Takatoshi Ito, Faculty Fellow, 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. We 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

Exchange Rate Risk Management of Export Firms: New findings from a questionnaire survey

Author(s)	Takatoshi Ito (Faculty Fellow, RIETI) Satoshi Koibuchi (Chuo University) Kiyotaka Sato (Yokohama National University) Junko Shimizu (Gakushuin University)
Release Date	April 2013
Research Project	Research on Exchange Rate Pass-Through
DP No.	13-E-024
URL	www.rieti.go.jp/jp/publications/dp/13e024.pdf

In this paper, we present new findings of Japanese firms' exchange rate risk managements based on a questionnaire survey sent to all Tokyo Stock Exchange listed firms in 2009. Using their responses, we conduct empirical analysis to investigate the relation between respective risk management tools including the choice of invoice currency and the price revision strategy (pass-through). Results show the following: first, firms with higher sales and greater dependency on foreign markets more actively engage in currency hedging including financial and operational hedging. Second, Japanese firms use both financial and operational hedging complementarily. Third, U.S. dollar invoicing is supported by both financial and operational hedging. Fourth, yen-invoicing substitutes for both financial and operational hedging. Fifth, pass-through also substitutes for financial hedging. These findings indicate that Japanese firms use operational hedging, financial hedging strategies, and pass-through policies depending on their choice of invoicing currency.

Figure 1: Choice of invoice currency and financial hedges

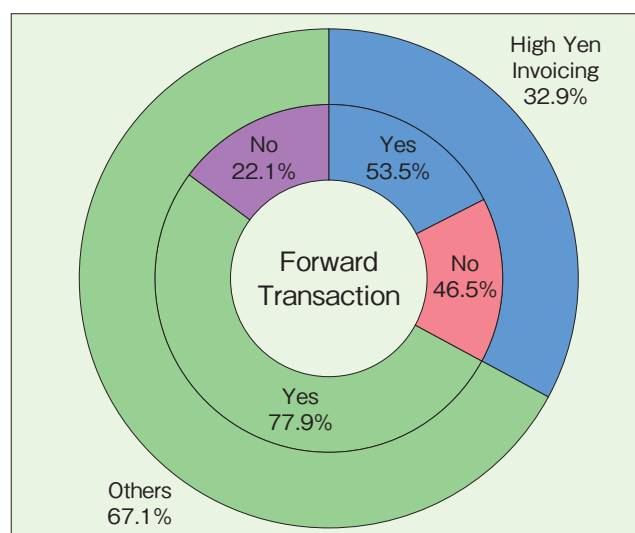
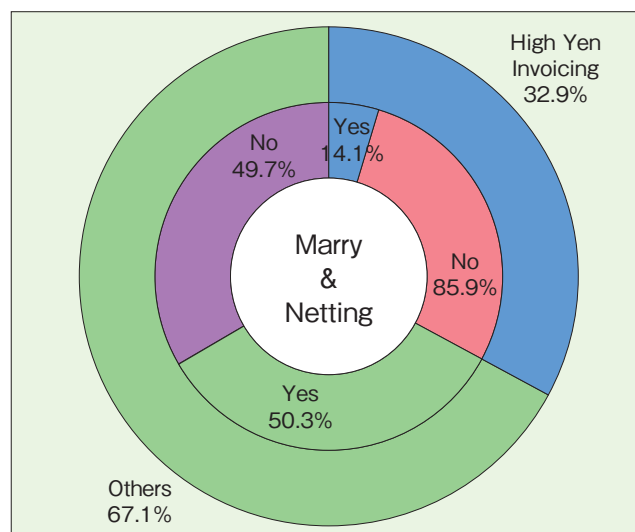


Figure 2: Choice of invoice currency and operational hedges



Note: Firms with more than 75% of yen invoicing share are classified into "High share of yen invoicing" and other firms into "Others." The outer circle shows the choice of invoice currency. The inner circle shows the answer of hedges.

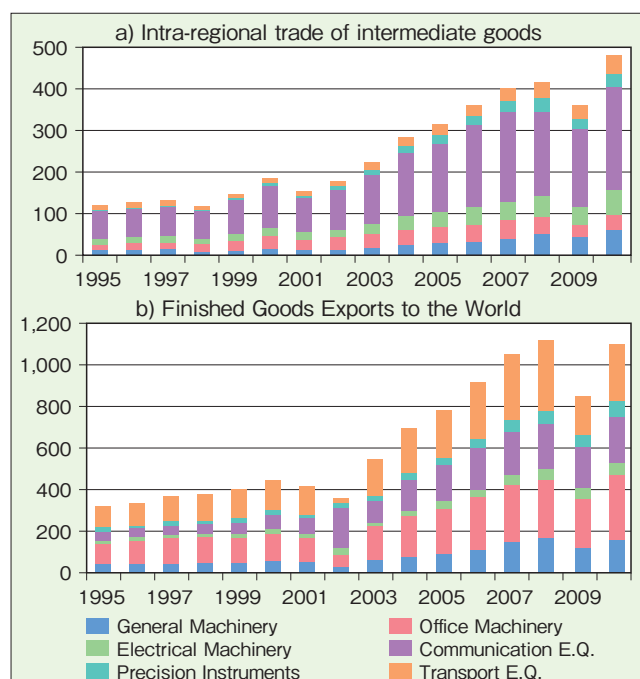
DP Title

Industry-specific Exchange Rate Volatility and Intermediate Goods Trade in Asia

Author(s)	Kiyotaka Sato (Yokohama National University) Junko Shimizu (Gakushuin University) Nagendra Shrestha (Yokohama National University) Shajuan Zhang (Yokohama National University)
Release Date	April 2013
Research Project	Research on a Currency Basket
DP No.	13-E-031
URL	www.rieti.go.jp/jp/publications/dp/13e031.pdf

This paper empirically analyzes the effect of exchange rate volatility on intra-Asian trade of intermediate goods at an industry level by constructing a new dataset of the industry-specific bilateral real exchange rate. As the final processed exports are destined for countries outside the Asian region, both the exchange rate and world demand are considered as a possible driving force in the cross-border fragmentation and processing trade. It is found that, in contrast to the recent studies, the exchange rate impact on intra-regional trade differs across industries. The exchange rate volatility has negative and significant effects only on the general machinery industry and a part of the electric machinery industry with more differentiated products, even when taking into account the world's demand for the final processed exports. These findings are supported by various kinds of exchange rate volatility in the short- and long-run. Our empirical results suggest that the different impact of the exchange rate volatility across industries is tied to the characteristics of traded goods in respective industries.

Figure: Asian triangular trade: 1995-2010



Note: Amounts of both intra-regional trade (USD billion) and finished goods exports to the world (USD billion) are calculated using the total machinery exports in 10 Asian economies: China, Indonesia, India, Japan, Korea, Malaysia, the Philippines, Singapore, Thailand and Taiwan. The machinery exports are based on the ISIC 2-digit classification that ranges from 29 to 34. The "world" in Figure b is defined as the all countries except the above 10 Asian economies. Source: Authors' calculation based on the OECD STAN database

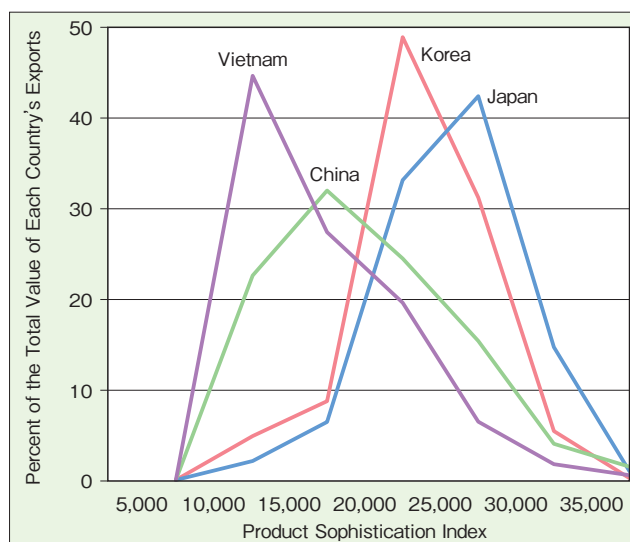
DP Title

The Sophistication of East Asian Exports

Author(s)	Willem Thorbecke (Senior Fellow, RIETI) Hao-Kai Pai (Research Assistant, RIETI)
Release Date	November 2013
Research Project	East Asian Production Networks and Global Imbalances
DP No.	13-E-092
URL	www.rieti.go.jp/jp/publications/dp/13e092.pdf

Hausmann, Hwang, and Rodrik (2007) found that countries that export more sophisticated products tend to subsequently grow more rapidly. We examine the sophistication of Asia's exports using Hausmann et al.'s and Kwan's (2002) measures. Japan remains the technology leader in Asia, but not in the world. In 2012, Japan's exports competed with those of South Korea and Taiwan and were complementary with those of China and the Association of Southeast Asian Nations (ASEAN). South Korea and Taiwan competed intensely with each other but less so with China and ASEAN, while ASEAN countries competed extensively with each other. Given the high levels of competition and cooperation among East Asian countries, greater exchange rate stability in the region would reduce export volatility among competitors and facilitate trade among comrades.

Figure: The frequency of Japanese, Korean, Chinese, and Vietnamese exports based on the sophistication of the products exported



Note: The figure represents the share of each country's exports at different levels of product sophistication. Product sophistication is calculated using the method of Kwan (2002). Source: CEPII-CHELEM database and calculations by the authors

Regional Economies

Program Director: Nobuaki Hamaguchi, Faculty Fellow, 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

Role of Hub Firms in Geographical Transaction Network

Author(s)	Yukiko Saito (Fellow, RIETI)
Release Date	September 2013
Research Project	Inter-organizational and Inter-inventors Geographical Proximity and Networks
DP No.	13-E-080
URL	www.rieti.go.jp/jp/publications/dp/13e080.pdf

In this study, we investigate the role of geographical proximity in an inter-firm transaction network and the role of hub firms on geographical spread of regional impact. By using inter-firm micro transaction data of over 800 thousands firms, we found that indirect transaction is geographically dispersed mainly due to a few hub firms, although firm's direct transactions mostly occur within geographically narrow areas. More precisely, median distance between indirect transaction partners (partners' partners) is 255km, which is much larger than that between direct transaction partners (29km). In a counterfactual transaction network without hub firms, whose transaction relations are no less than 100, median distance between indirect transaction partners is reduced to 70km, thereby suggesting the important role of hub firms in a geographical transaction network. We confirm this suggestion through an analysis of regional impact of the Great East Japan Earthquake.

Table 1: Cumulative percentage of firms by region

	Tier 0	Tier 1	Tier 2	Tier 3
Total	1.8%	5.1%	56.7%	90.5%
Hokkaido	0.0%	2.3%	60.2%	95.8%
Tohoku	16.6%	33.6%	82.0%	96.7%
Kanto	0.0%	2.7%	58.2%	89.5%
Chubu	0.0%	0.8%	51.6%	90.6%
Kinki	0.0%	1.2%	54.2%	88.0%
Chugoku/Shikoku	0.0%	0.5%	47.2%	90.1%
Kyushu	0.0%	0.3%	42.8%	88.3%

Table 2: Cumulative percentage of firms in counterfactual network without hub firm

	Tier 0	Tier 1	Tier 2	Tier 3
Total	1.8%	4.0%	20.3%	55.9%
Hokkaido	0.0%	1.3%	19.8%	65.2%
Tohoku	16.6%	27.3%	56.6%	81.2%
Kanto	0.0%	1.9%	19.8%	55.2%
Chubu	0.0%	0.6%	13.8%	54.4%
Kinki	0.0%	0.8%	14.0%	49.5%
Chugoku/Shikoku	0.0%	0.4%	11.5%	48.9%
Kyushu	0.0%	0.3%	9.8%	44.9%

Note: Tier 0 firms are defined as firms in the earthquake-affected areas, Tier 1 firms are defined as Tier 0 firms' partners, Tier 2 firms are defined as Tier 1 firms' partners, and Tier 3 firms are defined as Tier 2 firms' partners.

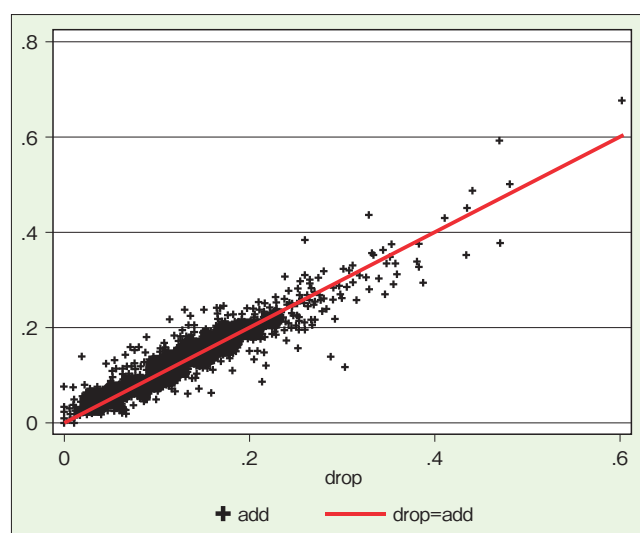
DP Title

Multi-Product Plants and Product Switching in Japan

Author(s)	Andrew B. Bernard (Tuck School of Business at Dartmouth) Toshihiro Okubo (Keio University)
Release Date	August 2013
Research Project	Studies on the Structure of Japanese Economic Space and Japanese Supply Chains Sustaining Growth Under Globalization and Disaster Risks
DP No.	13-E-069
URL	www.rieti.go.jp/jp/publications/dp/13e069.pdf

This paper explores the role of multi-product plants and product switching in the Japanese manufacturing sector. While a substantial body of work has explored the importance of the extensive margins of plant entry and exit in employment and output flows, only recently has research begun to examine the adjustment across products within establishments and its importance for plant and aggregate output and employment flows. Using a novel, annual plant-product dataset covering all Japanese manufacturing plants with more than four employees from 1992 to 2006, we provide the first evidence on the role of multi-product plants in the Japanese manufacturing sector and how the product mix and the plant mix have changed over time. Unlike previous studies, we are able to track annual changes in the product mix. The period covers a major decline in manufacturing activity, and we show that the mix of products and output shifted strongly toward larger multi-product plants that are part of multi-establishment manufacturing firms.

Figure: Add and drop rates across products



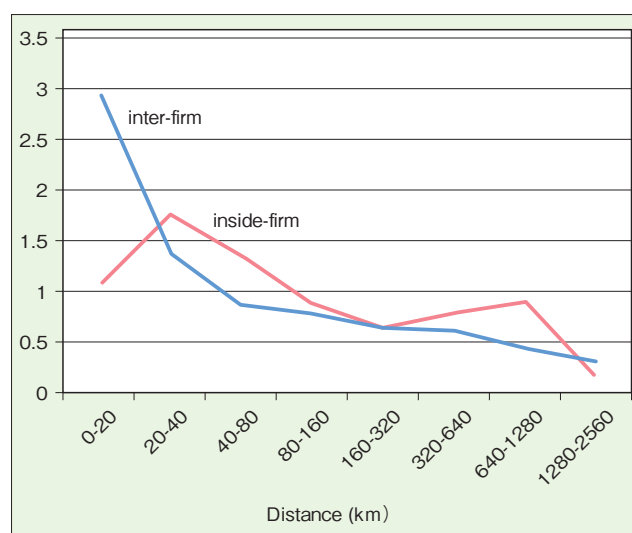
DP Title

Localization of Collaborations in Knowledge Creation

Author(s)	Hiroyasu Inoue (Osaka Sangyo University) Kentaro Nakajima (Tohoku University) Yukiko Saito (Fellow, RIETI)
Release Date	August 2013
Research Project	Inter-organizational and Inter-inventors Geographical Proximity and Networks
DP No.	13-E-070
URL	www.rieti.go.jp/jp/publications/dp/13e070.pdf

This study investigates the localization of knowledge exchange behavior by using data on inter-establishment collaborations in Japanese patent applications. Using distance-based methods, we obtain the following results. First, inter-establishment collaborations are significantly localized at the 5% level, with the range of localization at approximately 100km. Second, the extent of collaboration localization was stable during 1986-2005 despite the extensive developments in information and communications technology facilitating easy communication between remote researchers. Third, the extent of collaboration localization is much larger in inter-firm collaborations than in inside-firm collaborations. Furthermore, in inter-firm collaborations, the extent of localization is larger in collaborations with firms having only one research establishment. As a whole, inter-establishment collaborations are localized and stable, and localization occurs to complement firm-border effects, especially with regard to small firms.

Figure: Relative densities of inside-firm and inter-firm collaborations



Technology and Innovation

Program Director: Sadao Nagaoka, Faculty Fellow, 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

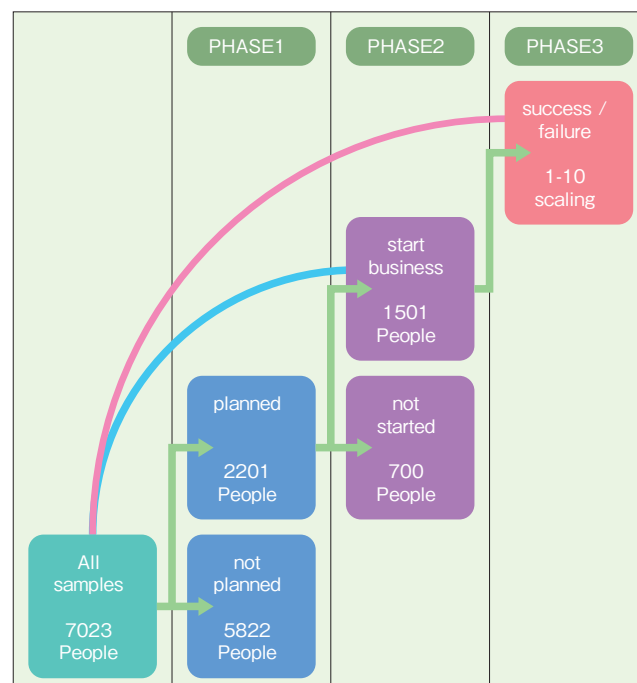
**Entrepreneurship and Human Capital:
Empirical study using a survey of
entrepreneurs in Japan**

Author(s)	Ryota Baba (Booz & Company (Japan) Inc.) Kazuyuki Motohashi (Faculty Fellow, RIETI)
Release Date	May 2013
Research Project	Empirical Studies on the International Comparison of Open Innovation
DP No.	13-E-049
URL	www.rieti.go.jp/jp/publications/dp/13e049.pdf

Entrepreneurship activities are low in Japan, and it is often discussed that possible reasons are the lack of venture capital and a rigid labor market. However, it is rare to find a study that analyzes the human capital aspect of entrepreneurs based on a large scale sample survey. In this study, the characteristics of the human capital of entrepreneurs, such as education and job experience, are analyzed based on a survey of entrepreneurs conducted by RIETI in 2012. The entire process of entrepreneurship is divided into three phases—(1) planning, (2) execution, and (3) achieving success in business—and the determinants of each step, not only the education and job background, but also personal relationships with the entrepreneur and his/her personality, are investigated. It is found that broad experiences while attending universities such as extra-curriculum activities are an important factor at the planning and execution stage. In contrast, broader job experiences but within a limited number of companies can explain the probability of entrepreneurship success well. Therefore, promotion of entrepreneurship activity in Japan including forming a spin-off company requires both a variety of extra-

curriculum activities experienced at universities and facilitating employees to develop broad professional experiences.

Figure: The numbers of samples by entrepreneurship phase



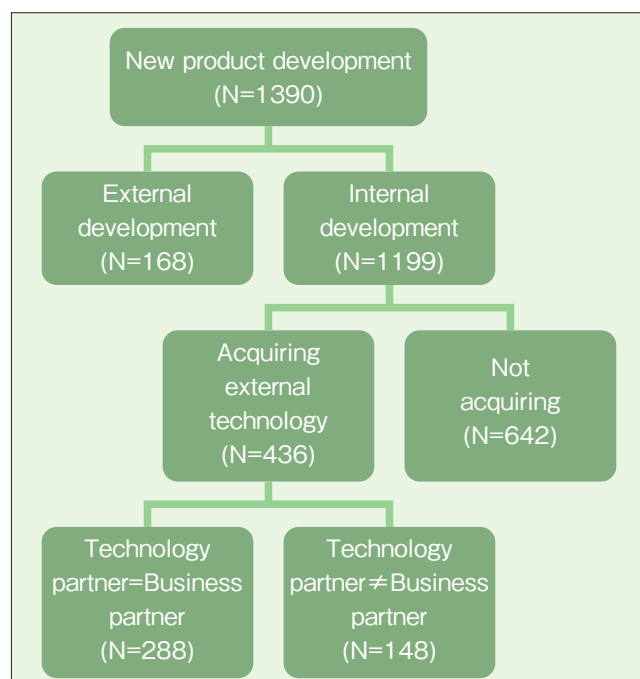
DP Title

Determinants of Demand for Technology in Relationships with Complementary Assets in Japanese Firms

Author(s)	Masayo Kani (Tezukayama University) Kazuyuki Motohashi (Faculty Fellow, RIETI)
Release Date	April 2013
Research Project	Empirical Studies on the International Comparison of Open Innovation
DP No.	13-E-033
URL	www.rieti.go.jp/jp/publications/dp/13e033.pdf

There is a growing trend of open innovation in the new product development process, while technology insourcing has not been investigated very well as compared to technology outsourcing in empirical literature. In this paper, we examine the factors that determine whether to acquire external knowledge and how to assimilate it in the process of new product development by using novel dataset at the product level, conducted by RIETI in 2011. We distinguish whether technology partners are also business partners such as suppliers or customers, and show their distinct patterns. In the case that technology partners are not business partners, patents play an important role in moderating transaction costs in the partnership, while co-specialization of technology and its complementary assets with partners is found for cases in which technology partners are also business partners.

Figure: Innovation strategy on new product development process



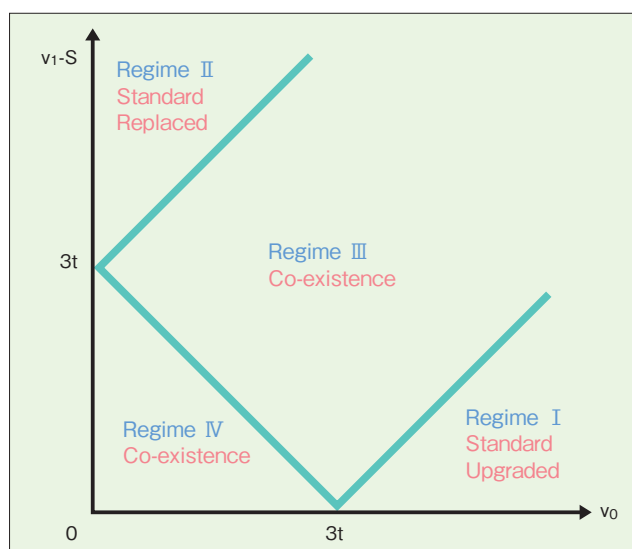
DP Title

Evolution of Standards and Innovation

Author(s)	Reiko Aoki (Faculty Fellow, RIETI) Yasuhiro Arai (Kochi University)
Release Date	September 2013
Research Project	Standard Policy for Innovation
DP No.	13-E-075
URL	www.rieti.go.jp/jp/publications/dp/13e075.pdf

We present a framework to examine how a standard evolves when a standard consortium or firm (incumbent) innovates either to improve the standard or to strengthen the installed base which increases switching cost. By investing also in technology improvement, both investments make it more difficult for another firm (entrant) to introduce a standard. Our analysis shows that the incumbent's strategy will differ according to whether the technology is in its infancy or if it has matured, but the existing standard will never be replaced by the entrant. Stability of a standard consortium standard has dynamic benefits in that it prevents replacement by an entrant. The incumbent deters entry when the technology is in its infancy but allows entry and co-existence of two standards when the technology is mature. This implies that dominance of a single standard even for well-established technologies suggests some market power by the incumbent. Our results also indicate that superior technology will never be sufficient to overtake an existing standard.

Figure: Stage two (Bertrand competition) equilibrium



Raising Industrial and Firm Productivity

Program Director: Kyoji Fukao, Faculty Fellow, RIETI

The aim of the 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 and 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

The Effects of Birth Weight: Does fetal origin really matter for long-run outcomes?

Author(s)	Makiko Nakamuro (Keio University) Yuka Uzuki (National Institute for Educational Policy Research) Tomohiko Inui (Faculty Fellow, RIETI)
Release Date	April 2013
Research Project	Research on Measuring Productivity in the Service Industries and Identifying the Driving Factors for Productivity Growth
DP No.	13-E-035
URL	www.rieti.go.jp/jp/publications/dp/13e035.pdf

This paper investigates whether birth weight itself causes individuals' future life chances. By using a sample of twins in Japan and controlling for the potential effects of genes and family backgrounds, we examine the

Table: Empirical results (twin-fixed effects)

Independent variables \ Dependent variables	Private Middle School	Student Performance (Age 15)	Ranking College	Highest Years of Schooling	Earnings
Birth weight (/100g)	0.050* (0.029)	0.210* (0.108)	3.138 (3.090)	-0.077 (0.170)	0.065 (0.071)
Log (birth weight)	0.112* (0.066)	0.575** (0.249)	7.326 (7.149)	-0.137 (0.417)	0.177 (0.161)
Non - LBW (Low birth weight)	0.053* (0.030)	0.099 (0.088)	5.659* (3.055)	-0.146 (0.162)	-0.042 (0.072)
Observations (of twin pairs)	1,257 (641)	2,206 (1,138)	918 (736)	2,234 (1,144)	1,832 (1,032)

Note: 1. The numbers in parentheses are heteroskedasticity - robust standard errors and clustering at the family level.
2. ** and * represent 5% and 10% significance level, respectively.
Source: Authors' calculations

effect of birth weight on later educational and economic outcomes. The most important finding is that birth weight has a causal effect on academic achievement at around the age of 15, but not on the highest years of schooling and earnings.

DP Title

Competition, Productivity Growth, and Structural Change

Author(s)	Takeo Hori (Aoyama Gakuin University) Taisuke Uchino (Research Associate, RIETI)
Release Date	May 2013
Research Project	Decomposition of Economic Fluctuations for Supply and Demand Shocks
DP No.	13-E-041
URL	www.rieti.go.jp/jp/publications/dp/13e041.pdf

Extending the endogenous growth model proposed by Young (1998), we construct a two-sector growth model that explains the observed pattern of structural change. Unlike existing studies, we assume neither non-homothetic preferences nor exogenous differential in productivity growth among different sectors. Our key assumption is that any two goods produced by firms in a sector are closer substitutes than those produced by firms in other sectors, which gives rise to an endogenous differential in productivity growth among different sectors. When the two composite goods are poor substitutes, the share of employment gradually shifts from the sector with a low markup to that with a high markup. To test the validity of the prediction of our model, we also estimate industry-level total factor

productivity (TFP) growth and markup using Japanese firm-level panel data. The empirical results show a negative correlation between estimated markup and long-term TFP growth, and a positive correlation between the growth of industrial labor input and markup, which supports our theoretical results. Finally, in contrast to the previous studies of structural change that consider competitive economies, we study the socially optimal allocation and characterize the optimal tax policies.

Figure 1: Correlation between markup and TFP growth

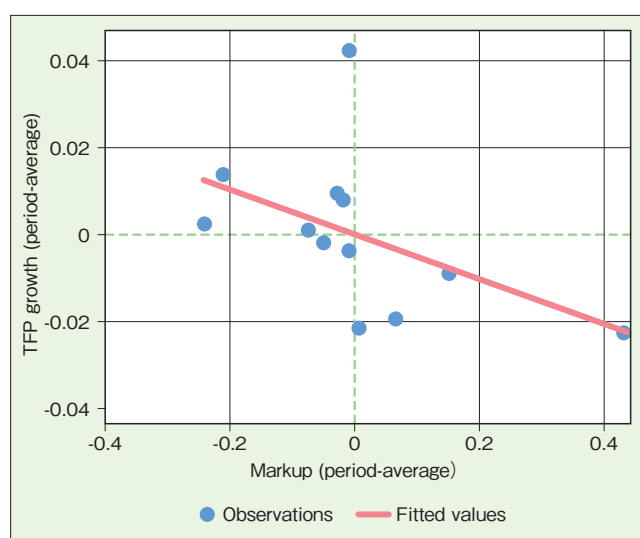
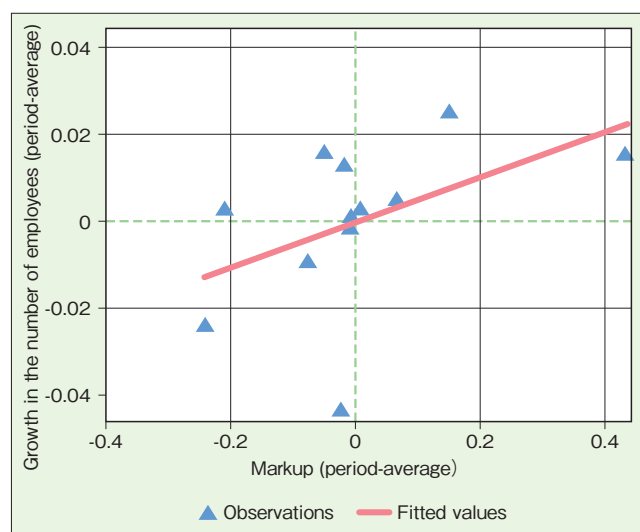


Figure 2: Correlation between markup and labor input growth



Notes: Markups, TFP growths, and labor input growths are measured as deviations from their respective means. Observations with markup significantly lower than 1 at the significance level of 5 percent are removed.

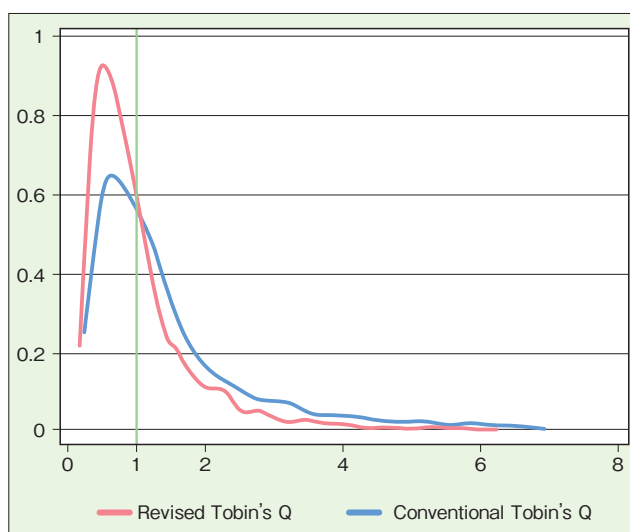
DP Title

Does the Stock Market Evaluate Intangible Assets? An empirical analysis using data of listed firms in Japan

Author(s)	Tsutomu Miyagawa (Faculty Fellow, RIETI) Takizawa Miho (Toyo University) Kazuma Edamura (NISTEP)
Release Date	June 2013
Research Project	Study on Intangible Assets in Japan
DP No.	13-E-052
URL	www.rieti.go.jp/jp/publications/dp/13e052.pdf

Following Corrado et al. (2009), we measure intangible assets at the listed firm level in Japan. Compared to the conventional Tobin's Q, the revised Q including intangibles is almost 1 on average, as suggested by Hall (2000 and 2001). The standard deviation of the revised Q is smaller than that of the conventional Q. Estimation results based on Bond and Cummins (2000) show that greater intangible assets increase firm value. In particular, in the IT industries, on average, Tobin's Q is higher than that in the non-IT industries, and the stock market reflects the value of intangibles in the IT industries. These results suggest that the government should adopt policies that promote investment, including intangibles in the IT industries, and change in the industry structure in Japan.

Figure: Density of Tobin's Q



Note: The vertical axis indicates Density, and the horizontal axis indicates Tobin's Q.

New Industrial Policy

Program Director: Hiroshi Ohashi, Faculty Fellow, 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

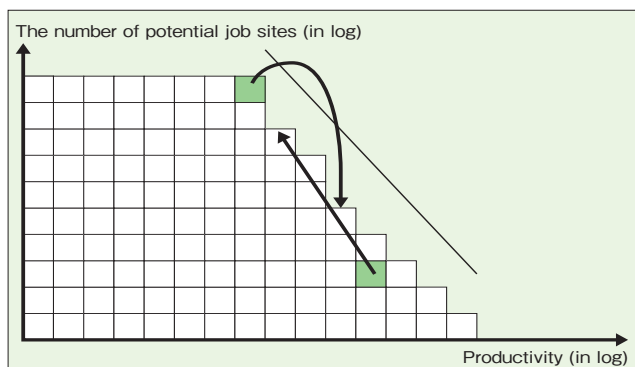
DP Title

Stochastic Macro-equilibrium and Microfoundations for Keynesian Economics

Author(s)	Hiroshi Yoshikawa (Faculty Fellow, RIETI)
Release Date	May 2013
Research Project	Issues Faced by Japan's Economy and Economic Policy Part II: Population decrease, sustained growth, economic welfare
DP No.	13-E-039
URL	www.rieti.go.jp/jp/publications/dp/13e039.pdf

In place of the standard search equilibrium, this paper presents an alternative concept of stochastic macro-equilibrium based on the principle of statistical physics. This concept of equilibrium is motivated by unspecifiable differences in economic agents and the presence of all kinds of micro shocks in the macroeconomy. Our model mimics the empirically observed distribution of labor productivity. The distribution of productivity resulting from the matching of workers and firms depends crucially on aggregate demand. When aggregate demand rises, more workers are employed by firms with higher productivity while, at the same time, the unemployment rate declines. The model provides a micro-foundation for Keynes' principle of effective demand.

Figure 1: Dynamics of creation and destruction of potential jobs



Note: Both productivity and the number of potential job sites are in the natural logarithm. The straight line as drawn in the figure means that the distribution of productivity is power-law.

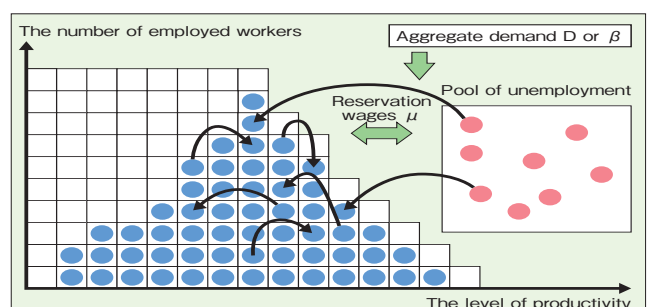
DP Title

Disguised Protectionism? Environmental Policy in the Japanese Car Market

Author(s)	Taiju Kitano (Hitotsubashi University)
Release Date	June 2013
Research Project	Basic Research for a New Industrial Policy
DP No.	13-E-059
URL	www.rieti.go.jp/jp/publications/dp/13e059.pdf

The U.S. government criticized Japanese environmental policies, which promoted eco-friendly car (eco-car) purchases via measures such as tax exemptions and subsidies, as disguised forms of protection by arguing that the fuel economy standard for the subsidy qualification was designed to be more beneficial to domestic firms. This paper examines Japanese environmental policies from 2005-2009 to assess whether or not they were adequately formulated from an environmental perspective. The analysis compares the outcomes between the actual fuel economy standard for subsidy qualification introduced in Japan and an alternative standard suggested by the U.S. government. Simulation results based on the structural econometric model of multi-product oligopolistic competition show that although both alternative and actual standards are comparable for the average fuel economy of new cars sold, the former is inefficient in improving the fuel economy because it requires much larger subsidies to achieve the same average fuel economy level as that of the latter.

Figure 2: Stochastic macro-equilibrium



Human Capital

Program Director: Kotaro Tsuru, Faculty Fellow, 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

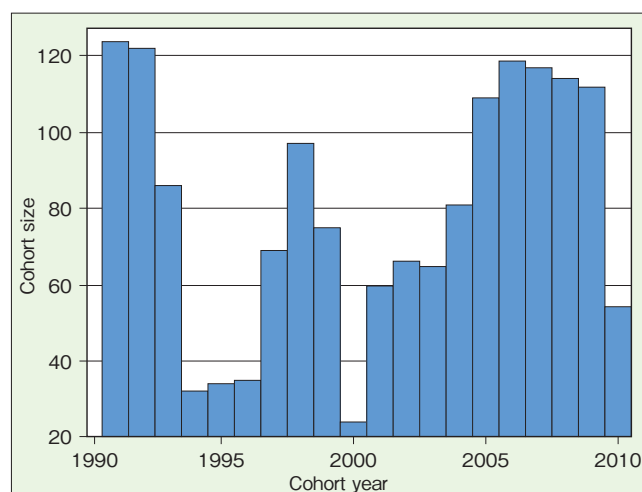
DP Title

Cohort Size Effects on Promotion and Pay: Evidence from personnel data

Author(s)	Shota Araki (Hitotsubashi University) Takao Kato (Colgate University) Daiji Kawaguchi (Faculty Fellow, RIETI) Hideo Owan (Faculty Fellow, RIETI)
Release Date	April 2013
Research Project	Economic Analysis of Human Resource Allocation Mechanisms Within the Firm: Insider econometrics using HR data
DP No.	13-E-029
URL	www.rieti.go.jp/jp/publications/dp/13e029.pdf

This paper provides econometric evidence on the cohort size effect in promotion and pay using detailed personnel records of all workers who joined two large manufacturers in Japan during the period 1991-2010. We find that entering the labor market when the economy is in a bad year and joining firms with fewer colleagues increase the probability of promotion and pay. Our finding implies that the cohort can be a reasonable proxy for the contestant pool.

Figure: Size of entry cohort of Company A, college-graduate white collar



DP Title

Dynamics of the Gender Gap in the Workplace: An econometric case study of a large Japanese firm

Author(s)	Takao Kato (Colgate University) Daiji Kawaguchi (Faculty Fellow, RIETI) Hideo Owan (Faculty Fellow, RIETI)
Release Date	May 2013
Research Project	Economic Analysis of Human Resource Allocation Mechanisms Within the Firm: Insider econometrics using HR data
DP No.	13-E-038
URL	www.rieti.go.jp/jp/publications/dp/13e038.pdf

This paper provides new evidence on the nature and causes of the gender pay gap using confidential personnel records from a large Japanese manufacturing firm. Controlling only for the human capital variables that are typically included in the standard wage function results in a substantial gender pay gap—16% for unmarried and 31% for married ones. However, additionally controlling for job level, skill grade, hours worked, and number of dependents almost eliminates the “unexplained” gender pay gap. We estimate various models of promotion rates and additionally find that (i) there is a statistically and economically significant correlation between the hours worked and the odds of promotion for women but not for men; (ii) maternity carries a substantial career penalty (up to a 20-30 percentage-point fall in future earnings), especially for college graduate women; and (iii) the maternity penalty can be avoided by promptly returning from parental leave and not reducing work hours after returning. As such, our evidence points to the importance of women’s ability to signal their commitment to work (or the level of family support they receive)—through working long hours and taking shorter parental leave—for their career advancement.

Social Security, Taxation, and Public Finance

Program Director: Mitsuhiro Fukao, Faculty Fellow 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

Stability of Preference against Aging and Health Shocks: A comparison between Japan and the United States

Author(s)	Hideki Hashimoto (The University of Tokyo) Hidehiko Ichimura (Faculty Fellow, RIETI) Satoshi Shimizutani (Consulting Fellow, RIETI)
Release Date	August 2013
Research Project	Toward a Comprehensive Resolution of the Social Security Problem: A new economics of aging
DP No.	13-E-068
URL	www.rieti.go.jp/jp/publications/dp/13e068.pdf

This study explores stability of preference against aging and health shocks. Contrary to a vast amount of literature assuming that risk attitude is unchanged over time, we utilize JSTAR (Japanese Study of Aging and Retirement), which provides longitudinal data on the middle aged and elderly comparable with the Health and Retirement Study (HRS)/English Longitudinal Study of Ageing (ELSA)/Survey of Health, Ageing and Retirement in Europe (SHARE), to examine how aging and past health experiences systematically affect risk attitude. We find that while there is empirical evidence that aging gradually causes individuals to be more risk averse, health shocks do not seem to affect risk preference systematically.

DP Title

The Future of Long-term Care in Japan

Author(s)	Satoshi Shimizutani (Consulting Fellow, RIETI)
Release Date	July 2013
Research Project	Toward a Comprehensive Resolution of the Social Security Problem: A new economics of aging
DP No.	13-E-064
URL	www.rieti.go.jp/jp/publications/dp/13e064.pdf

This paper reviews a decade of implementation of the public long-term care insurance (LTCI) program in Japan, which is now experiencing unprecedented pressure from its rapidly aging population. This overview of the program's features focuses on the incentive mechanisms and diversity, and examines official future projections of LTCI costs and their accompanying assumptions. It also includes the discussion of possible reforms for the LTCI program, with an emphasis on the micro aspects of LTCI, as evidenced by the Japanese Study on Aging and Retirement (JSTAR).

Table: Distribution of two types of questionnaires in JSTAR wave 1 to detect "irrational response."

		Risk attitude to 20% gain											Total
		1	2	3	4	5	6	7	8	9	10	11	
Risk attitude to 10% gain	1	26.86	1.34	1.19	0.52	0.3	0.22	0.15	0.07	0.07	0.07	0.07	30.88
	2	4.24	2.6	0.97	0.45	0.15	0.07	0.07	0	0	0	0	8.56
	3	1.49	2.16	2.53	0.52	0.15	0.07	0.07	0.07	0	0	0	7.07
	4	1.12	1.19	4.46	3.13	0.67	0.07	0.07	0.07	0	0	0	10.79
	5	0.74	0.97	2.08	3.35	3.42	1.04	0	0.07	0	0.07	0	11.76
	6	0.45	0.37	1.04	1.93	3.13	2.68	0.45	0	0	0.07	0	10.12
	7	0.15	0.3	0.52	1.04	1.12	1.71	0.97	0.15	0	0.07	0	6.03
	8	0.15	0.3	0.07	0.89	0.37	1.86	1.04	0.74	0.07	0.07	0	5.58
	9	0.07	0	0	0.22	0.37	0.07	2.16	0.15	0.45	0.07	0	3.57
	10	0.15	0.15	0.22	0	0.3	0.22	0.74	0.67	0.3	2.46	0	5.21
	11	0	0	0	0	0.07	0.07	0.07	0	0	0.22	0	0.45
Total		35.42	9.38	13.1	12.05	10.04	8.11	5.8	2.01	0.89	3.13	0.07	100
		Violation of monotonicity					Violation of local concavity						

Policy History and Policy Assessment

Program Director: Haruhito Takeda, Faculty Fellow, 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.

Introduction of Discussion Papers (DPs) published under the Program

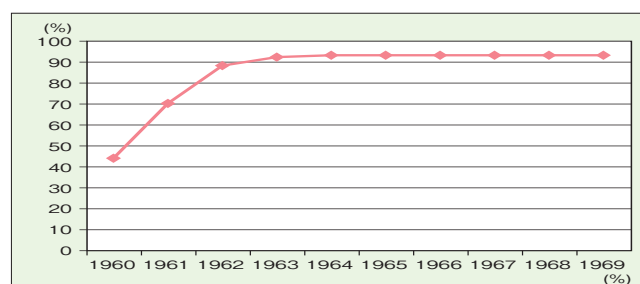
DP Title

Political Economy of Trade Liberalization: The case of postwar Japan

Author(s)	Megumi Naoi (University of California, San Diego) Tetsuji Okazaki (Faculty Fellow, RIETI)
Release Date	November 2013
Research Project	Historical Evaluation of Industrial Policies
DP No.	13-E-090
URL	www.rieti.go.jp/jp/publications/dp/13e090.pdf

How did the postwar newer democracies, whose governments faced pressure from both vested special interests and voters, achieve trade liberalization? Exploiting the case of trade liberalization in Japan in the 1960s, this paper addresses this question. Because the benefits and costs of trade liberalization are unequally distributed among the population, generating winners and losers, trade liberalization is inherently a highly political issue. The Japanese government and the Liberal Democratic Party (LDP) leaders used two tactics to build a coalition of legislators for trade liberalization. While they used sequencing of liberalization to buy off support from the legislators of the Upper House, they relied on side payments for the legislators of the Lower House. This strategy choice was consistent with the difference in the sizes of the electoral districts between the Upper House and the Lower House.

Figure: Changes in trade liberalization rate



Source: White Paper on International Economy and Trade, 1970

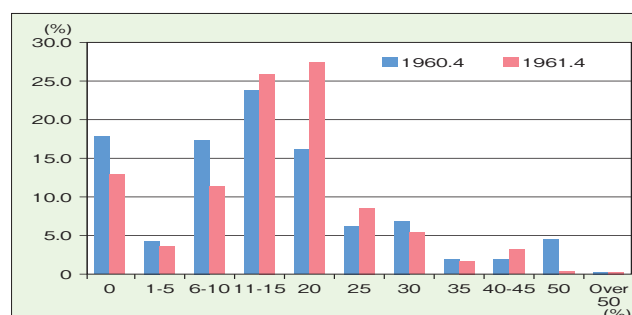
DP Title

Effects of Industrial Policy on Productivity: The case of import quota removal during postwar Japan

Author(s)	Kozo Kiyota (Faculty Fellow, RIETI) Tetsuji Okazaki (Faculty Fellow, RIETI)
Release Date	November 2013
Research Project	Historical Evaluation of Industrial Policies
DP No.	13-E-093
URL	www.rieti.go.jp/jp/publications/dp/13e093.pdf

This paper attempts to provide a systematic analysis on the effects of industrial policy in postwar Japan. Among the various types of Japanese industrial policy, this paper focuses on the removal of de facto import quotas through the foreign exchange allocation system. Analyzing a panel of 100 Japanese manufacturing industries in the 1960s, we find that the effects of the quota removal on productivity were limited—the effects were significantly positive, but time was required before they appeared. On the other hand, the effects of tariffs on labor productivity were negative although insignificant. One possible reason for this is that the Japanese government increased tariff rates before removing the import quotas and maintained high tariff rates afterward. As a result, the effects of the Japanese industrial policy in the 1960s might be smaller than widely believed in the Japanese economic history literature.

Figure: Distribution of tariff rates





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