

**DISCUSSION GUIDE FOR**

**“STRUCTURAL CAUSES OF JAPAN’S LOST DECADES”**

A DISCUSSION WITH PROFESSOR KYOJI FUKAO

**Organizing Questions**
- What is economic productivity?
- How does economic productivity impact economic growth?
- What leads to increases and decreases in economic productivity?

**Introduction**
Productivity is a central concept in economics and is one of the main determinants of economic growth. Experts have identified flat and low productivity as one of the main reasons that Japan’s economy has stagnated in recent decades. In this lesson, students learn about the concept of productivity in economics and use this knowledge to investigate why Japan’s productivity and economic growth have slowed since the 1990s.

**Objectives**
In this lesson, students will
- define productivity in economic terms;
- understand the main components of economic productivity in manufacturing;
- explain how productivity relates to economic growth;
- explain why Japan’s productivity slowed down in the 1990s; and
- propose ways that Japan and other countries can improve economic productivity.

**Materials**
Handout 1, Understanding Productivity, 30 copies
Handout 2, Video Lecture Prompts, 30 copies
Handout 3, Understanding Figures and Tables, 30 copies
Handout 4, Understanding Productivity Dynamics, 30 copies
Handout 5, Addressing Japan’s Productivity Stagnation, 30 copies
Answer Key 1, Understanding Productivity
Answer Key 2, Video Lecture Prompts
Answer Key 3, Understanding Figures and Tables
Answer Key 4, Understanding Productivity Dynamics
Teacher Information, Video Lecture Transcript
introduction

Equipment
Computer with Internet access and a Flash-enabled or HTML5-supported web browser
Computer projector and screen
Computer speakers

Teacher Preparation
Instructions and materials are based on a class size of 30 students. Adjust accordingly for different class sizes.
1. Make the appropriate number of copies of handouts.
2. View Video Lecture, “Structural Causes of Japan’s Lost Decades” by Dr. Kyoji Fukao (duration: 9 minutes, 18 seconds).
3. Become familiar with the content of the handouts, answer keys, and teacher information.
4. Set up and test computer, projector, speakers, and streaming video lecture. Confirm that you are able to play the video lecture and project sound audibly to students.

Time
Two 50-minute class periods

Procedures

Day One
1. Distribute Handout 1, Understanding Productivity, to students and instruct them to answer the questions in pairs. Give them 15 minutes to complete the worksheet.
2. Reconvene the class and work through each question on the worksheet. Use Answer Key, Understanding Productivity, to guide the discussion as needed.
3. Distribute one copy of Handout 2, Video Lecture Prompts, to each student and instruct them to read through the handout and questions before playing the video lecture.
4. Begin viewing Video Lecture, “Structural Causes of Japan’s Lost Decades.” Remind students to take notes related to the questions on Handout 2 on a separate sheet of paper.
5. After viewing the lecture, distribute Handout 3, Understanding Figures and Tables, to each student. Ask students to work in groups to complete the handout.
6. Go over the responses to Handout 3 and provide the correct answers using Answer Key 3, Understanding Figures and Tables.

Day Two
1. Begin the class by playing the video lecture a second time, informing students that they will need to complete their answers to the questions on Handout 2, Video Lecture Prompts, this time.
2. After viewing the video, give students five minutes to complete Handout 2.
3. Discuss the answers to each question, using Answer Key 2, *Video Lecture Prompts*, as a guide to provide the correct answers.

4. Distribute Handout 4, *Understanding Productivity Dynamics*, to each student. Give students 10 minutes to complete the handout, then review it using Answer Key 4, *Understanding Productivity Dynamics*.

5. As the culmination of this lesson, distribute one copy of Handout 5, *Addressing Japan’s Productivity Stagnation*, to each student. Instruct students to read the instructions on the handout and respond to the prompt as homework.

**Assessment**

The following are suggestions for assessing student work in this lesson:

1. Evaluate student responses to Handout 2, *Video Lecture Prompts*, using Answer Key 1, *Video Lecture Prompts*, as a guide.


3. Assess student responses to the prompt on Handout 5, *Addressing Japan’s Productivity Stagnation*, ensuring they align with the information presented in the video lecture.

4. Assess student participation in group and class discussions, evaluating students’ ability to
   • clearly state their opinions, questions, and/or answers;
   • provide thoughtful answers;
   • exhibit sensitivity toward different cultures and ideas;
   • respect and acknowledge other students’ comments; and
   • ask relevant and insightful questions.
UNDERSTANDING PRODUCTIVITY

1) What do you mean when you say that someone is “productive”?

2) What metric could you use to measure the productivity of the following units? Name one step in each case that would increase productivity.

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<thead>
<tr>
<th>Units of measurement</th>
<th>Potential steps to increase productivity</th>
</tr>
</thead>
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<td></td>
</tr>
<tr>
<td>Convenience store</td>
<td></td>
</tr>
<tr>
<td>Restaurant</td>
<td></td>
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<tr>
<td>Package delivery worker</td>
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<tr>
<td>Musical group</td>
<td></td>
</tr>
</tbody>
</table>

3) Based on the above table, how would you define “productivity” in economic terms?
Lecture Title: “Structural Causes of Japan’s Lost Decades”
Lecturer: Kyoji Fukao

Questions
Keep the following questions in mind as you listen to the lecture. After the lecture, please answer the questions on a separate sheet of paper.
1. What time frame is referred to as Japan’s “lost decades”? What does this term mean?

2. Why did the professor describe Japan’s negative exit effect as “special”? What causes Japan’s negative exit effect?

3. How does the negative exit effect relate to the slowdown of productivity growth?

4. According to the professor, why didn’t Japan invest heavily in ICT in the 1990s?

5. Japan is often thought of as a leader in technology. How would you explain the finding that Japan’s ICT introduction in distribution services was much lower than other countries?

Defined terms:
productivity—the amount of output per unit of input (labor, equipment, and capital). There are many different ways of measuring productivity. For example, in a car factory productivity might be measured based on the amount of time it takes to produce a car, while in the service sector productivity might be measured based on the revenue generated by an employee divided by his/her salary.

total factor productivity (TFP)—a variable used in macroeconomics to which accounts for effects in total output growth relative to the growth in traditionally measured inputs of labor and capital. TFP is used as a measure of an economy’s long-term technological change, and is considered by many economists the most important factor in an economy’s growth.

manufacturing sector—the portion of the economy that produces goods by manual labor or by machinery, especially on a large scale

Small and Medium Enterprises (SMEs)—businesses whose personnel numbers fall below certain limits. In most countries, SMEs outnumber large companies and employ more people.
Research and Development (R&D)—refers to the investigative activities a business conducts to improve existing products and procedures or to lead to the development of new products and procedures

internationalization—the act or process of making a product or service suitable for international markets and then participating in these markets

technology spillover—the benefit to industries, companies, or users of using a technology that was introduced in another industry or for another person

Information and Computer Technology (ICT)—the use of computers to store, study, retrieve, transmit, and manipulate data or information

value-added ratio—the difference between the value of a firm’s (or industry’s) output (i.e., the total revenues received from selling that output) and the cost of the input materials, components or services bought in to produce that output – including the cost of labor.

distribution sector—the portion of the economy dedicated to making products or services available to customers and users
UNDERSTANDING FIGURES AND TABLES

The four figures in the video lecture are vital to understanding the professor’s arguments. Review each figure and write one or two sentences in response to each question below.

Figure 1: Slowdown of Total Factor Productivity (TFP) Growth

In simple terms, what does this graph show?

To what extent are Japan’s manufacturing and non-manufacturing sectors responsible for the decline in Japan’s productivity growth since 1991?
What were the biggest changes among the four effects noted in the colored bars between the time periods of 1981–1985 and 2000–2005? According to the video lecture, why did these changes occur?
Figure 3: Why Did the Within Effect Decline?

Why Did the Within Effect Decline?

In the manufacturing sector, the TFP growth of large firms has actually accelerated. Small and medium-sized firms (SMEs) have been left behind (Fukao and Kwon 2006).

→ Possible reasons:
(a) SMEs left behind in R&D and internationalization
(in Japan, the R&D intensity of SMEs is much lower than that of larger firms)
(b) decrease in technology spillovers from large firms.

In simple terms, what does this graph show?

What does the statement “there was a decrease in technology spillovers from large firms to SMEs” mean?
Figure 4: Why Was Japan Left Behind in the Information and Computer Technology (ICT) Revolution?

Why Was Japan Left Behind in the Information and Computer Technology (ICT) Revolution

It appears that the ICT revolution did not happen in Japan simply because Japan has not accumulated sufficient ICT capital (Fukao 2013).

ICT Investment-Gross Value Added Ratio in Major Developed Economies: Distribution Services

During the time period displayed, where and when did the value-added ratio in distribution services increase the most?

In simple terms, what does this graph say about Japan?
**Understanding Productivity Dynamics**

As mentioned in the lecture, there are four components to a productivity dynamics analysis in any economic sector:

- **Within effect**: change in productivity (+ or -) in existing factories
- **Reallocation effect**: change in productivity (+ or -) due to change in production level of current factories
- **Entry effect**: change in productivity (+ or -) due to new factories starting production (“entering”)
- **Exit effect**: change in productivity (+ or -) due to factories shutting down (“exiting”)

Insert a + or - sign in the appropriate column to indicate how each action would affect overall productivity in Japan’s automotive manufacturing sector. Follow the example in the first row.

<table>
<thead>
<tr>
<th></th>
<th>Within effect</th>
<th>Reallocation effect</th>
<th>Entry effect</th>
<th>Exit effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitsubishi closes its least-productive factory</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Honda introduces new robots that attach doors in all of its factories, increasing productivity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mitsubishi’s newest, state-of-the-art factory opens</td>
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<td></td>
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<tr>
<td>After opening new auto assembly plants in Mexico and Thailand, Honda shuts down two of its most productive factories in Japan</td>
<td></td>
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<tr>
<td>Toyota opens a new factory, but due to several errors it proves to be less productive than most current operating factories</td>
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</tr>
</tbody>
</table>
Assuming that each of these changes affected the productivity of Japan’s automobile manufacturing sector by five percent, what would be the overall change in productivity of the sector as a result of these changes?

**Answer:** _____ % increase/decrease in productivity

<table>
<thead>
<tr>
<th>Nissan doubles production of LEAFs at its most productive factory</th>
<th>Within effect</th>
<th>Reallocation effect</th>
<th>Entry effect</th>
<th>Exit effect</th>
</tr>
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ADDRESSING JAPAN’S PRODUCTIVITY STAGNATION

As a culmination of this lesson, propose two ways that Japan could improve its productivity and thus accelerate its economic growth. Explain how each proposal would improve productivity, as well as the potential challenges with implementing each proposal. Please see below for an example you can follow. You can list any resource at your disposal to complete this assignment. Return this completed handout to your teacher at the next class period.

<table>
<thead>
<tr>
<th>Proposal</th>
<th>Argument</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favor larger firms with tax breaks and other policies so that they expand operations.</td>
<td>Japan’s larger firms are much more productive than its smaller firms, so if they expand and become a larger proportion of the economy, Japan’s overall productivity should rise.</td>
<td>Larger firms often have fewer middle-income positions, so favoring them may increase income inequality. Also, since SMEs employ the majority of workers in Japan, weakening their position may increase unemployment and regional and class inequalities.</td>
</tr>
</tbody>
</table>
1) What do you mean when you say that someone is “productive”?
   *Answers will vary, but in general, “productive” means that someone gets a lot done in a short period of time.*

2) What metric could you use to measure the productivity of the following units? Name one step in each case that would increase productivity.
   *The table below lists potential responses.*

<table>
<thead>
<tr>
<th>Units of measurement</th>
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</table>
| Smartphone assembly factory | • phones produced per hour/day/year  
                             • value of phones produced minus cost to operate factory  
                             • increase speed of assembly line  
                             • reduce error rate  
                             • concentrate on one type of smartphone to reduce complexity  
                             • introduce reliable robotics  
                             • charge more for completed phones |
| Convenience store | • number of transactions each hour/day/year  
                     • value of sales each hour/day/year  
                     • value of sales minus operating costs for store  
                     • increase prices of goods in store  
                     • encourage sales of more expensive goods  
                     • reduce staff costs  
                     • reduce costs paid by store to stock goods  
                     • reallocate stocking space to sales space  
                     • increase visibility to get more customers |
| Restaurant | • number of customers served per hour/day/year  
             • revenue received per hour/day/year  
             • revenue received minus operating costs  
             • increase prices of items on menu  
             • encourage sales of more expensive plates and drinks  
             • reduce staff costs  
             • reduce costs paid for ingredients  
             • adjust menu to reflect local tastes  
             • increase turnover of customers at store to serve more tables per hour |
3) Based on the above table, how would you define “productivity” in economic terms?

In economics, “productivity” is defined as the amount of output per unit of input (labor, equipment, and capital).
VIDEO LECTURE PROMPTS

1. What time frame is referred to as Japan’s “lost decades”? What does this term mean?
   Japan “lost decades” period started in 1991. Before that, Japan’s economy had grown quickly for decades. Beginning around 1991, a stock market and real estate crash drove Japan into recession, and it has never recovered the rapid economic growth rates it had before the 1990s. Economists began to refer to the 1990s as Japan’s “lost decade,” but as Japan’s economy remained stagnant after 2000, the term was updated to “lost decades.”

2. Why did the professor describe Japan’s negative exit effect as “special”? What causes Japan’s negative exit effect?
   The “exit effect” refers to the cumulative effect that factory shutdowns have on a given sector’s productivity. In most cases, companies will shut down their worst-performing factories, which will usually be their least productive. Thus, the exit effect means that non-productive factories are leaving the economy, and thus will have a positive effect on productivity.

   In Japan’s case, the exit effect is negative, which is unique among countries. This negative exit effect occurred because of the large productivity gap among Japan’s larger firms and smaller firms. Japan’s larger firms are very productive while smaller firms are generally not productive, but can often remain in business because of few competitive pressures. Thus, most of the factories that are closed belong to larger firms (Panasonic, Honda, Mitsubishi, Sony, etc.). While these factories might be the least productive factories within these firms, they are still more productive than factories owned by SMEs, and so the effect of these factories exiting the economy is that overall productivity declines.

3. How does the negative exit effect relate to the slowdown of productivity growth?
   The professor argues that Japan’s SMEs are much less competitive and productive than its larger firms. The negative exit effect in the manufacturing sector is one way of exploring why this might be the case. The professors’ finding that even large firms’ worst-performing units are more productive than those of small and medium-sized firms might explain the overall slowdown of Japan’s productivity growth and suggest ways to improve Japan’s productivity.

4. According to the professor, why didn’t Japan invest heavily in ICT in the 1990s?
   The professor notes that Japan’s economy offered much lower incentives for investing in ICT than other countries. Companies invest in ICT in part to replace human labor and thus reduce costs. However, companies in Japan often provide lifetime job protection to their employees. Since they could not reduce their work force, there was little incentive for Japanese companies to invest in ICT.

5. Japan is often thought of as a leader in technology. How would you explain the finding that Japan’s ICT introduction in distribution services was much lower than other countries?
   The term “technology” has different meanings in different contexts. In economics, it refers to improvements in productivity that can occur because of the introduction of new materials, processes, or efficiencies. The discussion here is limited to distribution services, such as trucking and logistics, and thus is unrelated to other realms in which Japan’s technology might be more advanced, such as robotics or high-speed trains.
UNDERSTANDING FIGURES AND TABLES

Figure 1:
In simple terms, what does this graph show?

Productivity growth in Japan’s manufacturing sector was rapid and increasing until about 1990. It has continued to increase since then, but at a lower rate, except for the period from 2002 to 2007 or so. In contrast, productivity in Japan’s non-manufacturing sector (i.e., agriculture and services) has been consistently low for decades.

To what extent are Japan’s manufacturing and non-manufacturing sectors responsible for the decline in Japan’s productivity growth since 1991?

Japan’s non-manufacturing sector has always had low productivity growth, holding back the country’s overall productivity. However, productivity growth in the manufacturing sector slowed substantially since 1991 and thus accounts for most of the decline in productivity growth in the overall economy.

Figure 2: What were the biggest changes among the four effects noted in the colored bars between the time periods of 1981–1985 and 2000–2005? According to the video lecture, why did these changes occur?

The two most dramatic changes between 1981-1985 and 2000-2005 are that the “within effect” (in blue) declined and the “exit effect” (in red) declined.

According to the lecture, the “within effect” declined because factory productivity stopped growing over this time period.

The “exit effect” declined because the factories that were closed during later time periods were those that were more productive than the average in their industry. This may have happened because a given company (e.g., Sony, Canon) closed its least-productive factories or replaced them with factories abroad, yet these factories, while the least productive for that company, were more productive than the average in their industry.

Figure 3:
In simple terms, what does this graph show?

Productivity growth in Japan’s largest manufacturers has been increasing over time. However, productivity has declined in Japan’s small and medium firms. Since these SMEs constitute a larger portion of the manufacturing sector in total than the large firms, the overall productivity of the sector has declined since the late 1980s.

What does the statement “there was a decrease in technology spillovers from large firms to SMEs” mean?

As the professor states, earlier in this period, smaller companies were able to adopt technology pioneered by larger companies. For example, a small manufacturer of camera parts may have adopted a new machine invented by a larger manufacturer, thus allowing the smaller manufacturer to also become more productive. However, in later periods, it became harder for smaller manufacturers to adopt technology that larger firms were using, leading to stagnation in their productivity.
Figure 4:

During the time period displayed, where and when did the value-added ratio in distribution services increase the most?

In the United States and the United Kingdom, between the years of 1991 to 2002 (basically the decade of the 1990s).

In simple terms, what does this graph say about Japan?

Compared with the other countries shown on the graph, the productivity in Japan’s distribution services did not substantially increase in the 1990s, when other countries experienced a “Information and Computer Technology Revolution.”
<table>
<thead>
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<th><strong>Understanding Productivity Dynamics</strong></th>
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Assuming that each of these changes affected the productivity of Japan’s automobile manufacturing sector by five percent, what would be the overall change in productivity of the sector as a result of these changes?

*Answer: 5% increase in overall productivity of Japan’s automobile manufacturing sector (20% increase - 15% decrease = 5% increase)*
Japan had a big financial crisis in the 1990s and after that Japan dissolved the problem of banks non-performing loans and firms balanced the balance sheet by 2000. But Japan’s economic growth didn’t accelerate after that. So now it is so-called Japan’s two lost decades, so we had economic stagnation for more than 20 years.

And so behind this stagnation, I think that some structural factor works. And one of the main factors for Japan’s slow economy growth is the stagnation of productivity. This figure shows total factor productivity level of manufacturing and non-manufacturing sector. And total factor productivity means the index of technology level and efficiency of the economy. And we can see that from 1990, the TFP growth slowed down in manufacturing sector substantially. So there is a kink of the TFP growth in manufacturing sector. And also in the case of non-manufacturing sector, Japan’s TFP growth has been always not so amazing. But again, there is a slowdown of TFP around 1990s.

And if we look at why TFP growth slowed down, both in manufacturing and non-manufacturing sector, in the case of manufacturing sector, please look at this figure. And this figure is a result of productivity dynamics analysis. That is based on factory-level data of the manufacturing sector, and using factory level data we can decompose the TFP growth of the manufacturing sector into these four components.

The blue graph shows within effect. If productivity increases within each factory, this becomes a positive value. And the reallocation effect takes positive value if more productive factory expands its production. And the entry effect takes positive value when more productive factory starts up. And exit effect takes positive value when less productive factories are shut down.

And what we can see from this figure is that the slowdown of TFP growth in the manufacturing sector was mainly caused by two factors. One is the decline of the within effect, and the other is negative exit effect. And the negative exit effect increased substantially from the 1990s. Negative exit effect means more productive factories are shut down and less productive factories continue. And why within effect declined—this figure shows TFP growth by factory size—factory size group. And we can see that in the case of large factories—most of them are owned by large firms—increased a lot, even after 1990.

So we didn’t have lost decades or two lost decades for large firms, but we can see that TFP growth slowed down in small and medium size factories (most of them are owned by small and medium sized firms). So, my hypothesis is SMEs—small and medium sized firms—were left behind in R&D and internationalization. And in Japan, the R&D intensity of small and medium size firms is much lower than that of large firms. And also, probably technology spillovers from large firms to SMEs declined in this period.

So next, let me explain about why in the manufacturing sector the exit effect was negative. And according to international comparison, Japan is special. It has negative exit effect. And according to our analysis, the negative exit effect occurred because Japanese large firms, like Toyota and you know, these companies, relocate their relatively productive factories abroad. Of course
they are rational and shut down their factories, which are not so productive in comparison with other factories they have. But from the viewpoint of industry average, their factories shut down are much more productive than other, you know, factories owned by other, smaller firms. So that caused a negative exit effect. And that means that both the decline or within effect which observed mainly in SMEs and negative exit affect are closely related. Both are caused by relocation of factories by large firms and because SMEs cannot get the spillover of technology from large firms, their own TFP growth also slows down, that decline of within effect.

As you pointed out, the ICT investment in Japan has been very low. And so this figure shows ICT investment gross value-added ratio of distribution services. Distribution services means wholesale and retail and transportation sector. And this was very low in Japan. And you can see, in the case of U.S. and the U.K., there was a huge, very rapid increase of ICT investment in this sector. And because of active ICT investment, U.S. experienced so-called ICT revolution. Their productivity increased a lot in, for example, distribution sector. But in Japan that kind of ICT revolution didn’t occur because – simply because – we didn’t do investment in ICT.

And there are several researches on why ICT investment didn’t increase in Japan. And I can point out several structural factors behind it. One is because in Japan the jobs are secured. And one of the reasons why firms introduce ICT is to make efficiency of production. And sometimes firms can save unskilled labor input. But because of jobs are secured, Japanese firms cannot get that kind of benefit from ICT introduction.

And also, in Japan the ICT experts—experts of, say, graduate of technology department, et cetera—want to work at large firms to have secure job at the large firms. But in the case of U.S., the engineers easily move among firms and don’t hesitate to work at small and medium sized firms. So that caused, especially for Japanese small and medium sized firms, difficulty to find good engineers and introduction of ICT was difficult for such firms.