

# DISCUSSION GUIDE FOR “JAPAN’S INSUFFICIENT DEMAND PROBLEM”

A DISCUSSION WITH PROFESSOR KYOJI FUKAO

Organizing Questions	<ul style="list-style-type: none"><li>• What does it mean for an economy to grow?</li><li>• What factors determine how quickly an economy grows?</li><li>• How do investment, savings, and consumption affect economic growth?</li><li>• Why do falling prices endanger economic growth?</li></ul>
Introduction	<p>One of the reasons that Japan’s economy has stagnated since 1991 is Japan’s high savings rate. Under normal circumstances, a high savings rate would be considered positive. However, high rates of savings that coincide with low levels of spending, can stunt economic growth. This lesson explains how Japan’s high savings rate has kept demand low and made economic growth more difficult. To understand the macroeconomics behind this situation, students learn the components of economic growth, the impact of inflation and deflation on spending and savings, and explore how Japan might address insufficient consumer demand.</p>
Objectives	<p>In this lesson, students will</p> <ul style="list-style-type: none"><li>• define economic growth;</li><li>• enumerate the elements of economic growth;</li><li>• explain why savings and consumption are inversely related;</li><li>• explain the relationship between inflation/deflation and savings; and</li><li>• demonstrate how falling prices (deflation) endanger economic growth.</li></ul>
Materials	<p>Video Lecture, “<i>Japan’s Insufficient Demand Problem</i>,” online at <a href="http://spice.fsi.stanford.edu/multimedia/japans-insufficient-demand-problem">http://spice.fsi.stanford.edu/multimedia/japans-insufficient-demand-problem</a></p> <p>Handout 1, <i>Understanding Inflation and Deflation</i>, 30 copies</p> <p>Handout 2, <i>Terms and Concepts</i>, 30 copies</p> <p>Handout 3, <i>Terms and Concepts Quiz</i>, 30 copies</p> <p>Handout 4, <i>Video Lecture Prompts</i>, 30 copies</p> <p>Handout 5, <i>Figures and Graphs</i>, 30 copies</p> <p>Handout 6, <i>Predicting Future Economic Growth</i>, 30 copies</p> <p>Answer Key 1, <i>Terms and Concepts Quiz</i></p> <p>Answer Key 2, <i>Figures and Graphs</i></p> <p>Answer Key 3, <i>Video Lecture Prompts</i></p> <p>Answer Key 4, <i>Predicting Future Economic Growth</i></p> <p>Teacher Information, <i>Video Lecture Transcript</i></p>

Equipment	Computer with Internet access and a Flash-enabled or HTML5-supported web browser Computer projector and screen Computer speakers
Teacher Preparation	<p>Instructions and materials are based on a class size of 30 students. Adjust accordingly for different class sizes.</p> <ol style="list-style-type: none"><li>1. Make the appropriate number of copies of handouts.</li><li>2. View Video Lecture, “<i>Japan’s Insufficient Demand Problem</i>,” by Dr. Kyoji Fukao (duration: 7 minutes, 3 seconds).</li><li>3. Become familiar with the content of the handouts, answer keys, and teacher information.</li><li>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.</li></ol>
Time	Three 50-minute class periods
Procedures	<p><b>Day One</b></p> <ol style="list-style-type: none"><li>1. Explain to students that this lesson centers on two topics: (1) inflation and deflation, and (2) the components of economic growth. These are central concepts in macroeconomics and have wide applicability when examining the health of any economy.</li><li>2. Distribute one copy of Handout 1, <i>Understanding Inflation and Deflation</i>, to each student. Ask students to work in pairs to answer the questions on the handout.</li><li>3. After 15 minutes, convene the class. Ask for volunteers to share their answers to each question. After hearing responses to all four questions, use the points below to lead a short discussion on inflation and deflation:<ul style="list-style-type: none"><li>• As the first question should illustrate, people generally expect the price of goods and services to increase over time. That’s usually the trend in most countries, with the exception of some commodities such as gasoline and milk. This is called inflation—an overall increase in prices. It is the normal state of affairs in most economies. For the most part, central banks and economists worry about keeping inflation from occurring too quickly. Hyperinflation—a state of affairs when overall prices rise very quickly—creates a lot of problems.</li><li>• However, an overall decrease in prices—deflation—also creates problems. What were your answers to question 4? A situation in which prices fall is called deflation, and it is problematic because if consumers and businesses expect prices to fall, they hold off from buying or investing. This reduces economic activity and harms the economy. In this situation, a high savings rate actually hurts</li></ul></li></ol>

the economy because it means that people and businesses are not spending money.

- Worse, there is a danger of falling into a deflationary spiral because as economic activity declines, companies may go out of business or lower their prices, which contributes to further deflation and reinforces the cycle. Japan has experienced long periods of deflation since 1991, exacerbating its economic woes. The lecture by Dr. Kyoji Fukao explains how Japan entered into this problematic economic situation.
4. Distribute one copy of Handout 2, *Terms and Concepts*, to each student. Ask students to work in groups to review the definitions and write a sentence correctly using each term.
  5. Collect Handout 2 for assessment.

### Day Two

1. Distribute one copy of Handout 3, *Terms and Concepts Quiz*, to each student. Instruct students to complete the quiz silently. Collect Handout 3 for assessment.
2. Distribute one copy of Handout 4, *Video Lecture Prompts*, to each student and instruct them to read through the handout and questions before playing the video lecture.
3. Play the video lecture, “*Japan’s Insufficient Demand Problem*.” Remind students to take notes related to the questions on Handout 4.
4. Distribute Handout 5, *Figures and Graphs*, to each student. Ask students to work in groups to complete the handout.
5. Review students’ responses to the questions on Handout 5 and provide the correct answers using Answer Key 2, *Figures and Graphs*. Collect Handout 5 for assessment.

### Day Three

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 4, *Video Lecture Prompts*, this time.
2. After viewing the video, give students five minutes to complete Handout 4, *Video Lecture Prompts*. Collect the handout for assessment.
3. Distribute Handout 6, *Predicting Future Economic Growth*, to each student. Ask students to work in groups of three or four to complete the handout. Allow 15–20 minutes for students to complete the handout, then review it using Answer Key 4, *Predicting Future Economic Growth*. If students do not finish the handout by the end of the class period, you may assign completion for homework.

### Optional Activity

One option to extend this lesson is to ask students to write a policy recommendation to the leaders of Country D (i.e., the slowest-growing country) in Handout 6. This is an advanced activity, as even Japan’s

economic and political leaders have struggled to stimulate their economy, which since the 1990s has had similar characteristics to the fictional Country D. Some potential policies include the following:

- boost government spending significantly (and temporarily) to spur demand for goods and services and propel the country out of its deflationary spiral
- loosen restrictions and barriers on immigration so that the labor force and consumer base rises
- loosen restrictions that prevent innovation from spreading throughout the economy
- make savings less attractive by taxing money held in savings accounts
- make it more attractive for businesses to invest by lowering taxes on business expenses

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

1. Evaluate students' ability to properly use the terms on Handout 2, *Terms and Concepts*.
2. Evaluate student responses to questions on Handout 3, *Terms and Concepts Quiz*, using Answer Key 1, *Terms and Concepts Quiz*, as a guide.
3. Evaluate student responses to Handout 4, *Video Lecture Prompts*, using Answer Key 3, *Video Lecture Prompts*, as a guide.
4. Assess student responses to questions on Handout 5, *Figures and Graphs*, using Answer Key 2, *Figures and Graphs*, as a guide.
5. Evaluate group responses to Handout 6, *Predicting Future Economic Growth*, using Answer Key 4, *Predicting Future Economic Growth*, as a guide.
6. 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 INFLATION AND DEFLATION

Take 15 minutes to discuss the following questions with a partner and write down your responses in the spaces below.

- How do you expect prices for the following goods and services to change over the next 12 months? Check the box in each row that best corresponds to your expectation.

	Decrease dramatically	Decrease slightly	Stay about the same	Increase slightly	Increase dramatically
Gallon of milk					
Box of cereal					
Gallon of gasoline					
Haircut					
Ticket to professional sporting event					
Ticket to see an IMAX movie					
College tuition					

- Imagine you have been saving up to buy a new refrigerator. While you are excited about getting this newer model, your current refrigerator works well enough, and money is pretty tight. You have noticed that the prices of refrigerators have been dropping by about \$15 dollars every month. How long would you wait to buy a new refrigerator?

## handout 1

3. You own a small business that makes bike locks. Business has been good, so you are looking into buying more machines to manufacture the locks. You research prices for these machines and you notice that each of them cost \$5,000 two years ago, then dropped to \$4,500 last year, and they each now cost \$4,000. You are wary about making unnecessary expenditures because the price of your bike locks has not increased for five years, so your profit margin is slim. How likely are you to wait before buying these new machines?
  
4. Imagine now that almost all goods and services were decreasing in price. Extrapolating from the examples in the last two questions, how does this affect consumers' decisions on whether to save or spend money? How does it affect the decisions of businesses on whether to save or invest money?

## TERMS AND CONCEPTS

In your group, review the terms and definitions in this handout. To demonstrate that you understand each term, write a sentence in which you use each term correctly in the last column below. Your teacher will collect this sheet for assessment.

Term	Definition	Use in a Sentence
<b>rate of return on capital</b>	the value created by a given investment in capital	
<b>potential GDP</b>	the economy's long-term growth trend for real GDP determined by the available supply of capital, labor, and technology	
<b>actual/real gross domestic product (GDP)</b>	a macroeconomic measure of the value of economic output adjusted for price changes (i.e., inflation or deflation)	
<b>capital-GDP ratio</b>	percentage of capital spending in relation to the size of the entire economy. Higher percentages indicate that a greater proportion of economic activity is dedicated to spending on capital.	
<b>inflation</b>	an increase in the overall price level	
<b>deflation</b>	a decrease in the overall price level (i.e., a negative inflation rate)	

Term	Definition	Use in a Sentence
<b>insufficient demand problem</b>	a situation in which individuals and firms refrain from investing and spending money, electing to save it instead. The lack of demand for goods and services prevents the economy from growing, and often leads to deflation.	
<b>current account surplus</b>	situation in which the value of a country's exports exceeds the value of its imports (in other words, the country has an overall trade surplus)	
<b>private savings</b>	the amount of money that private individuals and companies keep in their accounts rather than putting into other sectors of the economy through savings or investment	
<b>private investment</b>	the purchase of land, buildings, machinery, or equipment that is expected to produce income, appreciate in value, or both generate income and appreciate in value	
<b>capital accumulation</b>	the monetary value of investments in capital	
<b>marginal product of capital</b>	the change in production due to a one-unit increase in capital input	



## TERMS AND CONCEPTS QUIZ

Choose the correct term from the box below and enter it in the space provided next to each definition. Each term is used only once.

**Bank of Terms**

deflation  
potential GDP  
inflation  
capital-GDP ratio

private investment  
real GDP  
insufficient demand problem  
current account surplus

private savings  
capital accumulation  
rate of return on capital  
marginal product of capital

**Definitions:**

1. purchase of land, buildings, machinery, or equipment made to produce additional income:  
\_\_\_\_\_
2. the total value of a company's investment in capital: \_\_\_\_\_
3. the calculated long-term growth trend for an economy given its available supply of capital, labor, and technology: \_\_\_\_\_
4. an overall increase in prices: \_\_\_\_\_
5. the amount by which production increases given a one-unit increase in capital input:  
\_\_\_\_\_
6. a general decrease in prices: \_\_\_\_\_
7. situation in which demand for good and services decreases because individuals and firms save money rather than spending it: \_\_\_\_\_
8. the proportion of economic activity dedicated to spending on capital:  
\_\_\_\_\_
9. amount by which the value of a country's exports exceed the value of its imports:  
\_\_\_\_\_
10. the value that a given investment in capital creates: \_\_\_\_\_
11. amount of money kept in an account and not spent: \_\_\_\_\_
12. a macroeconomic measure of the value of economic output adjusted for price changes (i.e., inflation or deflation): \_\_\_\_\_

## VIDEO LECTURE PROMPTS

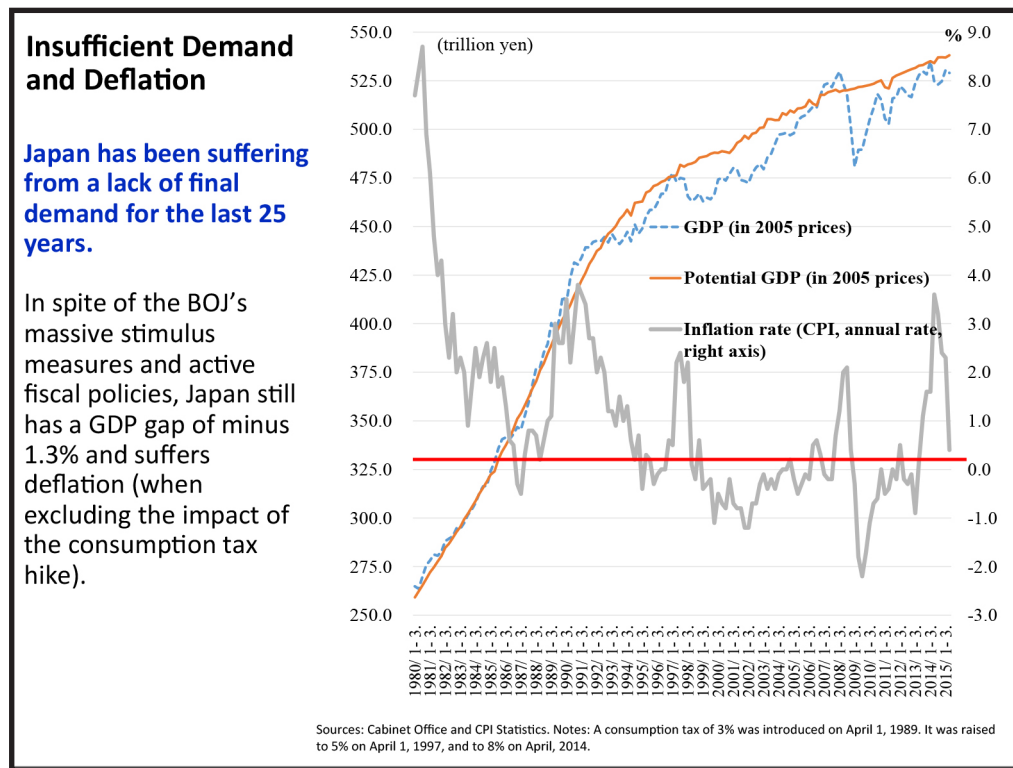
1. What does it mean that Japan's actual GDP was smaller than its potential GDP?
2. What is Japan's "insufficient demand problem"?
3. According to the professor, what are the two fundamental problems driving insufficient demand in Japan?

4. Why does the professor predict that China will encounter similar problems to Japan starting around the year 2020?

## FIGURES AND GRAPHS

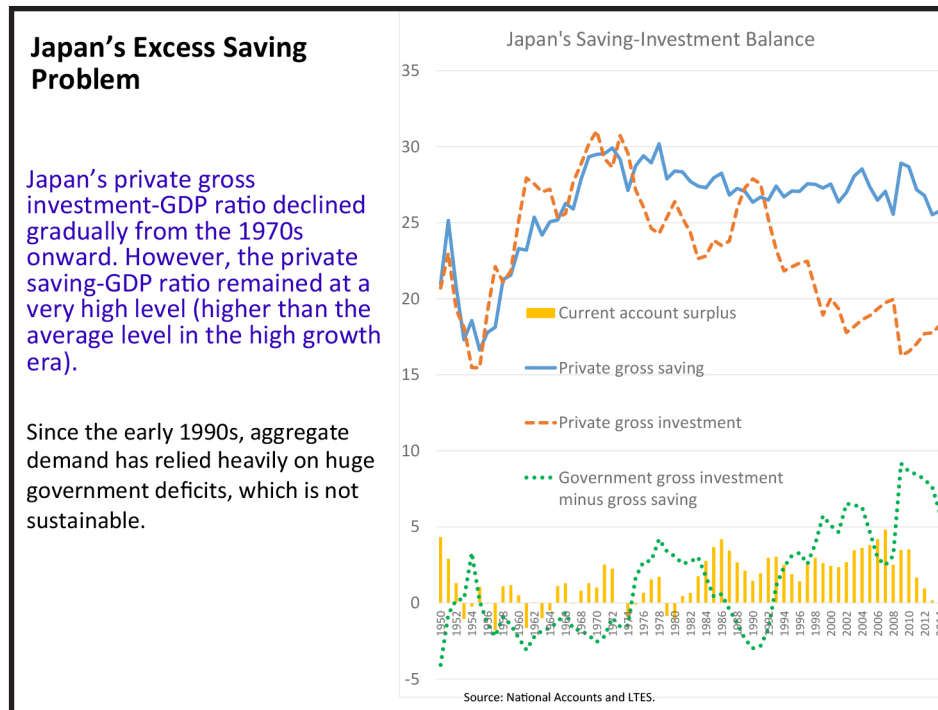
The five figures in the video lecture are vital to understanding the professor's arguments. Review each figure and write one or two sentences in response to each question.

**Figure 1: Insufficient Demand and Deflation**



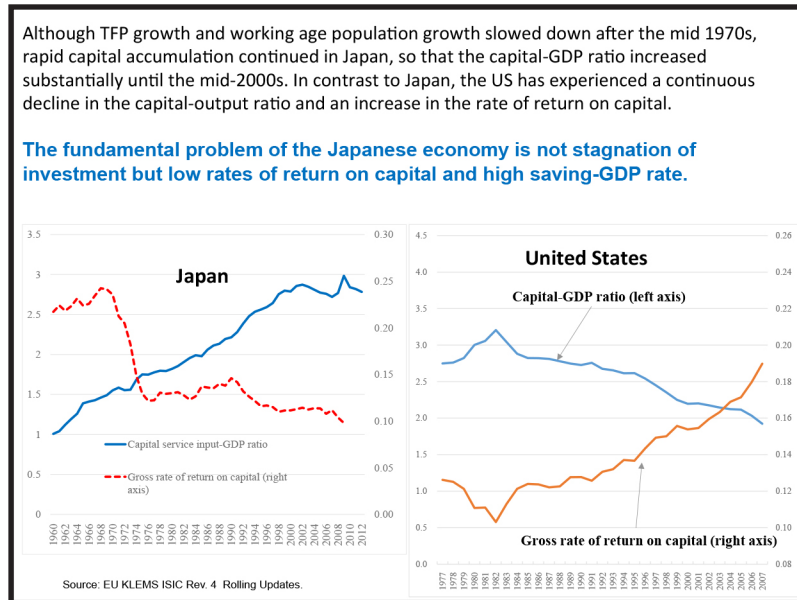
What is the relationship between Japan's inflation rate and the ability of actual GDP to meet potential GDP?

Figure 2: Japan's Excess Saving Problem



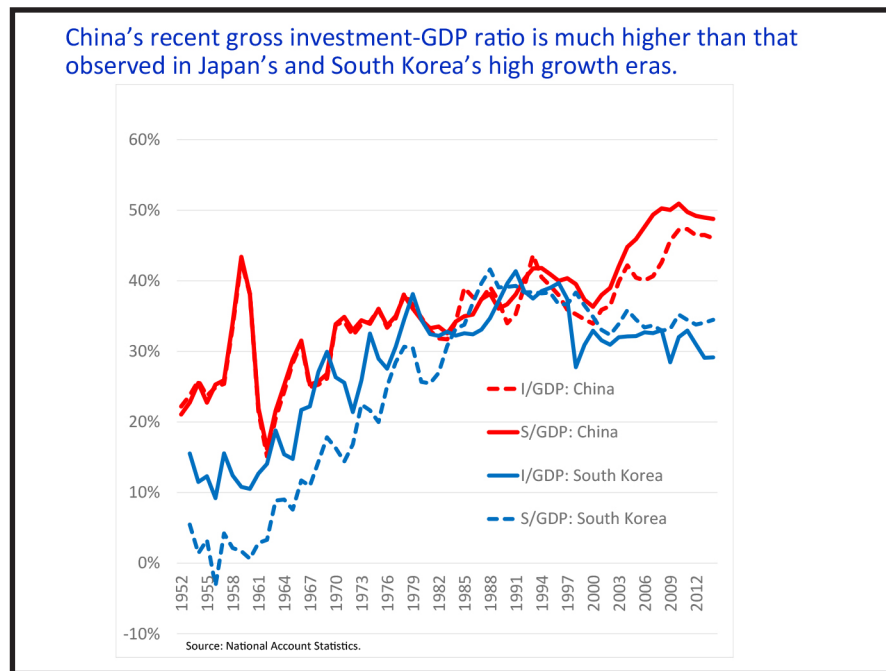
When do Japan's rates of private investment and private savings start to diverge? What are the results of this divergence?

Figure 3: Rates of Return on Capital in Japan and the United States



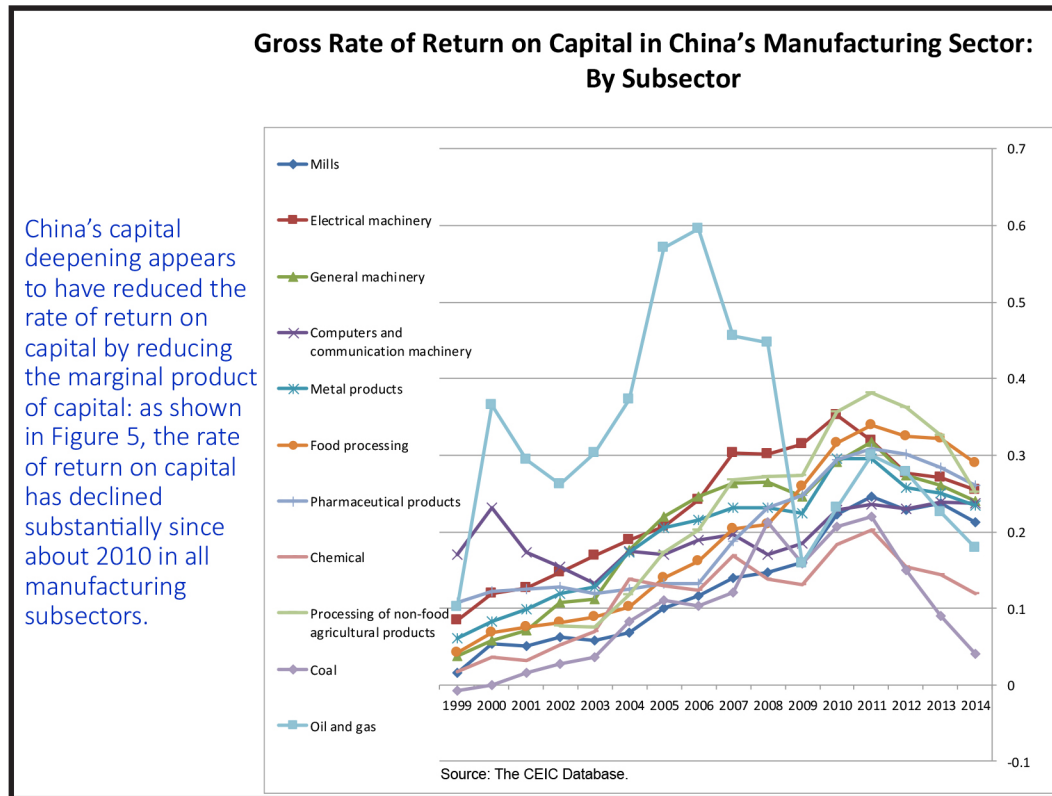
In simple terms, what story does this graph tell about the economies of Japan and the United States?

Figure 4: Comparison with Savings and Investment Rates in China and South Korea



In one or two sentences, how would you describe the savings and investment trends in South Korea over the time period shown? In China?

Figure 5: Gross Rate of Return on Capital in China's Manufacturing Sector



What might you predict about China's economy from this graph?



## PREDICTING FUTURE ECONOMIC GROWTH

This lecture and lesson center on the components of economic growth. Using what you learned about economic growth in Japan and China, your group now gets to attempt economic forecasting!

The table below contains data related to four fictional countries. Given this data, how quickly would you expect these countries to grow relative to each other?

**Rank how quickly you predict each country's economy will grow, from fastest (#1) to slowest (#4), and then prepare an explanation for your ranking.** You will give this handout to your teacher at the end of the class period.

	Country A		Country B		Country C		Country D	
	Current	<i>Projected in 5 Years</i>	Current	<i>Projected in 5 Years</i>	Current	<i>Projected in 5 Years</i>	Current	<i>Projected in 5 Years</i>
<b>Population (millions of people)</b>	100	100	50	55	13	14	120	118
<b>Total Factor Productivity Growth</b>	3%	2%	3%	3%	2%	5%	4%	2%
<b>Ratio of Investments to GDP</b>	18%	15%	30%	30%	25%	35%	40%	25%
<b>Ratio of Savings to GDP</b>	28%	28%	20%	18%	15%	16%	25%	30%
<b>Projected Growth Ranking</b>								

What is your rationale for this ranking?

## TERMS AND CONCEPTS QUIZ

### Definitions:

1. purchase of land, buildings, machinery, or equipment made to produce additional income:  
*private investment*
2. the total value of a company's investment in capital:  
*capital accumulation*
3. the calculated long-term growth trend for an economy given its available supply of capital, labor, and technology:  
*potential GDP*
4. an overall increase in prices:  
*inflation*
5. the amount by which production increases given a one-unit increase in capital input:  
*marginal product of capital*
6. a general decrease in prices:  
*deflation*
7. situation in which demand for good and services decreases because individuals and firms save money rather than spending it:  
*insufficient demand problem*
8. the proportion of economic activity dedicated to spending on capital:  
*capital-GDP ratio*
9. amount by which the value of a country's exports exceed the value of its imports:  
*current account surplus*
10. the value that a given investment in capital creates:  
*rate of return on capital*
11. amount of money kept in an account and not spent:  
*private savings*
12. a macroeconomic measure of the value of economic output adjusted for price changes (i.e., inflation or deflation):  
*real GDP*

## FIGURES AND GRAPHS

Figure 1: What is the relationship between Japan's inflation rate and the ability of actual GDP to meet potential GDP?

*The graph shows that periods when Japan's GDP lags substantially behind its potential GDP correlate with periods of deflation (i.e., negative inflation). The time periods of 1998–2004 and 2009–2010 best illustrate this correlation.*

Figure 2: When do Japan's rates of private investment and private savings start to diverge? What are the results of this divergence?

*The ratio of investment to GDP and the ratio of savings to GDP were virtually the same until around 1974. From that point until 1991, the level of investment in relation to the economy fell behind the level of savings. These levels converged again from 1990 to 1992, but since then the level of investment has declined almost continually and lags considerably behind the level of savings.*

*The implication of the post-1992 divergence is that savings rates have remained high, but there is less investment in the economy. In other words, spending by businesses as a percentage of the economy has decreased. With savings remaining high, this implies that there is less spending in Japan—less demand for goods and services. As the green dotted line shows, the government has tried to fill the demand gap by increasing its spending. However, this drives the government's debt higher and is not a sustainable strategy.*

Figure 3: In simple terms, what story does this graph tell about the economies of Japan and the United States?

*Investments in capital in Japan yielded high returns until the mid-1970s. Since then, rates of return to investments in capital have remained modest, which discourages businesses from investing in capital. Even so, the ratio of investments in capital to overall GDP increased in Japan until the mid-2000s.*

*Conversely, in the United States return on capital investments hit a low point around 1982 but has since been increasing rapidly. Over the same period of time, the ratio of investment to GDP has thus continued to fall. These two trends indicate that each investment in capital in the United States yields greater returns, so the need to spend on capital investments has decreased.*

Figure 4: In one or two sentences, how would you describe the savings and investment trends in South Korea over the time period shown? In China?

*For South Korea, rates of investment and savings increased continually from low rates in 1956 before stabilizing at a level around 32% since around 1997.*

*For China, rates of investment and savings have moved largely in lockstep, increasing consistently from 1961 until 2000. Both rates—but especially the savings rate—rose rapidly from 2000 to 2009, and have since started to decline.*

Figure 5: What might you predict about China's economy from this graph?

*Since rates of return on capital have declined for all of China's manufacturing subsectors since around 2010, there is less of an incentive for businesses to invest in capital. We would thus predict businesses to save more of their money. This might reduce the level of demand in the Chinese economy and lead to a period of economic stagnation similar to what Japan has experienced since the early 1990s.*

## VIDEO LECTURE PROMPTS

1. What does it mean that Japan's actual GDP was smaller than its potential GDP?

*Based on Japan's capital, labor, and technology, economists predicted its GDP to grow at a rate termed "potential GDP." However, Japan's GDP did not reach the rate predicted. This means that its economic resources (factories, workers, etc.) were not fully utilized. The professor asserts that the main factor that prevented Japan from achieving its potential GDP was excess savings (and therefore insufficient investment).*

2. What is Japan's "insufficient demand problem"?

*For the last 30 years or so, Japanese consumers have continued to save rather than consume, and Japanese firms have also saved rather than investing. This has led to insufficient demand for goods and services in Japan and has kept the economy from expanding.*

3. According to the professor, what are the two fundamental problems driving insufficient demand in Japan?

*There are two main factors behind Japan's insufficient demand problem.*

*First, the rate of return on capital (that is, the value produced by each dollar invested in capital) has decreased. Businesses thus do not derive as much benefit from investing their money, and have refrained from investing at the levels they previously did. This is related to the decline in Japan's productivity growth (covered in another lecture).*

*Second, Japanese consumers continue to save rather than spend their money. This means that businesses have less revenue, and less to potentially invest.*

4. Why does the professor predict that China will encounter similar problems to Japan starting around the year 2020?

*In many ways, the dynamics behind China's economy reflect those of Japan's before it entered its period of economic stagnation:*

- *China has been investing heavily (accumulating capital) for more than 40 years. This indicates that much of its growth has been due to investment, and if that investment drops, as it did in Japan, the economy will stall.*
- *The rate of return on capital in China's manufacturing sector has been falling since 2010. This is an indicator of declining productivity, and will depress the incentive for companies to invest in capital.*
- *China has a high savings rate, which may keep consumer spending from helping fuel the economy once investments decrease. This is the same dynamic that occurred in Japan starting in the 1990s.*
- *Finally, China's working-age population is predicted to start declining in 2020. With less labor available, the economy's potential GDP will decline.*

## PREDICTING FUTURE ECONOMIC GROWTH

	Country A		Country B		Country C		Country D	
	Current	Projected in 5 Years	Current	Projected in 5 Years	Current	Projected in 5 Years	Current	Projected in 5 Years
<b>Population (millions of people)</b>	100	100	50	55	13	14	120	118
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<b>Ratio of Savings to GDP</b>	28%	28%	20%	18%	15%	16%	25%	30%

Answer Key: Students should have projected the following, in order of fastest to slowest projected economic growth: Country C, Country B, Country A, Country D.

Students' reasoning should follow these lines:

- Country C has a growing population (labor), an accelerating productivity rate (technology), and is projected to maintain a high ratio of investment to GDP (capital), which will help fuel economic growth. While its savings rate is relatively low, it's not projected to change much over the next five years, so consumer demand should remain constant.
- Country B is projected to have a constant productivity rate (technology) and ratio of investments to GDP (capital use). However, the projected increase in population and decrease in savings rate mean that there will be more consumer spending (i.e., demand for goods and services), so the economy should grow.
- Country A is projected to have a constant population (labor) and rate of savings. However, its productivity (technology) and the level of private investment (capital) are expected to decrease, which indicate an economic slowdown.
- All four variables for Country D are projected to move in an unfavorable direction: its population (labor) will decrease, and rates of savings are projected to increase, which means less consumer spending. On the business side, productivity (technology) will decrease, as will the level of investment in capital. All of this points to lower levels of economic activity, and thus slower growth.

## VIDEO LECTURE TRANSCRIPT

**Professor Kyoji Fukao**

Professor of Macroeconomics and Productivity, Hitotsubashi University

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So, I'd like to talk about another of Japan's structural problems—that is Japan's insufficient demand.

And if you look at this figure, the orange line shows Japan's potential GDP, how much Japan can produce. And blue dotted line shows Japan's actual GDP. And you can see that most of the time, after 1990, Japan's actual GDP was much smaller than Japan's potential GDP. That means, because of the scarcity of demand, we have, you know, our factories and workers are not fully used during this period.

The main problem of Japan is excess saving problem. And if you look at this figure, the upper part shows—the blue line shows Japan's saving—private saving GDP rate, and orange dotted line shows Japan's private investment GDP rate. And we can see that from around 1960s, Japan's saving rate was very high—private saving rate was very high. And it was very important, and helped Japan's very rapid economic growth because it provided—it financed—Japan's capital accumulation in this period. But the high saving rate continued, even up to now. And as Japan did a lot of investment, and on the other hand, as I told in my last lecture, the TFP [total factory productivity] growth declined and also because of aging, Japan's working age population is declining. So the opportunity for investment declined and the rate of return on capital also declined. So that caused the continuous decline of private investment.

And if people preferred to save a lot, that means consume less, and there is not enough private investment, then we have the problem of insufficient demand. So Japan suffered this problem for the last, say, 30 or 40 years.

And if you look at this slide, this slide shows—the left hand side shows Japan's capital stock—capital service input-GDP ratio. So, in comparison with production, how much capital you input. And the red dotted line shows growth rate of return on capital. And we can see that Japan continued very rapid capital accumulation up to, say, middle of 2000, and probably reflecting too much capital accumulation, the rate of return on capital, declined—continued to decline. And the right hand side shows U.S. case, and you can see that in the case of U.S., because of working age population increased, because of higher birth rate and migration, and also productivity improved substantially, so capital-GDP ratio actually declined. And rate of return on capital increased over time.

So fundamental problem of the Japanese economy is not the stagnation of investment, but the factors behind it. That is, low rate of return on capital and also high saving-GDP rate. Now, Japanese government tried to get out from deflation and reduce the real interest rate and stimulate private investment. But I think these policies are not enough to get out from Japan's structural problems, and we need to reduce the savings-GDP rate and also accelerate productivity growth to solve Japan's long time stagnation.

This figure compares China's gross investment GDP rate and China's gross saving GDP rate, and also Korea's these numbers. And you can see that in the case of China, the saving GDP rate is very high and China invested a lot. The investment GDP rate was also very high. And China

continued this amazing capital accumulation for more than 40 years. That means China's—and also, according to recent works—the productivity growth of China is not so high, like Japan's, say, recent years.

So that means, and also in China, like Japan, the working age population is expected to start to decline in five years. So that means China will have similar excess saving problem in near future, like what Japan experienced in the last 30 years.

And one evidence is this figure. This figure shows gross rate of return on capital in China's manufacturing sector by subsectors. And we can see that after around 2010, the gross rate of return on capital is declining very sharply. So, like Japan, to solve the present slowdown of economic growth and insufficient demand problem, China needs to either reduce its saving GDP ratio or accelerate TFP growth.