# Technology policies in Japan;1990~

Akira Goto and Kazuyuki Motohashi

Univ. of Tokyo and Research Institute for Economy, Trade and Industry

# OUTLINE

- 1. Overview of the Japanese Economy in the 1990s ∼;Was technology responsible for the long recession?
- 2. Review of technology policies

2-1 New Framework of technology policy---"Basic Law on Science and Technology", creation of CSTP

2-2 Government R&D programs (subsidies, commissioned research, cooperative research)

2-3 R&D tax credit

2-4 Technology policy towards SMEs (Japanese version of SBIR)

- 2-5 Promotion of University-industry links
- 2-6 Government labs

#### 3. Conclusion

market friendly approach

closer cooperation with university

basic research

 Overview of the Japanese Economy in the 1990s ~

# Boom in the 1980s and

long recession in the 1990s and early 2000s

#### Fig 1 GDP growth ratio

source; K.Motohashi, Empirical Analysis of IT Innovation: Has IT Changed Long-term Japanese Economic Performance?, Toyokeizai,2005



## Cause of long recession

Macro-financial view

 Collapse of asset bubble in the 1980s dysfunction of financial sector
 Excess capacity built in the 1980s
 ➢ Alternative view---Productivity slowdown
 Productivity slowdown in the 1990s
 Hayashi-Prescott, Jorgensen-Motohashi, Fukao,,,,

### Cause of productivity slow down

Government policy and banks to keep "zombies" alive?

> less productive firms stayed while more productive firms exited

Deterioration of Innovation capability?

### Deterioration of innovation capability?

- "R&D became less efficient because Japan moved from catch-up to front runner stage"?
   exhaustion of easily "borrowable" technology
- "Mismatch" of Japan's innovation system ? to newly emerging key industries in the 1990s, such as IT and BT, and/or to innovation in how to innovate, such as more reliance in science

- However, R&D spending/GDP ratio remained among the highest in the world, and
  - output (patents, papers, technology exports) improved steadily

#### Fig.2 R&D Expenditure in Japan

source: Report on the Survey of Research and Development, each year, Statistics Bureau



#### Fig. 3 Japan's share in the U.S. Patents

source: NISTEP Science and technology indicators



# Fig. 4 Japan's technology balance of payments

source; NISTEP, Science and Technology Indicators



# Fig. 5 Japan's share among most highly cited papers

source; NISTEP documents



# 2.Review of Technology Policies in Japan in 1990s

- 2-1 New Framework of S&T Policy
- Enactment of "Basic Law on Science and Technology" in 1995, and subsequent planning of the Science and Technology Basic Plans
- Merger of Science and Technology Agency with Ministry of Education in 2001
- Strengthening of Council for Science and Technology Policy in 2001

### Structure of S&T Budget and Organization



#### 2-2 Government R&D programs:Development of METI's R&D Project



### METI's R&D Program

A policy package for technological breakthrough and innovation targeting at specific policy goal

- Focusing on important technological fields (2<sup>nd</sup> basic S&T plan)
- Based on technology roadmap and industrial needs
- Policy orientations by METI's industrial policy sections

Example of R&D Program in FY2005 (budget: 230.8 billion yen)

- Life Science: Health Assurance Program, Program for the creation of recycling based industrial system using biological functions
- Nanotechnology and Materials: Nanotechnology program, Program to create an innovative components industry
- Information & Telecommunications: Program for fundamental technologies of advanced information and telecommunication equipment and devices, Information infrastructure software development promotion program
- Environment & Energy: New global warming prevention technology program, The 3R (Recycle-Reuse-Reduce) Program

### 2-3 R&D Tax Credit

- Firms, not government, decide the project
  →market friendly policy
- Change in design of R&D tax credit system existing system lost effectiveness because tax credit was linked to increased amount of R&D spending
  - ⇒ many firms' R&D spending were not increasing and, many firms were losing money

### New R&D tax credit system

- 10~12% of R&D spending, not exceeding 20% of corporate tax payment of the company, can be deducted from corporate income tax (2% temporary measure for three years 2003~5)
- Amount to 600 billion yen of corporate income tax reduction

2-4Te4chnology Policy towards SMEs:Japanese version of SBIR (Small Business Innovation Research)

- Started in 1999
- Setting the target amount of R&D subsidy to SMEs
- Inter-ministerial joint approach: 7 ministries in 2005 (ex. MEXT, METI etc.)
- Other financial incentives
  - Low interest loan to SME's innovation activities
  - Wider coverage of SME's loan guarantee program

### Implementation of SBIR

source; METI documents



 Series of laws introduced to promote closer university – industry collaboration, following perceived U.S. model

1998 TLO Act

1999 Japanese version of Bayh-Dole Act

 Culminated in National University Corporation Act of 2004

→National Universities became independent administrative body, faculties are not civil servants anymore

 $\rightarrow$  Flexibility, and necessity to work with industry

### 2-6 Government Labs

- Restructuring of the government labs under METI and other ministries
  - $\rightarrow$  merger of labs within ministries
  - → most of them became independent administrative body with non public servant status

## 3. Discussion

- Further emphasis on R&D in the 1990s long run consideration and short run response
- Emphasis on basic research (S&T Basic plan)—increased government spending for public institution, but at the same time, closer ties with industry encouraged

- More market friendly approach
- R&D for "competitiveness", short term results –industry put more emphasis on R&D with short term results, less on basic long term R&D during recession
- With recent recovery, importance of long term research is emphasized, searching the best way to do long term R&D