March 2013

The 39th Medium-Term Economic Forecast (2012FY—2025FY)

Japan’s Changes in Industrial Structure and Economic Growth

— Twin Deficit Concerns Arising

JCER Medium-Term Economic Forecast Team

The Japan Center for Economic Research released its 39th Medium-Term Economic Forecast for 2012FY through 2025FY. According to our forecast, the growth of the Japanese economy will become slower in fiscal 2021-25 and Japan will likely record a twin deficit, meaning both the fiscal and current account balances will be in the red. Consequently, this situation may lead to a rise in interest rates and the potential risk of a sovereign debt crisis. Our economy requires drastic growth strategies, such as more open trade policies and the urgent reform of the nation's tax and social security systems.

Due to Japanese manufacturers shifting their operations overseas, the share of sectors of high productivity will decline. In contrast, because of the country’s issue of rapid aging, the share of sectors of low productivity such as health and long-term care services will expand, pushing down Japan’s economic growth. The decrease in the labour force will also put downward pressure on the growth rate; on average, it will slow from 0.9% in the 2010s to 0.4% in the early 2020s.

Japan's population will decrease from approximately 128 million in 2010 to 120 million in 2025, and one in every 3.3 people will be 65 and over. Consequently, the number of workers in the health and nursing care sectors will increase from 7 million to 10 million people, meaning one in six workers will be employed in these sectors. On the other hand, the number of workers in the manufacturing industry will decrease from 9.2 million in 2010 to 7.3 million in 2025.

The economic growth rate will decline to 0.0~0.5% in the early 2020s.
The current account balance will be in deficit due to the surge in fossil fuel prices and its substitution by thermal power.

With the Great East Japan Earthquake as a turning point, the trade and services balance has fallen into the red. In addition to Japanese manufacturers shifting their operations to other countries, and the increase in imports of products owing to a weakening supply capacity, the rise in fossil fuel imports due to fuel price hikes and the switchover to thermal power generation will widen the deficit in the trade and services balance. Consequently, the current account balance is expected to run into the red when it exceeds the surplus in its income balance (15 trillion yen in the red by 2025FY.)

As power conservation awareness rises in Japan, with further efforts made, we estimate that a 10%+ power cut can be achieved. If renewable energy is promoted, it could minimize fossil fuel imports and CO2 emission increases, which have been on the rise due to the replacement of nuclear power generation by thermal power.

Figure: Outlook for the Primary Balance and Current Account
Although the deficit will narrow tentatively, the GDP ratio of the national and local governments’ primary balance will not become positive even if the consumption tax rate is raised to 10%. Social welfare expenditures such as health and nursing care will continue to increase as the baby-boom generation will reach age 75 in the early 2020s. Additionally, tax revenues will be also sluggish because nominal GDP growth rate stagnate from the prolonged deflation. Consequently, the fiscal deficit will expand to 24.5 trillion yen in 2025 and gross government debt to 1,348 trillion yen (268.8% as a share of nominal GDP.)

Japan will likely record a twin deficit, which means that both the fiscal and current account balances will be in the red. The ratio of the national and local governments’ primary balance deficit and current account deficit to GDP will stand at 4.9% and 3.0% respectively. This situation is similar to or even worse than that of the United States in the 1980s. Japan's debt has long been financed mostly by the nation's abundant household assets deposited at financial institutions, which are used to buy government bonds. However, if the debt continues to swell, it will eventually exceed domestic investors' capacity to absorb any additional debt. This points to a growing necessity for foreign capital flow to finance the budget deficit. If foreign investors start to demand a higher sovereign debt risk premium that is commensurate with the country's government debt level, interest rates may potentially rise and Japan could face a sovereign debt crisis.

China’s economic growth rate will decline to 5-6% in the early 2020s.

In the medium term, growth rates in advanced countries will deteriorate since labor force participation rates will decline with the retirement of baby boomers. Growth rates of the United States and the European Union will slow to about 2% and 1% respectively. In China, the working age population (15-64 years old) will start to decrease in the late 2010s due to the nation’s one-child policy. The absence of factors that contributed to its high economic growth will lead to a declined growth rate (5-6% in the early 2020s.) According to these forecasts, while the share of world GDP of developed countries will
shrink, emerging countries, which will maintain relatively high growth rates, will boost their presence. The share of Japan’s GDP in the world will shrink from 8.5% in 2011 to 4.4% in 2025, whereas that of China’s GDP will expand from 10.6% to 15.7% during the same period, closing in on the United States, which has the largest share in the world (16.4% in 2025.)

**Policy Proposals**

In Japan, it is difficult to transfer parts of the production process and the “hollowing out” of industries occurs easily, because there are high barriers to transact with other countries. Trade rules should be created in the context of the Trans-Pacific Partnership (TPP) and Economic Partnership Agreement (EPA) negotiations in a positive manner to facilitate the international fragmentation of production. These policies can prevent the manufacturing industry, a leading industry, from moving production plants overseas. Furthermore, the substantial reduction of the corporate tax rate for manufacturers will be required.

In order to restrict the surge in labor demand for health and nursing care sectors, we should make use of information technology and robotic technologies aggressively. It is essential that women and elderly people be encouraged to participate in the labor market. Furthermore, we need to consider the option of employing more foreigners to overcome the labor shortage.

As for fiscal problems, further reviewing and reformation regarding various aspects of revenues and expenditures is needed, including the consumption tax rate hike and social security cuts. An increase in the environmental tax rate could be a measure that would “kill two birds with one stone”, because it could contribute to further power conservation. Thus, we need to examine this policy, while taking the competitiveness of manufacturing industry into consideration.
1. The Nature of Japan’s Problems: Our View

As Japanese manufacturers continue moving production offshore and competition further intensifies in the electronics industry, output is eroding in those high-productivity sectors\(^1\) which have driven Japanese economic growth in years past (Figures 1-1, 1-2). Meanwhile, owing to such factors as the aging of Japanese society and the greater role played by services in the economy, the structure of Japan's industry is undergoing great changes, seen in the growth of low-productivity sectors such as health and nursing care (Figure 1-3). We are concerned that, as this trend develops, the productivity growth rate for the Japanese economy as a whole will fall.

Figure 1-1. Japanese Manufacturers’ Shift to Offshore Production

![Figure 1-1. Japanese Manufacturers’ Shift to Offshore Production](image)

(Note)
1. Overseas Production Ratio = Overseas production sales / (Domestic production sales + Overseas production sales)
2. Figures for 2012FY are estimates.
(Source) Cabinet Office "Annual Survey of Corporate Behaviors"

Figure 1-2. Intense Competition in the Electronics Industry

![Figure 1-2. Intense Competition in the Electronics Industry](image)

(Source) Ministry of Economy, Trade and Industry "Indices of Industrial Production"

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\(^1\) High-productivity sectors are those industries with the highest value added per employee.
Productivity in the overall economy is influenced not only by advances in productivity in each industry, but by the impact of changes in the structure of industry. In other words, if the structure of industry shifts from low-productivity industries to high-productivity industries in response to changes in the conditions of production or the structure of demand, productivity in the economy as a whole will rise, while productivity in the economy overall will fall if the reverse happens (Figure 1-4).
The share of the manufacturing industry in the overall Japanese economy has been falling over the long term. In general, productivity in the manufacturing industry is high, as is the productivity growth rate. This is why the rate of change in productivity for the economy overall (the per-capita real growth rate) has been falling in tandem with the decline in the share of manufacturing in total output (Figure 1-5). In addition, the decline in the labor force is also expected to accelerate (Figure 1-6), just as Japan's potential growth rate is expected to fall.

Figure 1-5. Manufacturing Ratio and Productivity Growth Rate

![Figure 1-5](image_url)

(Note) The productivity growth rate (1985-93) and the manufacturing ratio (1985-2000) have been calculated from previous SNA series.
(Source) Cabinet Office "System of National Accounts"

Figure 1-6. Decline in Labor Force

![Figure 1-6](image_url)

(Source) Ministry of Internal Affairs "The Labour Force Survey" (F.Y.)
In addition to trends such as the decline in the productivity growth rate and the erosion in the working population, the following problems are coming to the fore.

- Forecasts of future growth rates for the coming years are being revised down for China as well as the United States and Europe. This makes it more likely that the outlook for exports, which many observers had hoped will drive the Japanese economy, may be less promising than expected.

- One question is whether Japan’s capital stock will rise. Another is whether investments will be made solely to replace capital stock rather than to strengthen capacity.

- Electricity rates are expected to rise due to the substitution of thermal power for nuclear and greater reliance on renewable sources of energy. Fossil fuel imports and CO2 emissions are also expected to increase. Another question therefore concerns the impact which these trends will have on Japan’s economy and industry.

- In our 38th Medium-Term Forecast for the Japanese Economy (released in March of 2012), we predicted that Japan would begin running a deficit in its current account around 2020. Another question, then, is what impact will the above factors have on the current account balance and government finances.

Addressing these problems will require examining not merely the trend of the overall economy but structural changes in Japanese industry and the likely impact of those changes. In our present forecast, therefore, we have lengthened our horizon by five years through FY2025 (ending March, 2026) and focused our discussion on the following questions:

- How will the structure of Japan’s industry and employment change?
- To what extent will the economic and productivity growth rates decline for the economy overall?
- To what extent will that impact the current account balance and government finances?
- What must be done to prevent the growth rate from falling?

\* In formulating a model of the future, we have based our analysis on forecast values adopted in 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 347 equations (102 of which are estimation formulas) and 253 exogenous variables. Moreover, the outlook for FY2012 and FY2013 set forth in this forecast is basically in line with our Short-Term Forecast No. 153, “Quarterly Forecast of the Japanese Economy” released on February 22 of 2013.
2. Forecast Approach and Principal Assumptions

2.1. Forecast Approach (Figure 2-1)

Total factor productivity (TFP)\(^3\) of the overall economy is an important element in determining the long-term growth rate of the economy, and in our 38th Medium Term Forecast of the Japanese Economy, we assumed that TFP would continue growing at a fixed pace each year (at 0.8%, or average for FY1991 through FY2007). We have therefore assumed that the historical average growth rate will continue into the future. It is a key assumption to make in our Medium-Term Forecast, which analyzes the dynamics of the economy. Indeed, the structure of Japanese industry is undergoing huge changes, and the productivity growth rate for the economy overall may possibly decline.

In our present report, our analysis first focuses mainly on the energy and materials industries, the machinery industries, the automobile industries and the fields of health and nursing care. Using an input-output model with fixed assumptions regarding the value added ratio (intermediate input ratio) and the labor productivity growth rate for each industry, we then estimate how production and employment (including changes in the structure of industry and jobs) in each industry are likely to respond to changes in the structure of demand. We then forecast the productivity growth rate for the economy as a whole. In the course of doing so, we compute the nominal output and production deflator by industry consistent with the forecast\(^4\).

\(^3\) We understand TFP as that portion of factors determining the supply-side capacity of the Japanese economy (or potential GDP) which are not attributable to the factor endowments of labor and capital.

\(^4\) We have assumed that the value added ratio (intermediate input ratio) for each industry will be determined by historical trends and that labor productivity will rise in line with the average in the period between 1996 and 2005, which does not include the global financial crisis.
2.2. Overseas Economies

2.2.1. Growth Rates (Figure 2-2)

**The United States:** With the gradual repayment of excessive debt on housing loans associated with the global financial crisis, consumption now has some chance to recover. However, there is now evident pressure on the growth rate from the “fiscal cliff,” or the spending cuts and tax increases for reducing the deficit, and the pace of growth will remain under the most recent peak of 3% through the middle of the decade. The retirement of baby boomers will pick up steam from the second half of the decade, lowering the macroeconomic labor force participation rate. As a result, the labor force growth rate will gradually slow, with the growth rate falling to about 2%.

**Europe:** For the rest of the decade, the European governments will have to improve their financial positions by cutting spending and raising taxes, which will be a drag on economic growth. It is likely that economic sluggishness due to retrenchment efforts by large countries such as Spain and Italy will have repercussions for core European nations like Germany and France. The pace of growth will subsequently fall to about 1% as these countries, like the United States, see a rise in retiring baby boomers.

**China:** Although the Chinese economic growth rate will slow from that country’s double-digit track record posted thus far, the Chinese economy will continue

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5 In forecasting the outlook for the Chinese economy, we have referred to the 12 February 2012 World Bank report.
to grow at the fast pace of 7% to 8% through the middle of the decade. At the eighteenth congress of the Chinese Communist Party held in November, 2012, the Chinese government set a target of doubling gross domestic product and per-capita national income by 2020 and resolved to strengthen efforts to reduce wealth disparities as the means of doing so. As a result of the one-child policy, however, the majority of workers are concentrated into the present working age population between fifteen and sixty-four, which will start to decline between 2015 and 2010. This means that the generations engaged in home buying will decline, eroding factors such as construction and real estate investment, which in the past have supported high growth. The Chinese growth rate will therefore fall to between 5% and 6% in the 2020s.

**Figure 2-2. Growth Rates**

(Notes) World GDP growth rate is calculated by multiplying each country’s GDP growth rate by the country’s share as a destination of Japan’s export.

(Source) IMF “World Economic Outlook (October 2012)”

Owing to these trends, the struggling nations of the West and Japan will account for a declining share of the global economy while the emerging nations experiencing relatively high growth will make their presence increasingly felt (Figure 2-3). Japan’s share of global GDP will fall from 8.5% in 2011 to 4.4% while China’s will rise from 10.6% to 15.7%, closing in on the United States, the world’s number one economy, which will likely account for 16.4% of global GDP in 2025.

Figure 2-3. Share of Global Economy

![Chart showing share of global economy by region]

2.2.2. Fossil Fuel Prices

Since global demand for crude oil will increase, led by emerging nations (Figure 2-4), West Texas Intermediate crude oil prices will continue rising, reaching $147.20 per barrel by 2020 (versus $154.10 per barrel as forecast in our 38th Medium Term Forecast) (Figure 2-5) and further to $197.10 per barrel by 2025.

Figure 2-4. Global Demand for Crude Oil

![Chart showing global demand for crude oil by region]
2.2.3. The Dollar-Yen Rate

In the long run, the currency rate is determined by purchasing power parity based on the corporate goods price index.\(^6\)

Although the yen has recently been somewhat stronger than purchasing power parity would seem to warrant, purchasing power parity itself is distorted by the fact that the rate of increase in the Japanese domestic price level is lower than overseas, accounting for a 1% annual appreciation in the yen. For this reason, we expect the yen to be somewhat overvalued in nominal terms (with the dollar at ¥86.60 in FY2015, ¥75.80 in FY2020 and ¥72.30 in FY2025) but to be somewhat undervalued in real terms (Figure 2-6).

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\(^6\) Assuming that equilibrium currency rates are determined by purchasing power parity deflated by the foreign trade price index, we have used the corporate goods price index for Japan and the United States rather than the foreign trade price index in making our estimates. Accordingly, this level indicates the equilibrium nominal currency rate for each year in cases when the fiscal year 1980 dollar-yen rate is deemed to be the equilibrium real (effective) currency rate between Japan and the United States. Regarding equilibrium currency rates, see Hiroshi Yoshikawa (2012), “The Equilibrium Exchange Rate,” Financial Review Vol. 48, January 1999 pp. 1-12, Ministry of Finance Policy Research Institute. Regarding real effective currency rates see Yuichiro Ito, Hiroki Inaba, Naoko Ozaki and Toshitaka Sekine, “Regarding Real Effective Exchange Rates,” Bank of Japan Review Series 2011-J-1, Research and Statistics Department, Bank of Japan, February 2011.
2.3. The Labor Force

We anticipate that the rate of increase in the Japanese population aged fifteen and over will be -0.1% for the first half of this decade, -0.2% for the latter half, and -0.4% for the first half of the 2020s. We have also assumed that the labor force participation rate for each age group will remain unchanged in FY2013 for males while gradually rising for females.

As a result, we anticipate that the rate of increase in the labor force is likely to be -0.6% for the first half of the present decade, -0.4% for the second half, and -0.6% for the first half of the 2020s.

2.4. Energy Supply

2.4.1. Nuclear Power Generation

Based on the September 14, 2012 plan “Innovative Strategy for Energy and the Environment” by the Energy and Environment Council, the Tokyo Electric Fukushima Daiichi and Daini power plants, the Chubu Electric Hamaoka plant will be shut down, along with other nuclear power plants as each reaches forty years in service. Meanwhile, we have assumed that the policy to shut down all nuclear plants by 2030 will remain on track.

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7 With regard to the female labor force participation rate, we have referred to the scenario, “Labor Market Participation Progresses at a Fixed Pace” described in the August 1, 2012 report, “Promotion of Policies for Creating, Fostering, Connecting, and Maintaining Employment” by the Labor Policy Study Group, Ministry of Health, Labor and Welfare Ministry.

8 However, we have assumed that, in 2013, except for the Fukushima Daiichi and Daini nuclear plants, the Kashiwazaki Kariwa Nos. 2-4, Chubu Electric’s Hamaoka plant, Tohoku Electric’s Onagawa plant and other nuclear plants reaching forty years in service, nuclear power stations will each in their turn be brought back online. Thus, we assume that half of all nuclear plants will be in a position to come back online.
2.4.2. Energy Conservation

The combined electric power sales for ten major power companies in FY2012 (April through December) fell by 6.8% from the same period in FY2010. Looking at rates of decline by type of contract shows that sales to households fell by 2.3 percentage points, sales to business firms fell by 2.2 percentage points and sales to industry fell by 2.4% in a balanced decline for each contract type (Figure 2-7-1). By electric power company service area, major declines were seen in Tokyo (9.7%), Tohoku (8.5%) and Kansai (6.5%). Power conservation in the disaster-affected region of Tohoku was semi-compulsory, and Tokyo in FY2012 maintained the substantial power conservation level seen in FY2011. Given the stoppage of nuclear plants and other factors, Kansai faced even tighter supply-demand conditions, and thus the extent of conservation was considerably larger than in FY2011.

Figure 2-7-1. Electric Power Sales by Type of Contract

By industry, the paper and pulp industries in Hokkaido, the chemical industries in Chugoku and the machinery industries in Tohoku, Tokyo, Hokuriku and Kansai contributed substantially to the reductions (Figure 2-7-2). The steel industry contributed positively in such regions as Kyushu, Chubu and Tokyo. A look at the relationship between electric power consumption and output by industry shows an improving trend in power efficiency on the whole. In five industries (with the exception of steel and machinery), output has not fallen to the extent that power consumption has declined and even rose for the ceramics/glass and chemical industries (Figure 2-7-3).
In this way, power conservation efforts have recently been gaining ground, and additional conservation of 10% can likely be achieved with further efforts. In our present forecast, we have referred to the report, “Innovative Strategy for Energy and the Environment,” in anticipating that, compared to 2010 levels (1.1 trillion kWh), a further reduction of ten percent or 110 billion kWh can be achieved by 2030, with cuts of 7.5% reached by 2025. Specifically, based on power conservation efforts achieved thus far, we expect levels of reduction to remain basically the same in the manufacturing industry, with a reduction of about 9% in non-manufacturing and about 15% for households.
2.4.3. Renewable Energy

The report on “Innovative Strategy for Energy and the Environment” anticipates that efforts to use renewable sources of energy will move forward and make up for the decline in nuclear power generation (rising three-fold from 110 billion kWh in 2010 to 300 billion kWh by 2030), but if the increase is measured excluding hydropower, the increase would be eight-fold. In our present forecast, therefore, we anticipate that use of renewables will gradually spread, reaching 58.9 billion kWh by 2025 (Figure 2-8).

Accordingly, that portion of the decline in power generation associated with the abandonment of nuclear power which cannot be offset by energy conservation and greater use of renewables will have to be made up through increased thermal power generation.
2.4.4 Electricity Rates and Supply Constraints

We anticipate that electricity rates will rise about 20% owing to greater use of thermal power and renewables, such that by 2025 household electricity rates will be about 20% higher compared to 2010. However, it is likely that supply capacity will be adequate because the shortfall which cannot be provided through energy saving and greater use of renewables can be covered by increased thermal power generation. Thus, we do not anticipate that electric power shortfalls will arise during the forecast period.

2.5. Reconstruction Demand

We have assumed there will be an increase in investment to rebuild the capital stock in the form of private nonresidential investment, private residential investment and government total fixed capital formation, representing the increase in investment needed to repair damage to the capital stock (¥18 trillion). The damage to the capital stock in the Great East Japan Earthquake exceeds that incurred in the Great Hanshin Earthquake (about ¥9.6 trillion), so we have assumed that the recovery will take five years (compared to about three years in the case of the Great Hanshin Earthquake).

2.6. Government Finances

2.6.1. Reconstruction Costs

We have assumed that government expenditures to cover the portion representing damage to public capital stock (about ¥9.1 trillion) will be made from FY2011 through FY2015.

2.6.2. Non-Recovery Spending

Based on ministry budget estimate criteria for FY2013, we have assumed that, with the exception of spending for social security and recovery, government spending from and after FY2014 will rise in tandem with the rise in the price level. In projecting the rate of increase in social security spending, we have taken account of various factors, including the price level and population. With regard to the share of basic pension benefits borne by the national treasury, we have assumed that the government share will be maintained at one half.

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9 However, as we found in our 38th Medium Term Forecast, if nuclear plants were relied on to the same extent they were prior to the accident, the cost of providing against the risk of future accidents would balloon, so it should be borne in mind that there is no absolute cost disparity between abandoning nuclear energy and continuing its use.
2.6.3. Taxes

We have assumed that the consumption tax rate will be raised by 3% in April of 2014 and a further 2% in October of 2015\(^\text{10}\). We have also accounted for corporation income tax cuts, as well as the imposition of the recovery income tax and the recovery residence tax.

3. Industry Trends and Potential Growth Rate

3.1. Trends in Major Industries and Changes in Employment and Industry Structure

Looking first at output of Japan’s major industries, we expect some impact in the manufacturing industry arising from the slowing of overseas demand and the shift of production offshore, but we expect output to rise in real terms when account is taken for quality as well as quantity (Figures 3-1-1 through 3-1-4). However, although we expect real output to rise for consumer electrical equipment, electronic computers, telecommunications equipment, semiconductors and electronic components, we see output falling in nominal terms as prices fall to reflect improvements in productivity. Since any increase in overseas demand will be met primarily through offshore production, output in the domestic auto industry to satisfy exports plus domestic demand will trend lower (Figure 3-2). On the other hand, we expect to see substantial increases in output for the health and nursing care industries.

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\(^{10}\) Computations in our model assume a 1% rise in each of FY2015 and FY2016. Also, given the rise in April of 2014, we anticipate that consumers will roll forward demand to FY2013 and that an associated contraction of demand will occur in FY2014 (with a 0.2% change in private consumption and 2.1% in private residential investment associated with each 1% change in the consumption tax.) However, both the rise and fall in consumption associated with the consumption tax hike of October, 2015 will, we assume, occur within the fiscal year, so our model takes no special account of fluctuations in consumption that year.
Figure 3-1-1. Demand Breakdown of Major Industries (1)

Figure 3-1-2. Demand Breakdown of Major Industries (2)

(Sources) Ministry of Internal Affairs and Communications "1995, 2000, 2005 Link Input–Output Tables", Ministry of Economy, Trade and Industry "2010 Updated Input–Output Tables"
Figure 3-1-3. Demand Breakdown of Major Industries (3)

(Sources) Ministry of Internal Affairs and Communications "1995, 2000, 2005 Link Input-Output Tables", Ministry of Economy, Trade and Industry "2010 Updated Input-Output Tables"

Figure 3-1-4. Demand Breakdown of Major Industries (4)

(Sources) Ministry of Internal Affairs and Communications "1995, 2000, 2005 Link Input-Output Tables", Ministry of Economy, Trade and Industry "2010 Updated Input-Output Tables"
As a result, the structure of employment will change as the number of people working in such fields as medical care and nursing rises (at 2.4% on average during the forecast period) in order to meet the continuing increase in demand. Meanwhile, the number employed overall will fall (-0.5% on average during the forecast period) in tandem with the decline of the labor force, with the number of persons working in other industries declining substantially (Figure 3-3).

The structure of industry will also change in that nominal value added will rise for services provided to offices, including those in health and nursing care, but it will decline for other industries (Figure 3-4).
Figure 3-3. Change in the Structure of Employment

(Million workers)

1995 2000 05 10 15 20 25 (Year)

(Foods) (General machinery) (Automobiles) (Metal products) (Semiconductors/electronic devices) (Pulp/paper/wooden products) (Other manufactured products) (Agriculture/forestry/fishery/coal/crude oil/natural gases) (Other non-manufactured products) (Wholesale trade) (Other business services) (Construction) (Health/nursing care) (Retail trade) (Personal services)


Figure 3-4. Change in Industrial Structure

(Trillion yen)

1995 2000 05 10 15 20 25 (Year)

(Foods) (General machinery) (Automobiles) (Petroleum/coal products) (Chemicals) (Iron/steel) (Other manufactured products) (Agriculture/forestry/fishery/coal/crude oil/natural gases) (Other non-manufactured products) (Other public services) (Public administration) (Health/nursing care) (Other business services) (Wholesale trade) (Real estate)


The next question concerns how these changes in the structure of industry will bring changes in the productivity of the overall economy.

Figure 3-5-1 presents a detailed picture of factors underlying the decline in the labor productivity growth rate since 1996, for which comparable data is available. The figure presents changes in the labor productivity growth rate in terms of (1) increases in the labor productivity growth rate of various industries, (2) changes in the value added ratio in each industry, and (3) changes in the structure of industry (and employment).

As for the factor of rising labor productivity in each industry described in (1), extra weight (value added) has been given to reflect the labor productivity growth rate of each industry. This value rises with improvements in the labor productivity of the respective industries. As for the factor of changes in the value added ratio described in (2), extra weight (output) has been given to reflect the margin of increase in the value added ratio (the share of value added in output) for each industry. This value increases as the share of intermediate inputs falls. As for industrial structure factors described in (3), the margin of change in the number of employees has been multiplied by the difference between the productivity of value added for each industry and the productivity of value added for the economy as a whole. This value will rise with an increase in the number of employees in industries with higher productivity than the economy as a whole or with a decrease in the number of employees in industries with lower productivity than the economy as a whole.

Figure 3-5-1. Breakdown of the Labor Productivity Growth Rate (1996-2025)

(Average annual growth rate and composition ratio, %)

1. Higher labor productivity
2. Change in value added ratio
3. Change in industrial structure
Total

(Sources) Ministry of Internal Affairs and Communications "1995, 2000, 2005 Link Input–Output Tables", Ministry of Economy, Trade and Industry "2010 Updated Input–Output Tables"

A look at factors underlying past increases in productivity shows that, between 2001 and 2005, when the Japanese economy was comparatively stable, labor productivity for the economy as a whole rose by an average of 1.1% per year. The first factor of rising labor productivity in individual industries contributed a positive improvement of 1.9% to labor productivity in the economy as a whole. The second factor of changes in the value added ratio contributed negatively by -0.4%. The third factor of changes in industrial structure also contributed negatively by -0.5%. Ordinarily, the structure of industry will shift toward sectors in which productivity is high and growing fastest, which can in turn be expected to boost productivity in the economy as a whole. However, the opposite occurred during this period. This is thought to be due to the fact that the demand structure shifted toward non-manufacturing and other low-productivity industries.

A closer look at each industry for the same period (Figure 3-5-2) shows that such industries as computers and telecommunications equipment, semiconductors and electronic components lifted overall productivity thanks to rising labor productivity and changes in value added ratios. Also, the wholesale and retail industries as well as finance and insurance lifted productivity thanks to rising labor productivity. These results are believed to be attributable to greater use of information technology in each industry. Meanwhile, productivity in agriculture, forestry and marine industries as well as retail is lower than that of the economy as a whole, so the decline in the weight of these industries had a positive impact for overall productivity thanks to the change in the industrial structure.

In contrast, the health and nursing care industries as well as personal services experienced improvements in labor productivity but have lower productivity than the economy as a whole. As a result, the increased weight of these industries (due to the changing structure of industry and employment) outweighed any improvements in labor productivity within these industries, causing overall economic productivity to fall.

In the period from 2006 through 2010, which includes the global financial crisis, no increase in productivity in the overall economy was apparent. In particular, changes in labor productivity contributed negatively. This was likely attributable to the fact that companies held onto employees even though output in each industry fell sharply.

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11 A change in the structure of industry characterized by a shrinking of industries with a high TFP growth rate and an expansion of those with a low TFP growth rate will undermine the macroeconomic TFP growth rate in a phenomenon known as the Baumol effect. See Kyôji Fukao, “Causes of Sluggish Productivity,” Chapter 2 of The Lost Twenty Years and the Japanese Economy (Tokyo: Nihon Keizai Shinbunsha, March 22, 2012). Fukao analyzes the slowdown in the TFP growth rate for the period prior to the present analysis, namely 1980 through 1990 and 1990 through 2002. Fukao notes that, “The expansion of the share of non-manufacturing, which has a low TFP growth rate, did indeed contribute to the decline in the TFP growth rate of the macro-economy overall, but the impact was small. The lion’s share of the slowdown in the TFP growth rate occurred from within each industry.”
3.4. Rising Productivity by Industry (Forecast Period)

With regard next to the factor of rising productivity during the forecast period, a look at the period from 2016 through 2020 shows some hope that rising labor productivity in individual industries at 2.1% could contribute to labor productivity for the economy overall in line with past trends. However, it also shows that changes in value added and industrial structure will likely contribute negatively at -0.3% and -0.9%, respectively, indicating that any large growth in overall economic productivity during the forecast period is unlikely (Figure 3-5-1).

Looking closely at the same period by industry, (Figure 3-5-3) shows that rising labor productivity will contribute positively in the computer and telecom equipment industry as well as semiconductors and electronic components. However, though productivity in these industries is higher than in the economy overall, their weighting declined owing to sluggish growth in output, so the negative contribution of structural change in industry will mean that any lift in productivity in the economy overall will be insignificant. Rising labor productivity can be expected to continue contributing positively to overall productivity in wholesaling, finance and insurance. And because the weighting of the agriculture, forestry and marine and the retail industries in the total number of employed will fall, the factor of structural change can be expected to contribute positively to overall productivity.

In contrast, the weighting of health and nursing care in the total number of employed will rise, so these structural changes can be expected to lower productivity in the economy overall.
The third decade of this century will bring further strengthening of a trend in which the weight of high-productivity sectors falls in the Japanese economy as Japanese manufacturers shift production offshore while the weight of low-productivity sectors such as medical care and nursing increases as the Japanese population ages and the services economy advances. As a result, we expect that productivity for the economy as a whole will gradually decline.

Figure 3-5-3. Productivity Growth Rates by Industry (2016-2020)

3.5. Erosion of the Potential Growth Rate

Technological innovation and other factors will improve productivity in various industries, boost value added ratios and improve efficiency in the structure of industry, leading to higher total factor productivity in the economy as a whole. Productivity will rise as the capital stock increases. However, this increase in productivity can be seen as representing the portion attributable to increases in the capital stock per employee (the capital equipment ratio). In the present forecast, our projection for TFP assumes that the rate of increase in labor productivity will rise in the same way as the labor productivity growth rate for the overall economy as reckoned in section 3.2 above. In this context, we have taken account of the impact from falling productivity of production owing to rises in the price of energy.¹²

As a result, productivity in the various industries should continue to improve over the forecast period. However, as demand shifts to low-productivity non-manufacturing sectors, undermining the productivity growth rate for the overall economy through the Baumol effect, a labor force decline is expected. As a result, the potential growth rate, at 0.5% for the first half of the present decade, is likely to continue at 0.5% in the second half of the decade before falling gradually to 0.2% in the first half of the 2020s (Figure 3-6).

Figure 3-6. Potential Growth Rate by Factor Components

4. The Real Economy

4.1. Export Growth Rate to Fall as World Growth Slows and Production Moves Offshore

In the global economy, as already indicated, pressure on the U.S. growth rate from the fiscal cliff is becoming increasingly apparent while the Europeans are having to cope with the sovereign debt problem. As a result, we have revised down our outlook for world economic growth through the middle of the present decade. Even after that, the retirement of baby boomers will lower the labor force participation rate, bringing and expected erosion of the economic growth rate. Growth rates for the Chinese economy are also expected to be revised down as that country’s working age population starts to decline on the impact of China’s one-child policy. Added to these factors will be the continued shift by Japanese manufacturers of production offshore, leading to an expected erosion of the export growth rate, which we expect to be 2.3% for the first half of this decade, 3.2% for the second half and 1.8% for first half of the 2020s (Figure 4-1).
4.2. Stable Prices to Support Steady Rise in Employee Compensation and Consumption

A look at employment and income shows that, since the labor force is eroding, the unemployment rate will decline slowly and the number of employees will fall. And since per-employee compensation (wages) can not be expected to rise, employee compensation (in the aggregate) will continue to fall through the present decade, falling by one tenth of a percentage point in the first half and by three tenths of a percentage point in the second half the present decade before rising by one tenth of a percentage point in the first half of the 2020s (Figure 4-2). Meanwhile, a look at the outlook for the price level indicates that although the consumption tax will be raised and electricity rates will move higher on rising prices for imports such as fossil fuels and the switch to thermal power to replace nuclear, the GDP gap will remain negative, with the rate of increase in the price level overall remaining subdued\(^{13}\). Supported in this way by stable prices, consumption can be expected to increase firmly, or by 0.7 percentage points for the first half of the decade, 0.3 percentage points for the second half, and by 0.1 points for the first half of the 2020s.

However, every percentage point increase in the consumption tax is expected to cause consumers to roll forward demand by 0.2 of a percentage point in the case of private consumption and by 2.1 percentage points in the case of private residential consumption. Since this would be followed by a contraction in consumption, it raises the risk that growth in consumption could be zero in FY2014.

We expect housing investment to follow the decline of the population, rising 0.7 of a point in the first half of this decade before falling -0.9 of a point in the second half and -2.3 points in the first half of the 2020s.

\(^{13}\) GDP gap = (real GDP – potential GDP) / potential GDP x 100.
4.3. Corporate Earnings and Private Nonresidential Investment: Nominal Domestic Private Nonresidential Investment to Fall under Consumption of Fixed Capital

With the economy slowly recovering and no improvement in wages, the rise in operating rates and the reduction of debt has meant that net property income for business firms has been positive, helping to lift corporate earnings (Figure 4-3). Economic trends will be significantly influenced by how and to what extent business firms allocate the benefits of these positive business activities, whether for wages, to lower export prices, to pay dividends, to invest in facilities to invest abroad or put them to a diversity of other uses. If companies use them to pay wages and invest in facilities at home, consumption and other forms of domestic demand could be expected to grow, but if business firms use them to lower export prices or invest abroad, any rise in domestic demand would likely be weak.

Figure 4-3. Corporate Earnings

(Note) The operating ratio is that of the manufacturing industry.
(Source) Cabinet Office “National Accounts”
A look at how business firms allocate cash flow (income minus tax plus consumption of fixed capital) for purposes other than nonresidential fixed investment (Figure 4-4) shows that, until the first half of the 2000s, they gave first priority to repayment of debts. From and after the second half of that decade, they increased direct foreign investment and investment in foreign securities, while also boosting cash and savings. In contrast, dividends on a net basis have remained at about the same level as cash and savings.

Labor’s share of income had been rising with the dramatic deterioration of corporate earnings on the impact of the global financial crisis, but business earnings have improved, it has gradually fallen back (Figure 4-5).
Business firms have been holding nonresidential fixed investment within the bounds of consumption of fixed capital in nominal terms, lowering it that much further. As a result, companies continue to have a savings excess (Figure 4-6). Fixed nonresidential investment is expected to recover along with corporate earnings, but the overseas investment ratio will rise owing to several factors, including the expansion of overseas markets and the shrinkage of Japan’s domestic market as a share of the global market. As a result, there is unlikely to be any strong recovery in nonresidential fixed investment. Accordingly, we expect nonresidential fixed investment to rise by 1.6 percentage points in the first half of the decade, by 1.3 points in the second half and by 0.7 of a point in the first half of the 2020s.

Business firms are keeping capital expenditures below consumption of fixed capital, which indicates that they are only carrying out replacement investment for accounting purposes. In the case of replacement investment, there is no net increase in the capital stock. However, in the present forecast, we have estimated the amount of physical loss, and even if the nominal amount is unchanged, the quality of investment goods will improve. As a result, decline in the deflator for private nonresidential investment will cause the capital stock to rise in real terms.

Figure 4-6. Cash Flow and Domestic Investment

(Note)
1. Data covers private corporations.
2. Cash flow = Corporate income−corporate tax + consumption of fixed capital
3. Saving − Investment balance is adjusted with transfers from the special account.
(Source) Cabinet Office “System of National Accounts”
4.4. Overseas Direct Investment: Move Overseas Continues

Owing to slumping economic conditions at home with steady economic growth overseas between FY2000 through FY2009, overseas markets became more attractive and the foreign investment ratio rose\(^\text{14}\). Because this trend will increase in the future, the foreign investment ratio is expected to rise to 25.3% by FY2025 (versus 21.3% in FY2010), and Japanese companies will continue steadily moving manufacturing bases offshore (Figure 4-7).

Figure 4-7. Foreign Investment Ratio (Manufacturing Industry)

To compete internationally, it is important for Japanese companies and industries to maintain a balance in their production capabilities and innovative capacity by retaining a certain level of domestic production facilities in order to maintain technological prowess even as they move some production offshore. In this context, any effort to facilitate the flow of components and products across national borders would make it easier for Japan to retain at home production of those components and products at which Japan excels. To make that possible, it will be important to build an environment in which Japanese companies can construct new global supply chains. It will also be important in the context of the Trans-Pacific Strategic Economic Partnership Agreement (TPP) negotiations to create international rules governing trade,

\(^{14}\) Foreign investment ratio = foreign private nonresidential investment / (domestic private nonresidential investment + foreign private nonresidential investment) x 100.
investment and intellectual property according to a twenty-first century model as the international fragmentation of production proceeds\textsuperscript{15}.

4.5. GDP Gap, Unemployment Rate and Wages: Growth Rate To Fall in Line with Potential Growth Rate Once GDP Gap Resolves

Let us summarize three points. First, it will be possible to offset the decline in generation capacity associated with the abandonment of nuclear energy by a combination of energy conservation, greater use of renewables and increased thermal power generation. Second, even if the world growth rate is low, on the demand side we can expect growth on continued exports as well as consumption supported by price stability (Figure 4-8). Third, on the supply side, we can expect imports to grow after the GDP gap gradually narrows and resolves around 2020. As a result, we expect the growth rate from the 2020s and after to come in line with the potential growth rate at 1.0% in the first half of the present decade, 0.7% in the second half and 0.4% in the first half of the 2020s (Figure 4-9).

\textbf{Figure 4-8. Aggregate Real Demand Growth Rate and Components}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure4-8.png}
\caption{Aggregate Real Demand Growth Rate and Components (Real Terms)\textsuperscript{15} (Aggregate Demand=GDP+Imports, Average annual growth rate and contributions, %)}
\end{figure}

\begin{itemize}
\item Bubble collapse
\item Brief recovery
\item Financial crisis
\item Export-led recovery
\item Global Financial Crisis
\item Recovery from earthquake disaster
\item Search for balanced recovery
\item Trial continues
\end{itemize}

(Source) Cabinet Office “System of National Accounts”

\textsuperscript{15} While “twentieth century trade” centered on trade in goods across national borders, “twenty-first century trade” means conducting two-way transactions in goods, investment and services where production processes themselves extend over national borders as international fragmentation progresses. See Tetsuya Hattori and Kazumasa Iwata “Chapter 5: Rebuilding the International Trade Regime” in The Challenge from Emerging Nations (Tokyo: Nihon Keizai Shimbunsha, November, 2011). Also, if Japan fails to join the TPP once it is established, the impact on the Japanese economy is likely to be negative.
Because the work force will decline during the forecast period, the growth rate will gradually slow, but the real economic growth rate, which is most important from the perspective of the quality of life, will remain steady at 1.3% in the first half of the present decade, 1.2% in the second half and 1.0% in the first half of the 2020s (Figure 4-10).

Figure 4-10. Real GDP Growth Rate Per Capita

Having risen to 5.2% in FY2009 in the context of the economic slump following the global financial crisis, the unemployment rate is expected to slowly decline as the GDP gap narrows, falling from 4.0% in FY2015 to 3.8% in FY2020 and further to 3.6% in FY2025 (Figure 4-11). At the same time, per-capita employee compensation (wages) can be expected to remain basically flat through the end of the decade before gradually turning higher, rising 0.1 of a percentage point in the first and second halves of the present decade and by 0.7 of a percentage point in the first half of the 2020s (Figure 4-11).
5. Prices, Interest Rates and CO2 Emissions

5.1. Prices to Begin Rising after GDP Gap Closes

Because the consumption tax will be raised as the GDP gap narrows, the consumer price index (CPI, general index) is expected rise at the rate of 0.8% in the first half of the decade, at 0.5% in the second half (Figure 5-1)\(^6\). Prices as measured by the CPI (general index) would rise despite the persistence of the negative GDP gap because of expected increases in import prices, including those for fossil fuels, and in electricity rates. The rate of increase in prices as gauged by the core-core CPI (the general index excluding food and energy) will be no more than 0.1% for the first half of the present decade and 0.2% for the second half even with the expected increase in the consumption tax rate.

After the GDP gap disappears around 2020, it will no longer be possible to supply rising demand from domestic supply, so the CPI (general index) is expected to rise to 1.1% in the first half of the 2020s.

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\(^6\) Without the impact of the consumption tax hike, the CPI growth rate would be lifted by an additional 2.3 percentage points in FY2014, 0.8 of a point in FY2015 and 0.7 of a point in FY2016.
5.2. Nominal Demand: Nominal Growth Limited if Impact of Consumption Tax Hike Excluded

The consumption tax will be raised in the present decade, but since the GDP gap will remain subdued, the GDP deflator growth rate will continue negative. As a result, the nominal growth rate for the present decade will be basically unchanged, or 0.4% in the first half of the decade and 0.2% in the second half (Figure 5-2). Prices will begin rising in the 2020s, but since the real growth rate will fall, the nominal growth rate will remain flat. As a result, nominal GDP will not exceed its most recent peak of ¥513 trillion posted in FY2007.

The growth rate of national income (ignoring indirect taxes and depletion) will be basically unchanged in the first half of the decade, 0.1% in the second half of the decade and again unchanged in the first half of the 2020s.
5.3. Interest Rates

Projecting short term interest rates under the assumption that monetary policy will be conducted based on the Taylor rule, we expect the decline in prices to continue, with the Bank of Japan not departing from the zero interest rate policy until FY2020 at the earliest (Figure 5-4).
The rate of increase in prices as gauged by the core-core CPI remains negative, and business firms have little interest in borrowing. Thus, the long-term interest rate in the first half of this decade will remain low (1.1% in FY2015). Since prices will begin rising around 2020, the long-term interest rate will likely begin rising too, reaching 1.3% in FY2020 (Figure 5-5).

It is expected that the basic environment affecting the long-term interest rate will continue into the 2020s, but in the first half of that decade, the balance of national and local government debt is expected to surpass the net financial assets of households, so there is some risk of a sudden rise in interest rates. We consider this point below.
5.4 Fossil Fuel Imports and CO2 Emissions: Set to Rise on Higher Fossil Fuel Prices and Increased Thermal Power Generation

The decline in electric power output owing to denuclearization cannot be offset merely by energy conservation and increased output though greater use of renewable energy. As a result, (nominal) imports of fossil fuels and CO2 emissions will increase on higher fossil fuel prices and the shift to thermal power generation. The increase from FY1990 levels will be 8.2% in FY2015, 11.8% in FY2020, and 13.9% in FY2025 (Figures 5-6 and 5-7).

If Japan is to achieve the greenhouse gas reduction target pledged to the international community, Japan will have no choice but to raise environmental taxes to promote greater energy conservation or to engage in international trading of CO2 emission credits17.

Figure 5-6. Nominal Imports of Fossil Fuels

Figure 5-7. CO2 Emissions

17 Our estimates factor in two facets of the issue, namely (1) increases in energy consumption with the expansion of economic activity (GDP), and (2) conservation resulting higher crude oil prices. The introduction of new forms of energy is incorporated as a factor in our estimates to some extent, but we have not accounted for any impact that higher environmental taxes and CO2 emissions credit trading might have in holding down CO2 emissions.
6. Current Account Balance, Government Finances, IS Balance

6.1 Current Account Balance and Currency Rates: Deficit to Expand after GDP Gap Resolves

With the Great East Japan Earthquake, Japan began running a deficit in its trade and services balance, and the margin of this deficit will expand as manufacturers continue moving production overseas, as fossil fuel and other import prices rise, and as reliance on thermal power generation rises (Figure 6-1-1). After the GDP gap resolves around 2020, moreover, imports of manufactured products will rise because domestic supply capacity will no longer be able to meet rising demand. Looking at balances by industry, surpluses will continue in the general machinery and automobile sectors, widening deficits will be seen in consumer electronics, and sectors such as semiconductors and electronic components will also begin running deficits (Figure 6-1-2).

Figure 6-1-1. Trade Balance by Industry

<table>
<thead>
<tr>
<th>Year</th>
<th>Others</th>
<th>Transport</th>
<th>Wholesale trade</th>
<th>Precision instruments</th>
<th>Automobiles</th>
<th>General machinery</th>
<th>Non-ferrous metals</th>
<th>Petroleum/coal products</th>
<th>Chemicals</th>
<th>Pulp/paper/wooden products</th>
<th>Textiles</th>
<th>Foods</th>
<th>Coal/crude oil/natural gas</th>
<th>Mining</th>
<th>Total</th>
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<tbody>
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<td>2005</td>
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</table>

(Sources) Ministry of Internal Affairs and Communications "1995, 2000, 2005 Link Input–Output Tables", Ministry of Economy, Trade and Industry "2010 Updated Input–Output Tables"

Figure 6-1-2. Trade Balance of Major Industries

<table>
<thead>
<tr>
<th>Year</th>
<th>General machinery</th>
<th>Automobiles</th>
<th>Household electric appliances</th>
<th>Semiconductors/Electronic devices</th>
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<tbody>
<tr>
<td>2005</td>
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(Sources) Ministry of Internal Affairs and Communications "1995, 2000, 2005 Link Input–Output Tables", Ministry of Economy, Trade and Industry "2010 Updated Input–Output Tables"
As a result, Japan’s surplus balance on income will continue, but the current account surplus will gradually narrow, and Japan will begin running a deficit around 2020. The deficit margin will then expand as imports increase in response to diminished supply side capacity. We expect Japan’s current account balance as a percent of nominal GDP to be 1.2% in FY2015, 0.4% in FY2020, and -3.0% in FY2025 (Figure 6-1-3). Japan will begin running a deficit in its current account all the sooner owing to many factors, including the decline in domestic savings as the population erodes and ages, the shift of manufacturing offshore, higher fossil fuel prices, and increased fossil fuel imports to supply thermal generation replacing nuclear.

![Figure 6-1-3. Balance in Trade and Services, Current Account](image)

During the forecast period, the terms of trade will continue to worsen owing to rising prices of imports, mainly raw materials, and falling prices of exports, mainly manufacturing goods (Figure 6-2).

![Figure 6-2. Terms of Trade](image)

(Note) Terms of trade index = Export deflator/Import deflator x 100
(Source) Cabinet Office "System of National Accounts"
Box 1. Simulation: If Fossil Fuels Prices Rise at Slower Pace

Currently, efforts are underway mainly in the U.S. to develop shale gas. This fuel could help ease the increase in the price of fossil fuels. If so, how long could it help Japan maintain a current account surplus? In order to examine the impact of rising fossil fuel prices on Japan’s current account balance, we have constructed an “optimistic scenario” under which the West Texas Intermediate crude oil price after 2014 rises at half the pace projected under our standard scenario (Box Figure 1).

We find that, given an optimistic scenario under which the WTI crude oil price is $122.40 per barrel in 2020 and $141.70 per barrel in 2025, Japan would begin running a current account deficit in 2023, or two years later. It should be noted, however, that some observers remain cautious about just how the development of shale gas will affect Japan’s fossil fuel import prices18.

Box Figure 1. If Fossil Fuels Prices Rise at Slower Pace

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18 The United States is the world’s largest natural gas consumer, and the quantity of LNG which the U.S. will be able to export in 2030 may be limited. When natural gas is imported in the form of LNG, costs for liquefaction and transportation can be burdensome. Caution is therefore necessary before any assumption is made that shale gas will dramatically lower Japan’s energy costs. (“The Present Status and Future Prospects of Shale Gas Oil: Considering the Impact on Japan,” Terukuni Isokawa, 2012, Mizuho Industry Focus Vol. 117, Industry Research Division, Mizuho Corporate Bank, December 13, 2012.)
Box 2. Simulation: Aggressive Fiscal and Monetary Policy

The Japanese government aims to pull out of the long-standing strong-yen/deflation slump and expand employment and income through a “Three Arrows” growth strategy aimed at achieving economic revival through aggressive monetary policy, flexible fiscal policy and stimulating private investment.

The question is what impact these policies can be expected to produce for the Japanese economy and the price level. To examine this impact, we have constructed an “aggressive scenario” under which a bold monetary policy and a flexible fiscal policy continue from and after 2014 and considered how the impact might differ from our standard scenario. Specifically, we have considered the impact on the rate of increase in the price level, the real growth rate, the long-term interest rate, the national and local primary balances (as percentages of GDP), the debt balance (as a percent of GDP) and the current account balance. We assume that public fixed capital formation increases by ¥5 trillion more than that under the standard scenario and, thanks to effective monetary policy, the dollar-yen rate remains at ¥95, with stock prices on the Nikkei rising to around 13,000 (Box Figure 2).

We find that public sector fixed capital formation and higher exports on the subdued yen would boost the real growth rate. Excess demand would lead to a rise in price levels, however, wages would not increase much and consumption would remain weak so long as the unemployment rate remained between 3.6% and 3.9%. As a result, these actions by themselves would still require some time to lift the consumer price index to 2% (ignoring the consumption tax). The long-term interest rate would also increase along with the rise in prices, reaching 2.1% in 2020. Tax revenues would increase as household and business income rose, but government spending would also grow. As a result, the national and local primary balances (as shares of GDP) and government debt (as a share of GDP) would end up at about the same levels as under the standard scenario. On the other hand, although exports would increase, the trade deficit would expand since imports would also increase owing to a higher real growth rate and a rise in prices of yen-based imports. All of these factors would work to move the current account balance toward a deficit.

In order to lift the price level, the GDP gap must be narrowed further. Thus, greater consumption should be encouraged by distributing the benefits of economic growth in the form of wages. Private nonresidential fixed investment should also be stimulated through a bold growth strategy incorporation deregulation and participation in the TPP.

6.2. Fiscal Balance: Deficit Primary Balance to Persist

Along with the consumption tax hike, tax revenues will steadily rise as the economy recovers. As a result, the negative margin in the national and local primary balances as a share of GDP will narrow. However, a surplus will not be achieved merely by raising the consumption tax rate to 10%. In the 2020s, baby boomers will be reaching the age of seventy-five or more, so social security spending, including that on health and nursing care for the elderly, will continue rising. The nominal growth rate will fail to gain ground owing to deflation, nor will tax revenues improve. As a result, the margin of the deficit will once again grow, reaching -3.4% in FY2020 and -4.9% in FY2025 (Figures 6-3-1, 6-3-2).

The rate of increase in the debt to GDP ratio may slow somewhat as interest rates are kept low and the consumption tax rate is raised. But since the primary balance will remain in the red, the debt to GDP ratio will continue growing, reaching 206.8% by the end of FY2015, 233.4% by the end of FY2020 and 268.8% by the end of FY2025.

Figure 6-3-1. Government Expenditure and Tax Revenues

(Source) Cabinet Office "System of National Accounts"
6.3. Household Savings Rate to Fall and Turn Negative

Household income will be supported by social security benefits (pension), but any major increase in employee compensation, which comprises a large part of household income, is unlikely. On the other hand, despite the increase in the consumption tax rate, the consumer price index will remain low, so consumption will steadily increase. As a result, the household saving rate will decline and turn negative, falling to -3.1% in FY2015, -5.6% in FY2020 and -9.0% in FY2025 (Figure 6-4).

On a flow basis, corporations will maintain a surplus but the general government will continue running a deficit. A closer look at the general government shows that social security funds will remain in the red owing to sluggish investment return (Figure 6-5).

As the household saving rate declines, the household SI balance will move into the red around 2015. Also, since the nation will have a current account deficit by around 2020, the SI balance of the rest of the world will then have a surplus. The same investment activities do not give corporations an investment excess (a deficit their current account balance) when they invest earnings overseas.

This situation means that, as domestic savings wane, Japan will have to finance its current account deficit from abroad. Close watch should therefore be kept to monitor any growth in the margin of the deficit in the trade and services balance, which entered the red in 2011, as well as the timing when the household savings rate, which is already declining, turns negative.

![Figure 6-5. Savings-Investment Balance (Flow)](https://example.com/image.png)

Looking at the above from a stock perspective, net household assets will gradually decline (Figure 6-6). Businesses are continuing to reduce debt, and they appear to have more surplus capital resources than in the 2000s. As for the rest of the world, rising net liabilities (rising external net assets) will turn down with the appearance of a current account deficit. The growth of net assets in business sector and the increase of net liabilities for the rest of the world that underlies it are indicative of the trend in which businesses are attempting to shift production bases offshore through direct investment.
The government debt will continue to be financed from Japanese household savings during the present decade. However, since increasing the consumption tax rate to 10% will not be sufficient to create a surplus in the primary balance, the debt to GDP ratio for the national and local governments will continue to increase. It is projected to surpass the net financial assets of Japanese households in the early 2020s. This means that Japan will have to rely on foreign borrowings to make up the difference. In BOX 3 we consider the risk of this situation leading to a sharp increase in interest rates.

Figure 6-6. Savings-Investment Balance (Stock)

Though the cost of credit default swaps (CDS) on Japanese debt had been rising until early 2012, it started to fall in response to the expected consumption tax increase (Figure 6-7). The cost of CDS on Japanese debt is thus a barometer of the views of foreign investors toward Japan’s fiscal condition. If Japan ends up having to cover its current account deficit with foreign borrowings, the nominal interest rate will be more likely to reflect the views of foreign investors. As a result, this trend should be watched carefully.

Box 3. Simulation: Sovereign Debt Crisis

—Foreign investors holding the country's government bonds will begin to find it necessary to sell their holdings in response to the nation's government debt coming to exceed its domestic financial assets

Japan is saddled with the world's largest public debt, but so far shows no signs of a sovereign debt crisis, with long-term interest rates remaining stable at low levels. This is because Japan's debt has long been financed mostly by the nation's abundant household assets deposited at financial institutions which use them to buy government bonds. This makes Japan very different from Greece and Spain which are also debt-ridden but not flush enough to buy up their own national debt. But if Japan's national debt is to continue to balloon, it will eventually exceed domestic investors' capacity to absorb additional debt and Japan may follow in the footsteps of the Southern European countries. The question then turns to what extent the government bond yield will go up.

Box Figure 3-1. Government debt and Private sector financial assets: Japan, Greece and Spain

Note: Private Sector Financial Assets = The sum of household (and Nonprofit organizations) financial assets less equity holdings and cash and deposits held by corporations.

Sources: OECD, IMF
We use an indicator called "domestic assets surplus" to measure the domestic market's capacity to buy government bonds. The surplus shows how much outstanding financial wealth held by the household and private sectors surpass the government debt. Based on the assumption that investors will begin demanding sovereign debt risk premium when the indicator's reading falls below a certain level, we estimated coefficients correlated with long-term interest rates, using a methodology called threshold regression with panel data covering 25 countries.

Our studies show that when the surplus dips below 105% of GDP, the coefficients of long-term interest rates to public debt become significantly larger (, meaning that debt will have a far greater impact on yields). Given Japan's sizable debt, the 10-year yields will reach 10% once investors become aware of sovereign default risk. At that time, 20% to 30% of Japan's debt will be owned by overseas investors. The surplus is expected to fall below 105% of GDP in 2018 in a pessimistic scenario, and in 2028 in an optimistic scenario. The optimistic scenario represents the government's cautious scenario. Fiscal outlook built on the premises that Japan will achieve high nominal GDP growth rate will blunt our crisis mentality. Even if the pessimistic scenario prevails, Japan will be able to dodge fiscal crisis by raising consumption tax rate 2% every year between fiscal 2016 and 2020, because that will enable Japan's market to maintain its ability to finance national debt. The government has decided to double the tax rate to 10% in 2015. We now need to discuss further steps we can take after that year to ward off a sovereign debt crisis.

Box Figure 3-2. Long-term interest rate and Government Debt

<Pessimistic scenario> <Optimistic scenario>

<table>
<thead>
<tr>
<th>Year</th>
<th>Sovereign debt risk premium ceiling</th>
<th>Sovereign debt risk premium ceiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>0% GDP</td>
<td>0% GDP</td>
</tr>
<tr>
<td>1995</td>
<td>2% GDP</td>
<td>2% GDP</td>
</tr>
<tr>
<td>2000</td>
<td>4% GDP</td>
<td>4% GDP</td>
</tr>
<tr>
<td>2005</td>
<td>6% GDP</td>
<td>6% GDP</td>
</tr>
<tr>
<td>2010</td>
<td>8% GDP</td>
<td>8% GDP</td>
</tr>
<tr>
<td>2015</td>
<td>10% GDP</td>
<td>10% GDP</td>
</tr>
<tr>
<td>2020</td>
<td>12% GDP</td>
<td>12% GDP</td>
</tr>
<tr>
<td>2025</td>
<td>14% GDP</td>
<td>14% GDP</td>
</tr>
<tr>
<td>2028</td>
<td>16% GDP</td>
<td>16% GDP</td>
</tr>
</tbody>
</table>
7. Economic Conditions in the Early 2020s: Challenges Continue

The following figure sums up the economic conditions described above.

![Figure 7. A Comparison of Japan in the 2010s and Early 2020s](http://www.jcer.or.jp/)

<table>
<thead>
<tr>
<th></th>
<th>2010s</th>
<th>Early 2020s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population aging rate (% aged 65+)</td>
<td>23.0% (2010), 26.8% (2015)</td>
<td>30.4% (2025)</td>
</tr>
<tr>
<td>Potential GDP growth rate (Avg.)</td>
<td>0.6%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Real GDP growth rate (Avg.)</td>
<td>0.9%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Per capita real GDP growth rate (Avg.)</td>
<td>1.2%</td>
<td>1.0%</td>
</tr>
<tr>
<td>CPI growth rate (Avg.)</td>
<td>0.6%</td>
<td>1.10%</td>
</tr>
<tr>
<td>Imports (% of Real GDP)</td>
<td>13.0% (2010), 14.3% (2015)</td>
<td>16.3% (2025)</td>
</tr>
<tr>
<td>Current account (% of Nominal GDP)</td>
<td>3.5% (2010), 1.2% (2015)</td>
<td>-3.0% (2025)</td>
</tr>
<tr>
<td>Primary balance (% of Nominal GDP)</td>
<td>-6.6% (2010), -3.5% (2015)</td>
<td>-4.9% (2025)</td>
</tr>
<tr>
<td>CO2 Emission (compared to 1990FY)</td>
<td>6.1% (2010), 8.2% (2015)</td>
<td>13.9% (2025)</td>
</tr>
</tbody>
</table>

The Japanese population of around 128 million in 2010 will decline to around 120 million by 2025, and the aging of Japanese society will progress such that the elderly ratio will rise to 30.4%, in which case one out of 3.3 people will be a senior. In conjunction with this trend, the number of employees in the health and nursing care industries, which was 7.05 million in 2010, will increase to 10.11 million in 2025. One out of six people are expected to be working in the health and nursing care sectors. The number of people engaged in the manufacturing sector, however, will decline from 9.21 million to 7.25 million.

A per-capita real economic growth rate of 1.0% will be maintained through the first half of the 2020s. But as the work force erodes, the real economic growth rate will fall from 0.9% in the present decade to 0.4%. Since the GDP gap will resolve around 2020, prices will start to rise, and imports will increase. Along with the rise in prices, interest rates will start to rise. Denuclearization will be underway, but since it will be impossible to offset the resulting decline in power generation merely with a 10% energy saving (over thirty years) and greater use of renewable energy, fossil fuel imports to fuel thermal power generation will continue to increase, as will CO2 emissions.

In addition to shift of manufacturing overseas and the increase in imports, the rise in fossil fuel prices and the increase of fossil fuel imports for thermal power generation to replace nuclear will serve to widen the margin of the deficit in the trade and services balance. Around 2020, the deficit will surpass the surplus in the income balance, and
Japan will likely begin running a current account deficit. The deficit in the primary balance will narrow in response to the increase in the consumption tax to 10%, but this will be insufficient to move it into surplus again. The deficit will start to expand again as social security expenditures continue increasing along with the growth of the aged population.

Thus, Japanese economy risks running a “twin deficit” in the early 2020s with deficits in the fiscal balance and the current account balance. If this comes to pass, the combined national and local government debts will likely exceed the net financial assets of Japanese households in the first half of the 2020s. Japan will then have to borrow from overseas to make up the balance. If overseas investors demand high financial risk premiums appropriate to the size of Japan’s government debt, interest rates could rise sharply, and Japan could face a fiscal crisis.

Since Japan will reach this impasse owing mainly to the erosion of the population and the aging of society, the population decline must be arrested. Even if the population decline can be halted, the labor force will not increase right away, and the aged population will continue to grow. With the population declining and the aged population growing, minimizing the adverse impact will require higher per capita growth and an improvement in the government’s financial position.

8. Overcoming the Challenges

① In order to deal with global competition, Japan’s competitors are making aggressive use of economic integration and economic partnership agreements (EPA) to smoothly fragment production operations across national borders. They move manufacturing operations offshore when it is advantageous to do so and then import (intermediate and final) products back, and they retain at home other operations when it is best to do so and then export finished products, responding in this way to global competition. For example, Germany’s terms of trade have not worsened to the extent that Japan’s have because Germany has adopted this strategy (Figure 8-1).

Japan, on the other hand, sets high barriers for international business transactions, which makes difficult for businesses to shift a portion of their manufacturing operations overseas (Figure 8-2). As a result, businesses have only two options to choose from. They can keep all their production operations at home, including those in which they have superior talents. Alternatively, they can shift all of their operations overseas, which leads to hollowing out of Japanese industry. Either of these options imposes a potential risk to the future of Japan. However, Japanese companies can not effectively compete if they are forced to maintain all their operations within Japan. On the other hand, if they shift everything overseas, they can not make use of Japan’s technological strength and are not in a position to create jobs in Japan.
It is important that Japan aggressively pursue TPP and EPA strategies, which will make it easier for Japanese companies to fragment their operations across national borders, thereby providing an environment in which Japan’s manufacturing sector, the most profitable, is able to compete globally without having to completely leave Japan.

② In order to level the playing field with foreign competitors, Japan needs to lower its corporate income tax, which is higher compared to other nations. If the government restricts favorable taxation rates to the manufacturing sector, which faces foreign competition, the fiscal impact would be minimal. A way should be found to substantially lower the corporate income tax for the manufacturing industry in real terms while adhering to international rules.

③ As Japanese society ages and services account for a greater share of the economy, the health and nursing care sectors will inevitably expand. It will therefore be important to hold down the number of workers needed in the health and nursing
care sectors by making aggressive use of IT and robotics technology, thereby arresting the sharp decline in the number of workers in other sectors. The expansion of demand in the health and nursing care sectors affords an opportunity to apply Japan’s technological prowess to the medical equipment industry. In addition to promoting the participation of women and seniors in the labor force, recruitment of desirable foreign experts should also be seriously considered.

Figure 8-3. How Measures in the Health/Nursing Care Sector can Affect the Productivity of the Overall Economy

<table>
<thead>
<tr>
<th>Case</th>
<th>Measures</th>
<th>Productivity of Overall Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maintaining the status quo</td>
<td>Due to increased weight placed on the health/nursing care sector, the overall productivity growth rate will become lower than in the past.</td>
</tr>
<tr>
<td>2</td>
<td>Development of IT/robot technology</td>
<td>Productivity will increase in the health/nursing care field. Moreover, the overall productivity growth rate will become higher than in the past, because the shift in workers of high productivity sectors will not occur.</td>
</tr>
<tr>
<td>3</td>
<td>Participation of women/elderly in the labor market, acceptance of foreign workers</td>
<td>Due to the increased weight placed on the health/nursing care sector, the productivity growth rate will become lower than in the past. However, since the shift in workers of high productivity sectors will not occur, productivity will not fall by as much as in case 1. The growth rate will increase due to the increase in the labor force.</td>
</tr>
<tr>
<td>4</td>
<td>Increased demand untended with</td>
<td>The overall productivity growth rate will remain unchanged.</td>
</tr>
</tbody>
</table>

④ Energy conservation efforts are well underway. Further creative efforts could yield additional energy conservation of 10%. In addition, aggressive use of renewable forms of energy could make it possible to minimize the increase in fossil fuel imports and CO2 emissions that will result from the increase in thermal power generation to offset the loss of nuclear power.

⑤ As for government finances, further reconsideration and reforms are necessary in both revenues and expenditures, which include consumption tax increases and social security spending. Also, boosting the environmental tax would serve the additional purpose of encouraging energy conservation. Raising the tax should therefore be considered, with due care also being taken to avoid harming the competitiveness of Japan’s manufacturing industry.