

March 22, 2012

## Energy, International Fragmentation, and Rebuilding Decontamination Costs Place Heavy Burden on Japanese Public

JCER Medium-Term Economic Forecast Team

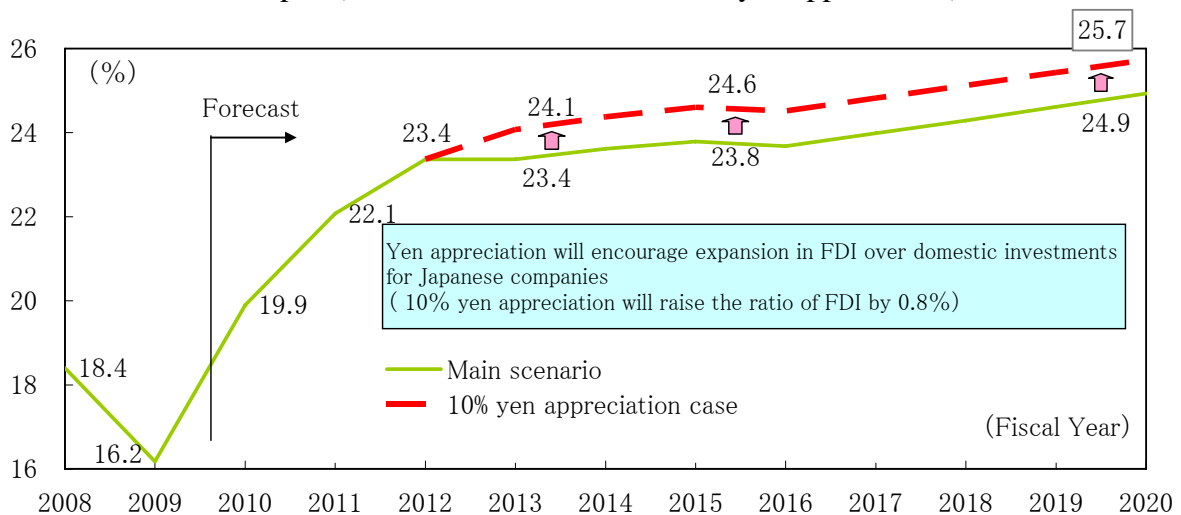
### Key Points

The Japanese economy has been recovering rapidly from the Great East Japan Earthquake, but in the wake of the nuclear accidents Japan needs to carry out a major review regarding the composition of its energy supplies. As widening credit concerns loom in Europe, the growth rate forecasts for various countries are being cut. In this context, the question is whether Japan can maintain steady economic growth. Addressing this question will be the task of the present Medium Term Forecast.

- (1) In the event that all Japanese nuclear power stations are shut down by the beginning of fiscal year 2012 (April 2012 - March 2013), supply-side capacity will be constrained by electric power shortages. If a total shutdown of existing power plants can be avoided, on the other hand, it would be possible to offset electric power shortages and supply-side constraints by substitution with thermal power generation and adoption of new forms of energy. This would make it possible to expect steady growth (or an average growth rate of 0.9% over ten years).
- (2) There is no absolute difference in expense between abandoning or continuing nuclear power (Figure 2). If steps are taken to abandon nuclear power by FY2050, costs will be required to adopt new forms of energy and switch to thermal power. At the same time, continuing with nuclear power will involve large costs to provide against the risk of future accidents. A basic energy plan should be prepared focusing on the CO<sub>2</sub> reductions possible through promotion of new forms of energy, the outlook for long-term energy supplies and fostering of new industries. In order to support the spread of new forms of energy, it will be necessary to create special tax-free zones and significantly ease zoning regulations making it possible to make use of disaster-affected land in Tohoku, uncultivated land around the country, and national parks as well.
- (3) Decontamination would cost between three and thirteen times more than buying contaminated land. If the expense is financed by an increase in electric power rates, private sector activity would come under pressure. In the short run, the expense would take the form of expenditures for government consumption and public works investment, so the impact on real GDP on the whole would not be apparent on the surface. Nevertheless, personal consumption and private nonresidential investment would come under downward pressure. Including final disposal, the decontamination work is certain to take a decade or more, which over the long term would crowd out private-sector activity and very likely crimp GDP as well. When a concrete recovery plan for Fukushima Prefecture is drafted, consideration should be given to reconsidering such issues as the order of priority for decontamination and whether the amount of compensation for victims of the nuclear accident is presently adequate.

- (4) Movement of production facilities out of Japan is expected to increase steadily with the growth of overseas economies, and if the yen strengthens further, overseas direct investment will accelerate sharply (Figure 1). In light of international competition, Japanese business firms will maintain a certain level of production within Japan in order to maintain a high technical level along with overseas production, so it will be important on both the company and industry level to maintain a balance between production functions and technical innovation capabilities. In order to make that possible, it will be important to create an environment making it easier for Japanese firms to rebuild their global supply chains. Thus in TPP negotiations, Japan should support the creation of rules relating to trade, investment and intellectual property based on a 21st century model which takes account of the international fragmentation in the stages of production.
- (5) With regard to restoring government finances, merely increasing the consumption tax rate by 10% will not stabilize the debt to GDP ratio, meaning that the risk of a government default will continue rising. It seems increasingly likely that the current account balance will fall into the red by the end of the decade. This indicates a growing necessity for foreign capital inflow to finance the budget deficit amid decreasing capacity of Japanese domestic savings, and the need for further review and reform regarding various aspects of revenue and expenditure, including the natural increase in social security expenditures.
- (6) At a time when a growth rate of just about 1% can be expected, large hikes in tax rates would place a huge burden on the economy. The increased accounting burden on business firms associated with incremental increases in the consumption tax rate should be kept in mind. Nevertheless, it would be desirable to limit the margin of increases in the consumption tax rate to 1% in order to soften the shock to the economy.

[Figure 1] A Forecast of the Foreign Direct Investment Ratio in the Manufacturing Industry in Japan (Simulation in the case of 10% yen appreciation)

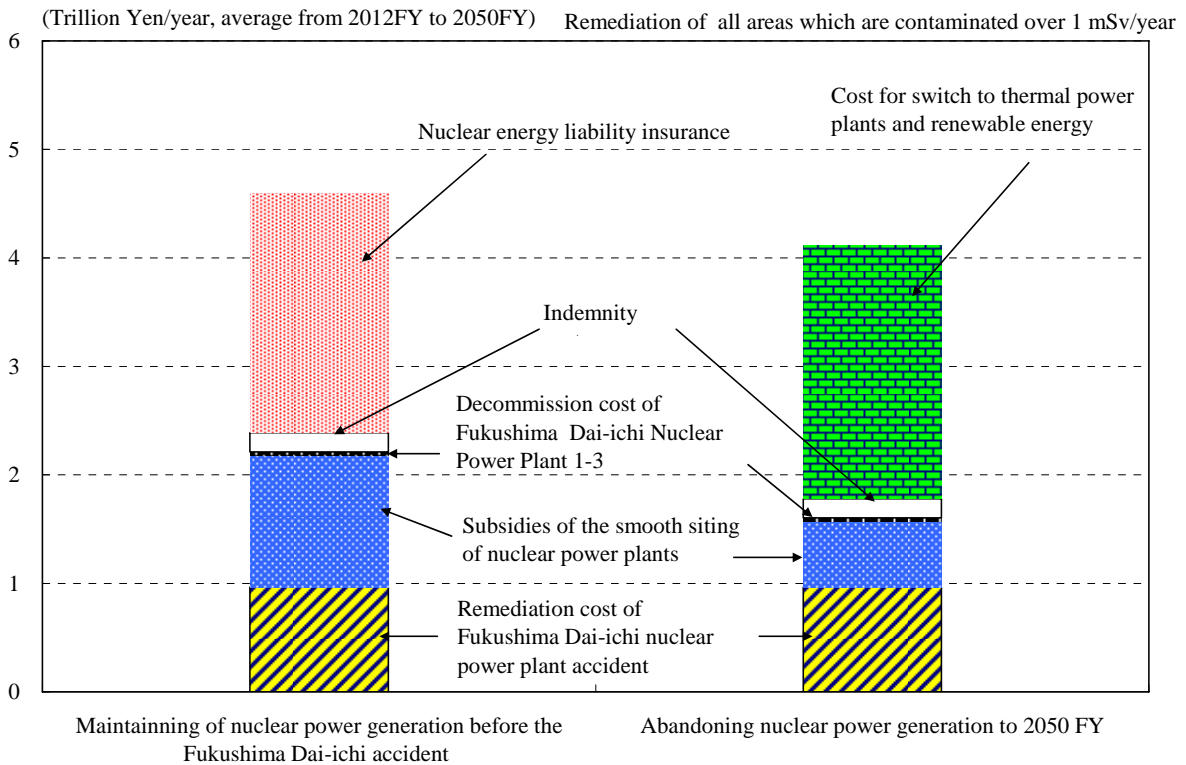


Note: Foreign Direct Investment Ratio

= Foreign Direct Investment / (Domestic Investment + Foreign Direct Investment) × 100

Sources: Ministry of Economy, Trade and Industry, *Survey of Overseas Business Activities* and Ministry of Finance, *Financial Statements Statistics of Corporations by Industry* (Forecast by JCER)

[Figure 2] A Comparison between Maintaining Nuclear Plants and “Exit Costs” from Nuclear Power in FY 2050



Note: Based on articles by the Ministry of Environment, Japan Nuclear Fuel Limited, TEPCO, Nuclear and Industrial Safety Agency, Japan Atomic Energy Commission, and Cabinet Secretariat, (Forecast by JCER)

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Medium-Term Economic Forecast Team**

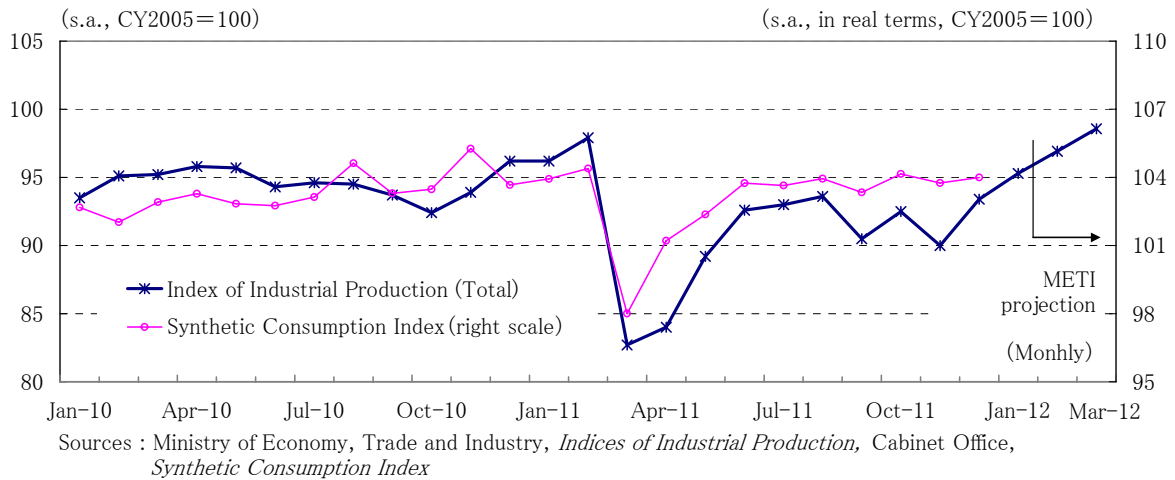
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1. Defining the Issues

- Structural changes associated with electric power shortages and the rebuilding of supply chains

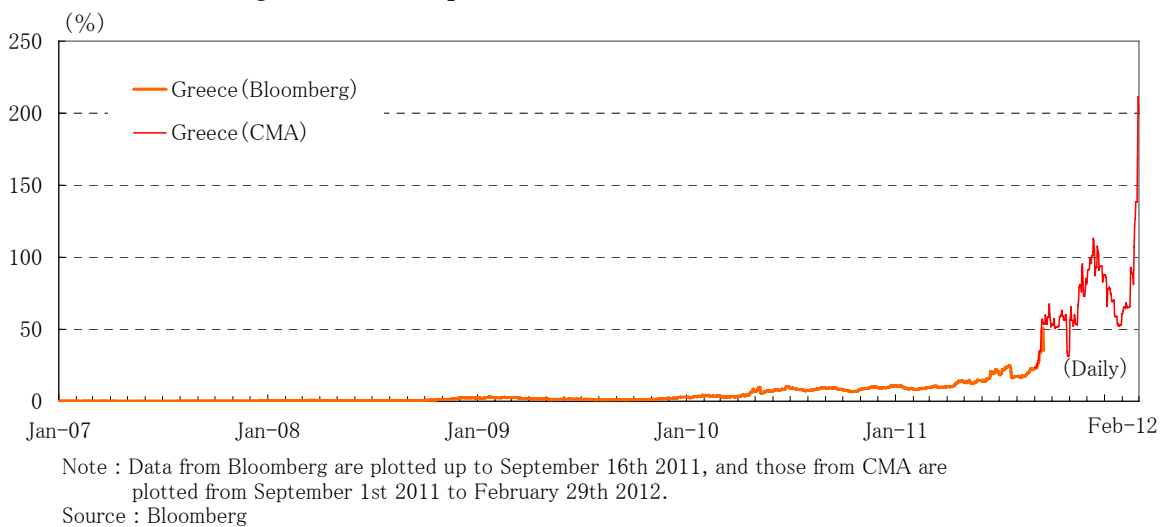
Over the past year, the Great East Japan Earthquake cut supply chains for the auto and other industries, froze economic activity mainly in the disaster-affected region, and depressed consumer sentiment not just in the affected areas but around country. Nevertheless, excepting the impact of the nuclear power station accident, Japan’s economic fundamentals were not severely damaged. Thanks to efforts at the factory level, production recovered much faster than initially anticipated, and most recently consumption has begun to recover as well.

[Figure 1-1] Production and Consumption



Meanwhile, the environment surrounding the Japanese economy is undergoing radical change. Japan is pressed to substantially overhaul the composition of its energy supplies in the wake of the nuclear accident. Moreover, there is also no room for complacency regarding European economies, which still seem in danger of an even deeper crisis.

[Figure 1-2] CDS spread of 5-Year Greek Government Bond<sup>1</sup>



1 CDS spread shows the credit risk of, for example, government bonds.

In this context, the following problems are coming into increasing focus with regard to the future of the Japanese economy.

- Will supply constraints in supply-side capacity continue to emerge due to electric power shortages? How will the composition of energy supplies change? What changes will that in turn bring about in Japan's economy and industrial structure? Will the Japanese economy be able to maintain stable growth?
- The growth rate for the international economy is being revised down while the outlook for fossil fuel prices is being revised up. How much impact will this have?
- How will the reconstruction of supply chains and the overseas shift in production facilities proceed? How should companies fragment operations between Japan and overseas facilities?
- By how much will fossil fuel imports increase? What impact will the rise in electricity rates have on prices? How long will deflation continue?
- What is the outlook for Japan's trade balance and current account balance? Will they go into the red?
- Massive expenditures will be necessary for restoration and reconstruction, and some observers say these could be financed with higher taxes for reconstruction. However, Japanese government finances were already deteriorating before the disaster. The question is, can the government avert a fiscal default?

In our updated "37th Medium Term Forecast for the Japanese Economy" released in June, 2011, we revised our medium-term outlook in the wake of the earthquake and tsunami disaster, focusing mainly on supply side constraints from electric power shortages, damage to the capital stock, and recovery demand. With these questions in mind, then, our current report presents our forecast for the coming decade based on economic conditions at home and abroad since the above report<sup>2</sup>. Accordingly, the present report also includes analyses which were incomplete in our last report, including our forecast of energy supplies and crude oil prices, the possibility of production facilities moving offshore, and the consequences of electric power shortages undermining consumption by negatively influencing consumer confidence.

## 2. Principal Assumptions

- Nuclear power generation to fall to 60% of pre-quake levels by FY2020 (with complete abandonment by 2050 anticipated)

Two factors which will have a considerable influence over the Japanese economy in the coming decade will be the manner in which the upcoming review of energy supplies is conducted and trends in overseas economies. Any forecast of the future will depend heavily on these

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<sup>2</sup> In formulating a description of the future, we have based our analysis on values forecasted through our macroeconomic model. This model is based on the JCER Environmental Economics Macroeconomic Model (please refer to JCER Discussion Paper No. 127 of April, 2010, "Impact of a Carbon Tax as Analyzed Using the JCER Environmental Economics Macroeconomic Model") but incorporates equations relating to SNA distribution categories. It comprises some 366 equations (116 of which are estimation formulas) and 243 exogenous variables. Moreover, the outlook for FY2011 and FY2012 set forth in this forecast is basically in line with our Short-Term Forecast No. 149, "Quarterly Forecast of the Japanese Economy" released on February 21, 2012. Numbers related to the SNA are converted to the 2005 benchmark using results from our 2000 benchmark-based macroeconomic model.

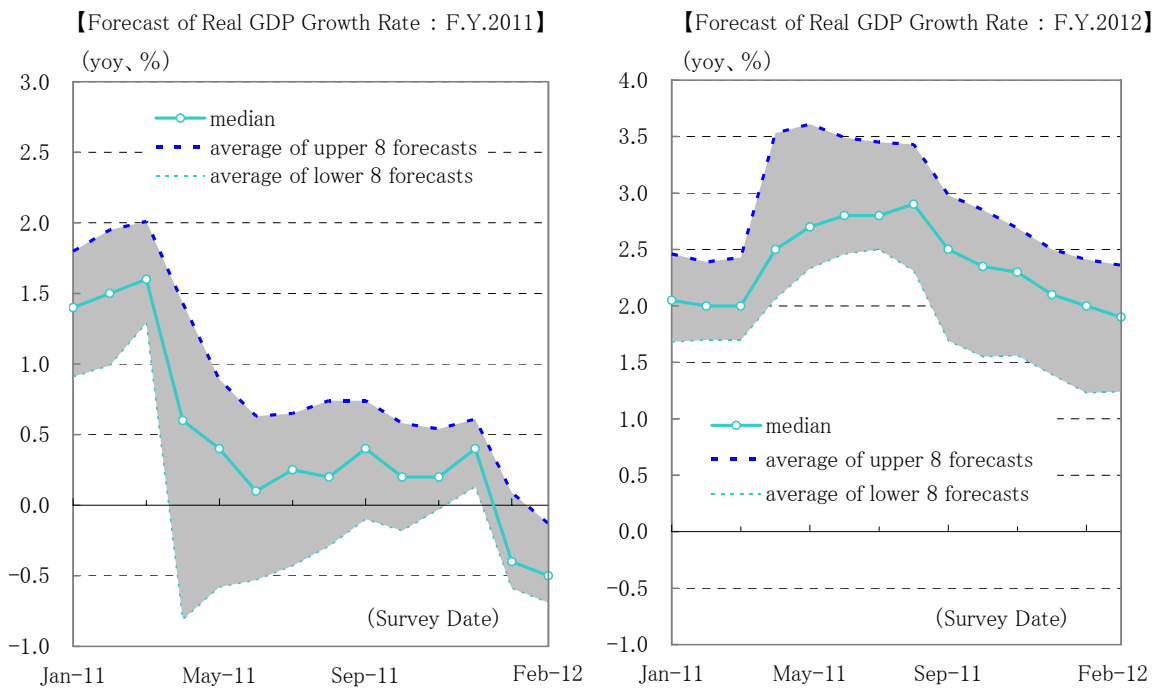
questions.

## 2.1. The Great East Japan Earthquake

### 2.1.1. The Direct Impact of the Quake and Tsunami

Immediately after the earthquake disaster, there was concern over what impact it would have on the economy, but thanks to efforts by plant workers, supply chains were restored much faster than initially expected<sup>3</sup>. Production has recovered rapidly, with consumption also recovering as well recently. Views on the outlook for the economy have also grown brighter as pessimistic views have been revised upward. However, recent financial turmoil in Europe has forced forecasters to revise their projections downward again.

[Figure 2-1] Shift in GDP Growth Rate Forecasts



Source : Economic Planning Association, *Monthly Survey of Japanese Economic Forecasts*

### 2.1.2. The Impact of Shutting Down All Nuclear Plants

- **The outlook of nuclear power stations (two scenarios)**

The present forecast contemplates two scenarios based on our findings in “II. Energy 1. Four Scenarios Depending on Nuclear Power Scheme”<sup>4</sup>.

#### Standard Scenario

It will be possible to avert a shutdown of existing nuclear power plants, but new construction of plants will be suspended (with a view to abandoning nuclear power by 2050). In 2012, however, nuclear power stations providing electric power to the Kanto region will not be in operation. These include Tokyo Electric Power Company’s Fukushima Daiichi and Daini plants as well as seven reactors of the Kashiwazaki Plant. Moreover, we assume Chubu Electric’s Hamaoka

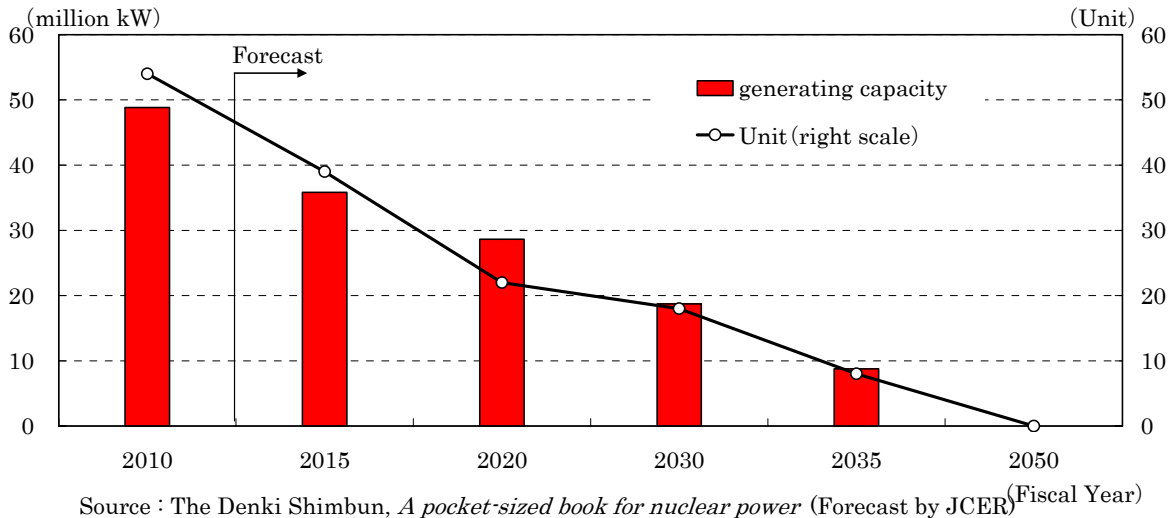
<sup>3</sup> For details, please see our report: “III. International Fragmentation 1. Broken Supply Chains: Inspection and Lessons - Impact mainly on the automobile industry, constraints imposed by custom electronic components and associated industries” (<http://www.jcer.or.jp/research/middle/detail4300.html> ※available only in Japanese)

<sup>4</sup> <http://www.jcer.or.jp/research/middle/detail4300.html> ※available only in Japanese



nuclear power station will also be offline.

[Figure 2-2] An Outlook on the Closure of Nuclear Plants (Standard Scenario)



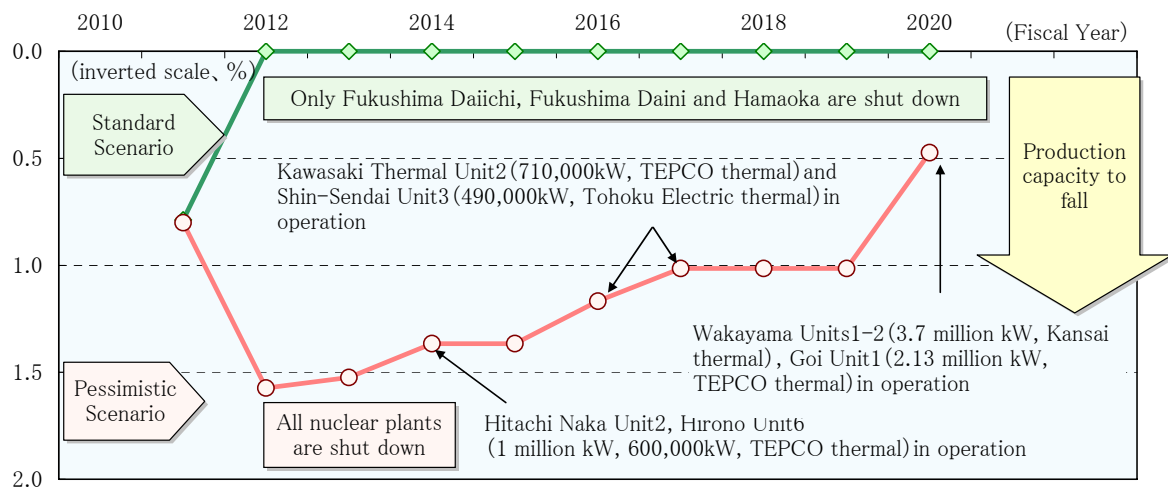
**Pessimistic Scenario**

All nuclear power stations would be shut down by the beginning of FY2012.

• **Total factor productivity growth rate**

Of the factors defining the supply capacity (or potential GDP) of the Japanese economy, our update perceives those which are not based on factors of production, namely labor and capital, as total factor productivity (TFP). We then consider how much production and business activity will have to contract due to power shortages arising from a nuclear plant shutdown. Specifically, we first assume that, absent the impact of the power shortage, TFP would grow at 0.8%, or at the average rate prevailing over the years 1991 through 2007. We then consider how far this value would drop owing to an electric power shortage.

[Figure 2-3] Supply-side Constraints from Closure of Nuclear Plants (Negative Impact on Potential GDP, %)





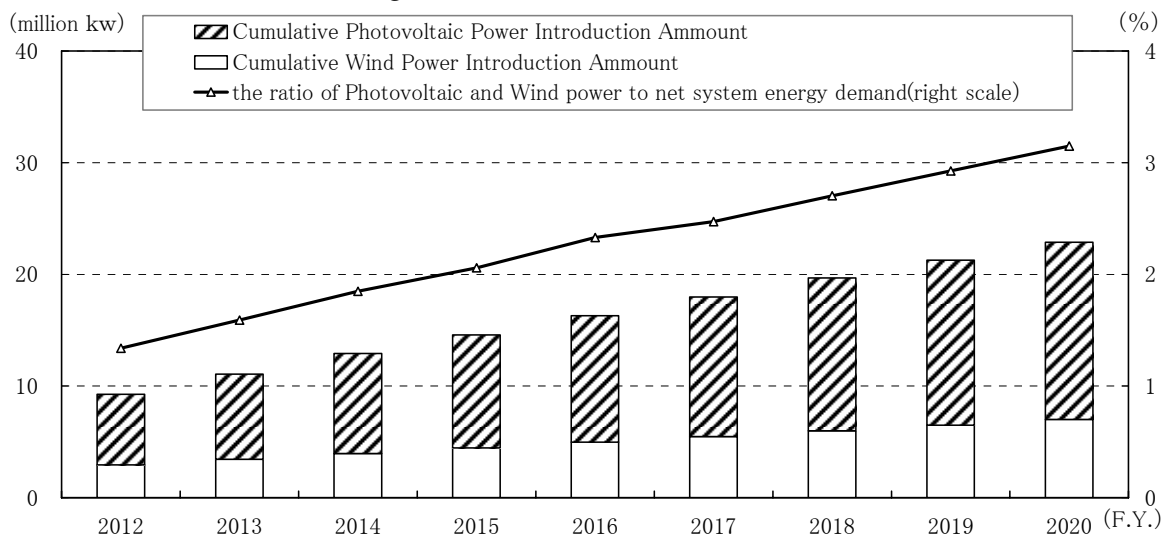
• **Energy supply outlook: How will the composition of the energy supply change?**

As our analysis in “II. Energy 1. Four Scenarios Depending on Nuclear Power Scheme” indicated, even if nuclear power generation is maintained at present levels (about 30% of total energy generated, or 280 billion kWh per year) and nuclear power generation is abandoned by 2050, cost increases would be unavoidable. However, in order to continue nuclear power generation (which would require construction to replace plants being decommissioned), it would be critical to thoroughly review safety standards in light of the Great East Japan Earthquake, which makes it difficult to assume realistically that the replacement and new plant construction could be completed by 2020. Thus under the Standard Scenario, we have assumed that nuclear power generation will indeed be abandoned by 2050, meaning that nuclear power stations will successively be decommissioned once they are past forty years in service.

Costs will be higher in 2020, but over the long term, switching over to thermal power generation and promoting the adoption of new forms of energy would not necessarily be expensive compared to continuing nuclear power generation. The government will adopt a new energy feed-in tariff scheme from the summer of 2012, and expectations are that solar and wind power generation will become more popular as a result. We estimate that the share of new forms of energy will rise to about 11% by FY2020, with hydropower accounting for 8%, and solar and wind power accounting for 3%.

In so far as nuclear power plant construction is difficult within a ten-year time frame, it will be necessary to draw up a basic energy plan providing for reductions in CO<sub>2</sub> emissions, a review of long-term energy supplies and fostering of industries friendly to the environment over the long term. Promoting the adoption of new forms of energy based on such a plan would be a realistic choice so far as future energy policy is concerned.

[Figure 2-4] Energy Supply Outlook



## 2.2. Overseas Economies

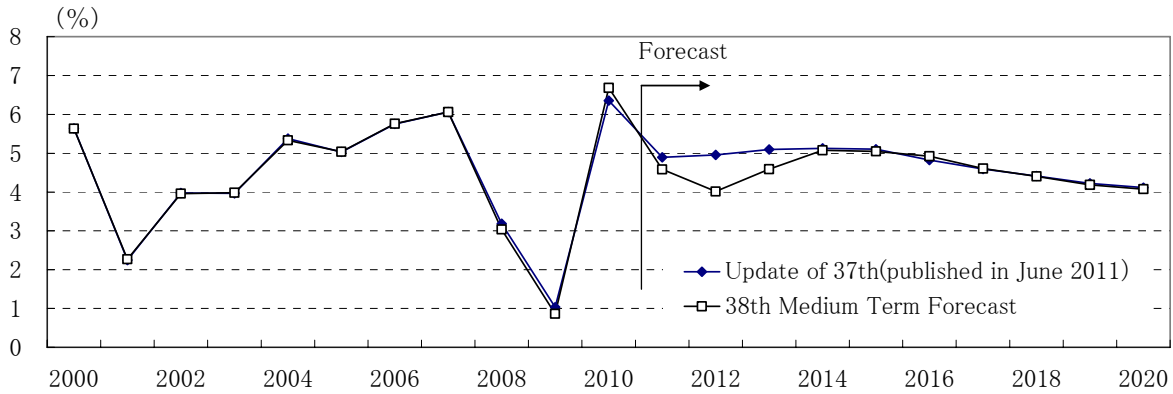
### 2.2.1. Growth rate: Revised down (See also, “VI. Appendix 1. External Environment (United States, Europe and China)”<sup>5</sup> )

The growth outlooks for various countries have been revised down owing to a number of factors, including the widening credit concerns in Europe and the slow recovery from the

<sup>5</sup> <http://www.jcer.or.jp/research/middle/detail4300.html> ※available only in Japanese

global financial crisis in the United States. The global growth rate (measured as the weighted average of Japan's export markets) will be 4.7% in the first half of the forecast period and 4.5% in the latter half (compared to our June 2011 forecast of 5.0% and 4.4%, respectively).

[Figure 2-5] World Economic Growth Outlook: A Comparison between our updated 37<sup>th</sup> Forecast and 38<sup>th</sup> Forecast



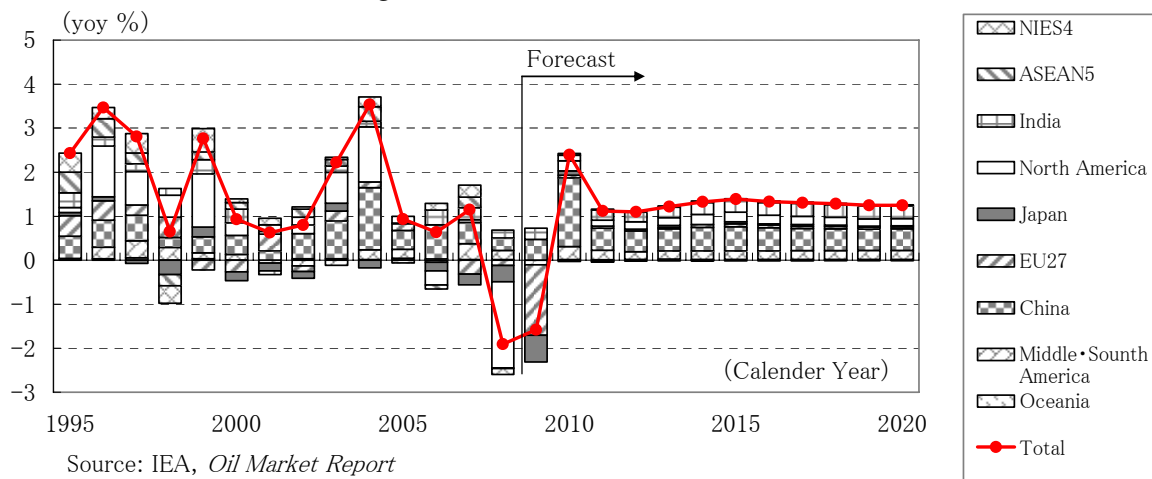
Note : World GDP growth rate is made by multiplying each country's GDP growth rate by the country's share as a destination of Japan's export. (Calendar Year)

Source : IMF, *World Economic Outlook*

**2.2.2. Fossil fuel prices: Revised upward (See also, "VI. Appendix 2. Outlook on Crude Oil Prices"<sup>6</sup>)**

If we assume that, during the forecast period, improvements in energy efficiency in the various countries and regions will advance at about the same pace as in the years 2005 to 2009 on average, global crude oil demand will grow at an average rate of 1.2%. With regard to China, efficiency in crude oil demand will improve basically in line with the targets cited at the time of the Fifteenth Session of the Conference of Parties to the United Nations Framework Convention on Climate Change (COP 15) held in 2009 (which aimed to limit emissions intensity to 45% versus 2005 levels by 2020)<sup>7</sup>. A look at the details shows a large contribution to crude oil demand by China, which is continuing fast economic growth.

[Figure 2-6] Global Crude Oil Demand



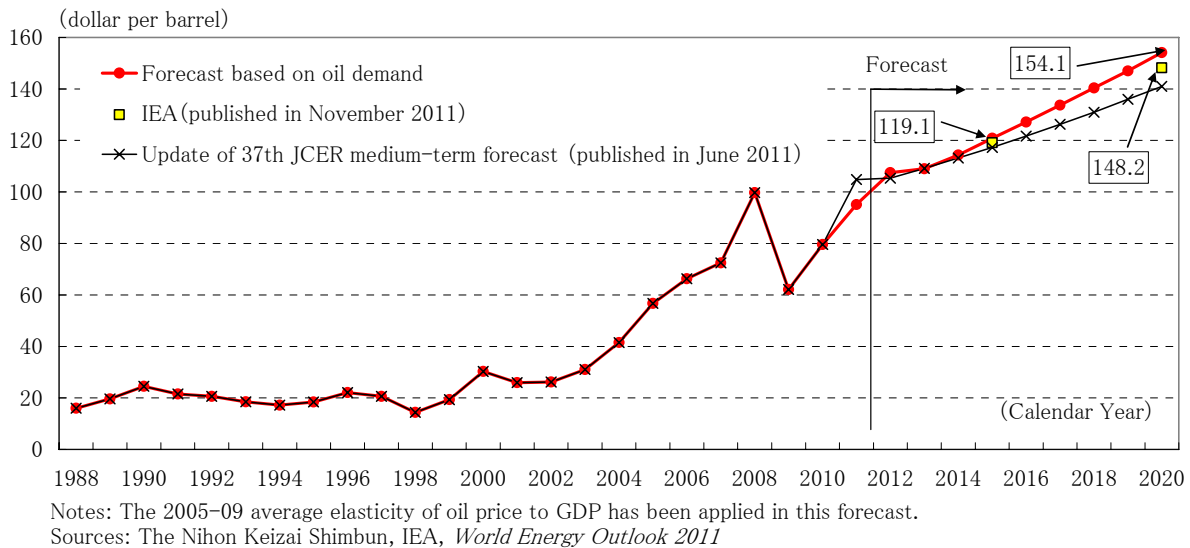
Source: IEA, *Oil Market Report*

<sup>6</sup> <http://www.jcer.or.jp/research/middle/detail4300.html> ※available only in Japanese

<sup>7</sup> For details, please see our report: "II. Energy 2. China's International Commitment to Reduce CO<sub>2</sub> Emissions is an Achievable Target" (<http://www.jcer.or.jp/research/middle/detail4300.html> ※available only in Japanese)

Since the global demand for crude oil will rise, the price of West Texas Intermediate will continue to rise, reaching \$154.1 a barrel by 2020 (\$141 a barrel under our June 2011 forecast). In tandem, other fossil fuel prices will also rise.

[Figure 2-7] Crude Oil Price Forecast: A Comparison between our updated 37<sup>th</sup> Forecast and 38<sup>th</sup> Forecast



### 2.2.3. Yen-dollar rate

Over the long term, the yen-dollar rate will be determined by purchasing power parity. In nominal terms, the price level is rising slower in Japan than in other countries, therefore, we expect the dollar to continue trading at around ¥80 (with the yen somewhat weaker in real terms).

### 2.3. Labor force, capital stock

Factors of production determining supply capacity suffered severe damage in the earthquake disaster. Our assumptions are as follows.

**(1) Population:** We have assumed that, during the forecast period, the population aged fifteen and above will decline at an annual average rate of 0.1% between 2011 and 2015, and decline at 0.2% during the second half of the period (between 2016 and 2020). Considering recent trends of fewer immigrants and more emigrants, we estimate less population growth than that of the National Institute of Population and Social Security Research<sup>8</sup>.

**(2) Labor force:** We have assumed the labor force participation rate by both sexes and all age groups will remain unchanged at the 2012 level.

**(3) Damage to capital stock (FY2010):** Referring to estimates by the Development Bank of Japan<sup>9</sup>, we have estimated the nationwide capital stock damage (on a gross basis) at about ¥18 trillion. The values as itemized are: about ¥9.1 trillion for public capital, about ¥2.6 trillion for

<sup>8</sup> "Population Projection for Japan (January 2012)". Medium variant estimation sees ▲0.0% growth for 2011 to 2015, and ▲0.2% growth for 2016 to 2020.

<sup>9</sup> "Regarding Estimates of Damage to Capital Stock from the Great East Japan Earthquake," DBJ News, April 28, 2011.

private residential housing, and about ¥6.3 trillion for private business facilities<sup>10</sup>.

#### 2.4. Reconstruction Demand

We have assumed there will be an increase in investment for recovery of capital stock in the form of private nonresidential investment, private residential investment and government fixed capital formation investment equivalent to the ¥18 trillion in damage to capital stock. Since the amount of damage to capital stock associated with the Great East Japan Earthquake exceeds that associated with the Great Hanshin Earthquake (which was ¥9.6 trillion), we have assumed five years will be required for reconstruction (versus the approximately three years required after the Great Hanshin Earthquake).

#### 2.5. Government Finance

**2.5.1. Restoration costs:** Our estimates are about ¥2.4 trillion for government expenditures in FY2011-2012 (for removal of debris) and about ¥2. trillion for income transfers to households (in the form of unemployment compensation and employment adjustment subsidies) and about ¥2.9 trillion in income transfers to corporations (in the form of investments in small and medium corporations, compensation for losses caused by the earthquake disaster, unfounded rumors or misinformation and expenditures to cope with the problem of double loans). Also, these assumptions do not take into consideration any burden they state might undertake in the form of expenses for the nuclear accident cleanup (including those for decontamination, power plant site subsidies, damages compensation and reactor decommissioning). Taking decontamination expense and all other costs related to the nuclear accident cleanup into consideration and factoring them into electricity rates would add another 8% to 10.7% to electricity rates for households and business firms (amounting to ¥1.3 to ¥1.8 trillion annually). The impact of such costs on the economy is analyzed in II. Energy “1. Four Scenarios Depending on Nuclear Power Scheme”.

[Figure 2-8] A Comparison of Decontamination Costs

Decontamination of living areas only		Decontamination of living areas and the purchasing contaminated land		Decontamination of all contaminated areas including woodland	
Electricity price hike owing to decontamination costs etc (Yen/kWh)	Rate of increase in electricity prices (%)	Electricity price hike owing to decontamination costs etc (Yen/kWh)	Rate of increase in electricity prices (%)	Electricity price hike owing to decontamination costs etc (Yen/kWh)	Rate of increase in electricity prices (%)
1.4	8.0	1.4	8.3	1.9	10.7

Note: The 2008-09 fiscal year average electricity price of 17.39 yen per kWh has been applied in the analysis

**2.5.2. Reconstruction spending:** We assume that only the portion corresponding to the public capital stock damaged by the earthquake disaster (about ¥9.1 trillion) will be expended between FY2011 and 2015.

**2.5.3. Expenditures other than restoration and reconstruction spending:** We assume that expenditures for FY2012 will be in line with ministerial budget requests. For FY2013 and thereafter, expenditures for social welfare will rise due to ageing of the population, with general expenditures other than those for social welfare and reconstruction rising in line with

<sup>10</sup> See our 37th Medium Term Forecast for the Japanese Economy (June, 2011), “Supplement 2. Estimates of Stock Damage and Population aged 15 and Above”

increases in the price level.

**2.5.4. Reconstruction tax and supplementary budget:** We have assumed a ¥11 trillion tax increase for reconstruction and a third supplementary budget.

**2.5.5. Consumption tax rate:** We expect that the consumption tax rate will be increased to 8% in April 2014 and to 10% in October 2015<sup>11</sup>.

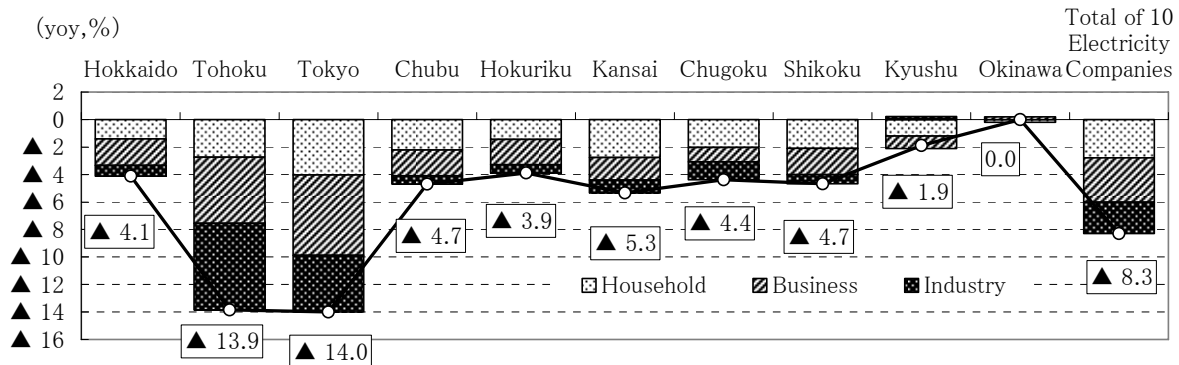
**3. The Real Economy**

- Growth to remain under 1% due to population decline even with increase in nuclear plant operating rate
- Strengthening of yen by 10% would push firms to accelerate overseas investment to cut costs

**3.1. Power Usage in Summer 2011**

Electric power usage in the summer of 2011 fell sharply nationwide, including in the Tohoku and Kanto regions. By type of contract, power provided under household and commercial contracts fell by a large margin. Power provided under industry (or manufacturing) contracts also decreased markedly primarily in the Tohoku and Kanto regions on a number of factors, including the usage of in-house power generation, limitations to using lighting, air conditioning etc, operating on weekends to avoid concentrated usage of electricity on weekdays and other energy saving efforts. As a result, Japan’s manufacturing sector was able to achieve a production increase while saving on energy at the same time<sup>12</sup>.

[Figure 3-1] The Rate of Change in Electric Power Sales by Type of Contract



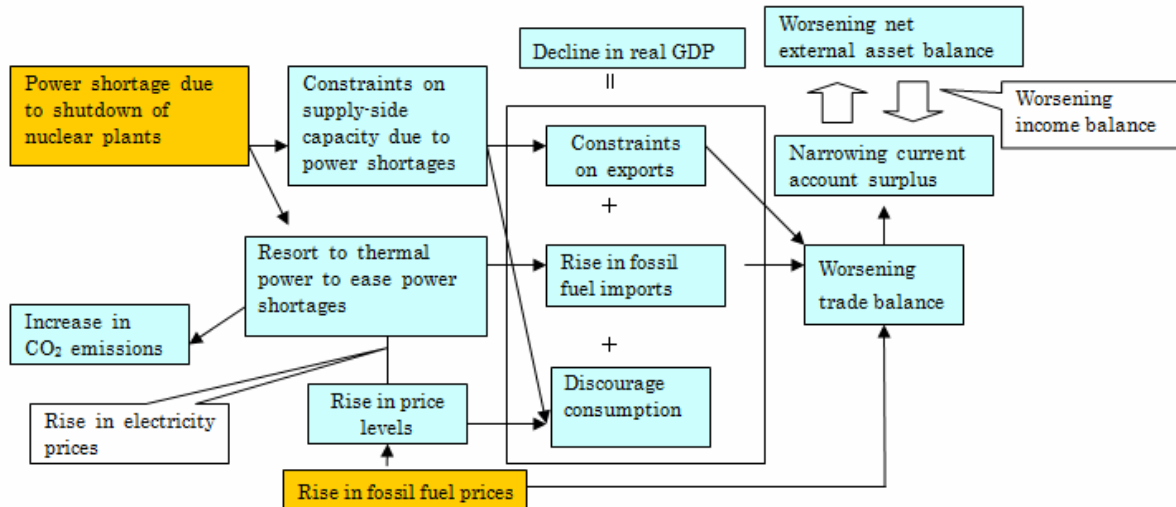
Notes : 1. The data compares electric power sales of summer (July & August) 2010 and 2011.  
 2. "Household" indicates electricity for residential use. "Business" and "industry" includes power consumption by liberalized sectors, and the amount for the electricity contract is equally divided and added to "business" and "industry" respectively.

Source : Federation of Electric Power Companies, *The statistics of electricity*

<sup>11</sup> In our economic model, we assumed the consumption tax rate will be raised by 1% for F.Y.2015 and F.Y.2016 respectively. Concerning the rate hike in April 2014, last minute demand will occur in F.Y.2014 and its pushback in F.Y.2015. However, regarding the October 2015 rate hike, both last minute demand and its pushback will happen within the same fiscal year, canceling each other out. To examine the impact of the tax rate hike on the economy, we conducted two simulations, the first with no consumption tax rate hike and the second in the case where the tax rate is increased by 1% each year from F.Y.2014, to reach 10% in F.Y.2018 (refer to BOX2).

<sup>12</sup> For details, please see our report: *Keizai-Hyakuyobako No.52 "Production Increase Difficult amid Energy-Saving – Fuel costs on the rise with the Suspension of Nuclear Power Plants"* (January 13, 2012: <http://www.jcer.or.jp/report/econ100/index4272.html> ※available only in Japanese)

[Figure 3-2] Economic Impact of Power Shortage and Rising Fossil Fuel Prices



**3.2. Potential Growth Rate: The possibility of further supply side constraints due to electric power shortages**

Many important people and production facilities were lost in the recent Great East Japan Earthquake. In the future, the relative age of the Japanese population will rise and the size of the labor force will shrink (-0.6% in both the first and second half of our forecast period). But if a total shutdown of existing nuclear power stations can be avoided (as under the Standard Scenario), it will be possible to offset any electric power shortages and supply side constraints as would arise from suspending construction of new nuclear power plants by substituting thermal power generation and making use of new forms of energy. Potential GDP could then be expected to rise at a pace of around 0.5% in the latter half of our forecast period and on rising productivity and accumulation of capital (0.5% in the first half and 0.6% in the latter).

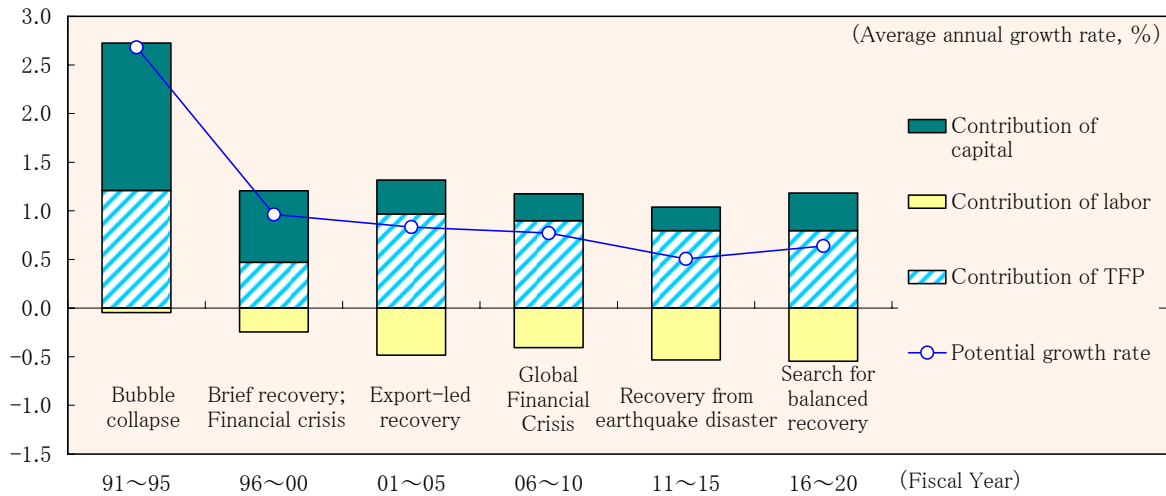
In contrast, if all nuclear power stations are shut down by the beginning of FY2012 (as under the Pessimistic Scenario), supply side capacity would be subject to constraints during the forecast period even if use is made of thermal power generation and new forms of energy in an attempt to offset the resulting electric power shortage.

As we will see below, moreover, private nonresidential investment recently (FY2010) has proceeded only fast enough to offset the consumption of fixed capital. In accounting terms, this means only replacement investment has been made. When only replacement investment takes place, there is no net increase in the capital stock, so the contribution to the potential growth rate is zero. In our present forecast, however, we have estimated physical loss. Also, the deflator for private nonresidential investment is down while the real growth rate exceeds the nominal growth rate. As a result, the capital stock contribution can not automatically be regarded as zero.

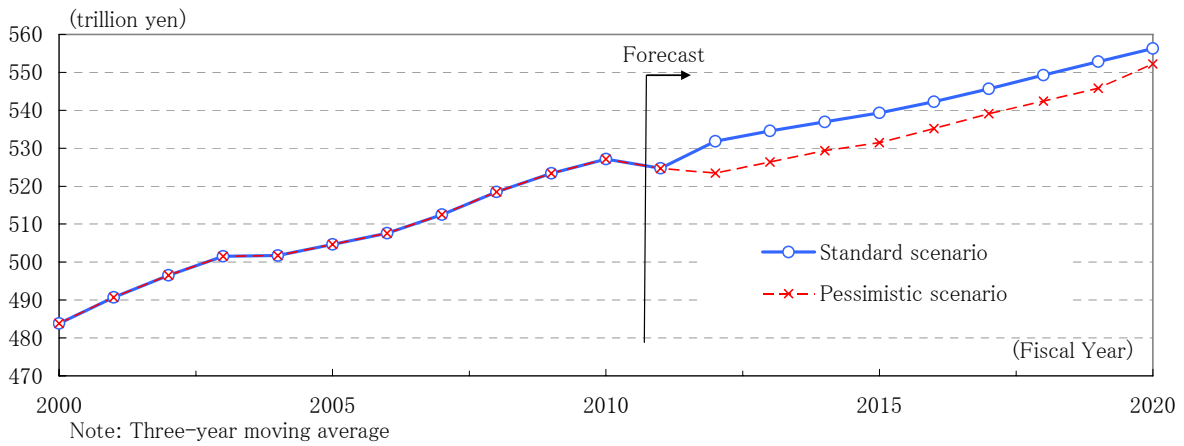
Nevertheless, if the capital stock contribution remains at zero, the negative -0.5% contribution from the shrinking labor force would mean that growth would be under 0.5% even if total factor productivity grew at the rate of 0.8%<sup>13</sup>.

<sup>13</sup> In addition, TFP would also be expected to grow, amid accumulated domestic investment leading to technical progress; however it needs to be confirmed whether a growth rate of about 0.8% could be maintained even when domestic investment grows slowly.

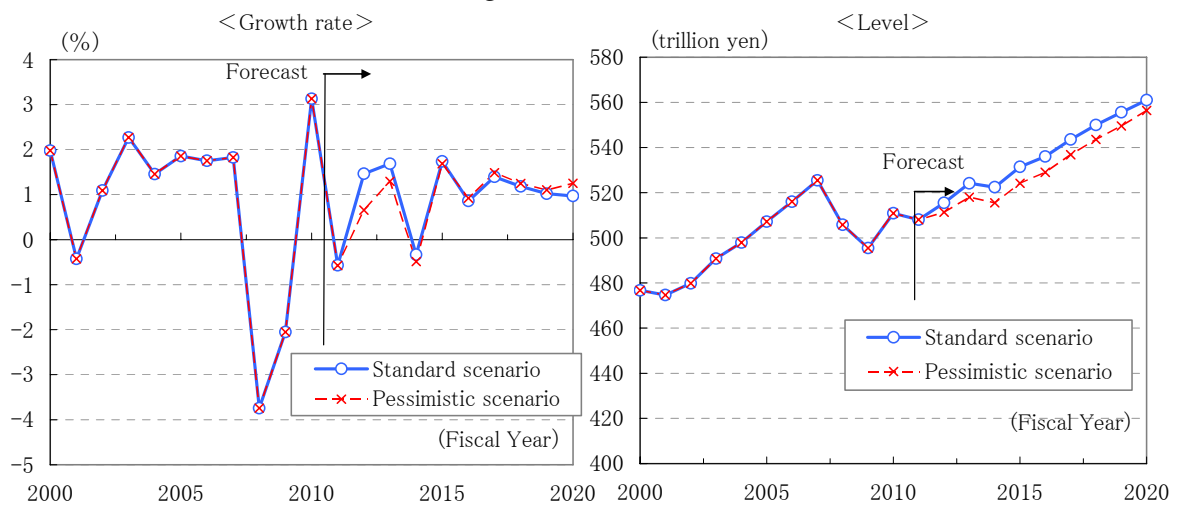
[Figure 3-3] Potential Growth Rate of the 1990s, 2000s and 2010s by Factor Components



[Figure 3-4] Potential GDP (three-year moving average)



[Figure 3-5] Real GDP



Source : Cabinet Office, National Accounts

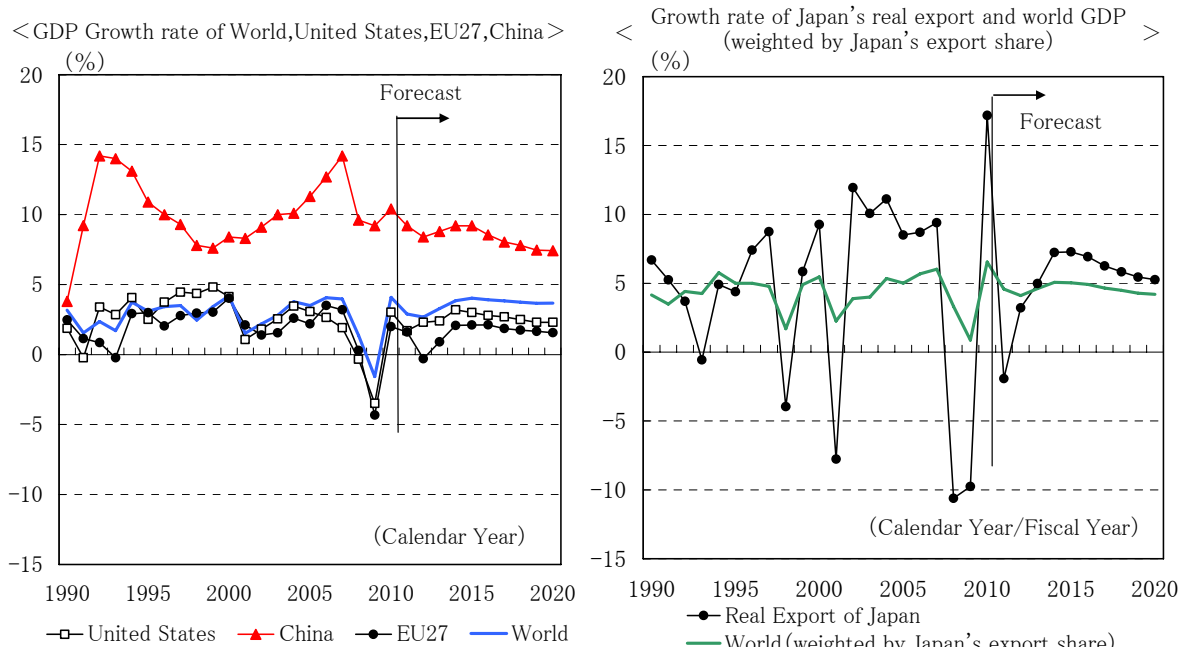


### 3.3. Exports

Despite the impact of recent strength in the yen and cuts in the outlook for global growth, Japanese exports should rise steadily in the latter half of our forecast period.

The U.S. recovery from the global financial crisis has been slow, and credit concerns in Europe will be a drag on growth in the first half of our forecast period. But given the likelihood of continued strong growth in emerging economies, the global economy can be expected to grow steadily, or at about 3.3%. In the second half of our forecast period, growth should be firm, or in line with the potential growth rate at 3.8%. The global economic growth rate measured as the weighted average of Japan’s export markets will remain high at 4.7% in the first half and 4.5% in the second half of our forecast period. In tandem with this growth in the world economy, Japanese exports will be negatively impacted in the first half but will grow steadily toward the latter half of the forecast period (4.1% in the first half and 5.9% in the second half, versus 6.0% and 5.6%, respectively, under our last June forecast). If all nuclear power stations are shut down and supply side constraints emerge, however, exports will also be constrained<sup>14</sup>.

[Figure 3-6] World Economic Growth, World Economic Growth Weighted by Japan’s Export Share and the Growth of Japan’s Exports



Note: Japan’s real export data is given in fiscal year terms. World GDP growth is weighted by nominal GDP share. Sources : IMF, *World Economic Outlook September 2011*. Forecasts made by JCER.

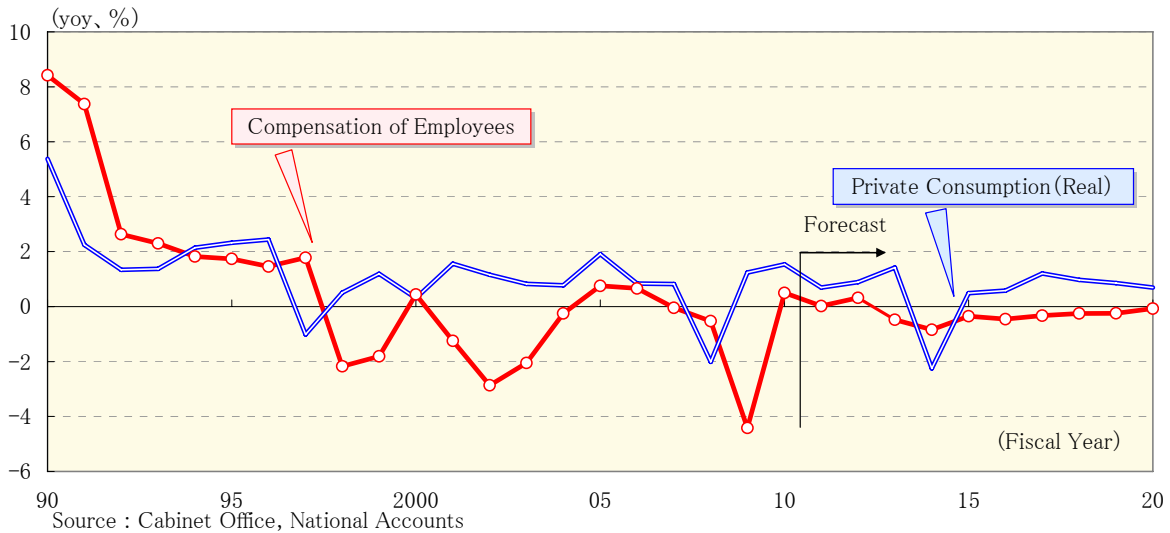
### 3.4. Employee compensation and consumption: How much impact will there be from an upward revision in fossil fuel prices?

As for income, per capita employee compensation (wages) will rise in tandem with the steady recovery of the economy, but given the shrinking labor force population, employee compensation (on a gross basis) will show no growth (slipping -0.3% in both the first and second half of our forecast period). As for the price level, prices for fossil fuels and other imports will rise, electric utility rates will as well owing to the switch from nuclear to thermal power and the consumption tax rate will also be raised. However, the negative GDP gap will persist for some time, so on the whole, any increase in the price level will be small. Thus

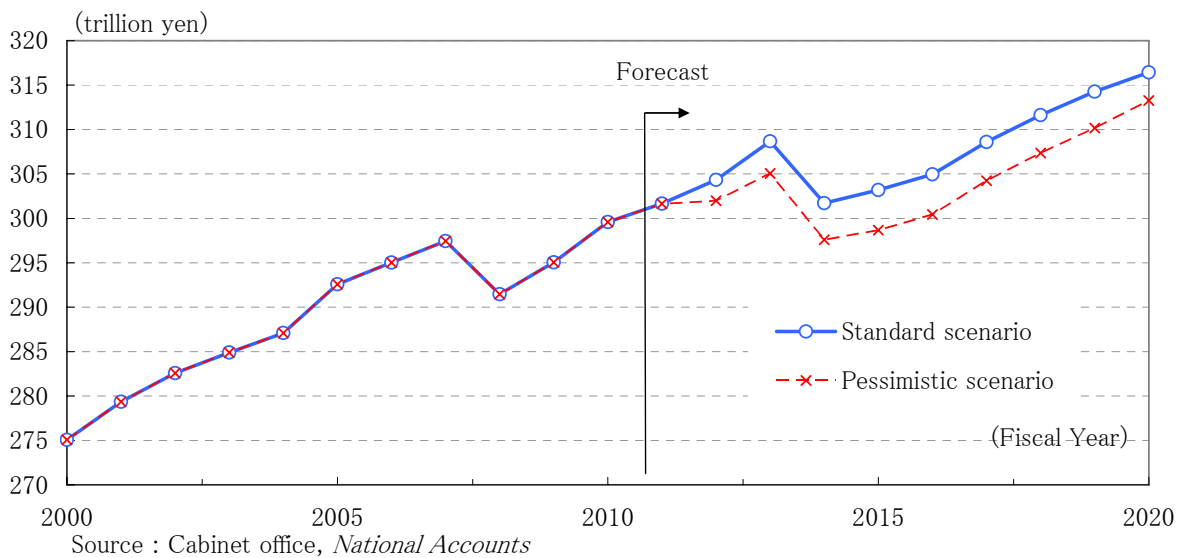
<sup>14</sup> In percent terms, we assume that exports would shrink in proportion to supply side constraints.

supported by stable prices, consumption can be expected to rise firmly (0.2% in the first half and 0.9% in the second half of the forecast period). In the event, however, that all nuclear power stations are taken offline and supply side capacity is constrained such that the Pessimistic Scenario comes to pass, future income expectations will fall, leading to worsening consumer sentiment, which will push down consumption. In that case, the shortfall in electric power in FY2012 could be expected to be about 2.5%, undermining potential GDP by about 1.6% and pushing down per capita real consumption by about 0.7 percentage points<sup>15</sup>.

[Figure 3-7] Compensation of Employees and Private Consumption



[Figure 3-8] Real Private Consumption (Level, Comparison by Scenario)

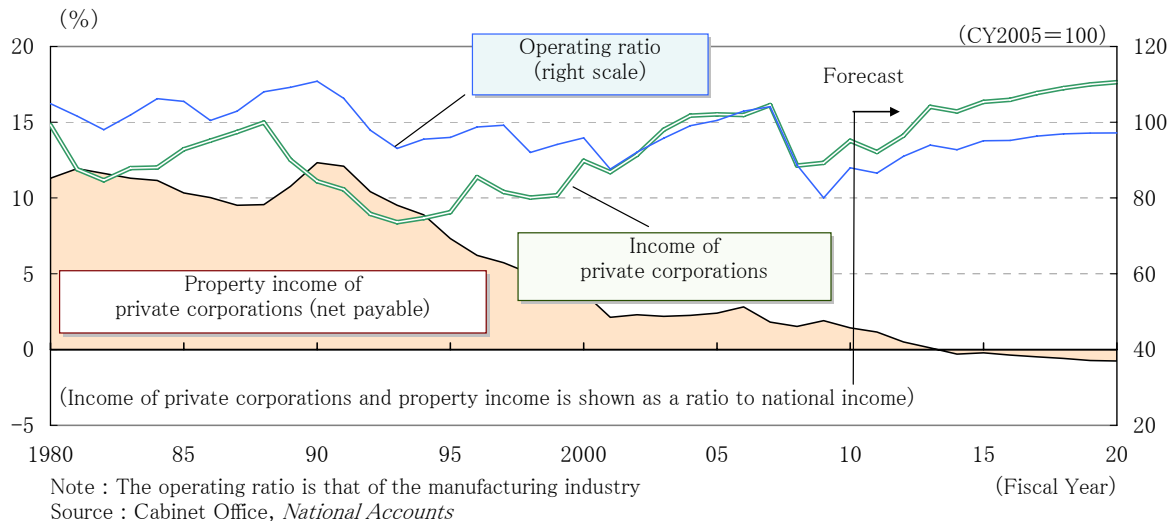


**3.5. Corporate earnings and private nonresidential investment: How much will private nonresidential investment recover?**

<sup>15</sup> Our forecast takes account of the fact that an electric power shortage would constrain supply side capacity, leading to a decline in per capita potential GDP, in turn directly pushing consumption down. For our methodology, please see "IV. Appendix 3. The Impact of Electricity Shortage on Consumption" (<http://www.jcer.or.jp/research/middle/detail4300.html> ※available only in Japanese).

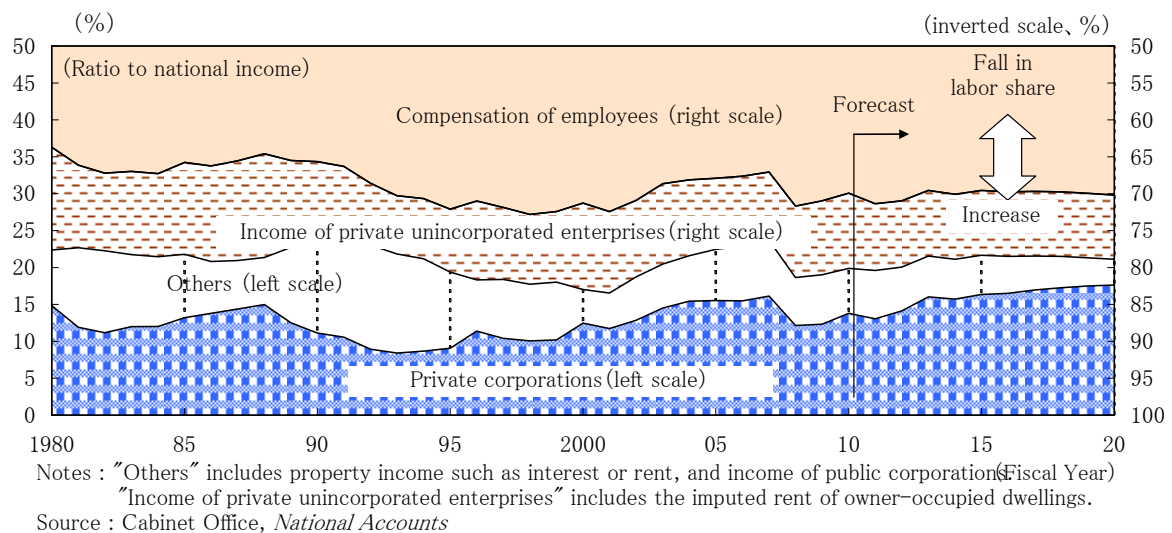
Given the low rate of increase in wages, such factors as the steadily recovering economy, rising capacity utilization rates and excess net property income owing to debt reduction will serve to lift business earnings. The future economic trend will be greatly influenced by how these benefits from strong business activity are allocated among various choices, including wages, dividends, lower export prices, private nonresidential investment or overseas investment. If they are allocated to wages and domestic private nonresidential investment, consumption and other forms of domestic demand could be expected to rise, but if instead they are allocated to lower export prices and to foreign investment, any rise in domestic demand would be weak.

[Figure 3-9] Corporate Earnings



The labor share of national income (71.0% in FY2009) had been rising owing to the impact of the global financial crisis it is likely to gradually fall as the GDP gap<sup>16</sup> narrows (to 70.3% in the first half and 69.9% in the second half of our forecast period).

[Figure 3-10] Labor Share of National Income

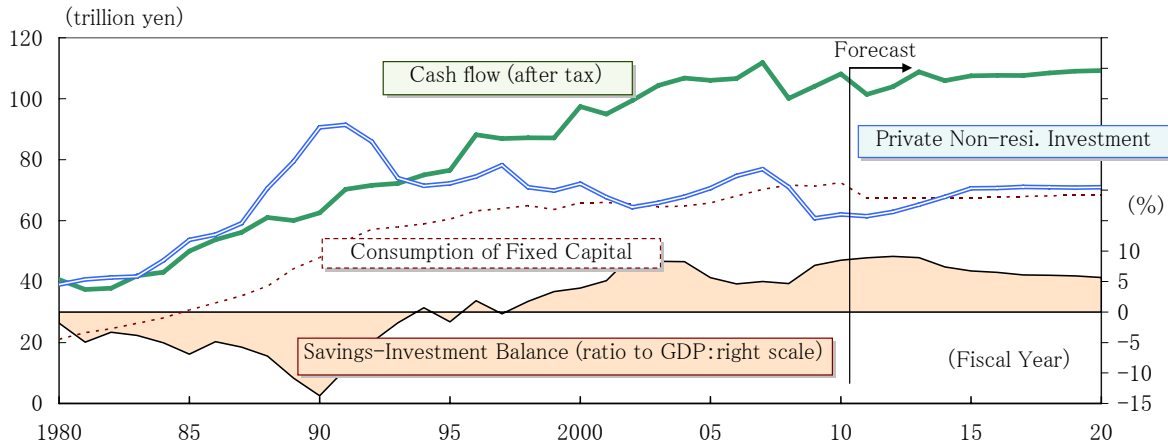


Since the mid-1990s, Japanese businesses have retained cash and given priority to repaying debts. Recently, they have also limited capital investments within the scope needed to offset the

<sup>16</sup> GDP gap = (real GDP - potential GDP) / potential GDP x 100.

consumption of fixed capital and so they enjoy excess net savings. Expectations are that private nonresidential investment will also recover in line with corporate earnings, but as the global market grows and the relative size of Japan's domestic market shrinks, the overseas investment ratio will grow, which would mean less hope for a strong recovery and likely no chance of one strong enough to push firms into a position of excess borrowing<sup>17</sup>.

[Figure 3-11] Cash Flow and Domestic Investment



Notes : Figures are those of private corporations.

Cash flow = Income - corporate tax + consumption of fixed capital

Savings-Investment balance is adjusted with transfers from the special account.

Source : Cabinet Office, *National Accounts*

**3.6. Direct overseas investment:** How will progress be made in the rebuilding of supply chains and to what extent will production facilities be moved offshore? What is the best form that international fragmentation of production can assume?

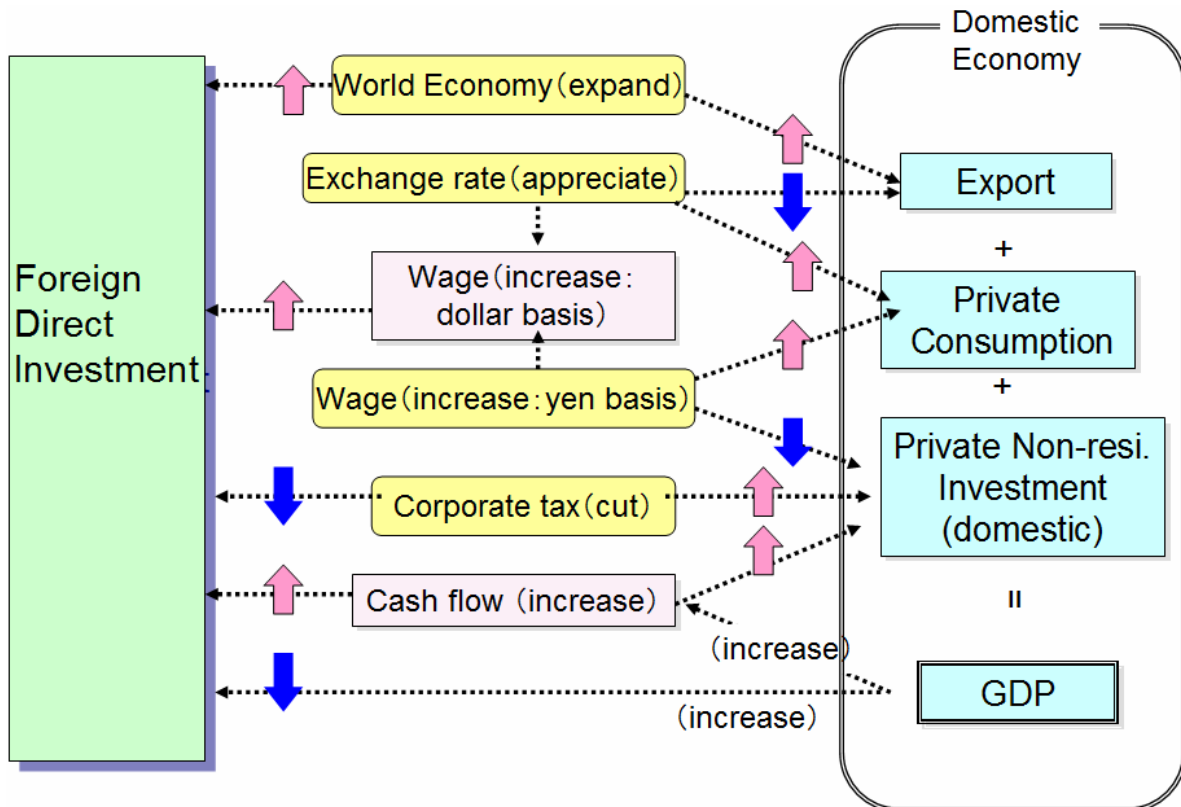
Various changes in the economic environment are likely to influence both direct overseas investment and the domestic Japanese economy through routes such as the following.

- (1) The growth of the international economy will bring about increased exports and direct overseas investment in distribution facilities.
- (2) By increasing the cost of wages denominated in foreign currencies, the strong yen will cause an increase in direct overseas investment and a decrease in exports. In an environment of price stability, it will also have the effect of increasing personal consumption because it will increase real income.
- (3) Rising wages in Japan will cause increases in direct overseas investment and personal consumption. However, it will have a negative impact on business earnings and will therefore have the effect of lowering domestic private nonresidential investment and direct overseas investment.

<sup>17</sup> In making our forecast, we have employed a mechanism to simultaneously determine overseas direct investment and domestic investment to achieve consistency between the two. Specifically, we have adopted the methodology used in our 37th Medium Term Forecast for the Japanese Economy Discussion Point 8, Overseas Investment Ratio: Outlook Points to Further Increase" (February 17, 2011). In the analysis, we used a framework in which the size of domestic and overseas markets, wages (including currency rates) and corporation taxes influence the choice between overseas direct investment and domestic investment. (Please see "VI. Appendix 4. Foreign Direct Investment and Domestic Investment" (<http://www.jcer.or.jp/research/middle/detail4300.html> ※available only in Japanese))

- (4) Lowering the corporate income tax rate would cause direct overseas investment to decline while causing domestic private nonresidential investment to increase since it would boost business cash flows.
- (5) By increasing business cash flows, Japanese economic growth would increase both domestic private nonresidential investment and direct overseas investment, but because the Japanese market would become very attractive, the effect would be especially strong for domestic private nonresidential investment.

[Figure 3-12] Foreign Direct Investment and the Domestic Economy



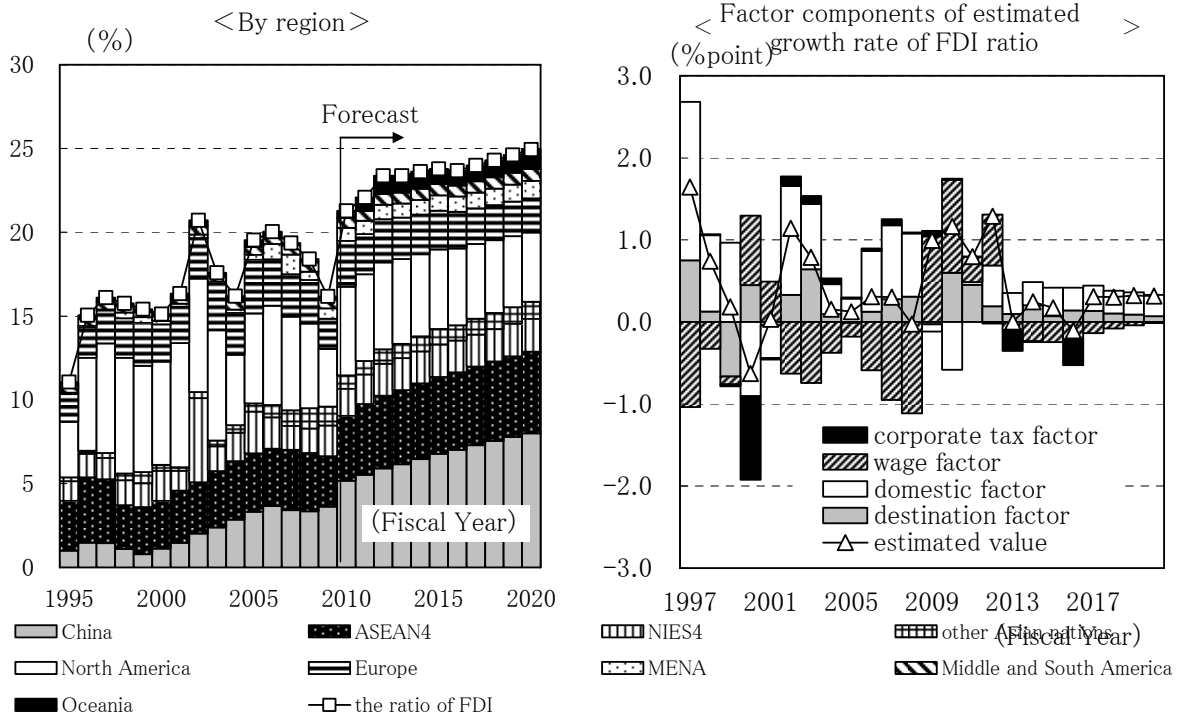
If we consider the movement of production facilities offshore with this mechanism in mind, we can see that between FY2000 and FY2008 the Japanese economic slump and firm growth in overseas economies caused overseas markets to become more attractive, thus increasing the overseas investment ratio<sup>18</sup>. Between FY2008 and FY2010, moreover, the strong yen and other factors increased Japanese domestic wages relative to overseas, which in turn caused the overseas investment ratio to rise. A look by region shows that overseas investment in the rapidly growing economies of China and ASEAN4 nations is rising, leading to expectations that, with the same trend continuing, the overseas investment ratio is likely to reach 24.9% by 2020 (versus 18.4% in FY2008) and that Japanese companies are likely to steadily increase efforts to shift production facilities offshore.

This does not mean of course that all companies have been aggressively shifting production facilities overseas. Rather, as seen in the supply chain disruptions caused by the Great East

<sup>18</sup> The Foreign Direct Investment Ratio= Foreign Direct Investment / (Domestic Investment + Foreign Direct Investment) × 100.

Japan Earthquake and the widespread flooding in Thailand, the move of facilities overseas can be seen as a move by business firms to broaden their production activity to the global level (international fragmentation in the manufacturing process) even as they continue production activity in Japan<sup>19</sup>. However, if the yen were to keep strengthening and electric utility rates were to keep rising, it would raise the question of how much overseas direct investment would accelerate. Another question concerns the impact that in turn would have on the domestic economy.

[Figure 3-13] Foreign Investment Ratio (Manufacturing Industry)



Note : Foreign Direct Investment Ratio= Foreign Direct Investment / (Domestic Investment + Foreign Direct Investment) × 100. ASEAN4 consists of Indonesia, Malaysia, The Philippines and Thailand. NIES4 consists of Hong Kong, South Korea, Singapore and Taiwan. Europe includes EU27 and other countries such as Russia and Turkey. Sources : Ministry of Economy, Trade and Industry, Survey of Overseas Business Activities and Ministry of Finance, Financial Statements Statistics of Corporations by Industry (Forecast by JCER)

**BOX 1.** If the yen were to keep strengthening and electric utility rates were to keep rising how much would overseas direct investment accelerate? What impact would that in turn would have on the domestic economy?

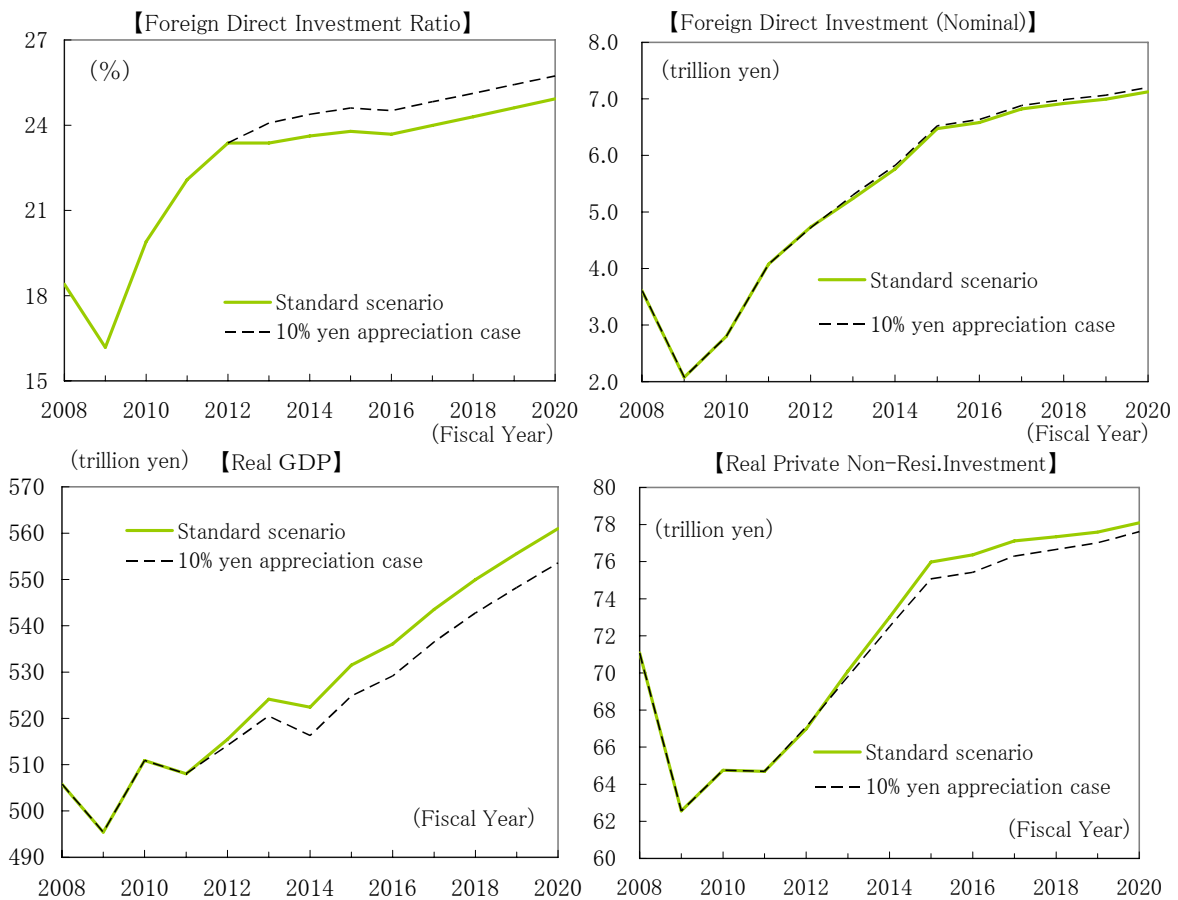
Simulation 1: The yen strengthens by 10% against the dollar from FY2012.

We have analyzed what impact the Japan economy would incur in the event the yen

<sup>19</sup> Hollowing out is likened to the “doughnut phenomenon.” However, since the mid-1980s Japanese companies have fragmented their production beyond national borders among different regions including East Asia and North America, hence some observers believe that this is giving rise to a kind of expanding pizza phenomenon. For example, see Itami, Hiroyuki et al., “Sōron, Kūdōka dewa naku, naniga okite iru no ka?” in *Nihon kigyō no senryaku to kōdō; kūdōka wa mada okite inai.* (“General Thesis: It isn’t hollowing out, so what is going on?” in *The Strategy and Behavior of Japanese Companies; Hollowing Out has not Happened Yet.*) Tokyo: NTT Shuppan, June 2004.

strengthened by 10% against the dollar (versus about ¥70 against the dollar in 2012). In this case, the strong yen would lower real GDP by about 1% via two routes, namely (1) by causing business firms to carry out private nonresidential investment overseas rather than domestically as their costs rose, and (2) by decreasing exports. In terms of the degree of the impact, that of the second route would be the larger, with the downturn in exports hampering private nonresidential investment by impairing business earnings. Nominal direct overseas investment would rise only a trifle because, as corporate earnings fell with the decline in exports, it would cause businesses to be more cautious not only regarding domestic investment but overseas investment as well<sup>20</sup>.

[BOX 1 Figure 1] Simulation – 10% Yen Appreciation Case



Simulation 2: Electric utility rates rise by 10% from 2012.

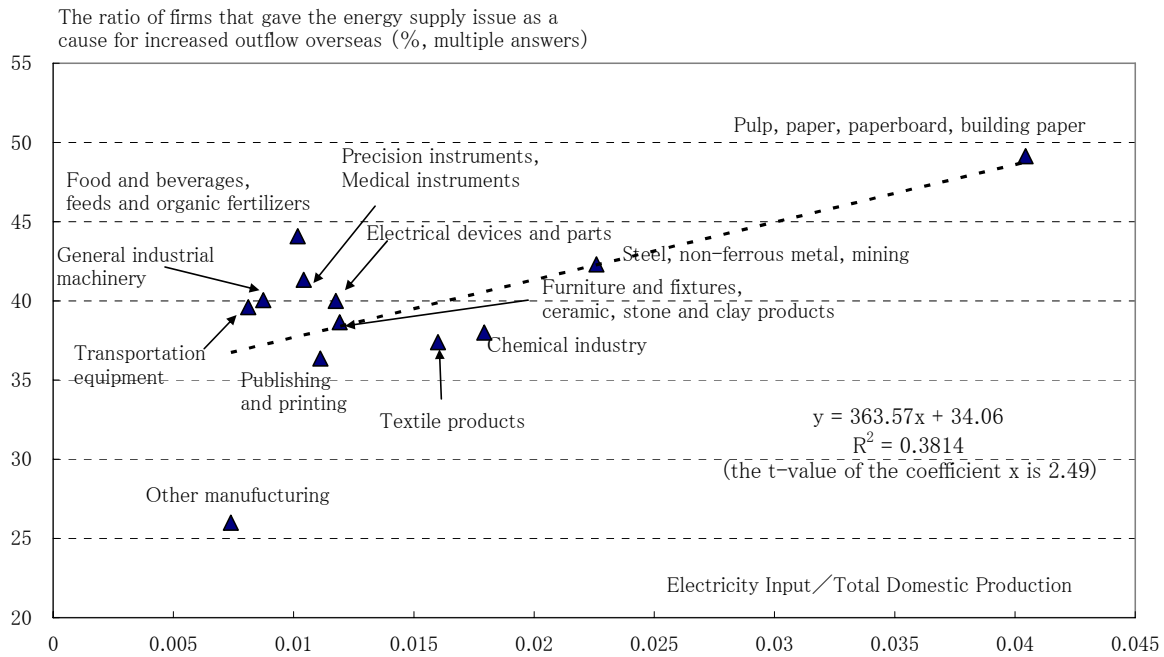
In the event that all nuclear power stations are shut down by the beginning of FY2012 (the Pessimistic Scenario), the production activities of business firms would be subject to severe constraints. Specifically, along with the supply side constraints caused by the electric power shortage, considerable resort would have to be made to thermal power, with the resulting increased cost of fossil fuel imports being passed on yet again to electric power rates. According

<sup>20</sup> However, in our forecast, we have not taken account of any possibility that direct investment might cause the export of capital goods to rise or production to be carried out overseas, in turn causing a rise in the export of parts, an increase in reverse imports into Japan and domestic production being replaced.



to the Teikoku Databank report “Report on Business Sentiment regarding Industrial Hollowing Out” (July Special Plan 2011), businesses cited energy supply problems as a reason for an acceleration in their move overseas, and the greater the share of electric power inputs in their output (an example being paper/pulp or other paper processing and production), the greater was their tendency to consider shifting production overseas.

[BOX 1 Figure 2] Electricity Input Ratio and the Proportion of Firms that gave the Energy Supply Issue as a Cause for Increased Outflow Overseas



Under the Pessimistic Scenario sketched in this forecast, we do not directly project any path through which a overseas shift by Japanese companies would be accelerated due to supply side constraints and higher electric utility rates owing to electric power shortage. For the sake of simplicity, we have assumed that a rise in electric power costs would have the same impact on overseas investment as a rise in labor costs. Based on this assumption, we have translated a rise in electric power costs into a rise in labor costs, estimated the consequent rise in the overseas investment ratio and considered what the impact would be for the Japanese economy.

According to the 2005 Input-Output Tables released by the Ministry of Internal Affairs and Communications, the value of electric power inputs for the Japanese manufacturing industry (of 108 sectors, including foods and other manufacturing industries) was about ¥4.4 trillion, equivalent to 9.3% of employee compensation (about ¥46.6 trillion) or labor costs. Accordingly, a 10% rise in electric power rates could be computed as about a 0.93 point rise in wages. The simulation shows that while a rise in electric power rates would push down private nonresidential investment by lowering corporate earnings, a 10% rise in electric power rates would produce only a 0.1 point increase in the direct overseas investment ratio.

As seen from BOX 1, a strengthening of the yen or a rise in electric utility rates can be

considered factors in boosting vertical direct investment. The impact on the domestic economy, meanwhile, would be strongest through the effect of reducing exports or consumption. Discussions have focused on the various influences that vertical direct investment has on the individual companies and industries which invest offshore. At the level of the business firm, any company which halted all production in Japan and moved factories entirely to China or India would not be able to cope with any future increase in local wages, and there would be a strong likelihood of an accelerated shift of factories to countries where other costs were low. According to the study by Itami et al (2004) cited above, American television manufacturers were aggressive in shifting production offshore, but there were quite a few cases in which they disappeared as business firms<sup>21</sup>. On the industry level, moreover, considerable knowledge and know-how was lost regarding old technology or basic or associated technology within the country, and that was related to the fact that new technology was not created.

In order to avoid suffering the same fate, Japanese companies need to work out function-based geographical strategies to determine which production processes to shift elsewhere and which to leave in place. Specifically, in the context of international competition, it is important both at the company level and the industry level to maintain a certain degree of production domestically along with overseas production in order to ensure a high degree of technical capability and to retain balanced production functionality and technological innovation capacity<sup>22</sup>. Facilitating global circulation of parts and products will enable Japanese companies to produce such products domestically, an area in which they have an advantage. In order to make that possible, it will be important to create an environment in which Japanese companies can rebuild their global supply chains. Thus in TPP negotiations, Japan should work for the creation of rules relating to 21st century-style trade<sup>23</sup>, investment and intellectual property in line with the international fragmentation of manufacturing processes<sup>24</sup>. Furthermore, with growing concern over the decline of Japan's technological capability, it is necessary to create an environment to boost the number of researchers with proper training schemes<sup>25</sup>.

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<sup>21</sup> "American television manufacturers were aggressive in shifting production offshore, but there were quite a few cases in which they disappeared as business firms.... Perhaps the consumer electronics industry itself might have survived in the United States to a considerable extent as an industry, but that was not to be." (Itami et al (2004).

<sup>22</sup> If Japanese companies were to overreact against the recession and the strong yen and carelessly shutter highly productive but high cost domestic facilities in order to move them overseas, it would be a long-term loss for the Japanese economy and an unwise policy in terms of corporate global management. The reason is that failing to retain good facilities domestically as "competitive mother factories" would mean that, eventually, even the overseas production facilities of one's own firm would lose out in the local productivity competition, such that the domestic design center, being distant from the center of manufacture, would also decline. (Takahiro Fujimoto (2011), "Policies which Leverage 'Domestic Capabilities' of a Japan Resilient in Recovery" in Shigeru Ito, Masahiro Okuno, Takashi Ohnishi and Masaharu Hanazaki Eds., *The Great East Japan Earthquake: Proposals for Recovery* (Tokyo: The Tokyo University Press, July, 2007). Also see: "III. International Fragmentation 1. Broken Supply Chains: Inspection and Lessons - Impact mainly on the automobile industry, constraints imposed by custom electronic components and associated industries"

<sup>23</sup> In contrast to 20th century trade," which was centered in transactions of goods across national borders, "21st century trade" involves two-way transactions in goods, investment and services among fragmented production processes across national borders in tandem with the development of international production fragmentation. (Tetsuya Hattori and Kazumasa Iwata (2011), "Chapter 5: Rebuilding of the International Trade System" in *The Challenge from Newly Emerging Countries*, Nihon Keizai Shimbunsha, November, 2011).

<sup>24</sup> It is assumed that the Japanese economy would be adversely affected if a TPP is created but Japan does not participate.

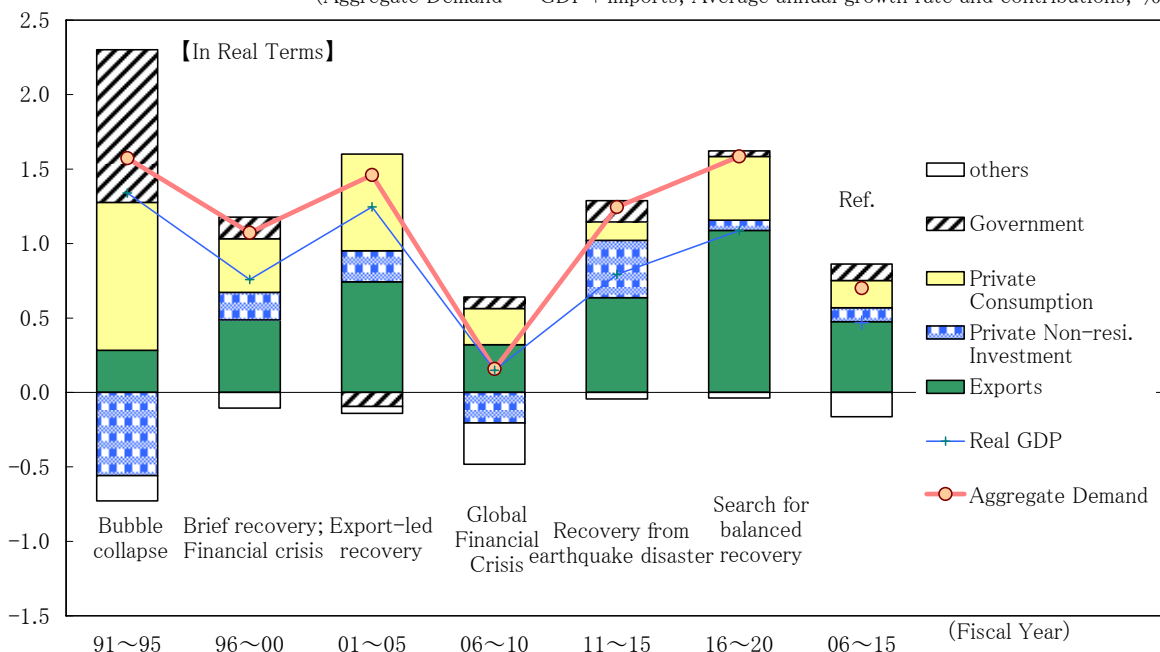
<sup>25</sup> For details, please see our report: "III. International Fragmentation 2. R&D Investment to be focused on Local

**(7) GDP Gap, unemployment and wages:** What would be the result for the economy (in the event of supply side constraints caused by electric power shortages and changes in the energy supply structure)? Would the Japanese economy be able to continue steady growth?

As we have seen above, if it is possible to avoid a complete shutdown of nuclear power plants, the Japanese economy would be able to maintain steady growth over the forecast period (at 0.8% in the first half and 1.1% in the second) owing to the following factors: (1) Any electric power shortage and constraints on supply side capacity could be offset by resort to thermal power plants and adoption of new forms of energy; (2) The global economy will continue firm growth, and Japanese exports will rise steadily; (3) With consumption rising soundly, private nonresidential investment can be expected to recover. Even if there is a rush of demand ahead of a hike in the consumption tax rate, the GDP gap could be expected to resolve from and after FY2016.

[Figure 3-14] Aggregate Real Demand Growth Rate and Components

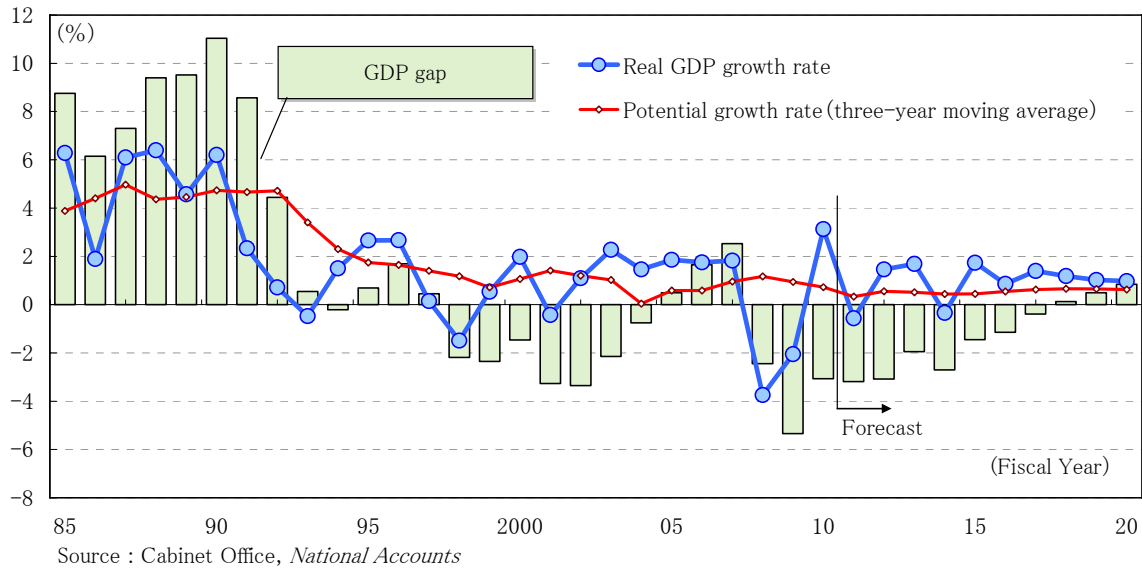
(Aggregate Demand = GDP+imports, Average annual growth rate and contributions, %)



In contrast, if all nuclear power stations are indeed shut down at by the beginning of FY2012, even if an attempt is made to resort to thermal power plants and adopt new forms of energy to offset the resulting power shortages, supply side capacity would be constrained, and both exports and consumption could be expected to slow. As a result, the growth rate would likely be pushed down especially in the first half of our forecast period (with growth being 0.5% in the first half and 1.2% in the second).

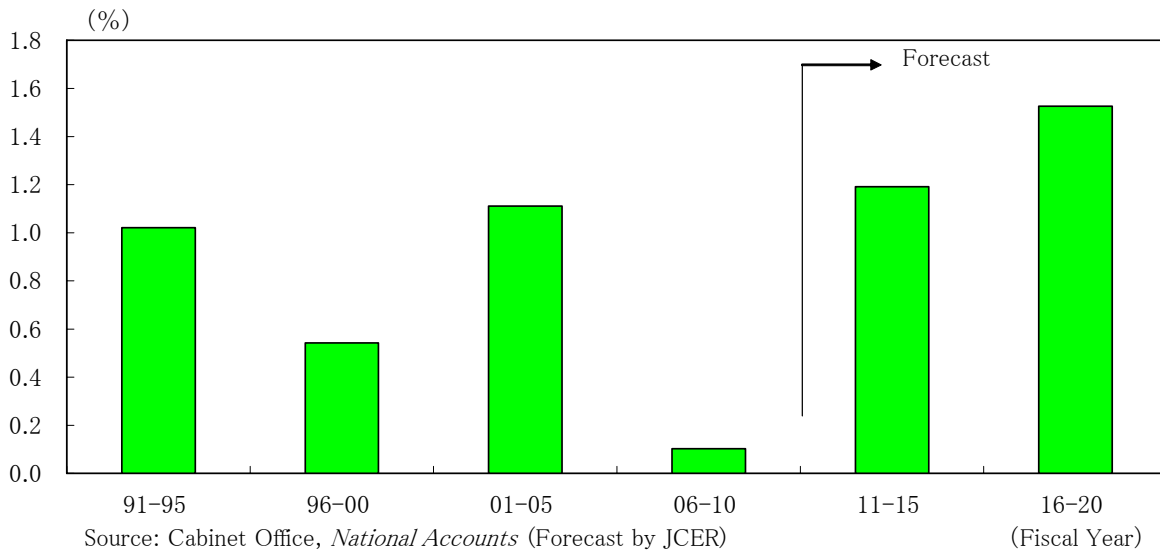
Demand,- Expansion Expected in Asian Countries (<http://www.jcer.or.jp/research/middle/detail4300.html> ※ available only in Japanese)

[Figure 3-15] Potential Growth Rate, Real Growth Rate, GDP Gap



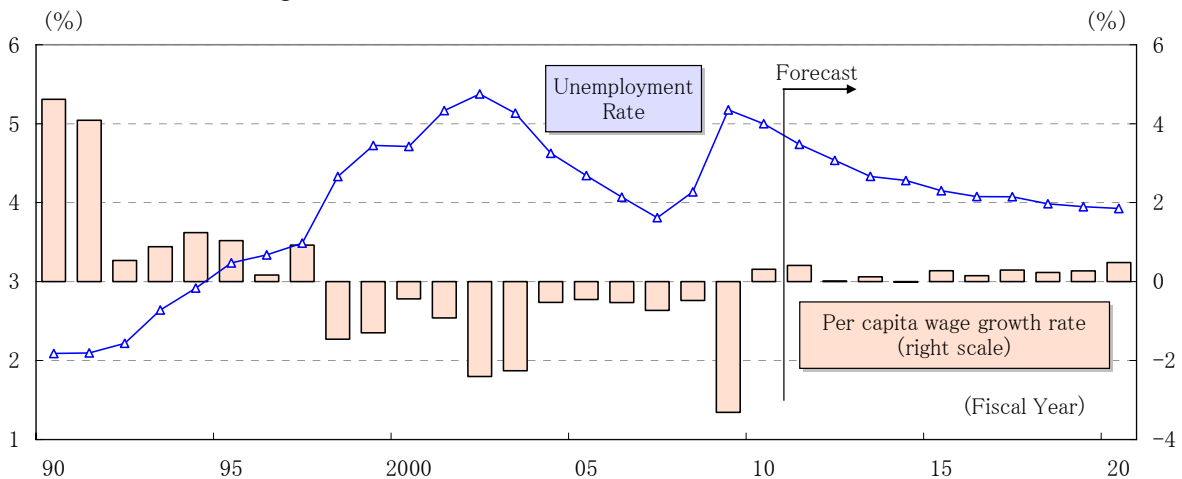
The growth rate will be no more than about 1% because the labor force population will shrink over the course of the forecast period, and from the perspective of an enriched livelihood, it is the per capita growth rate that is more important. We expect the per capita real growth rate over the first half of the forecast period to be 1.2% in a reaction to the second half of the 2000s, and 1.5% over the latter half of the forecast period.

[Figure 3-16] Real GDP growth rate per capita



The Japanese unemployment rate rose to 5.2% in FY2009 during the recession which accompanied the global financial crisis, but we expect it to gradually fall as the GDP gap narrows (4.2% in FY2015 and 3.9% in FY2020). In the process, per capita employee compensation (or wages) can be expected to remain basically unchanged during the first half of the forecast period before gradually turning up again (0.2% in the first half and 0.3% in the second half).

[Figure 3-17] Unemployment Rate, Wage Growth Rate



Note : The Labor Force Survey for F.Y.2010 has been estimated by JCER.  
 Sources : Cabinet Office, National Accounts, Ministry of Internal Affairs and Communications, Labour Force Survey.

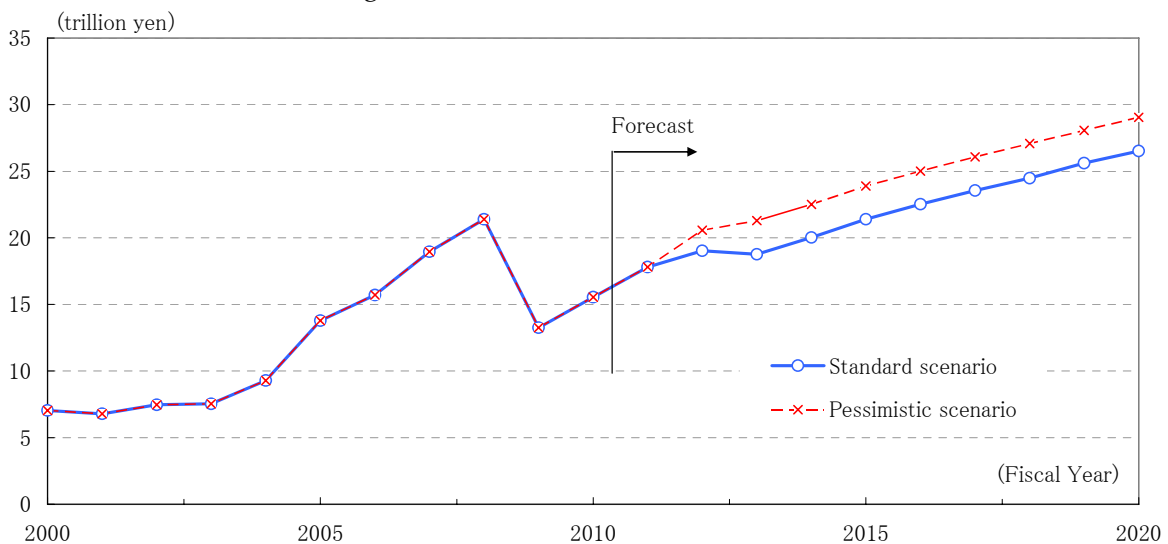
**4. Prices, Interest Rates, CO<sub>2</sub> Emissions**

- Prices to rise on factors such as higher electricity rates and consumption tax rate hike

**4.1. Prices:** How much will imports of fossil fuels increase? How much will the price level rise due to higher electric power rates? How long will deflation continue?

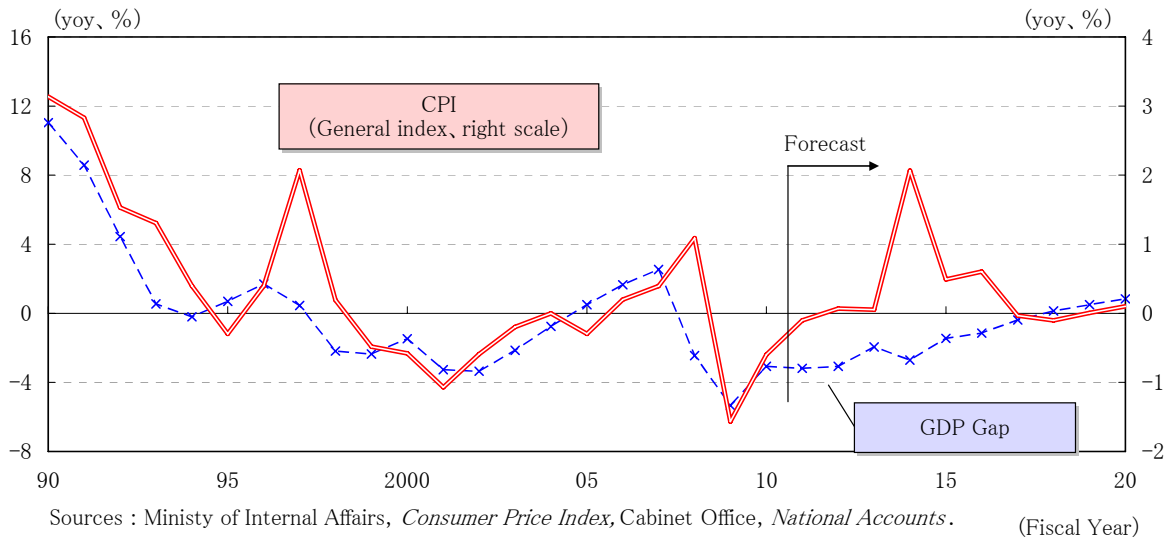
Imports (on a nominal basis) of fossil fuels will increase on rising import prices, including those of fossil fuels, and due to the substitution of thermal power in place of nuclear power generation. In the event that all nuclear power plants are shut down, fossil fuel imports would rise even further on the wholesale shift to thermal power.

[Figure 4-1] Nominal Fossil Fuel Imports



The rate of decline in the price level will slow as the GDP gap starts to narrow. Increases in the consumption tax rate in the first five years will be an additional factor. The inflation rate will reach 0.5% in the first half and 0.1% in the second half of our forecast period.

[Figure 4-2] GDP Gap and the Inflation Rate

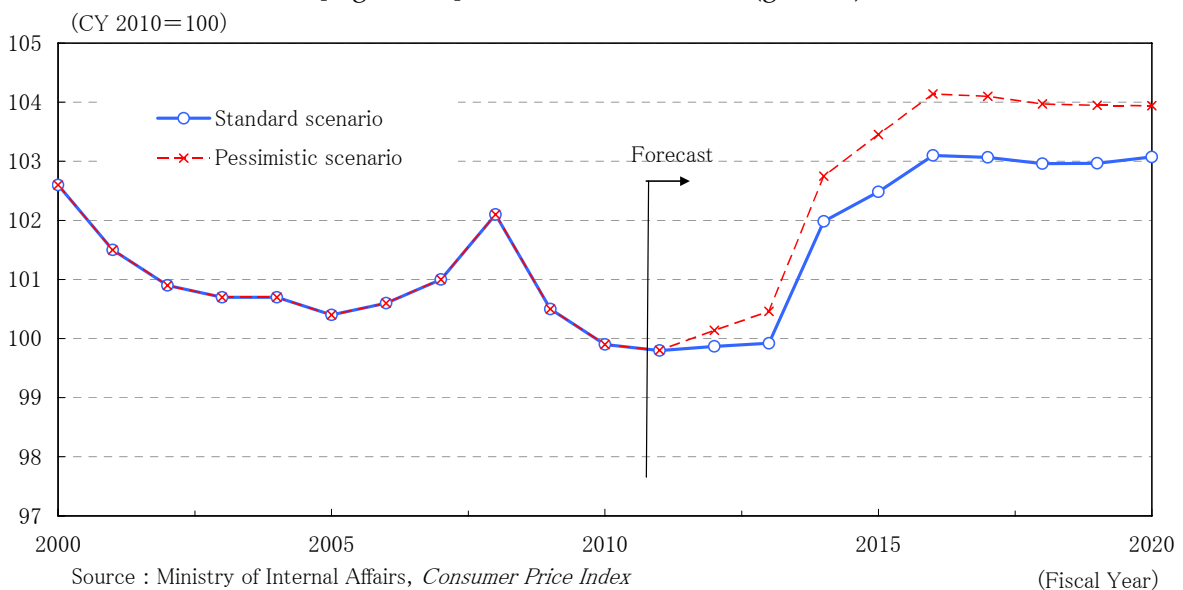


The reason that the rate of decline in the price level as gauged by the (general) consumer price index is small despite the negative GDP gap is due to expectation of an increase in electric utility rates resulting from the substitution of thermal power for nuclear power generation and the rise in import prices, including those of fossil fuels.

A look at the rate of growth in prices based on the core-core CPI (which excludes fresh foods (except alcoholic beverages) and energy) shows, despite the expected hike in the consumption tax rate, a 0.2% increase in the first half of our forecast period and a 0.2% decrease in the second half.

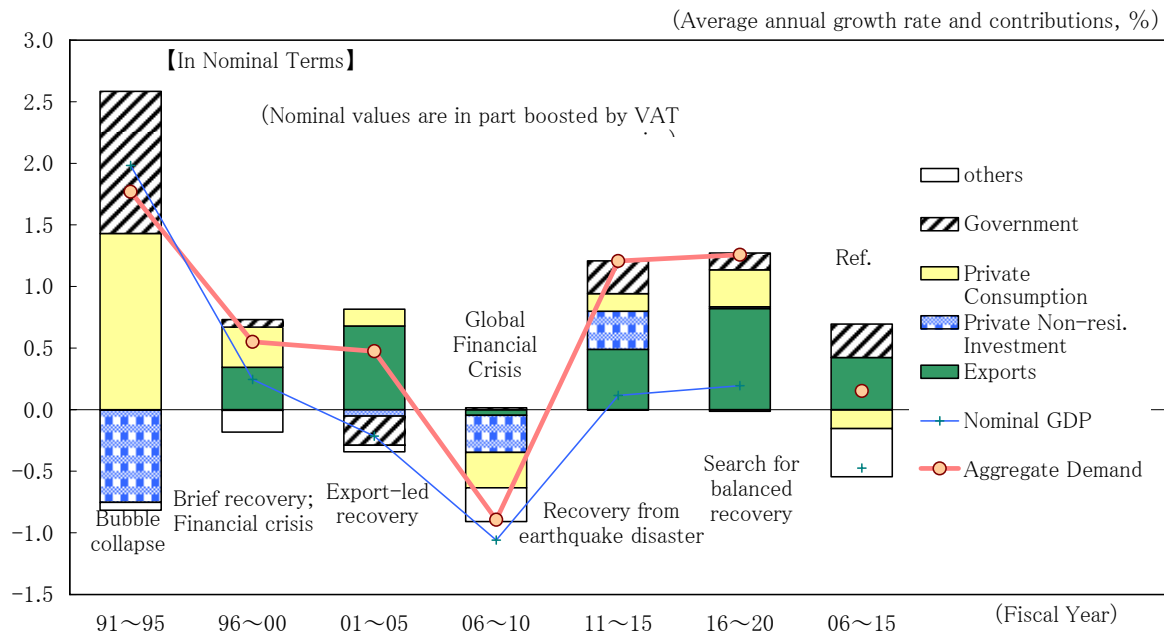
If all nuclear power stations are shut down, Japan would need to rely heavily on thermal power, and the cost of increased fossil fuel imports would be passed on in the form of higher electric utility rates, in turn boosting the price level even more.

[Figure 4-3] Consumer Price Index (general)

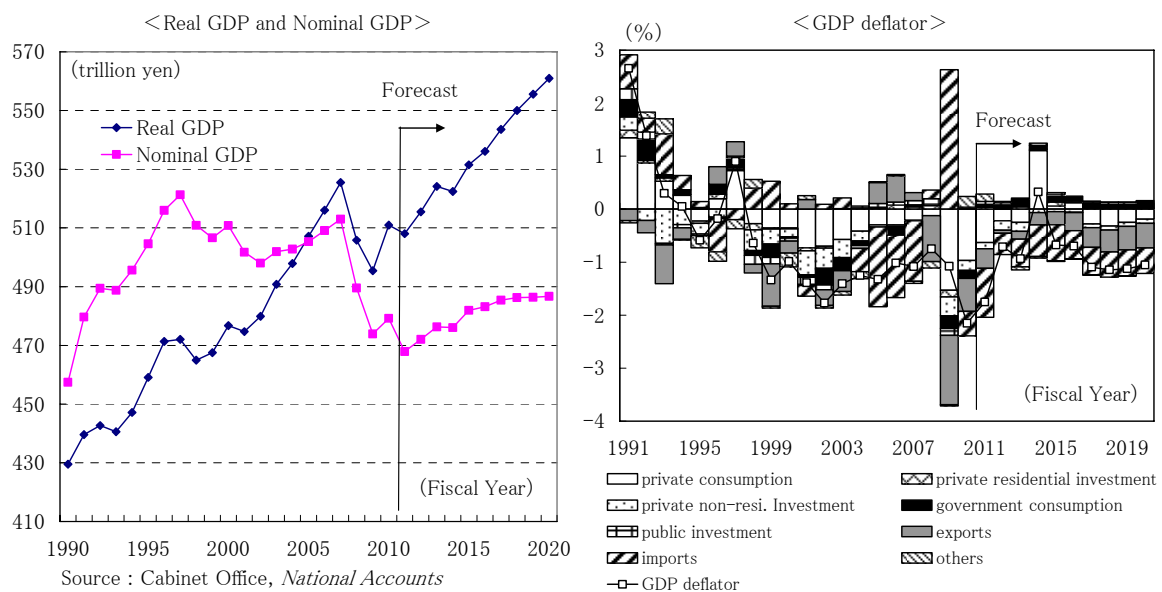


**4.2. Nominal Demand:** Throughout our forecast period, the rate of change in the GDP deflator will continue negative, despite the potential tax rate hike, due to the negative GDP gap. As a result, the nominal growth rate will be essentially in line with that of the second half of the 1990s (0.1% in the first half and 0.2% in the second half of our forecast period). We believe nominal GDP in FY2020 will be ¥486.7 trillion, which is below the most recent peak of ¥513.0 trillion reached in FY2007. National income, excepting indirect taxes and depletion, will be negative through our forecast period owing partly to the impact of the increase in the consumption tax rate. (We expect it will be -0.2% in the first half and -0.5% in the second.)

[Figure 4-4] Aggregate Nominal Demand Growth Rate and Components



[Figure 4-5] Real GDP, Nominal GDP, Deflator

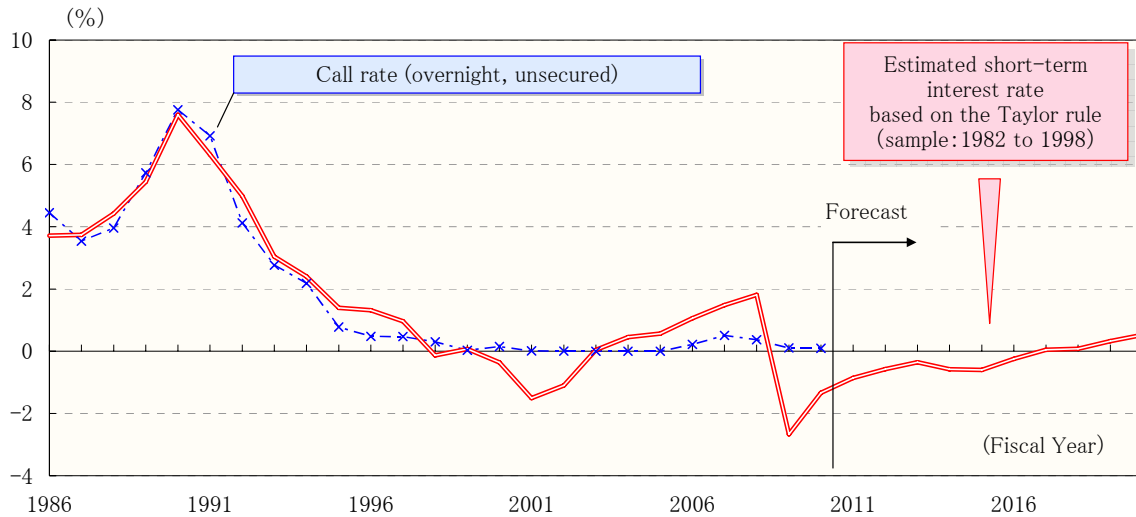




4.3. Interest rates

If we project short-term interest rates based on the assumption that monetary policy will be conducted according to the Taylor rule, given further erosion in the price level, the zero interest rate policy is not likely to be abandoned until FY2017 at the earliest.

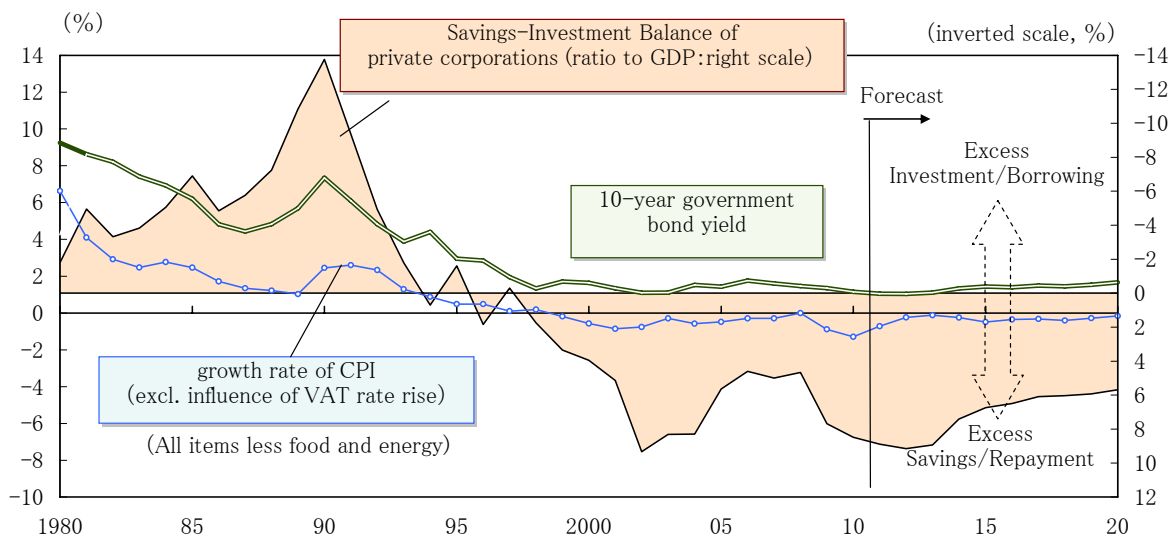
[Figure 4-6] Short-term Interest Rates and Interest Rates based on the Taylor Rule



Source : The Bank of Japan, *Financial and Economic Statistics Monthly*.

The rate of increase in the price level as gauged by the core-core CPI remains underwater, and given the general lack of any predisposition by business firms to borrow, the long-term interest rate will be on the low side at 1.2% over the first half of our forecast period. In the second half, firms' appetites for borrowing money will gradually be thawed out, leading to an increased long-term interest rate (to 1.5%). Given the foregoing, the long-term rate will exceed the nominal growth rate, such that even with the primary balance in equilibrium, the debt to GDP ratio will still not easily narrow.

[Figure 4-7] Long-term Interest Rate

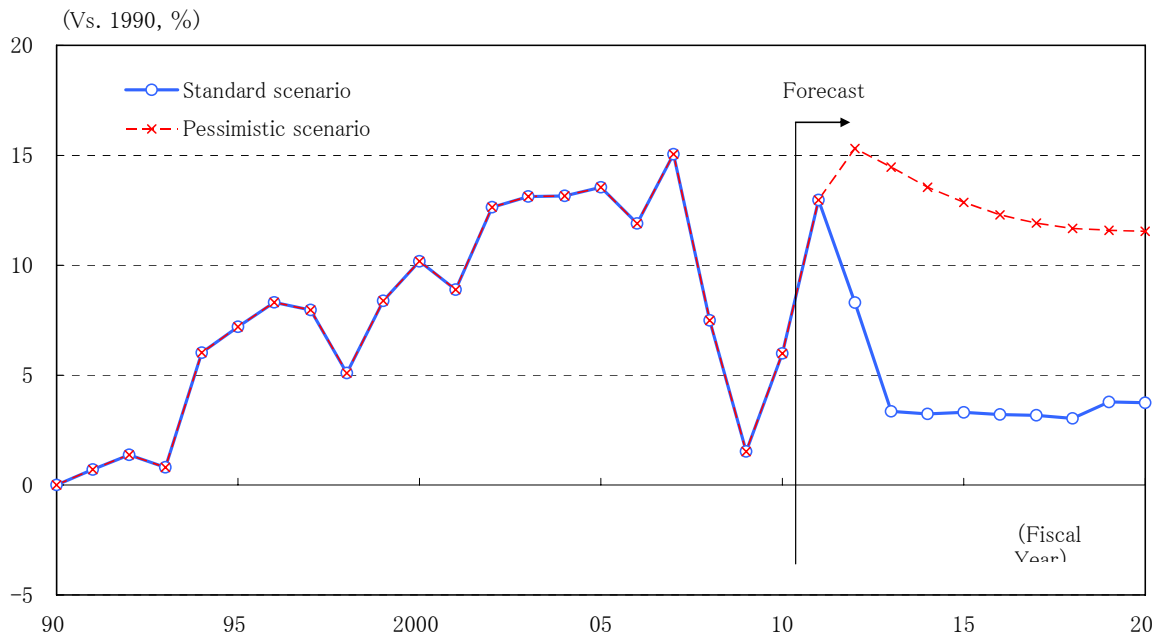


Note : Savings-investment balance is adjusted by transfers from the special account.  
Sources : Ministry of Internal Affairs, *Consumer Price Index*, Cabinet Office, *National Accounts*.

#### 4.4. CO<sub>2</sub> emissions: Achieving greenhouse gas reduction targets increasingly difficult.

As the economy recovers, CO<sub>2</sub> emissions will increase (3.3% versus 1990 levels by FY2015 and 3.7% by FY2020)<sup>26</sup>. Also, in the event that all nuclear power stations are shut down, the progressive use of thermal power to replace it would cause CO<sub>2</sub> emissions to rise sharply. In order to achieve the greenhouse gas reduction targets announced internationally, Japan would have no choice but to adopt such policies as instituting an environment tax on fossil fuels or engage in emissions trading in order to drastically save energy.

[Figure 4-8] CO<sub>2</sub> Emissions



### 5. Current Account Balance, Government Finances, SI Balance

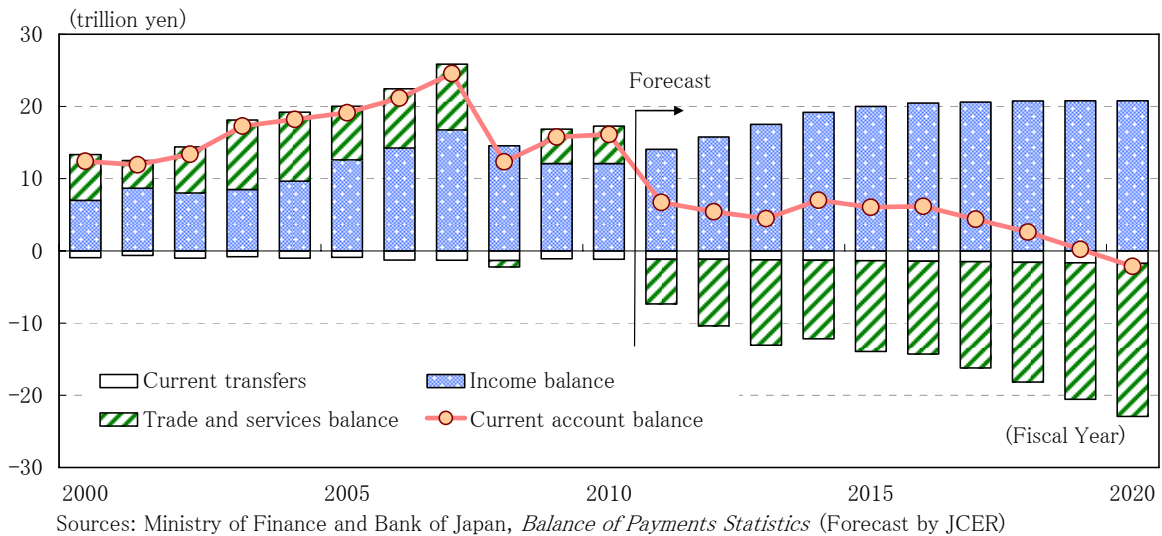
- No surplus in primary balance even with consumption tax rate hike
- Household savings rate to turn negative by FY2016

#### 5.1. Current account balance and currency rates: What is the outlook for the trade balance and current account balance? Will they be in the red?

Japan's balance in trade and services will remain chronically in the red owing to the rise in the prices of fossil fuels and other imports as well as the replacement of nuclear power generation with thermal power. As a result, Japan will continue to have a surplus in its income balance, but the margin of surplus in its current account balance will narrow until the balance ultimately falls into the red in the second half of the present decade (1.3% as a share of nominal GDP in FY2015 and -0.4% in FY2020). If all nuclear power plants are shut down, time when the current account falls into a deficit will be even sooner.

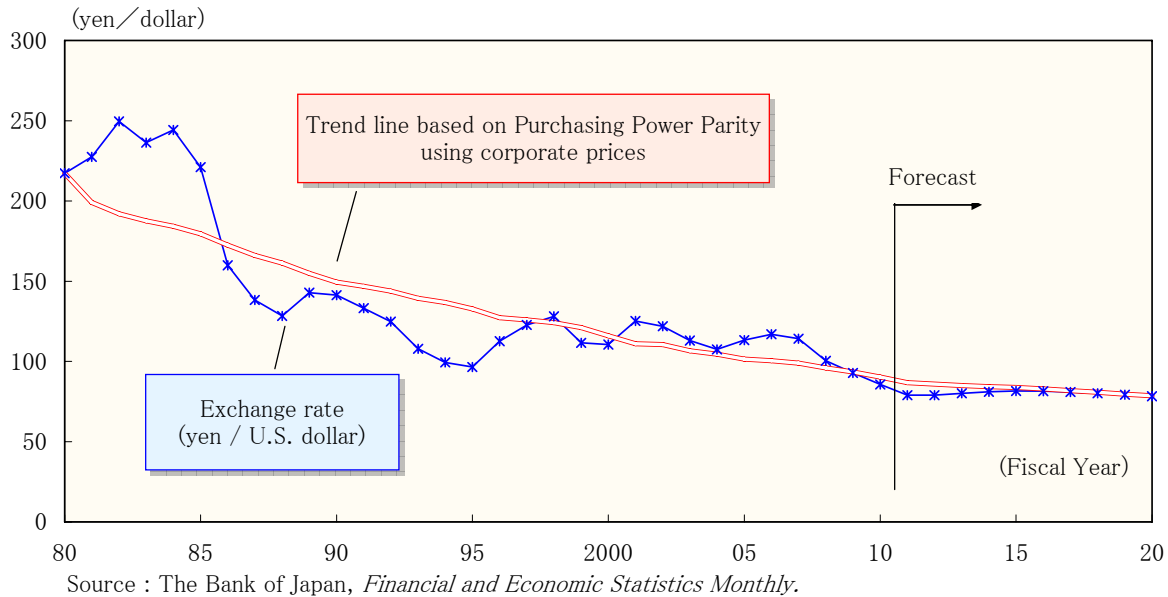
<sup>26</sup> We have made our estimates here taking account of increases in energy consumption with economic activity (GDP) as well as efforts to economize with the rise in of crude oil prices, and although we have to a certain extent factored in the adoption of new forms of energy, we have not accounted for the impact of an environment tax and CO<sub>2</sub> emissions trading.

[Figure 5-1] Balance in Trade & Services, Current Account



We assume currency rates will be determined over the long term by purchasing power parity. In comparison to recent trends seen from purchasing power parity, the yen has been strong. However, reflecting Japan’s low inflation rate compared to that of overseas’ economies, the purchasing power parity itself is expected to appreciate at an annualized rate of 1.4%. For these reasons, we believe the yen will remain basically unchanged against the dollar in nominal terms (at about ¥80 to the dollar) or slightly weaker in real terms.

[Figure 5-2] the trend line of exchange rate in light of purchasing power parity



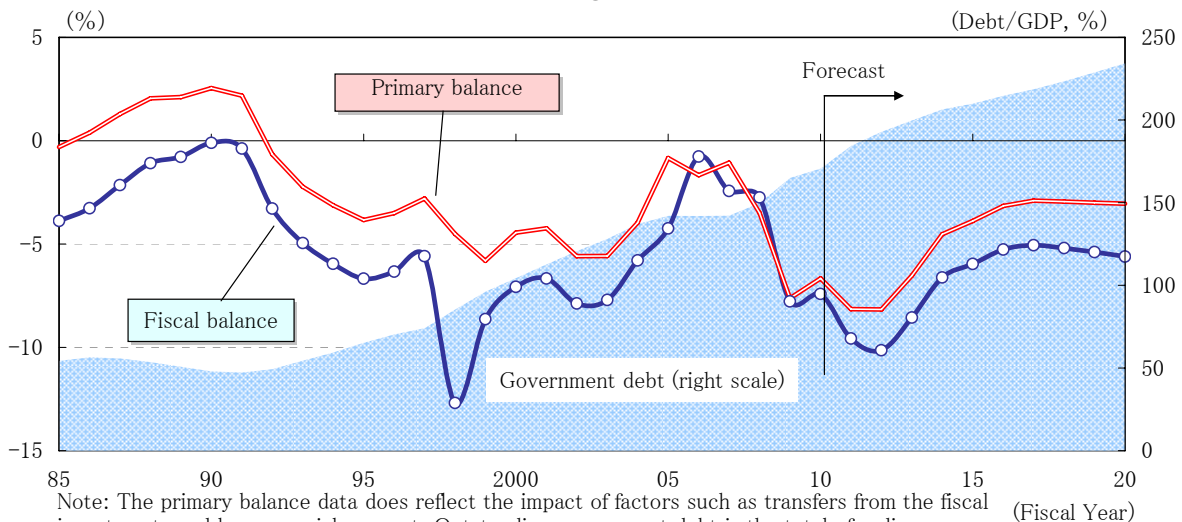
**5.2. Government financial balance:** Since tax revenues will progressively increase as the economy steadily recovers, the negative margin of the ratio of national and local government primary balances to GDP will slowly narrow. We expect that the consumption tax rate will be raised by 3% in April FY2014, and raised by 2% to reach 10% in October FY2015.

We have also assumed that expenditures for FY2012 will be in line with ministerial budget

requests and that, from FY2013 and thereafter, expenditures other than those for social welfare spending will rise in line with the increase in the price level. We assume social welfare expenditures will rise at a rate with takes added account of price and population factors. We have also assumed that the government share of basic pension benefits will remain at one half. Massive expenditures will be necessary for recovery and reconstruction, but we expect these will be offset by such means as a reconstruction tax increase.

Since social welfare expenditures will continue to rise, the ratio of the national and local governments' primary balance to GDP will not become positive even if the consumption tax rate is raised to 10%. Instead, a deficit of at least -3.0% will remain in FY2020, while the fiscal balance to GDP ratio will stand at -5.6. The fact that interest rates are being kept low and the consumption tax rate will rise mean that the pace of increase in the ratio of debt to GDP will slow. However, since the primary balance remains in the red, the expansion of the debt ratio will not stop. (We anticipate it will be 210.0% at the end of FY2015 and 234.4% at the end of FY2020.)

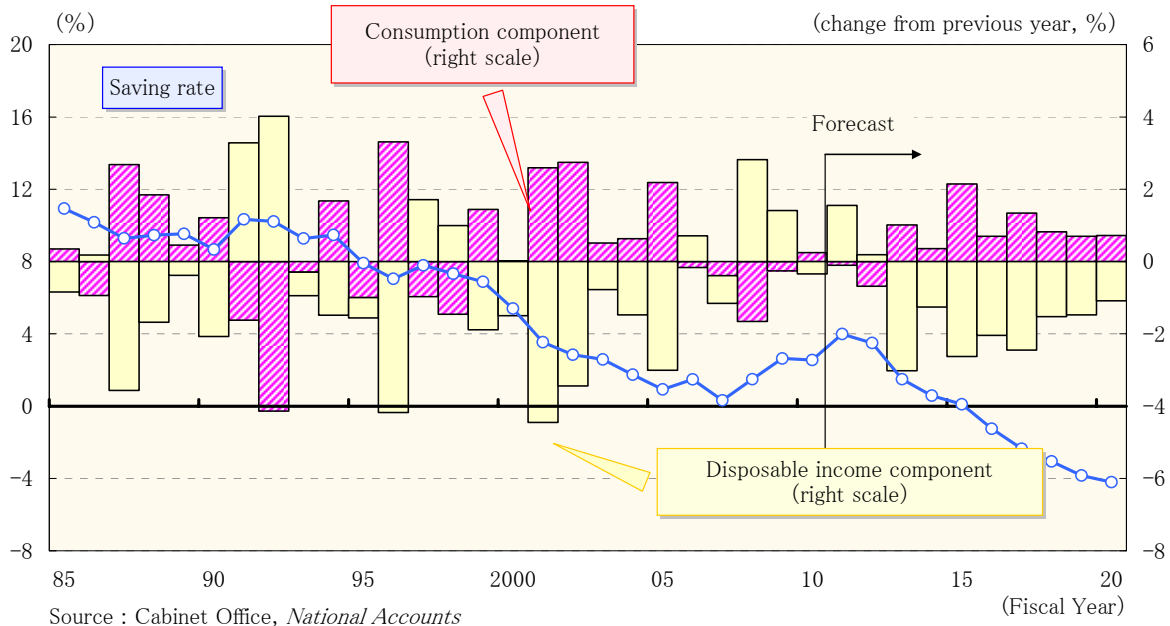
[Figure 5-3] Primary Balance of National and Local Governments, Fiscal Balance and Outstanding Debt/GDP



Note: The primary balance data does reflect the impact of factors such as transfers from the fiscal investments and loans special account. Outstanding government debt is the total of ordinary Japanese government bonds (JGBs), local government bonds and the outstanding balance of local allocations and transfers.  
Sources: Ministry of Finance, Cabinet Office, National Accounts.

**5.3. Household savings rate:** No large increase can be expected in employee compensation, which accounts for the lion's share of household income, but household income will be supported by social welfare benefits (including pensions and childcare allowances). Despite such factors as the increases in the consumption tax rate during the forecast period, consumption will sustain a certain rate of growth given the slow rate of increase in prices. As a result, the household savings rate will fall, turning negative in the second half of the forecast period (reaching 0.1% in FY2015 and -4.2% in FY2020).

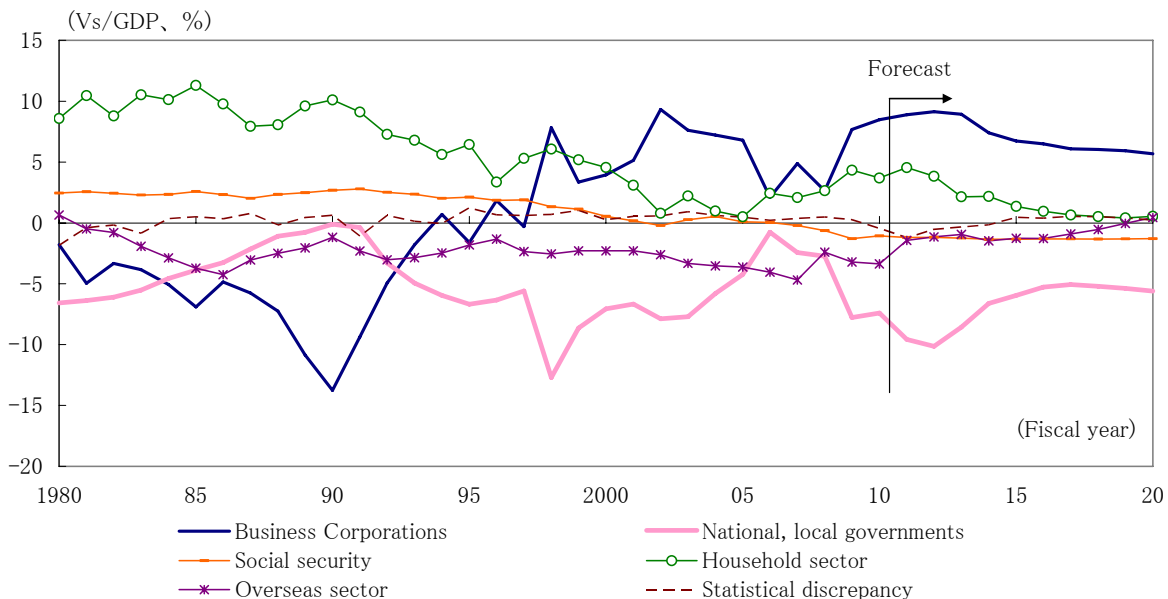
[Figure 5-4] Household Savings Rate



**5.4. Savings and investment balance: The risk of government default continues to increase:** During the forecast period, corporations and households will maintain surpluses in line with the trend of the first decade of the 2000s, and the general government will continue running a deficit. Given the low investment return on social security funds, the general government will continue to run a deficit. The current account balance will fall into the red, so the balance of savings and investment with the rest of the world will return to a surplus.

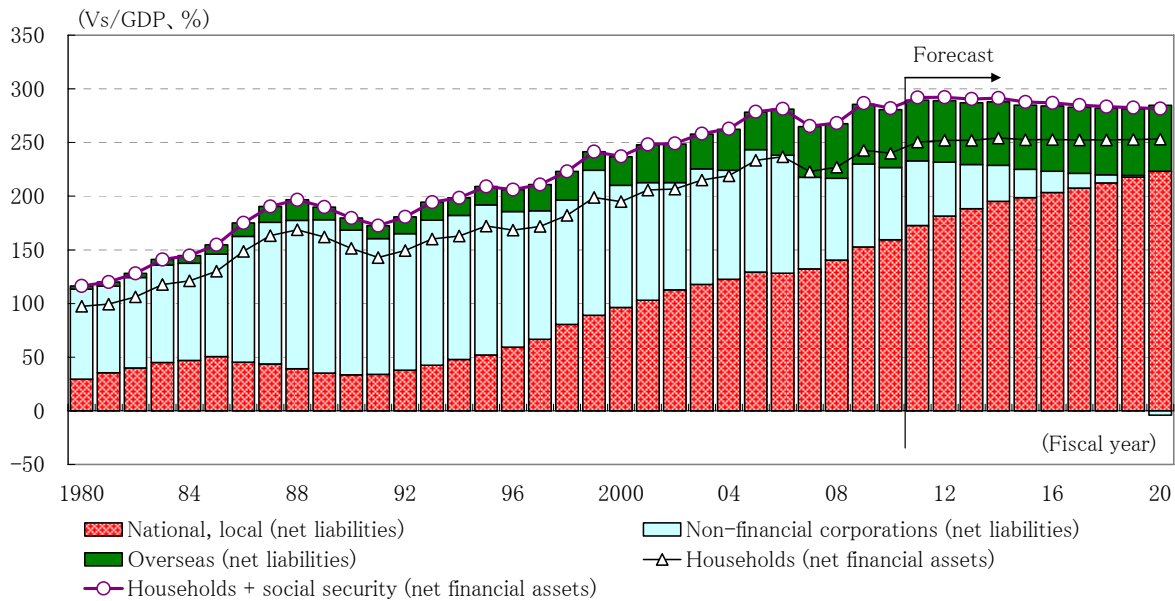
Also, if business firms were to use earnings for overseas direct investment, it would not lead to excess investment (creating a current account deficit).

[Figure 5-5] Savings-Investment Balance (Flow)



Source: Cabinet Office, National Accounts.

[Figure 5-6] Savings-Investment Balance (Stock)



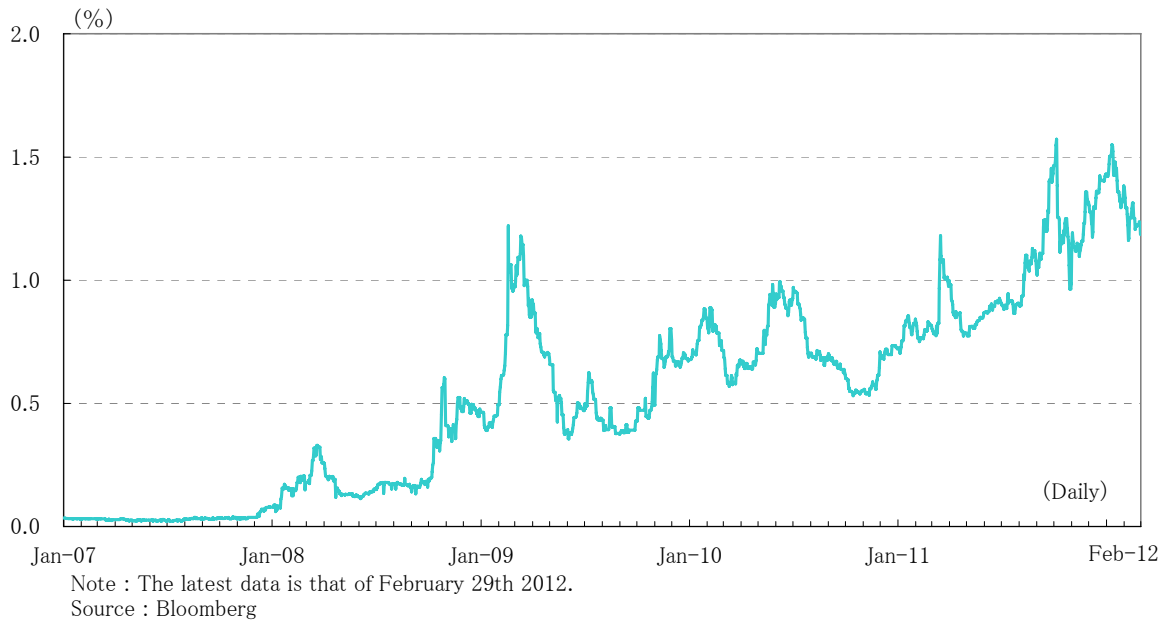
Source: Bank of Japan, *Flow of Funds Accounts*.

In light of the foregoing, household net assets will remain basically unchanged. Business firms will continue to hold down debt as they seek to maintain an even stronger forward-looking cash-rich position than in the first decade of the century. For the rest of the world, net liabilities will continue rising (a rising external net wealth). The rise in net assets for the corporate sector and the underlying net liabilities increase for the rest of the world could reflect the tendency that business firms are in some sense tending to shift production offshore through direct investment.

During the forecast period, government liabilities will remain within a level that can be offset by household savings, but merely raising the consumption tax rate by 10% will not serve to stabilize the debt to GDP ratio, meaning that the risk of a government default will continue to increase. A current account deficit by the end of the present decade appears even more likely. This means there is a growing necessity for foreign capital inflow to finance the budget deficit amid a decreasing capacity of Japanese domestic savings, and indicates a need for further review and reform regarding both revenues and expenditures, including the natural increase in social welfare expenditures. Nominal interest rates have recently been low in Japan, but with a growing government debt-to-GDP ratio, the CDS spread on Japanese government bonds is steadily on the rise. It is necessary to bear in mind that the views of Japanese investors and those of foreign investors regarding the state of Japanese government finances may be different<sup>27</sup>, and if it comes to the point where it is inevitable that the budget deficit be financed by foreign capital, interest rates will move upward along with the views of foreign investors.

<sup>27</sup> "In the case of Japan, Japanese investors overwhelmingly dominate the spot market, and this tendency has considerable impact on price determination. At the same time, the CDS market is a professional's market formed primarily by large financial institutions, securities brokerages and hedge funds. While hedge funds and other foreign investors are active . . . there are still many investors who regard derivatives as difficult to handle. Hence it appears as though there is little participation by them. (Koichi Iwai (2010), "The Credit Default Market is a Unique Market in which Foreign Investors Predominate," *Economist*, June 29, 2010, Asahi Shimbun-sha.

[Figure 5-7] CDS spread on Japanese Government Bonds



#### BOX 2. Impact of Consumption Tax Rate Hike ( Simulation)

Under our Standard Scenario, we have assumed that the consumption tax rate will be raised by 3% in April 2014 and by 2% to reach 10% in October 2015. Here, we will consider and compare what shocks the economy would incur in two instances, namely (i) if the consumption tax rate were not raised at all and (ii) if it were raised by 1% per year from FY2014 to reach 10% in FY2018.

First, if the consumption tax rate is raised to 10% in two steps (by 3% in April 2014 and by 2% in October 2015), FY2020 real GDP would be ¥561.0 trillion, or 0.3% lower than it would be if there were no hike at all. The primary balance to GDP ratio for the national and local governments in FY2020 would be -3.0%, which represents a 2.5 percentage point narrowing of the deficit margin compared to no hike but still well short of reaching a positive value. The ratio of government debt to GDP in FY2020 would be 234.4%, meaning that a margin of increase in the consumption tax rate of about 5% could be described as inadequate. Considering the size of the shock to the economy, on the other hand, last minute demand and its pullback may cause the growth rate for FY2014 to become zero<sup>28</sup>. Drastic increases in the tax rate (2.4 - 2.5 trillion yen per 1%) would be big burden for the economy, which is expected to grow at an average annual rate of only around 1% during our forecasting period.

In the event of hike to 10% in increments of 1% (from FY2014 to FY2018), the impact of the tax hike on the growth rate would be alleviated. The primary balance to GDP ratio for the national and local governments in FY2020 would be about -3.1%, about the same level as would be the case with a hike in two steps.

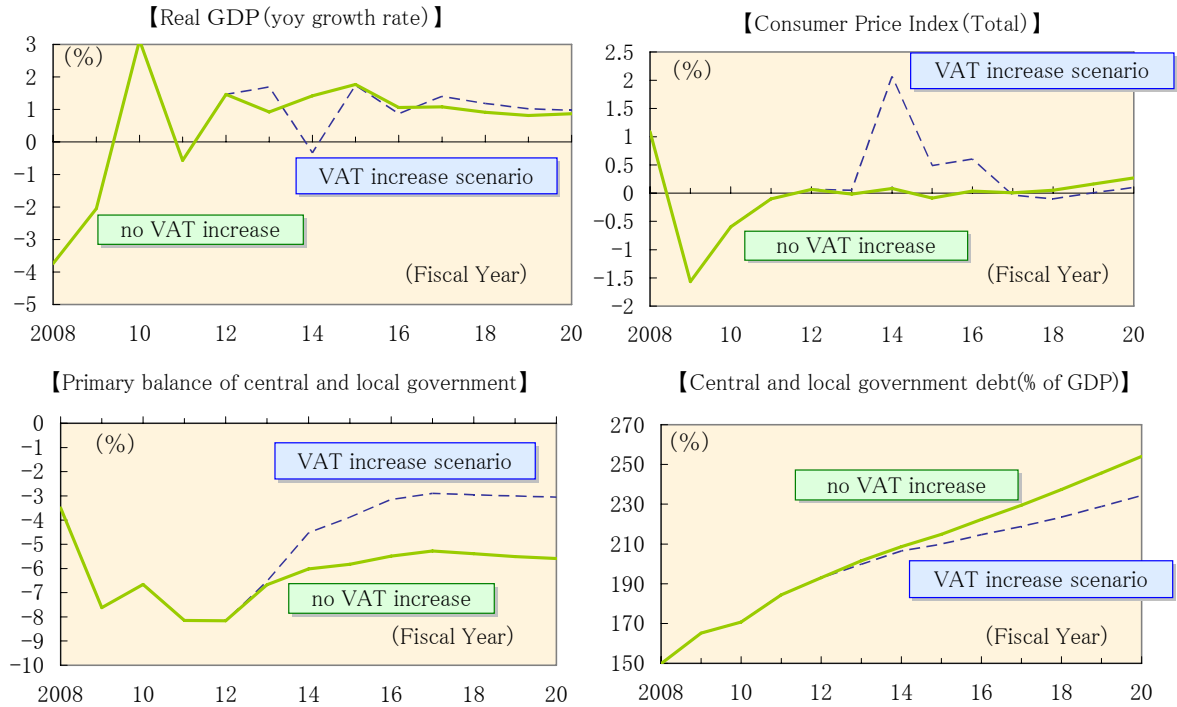
It is necessary to bear in mind the added accounting burden that incremental hikes in the consumption tax rate would impose on business operators, but considering the milder shock on

<sup>28</sup> We expect that for every 1% hike in the consumption tax rate, there would be a 0.32% last-minute demand reaction in private consumption and a 3.5% reaction in private housing.

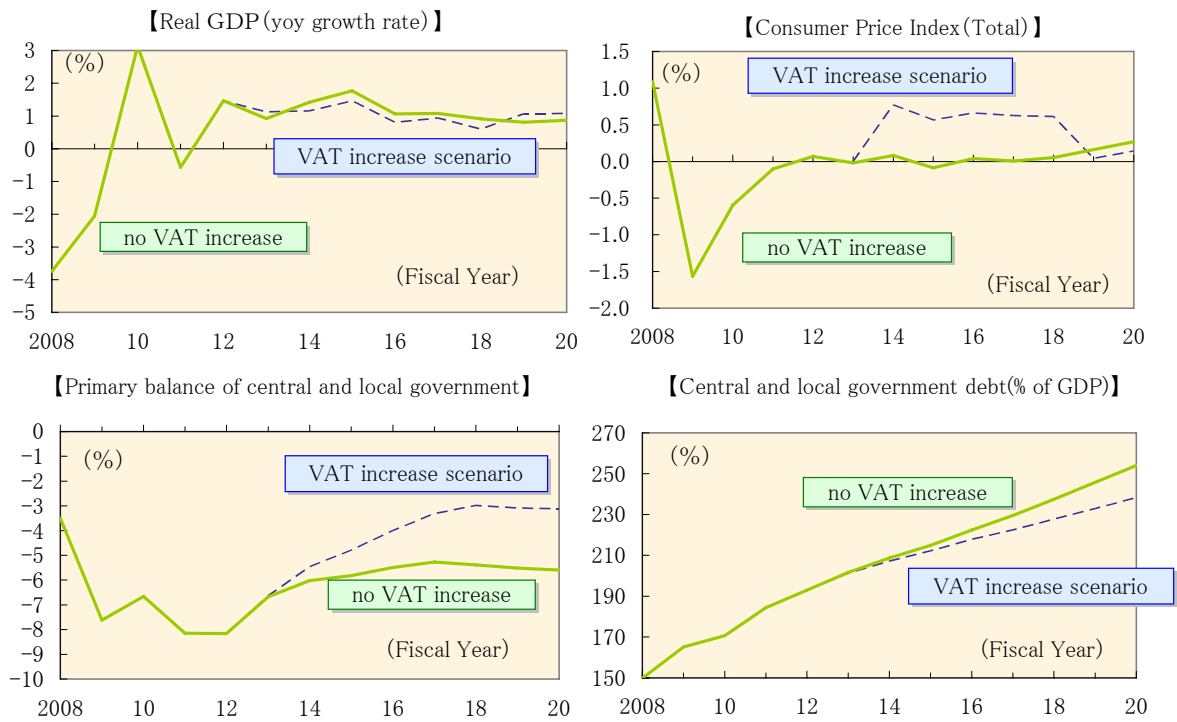


the economy, it would be desirable to make the hikes in increments of 1%.

[BOX 2 Figure 1] The impact of the Consumption Tax rate hike ( by 3% in April 2014 and by 2% in October 2015)



[BOX 2 Figure 2] The impact of the Consumption Tax rate hike ( in increments of 1% from FY2014 to FY2018)



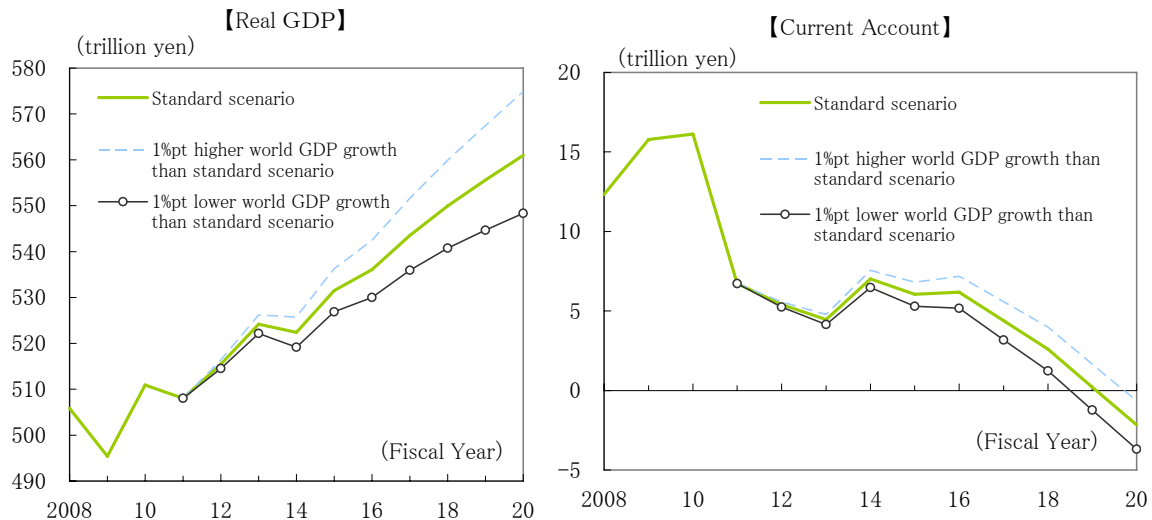
**BOX 3. Impact on the Japanese Economy of Changes in the Global Economic Growth Rate (Simulation)**

There are various uncertainties regarding the environment surrounding the Japanese economy, and it is difficult to make forecasts with certainty. As one clue to understanding the shape of the economy in the event of changes in this environment, we have considered the impact on the Japanese economy of changes in the global economic growth rate.

Specifically, we have carried out simulations to determine the impact if the average rate of growth in the global economy measured as a weighted average of Japan’s exports is 1 percentage point higher compared to our standard scenario from and after 2012 and if it were 1 percentage point lower.

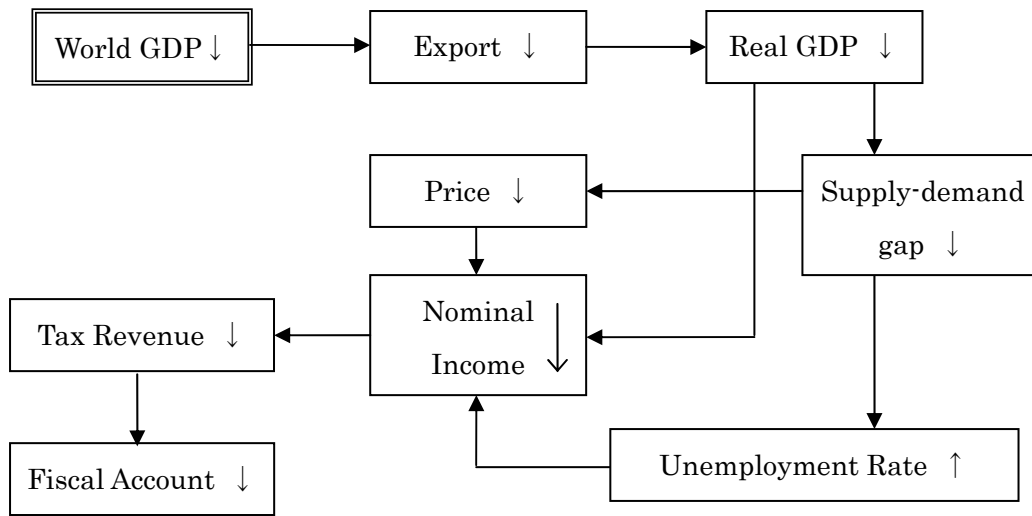
BOX 3 Figure 1 shows the impact on real GDP and the current account balance of the different paths for the global economic growth rate. Here, we focus primarily on the scenario prevailing in the event the global economic growth rate falls. Because a decline in the rate of global economic growth would push down Japanese exports (just as a rise would push them up), the rate of real growth would fall (or rise). A decline (or increase) in gross demand due to a decline (or rise) in exports would also cause imports to decline (or rise), the margin of decline (or rise) of the former would be larger, so the trade balance would worsen (or improve). Since the current balance is the sum of the trade balance, the income balance and current transfers, the current balance would also deteriorate (or improve).

[BOX 3 Figure 1] Simulation Results (Real GDP, Current Account)



In order to consider the impact in detail, we have shown the routes through which a decline in the global economic growth rate would be felt in BOX 3 Figure 2. As indicated in the figure, a decline in the real growth rate would cause the output gap to worsen more compared to the Standard Scenario. A deterioration of the output gap would have a negative impact on the rate of increase in the price level and unemployment and would set back the timing for the elimination of deflation. There would also be a negative impact on per capita nominal employee compensation, so it would cause the government financial balance to worsen by causing tax revenues to decline.

[BOX 3 Figure 2] Transmission channel



In order to grasp the size of the impact in quantitative terms, BOX 3 Table 3 presents a list of the results of these simulations. The model adopted here is almost linear, so if the shock delivered is doubled, the margin of divergence from the Standard Scenario could also be seen as doubling. If the global economic growth rate should fall by 1 percentage point, Japan's real economic growth rate would be pulled down by about 0.2 percentage points during our forecast period overall.

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[BOX 3 Table 3] Summary of the Simulation Results

Subject	Fiscal Year	2010	2015	2020	Average Annual Growth rate (%)		
					06-10	11-15	16-20
Real GDP Growth Rate (%)	Standard scenario	3.1	1.7	1.0	0.1	0.8	1.1
	World GDP: 1%pt higher		2.0	1.3		1.0	1.4
	World GDP: 1%pt lower		1.5	0.7		0.6	0.8
Real Private Non-Resi. Investment (yoy, %)		3.5	4.1	0.6	-1.7	3.3	0.5
			4.1	0.6		3.3	0.5
			4.0	0.7		3.2	0.6
Real Export (yoy, %)		17.2	7.3	5.3	2.4	4.1	5.9
			8.6	6.6		5.1	7.3
			6.0	4.0		3.1	4.6
GDP Gap (%)		-3.1	-1.4	0.8	-1.3	-2.5	-0.0 *
			-0.6	3.3		-2.1	1.8
			-2.3	-1.4		-2.9	-1.7
Nominal GDP Growth Rate (%)		1.1	1.2	0.1	-1.1	0.1	0.2
			1.5	0.5		0.3	0.5
			1.0	-0.3		-0.0	-0.1
Consumer Price Index (Total, yoy, %)		-0.4	0.5	0.1	-0.1	0.5	0.1
			0.7	0.6		0.6	0.5
			0.3	-0.4		0.4	-0.2
Unemployment Rate (%)		5.0	4.2	3.9	4.4	4.4	4.0 *
			4.1	3.7		4.4	3.8
			4.2	4.2		4.4	4.2
Compensation of Employees (yoy, %)		0.5	-0.3	-0.1	-0.8	-0.3	-0.3
			-0.1	0.4		-0.2	0.1
			-0.5	-0.5		-0.4	-0.6
Tax Revenue (trillion yen)		77.3	95.6	101.5	84.0	85.8	100.3 *
			96.3	104.2		86.1	102.1
			94.9	99.1		85.5	98.6
Primary Balance of Central and Local Government (% of Nominal GDP)		-6.7	-3.9	-3.0	-4.1	-6.3	-3.0 *
			-3.8	-2.8		-6.2	-2.8
			-4.0	-3.3		-6.3	-3.2
Current Account (% of Nominal GDP)		3.4	1.3	-0.4	3.6	1.2	0.5 *
			1.4	-0.1		1.3	0.7
			1.1	-0.8		1.2	0.2
World GDP Growth Rate※ (weighted by the share of Japan's export destination, %, annual)		6.5	5.0	4.2	4.5	4.7	4.5
			6.0	5.2		5.5	5.5
			4.0	3.2		3.9	3.5

Notes: "\*" denotes average during the period. "※" denotes exogenous variable.

Figures of the standard scenario are shown in the upper row.

Figures of the case which assumes 1% higher world GDP than the standard scenario are shown in the middle row.

Figures of the case which assumes 1% lower world GDP than the standard scenario are shown in the lower row.

## 6. Proposals

- Promote new forms of energy and expedite concrete decontamination measures
- Trans-Pacific Partnership will help Japan remain competitive
- Reforms essential regarding expenditures and revenues, including social security
- Boost consumption tax rate in increments of 1%

### 6.1. Regarding new forms of energy

In the wake of the accident at the Fukushima nuclear power station, conditions are such that restarting nuclear power stations all over the country will be difficult, which will make it difficult for Japan to adhere to the Kyoto Protocol (a cut of 6% versus 1990 levels on average between 2008 and 2012), which provides for international emissions controls on greenhouse gases. Under these circumstances, cost increases will be unavoidable whether nuclear power generation is continued or whether it is abandoned. In the "post-Kyoto" negotiations to

determine new emissions controls to be determined by 2020, moreover, Japan has announced that it will cut greenhouse gas emissions by 25% versus 1990 levels by 2020, but achieving this target under present circumstances will be extremely difficult. For this reason, wider use of new forms of energy will be indispensable in order to both secure energy supplies and cut greenhouse gas emissions. Japan needs to proceed with bold steps in systematic way to promote the spread of new forms of energy at an accelerated pace through such measures as the creation of tax-free zones to exempt such taxes as corporation income tax and fixed asset tax in the Pacific coastal region of Iwate, Miyagi and Fukushima Prefectures, which suffered devastating damage in the earthquake and tsunami, as well as such measures as the securitization of lands to secure sites for new energy facilities.

## **6.2. Regarding decontamination of regions contaminated by radioactive materials due to the accident at the Fukushima nuclear power station**

**“II. Energy 1. Four Scenarios Depending on Nuclear Power Scheme”.** As our analysis indicates, it is believed that proceeding with the decontamination will give rise to decontamination costs amounting to ¥12 to ¥15 trillion over the next forty years if final disposal is taken into consideration. This amount is 3 to 13 times the ¥4.3 trillion cost of buying up contaminated land which we reported in our April 25, 2011 report<sup>29</sup>. It should be understood that huge costs will be required in order to decontaminate all the contaminated land where the radiation is 1 millisievert or more per year. Another pressing issue is that of finding a final disposal site once the decontamination of the entire contaminated area is begun. Thoroughgoing reviews of nuclear energy policy and the nuclear energy budget will be a matter of course, and it will also be necessary to determine the form in which the Japanese public will be asked to bear the expense for decontamination, whether through taxes or higher electric power rates. The specific shape of the decontamination plan will have a major impact on how the victims of the Fukushima nuclear power accident will live their lives in the future, and the manner in which the expense is to be borne will be a heavy burden on the Japanese economy. These facts are certain, so it would be desirable for the Japanese government to give an outline of its plans as soon as possible.

## **6.3. Regarding the shifting of production facilities offshore**

In light of international competition, Japanese business firms will maintain a certain level of production within Japan in order to maintain a high technical level along with overseas production, so it will be important on both the company and industry level to maintain a balance between production functions and technical innovation capabilities. At the same time, facilitating global circulation of parts and products, will enable Japanese companies to produce such products domestically, an area in which they have an advantage. In order to make that possible, it will be important to create an environment making it easier for Japanese firms to rebuild their global supply chains. Thus in TPP negotiations, Japan should support the creation of rules relating to trade, investment and intellectual property based on a 21st century model in line with the international fragmentation of the stages of production.

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<sup>29</sup> “Impact to last Decade or more if Existing Nuclear Plants Shut Down”  
([http://www.jcer.or.jp/policy/pdf/pe\(iwata20110425\).pdf](http://www.jcer.or.jp/policy/pdf/pe(iwata20110425).pdf))

#### 6.4. Regarding government finances

The Japanese government is aiming to raise the consumption tax rate to 10% during the present decade. However, merely raising the consumption tax rate to 10% will not serve to stabilize the debt to GDP ratio, and the risk of a government default will continue to rise. It seems increasingly likely that Japan's current account will enter the red by the end of the decade. This means a growing necessity for foreign capital inflow to finance the budget deficit amid decreasing capacity of Japanese domestic savings, and from the standpoint of economic recovery as well, further review and reform will be necessary with regard to both revenue and expenditure, including the natural increase in social insurance spending.

#### 6.5. Consumption Tax Increase

At a time when growth of only 1% can be expected, raising the consumption tax rate by a large margin would place a huge burden on the Japanese economy. It is necessary to bear in mind the increased accounting burden that an incremental increase in the consumption tax rate would place on business firms, but from the standpoint of easing the shock to the economy, it would be desirable to raise the consumption tax rate in increments of 1%.

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