

Perspectives on Double Sustainability in Japan: Environmental Aspects and Long term Economic Dynamics

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Akira Maeda

University of Tokyo

maeda[at]global.c.u-tokyo.ac.jp

Outline

1. Japan's climate policy debates: a retrospect
2. Current issues and debates
3. Some prospects

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Four periods

In retrospect, Japan's climate policy debates can be divided into four periods:

- First period: before the Kyoto Protocol (1997)
- Second period: after the Kyoto Protocol (1997)
- Third period: after the 2008 G8 Summit held in Hokkaido, Japan
- Fourth period: after the Great East Japan Earthquake of March 11, 2011 to present

First period: Before the Kyoto Protocol

- Japan's contribution to the global environmental policy formulation in the international policy arena has not been small since the very beginning.
 - The United Nations' World Council on the Environment and Development (WCED), so called "the Brundtland Commission", established in 1984—partly, a result of Japanese government's suggestion at a UN Environmental Programme's (UNEP's) meeting in Nairobi, Kenya, 1982.
 - The Commission's "Our Common Future," 1987 coined a new concept "sustainable development."
 - The Club of Rome, established in 1968, led to a well known report "The Limits to Growth."
 - One of the Japanese delegates, Prof. Yoichi Kaya, U. Tokyo, becomes well known with "Kaya's Identity" twenty years later.

Before the Kyoto Protocol, cont'd

- UNEP and the World Meteorological Organization (WMO) created the Intergovernmental Panel on Climate Change (IPCC) in 1988, which issued its first Assessment Report in 1990.
 - Some members from Japan become known as
 - Kaya's Identity
 - The Morita database, etc.
- The Kyoto Protocol was finally agreed in 1997.
- The history shows until the KP, Japan's contribution was large, which centered around technical aspects, including policy analysis, computer modeling techniques, etc., rather than general initiatives, both internationally and domestically.

Second period: After the Kyoto Protocol

- The Kyoto Protocol became a big turning point to Japan:
 - It attracted ordinary Japanese people's attention, not just scientific interests among the academic communities in Japan.
 - Since then, almost all Japanese people have been interested in the global environmental issues / climate change.
 - There appeared many half-learned "experts."
- Pros and cons at every stage of policy making w.r.t.:
 - Strategies to attain the carbon reduction target stipulated in the K.P.,
 - The use of the Kyoto mechanisms.
- The debates were basically on the side of pro-environment.
 - A main voice was: "to attain the target, what shall we do?"

The G8 Summit in 2008

- The 34th Group of Eight Summit was held in Lake-Toya, Hokkaido from July 7 to 9, 2008 under the chairmanship of Prime Minister Yasuo Fukuda.
- The summit was another turning point for Japan's climate policy debates:
 - It was the first G8 summit that placed emphasis on energy and climate change issues, outside the COPs of UNFCCC.

Declaration of Leaders Meeting of Major Economies on Energy Security and Climate Change came out, addressing:

- “Climate change is one of the great global challenges of our time... “
- “We welcome decisions taken by the international community in Bali...”

The G8 Summit in 2008, cont'd

- Just before the summit, in June, Prime Minister Yasuo Fukuda made an unscheduled press conference, expressing his intention to contribute to international climate change policy debates, both the Kyoto target and the Post Kyoto debate.
 - Also, he declared that the government would launch a domestic emissions trading scheme.
- The political situation at that time was unstable:
 - The opposition party has occupied a majority of the seats in the Upper House. Fukuda was losing his popularity because of his public image of weak leadership.
 - He in fact resigned from the Cabinet in September.
 - The conference can be seen as his last means of trying to regain his popularity.

Third period: After the Summit

- Prime Minister Fukuda's declaration created debates on the choice of environmental policy measures, esp. market-based instruments vs. command-and-control.
- Then, the Lehman Shock of September 2008 came out.
- These consecutive incidents activated Japan's environmental policy debates in many aspects:
 - Pro-environment vs. Pro-economic growth
 - Concerted actions in the international community vs. Self-reliance
 - National interests vs. global commons
 - The Ministry of Environment vs. The Ministry of Economy, Trade and Industry
 - MBI vs. CAC

Fourth period:

The Earthquake of March 11, 2011

- However, the Great East Japan Earthquake of March 11, 2011 overturned everything.
 - The combined natural disaster of earthquake and tsunami
 - The nuclear accident at the Fukushima Daiichi (#1) nuke
- Anti-nuclear movements became active again, which had been dormant since the Kyoto Protocol.
- Tokyo Electric Power Company: the party concerned
 - It was the world largest “private” power company.
 - Local monopoly—covers Tokyo metropolitan area.
 - Nuclear power is a national policy, but plants are owned and operated by those “private” power companies.
- The nuke accident spurred debates on such a government-private cooperation regime.

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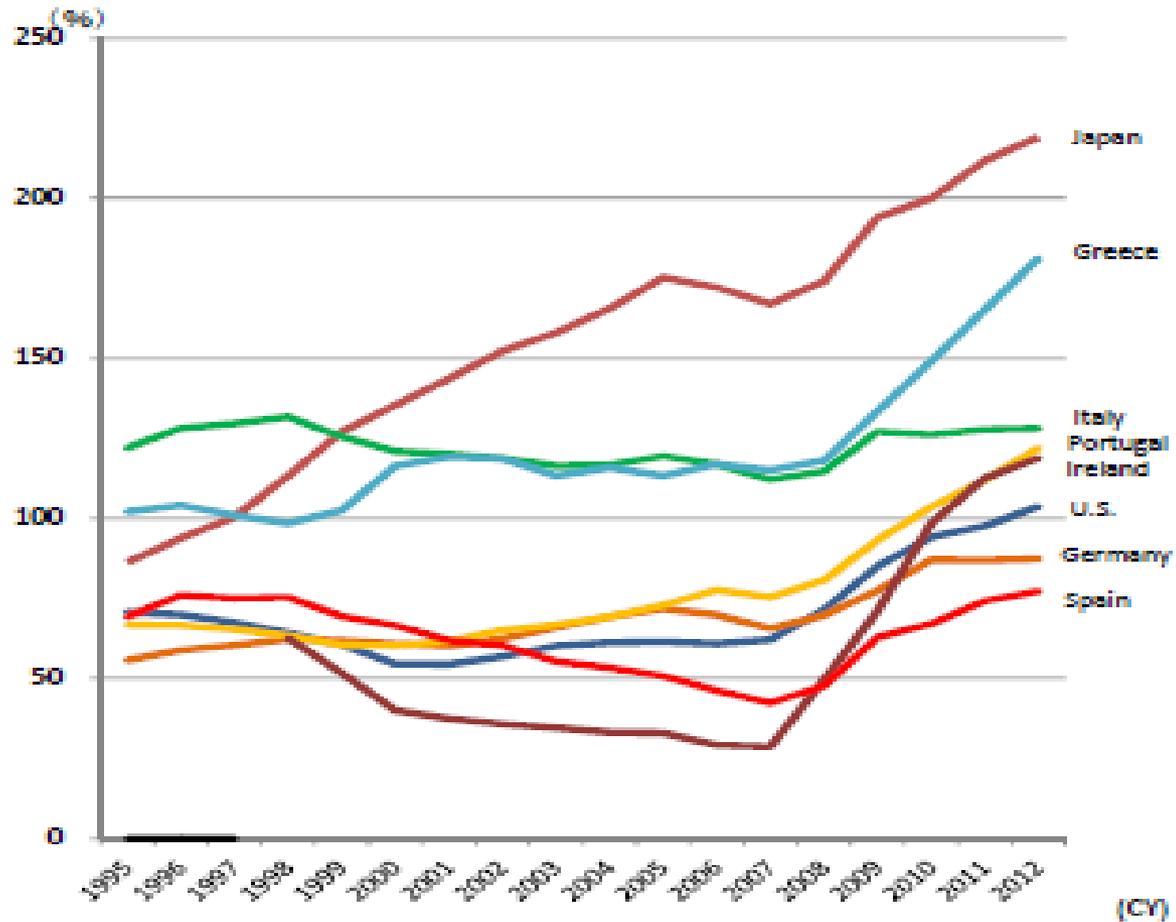
The triple E concept

- Most Japanese advocates, not just in academia, but also in social activists' communities, had been suggesting the “triple E”—energy security, the environment, economic growth / efficiency was one of the most important concepts for Japan's national energy policy formulation.
 - The concept has been a basis for Japan's energy and environmental policy formulation.
 - Left-wing critics, even anti-nuke activists had been agreeing the importance of the triple E.
- The nuke accident of March 11, 2011 triggered restructuring and reformulation on the concept.

Japan's economy

- The government deficit and debt are larger than any other OECD countries. (See figure.)
- Social security, including the public medical insurance, pension, nursing-care-for-the-elderly schemes, amounts to about 31% share of government's annual expenditure in FY2011. (See figure.)
- General consumption tax rate has been low, compared to other OECD countries.
 - First introduced in 1989: 3%, raised to 5% in 1997.
 - The Diet passed legislation for scheduled raises of the tax rate: up to 8% April, 2014; to 10% October, 2015.
- Economic indices show stagnation in the economy in these days.

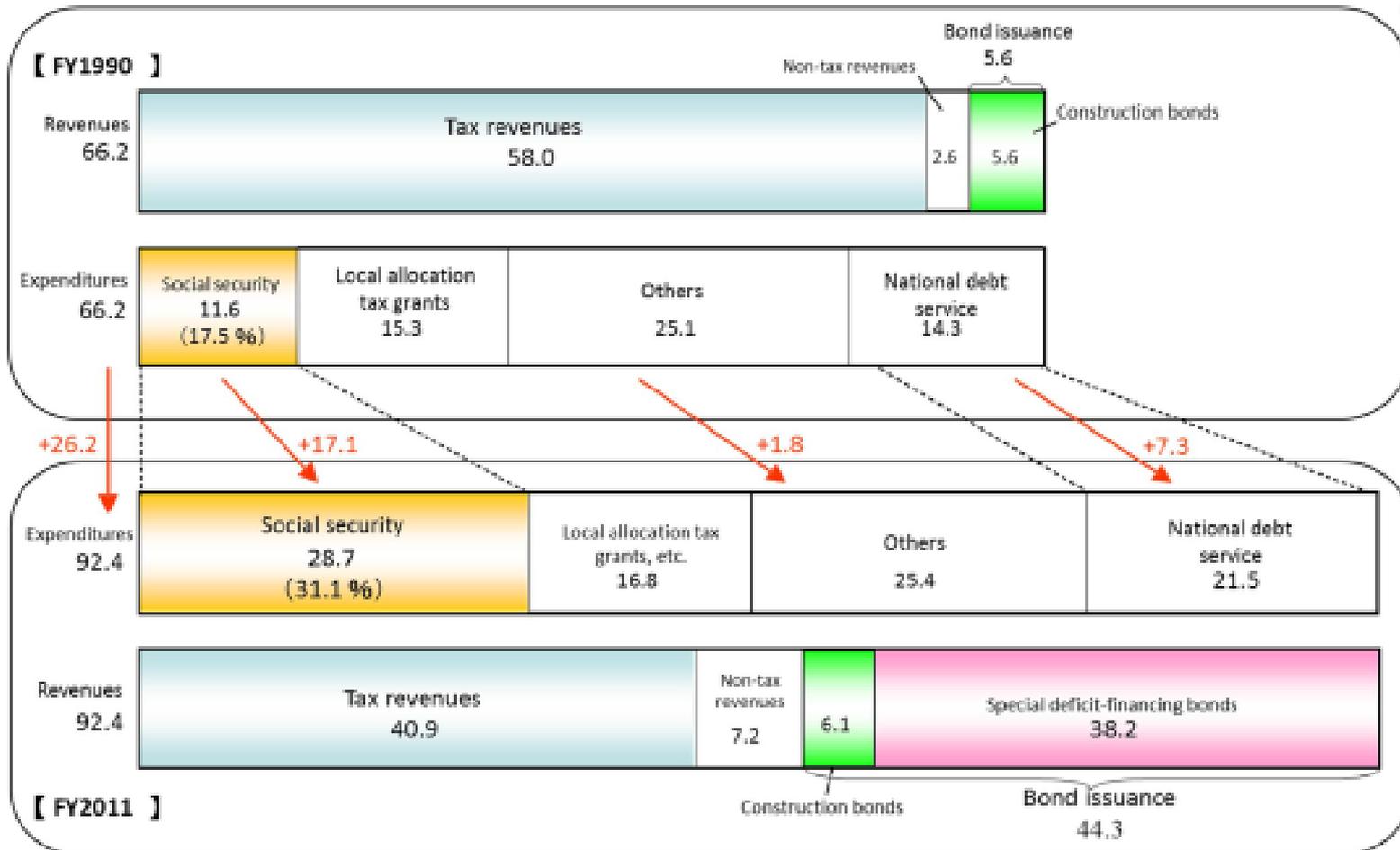
Government debt



(Source) OECD "Economic Outlook 90"
 (Note) Figures are general government-based data (including the central/local governments and the social security funds).

Budgets

(unit: trillion yen)



Japan's politics

- The Cabinets and ministers do last no longer than one year after Abe (who preceded Fukuda):
 - Koizumi: Apr. 2001 to Sept. 2006
 - Abe: Sept. 2006 to Aug. 2007
 - Fukuda: Sept. 2007 to Aug. 2008
 - Aso: Sept. 2008 to Sept. 2009

(Historic change from LDP to DPJ)

 - Hatoyama: Sept. 2009 to June 2010
 - Kan: June 2010 to Sept. 2011
 - Noda: Sept. 2011 to Dec. 2012 (predicted)
- The citizens are in a mood of resignation.
 - Moreover, changing ministers is now being a routine work for government officials in the Japanese parliamentary cabinet system.

Climate change of the day

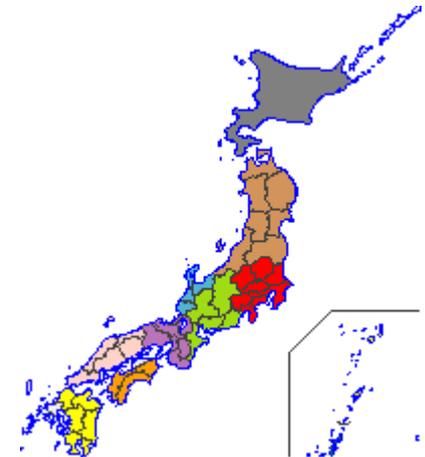
- Climate change, the topic itself is no longer attracting attentions of ordinary Japanese citizens.
 - In contrast, energy policy topics are climbing up to top notches of their attention.
 - Their attention is getting inward-looking: No press news on UNFCCC's COP appeared in these days.
- A strong anti-nuclear movement is on-going.
- Environmental tax has just started.
- Feed-in-tariff (FIT) policy has also begun in July 2012.
 - However, there seems no clear vision for the future of renewables.
 - These env. tax and FIT are, in a sense, legacies of the pro-environment movement before the Earthquake of 3.11, 2011.

Japan's energy security up to now

- Japan has no fossil fuel resources on the homeland:
 - Two oil crises experienced in 1970s gave an emotional trauma for the Japanese economy, which has been the only, but strongest motivation for de-petroleum since then.
- Thus, Japan's energy security concept has centered around:
 - Conservation (or, energy efficiency)
 - Nuclear
 - Standard technologies: boiled / pressurized water reactors
 - Advanced: fast breeder reactors, plus fuel cycles for plutonium production
 - Close relation / cooperation regime between the government and the energy industry (esp. 10 locally-monopolized private power companies).

Electricity reform

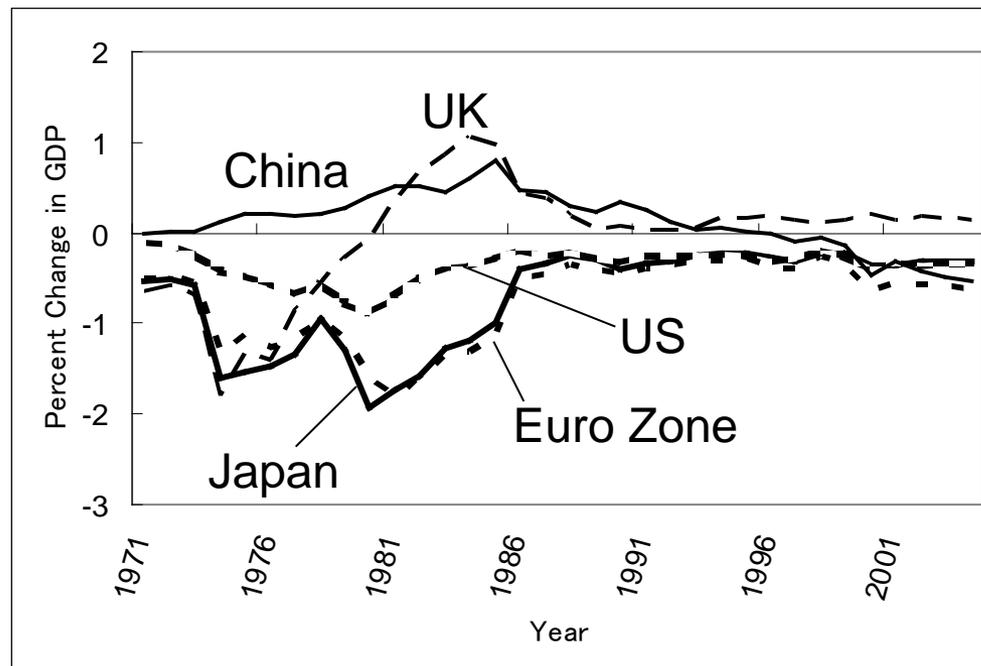
- Electricity Business Act (Act No. 170 of July 11, 1964) is a fundamental law that embodies Japan's electricity policy.
 - The first major amendment took place in 1995
 - Second: 2000; Third: 2003.Through these amendments, the regime of 10 locally monopolized private companies has slowly been “liberalized.”
- The liberalization was then considered as being completed. The debate became dormant.
- The March 11 nuke accident activated it again.
 - There will be a significant change within a few years to come that aims creating a much more “liberalized” market.



Energy-economy link

- An underlying assumption for Japan's energy security concept is that oil prices are one of critical factors for the Japanese economy. However, the assumption is now questionable.

Price elasticity of GDP wrt world oil price (x 40)



$\frac{\% \text{ change in GDP}}{\% \text{ change in oil price}}$
was large before,
but not now.

Source: Maeda (2008: *The Japanese Economy*)

Inconsistencies

Reflecting all these things, we find a lot of contradictions:

- Nuclear:
 - The fact: all 54 nuke plants have been shut down due to regular inspection procedures, and are waiting for Government's permission for getting back into operation.
 - The decision is getting harder day to day:
 - Anti-movement vs. industry leaders who are worrying about possible rises of electricity prices
 - Politicians cannot make decisions, but are still appealing for “political leadership” and pretending to fight against the “notorious” bureaucrats.

Inconsistencies, cont'd

- Electricity:
 - The electricity reform is supposed to aim at liberalized electricity markets.
 - On the other hand, high unit-cost PVs, winds, and other renewables are still given a priority through the FIT scheme (starting on July 2012).
 - The scheme commands utility companies to buy PV-generated electricity at the price 0.3 euro/kWh while retail prices are about 0.1 euro/kWh.
 - The Tokyo Electric Power Company's legal responsibility for the nuke accident compensation and remedy scheme remains unclear.
 - As of June 2012, the company became a “government-owned” company due to capital increase and subscription by the government. Otherwise, it might have gone bankrupt.

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Focal issue

“Risk” is a keyword.

- The world economy is facing risks in many ways:
 - Some EU member countries are confronted with serious fiscal deficits, which is a source of bond default risks, permeating among all EU economies.
 - The US economy is confronted with the risk of the “fiscal cliff.”
 - The Asian economies inc. Japan are aware of so-called China risk.
- Japanese citizens are now very sensitive to risks of natural disasters (earthquakes, tsunami, etc.) as well as man-made disasters (radioactivity).

Studies on risks

- In the academic communities—both social and natural scientists, “making provision against risks” is now being considered as a good research topic.
 1. After having engaged in cost-benefit-like assessment studies on climate change, most scientists and scholars are getting aware of the need for assessing risks and uncertainties:
 - The Japanese Ministry of Environment created a research project on long-term climate change risks: “Integrated Research on the Development of Global Climate Risk Management Strategies.”
 2. Financial risks associated with emissions permit trading markets (such as EU-ETS) are attracting both researchers’ and practitioners’ attention.
 - One of devices is called “safety valve mechanism.”

MoE's research project on climate risks

“Integrated Research on the Development of Global Climate Risk Management Strategies—Integrated Climate Assessment – Risks, Uncertainties and Society (ICA-RUS)”

- Period: FY2012 – 2016; Budget: about 3 million euro / year
- Directed by Dr. Seita Emori, National Institute for Environmental Studies with the cooperation of 15 institutions.

It comprises of fine themes:

- (1) Synthesis of global climate risk management strategies,
- (2) Optimization of land, water and ecosystem uses for climate risk management,
- (3) Analysis of critical climate risks,
- (4) Evaluation of climate risk management options under technological, social and economic uncertainties, and
- (5) Interactions between scientific and social rationalities in climate risk management.

MoE's project, cont'd

“Through this research, we will develop and provide concepts and options for climate risk management strategies which can be considered rational both scientifically and socially, by comprehensively taking into account various constraints, uncertainties, risk management options, social value judgments and other factors.”

“This will lead us to contribute to international consensus building, national policy planning and deeper public understanding on climate issues.”

The detail will be made available soon on the web.

Currently, only info in Japanese is available at:

http://211.5.72.156/nies_ica-rus/index.html

Risks in carbon market

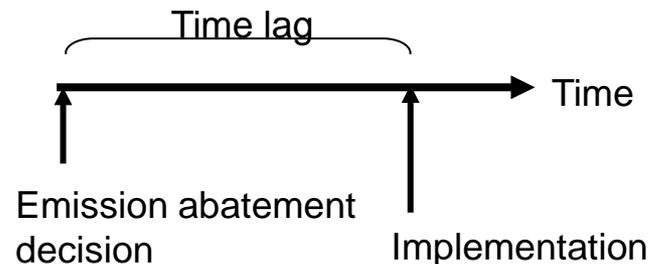
- Financial risks associated with emissions permit trading markets (such as EU-ETS) are attracting both researchers' and practitioners' attention.
- Primal question is: How can market risks arising from permit price fluctuations be mitigated?
- A possible solution is “safety valve mechanism.”

Safety valve mechanism:

The regulator sets an upper limit on the spot permit market price, which is called the trigger price. It sells an unlimited number of permits at the trigger price when the market price reaches the trigger price.

Source of market price risks

- Emissions of GHGs are closely linked to production activities, and thus abatement decisions are usually constrained by long-term production plans.
 - In most cases, investment in abatement technologies at production facilities is required to achieve emission abatement.
- Moreover, once such investment decision is made, the plan cannot be easily adjusted until the completion.
 - Thus, physical investments entail not only a time lag between abatement decisions and the achievement of abatement but also inflexibility regarding abatement actions at the time of permit trades.

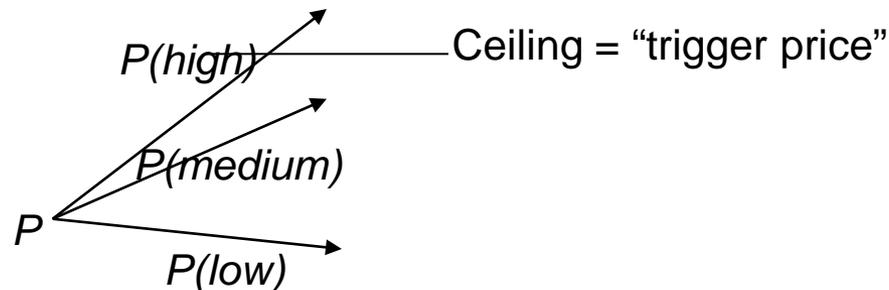


Source of market price risks, cont'd

- Again, emission abatement decisions must be made within a context characterized by a time lag, abatement inflexibility, and market uncertainty at the time of the abatement decision.
- Regulated emitters may fear that market prices will increase.
 - If market prices do indeed increase to unaffordable levels, regulated emitters cannot engage in further emission reduction *ex post facto*.
 - Unaffordable market prices then may force emitters who had planned to purchase permits to declare bankruptcy rather than further reduce emissions.

Need for safety valve mechanism

- Safety valve mechanism allows regulators of a cap-and-trade system to set an upper limit on market prices—a so-called “trigger price”.
- It guarantees that regulators will sell additional permits if the market price of permits reaches the limit.
- This mechanism may prevent permit prices from rising to an unsustainable level.
- Thus, this mechanism may ease price risks for permit market participants.



A study result

- A primary concern in designing a safety valve mechanism for a cap-and-trade system is: identifying the rule for determining and implementing the trigger price (the upper limit price).
- Addressing this consideration, Maeda's study (2012, JRE) provides policy-makers with practical guidance in designing a permit market.

Maeda, A. "Setting Trigger Price in Emissions Permit Markets Equipped with a Safety Valve Mechanism." *Journal of Regulatory Economics* 41(3): 358-379. 2012.

A rule for trigger price setting

Maeda (2012, JRE) suggests a “doubling” rule for the trigger price setting:

“The trigger price should be set at double the marginal abatement cost.”

Proposition:

If, given L (i.e. total carbon emission permits), the trigger price is set at double the marginal abatement cost, that is,

$$p=2 \text{ MAC}(\text{expected BAU total emission} - L)$$

then the set of induced emission reductions is never affected by uncertainty (i.e. possible source of market price fluctuations).

Various risk conceptions

- There may be a variety of definitions of risks.
 - People from natural science and engineering fields usually think that *risks* are associated with the magnitude of the damage and its probability assessment.
 - Social scientists, in particular economists usually consider *risks* as being associated with human preferences and attitudes toward uncertainties.
- Such differences in definitions can sometimes lead to an argument at cross-purposes.
 - However, they share at least some part of research interests in risks and uncertainties, which definitely contributes to advances in the understanding of climate change and its impacts.

Conclusions

1. Japan's climate policy debates: a retrospect
 - The citizens' attention and focus have been moving.
 - The earthquake and nuke accident overturned everything.
2. Current issues and debates
 - The triple E concept has been a basis for Japan's energy and environmental policy formulation.
 - The current debates in Japan are in a mess, and are uneasy to predict for the resolution.
3. Some prospects
 - Risks and uncertainties are coming up to the center of attention.
 - Quick look at:
 1. Japanese MoE's ICA-RUS project
 2. A study of safety valve mechanism for carbon market

Akira Maeda: personal record

Appointments (primal):

- Project Professor, U. Tokyo (Apr. 2011 to present)
- Associate Professor, Kyoto U. (Apr. 2004 to Mar. 2011)
- Assistant Professor, Keio U. (Apr. 1999 to Mar. 2004)
- The Tokyo Electric Power Co. (Apr. 1990 to Dec. 1996)

Appointments (secondary):

- An ad hoc committee member, The Industrial Structure Council, Ministry of Economy, Trade and Industry, Japan (Jun. 2010 to May 2011)
- Research Fellow, the Economic and Social Research Institute, Cabinet Office, Government of Japan (Oct. 2004 to Apr. 2007)
- Research Scholar, the International Institute for Applied Systems Analysis (IIASA), Austria (Jun. 2001 to Sept. 2001)

Education

- Ph.D. (engineering-economic systems and operations research / economics as a minor), M.S., Stanford University, CA, USA (99, 96)
- M.Eng., B.S., University of Tokyo, Japan (90, 88)

Akira Maeda: personal record, cont'd

Social contributions

- Serve as associate editor (or equivalent) to several academic journals including *Energy Economics* (Elsevier), *Sustainability Science* (Springer), etc.
- Serve as steering committee member (or equivalent) to several academic societies including Japan Economic Policy Association, Japan Society of Energy and Resources, etc.

Books

- *Environmental Economics and Policy* (2010: Nikkei Publishing Inc.)
- *The Economics of Emissions Trading* (2009: Iwanami Shoten, Publishers)
- *Economic Theory of Capital Asset Markets* (2003: Toyo Keizai Inc.)
- *A First Course in Managerial Economics* (2003: Keio University Press)
(all in Japanese)
- A coauthor of *Innovation in Energy Technology: Comparing National Innovation Systems at the Sectoral Level* by Organisation for Economic Co-operation and Development, OECD Publishing (2006)