

RIETI

Highlight

2017
SPECIAL
EDITION

63

Special BBL Seminar by the President

Law and Economics on Market Quality

RIETI Policy Symposium

**Frontier of Inter-firm Network Analysis:
Power of network and geographical friction**

Research Activities

**RIETI Research Framework
for the Fourth Medium-Term Period**

Makoto Yano
President and Chief
Research Officer (CRO),
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RIETI 
Research Institute of Economy, Trade & Industry, IAA

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What is *RIETI Highlight Special Edition*?

RIETI's English PR magazine *RIETI Highlight Special Edition* is edited and published annually for our international readers as an extra number of Japanese PR magazine *RIETI Highlight*. With the contents featuring RIETI's recent activities, we hope this will be helpful not only in spreading our activities and research findings but also in deepening international readers' understanding on our mission as a leading Japanese policy think tank.

Message from the Chairman

The global economy remains sluggish in part due to an oversupply of oil and other resources and their resulting low prices. In the meantime, declining birthrates and aging populations in major countries are weakening their potential growth rates due to structural reasons. It has become increasingly necessary to undertake monetary and fiscal policies and structural reform to reinvigorate economies.

One example is the Japanese economy, which has been seesawing up and down despite favorable conditions such as monetary easing and low oil prices. Employment and income figures continue to improve, whereas the slack global economy and strong yen have constrained the growth of exports and production.

In addition, both the declining population as well as its aging are holding back Japan's growth potential. Japan has experienced the lost two decades whereby the nation's growth potential has been stunted. Such experience may show that Japan could be the first country to enter a period of secular stagnation that other developed countries will also have to endure eventually.

In light of these circumstances, the reinvigoration of the Japanese economy will require not only short-term economic measures but also bold structural reforms that extend as far as work style reform and the Fourth Industrial Revolution.

RIETI's mission is to conduct theoretical and empirical research as a policy think tank, maximize synergies with those engaged in policymaking, and make evidence-based policy proposals. The institute also pursues a wide range of socio-economic research that includes economics and finance, social security, human capital, energy, environment, trade policy, and more. Internationally, RIETI has earned high praise and recognition for these efforts.

RIETI's Fourth Medium-term Plan has been in effect since April 2016. Under the plan, we are pursuing further research initiatives with mid- to long-term perspectives in the following three economic and industrial domains:

1. Cultivating Japan's strength in the world economy
2. Making Japan into an innovative nation
3. Overcoming population decline

Our quarterly Japanese-language public relations magazine *RIETI Highlight* reports on RIETI's research findings and symposiums concerning domestic and overseas economic and social issues. With special issues and individual articles, we strive to deliver this valuable information in a timely manner.

We are pleased to present the English-language *RIETI Highlight 2017 Special Edition*. This edition introduces selected activities during 2016 and provides an overview of our organization and individual programs during the Fourth Medium-term period. Also included are fellows' columns from a range of perspectives and outcomes from partnerships with overseas research institutes.

Working in a variety of fields and following the aforementioned new medium-term perspectives, RIETI is taking its research on the issues facing Japan to a deeper level. In addition, we are publishing our latest findings and reports from symposiums and other events here in *RIETI Highlight* to reach a wider audience both in Japan and abroad. We hope you will find it to be useful and enlightening.

中島 厚志

Atsushi Nakajima
Chairman, RIETI



Atsushi
Nakajima

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 (IBJ)

Law and Economics on Market Quality

“A high-quality market is indispensable to the sound development and growth of a modern economy”—the basic hypothesis here concerns the quality of markets. How can we build a high-quality market and get our economy on a sound development and growth trajectory? Makoto Yano, President and Chief Research Officer (CRO) of RIETI, delivered a lecture on the topic of “Law and Economics on Market Quality” at a Special BBL Seminar. (May 24, 2016)

Introduction

A century ago, Louis D. Brandeis, an associate justice of the U.S. Supreme Court, quoted Professor Charles H. Henderson as saying, “A lawyer who has not studied economics and sociology is very apt to become a public enemy.”

This is a very thought-provoking statement. In Japan, law scholars and economists are not properly communicating with each other. This situation is very problematic for the Japanese economy.

In social science, a method that appears to have no direct relation is often considered to be an effective way of achieving a goal. This concept, called the “theory of roundaboutness,” had an enormous impact on legislation as well as on 20th century economics and social sciences particularly in such fields as corporate governance and mechanism design.

However, it is no good taking a roundabout route in a haphazard manner. We need to find an efficient way of doing so. What social science tells us is to take an evidence-based approach to form ideas based on scientific evidence such as statistical data.

Stagnation in the Japanese economy and market quality

The Japanese economy has been stagnant for a prolonged period of time. During its bubble period, Japan’s gross domestic product (GDP) per capita reached a level closest to that of the United States, but has been faltering ever since the burst

of the real estate bubble in the early 1990s. I believe that the absence of a high-quality market is the reason.

A market is a pipe channeling new technologies and resources to people’s lives. If the pipe is straight, clean, and in good quality, natural resources and science technologies will be channeled through and lead to better livelihoods. However, if the pipe is bent, rusty, and in poor condition, things clog up and stagnate.

According to the Bloomberg Innovation Index, Japan ranks second only to South Korea as the most innovative country in the world. However, in the ranking of GDP per capita, Japan drops to 25th. The combination of a low level of GDP per capita and a high level of the innovation index means that the productivity of innovations is low. We have a situation where innovations fail to translate into better livelihoods. I believe that this is not because of any lack of technological capabilities.

In the late 1970s, when personal computers (PCs) came into being, Japanese companies were just as innovative as their counterparts in the United States. However, when we look at today’s PC market, we cannot help but admit that things are not going well in Japan. Probably, one big reason behind this is Japanese companies’ failure to capture and incorporate people’s needs in developing products.

People used to say that “semiconductors are the rice of industry.” From the viewpoint of those economists like myself, this is a very problematic idea. First of all, rice is an inferior good in an advanced economy. In addition, rice is a protected industry in Japan. Obviously, this metaphor would not work out well for the semiconductor industry. Under the post-war food control system, rice farmers did not have to think about the needs of consumers because they could sell what they produce to the government at designated prices. If Japanese people were led to believe



Makoto Yano

President and Chief Research Officer (CRO), RIETI / Professor, Institute of Economic Research, Kyoto University

Profile

Makoto Yano is the President and CRO of RIETI since April 2016. His expertise is in dynamic economics, law and economics, and market organization. Yano will continue the tradition of putting forward various policy proposals based on academically rigorous research and innovative ideas and dedicate his utmost efforts to develop RIETI further as an international forum for policy research.

that semiconductors were products like rice, it was no wonder that the needs of customers were largely ignored back then.

In contrast, the U.S. computer industry captured the needs of customers, foreseeing as early as the early 1960s that there would come a time when even children would make full use of PCs. Even today, this remains a driver of the U.S. computer industry.

Back in the 1980s, the greatest needs for computers were versatile PCs that allow us to use various software products rapidly advancing in the United States. However, Japanese computers at the time were using hardware chips to generate double-byte Japanese fonts, having a completely different architecture from those in the rest of the world. As a result, customers' needs and wants for state-of-the-art software were not properly reflected in the market.

When DOS/V, which is capable of producing Japanese fonts via software alone, was created in the late 1980s, excellent Japanese software such as Ichitaro was replaced by U.S.-made software such as Word and Excel. If Japan had foreseen this and fulfilled the needs of customers in some way, the situation could have turned out quite differently.

Dynamics of market quality

There are two kinds of markets: high-quality ones and low-quality ones. A low-quality market is often filled with products that do not reflect the needs of customers. It eliminates competition and customers are forced to buy what sellers want to sell. Concealed information spells

scams and cheating, and shoddy goods are bound to run rampant in the absence of quality goods. In contrast, a high-quality market can induce the development of products that better reflect the needs of customers. It is highly competitive and free from scams and cheating. All of these point to one thing: the presence of a high-quality market is indispensable to the sound development and growth of an economy. That is a hypothesis that I came up with about 20 years ago.

One of the things that support the hypothesis is the historical fact that a series of industrial revolutions and economic crises have occurred in a cyclical pattern, triggered by changes in market quality. The First Industrial Revolution gave rise to the exploitation of industrial workers, a major labor issue. The Second Industrial Revolution was followed by the formation of industrial monopolies, the Great Depression, and massive unemployment. The exploitation of workers and the monopolization of industries occurred because competition was imperfect, and the Great Depression occurred because information was not properly shared. What we can see in these episodes is a common pattern of events. That is, the advent of technological innovation is followed by degradation in the quality of competition and information, and hence compromised market quality, which culminates in an economic crisis.

The importance of law and economics is in the fact that the implementation of appropriate rules have always served as a trigger to turn around those crises. Specific examples include a series of labor-related laws established in England after the First Industrial Revolution, U.S. antitrust laws in following the Second Industrial Revolution, and U.S. securities laws in the aftermath of the Great Depression.



Market quality and the principle of nondiscrimination

I believe that the quality of a market is determined by two factors: efficiency and fairness. Efficiency means that nothing is being wasted, and fairness refers to a state in which the rules are being complied with. A market functions well when its rules are respected but goes wild when the rules are broken.

This is not to say that any rules will do well. We need to have rules that can derive the benefits of the market. A Japanese dictionary defines the term “*kyooso*,” a word used as a translation of “competition,” simply as “vying with one another.” However, in an English dictionary, “competition” is defined as “the act or action of seeking to gain what another is seeking to gain at the same time and usually under or as if under *fair or equitable rules and circumstances*.” This is something that many Japanese are not aware of, but competition cannot take place without appropriate rules.

Meanwhile, the determination of fairness is said to be dependent on rules, and, according to an English dictionary, “fairness” means “conforming to *an established commonly accepted code* or the rules of a game or other competitive activities.” Markets are supposed to have competition and thus there are some basic principles underlying market competition.

Ronald Coase, who won a Nobel Prize in Economics for his theory of property rights, argued that the market would not function properly in the absence of an institutional system for enforcing property rights. Prior to this,

neoclassical economists defined the market as a mechanism for ensuring voluntary transactions.

However, these two principles alone do not fully explain the market. So, I came up with the third one: anyone must be able to trade with anyone else. I call this the principle of nondiscrimination. My view is that these three principles or rules are underpinning the market.

The principle of nondiscrimination has three effects: 1) efficient distribution of resources, 2) leveled distribution of gains from trade, and 3) freedom of entry and creation and innovations. Here, I would like to focus on the relationship between the principle of nondiscrimination and innovations.

Freedom of entry is the underpinning philosophy of U.S. antitrust laws. The U.S. Supreme Court’s 1972 ruling in *United States v. Topco Associates* states as follows: “Antitrust laws in general . . . are the Magna Carta of free enterprise . . . And the freedom guaranteed each and every business, no matter how small, is the freedom to compete—to assert with vigor, imagination, devotion, and ingenuity whatever economic muscle it can muster.”

In other words, ensuring free entry and competition is crucial to maintaining free enterprise activity. As European competition laws have many similarities with those of the United States, this idea will gradually evolve as an established philosophy in many other countries.

Principle of nondiscrimination and innovations

Looking at this in terms of market quality, we can see the market as a two-way pipe, which uses natural resources to generate and deliver outputs to help improve people’s lives, while at the same time providing information that helps link people’s needs to seeds for innovations.

Turning to the development of the Japanese market over the years, market quality improved for some time but has been on the decline in recent years. The 1980s, when market quality was up, was a period that witnessed Japan’s rise as a major economic power. And then, as a result of rapid changes, the market became dysfunctional, leading to the quarter-century-long stagnation.

I think that up through the 1970s, Japan’s automobile industry was a free market that was completely open to new entries. In hindsight, policy measures prescribed by the Ministry of International Trade and Industry (MITI) back then were guaranteeing the freedom of entry to the market.

Honda Motor Co., Ltd. is the best case example. The company began producing automobiles in 1963 and evolved, over the next 20 or so years, into one of the world’s leading automobile manufacturers with its production volume reaching a level half of that of Toyota Motor Corporation. This was possible because Honda entered the market with a

full understanding of the needs out there.

The needs in the latter half of the 1960s were for cars that emit cleaner exhaust fumes. The United States, sharing the same thought, introduced the Clean Air Act in 1963, which went through major amendments in 1970 to significantly strengthen pollution controls. The law as amended in 1970 is known as the Muskie Act.

Against this backdrop, the needs were turned into seeds for innovation. In 1972, Honda's proprietary reciprocating engine—CVCC, an acronym for “compound vortex controlled combustion”—became the world's first engine to have satisfied the requirements under the Muskie Act, paving the way for its commercial production. In 1973, Mazda Motor Corporation followed with its rotary engine. Some European automakers such as Audi AG were also trying to develop Muskie-compliant rotary engines, but Mazda was the first to succeed.

The CVCC engine was born from an idea developed for diesel engines. As the combustion efficiency of diesel fuel is rather poor, a diesel engine needs to have a sub-chamber to ignite. It is designed to generate an explosion in the main combustion chamber by generating an explosion in the sub-chamber. With the CVCC engine, Honda applied this mechanism to gasoline engines.

Meanwhile, the 1970s saw the emergence of needs for higher fuel economy besides cleaner exhaust fumes. From 1974 through 1978, Honda's Civic model was ranked No. 1 in fuel economy in the United States. With this, Honda earned high acclaim to become the top automaker in the United States. Mazda's rotary engine did not have as much impact perhaps because of poor fuel economy.

However, both of those engines made a huge contribution in demonstrating Japan's technological capabilities to the rest of the world. When a major oil crisis hit in the 1970s, Japanese cars dominated the world. I think that this remarkable accomplishment owes considerably to the success of the two engines that had built an image of Japan as a technology powerhouse.

Seen in this light, the starting point for Japan's success was the freedom of entry to the market. Without that, neither Honda nor Mazda would have been able to invest in the development of new technologies in expectation of huge profits in the future. So, that was why the Japanese automobile industry has been able to remain the global leader for the past several decades.

How entry restrictions inhibit innovation

Meanwhile, some other industries have been unable to innovate because of regulatory barriers that inhibit entry to the market. The case of personal data assistants (PDAs) is one example. Since the early 1990s, we, consumers, have been clamoring

for a function that enables us to make text inputs in the same way as they write on a piece of paper. We have also thought of devices with rotating screens to use both landscape and portrait orientations. The starting point of the lineage of technology leading to these functions is the Zaurus, an electronic notebook developed by Sharp Corporation in the 1990s, which offered leading-edge technologies in PDAs (or pocket computers).

Despite this, the image of today's Sharp is clouded by the product name “Galapagos” that the company chose for its electric book-reading device in 2010; now, the word “*gala-kei*” is commonly used to refer to old-fashioned mobile phones that disappeared from the market around 2010. I think that the transition from the Zaurus, which conjures up the powerful image of a gigantic dinosaur, to the Galapagos, the insular island chain inhabited by endemic species, was the desperate signal that Japan has lost its leading edge in IT technology.

The first-ever electronic notebook was put on the market by Casio Computer Co., Ltd. in 1973, while Sharp introduced one with similar functions as today's models in 1987. The handwriting recognition technology was jointly developed by Sharp and Apple Inc., which were also recognizing the importance of enabling customers to input data by writing on the screen. Sharp beat Apple by one year in turning the technology into commercially viable products. So, it is presumed that back then, Sharp was a step ahead of Apple in PDA and electronic stationary technologies.

Subsequently, however, while Research In Motion Limited (RIM), a Canadian company currently known as BlackBerry Limited, launched a full-fledged phone/email device, the BlackBerry Quark, in 2003, and Apple introduced its first iPhone in 2007. Around this time, Sharp discontinued selling the Zaurus devices. The reason is clear; both the BlackBerry and iPhone offered integrated mobile phone and electronic notebook functions.

When I started using a Zaurus in the mid-1990s, I wondered why Sharp had not combined mobile phone functions into its PDAs despite such an obvious business opportunity. I then immediately realized the very simple answer; the Japanese mobile phone service market was so highly protected that it was basically impossible for a newcomer to enter. In Japan, the first generation (1G) mobile telephone technology was introduced in 1985, followed by the 2G in 1993 and the 3G in 2001—all linked to the allocation of frequency bands administered by the Ministry of Posts and Telecommunications.

The door to the market technically opened in 2001 and SoftBank Group Corp. made its way into the mobile phone business. Still, entering the mobile phone service market remained extremely difficult—if not impossible—for non-telecommunications companies. As the producer of the Zaurus devices, Sharp must have been well aware that a combination of mobile phone and PDA functions would be a perfect recipe for bountiful profits. As far as I understand, the

Q When the Japan Law and Economics Association (JLEA) was established, I thought that it would become a key catalyst in creating a better society. Unfortunately, however, it has not developed as expected. How can we rebuild it?

A The JLEA's activities are carried out in such a way that leading economists in academia take a leadership role to inspire others to join the initiative. However, my personal view is that it would be difficult to make tangible progress unless we make steady efforts to teach the importance of economics in university classes. Some time ago, there was a move to incorporate more elements of economics into the national bar examination. While such efforts should be continued, it would be desirable to have more economic discussion in law school classrooms.

In this regard, Japan is currently standing at a starting point of its endeavor toward achieving what Professor Brandeis said a hundred years ago. We need to make continuous efforts to promote the importance of law and economics in various places and occasions, for instance, at research institutes such as RIETI and in university classrooms.

Q As a result of the suspension of nuclear power generation, Japanese electric power companies have been incurring 100 billion yen in losses every year. In the end, consumers are the ones who must pay the price in the form of higher electricity bills. From the perspective of law and economics, how do you view this situation?

A The big problem is that the Japanese society did not have a shared understanding of what the law says. In other words, technologies were used without proper explanation about the potential risks or danger involved. When people were explained about a plan to construct a nuclear power plant, typically, the first thing they were told was how safe it would be. However, that kind of technology cannot be free from the risk of hazards.

Accurate information concerning this point has not been communicated to the general public and information is not being properly shared. A law is established and adopted by a majority vote, but voting should take place based on the precondition that relevant information is shared by all members of society. From the perspective of law and economics, taking any action without fulfilling this precondition is unacceptable. So, unless we first clear this hurdle, it would be difficult to put nuclear technology in good use.

only reason why the company nonetheless failed to integrate the two sets of technology is the government's policy for the telecommunications sector, which virtually inhibited new entrants from getting into the market. I think that the oligopoly of radio frequencies during that period of time is blamable for severely suppressing the development of Japan's overall telecommunications market. If Japan were to prevent today's plight, it would have had to liberalize its telecommunications market at the time of the U.S.-Japan Structural Impediments Initiatives talks from 1989 to 1990.

U.S. companies are on the constant lookout for new business opportunities. Japanese companies cannot develop new technologies into commercially viable products in a timely manner unless the government liberalizes the market at a sufficiently early stage. Had Sharp and/or other like companies embarked on the development of mobile phone-cum-PDA devices in the mid-1990s, Apple would not have been able to dominate the market as it does today. As such, there is no long-term prosperity in an economy where the market is incapable of properly reflecting the needs of customers.

Laws and regulations for enhancing market quality

Necessity is the mother of invention. We must first define economic policy as infrastructure for transforming people's needs into concrete products or services via the market and then promote the development of technologies to link the needs to seeds for innovation. The Japanese government had been doing this very well with its policy vis-à-vis the automotive industry up until the 1980s but has been unsuccessful thereafter. New laws and regulations are meant to be an instrument to break such an impasse in the government's policy. However, establishing ill-designed laws and regulations, such as the radio frequency regulations, would make things worse.

Richard A. Posner, a famous American lawyer/economist, wrote in his book as follows: "Suppose courts, in determining the rights and duties of parties to contracts, do not use the criterion of efficiency to guide their decision, but use instead some noneconomic criterion of fairness. What effect do their decisions have on the process of exchange?"

This question applies to all sorts of social decision and policy making. We need to create a society that can promote innovation by making effective use of the market. Japan, which had such an economy in the period immediately after World War II, should be able to rebuild it. As a starting point of this endeavor, it is important to ponder the question raised by Posner.

RIETI-CEPR Brexit Symposium in Japan

Presentation of the Latest Brexit-related Information concerning Trade and Investment, Labor Markets, and International Financial Markets

Since the announcement of the United Kingdom's decision to leave the European Union (EU) based on the result of the national referendum held in June 2016, the European business environment has become uncertain for more than 1,000 Japanese companies investing in the UK as a base for EU-oriented business. Having formerly advanced under the banner of free trade, the UK now casts a damper on the trend of the global economy, and Japanese companies therefore are having difficulty in making management decisions regarding their business activities in the EU.

Against this backdrop, RIETI's symposium on Brexit was held in Tokyo with approximately 200 concerned parties participating, including the main representatives of companies and researchers. Participants in the symposium displayed a sincere desire to obtain any useful information that might be available concerning the implications of Brexit.

The symposium was held in cooperation with the Centre for Economic Policy Research (CEPR), one of the world's leading policy think tanks. Experts in three areas of major concern to Japanese companies with established bases in the



BREXIT

On the future of the UK and the global economy

November 7, 2016

UK and the EU—trade and investment, labor markets, and international financial markets—were invited to present the latest Brexit-related information to a Japanese audience. In addition, the UK economy experts held in-depth discussions with Japanese experts and practitioners from the worlds of business, academia, and government, including representatives of the Ministry of Economy, Trade and Industry and Japanese manufacturers and financial institutions that have advanced into the UK and the EU. The subjects discussed included expected future policy responses, the future position of the British pound sterling, which has weakened significantly in the wake of the Brexit decision, the future economic order of the EU, and the future direction of globalization of the world economy as the Brexit process unfolds.

RIETI hopes that the discussions held at this symposium will contribute to the formulation of policy and the orientation of business activities in relation to Brexit in Japan.

As a related article, p. 40 of this issue features the special column “The Uncertain Consequences of Brexit,” written by Professor Richard Baldwin, one of the presenters at this symposium.



Speakers / Panelists:

Richard Baldwin (President, CEPR / Professor, Graduate Institute, Geneva)
Barbara Petrongolo (Director, Labour Economics Programme, CEPR / Professor, Economics, Queen Mary University of London)
Tarun Ramadorai (Research Fellow, CEPR / Professor, Financial Economics, Imperial College London)

Japanese Panelists:

Koichi Akaishi (Director-General for Trade Policy, Trade Policy Bureau, METI)
Kazuya Kobayashi (Managing Executive Officer, Mizuho Bank, Ltd.)
Yasuo Tanabe (Senior Vice President and Executive Officer, Hitachi, Ltd.)
Ryuhei Wakasugi (Senior Advisor and Faculty Fellow, RIETI / Professor Emeritus, Kyoto University and Yokohama National University / Professor, University of Niigata Prefecture)

Moderator:

Atsushi Nakajima (Chairman, RIETI)

EVENTS Symposium

RIETI organizes policy symposiums and various seminars as a means to activate policy debate by putting forward the findings of each research project and eliciting public opinions from various points of view. RIETI researchers make presentations on their respective research projects while inviting experts in the relevant fields—policymakers, practitioners, scholars, and journalists—to participate in active debate and further refine research results.

地理的な障壁の削減効果 Effect of reducing geographical friction

地理的な障壁の削減 geographical friction		短期の効果 Short term effect 立地所与 Location given	長期の効果 Long term effect 立地選択 Location choice
移動 of goods	金銭的成本 Financial cost 時間コスト Time cost		
移動 of people	金銭的成本 Financial cost 時間コスト Time cost		

結果と悪い効果 positive effect vs. negative effect:
異なる違い、企業による違い、人による違いを考慮 → 格差?
Consider heterogeneity among regions, firms, and people → Inequality

追加的にどのような政策がとられるべきか。What additional policy should be done?

RIETI
企業間ネットワーク研究の最前線
地理的な障壁を超える「つながり力」
主催：世界経済・産業研究所
2016.3.8

RIETI Policy Symposium

Frontier of Inter-firm Network Analysis: Power of network and geographical friction

Date: March 8, 2016

The inter-firm network is becoming increasingly important both politically and academically. The availability of micro level data encourages empirical and quantitative analysis, which forces us to construct a theory to explain the observed facts. Politically, we expect the “power of network” works to improve the productivity of firms, but at the same time there are concerns about its side effects. For the development of the network, what kinds of policies should we perform? What kinds of results can we expect from those policies? In this symposium, RIETI invited the world’s leading researchers in the fields of international trade and spatial economics to report on their latest research from theoretical, empirical, and quantitative aspects. We then collected questions from the audience and, based on them, held a panel discussion on the prospect of both research and policy.

Opening Remarks and Introduction



Masahisa Fujita

Former President and CRO, RIETI /
Professor, Konan University /
Adjunct Professor, Institute of Economic
Research, Kyoto University

Improvement in transport technology and information and communications technology (ICT) has reduced transportation costs significantly. This has induced globalization of production and localization into attractive regions and also has created an open brain power society, which has resulted in a complex networked world. Not only

academically, but also politically, the “power of network” becomes more important. This encouraged us to conduct the Geospatial Networks and Spillover Effects in Inter-organizational Economic Activities project and hold this

symposium. In this symposium, we would like to focus on the inter-firm network and discuss its implications for economic societies and policies.

The development of networks may make the world efficient under normal conditions, but also make it vulnerable so that local shocks can affect the aggregate economy. The automobile industry is an example. The production of each key part in this industry became localized to achieve scale economies under low transport costs. This resulted in the propagation of the shock of the Great East Japan Earthquake over the entire Japanese economy, other Asian countries, and the United States. Most firms, including those in other industries, have direct or indirect partners that suffered from the earthquake, which suggests the broad inter-firm network in Japan. It is very surprising that the local region of Tohoku, which accounts for only 4% of the gross domestic product (GDP) in Japan, affected the entire economy of Japan and also of the world. We cannot explain this with the simple framework of perfect competition in textbooks, thus we have become more interested in the inter-firm network both politically and academically.

We attempted and performed policies for the reduction of geographical frictions because we generally can expect

improvement in firm productivity or an increase in welfare. But the question is whether the frictionless world is also suitable for knowledge creation in the long run. Innovation occurs most when common and differential knowledge is in balance. We need some common knowledge to share ideas, but the synergy effects should lessen with little differential

knowledge. Concentration in urban areas may generate the synergy effect in the short run. In the long run, however, it may induce expansion of common knowledge and prevent innovation. To avoid this problem, we need to enhance the flow of knowledge and people among diverse organizations, cities, regions, and countries.

Presentation 1

Implications of Inter-firm Networks for Theories of Production and Trade

Before discussing networks, I would like to consider international trade because the theory of networks fits into the theory of international trade. For the last 20 years, new evidence has continually forced us to construct better models for understanding the world. There was a useful back-and-forth between the observable data and theory we used. At the same time, the volume of trade increased vastly relative to other activities. We understand that gains from trade are inversely related to the ratio of what is purchased from domestic suppliers to what is purchased in total by a country, which implies that the world experienced increased gains from trade during this period.

Progress in modeling, however, is not due to a changing world. We just try to model the world more closely to how it actually is, measure the features that we previously ignored, and embed those features into general equilibrium systems so that we can discuss welfare improvement around the world. We still have many issues that we do not understand. For example, we progressed



Samuel Kortum

James Burrows Moffatt Professor of Economics, Yale University

by incorporating more heterogeneity on the supplier side, but not on the demand/buyer side. As a consequence, theories of importing behavior have progressed less than those of exporting behavior, yet the measure for the gains from trade is based more directly on importing rather than on exporting.

About buyer-supplier networks, they are also just a feature of the world and not necessarily a trend. We need to, and are forced to, incorporate a firm-to-firm network into our theory of trade because data and measures of networks at the micro level are now available and in need of explanation. Incorporating such a network will enable us to give more appropriate policy advice. Modeling networks may solve other puzzles or shortcomings in the theory, similar to what incorporating granularity and heterogeneity did, but in this case on the demand/importer side. It also forces us to think about the boundaries of a firm, e.g., what tasks get done in-house and which are outsourced to other firms.

There is a nice analogy between international trade and the firm-to-firm network. Countries may stop producing a certain good and instead purchase it from other countries. We would expect the same thing for firms. Firms may stop performing a certain task and instead purchase an intermediate from another firm in the network. Then, intermediates may become an increasingly dominant share of production costs. We should begin to focus on this ratio, which may give us a more subtle view of the impacts of international trade.

Ideas also could move from one firm to another, and this flow of ideas may be more important than the flow of goods. Acknowledging this possibility raises another challenge for economics. This flow happens through the network and holds the possibility of huge gains as firms share knowledge with each other.

Presentation 2

Empirical Evidence of Firm-to-firm Network in Trade and its Implications

Up to now, we have worried a lot about the production side and almost not at all about the customers. We need to look for the customers and see how they matter. We also need to think about how firms form production networks and how the pairing of firms affects prices, quantities, and welfare. We need to learn more about them because the trade costs or policy costs that prevent those connections may have big welfare implications.

We tend to think manufacturing exporters make

everything they export, but a study shows that they export more products than they actually produce. They source goods from other firms and ship them in their distribution networks. Current models cannot explain this well, but the most likely explanation is that customers value the bundle more than the individual components. This is also important for policy because barriers on foreign



Andrew Bernard

Jack Byrne Professor, Tuck School of Business, Dartmouth College

made products may limit those goods that could be put into the bundle.

About connections of buyers and sellers, studies on several countries show that most firms have very few partners in a market, but most matches have a well-connected big firm on one side. Geography also matters for connections. For instance, a study on Japanese data shows that the majority of connections is formed in the same area, though big firms can find suppliers at greater distances. Besides, big firms connect with every type of firm, but small firms tend not to match up with other small firms and tend to connect with big firms because there is a cost in making those connections.

Actually, a study shows that exogenous reduction in search costs increases the connections for firms and improves

their performance.

There also are many things that we do not know about the connections, e.g., what costs are important for matching and how production networks evolve. We tend to presume that there is knowledge passing through these networks, but we do not have any direct evidence on that.

Contract choices also matter in a model with two-sided heterogeneity in which exporters and importers have market power. A study shows that, as trade costs fall, importers and exporters are able to change their contracts in some products and might benefit at the expense of domestic customers.

Research on the network has just started so we do not have much to say right now, but I think the welfare implications of this type of research are enormous.

Presentation 3

Trade, Sectoral Linkages, and Labor Market Dynamics: Quantitative Implications

Fluctuations in aggregate economic activity are the result of a variety of disaggregated changes which can be classified into three types of shocks: sectoral shocks, regional shocks, and sectoral and regional shocks. These affect the aggregate economy through the four important mechanisms: sectoral linkages, geographic factors, inter-regional trade, and migration.

There is a huge network of connections across sectors, but how much a sector is connected to the others is different among sectors. For geographic factors, some sectors concentrate in a few regions while others are uniformly dispersed across regions. Therefore, depending on a sector, a shock may affect some regions more than others or may affect almost the entire economy. Inter-regional trade is also important; especially for a large country, it can be more important than international trade. Besides, some resources move across a space after a shock, especially laborers.

I tried to build a model to quantify different disaggregated shocks, taking into account these four mechanisms. I will present three examples: productivity boom in one region in one sector, reduction in inter-regional shipping costs, and some results about the Japanese economy.

From 2002-2007, California experienced a boom in computers and electronics. California gained the most, but many other regions also gained from the shock because the products are important inputs in the production of other

sectors and are shipped across regions. However, a region close to California loses because productive firms and laborers leave the region for California after the shock. We also find this local shock actually generated large aggregated gains in the United States even compared to the North American Free Trade Agreement (NAFTA).

If the inter-regional shipping costs disappeared in the United States, we find that the aggregate productivity increases by 3.62%, aggregate gross domestic product (GDP) increases by 10.54%, and aggregate welfare also increases hugely. Reducing inter-regional trade distortions can potentially have considerable aggregate effects, especially for large countries.

About aggregate effects to the Japanese economy, NAFTA affected the economy negatively because of trade diversion effects, though the level was mild. Preferential trade agreements in the world from 1995-2010 increased its real income by 4%, and the economy also gains from China's productivity boom because of the cheaper intermediate goods from the country.

I think there is much more to be done in this area. So far, our limitation is access to data. The more data we have, the more we can learn with these tools, and we can construct even better tools to understand how disaggregated shocks actually affect the aggregate real economy.



Lorenzo Caliendo

Associate Professor of Economics,
Yale University

Presentation 4

The Implications of Agglomeration and Regional Spillover Effects

Why do economic activities concentrate in some regions?

One of the most important reasons is agglomeration effects: more concentration leads to higher productivity. However, they do not concentrate in one place, because dispersion forces also exist, e.g., congestions costs and land prices. These effects depend on industries. A study shows that finance is concentrated relative to manufacturing in Japan because agglomeration effects do not spill over very far for

financial sectors, whereas they do for manufacturing.

The Krugman model explains other reasons for agglomeration. Firms want to be located where there is strong demand for their products. Then firms can save transportation costs and have more money to pay their workers, which attracts more workers. Large manufacturing supply there lowers prices, which also attracts workers. Some firms, however, choose to locate in rural areas because immobile agricultural labor is there, so multiple cities exist in equilibrium. This model predicts that a fall in transport costs leads to more agglomeration as firms agglomerate and export goods to the agricultural labor. The Helpman model, in contrast, has an opposite prediction that a fall in transport costs promotes dispersion. It considers fixed land and mobile labor, so reducing costs may spread activities around the regions for low land prices. Thus, the effects of transportation costs on agglomeration really depend on which models we believe in.

An interesting example in practice is the raw silk industry in Japan. After the Meiji restoration, transport costs exogenously declined rapidly, both domestically and internationally. Raw silk became a huge export industry, so the Krugman model suggests that the industry moves to coastal areas that are close to international export markets. However, the raw silk industry stayed in the countryside because of certain important fixed factors: mulberry plants that are

necessary to feed the butterflies and to spin cocoons. The government also picked Tomioka because it has the tradition of the raw silk industry in the region. Interestingly, workers were not fixed factors, since the workers for the silk factories came from all over Japan. For the raw silk industry, the Helpman model seems to fit better than the Krugman model.

Another study shows that industry concentration helps Japanese total factor productivity (TFP) growth in non-manufacturing, though it does not help in manufacturing. These studies suggest that manufacturing as a whole may not be characterized by these dynamic externalities as much as non-manufacturing. As another aspect for a city to become a place that people with desirable skills grow and gather, it should have great universities, and also should have a diversity of cultural activities because those people who are in demand elsewhere will leave if the place is not attractive.



Robert Dekle

Professor of Economics, University of Southern California

Panel Discussion



Introduction to panel: **Yukiko Saito**
(Senior Fellow, RIETI)

Moderator: **Nobuaki Hamaguchi**
(Program Director, RIETI / Professor, Research Institute for Economics and Business Administration, Kobe University)

Saito: Researchers in economics have become more interested in inter-firm networks, especially regarding how idiosyncratic shocks affect the aggregate macro economy through networks and how we can incorporate the inter-firm network into trade theory as an extension of the new new trade theory. Geographical frictions are important for the development of networks, and their effect on mobility seems to be different among goods and people as the evidence shows that knowledge-creating activities are localized compared to overall economic activities in Japan. Also, frictions can be

classified into financial costs and time costs. Reduction of these costs should have both positive and negative effects and different effects depending on periods, i.e., the long-run effect or the short-run effect. These effects also should be heterogeneous among regions, firms, and people.

In order to reduce geographical frictions, we have attempted and performed policies such as cluster policy, liberalization of trade, and the development of the transportation infrastructure. The maglev train will connect Tokyo and Osaka and create a super mega-region. What effect can we expect as a result of these policies? What policies should we perform additionally to compensate for the negative impacts?

Hamaguchi: I will ask a couple of questions collected from the audience to each panelist.

Q Is it okay to work on a specific industry in network analysis?

Kortum: There is a tradeoff: studying a particular industry enables us to understand its details, whereas studying the network more broadly enables us to make a generalization. I think there is room for both types of analysis.

Q The most natural way to model the formation of inter-firm transaction networks seems to be based on a two-sided matching game. What difficulty do we have if we use this?

Kortum: We might be able to start working with the job search model in labor economics, which I think is a nice analogy. However, a single supplier can supply many different customers, unlike a worker who can only supply labor to one employer. We need to think about applying the model in the context we are using and need to move the model in the direction that makes it more appropriate for the application.

Bernard: In the typical two-sided matching game, it is one-to-one matching. The best attributes in each side match, the second ones match, and so on. For firms, it works differently. Most matches and most activities are many to many. We have to make sure that a model is designed correctly, otherwise we may reach incorrect conclusions.

Q Is it possible to introduce heterogeneity in consumers into buyer-seller matching?

Bernard: Modelling if all aspects are heterogeneous is not necessarily useful. Differentiation in consumers might matter for firms and consumers, but it is hard to work even with two-sided heterogeneity. At this point, adding a third heterogeneity is beyond my capacity.

Q Can new trade theory be extended or incorporated into new economic geography?

Bernard: In my work with Dr. Saito, we argue that the ability to find more and better suppliers lowers firms' costs. When firms agglomerate, they can have a richer range of suppliers and that lowers the marginal costs, which induces a kind of agglomeration effect. The heterogeneity of firms in trade theory is going to naturally get us to understand what distance does, and I think this is the link between geography and trade theory.

Q What are the differences and similarities between your analysis and the Acemoğlu model?

Caliendo: Our research is complementary to what Acemoğlu does. He mostly focuses on the effects of sectoral shocks on

the aggregate economy in characterizing the properties of the input-output matrix of the network. He does not have geography and regional shocks. He does not consider selection channels either. The most productive firms are the ones that are able to survive a shock and export in my model. These are important channels which affect an inter-regional network.

Q What is a typical example of inter-regional distortions?

Caliendo: We find that 90% of the costs of shipping goods across the United States are due to distance. This is attributed to some regulations, but mostly to transportation costs. Improving transportation costs would allow us to get gains and spillover effects.

Q Many people with high productivity and who work in Tokyo actually reside in suburban areas. How do you control this fact?

Dekle: Even with broader commuting regions, we still find much higher productivity in Tokyo. It is not just driven by the idiosyncrasy that commuters live in the outlying regions of Tokyo and that all of the production is in Tokyo.

Q Whether a fall in transport costs induces agglomeration or dispersion seems to depend on the industries of firms. Do you have any opinion on that?

Dekle: There must be industrial heterogeneity in the characteristics of industries in the mixture of industries. Actually, there are many case studies and empirical studies on the characteristics of industries. To digress a bit, I also want to stress an aspect that people do have much mobility both domestically and globally. Compared to the United States, what Japan needs to do is to make areas that the government wants to develop into more attractive places for talented people to live.

Hamaguchi: I would like to discuss about policies. Many policies are attempted and made to reduce the friction of distance, not only inside a country but also internationally. I would like to ask questions about that.

Q If construction of the maglev will be completed between Tokyo and Osaka, this will create a huge mega-region in which we can exchange goods and ideas. What kind of effect will we have from this?

Kortum: In Professor Dekle's and Dr. Saito's presentations, the finance sector seems to crowd out manufacturing from Tokyo, and knowledge production is more concentrated in Japan. Ironically, we think ideas can move any distance with the same costs, yet concentration seems more important for industries that rely on ideas, and they seem to benefit the most from the maglev and agglomeration.



Bernard: We think ideas can flow easily, but there is something about being present to exchange and understand complicated ideas. The maglev may induce clustering, but it may allow firms to stay where they are. My work with Dr. Saito suggests that firms can find suppliers in greater distances by the maglev, which means they do not have to move closer. I think forces work in different ways in different industries. However, knowledge workers want to live and agglomerate in attractive places, which may induce another political problem of regional inequality.

Caliendo: A city in the United States, which was prominent in the past because of a canal, has lost people these days because we do not need the canal to move goods anymore. Improving technology may generate booms in some places, but it may generate busts in others. Reducing frictions inside a country in general generates welfare gains, but we need to keep in mind that some areas actually lose from this.

Q What we can expect as a result of co-location of business and people driven by cluster policy? Should the agglomeration go more intense in a particular location?

Bernard: I worry that we tend to think we know which industries should cluster and where they should locate. I believe that locating close to suppliers is potentially a big benefit for firms, but I am not sure that the benefits are big enough to outweigh the costs, which are hard to measure.

Q What can you say about promoting liberalizing trade policies such as the Trans-Pacific Partnership (TPP)?

Kortum: That sort of policy, in general, is good for countries. The only worry is that specific businesses can capture the negotiations and get special deals, which may not serve the general public.

Caliendo: In a recent study, we tried to think about the hypothetical scenario of Japan moving to a world with zero tariffs. We find little positive aggregate gain because tariffs are already low in Japan. I think what was discussed in the TPP are other types of trade costs and other types of ways to facilitate trade between countries, which should generate larger gains. For example, in my home country, Uruguay, exports are subject to inspections which take from a day to a month. Reducing those types of regulations should benefit exporters.

Q Is there any policy measure to handle inequality?

Caliendo: We can quantify who gains and who loses, and potentially think about a redistribution scheme that actually makes all of us better off. In the United States, one key reason for inequality is huge mobility costs. I do not know what the costs are for now, but reducing these costs potentially can reduce the potential losses and allows the gains to spill over.

Bernard: In a study on Denmark, we find that displaced

workers have higher wages five years later than the workers who maintained their jobs, partly because of the flexibility of the Danish labor market and the support in the short term. It means that it is possible to have shocks that can seem to have big negative consequences on inequality turn out to have almost no negative effects on inequality.

Dekle: Interestingly, a survey shows that there is no increase in asset income inequality in Japan from 2000-2013 because asset prices have not gone up in Japan. So if there is an inequality problem, it is on the wage side.

Hamaguchi: We talked about the matching within a country that enhances the performance of firms. It could also enhance the competitiveness of firms in international competition. I would like you to speak about this.

Kortum: I think a nice way to think about the macroeconomic benefits of improving the network is as an improvement in productivity. We actually think about international trade as if it gave us access to a new technology. Viewing the network as a productivity booster is a good first cut at the problem.

Bernard: We find that firms with richer and deeper supplier bases seem to succeed in international markets as well, though causality has not been proved yet. My guess is that the domestic success of firms in establishing their connections leads to their international success.

Hamaguchi: Infrastructure helps to enhance the network and to improve productivity of companies, but this is not necessarily considered when we build infrastructures. We may be able to incorporate such a benefit into the cost-benefit analysis. Could you discuss this?

Bernard: Our research shows that opening up the *Shinkansen* in Kyushu lowers the costs of finding suppliers or the costs of regularly going to the suppliers to exchange ideas, and this increases firm productivity and sales. We are almost sure that it might improve productivity, but we need to worry about the magnitude. It is also true for international relations. How can we encourage the international supply chains to deepen and become more robust between Japanese firms and foreign suppliers and customers? The *Shinkansen* and maglev should reduce search costs, but they are incredibly expensive to do. There should be other ways to reduce search costs. Thinking about this in terms of supply side cost benefit is something we have not done, and we should do it for both international and domestic infrastructure.

Dekle: In a course about old old trade models that I took decades ago, the professor said that infrastructure projects have to be self-sustaining and make at least zero profits. I think infrastructure projects at some point have to meet the profit requirement. I think each project should really be measured on a cost-benefit analysis for the sake of raising Japanese aggregate GDP.

EVENTS BBL Seminar

RIETI's periodic Brown Bag Lunch (BBL) seminars welcome an array of guest experts to share their research and views. The sessions encourage lively discussion that contributes to dynamic policy-related debate.

The Changing Landscape of Trade Negotiations

Date: August 5, 2016

Speaker: **Alan V. Deardorff**

**John W. Sweetland Professor of International Economics
Professor of Economics and Public Policy, University of Michigan**



The modern world of trade negotiations

The modern world of trade negotiations started at the end of World War II with the creation of the General Agreement on Tariffs and Trade (GATT). Tariffs today are something on the scale of one-tenth of pre-GATT levels. The tariffs were lowered on a “most favored nation (MFN)” basis: the same tariff for all GATT signatory countries. Free trade agreements (FTAs), by contrast, are discriminatory.

The GATT expanded from the original 15 countries to 128 countries by 1994. In 1995, the last round of negotiations created the World Trade Organization (WTO), and since then, the membership has grown even further, to approximately 160 member countries. The WTO incorporated the GATT. It also included two other smaller agreements: the General Agreement on Trade in Services (GATS) and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

The WTO was expected to lead to continuing rounds of negotiations that would bring down tariffs and expand coverage to reduce non-tariff barriers to trade in goods and identify barriers to trade in services. The Doha Round of negotiations, which finally started in 2001, was a failure. It was never officially declared dead, but it is over. The only

multilateral successes that have occurred under the WTO were the Bali package in 2004 on trade facilitation, and then in Nairobi, there was a commitment to abolish export subsidies on farm products. So, they are still negotiating but in much smaller and less ambitious ways. They have also begun to negotiate so-called plurilateral agreements. A multilateral agreement is by definition applied to and implemented by all WTO members. A plurilateral one is for a group of members who can choose to join or not. A number of these agreements have been made in recent years. This seems to be the limit of what the WTO can accomplish in terms of trade negotiations. The WTO's other major reason for existing is its dispute settlement system, which is doing fine and is a huge improvement over what had been available prior to the WTO. In many ways, the WTO is an important and successful organization, just not in trade negotiations.

An FTA is an agreement, usually between two countries but sometimes a group of countries, to eliminate essentially all tariffs on trade between them. This means they are departing from the MFN requirement of the GATT and WTO, which prohibits discrimination, but the GATT and WTO rules permit this, and it has been done.

Country trade agreement rates

Japan was a bit later than some countries in joining this process. As far as I know, its first FTA was with Mexico in 2004, a decade after the North American Free Trade Agreement (NAFTA) and a decade or more after the start of the major period of growth of FTAs around the world. Japan has since picked up speed and now has concluded eight agreements, including one with the Association of Southeast Asian Nations (ASEAN), which includes 10 other countries. So it now has them with a fair number of countries, with some others under negotiation. I still would not say that Japan

is at the forefront of this move to adopt trade agreements.

One way of looking at the proliferation of these agreements is to make a list of countries. I picked the 66 biggest countries by gross domestic product (GDP). I looked at what had been reported to the WTO in 1990 regarding trade agreements, not including customs unions. There were very few; mainly Norway and Switzerland concluding them with the European Union (EU) countries. By 1995, there were a few more scattered all over the world. It slowly and steadily increased until today. There is

now a trade agreement rate of 20% among the 66 countries. Most countries are now concluding them with a number of partners. If we assume approval of the Trans-Pacific Partnership (TPP), the Transatlantic Trade and Investment

Partnership (TTIP), and the Regional Comprehensive Economic Partnership (RCEP), and if we also include customs unions such as the EU, then the rate reaches 36%.

Mega-FTAs

The most recent development in the world of FTAs is the mega-FTA: an FTA among a large number of countries. There is precedent for this. The EU, for example, was a customs union but it was a mega agreement, starting with six countries

and growing over time to 28. There are four FTAs I learned about in Africa, three of which include more than a dozen countries. We look to be moving toward more of them. The major examples are the TPP, TTIP, and RCEP.

The TPP

The TPP negotiations were launched in 2008, and agreement among 12 countries, including the United States and Japan, was reached on October 5, 2015. It has so far not been ratified by any of the countries as far as I know. A distinctive feature of the TPP compared to all prior trade agreements is that it is characterized as an open agreement which additional countries may join. In a way, this already happened, as Japan opted to join the process while the negotiations were already underway.

Japan's participation is most important from the U.S. perspective, and I would speculate that the reverse is also true. The inclusion of so many other countries will matter in several ways. Vietnam is also important because it is a much more centrally planned economy with a much larger presence of state-owned enterprises. If this is going to be an open agreement, it has to show how state-owned enterprises will be handled. China will need to see what those rules are before deciding whether to join.

Among the 30 chapters of the TPP, the centerpiece is the tariffs. On cars and trucks, U.S. tariffs against all other TPP countries will be removed. The tariff on cars is only 2.5%, whereas the tariff on trucks is much larger, at 25%. The reason for this so-called "chicken tariff" is unusual. It was first established under U.S. President Lyndon Johnson in the 1960s in response to a trade dispute with Europe, which was refusing to buy chickens from the United States. The United States put a big tariff on trucks in response, of which some European countries were major exporters. The tariff still exists even though the chicken dispute went away. It will be a phased removal, with the tariff gradually reduced to 0% after a very long period of time.

What is more interesting is that because this is a mega-FTA, it has a feature that would have been impossible

in a bilateral FTA: the schedule of rates can differ among the exporting countries. There are 12 members, so there are 11 other countries exporting to the United States. There is no commitment that they will all be treated the same. The lengths of the periods of the gradual tariff reductions differ by category and by country. The United States is trying to structure its participation so that it will not have to renegotiate its already existing agreements with other countries. Other countries do not have the same political constraints. Some of the commitments are based on agreements the United States already has with other countries. The TPP is a great deal more complicated than I ever would have dreamed. A mega-FTA where we deal differently with different countries inevitably entails complexity.

Some of the other noteworthy features include the investor-state dispute resolution mechanism, which has been controversial in the United States. I understand this to be an issue between the United States and Europe because the Europeans are afraid of the former's big multinationals. It became especially controversial in the United States when news got out that investor-state dispute resolution mechanisms had been used by tobacco companies—especially in Australia—in an attempt to prevent the use of cigarette packaging intended to discourage smoking. They resolved this controversy by exempting the tobacco industry from the dispute resolution mechanisms, which means that the United States will also lose their lobbying efforts in getting the TPP ratified.

The treatment of biologic drugs is another feature. A biologic drug is a medicine which, rather than being made by people in laboratories, is made by living organisms. This includes bacteria-making medicines, etc. The issue here



concerned data exclusivity. The United States wanted 12 years of protection for its companies working in this field. Australia and other countries wanted a shorter period. In the end, they made a compromise: the United States has 12 years of protection but the others can offer five years. How will that work for pharmaceutical companies?

Agriculture is an important area for Japan. I understand that Japan's tariff on beef (38.5%) will be lowered to 9%, almost twice as fast as the United States is reducing its tariff on trucks. On pork, Japan has a much lower tariff, which will more or less be cut in half. Japan's rice tariff will not be reduced at all.

The last controversial issue I wanted to mention is exchange rates. When U.S. President Barack Obama requested trade promotion authority—what we used to call “fast track” authority—concerns about exchange rates were an obstacle. Currency manipulation is not included in the TPP. This issue was resolved with a side agreement on exchange rates, under which all members commit to avoid manipulation and a group will meet annually to discuss it. However, this agreement has no enforcement mechanism, making it unlikely to satisfy those with exchange rate/currency undervaluation concerns.

The RCEP and TTIP

The RCEP negotiations began in 2012, several years after the TPP, but it existed as an ASEAN+ concept long before that. It is an agreement being discussed by the 10 members of the ASEAN group plus six countries with which ASEAN already has bilateral FTAs. It would be a major mega-FTA. It will never be as comprehensive as the TPP but it might have better odds of coming to pass. Of importance to the United States is that it includes China—China is the center—whereas the

United States seems to be the center of the TPP. In that way, it is important to note that Japan is in both.

The TTIP is even newer, having been launched in 2013. In a way, it is just a bilateral agreement between the United States and the EU, but the EU has 28 members so it does involve a large number of countries. “Tripartite Free Trade Area” is another new idea: an effort to combine three of the four already existing trade agreements in Africa.

Conclusion

Overall, FTAs and mega-FTAs are likely to be beneficial. It is important to ask what all this will mean for the WTO. I think it is a very important organization. Some thought that the TPP might pressure the Doha Round to succeed, but that did not happen. Some uncompetitive or less competitive industries may go out of business due to greater competition from other trade agreement members, and, if so, that will relieve some protectionist pressures. This should be helpful for the WTO and may lead to less frequent use of some of the administered protections it sanctions. I think less frequent use of these protections would actually help the WTO. In addition, parties to trade disputes will be able to choose whether to have their complaints resolved by the WTO or in the TPP or other dispute resolution mechanisms. This could reduce the importance of the WTO, but I imagine it will remain relevant. It will continue to be important in the types of negotiations it has always conducted, and which cannot be addressed under regional trade agreements.

Hopefully, the mega-FTAs will move us closer to free trade. Rules of origin are a problem. If the mega-FTAs grow larger, I think these issues will dissipate. The issue of sensitive sectors (sectors excluded from trade liberalization) is also significant. It is acceptable for tariffs in certain sectors to be phased out gradually, but permanent tariffs, such as Japan's rice tariff, are problematic. It remains to be seen whether the TPP will

come to pass. Donald Trump and Hillary Clinton both oppose the TPP. Trade is currently unpopular in the United States. There is hope, however, that it will come up during the lame duck session. It will need a lot of Republican votes and some Democrat votes. That will be hard to get. If the TPP doesn't pass in the United States, I think it's over. I think the TTIP would then also die. Other mega-FTAs, such as the RCEP, may or may not stop. Some believe a failed TPP would make the RCEP stronger. TPP failure could be traumatic to anyone thinking to create new bilateral agreements, and would result in protectionism.



Q&A

What do you think are the odds the TPP will pass in the lame duck session? Obama might want to leave a legacy by passing it. What are the dynamics?

I don't know the answer, given that I am an economist rather than a political scientist. Disagreement exists over the TPP's prospects. Some are optimistic that it will get passed. There are many pro-trade Republicans, and the Republicans have a majority in both the House of Representatives and the Senate. However, the more recently elected Tea Party Republicans are anti-business, anti-trade, and anti-TPP. Not all Republicans will vote for the TPP. On the Democratic side, Democrats have tended to be anti-trade for more than half a century. When NAFTA was negotiated by U.S. President George H.W. Bush and then came to Congress under President Bill Clinton, a Democrat who came to believe through becoming president that trade agreements were a good thing, he pushed for passage but mainly succeeded through Republican votes. How will Obama pull that off? Bill Clinton also had an advantage that will not be available to Obama due to the elimination of earmarks. It was formerly possible to add tiny pieces to legislation, called earmarks, specifically to benefit particular members of Congress and their constituents. Earmarks were a currency used to buy votes from the opposition.

I would like to add another implication of mega-FTAs to the WTO. The mega-FTAs will result in the creation of new rules and disciplines. The choice between the WTO dispute settlement procedures and the TPP dispute settlement procedures is likely to disfavor the WTO as its rules are almost half a century old. Many countries would choose the newer rules and disciplines.

That's a very good idea. For old issues such as underpricing and subsidies, that is not a problem. However, the WTO has never grappled with a range of new issues which are built into the TPP. If the TPP survives, the most optimistic scenario for a trade advocate would be for it to be ratified and expand over time until it ultimately supplants the WTO as the governing body for trade. One of the hopes is that the TPP will be able to flexibly negotiate new rules over time. The bigger it gets, the harder that's going to be. The WTO couldn't complete the Doha Round in part because of how many members it now has.

Legally, the Japan-Singapore agreement preceded the Japan-Mexico agreement. You missed one point concerning the WTO plurilateral approach. The WTO does have a role in negotiations by providing a forum. This doesn't mean all 161 countries, but even 20 can negotiate within the framework of the WTO. That is one positive aspect of the WTO. I would like to ask how we can cope with protectionism in the future.

I think our best defense against protectionism continues to be the WTO. If a country raises protectionist barriers that are contrary to its WTO commitments, other countries will file disputes. It's a slow and difficult process, but it does work. In most cases, the WTO is successful in eliminating the offending policies. Even more importantly, it has been true

and I think it will continue to be true, that at least within the U.S. government—and I think this is true of other governments as well—the issue is raised as to whether a certain action violates WTO commitments. There has been a desire not to break WTO rules. However, I think we have bigger problems to deal with at present than protectionism.

Industries are calling for more and more FTAs. Why is this?

I think this is because they want to engage in trade, and every FTA tends to lower tariffs. It is complicated and industries do not always take advantage of the tariff cuts that an FTA includes because of rules of origin and the complexity of satisfying them. However, they do take advantage quite often. Lower trade barriers are preferable to companies. Employees may not like them due to the fact that jobs may go to other countries, but the companies by and large benefit. Larger and more complex agreements pose no difficulties because a company only needs to look at the part of the agreement that relates to its specific industry.

I have a question on the RCEP, which was initially driven by the ASEAN countries. The idea was initiated by the Ministry of Economy, Trade and Industry about 10 years ago with the hope that ASEAN would proceed with this initiative. In 2010 at the APEC summit meeting in Yokohama, a dispute erupted over leadership of the Free Trade Area of the Asia Pacific (FTAAP). Afterwards, Japan decided to join the TPP. Work on the CJK (China-Japan-Korea) FTA also started around the same time as RCEP. China could not enter the TPP at this time because of the transaction rules and the TPP's approach to state-owned enterprises. If the TPP fails, China will be more likely to proceed with the RCEP. China would prefer an initiative in the Asia-Pacific region without the United States, so it would be a comfortable agreement for China. Judging from statistics, U.S. exports are expanding at this moment, and exports from China to the United States are decreasing. Some people see this as a revitalization of the U.S. manufacturing industry. Why at this time would the United States entertain anti-trade ideas?

The people taking anti-free-trade positions are not looking at the statistics and probably would not believe them if they did. It is true that the huge expansion of exports from China since it joined the WTO displaced many workers in the United States. The U.S. overall unemployment rate has fallen considerably, but the jobs that replaced the jobs lost have often not been as highly paid and in many cases are not even full time. A fairly large segment of labor in the United States feels correctly that it has been hurt by trade. It may be true that Chinese exports are falling while U.S. manufacturing is increasing, but the United States has just turned the corner. It hasn't gone past it yet. Nobody feels it has gotten better. There are real reasons for them to be unhappy based on what has happened over the last decade or two. I am not sure what we can do about this situation, especially when economists are diminishing in influence.

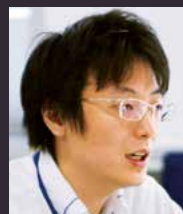
RESEARCH ACTIVITIES — Research Digest

In Research Digest, we interview authors of Discussion Papers (DP) to provide a simple introduction to their understanding of problems addressed in their papers, along with the major points and policy implications.

The Impact of a Permanent Income Shock on Consumption: Evidence from Japan's 2014 VAT increase

Takashi Unayama Faculty Fellow, RIETI

Interviewer: Yoshiyuki Arata, Fellow, RIETI



Profile: Takashi Unayama is an associate professor at the Institute of Economic Research, Hitotsubashi University. He has been a faculty fellow at RIETI since 2009. His research areas cover household behavior, applied econometrics, and the Japanese Economy. His works include “Measuring Intertemporal Substitution in Consumption: Evidence from a VAT Increase in Japan” with David Cashin, and *Review of Economics and Statistics*, vol. 98, no. 2, pp. 285-297, 2016.

When Japan's consumption tax rate, or value-added tax (VAT) rate rises, it causes the price of goods to increase proportionally, which in turn represents the proportional reduction in lifetime disposable income. In other words, according to the life-cycle/permanent income hypothesis (LCPIH), which posits that personal consumption behavior is determined by lifetime disposable income, we can expect that a VAT rate increase will cause consumption to fall proportionally. RIETI Faculty Fellow Takashi Unayama analyzed the impact on consumption of the April 2014 VAT rate increase from 5% to 8% and verified that this theoretical prediction holds true. He also focused on “hand-to-mouth” households, which do not follow the LCPIH, and identified how a VAT rate increase has impacted these households.

Overview of research

Could you outline your research?

A VAT rate increase in Japan causes the prices of goods to rise proportionally. This means that if we take future income as a given, lifetime disposable income will fall. Following the standard LCPIH, a decline in lifetime disposable income should bring about an equivalent decline in consumption. In a recent joint research study with David Cashin, an economist with the Board of Governors of the U.S. Federal Reserve System, using the Family Income and Expenditure Survey data on Japanese household expenditures, we examined whether the 2014 VAT rate increase caused any changes in consumption as predicted theoretically.

According to the LCPIH, consumption should decline as soon as households become aware of the VAT increase. To determine whether consumption has changed as the theory suggests, it is necessary to know when households become aware of the increase. However, in general, it is challenging to identify the precise point in time at which households become

aware of a tax increase (what we call the tax increase announcement time) because not every household is aware of the tax increase at the same time.

The policymaking process, starting with the government's recognition of a need for a VAT increase, takes a long time. In the meantime, people gradually share information, and under normal circumstances, everyone has already taken the VAT increase into account by the time the political process is completed.

The 2014 increase, however, was decided under special circumstances that made it possible to identify the time of announcement. The special circumstances were the fact that Prime Minister Shinzo Abe had a free hand to implement a VAT increase as soon as he took office. This is to say that the increase was decided not by a complicated legislative process but merely by a decision of the prime minister. Under those circumstances, when Prime Minister Abe held a press conference on October 1, 2013 to unveil the increase, attention was highly focused on the event, and this became a clear declaration of a tax increase.

Changes in consumption were observed at the time, taking October 1, 2013 as the tax increase announcement time. The result was an approximately 4% decline in consumption in October 2013, along with a decline of about 0.5% in April 2014 when the increase went into effect. This roughly corresponds to the 5% tax increase that was initially planned, so, in large part, changes were observed that were in line with the theory.

Do you mean the slowdown in consumption was just as predicted?

Actually, I had not expected the drop in consumption to be quite that large. Although I believed there would be some impacts of the drop, I thought that it would be difficult to observe them since the consumption level would be adjusted long before the increase. In fact, in another research study that I conducted with Cashin analyzing the impact of the 1997 VAT increase, we found hardly any change in consumption at the time set as the announcement time, and the change in

consumption upon implementation of the increase was very small.

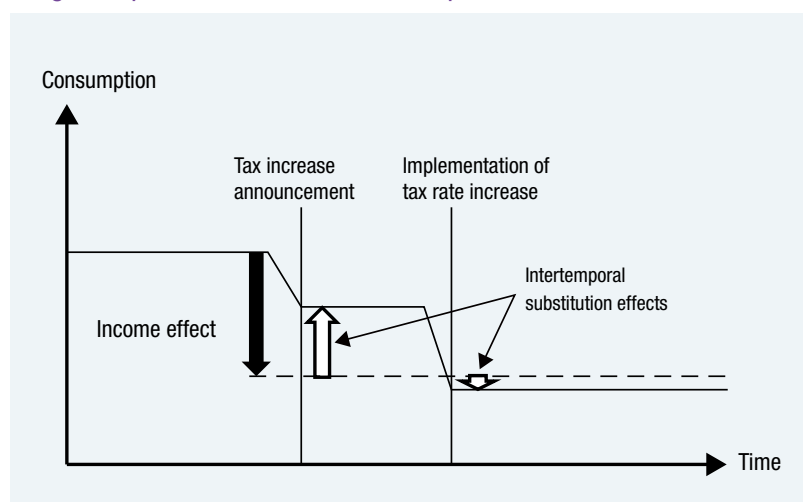
The results show, however, that Japanese households did not adjust their consumption until the time of the announcement as they believed there was enough of a possibility that the increase would be postponed or suspended. In other words, the change actually observed was as suggested by the LCPIH and could have been predicted by theory. What was not predicted was that the announcement is so clear that its impacts could actually be observable. In that sense, Prime Minister Abe's decision had a greater impact than predicted.

So the cause of the recent economic stagnation is the VAT rate increase?

What our analysis tells us is that the VAT rate increase had about a 5% effect on the decline in consumption compared to prior to the announcement of the increase, namely, the period through September 2013. Looking at subsequent trends, however, we see consumption declining again, starting at about the end of 2015. I don't really know the reason for this, but the timing makes it seem like it cannot be the effect of the VAT.

I believe there still is room for verification in the premise that a VAT rate increase deteriorates the economy. When the VAT rate increase occurred in April 1997, the preliminary figures that were announced based on economic indicators gave the impression that the economy had reached a turning point in April of that year, which exerted a traumatic influence on the Japanese households. Even if the impact of the VAT cannot be ignored, it is impossible to imagine that it has a catastrophic effect on the economy.

● Figure: Impact of VAT increase on consumption



VAT increase postponement effect

I understand your recent research looked into the first postponement of an increase in November 2014. Was the postponement effective in boosting the economy?

The results suggest that the postponement announcement raised consumption by more than 1%. Delaying a 2% increase by a year and a half should be equivalent to a 2% tax break during

those 18 months. Theoretically speaking, a tax break for a mere year and a half should not have much effect, so in consideration, it had a very great effect indeed.

One reason may be the possibility that it was perceived by some as a permanent tax cut. The increases in 1997 and April 2014 were implemented legislatively, but when an increase was postponed the first time, some households may have perceived this as meaning it was politically infeasible to increase the VAT again. This is a point I hope to fully consider going forward.

There was also a second postponement. Do you think that was the right thing to do?

The reason for the postponement was probably to maintain consumption levels, but if the goal had been for the government to enhance predictability in consumption trends, they should have thought more carefully about how to announce the postponement.

A tax rate increase will inevitably have a negative impact on consumption, but that impact can be kept from showing itself if enough time is taken to allow the information to penetrate in and be digested. Sudden policy changes, such as declaring a postponement to a tax rate increase, may have a temporary positive effect, but it will always be coupled with a downturn that negates it. The government should take plenty of time to communicate its policy so that households can predict future trends more easily so as to minimize policy uncertainty.

A situation like this with many sudden postponements exacerbates policy uncertainty, making it unclear what things households are taking into account. The government cannot predict how consumption will react the next time it takes action. This is not a desirable situation for either households or the government.

The government has not given up on its goal of turning Japan's primary balance to a surplus by FY2020. Is raising the VAT an effective way of achieving that?

Several points come to mind. First, some would say that if a VAT rate increase leads to a corresponding consumption drop, tax revenue will not rise and therefore the tax rate increase would be meaningless. That is a major mistake, however, because what we are looking at is real consumption. If taxes rise by 5% and real consumption falls by 5%, then nominal consumption is flat, given tax-inclusive prices. In other words, in principle, a VAT rate increase raises tax revenue by as much as the tax rate increase. In that sense, a tax rate increase has a positive impact for getting the fiscal balance back in the surplus.

Also, if instead of a VAT rate increase, the government raised the expected value of future income, consumption would recover and tax revenue would rise as well. This means that the growth strategy should be raising the expected value of future income growth. Of course, if that can be achieved, tax revenue can be increased from sources other than the VAT, and this is an extremely desirable thing. But achieving it is difficult and does not necessarily contradict a VAT rate increase.

● Table: Consumption changes by HtM status

			Before Announcement (Oct 2012-Sep 2013)	After Implementation (Apr 2014-Mar 2015)	Test for the difference
NHTM	ND	Mean	0.012	-0.015	-0.027***
		Std. Dev.	0.463	0.459	0.002
		Obs.	48,055	48,485	
HTM	ND	Mean	-0.006	0.008	0.014***
		Std. Dev.	0.449	0.449	0.0062
		Obs.	5,275	5,168	
	Total Income	Mean	-0.007	0.014	0.021
		Std. Dev.	0.988	0.889	0.013
		Obs.	4,916	4,845	

Note: This shows the deviation from the log of the average adjusted real monthly household income and non-storable, non-durable consumption. The adjusted figures are obtained from a regression of corresponding variables on month dummies and other control variables used in the regression analysis. *, **, and *** represent significance at the 10%, 5%, and 1% levels respectively.

If the government were to raise the VAT rate to 10%, some reduced tax rates would be applied. Would this be an effective economic measure?

This is somewhat off the topic of my recent research, but in general, applying reduced tax rates, which have a major impact on the relative price of goods, significantly distorts the market structure. Basically, this is not desirable. If we want to mitigate the impact of a tax rate increase on the macro economy, we should minimize the scale of the increase in the tax rate itself. On the other hand, if the purpose is to support households with certain attributes, such as the poor, transferring income instead of applying reduced tax rates has a lower administrative cost and would not, in my opinion, significantly distort the behavior of firms and households.

Existence of hand-to-mouth households

In your paper, you talk about the behavior of hand-to-mouth households. How does this relate to the LCPIH?

Many papers have already been devoted to testing the LCPIH. Some of these have made it clear that some households behave in ways inconsistent with the hypothesis. These are so-called “hand-to-mouth households.”

In the context of the LCPIH, a hand-to-mouth household is one that lives by spending all of its expendable economic resources that are immediately available: monthly income, immediately available savings, and the like. The expression probably conjures up an image of the poor, but it is basically a separate concept. If a household which earns one million yen a month spends its entire income, that is a hand-to-mouth household. Another household may have an income of only 100,000 yen per month, but if it manages to save even a part of

it, then it is not a hand-to-mouth household.

Hand-to-mouth households are thought to exist due to imperfect capital markets that keep households from borrowing appropriately and from practicing optimal consumption as determined by LCPIH. A household may appear to be restraining consumption due to a relatively low current income as well as an inability to borrow despite expectations of a higher income in the future and thus increased consumption.

How do hand-to-mouth households react to VAT rate increases?

Consumption by hand-to-mouth households does not decline even if a VAT rate increase is announced and households recognize that their lifetime disposable income will be reduced. The reason is that their optimal consumption level is higher than what their current income allows. So a VAT rate increase does not cause much change in household consumption even if optimal consumption level falls.

We actually observed changes in consumption by classifying households into “hand-to-mouth” and “non-hand-to-mouth.” The results confirmed that hand-to-mouth households do not lower their consumption at the time of announcement of a tax rate increase. In that sense, the results show that changes in consumption are consistent with our verification of the LCPIH.

We do understand, however, that Japan has a lower percentage of hand-to-mouth households than other industrialized nations. Therefore, we saw a reaction to VAT rate increases that was closer to a simple LCPIH.

Future research themes

Could you tell us about your research themes going forward?

As far as VAT rate increases are concerned, having more hand-to-mouth households provides a more stable support for consumption. Conversely, when governments temporarily give out cash as an economic measure, hand-to-mouth households respond more faithfully to such stimulus measures because these are households that would like to consume if only they had cash available. In that sense, hand-to-mouth households are a desirable thing for the government.

However, we do not intuitively think it is desirable to adopt policies that actively try to increase the number of hand-to-mouth consumers with some kind of constraint. On the other hand, it is conceivable that hand-to-mouth consumers will increase if there is an expectation of future income growth and a rise in interest in illiquid assets such as housing.

In that sense, when a growth strategy performs well, the government has more freedom to undertake policies. In the future, I would like to continue verifying the LCPIH as well as further addressing the role of hand-to-mouth consumers in economic initiatives.

DP No. 16-E-052

“The Impact of a Permanent Income Shock on Consumption: Evidence from Japan’s 2014 VAT increase” David Cashin (Board of Governors of the Federal Reserve System), Takashi Unayama (Faculty Fellow, RIETI)

<http://www.rieti.go.jp/publications/dp/16e052.pdf>

Shock Propagations in Granular Networks

Daisuke Fujii Fellow, RIETI

Interviewer: Yukiko Saito, Senior Fellow, RIETI



Profile: Daisuke Fujii, Postdoctoral Research Fellow, University of Southern California, also has been a Fellow at RIETI since 2014.

His expertise includes international trade, firm dynamics and macroeconomics, supply chain and firm networks, and urban economics.

His works include "Essays on International Trade Dynamics," University of Chicago Dissertation, 2014; "International Trade Dynamics with Sunk Costs and Productivity Shocks," 2014; "Determinants of Industrial Coagglomeration and Establishment-level Productivity" with Kentaro Nakajima and Yukiko Saito, 2015; and "Indirect Exports and Wholesalers: Evidence from Interfirm Transaction Network Data" with Yukako Ono and Yukiko Saito, 2016.

Modern societies are supported by complex production networks. The structures of production networks (inter-firm procurement, sales, etc.) have a variety of macroeconomic impacts. Much research has been done on the propagation effect of shocks in production networks, but so far there has not been much empirical research at the firm level. Using large-scale inter-firm transaction data, RIETI Fellow Daisuke Fujii examined the characteristics of transaction networks and their relationships to sales growth rates at firms and such rates at those firms' suppliers and customers (i.e., upstream and downstream firms), analyzing the extent of a shock propagation. This research has some effective implications for the building of a theoretical model of production networks, which could also aid in developing policies that help match firms with each other.

Background of the research

Your area of specialty is international trade, so what spurred your interest in shock propagations in inter-firm networks?

Originally, trade theory concerned itself mainly with nation-to-nation trade, using macro data, and began with the Ricardian trade theory. Then in the 1980s, Paul Krugman and others started developing new models. The past 15 years have seen a great deal of research in the United States that incorporates the heterogeneity of firms into trade models, but these models were built on the assumption that every firm is independent and the empirical research has largely followed this trend. Therefore, the clear interactions between firms, especially inter-firm production networks through intermediate inputs, did not factor into the trade models, so I became interested in work that implied this.

I also read papers on propagations of shocks after the financial crisis, the bankruptcy of Lehman Brothers, and the Great East Japan Earthquake. I found evidence of how shocks at individual firms could propagate to the entire economy in those papers. I therefore realized how important it is to demonstrate this by theoretically incorporating it into our models. This had not yet been done in the field of international trade, so it was my starting point. However, I also realized that I'd need to truly understand the mechanism through which a shock at an individual firm could propagate to the entire economy before incorporating it into trade theory.

What has been found out already so far about the mechanism of shock propagation?

In 2010, Xavier Gabaix pointed out that in economies where there is some bias in the distribution of firm scale, the individual shocks of large firms can account for macro fluctuations. Then, a 2012 paper by Daron Acemoglu et al. provided a microfoundation to the idea by considering inter-firm transaction networks. Namely, firms and industries that have many partners also have high sales, and that is why they can have such a big effect on macro fluctuations.

Although the Acemoglu et al. model treats all connections to other firms as being reflected in sales and thus can be used to create an indicator of impact, it still describes a one-to-one relationship with sales. In other words, they were looking only at the scale of sales to explain the impact of individual firms on macro fluctuations and did not include an explicit network model.

But if we look beyond the differences caused by the distribution of large and small firms and expand our interest to the route by which shocks propagate, the network structure becomes very important. When it comes to macro fluctuations, economists largely understand that firms with many connections have a big impact, but it is critical that we really grasp the kinds of firms to which such firms are connected and the route and mechanism through which shocks propagate. This is important, for example, when governments are thinking about using public funds to rescue specific firms.

On the research content

What was your perspective as you analyzed shock propagations in your recent paper?

I started with the premise that the paper would not go into the causal relationship, and just focused on the correlation between a firm's sales growth rate and its partners' sales growth rate. You wrote an excellent paper on shock propagations following the Great East Japan Earthquake, which delved into the causal relationship. My perspective was different, however. My starting point was to get an overall panoramic view by covering a large number of firms and sectors. I was trying to get a comprehensive understanding of how the size of the shock propagated varied based on factors such as firm characteristics.

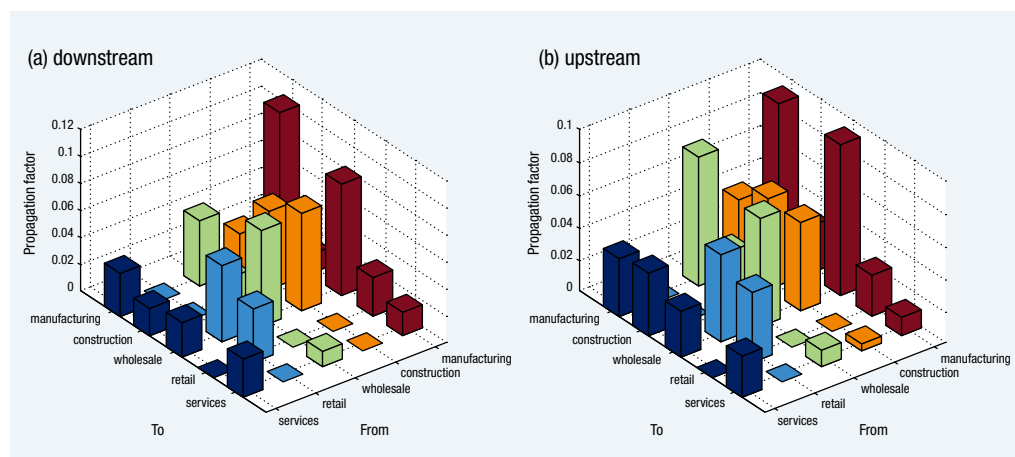
My own research tells me that shocks propagate out to indirect

partners and that within the network structure, many firms are indirectly related. I understand that it is very important to consider indirect partners. What innovative ideas and analysis techniques did you use in your research?

When you try to measure the relationship between an individual firm's sales growth rate and that of its partners, there is the well-known problem that a network structural bias will assert itself when a simple regression analysis is done. To overcome this, I performed my analysis with a spatial autoregressive model, such as that which is used in spatial economics among others. This model basically measures the size of the propagated shock taking all network effects into account, so my analysis also accounted for indirect partner effects.

I also carefully sorted out the shocks based on whether they propagated to the firm's suppliers (upstream firms) or to its customers (downstream firms). Plus, an additional value of this research is that I was able to examine how the propagated shocks differed based on firm characteristics such as industry sector. I took several different approaches to examining how the propagation characteristics differed from each other. For example, I tried sorting the firms into manufacturing and non-manufacturing firms, breaking them down into five sectors (see Figure), sorting them out by size, and so on.

● Figure: Propagation factors of five sectors



Lessons from analysis results

What did you learn from the analysis results?

I learned that basically, in each year, there were bigger shocks to upstream partners than downstream partners. In other words, the upstream propagation factor is higher in all years. As I mentioned before, this analysis looked at correlations and not causal relationships, but one possibility is that it is more difficult to find alternatives when events occur on the customer side than when they occur on the supplier side.

By industry, the results show that in all years, there were much greater propagation effects for manufacturing firms than non-manufacturing firms. The same phenomenon was discussed in a paper by Javier Cravino and Andrei Levchenko in the forthcoming *Quarterly Journal of Economics*. That paper looked at the correlation between sales at parent companies and at their overseas subsidiaries. Here too, the results indicate a much higher correlation for manufacturing firms than service

firms. There is a strong possibility that this occurs because manufacturing firms handle physical intermediate inputs that are difficult to substitute if something happens.

When I divided the firms into five sectors, again, the connections between manufacturing sectors had the highest propagation factor. Conversely, the results for retail and service sectors showed practically no propagation factor. This shows that retail and service sectors are not so dependent on their suppliers and customers.

Did you find any differences between long-term and short-term shock propagation, or any difference by year and so on?

I was looking at yearly data, so essentially all of the shocks were short-term, but over the long term, I think shocks are absorbed and softened to some extent. I believe that there are probably differences in long-term and short-term propagation based on sectors.

Also, I was analyzing the years 2006, 2011, and 2012. Although there was some variability among the numbers with regard to the size of the shock propagated, the fact is that it would be hard for me to illustrate relationships with changes in business conditions since there are findings from only these three years of data. If I had 10 years of data, for example, I

could correlate the findings with business cycles, so I would be very interested in expanding the scope of this research in the future.

If we're going to talk about shock propagation, I'm sure there are those who would want to know what we should do if there is, for example, a large-scale natural disaster or exogenous shock. Does your research have any policy implications in this area?

The finding that there is a high propagation factor in the manufacturing industry was

very robust, so it is important that policies take this into account.

In the manufacturing sector in particular, there are suppliers that make very crucial components on a small scale and wholesale them all around. Policies should look at the relative impact of connections, even down to the parts that might not be noticed at that scale, and provide support accordingly.

Shocks are not always bad things; there are good shocks such as innovation. We also have to consider how such shocks are propagated. Does your recent analysis have any implications for how to propagate positive shocks more strongly?

The research did not consider endogenous network formation, but I think it would be a good idea for the government to create a system that matches firms with each other. If an innovation occurs somewhere, the program could bring together firms that stand to generate significant profit from that innovation but are not yet connected to each other. I believe that this would

greatly enhance the propagation effect. I think it would be very worthwhile to research the policy side of this in the future.

Future direction of research

Do you have any new solutions or approaches to the issues you analyzed?

First, I would like to use exogenous shocks to analyze the causal relationships of shocks propagated in a network. What I am considering now is to expand the scope of my research, in which I would like to examine how fluctuations in sales at exporters and importers are propagated to suppliers and customers in Japan by use of data on foreign trade, exchange rate fluctuations, and so on.

Another thing I would like to do is to build a model that explicitly takes into account network formation and to examine how networks themselves change. My recent paper took networks as a given, but networks change over the medium to long term. So I think this will be a very important point going forward. The question of what kinds of firms connect with each other and how links become severed when something happens has extremely important policy implications.

How are you thinking of developing this research going forward?

There are two big challenges. One is building a trade theory model that really considers inter-firm networks within Japan. The trade theory models used until now do consider the heterogeneity of firms, but they do not go as far as inter-firm networks. Quite a few international trade models have been built lately that include input-output (I-O) tables, and those are used to discuss value-added trade and indirect trade. This is exactly the kind of research we need.

However, analysis using the existing I-O tables essentially cannot distinguish between the intensive margin (an intensification of trade, such as value of trade per firm) and extensive margin (an extension of trade, such as number of trading firms). The significance of building a trade theory model that accounts for inter-firm networks would be that it could explicitly handle even the network's formation and the extensive margin. It would be possible to expand the analysis to include the firm's process of deciding whether to enter a market in the first place. I would like to build a theoretical model that accounts for a firm considering whether to get involved in foreign trade in the first place, and if it does, the model should allow it to think long-term about the kinds of firms with which it will form a network.

Indirect trade is going to be very important going forward. I previously wrote a paper with you and Yukako Ono on the role that wholesalers play in indirect trade. For example, many of Toyota Motor Corporation's suppliers in Japan are small and do not engage in foreign trade, but the added value that they create is traded through the medium of a product: a Toyota vehicle. In that sense, even domestic firms are not unaffected by shocks

from abroad. That is another area I would like to research.

Another research topic that I would find very interesting is to look at the dynamics of network formation. There is not a lot of data on large-scale inter-firm networks, even outside Japan. If we follow firms' life cycles from a time series and panel perspective, it is important for the sake of spotting macro fluctuations to look at the dynamics, namely, with what kinds of firms the subject firm is starting to do business, how it grows with its partners, and how it exits markets. So, I would like to continue my investigation in those two directions.

What kinds of policy suggestions do you think could be derived from further research in those two directions?

For example, current foreign trade statistics can only measure direct trade, but out of all the firms in business, there are very few doing direct foreign trade—just a small percentage. However, if we expand the scope to include firms with connections to those firms doing foreign trade, the number increases greatly. Even firms that were always thought to do no foreign trade are likely to be indirectly exporting quite a bit of their value overseas. When we try to estimate the effect of trade policies such as the Trans-Pacific Partnership (TPP), we have to consider the impact on those firms doing indirect trade.

If you consider inter-firm networks, then even firms that are non-exporters under the existing definition are affected by foreign risks and exchange rate fluctuations. And that impact also extends to monetary policy. The monetary policy of the Bank of Japan influences exchange rates in the short term, which results in a secondary effect, namely, changes in corporate earnings at firms that conduct foreign trade. The Nikkei Stock Average, which is compiled primarily from exporting firms, correlates strongly to the exchange rate. The effect that monetary policy has on firms doing foreign trade extends also to the partners of those firms. Therefore, even non-exporting firms would likely feel some impact, which would vary depending on their distance from the exporting firm in the supply chain. Transaction data from Tokyo Shoko Research, Ltd. (TSR) can quite explicitly track this, so I think we should be able to see the propagation effect, particularly of shocks from abroad and from monetary policy, in channels where we have not been able to see them up to now.

Moreover, I believe that research into the dynamics of transaction networks can offer suggestions to how governments should support network building. For example, a younger firm may form and sever its connections with a variety of firms because of the asymmetric nature of partner information. As time goes by, however, I predict that the quality of inter-firm matching will become clearer and stable transactional relationships will form over the long term. If there were a platform where users could share a certain amount of information, such as what firm the user should first connect itself to, it would undoubtedly be very effective at the initial matching stage. I would also like to look for implications such as a policy of lowering costs when such firms form links.

Social Challenges of Automated Driving: From the development of AI technology to the development of relevant rules

Shunsuke Managi

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Environmental Engineering, School of Engineering,
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Development of AI rules

Artificial intelligence (AI) is on the move, so much so that it is no exaggeration to say that not a single day goes by without seeing an article mentioning AI in newspapers. A major challenge at the moment is a lack of progress in the discussion of how our society should

determine rules to be programmed well in advance when AI comes into greater use.

No matter how the volume of big data or the speed of computing may be increased, and regardless of how the entire big data process may be streamlined, we cannot expect any drastic change in society—such as one in which nearly half of workers would be replaced by AI—without first building consensus over what should be the basic objective of using AI, how agreement can be reached on the objective, and how to come to terms with various issues that could pose a social dilemma.*

A driver's failure to stay alert while in self-driving mode due to misunderstanding about the level of automation could result in a serious accident, for instance, when the car turns out to be not as automated as had been assumed by the driver.

In the United States, the driver of a Tesla Model S electric car was killed on May 7, 2016 after his car collided into a trailer. As the Tesla was operating in autopilot mode at the time of the accident, the automated driving systems have been cited as a possible cause of the crash. From the very beginning, Tesla Motors, Inc. has been insisting that it is the driver's responsibility to keep his or her own safety. While the National Highway Traffic Safety Administration (NHTSA), a unit of the U.S. Department of Transportation, is still investigating the operation of the systems at the time of the accident, a consumer group has been denouncing Tesla Motors, saying that the automaker should stop calling its technology "autopilot" if it holds drivers responsible for any

accident involving the technology. What we can see from this particular accident is that it is for humans—not AI—to decide the degree of responsibility to be assumed by humans as drivers.

Going forward, more automated driving systems are expected to come into use and replace relatively simple driving assistance systems. And if any ambiguity exists as to whether it is humans or AI to hold ultimate decision-making authority, it must be clarified in advance.

Expectations on automated driving and challenges ahead

Autonomous cars (also known as robotic cars or driverless cars), which are capable of navigating and reaching a destination without a human driver behind the wheel, are drawing much attention including media coverage. In what follows, I would like to introduce how automated

driving is perceived as a foundation for considering the ongoing debate on AI and future debate on artificial life.

In a bid to promote our understanding of the current level of public acceptance of automated driving in Japan, we conducted a large-scale questionnaire survey covering more than 240,000 individuals. The primary purpose of this survey was to assess the user acceptance of fully autonomous driving. Based on the assessed level of acceptance, we then examined the market potential challenges of fully autonomous vehicles under the business-as-usual scenario. We also explored what type of people would purchase a fully autonomous vehicle under varying conditions (price and functions), and what concerns they have in introducing or purchasing one.

Asked how soon they think they might want to purchase a fully autonomous car, most respondents (more than 80%) answered between one to 15 years' time, bringing

the average timing of purchase to approximately 9.5 years' time or FY2025. With more than 70% of the respondents found to have in mind some idea about the timing for purchasing a fully autonomous car, public awareness and expectations of autonomous driving are fairly high.

Next, we asked whether they would purchase an optional feature that enables autonomous navigation and driving, if they are to purchase a car. Those who responded positively accounted for 47%. A closer look at those respondents reveals a significant difference by gender, with a disproportionately large number of male respondents showing willingness to purchase it. Meanwhile, 41% of those who currently do not own a car and 44% of those who do not have a driver's license responded positively. From the viewpoint of automobile makers, they can be seen as a new layer of customers because autonomous driving capabilities would be a must-have feature for them.

Asked when or in what situation they would activate the autonomous driving mode, approximately half of the respondents said they would do so while driving on highways. Also, more respondents said that they would use the mode on lightly trafficked roads than those who intend to use it on heavily trafficked roads. Thus, their general assumption is that autonomous driving is for use when roads are easy to navigate and do not require sophisticated driving techniques, as would also be the case when driving on highways. The most conspicuous difference between genders was observed in their responses to whether or not they would rely on autonomous driving while on highways, which is attributable to the combination of two factors, i.e., that female drivers use highways less often than their male counterparts and that women are less inclined to purchase autonomous driving capabilities.

We also examined respondents' willingness to pay

(how much they would be willing to pay) by type of functions: 1) autonomous driving at high speed, 2) autonomous driving in a traffic jam, 3) autonomous parking, and 4) fully autonomous driving. The average amount the respondents would be willing to pay was approximately 110,000 yen for autonomous driving at high speed, 100,000 yen for autonomous driving in traffic jams, 90,000 yen for autonomous parking, and 190,000 yen for fully autonomous driving, when including those who chose "zero yen" as their answer. When limited to those with an intention to pay a certain amount, the figures rise to approximately 170,000 yen (n=153,625 people) for autonomous driving at high speed, 160,000 yen (n=157,409) for autonomous driving in a traffic jam, 160,000 yen (n=137,985) for autonomous parking, and 290,000 yen (n=163,200) for fully autonomous driving. As such, the amounts people would be willing to pay for the partial autonomous driving capabilities, particularly for autonomous parking, are high relative to the amount they would pay for fully autonomous driving. However, those amounts are far below the prices at which automobile makers wish to pay for those capabilities, indicating that there remains a significant gap to close before they can sell those products to enough consumers.

Next, we examined the amount the respondents would be willing to pay for each autonomous driving capability by type of respondents. Respondents without a driver's license showed less willingness to purchase a fully autonomous driving capability, but would pay a higher amount for the feature than the average respondent. Meanwhile, a comparison of respondents owning a car and those not showed that the latter would pay less for fully autonomous driving capability. We also found that elderly people are willing to pay a relatively high amount for fully autonomous driving capability.

Advantages		Selected as one of multiple responses	Selected as one of top three responses
1	It will eliminate concerns about elderly drivers.	45.44%	29.92%
2	In areas in which it is difficult to park/exit a vehicle, vehicles will be able to park automatically after occupants get out.	37.25%	21.01%
3	The burden on drivers will be reduced.	36.42%	18.92%
4	There will be an automatic braking function for emergencies.	35.54%	14.66%
5	The incidence of traffic accidents as a result of driver error (one's own or another's) will be reduced.	32.43%	18.38%
6	Long-distance travel will become easier.	32.32%	13.39%
7	It will be possible to summon a car to any location.	31.67%	14.31%
8	Drivers will be able to freely switch between driverless and manual operation.	28.60%	7.91%
9	People will be able to use their time in the car more effectively.	23.95%	8.20%
10	It will be possible for cars to sense traffic signals and take off automatically.	22.19%	2.55%
11	Driverless lane changing, passing, and merging will be possible.	20.85%	3.14%
12	It will be possible to transport goods in driverless vehicles.	18.12%	5.44%
13	Driving licenses might become unnecessary in the future.	12.18%	4.36%
14	It may no longer be necessary for humans to take responsibility for traffic accidents.	11.72%	4.31%
15	People's sphere of action will be expanded.	10.72%	2.08%
16	It may become possible to transport children by themselves (without accompanying guardians).	4.01%	0.57%
17	Owning a driverless vehicle will serve as a status symbol.	2.02%	0.24%

● Table: Perceived advantages of fully autonomous driving

- The fact that "It will eliminate concerns about elderly drivers" was the top response. ⇒ Manifestation of concerns over elderly drivers
- Demand exists for the introduction of driverless vehicles as a response to traffic accidents.
- More than 10% of respondents consider it beneficial as they will not need a driver's licenses.
- The choice regarding the importance of status was the lowest-ranked response. ⇒ Fewer than 1% of respondents selected this response as their top three responses.

Source: Survey on the Impact of Transportation Environment on Lifestyle Satisfaction Conducted by Kyushu University in November 2015

Subjects: Japanese citizens
Number of respondents: 246,642
Method: Internet questionnaire
Response rate: Approximately 25%

Advantages and disadvantages of autonomous driving

of fully autonomous driving, reflecting respondents' anxiety about the dangers of elderly driving. Second, fully autonomous driving is seen as a necessary effective measure to reduce traffic accidents. Meanwhile, more than 10% of respondents said that the possible elimination of the need to obtain a driver's license as an advantage of fully autonomous driving. This is incompatible with the idea of requiring some sort of license, such as the one currently being discussed in California. Serving as a status symbol was the least selected as an advantage of owning a fully autonomous car, showing a distinctive difference from the time when hybrid cars first hit the market and celebrities rushed to buy them.

The greatest disadvantage was uncertainties about the safety of the technology, indicating that there still remain deep-rooted concerns. Since this is based on the survey conducted before the recent fatal Tesla accident, the level of concerns may be even higher today. Those who cited the possibility of information leakage and the impossibility of driving at a speed above the statutory limit were small in number. Instead, the possibility of children traveling on their own without their parents or guardians knowing was cited by more than 40% of respondents, pointing to the need to establish an appropriate licensing system and/or regulations for users in order to increase the public acceptance of fully autonomous cars.

What can be expected in the future?

different. Unable to understand the mechanism of autonomous driving, they are worried about the possibility of accidents and consider it as a disadvantage, and this poses many potential challenges to the deployment of autonomous cars.

Regarding the Tesla accident, automotive specialists point out that the vehicle in question cannot be defined as an autonomous car in a strict sense because the autonomous driving technology used in it is at a substandard level.

We also asked respondents what advantages and disadvantages they see in fully autonomous driving. First, they found the following advantages. (See [Table](#)) The elimination of concerns about elderly drivers was found to be the greatest advantage

Many consumers see advantages in having fully autonomous cars on the roads. One big reason is that autonomous cars are expected to reduce car accidents based on the way their functions are designed. However, from the viewpoint of consumers, things look

However, the company sold the vehicle as an autonomous car and thus cannot excuse itself by saying that its autonomous driving feature was still in public beta mode.

It is undesirable to make plans for commercialization based on the assumption that people understand what is explained. It is reasonable to expect more accidents involving autonomous driving in the coming years. Autonomous driving might be able to prevent up to 90% of the traffic accidents we see today. However, as the distance traveled by autonomous cars is increasing across the world, responding to accidents may pose a huge challenge. Ethical issues could arise as well. Suppose that autonomous driving is not functioning and an accident is unavoidable. In this situation, should the human driver hit a wall to stop the car or hit a pedestrian instead? We will be facing, and be required to find an answer to, various situations where an individual's ethics is questioned socially as is the case in the above example. This is not a technological issue but a social issue that we face. If we are to deploy autonomous driving from an early stage of this technology, we must promote vigorous open discussions and deepen our understanding as to how we should solve various issues—including ethical ones—surrounding autonomous driving.

Lastly, we need to understand the limits of a human's ability to stay alert. Suppose that in the future we have a highly advanced technology that allows for almost fully autonomous driving. Someone, who used to drive in the past, is traveling aboard an autonomous vehicle, relaxing and doing almost nothing. Now, if suddenly encountered with a situation that cannot be dealt with automatically or if the vehicle's autonomous driving capabilities malfunction, would the human ex-driver be capable of coping with the situation? Even if a human aboard an autonomous car is authorized to take control of the vehicle when the need arises, he or she may be too panicked to respond quickly. In promoting the automation of driving, rules must be developed by taking into account human behavior in an unfamiliar situation. Although some jobs will be lost to automation, the development of new rules will create new types of jobs because rulemaking is an act of humans.

Similar arguments can be made about artificial life, which is another direction in which the ongoing debate on artificial intelligence is going. As the term literally indicates, artificial life is about artificially providing life functions to machines. Artificial life would enable us to exploit numerous judgments that have been made by humans in similar situations instead of trying to achieve social consensus. The ongoing efforts for the development of artificial life are focused on fundamental research. However, as with the case of artificial intelligence, things are moving in the direction of taking the aspect of real-world applicability into greater consideration.

With all such technological possibilities in mind, we need to consider how we should assimilate those possibilities into our society.

Footnote:

* With an aim to address those issues, we have launched a research project entitled "Economics of Artificial Intelligence" at RIETI. (See "Research Program V" on p. 36-37)

Evidence of “Evidence-based Policymaking”



Masayuki Morikawa

Vice Chairman and Vice President, RIETI

The importance of evidence-based policymaking has been highlighted in recent years. International institutions led by the Organisation for Economic Co-operation and Development (OECD) and the World Bank are promoting this policymaking approach vigorously, while some advanced economies, such as the United States and the United Kingdom, are taking concrete steps to put it into practice.*¹ The approach has been applied to various policy areas including healthcare, social security, labor, and education. Japan has recently begun to take similar steps in some policy areas such as science and technology. In a bid to promote evidence-based policymaking, the Ministry of Economy, Trade and Industry (METI) seems to be planning to mandate the presentation of empirical evidence, such as statistical data and research findings, as a requisite to introducing new policy programs. The move should be welcomed as it contributes to the effective use of limited financial, personnel, and other policy resources.

Roles of policy think tanks

In order to ensure that evidence-based policymaking will deliver its intended effects, not only policymakers but also relevant research institutes have important roles to play. For instance, IZA, a leading think tank in Europe which has a partnership with RIETI, has a website section called “IZA World of Labor: Evidence-based policymaking,” which is designed to provide policymakers with findings from academic policy research in the areas of labor economics. Its research findings have also been compiled and published as a book (Zimmermann and Kritikos, 2015). High-quality research findings are presented in a way that is easy to understand for the general public on various issues of great interest to Japan including non-standard employment (part-timers, agency workers, etc.), gender inequality, child care support, work-life balance, foreign labor, and employer-provided education and training.

RIETI also takes it as its important mission to put forward evidence-based policy proposals. Specific examples

include Fujita ed. (2016), a recent publication from RIETI, which has a subtitle entitled “Evidence-based Policy Recommendations” and provides a bird’s eye view of research findings in each area relevant to putting the Japanese economy on a sustainable growth path.

However, in order to promote evidence-based policymaking, we first need to have evidence as to how such an approach is perceived by Japanese policymakers, to what extent it is being utilized in a practical policymaking setting, and what factors, if any, stand as obstacles to taking such a policymaking approach.

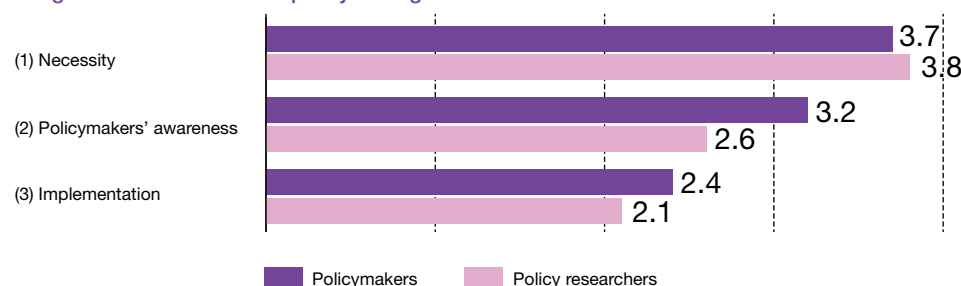
Actual state of evidence-based policymaking

With an aim to link RIETI’s research findings to policy planning and formulation, we conducted surveys to find out how policymakers and policy researchers perceive evidence-based policymaking, asking their views on:

1) the necessity of evidence-based policymaking, 2) policymakers’ awareness, 3) progress hitherto made in implementing evidence-based policymaking, and 4) factors inhibiting the implementation thereof. In doing so, we thought it would be desirable to be able to identify the perception gap between policy researchers (including think tank researchers and academic scholars engaging in policy research) and policymakers. Thus, we conducted two separate surveys on two different samples—(A) government policymakers and (B) policy researchers (RIETI fellows)—using almost identical questionnaires.*² Since these are simple surveys conducted on small samples, I have considerable reservations about interpreting the survey results. But I would like to introduce some of our preliminary findings.

Aggregate survey results regarding the first three questions are shown in **Figure 1**. The number beside each bar, which takes the value of one through four, represents the average score rated by respondents in each group using a single-answer, multiple-choice format. The higher the value is, the greater the tendency is for the respondents to believe

● Figure 1: Evidence-based policymaking



Note: Rated on a scale of one to four. The higher the value is, the higher the level of necessity, awareness, or implementation (as applicable) is.

that “evidence-based policymaking is necessary,” “policymakers are aware of evidence-based policymaking,” or “evidence-based policymaking is implemented” as applicable, with a value of 2.5 indicating that the positive and negative responses are roughly equivalent.^{*3}

Both policymakers and policy researchers showed similar patterns in their responses. Respondents in both groups are quite forthcoming in acknowledging 1) the necessity of evidence-based policymaking. However, they gave rather low scores to 2) policymakers’ awareness of evidence-based policymaking, and their evaluations were even lower on 3) the implementation of evidence-based policymaking. Meanwhile, a comparison between the two groups show that policy researchers’ evaluations on policymakers’ awareness of evidence-based policymaking are lower than policymakers’ self-evaluations, and the same tendency is observed on the degree of its implementation.^{*4}

One interpretation of this is that the differences represent perception gaps between the two groups on the quantity and quality of evidence deemed necessary. Whether in making budget requests or amending laws, there are many hurdles that need to be cleared, such as priority setting within each organization, scrutiny in the budget-making process, and deliberations in the Diet, making it impossible to formulate any policy without evidence. Furthermore, in a relatively recent move, government policy programs have been made subject to ex post evaluation, for instance, through the administrative project review system launched several years ago.

At the forefront of policymaking, aggregate statistical data, information obtained from interviews with companies, and overseas case examples tend to be used as evidence showing the need to maintain, alter, or scrap specific policy programs. In contrast, policy researchers are more inclined to look to detailed empirical analysis in assessing the effects of policy measures. For instance, they would try to determine whether

an observed correlation is a causal relationship, or they would want to know the size of effects in quantitative terms. Also, there is a growing tendency to put emphasis on the estimation of causal relationships based on evidence from natural experiments and more recently on policy evaluation using randomized controlled trials (RCT).

The quantity and quality of evidence needed in actual policy

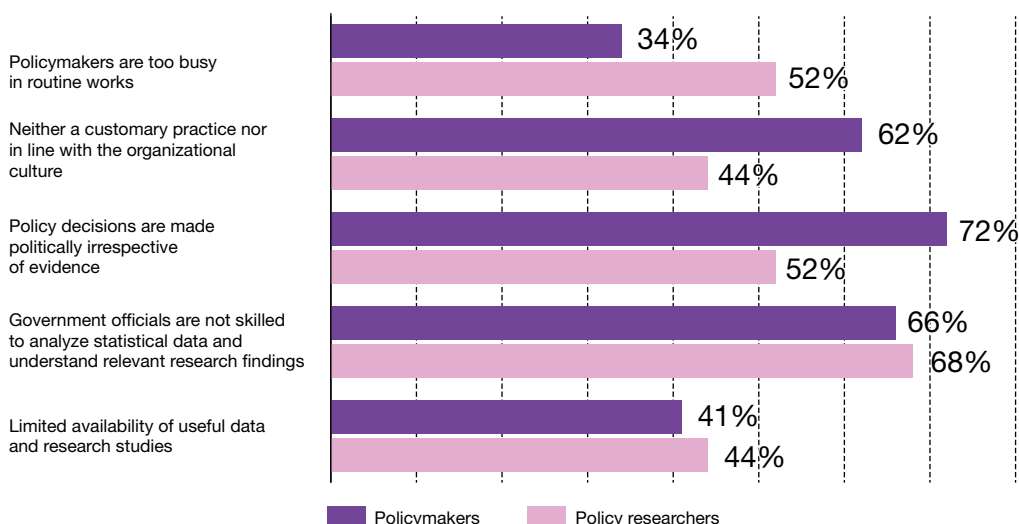
formulation vary depending on the skill levels of senior decision makers and examiners. This is a question of whether it should be considered sufficient enough to present specific examples and show the existence of a correlation, or if further evidence is required.

Obstacles to evidence-based policymaking

Figure 2 illustrates responses to the question concerning factors inhibiting evidence-based policymaking.^{*5} It is a multiple-answer question and each percentage value represents the ratio of respondents who selected the answer.

“Policy decisions are made politically irrespective of evidence” is the most chosen answer by policymakers, followed by “Government officials are not sufficiently skilled to analyze statistical data and understand relevant research findings,” and “Evidence-based policymaking is neither a customary practice nor in line with the organizational culture” in that order. This compares to

● Figure 2: Obstacles to evidence-based policymaking



Note: Multiple answers are allowed and each percentage value represents the ratio of respondents who selected the answer.

“Government officials are not sufficiently skilled to analyze statistical data and understand relevant research findings,” “Policymakers are too busy in daily works and unable to find time for evidence-based policymaking,” and “Policy decisions are made politically irrespective of evidence” selected by policy researchers, showing some differences in the patterns of responses between the two groups.*6

It is interesting that policymakers, who appear very busy in the eyes of policy researchers, do not find their heavy workload as constraints on evidence-based policymaking.*7 “Government officials are not sufficiently skilled to analyze statistical data and understand relevant research findings” was selected by roughly two-thirds of the respondents in each group, suggesting that improving government officials’ analytical skills is crucial to evidence-based policymaking. It is expected that not only the use of microdata collected for government statistics but also the applications of big data and artificial intelligence may become feasible in the coming years, and it may require much higher levels of skills to utilize them.*8

Conclusion and some reservations

Few respondents deny the necessity of evidence-based policymaking. However, when asked whether they think evidence-based policymaking is being implemented in Japan, both policymakers and policy researchers are far from positive in responses. In addition to

evolving the existing policymaking and ex post evaluation mechanisms, government officials need to improve their skills to utilize academic research findings. At the same time, it is also important to enhance the interest of academic scholars and researchers in real-world government policies, and thereby accumulate and disseminate in an easy-to-understand way research findings useful for policymaking.

As aforementioned, the surveys were conducted on small samples, which are presumably biased in favor of evidence-based policymaking as respondents contained therein are either policymakers having contact with RIETI or researchers engaging in policy research at RIETI. There is no ruling out the possibility that policymakers who have no contact with policy research and scholars who have very few occasions to interact with policymakers may have different views. Also, the ratings provided by respondents on various aspects of evidence-based policymaking are based on their subjective judgments.

Also, even though both policymakers and researchers definitely affirm the importance of evidence, they may differ in their understanding of what constitutes sufficient evidence. Finding ways to bridge such gaps between policymakers and researchers is an important role that policy think tanks, including RIETI, are required to play.

Notes:

- *1 Particularly, in the United Kingdom, evidence-based policymaking has been promoted for nearly 20 years since the government of Prime Minister Tony Blair (see Ieko et al., 2016).
- *2 The survey of sample (A) was conducted from December 2015 through January 2016 and for sample (B) from February through March 2016. The number of effective responses is 192 for sample (A) and 50 for sample (B). I am grateful to Mr. Junichi Ogawa and Ms. Akemi Mogi of RIETI who helped with conducting the surveys. I would also like to express my appreciation to the policymakers and researchers who took time from their busy schedules to respond to the surveys.
- *3 Questions asked in 1) through 3) are as follows: 1) Do you think evidence-based policymaking is necessary?; 2) Are you cognizant of an evidence-based approach in performing your policymaking duties? (for policymakers) / Do you think that policymakers are cognizant of an evidence-based approach in performing their policymaking duties? (for policy researchers); and 3) Do you think that evidence-based policymaking is being implemented in Japan? Answer options are “Yes, definitely,” “Yes, to some extent,” “Not very much,” “Not at all,” and “Not sure / Do not know.” In Figures 1 and 2, those who selected the last answer option (“Not sure / Do not know”) are excluded from aggregation.
- *4 There is a statistically significant difference at the 1% level in 2) and 3).
- *5 Respondents were asked: “Which of the following factors do you think inhibit evidence-based policymaking? (Choose all that apply.)” Answer options are: “Policymakers are too busy in routine works and unable to find time for evidence-based policymaking,” “Evidence-based policymaking is neither a customary practice nor in line with the organizational culture,” “Policy decisions are made politically irrespective of evidence,” “Government officials are not sufficiently skilled to analyze statistical data and understand relevant research findings,” “Useful data and research studies are very limited in availability,” and “Others.”
- *6 There are statistically significant differences between the two groups at the 5% level in the ratio of respondents who chose each of the following answers: “Policymakers are too busy in routine works and unable to find time for evidence-based policymaking,” “Evidence-based policymaking is neither a customary practice nor in line with the organizational culture,” and “Policy decisions are made politically irrespective of evidence.” Meanwhile, as evident from Figure 2, there is no significant difference in the ratio of those who selected “Government officials are not sufficiently skilled to analyze statistical data and understand relevant research findings.”
- *7 Based on her own experience of serving as chief economist at the U.S. Department of Labor by temporarily leaving academia, Adriana Kugler notes that while policy development in Washington is surprisingly grounded on evidence, time is the biggest constraint inhibiting evidence-based policymaking (Kugler, 2014). Based on this observation, she points to the importance of increasing interactions between policymakers and academic researchers.
- *8 Uchiyama (2015) calls for reviewing the recruitment and personnel management systems at government agencies in order to enhance Japan’s policymaking capabilities, noting that the number of government economists increased in the United Kingdom under the Blair government, which emphasized evidence-based policymaking.

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Making Agglomeration “Metabolized” for Innovation

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There is no consensus on the effects of agglomeration on innovation. This column presents new evidence on how knowledge turnover impacts the quality of innovation. Agglomerated regions with active knowledge turnover, as measured by interregional migration of university graduates, tend to have a higher number of patent citations, the metric used for quality of innovation. Cluster policy aimed at active innovation may not be effective if interregional migration of knowledge workers is inactive.

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Innovation is an important driver of economic growth. In particular, to acquire global competitiveness, the quality of innovation matters more than the quantity. Although innovative outcomes rest on individual efforts in research and development in firms and scientific organizations, economic research has also paid special attention to the agglomeration economy, which is expected to foster innovation through active knowledge spillovers (e.g., Carlino and Kerr, 2015).

It is more likely that high-quality innovations are born in cities. The large number of specialized people in cities is not the only reason for such advantage—the greater diversity of knowledge also matters. It is often pointed out that proximity to a greater number of people facilitates face-to-face communication and fosters innovation. However, as analyzed by Berliant and Fujita (2012), repeated interactions increase common knowledge and reduce knowledge diversity across workers, which limits opportunities for learning fresh ideas from each other. In fact, Huber (2012) indicates that technological knowledge spillover effects within the Cambridge Information Technology Cluster are very weak. In that sense, the effect of agglomeration on innovation is not sustainable just because an industrial cluster is established.

In this regard, we need to take a new look at the measurement of agglomeration economies to analyze their effects on innovation. Besides the size, we need to take into account how well the knowledge diversity is maintained. Concerning the latter, an attempt of our study (Hamaguchi and Kondo, 2015) is to examine the effects of knowledge turnover on the quality of innovation.

How can we capture knowledge turnover in the real world? Our empirical strategy is to use interregional migration of university graduates. Thus, we examine whether patents invented in regions with bigger migration of university graduates have more citations after controlling for agglomeration, human capital, and industrial diversity.

Interregional migration enhances the diversity of people and their ideas

The account of migration resembles the metabolism of the human body, which is the basis for a sound mind and ideas in a sound body. In other words, a metabolized agglomeration is supportive of innovation.

There are difficulties in measuring knowledge turnover in the real world. It might be measured by workers' flows at the firm or establishment level. In this study, we consider knowledge turnover in a broader context to capture changes in human relationships. We would like to incorporate broader effects arisen from them such that even the non-labor force would affect the invention process outside of firms.

Our idea is motivated by Faggian and McCann (2009), who criticize the existing literature on geography of innovation and mention that it tends to ignore the role played by the mobility of human capital. Their analysis demonstrates the statistically positive significance of university graduate human capital inflows on regional innovation performance.

Note that knowledge turnover differs from the common measure of diversity. The inverse of the Herfindahl-Hirschman index is often used as a diversity measure. However, it cannot capture a dynamic change arising at the individual level. For example, the commonly used diversity index is unchanged if migrants have the same characteristics (e.g., gender, age, education level, and occupation). However, interregional migration will generate a big impact on knowledge diversity if individuals have unobserved heterogeneous characteristics. Thus, we would like to capture changes in knowledge diversity arisen from interregional turnover of people under the condition in which individuals are heterogeneous.

Positive effects of knowledge turnover on quality of innovation

We empirically investigate whether interregional knowledge turnover has a positive impact on the quality of innovation. Our study uses the Japanese patent database of the Institute of Intellectual Property, which contains information on patent citations and inventors.*

We measure the quality of innovation by the number of forward patent citations by examiners. Inventors' addresses are used to link regional characteristics with regions where inventions were created. Interregional migration of university graduates is calculated from the population census.

The **Figure** below presents the relationship between the number of patent citations and interregional migration flows of university graduates (the sum of in- and out-migrations). Panels (a) and (b) show a positive correlation between them in both 1980 and 2000. However, we should note that not all patents invented in regions with bigger knowledge turnover have a greater number of citations. There is also a large number of patents that have no citation in regions with bigger knowledge turnover. On the other hand, frequently cited patents are hardly observed in regions with smaller knowledge turnover.

The regression analysis also confirms a positive relationship between the number of patent citations and interregional knowledge turnover, even after controlling for other factors. More importantly, we find that agglomerated regions with active knowledge turnover tend to have a higher number of patent citations. Our results suggest that making agglomeration metabolized increases the quality of innovation.

Important messages for innovation policy

A new innovation strategy must be discussed going forward beyond short-term benefits from agglomeration. We need to know that the agglomeration economy reaches a mature stage (e.g., Japan is currently facing population decline and some

OECD countries also will face it in the coming decades). The important question is how we can build a sustainable innovation system in a whole nation.

► Our empirical findings suggest that industrial cluster policy aiming at active innovation does not necessarily work well if interregional migration of knowledge workers is inactive.

Urban policymakers should consider how to make agglomeration metabolized in order to incorporate fresh knowledge from outside cities. Although it is often considered that rural areas have difficulties in enjoying agglomeration benefits for innovation, our empirical findings shed light on the fact that rural industrial clusters also have opportunities for high-quality innovation through active knowledge workers' mobility.

► Thus, an important view for industrial cluster policy is mutual cooperation between urban and rural policymakers to facilitate interregional migration without burden, which will make the innovation system sustainable in the long run.

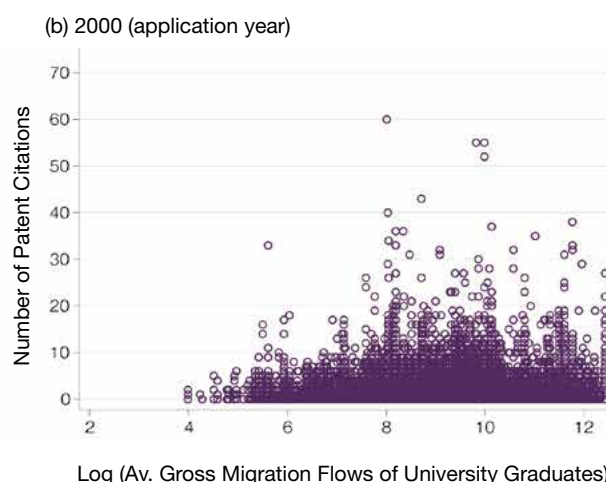
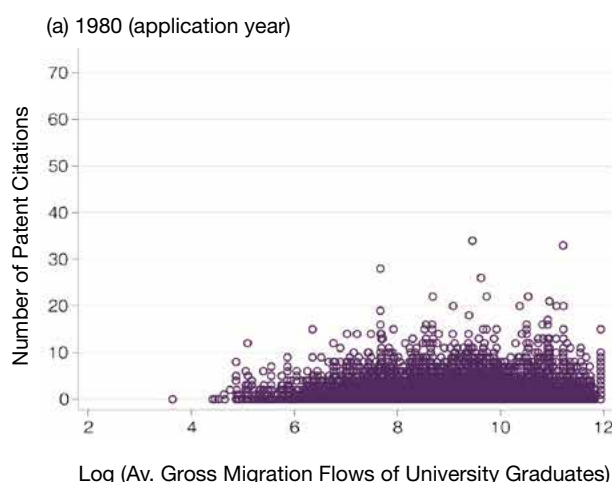
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Footnote:

* See the web page of the Institute of Intellectual Property:
http://www.iip.or.jp/e_e_patentdb/

● **Figure: Number of patent citations and gross migration flows**



Source: Hamaguchi and Kondo (2015)

RIETI Research Framework for

RIETI promotes research activities under three new medium- to long-term perspectives on economic and industrial policies with the “Medium- to Long-Term and Structural Points and the Future Direction of Economic and Industrial Policies” (Industrial Structure Council, April 2015) in mind.

Lineup of Research Programs:



the Fourth Medium-Term Period

(Fiscal 2016 to Fiscal 2019)

Three new medium- to long-term perspectives on Economic and Industrial Policies:

- 1 Cultivating Japan's strength in the world economy
- 2 Making Japan into an innovative nation
- 3 Overcoming population decline

Research Process

To further improve on the quality of research, RIETI ensures that discussions are organized for each research project through brainstorming workshops and Discussion Paper/Policy Discussion Paper seminars, where Japanese and foreign experts and policymakers participate to deepen the research.



Program Introduction

Under the fourth medium-term plan covering the four-year period commencing in April 2016, RIETI continues to make efforts not only to enhance its function as a knowledge platform but also to secure its position as an internationally esteemed policy think tank.

Program I Macroeconomy and Low Birthrate/Aging Population



Program Director: Keiichiro Kobayashi
Faculty Fellow, RIETI
Professor, Faculty of Economics, Keio University
Research Director, Canon Institute for Global Studies

Maintaining long-term growth has been a challenge for economies around the world, and Japan is facing a rapidly aging population ahead of that of other nations. We will conduct research that contributes to policies to maintain Japan's economic vitality as well as to the development of the global economy. Specifically, we will consider system infrastructure, such as the role of Asian currency baskets, and analyze trends in international finance and the global economy, and long-term deflation mechanisms, etc. Furthermore, we will conduct multifaceted and integrated research on the analysis of comprehensive panel data on the elderly, direction of the comprehensive reform of the social security and taxation systems, policy proposals for economic recovery, fiscal consolidation, etc.

Program II International Trade and Investment



Program Director: Eiichi Tomiura
Faculty Fellow, RIETI
Professor, Faculty of Economics, Hitotsubashi University

When considering Japan's economic policies in the midst of globalization, an understanding of international trade and foreign direct investment is even more important now than in the past. This program, focusing on the globalization of firm activities (i.e., exports and overseas production), will study the international trading networks of firms from theoretical and empirical perspectives, while also studying trade policies and international trade and investment rules from empirical and legal perspectives.

Program III Regional Economies



Program Director: Nobuaki Hamaguchi
Faculty Fellow, RIETI
Professor, Research Institute for Economics and Business Administration, Kobe University

This program will study the effect of international trade, movement of capital and labor, and changes in technology on urban and rural areas and industries, while viewing the regions of Japan in the context of the global economy and using this to develop proposals, etc., on such important policy issues as the aging population and regional revitalization.

Specifically, we will consider policies to promote the features of export industries in regional areas and regional economic circulation, strengthen functions of regional financial institutions, create social institutions that utilize cutting-edge information technology and transport infrastructure, and utilize and strengthen international production networks (value chains), as well as create statistical indicators that conform with the structure of economic spaces, form policymaking frameworks, etc.

Active Projects

Exchange Rates and International Currency

Project Leader: Eiji Ogawa (Faculty Fellow)

Toward a Comprehensive Resolution of the Social Security Problem: A new economics of aging

Project Leader: Hidehiko Ichimura (Faculty Fellow)

International Financial System and the World Economy: Medium and long-term issues (International Capital Flows and the World Economy: Medium and long-term relations)

Project Leader: Kenichi Ueda (Faculty Fellow)

Microeconomics, Macroeconomics, and Political Philosophy toward Economic Growth

Project Leader: Keiichiro Kobayashi (Faculty Fellow)

East Asian Production Networks, Trade, Exchange Rates, and Global Imbalances

Project Leader: Willem Thorbecke (Senior Fellow)

Fiscal and Social Security Policy under a Low Birthrate and Aging Demographics

Project Leader: Sagiri Kitao (Faculty Fellow)

Monetary and Fiscal Policy in the Low Growth Era

Project Leader: Ippei Fujiwara (Faculty Fellow)

Active Projects

Empirical Studies on the Chinese Market and Trade Policy (Studies on the Effects of Chinese Industrial and Trade Policy on International Trade, FDI, and Firm Activities and the Preferences of Foreign Workers at the Individual Level in Japan)

Project Leader: Ryuhei Wakasugi (Faculty Fellow)

Empirical Analysis of Global Activities and Transaction Networks of Japanese Firms

Project Leader: Eiichi Tomiura (Faculty Fellow)

A Study of Free Trade Agreements

Project Leader: Shujiro Urata (Faculty Fellow)

*until December 2016

Analyses of Trade Costs

Project Leader: Jota Ishikawa (Faculty Fellow)

Firms' Domestic and International Networks

Project Leader: Yasuyuki Todo (Faculty Fellow)

*until January 2017

Comprehensive Research on the Current International Trade/Investment System (pt.III)

Project Leader: Tsuyoshi Kawase (Faculty Fellow)

Studies on Firm Management and Internationalization under the Growing Fluidity of the Japanese Economy

Project Leader: Hongyong Zhang (Fellow)

Active Projects

Regional Economic Structural Analysis and its Application to Regional Creation

Project Leader: Ryohei Nakamura (Faculty Fellow)

Spatial Economic Analysis on Trade and Labor Market Interactions in the System of Cities

Project Leader: Takatoshi Tabuchi (Faculty Fellow)

The Role of Regional Financial Institutions toward Regional Revitalization: How do regional financial institutions contribute to improving the quality of employment in the local economy?

Project Leader: Nobuyoshi Yamori (Faculty Fellow)

Regional Economies in the New Era of Globalization and Informatization

Project Leader: Nobuaki Hamaguchi (Faculty Fellow)

Dynamics of Inter-organizational Network and Geography

Project Leader: Yukiko Saito (Senior Fellow)

An Empirical Framework for Studying Spatial Patterns and Causal Relationships of Economic Agglomeration

Project Leader: Tomoya Mori (Faculty Fellow)

Economic Analysis of Property and Reform Proposal

Project Leader: Motohiro Sato (Faculty Fellow)

Program IV Innovation



Program Director: Sadao Nagaoka
Faculty Fellow, RIETI
Professor, Tokyo Keizai University

The creation of new knowledge and its exploitation to resolve problems which we face is the main source of innovation.

This program will develop original data to understand the innovation processes, and will conduct research from an international perspective, so as to contribute to evidence-based policy formation.

Specifically, the program will analyze the innovation capabilities of industries, the economic impact of artificial intelligence, intellectual property systems, open innovation, knowledge transfer and the mobility of human resources across organizations, university-industry cooperation, technical standards, and business and industrial organizations that promote innovation.

Program V Industry Frontiers



Program Director: Hiroshi Ohashi
Faculty Fellow, RIETI
Professor, Faculty of Economics,
The University of Tokyo

Through innovation in the key technological areas of sophistication of data processing and evolution of telecommunication networks, signs of changes in the industrial structure have begun to be seen in Japan as well as in other leading nations.

Via the Internet of Things (IoT) using sensor technology, large quantities of unstructured data have now become accessible, and artificial intelligence (AI) technology is being gradually put into practical use.

In Japan, new industrial frontiers are opening. As such, this program will venture on research as to how policies should be instituted to overcome the challenges facing the Japanese economy, taking cross-industry policies into perspective, in addition to conventional policies intended for individual industries.

Program VI Raising Industrial and Firm Productivity



Program Director: Kyoji Fukao
Faculty Fellow, RIETI
Professor, Institute of Economic Research,
Hitotsubashi University

The aim of this program is to measure industry and firm-level productivity and its determinants for Japan and other East Asian countries and to conduct research on policies aimed at raising productivity. At the industry level, in addition to updating and expanding the Japan Industrial Productivity (JIP) and China Industrial Productivity (CIP) databases in collaboration with Hitotsubashi University, we will construct an industrial productivity database by prefecture for Japan and examine the total factor productivity (TFP) disparity between regions and the factors behind it, etc. At the firm or establishment level, employing micro-data from government statistics and corporate financial data in Japan and abroad, we will research the following: determinants of productivity gaps among firms; the impact of globalization and changes in demand affecting corporate performance; policies for raising productivity in the service sector; productivity gaps between firms in Japan, China, and Korea; and international comparison of productivity dynamics. We will also 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 at both industry and firm levels, and examine the economic effects of such investments.

Active Projects

Empirical Studies on “Japanese-style” Open Innovation

Project Leader: Kazuyuki Motohashi (Faculty Fellow)

Mobility of Knowledge and Innovation Performance

Project Leader: Isamu Yamauchi (Research Associate)

Comparative Studies of the Social Impacts of Artificial Intelligence (AI): From the perspectives of economics, sociology, and natural science/engineering

Project Leader: Hiroyuki Chuma (Faculty Fellow)

Study on Industrial Innovation Capability and Innovation Infrastructure

Project Leader: Sadao Nagaoka (Faculty Fellow)

Empirical Study on the Management and Utilization of Data Generated from Industry

Project Leader: Toshiya Watanabe (Faculty Fellow)

Active Projects

Sustainable Growth and Macroeconomic Policy

Project Leader: Hiroshi Yoshikawa (Faculty Fellow)

Study on Corporate Finance and Firm Dynamics

Project Leader: Ichihiro Uesugi (Faculty Fellow)

Globalization, Innovation, and Competition Policy

Project Leader: Noboru Kawahama (Faculty Fellow)

*until December 2016

Agricultural Policy Reform Aimed at Competitive Agriculture in the Age of Globalization and Decreasing Population

Project Leader: Kazuhito Yamashita (Senior Fellow)

Basic Research on New Industrial Policy

Project Leader: Hiroshi Ohashi (Faculty Fellow)

Study on Markets and Policies in the Power System Reform

Project Leader: Makoto Tanaka (Faculty Fellow)

Economics of Artificial Intelligence

Project Leader: Shunsuke Managi (Faculty Fellow)

Productivity Revolution through IoT

Project Leader: Koichi Iwamoto (Senior Fellow)

Large-scale Simulation and Analysis of Economic Network for Macro Prudential Policy

Project Leader: Hideaki Aoyama (Faculty Fellow)

Economic and Financial Analysis of Commodity Markets

Project Leader: Kazuhiko Ohashi (Faculty Fellow)

Active Projects

East Asian Industrial Productivity

Project Leader: Kyoji Fukao (Faculty Fellow)

The Role of Intangibles on Productivity Improvement

Project Leader: Tsutomu Miyagawa (Faculty Fellow)

Refinement and Analysis of the Regional-Level Japan Industrial Productivity Database: Providing basic information for Japan's regional development policy

Project Leader: Joji Tokui (Faculty Fellow)

Measurement of the Qualities of Health and Education Services, and Analysis of their Determinants

Project Leader: Tomohiko Inui (Faculty Fellow)

Microeconomic Analysis of Firm Growth

Project Leader: Kaoru Hosono (Faculty Fellow)

Decomposition of Economic Fluctuations for Supply and Demand Shocks: Service industries

Project Leader: Yoko Konishi (Senior Fellow)

International Price Competitiveness and Productivity Gaps

Project Leader: Koji Nomura (Faculty Fellow)

Program VII Human Capital



Program Director: Kotaro Tsuru
Faculty Fellow, RIETI
Professor, Graduate School of Business and
Commerce, Keio University

For Japan, a nation with scarce resources, to maintain and strengthen economic vitality and innovation and increase its growth potential by using its advantages amid a declining population resulting from a rapidly aging society and intensifying global competition among other factors, a significant key is how to utilize its human resources. We will conduct multifaceted, comprehensive research on ideal labor market systems to increase worker incentive and capability; reconstruction of employment institutions and systems from a full life-cycle perspective from early childhood education through higher education; human resources development in employment years; and utilization of the elderly as human resources as well as from the perspective of promoting diversity including increased women's participation.

Program VIII Law and Economy



Acting Program Director: Makoto Yano
President and Chief Research Officer (CRO), RIETI
Professor, Institute of Economic Research,
Kyoto University

Technological innovation is expected to accelerate in many fields such as financial services, information/communications, and life sciences. In such an environment, what can a nation do to build an economy that leads the world in innovation? Many cases have been observed that important innovation is born in a market in which free entry and free enterprise are guaranteed. In order to foster such a market, various rules and institutional arrangements need to be built into the economy. From this viewpoint, in the present program, the design of new types of economic and industrial policies is investigated.

Program IX Policy History and Policy Assessment



Program Director: Haruhito Takeda
Faculty Fellow, RIETI
Professor Emeritus, The University of Tokyo

This program aims to review and assess policy shifts, chiefly during the period 1980-2000, as we look at the roles played by Japan's economy and society as well as its trade and economic industrial policies at the end of the 20th century. While the final two decades of the 20th century were a time of significant changes in Japan's economy and society, they also represent an important point of comparison when considering the development of policy after the creation of the Ministry of Economy, Trade and Industry from a historical perspective. We will attempt to clarify how changes in trade and industrial policy at the turn of the century were affected, based on the recognition of policy issues over the preceding quarter-century, choice of policy responses, and evaluation on their results.

Active Projects

Fundamental Research for Sustainable Economic Growth in Japan

Project Leader: Kazuo Nishimura (Faculty Fellow)

Economic Analysis of Human Resource Allocation Mechanisms within the Firm: Insider econometrics using HR data

Project Leader: Hideo Owan (Faculty Fellow)

Transformation of the Japanese Labor Market: Toward a labor market for all

Project Leader: Daiji Kawaguchi (Faculty Fellow)

Reform of Labor Market Institutions

Project Leader: Kotaro Tsuru (Faculty Fellow)

Change in the Utilization of and Investment in Human Resources

Project Leader: Yoshio Higuchi (Faculty Fellow)

Research on Working Style Reform and Health Management

Project Leader: Isamu Yamamoto (Faculty Fellow)

Active Project

Intellectual Property and Standardization—Strategy and Policy

Project Leader: Masabumi Suzuki (Faculty Fellow)

Active Projects

Political Analysis and Policy History Research on the Kyoto Protocol Negotiations

Project Leader: Izuru Makihara (Faculty Fellow)

Historical Evaluation of Industrial Policy (H28FY)

Project Leader: Tetsuji Okazaki (Faculty Fellow)

Historical Study on Industrial Policy

Project Leader: Haruhito Takeda (Faculty Fellow)

Highlight Seminars series

Started in fiscal 2012, RIETI holds the Highlight Seminars series to disseminate timely research results on policy issues of great public interest and discuss them in detail.

The 16th seminar's theme was **“Enhancing Productivity and Reforming Working Styles,”** inviting two of research program directors as speakers. (November 17, 2016)



Kotaro Tsuru
(Program VII Director)



Kyoji Fukao
(Program VI Director)



The Uncertain Consequences of Brexit

Richard Baldwin

President, CEPR
Professor, Graduate Institute,
Geneva



On June 23, 2016, Britain voted to leave the European Union (EU). The question was simple: “Should the United Kingdom (UK) remain a member of the EU or leave the EU?” with the possible responses being “Leave” or “Remain.” The implications, however, are extremely messy since voters were not asked about what should come after Brexit.

The vote

The Leave voters were on average older, less educated, and less employed than the Remain voters. For example, 73% of 18 to 24 year-olds voted Remain while 60% of over 65 voted Leave. A majority of Britons with jobs voted Remain while a majority of those who were retired or without jobs voted Leave.

The vote was not along party lines. About 40% of Leave voters were from the Conservative Party while about 20% were from the Labour Party (the rest were from the far-right UK Independence Party, or unaffiliated).

Most striking of all, many of the Leave voters had no idea of the economic consequences of their vote. According to an exit poll conducted on the day of the vote, 69% of Leave voters thought the decision “might make us a bit better or worse off as a country, but there probably isn’t much in it either way.”

The Brexit process

To exit the EU, the UK has to trigger a provision of the EU Treaties known as Article 50. This launches a two-year process that ends with the UK outside the EU with or without a formal agreement. The period can only be extended by unanimous agreement.

Technically, there are two parts of the Brexit negotiations: a “divorce,” and a “remarriage.” The divorce settles rather technocratic issues such as how much the UK has to pay for the future and past spending commitments it agreed to when it was a member, and the status of EU citizens who are long-time residents in the EU and vice versa. For this, the two years will probably suffice; with the trickiest part being the amount to be paid (the *Financial Times* estimated it to be up to 20 billion euros).

The hard part is the remarriage, i.e., the new economic relationship between the UK and the EU. Here there are three options. Only the first, so-called “Hard Brexit,” or the WTO-option, would lead quickly to negotiation. This would involve the UK exports of goods and services being treated the same as those of any other WTO member. The exact implication of this would vary by sector and product since EU restrictions on imported goods and services vary, but a rough estimate is that it

would be like a rise in the cost of exporting to the EU by 6% due to tariff, red-tape, and regulatory barriers that would be imposed.

The second option would be a “deep” free trade agreement of the type that Japan has with, say, Thailand, or the EU has with Canada. This would provide tariff-free trade in goods, but exporters and importers would still face many technical and frictional barriers that arise with the imposition of border controls (Note that there have been no physical checks between the UK and EU for exported goods and services since 1992, but these would be reimposed). The UK service sector, especially financial services, would suffer severely under this option.

The third, or “Soft Brexit,” option would involve the UK staying inside the deep economic cooperation arrangement known as the Single Market (similar to what Norway is in now). This would minimize the economic disruption, but it would also commit Britain to a deep economic relationship with the EU without having a political voice inside the EU.

A study by professors at the London School of Economics estimated that the Hard Brexit option would lower UK incomes by about 2.6% while the Soft Brexit option would lower them by only 1.3%.

Looking forward

In my view, the current government is split between “ideologues” and “pragmatists” camps. The ideologues want the Hard Brexit option since they cherish a 19th century conception of sovereignty and are unconcerned by the economic disruption it would imply (or deny that it would be costly). The pragmatists respect the referendum results but want to minimize the damage.

To date, Prime Minister May has kept the two camps together by keeping her “remarriage” plans secret—ostensibly to avoid constraining Britain’s negotiating tactics. This intentional obfuscation allows her to suggest that the UK can negotiate a remarriage that gives both the ideologues and the pragmatists most of what they want.

Unfortunately, the EU side cannot agree to this for a variety of reasons. First, it would just not be possible for the 27 EU members to agree unanimously on any special deal within two years (the EU routinely takes several years to agree anything that requires unanimity). Second, the EU27 will not want to create an attractive halfway house between being in and out of the EU since this would encourage the anti-EU fringe parties that exist in many of the EU27 nations. Lastly, discussion of a halfway-house agreement would trigger a disruptive discussion inside the EU. The Single Market, which is a complex, delicately balanced deal negotiated over three decades, would be threatened by such discussions. Thus to avoid threatening the Single Market—which is important to all EU27 members—the EU will, in my view, force the UK to choose between being in the Single Market with its “four freedoms” (free movement of goods, services, capital, and people), or being outside with access that is no better than what Canadian firms enjoy.

It seems quite clear that the remarriage talks will take years, so some transitional trade arrangement will be necessary, but for the same reasons, the EU27 are likely to only accept a continuation of the status quo during the transition and that means the UK will have to accept all four freedoms including the free mobility of people.

The World Economy: Growth or Stagnation?



Dale W. Jorgenson



Kyoji Fukao



Marcel P. Timmer

The RIETI research program entitled “Raising Industrial and Firm Productivity” joined the World KLEMS Project, a research consortium led by Harvard University Professor Dale W. Jorgenson, providing high quality data for the measurement of industry-level productivity (called “KLEMS data sets”) for Japan and China, i.e., the JIP Database and the CIP Database, thereby enabling international productivity comparisons across countries including Japan and China. As part of this international collaboration, the Third World KLEMS Conference was held in Tokyo in May 2014, with RIETI and other institutes including Hitotsubashi University serving as co-hosts. In the run-up to this, RIETI also organized the RIETI World KLEMS Symposium in May 2014. *The World Economy: Growth or Stagnation?*, the fruit of collaboration of the world’s leading researchers on productivity based on their research papers presented at these events, analyzes from various perspectives the current status and future of the world economy, which is said to have entered secular stagnation.

The World Economy

Growth or Stagnation?

Edited by Dale W. Jorgenson,
Kyoji Fukao, and Marcel P. Timmer

Edited by **Dale W. Jorgenson,**
Kyoji Fukao, and
Marcel P. Timmer

Cambridge University Press, 2016

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The Research Institute of Economy, Trade and Industry (RIETI) is a policy think tank established in 2001. Our mission is to conduct theoretical and empirical research, to maximize synergies with those engaged in policymaking, and to make policy proposals based on evidence derived from such research activities. For such activities, RIETI has developed an excellent reputation both in Japan and abroad.

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