

## Sayuri Shirai: Have demographic changes affected Japan's macroeconomic performance? Some implications for monetary policy

Speech by Ms Sayuri Shirai, Member of the Policy Board of the Bank of Japan, given at the Bank of Finland, Helsinki, at the Sveriges Riksbank and at the Stockholm University, Stockholm, 3–7 September 2012.

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### I. Introduction

Hello everyone. My name is Sayuri Shirai, and I am a Policy Board member of the Bank of Japan. I am delighted to be giving a talk today on the theme of demographic changes and their impact on macroeconomic performance with some implications for monetary policy. I feel that it is important to be addressing you and exchange views with you about this issue here in Europe, especially in the Nordic countries, for two main reasons.

First, after having undergone a process of rapid industrialization, many European countries encountered a rapid decline in their fertility rates, beginning in the second half of the nineteenth century. This promoted active debate on population-related issues in Europe, including those related to neo-Malthusianism and the conservative view of encouraging both a traditional family style and childbirth. By the 1930s, Sweden was faced with the lowest fertility rate in Europe. The Swedish Nobel Laureate Karl Gunnar Myrdal was concerned about the consequence of this declining rate – namely, an eventual decrease in the total population and its medium- to long-term impact on macroeconomic performance, such as a decline in investment and living standards, a rise in unemployment, and the prevalence of poverty. In his influential book *Crisis in the Population Question* (*Kris i Befolkningsfrågan*) which he published together with his wife Alva Myrdal in 1934, and in a number of other associated papers, he stressed the importance of social policies to reverse the declining trend in the fertility rate and promoted the concept of socialization of consumption related to childbirth and childcare, while respecting women's choices in this matter. These policies included free services to all child-bearing households, and would be financed by a progressive income tax system. This idea of using social policies to mitigate any negative externalities caused by depopulation contributed to the creation of the contemporary Swedish welfare model. Today, the Nordic countries, including Sweden and Finland, are famed for their distinguished universal, comprehensive social welfare systems, which have generated some successful outcomes, such as the maintenance of reasonably high total fertility rates (TFRs),<sup>1</sup> high levels of human capital, and high labor participation ratios for women.

Second, the *2012 Ageing Report* published by the European Commission provides long-term macroeconomic and budgetary projections for the period of 2010-60, and it stresses the challenges posed by population ageing. Assuming that the TFR in the European Union (EU) will moderately increase from the current rate of 1.59 to 1.64 by 2030 and further to 1.71 by 2060, and assuming that net migration inflows as a percentage of the total population remain at about 0.2 percent throughout the 2010-60 period, the report projects that the total population will decline only after 2040. However, the size of the working-age population (aged 15 to 64 years old) is projected to decline after 2012.

The simple fact is that both Japan and Europe are facing a common structural issue – population ageing. Japan is taking the lead with demographic and associated macroeconomic issues. It is widely known that Japan has already witnessed a reduction in its

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<sup>1</sup> The TFR refers to the number of children that would be born to a woman if she were to live to the end of her child-bearing years and bear children in accordance with current age-specific fertility rates.

working-age population in absolute numbers since the mid-1990s. About a decade after this time, the total population declined in 2005 and 2009, and it is projected to decrease constantly from 2011 onward. As a result, Japan has become the most progressed ageing society: the share of the population aged 65 and over was 23 percent in 2010 – the highest level in the world. The rapid pace of decreases in the growth rate of the working-age population and total population appears to be unprecedented globally. This has certainly generated various unfavorable impacts on Japan's macroeconomic performance, thereby also affecting the environment related to monetary policy management.

Given that Japan and Europe face similar phenomena (i.e., increases in life expectancy and the relative size of their elderly populations), it is necessary to deepen our understanding of the impact of demographic changes on macroeconomic performance and possibly also about the environment surrounding monetary policy management. However, these issues are not yet being actively debated among central banks around the world.

Let me outline the sequence of my presentation. It comprises four sections. In Part II, I will briefly examine demographic changes in Japan in the post-1945 period. Part III will focus on the impacts of these changes on macroeconomic performance. Then, the issues of the long-standing output gap and mild deflation, which are partially influenced by demographic changes, will be discussed in Part IV together with monetary policy management. In Part V, I will present concluding remarks.

## **II. Demographic changes in the post-1945 period**

I would like to begin my presentation by making an overview of Japan's demographic changes in the post-1945 period.

### ***Rapidly reduced fertility rate and working-age population***

In the aftermath of World War II, Japan enjoyed a period of so-called “population dividend,” which helped produce higher economic growth. This refers to a period when the total dependency ratio (defined as the youth and elderly population over the working-age population) decreases drastically with a decline in the number of children. In Japan, the total population rose rapidly in the second half of the 1940s with the first postwar baby boom in 1947–49; this was followed by the second-generation baby boom in 1971–74 (Chart 1). This trend helped Japan become one of the most populous nations globally – with a total population of 128 million in 2011, or the 10th-largest country by population size as of 2010. Starting with a very high TFR at around 4 in the late 1940s, the TFR dropped to around 2 – a rate much lower than before but still close to the replacement rate (the rate enabling natural population growth) – by 1958. Thereafter, the TFR remained at a still high level of 2 or above (Chart 2). During that period, Japan enjoyed a growing working-age population.

Since then, the situation has changed dramatically. First, the number of childbirths started to show a constant decline after the second-generation baby boom in the 1970s. In parallel, the TFR began to decrease sharply from over 2 in the 1970s to 1.39 in 2011 – notwithstanding that a moderate recovery in the TFR is currently in progress. The declining trend could be attributed to such factors as rising income, a growing focus on work and education among women, the rising cost of child care and education, the decreasing size of families, and a growing number of unmarried people (resulting in a smaller number of children given that few unmarried couples in Japan have children). Second, about 20 years after the decline in the TFR, a decrease in the working-age population occurred. The size of the working-age population started showing a clear decrease from the mid-1990s.

According to official projections, the total population will decline from the current level of 127.8 million to 120 million by 2026, to under 100 million by 2048, and further to 86.7 million by 2060. The working-age population is projected to decrease more drastically – from the current level of 81.3 million to 44.2 million by 2060.

### ***Emergence of the most progressed ageing society***

One of the most structurally important challenges for Japan is dealing with the progressive ageing of the population. The pace of ageing accelerated as life expectancy at birth increased rapidly from 50.1 years in 1947 to 79.6 years in 2010 for men, and from 54.0 years to 86.4 years, respectively, for women. This has put Japan among the nations with the highest longevity in the world (Chart 3). This could be the consequence of such factors as medical advancements, higher living standards, universal public health insurance, and elderly care systems. As a result, the ratio of the population aged 65 and over to the total population rose steadily from just 4.8 percent in 1947 to about 23 percent in 2010. This percentage is the highest in the world, being followed by that of Germany (20.6 percent) and Italy (20.3 percent). The pace of increase in the elderly ratio accelerated after the 2000s.

Reflecting expected increases in life expectancy over the period of 2010–60 (from 79.6 to 84.2 years for men; from 86.4 to 90.9 years for women), the proportion of the elderly population is officially projected to grow further to 25 percent in 2013. Thus, elderly people will comprise one-fourth of the total population. According to projections, this proportion will reach 33.4 percent by 2035, giving rise to a society in which one in three people will be elderly. This ratio is projected to rise to about 40 percent by 2050. By this time, the population aged 75 years and older will account for a quarter of the total population.

### **III. Demographic changes and macroeconomic performance**

Having outlined trends in Japan's demographic changes, I would now like to move to Part III of this presentation and show some impacts of demographic changes on the Japanese macro-economy. Though a large number of studies have investigated the supply side (i.e., the impact on potential economic growth), shedding light on the demand side is equally important.

#### ***Impact of demographic changes on economic growth***

Japan achieved high real GDP growth of 10.4 percent in the 1960s, which enabled it to catch up with a number of advanced countries. This period was followed by moderately high-growth rates of 5 percent in the 1970s and then 4.3 percent in the 1980s. Following the collapse of bubbles in real estate and stock prices in the early 1990s, however, Japan entered a prolonged period of low economic growth. Real GDP growth rates dropped to 1.5 percent in the 1990s and further to 0.6 percent in the 2000s (Chart 4 [1]).

First, the impact of population developments on economic growth can be observed by decomposing the real GDP growth rate into (a) the population growth rate and (b) the per capita real GDP growth rate. Chart 4 (2) shows that population growth made a positive contribution until the 1990s, even though the scale of that contribution dropped in the 1980s and 1990s. The positive contribution virtually disappeared in the 2000s.

Second, the impact of population ageing on economic growth can be traced by decomposing the real GDP growth rate into (c) the growth rate of the number of employed workers (or the growth rate of employment) and (d) the real GDP growth rate per employed worker. Population ageing tends to reduce both the size of the working-age population and the labor participation rate for the whole economy, thereby reducing total employment. Chart 4 (3) indicates that the contribution of employment to economic growth turned from positive to negative in the 2000s.

Third, the labor market has transformed drastically over the same period, and this has contributed to a decline in the total number of working hours. The number of part-time and non-regular workers has increased relative to that of regular workers, reflecting the increasing rate of female labor participation. In addition, the number of hours worked per regular worker has decreased in accordance with global trends and the growing sophistication of society. Although these developments have no direct links with

demographic changes, the increasing number of female and elderly workers is likely to reduce the total hours worked for the whole economy. Thus, it may be useful to examine the impact of working hours on economic growth. This can be achieved by decomposing the real GDP growth rate into (e) the growth rate of hours worked and (f) the real GDP growth rate per hour (or the growth rate of labor productivity per hour). Chart 4 (4) reveals that a decrease in hours worked after the 1990s contributed negatively to economic growth.

Charts 4 (2)–(4) indicate that both demographic and labor market changes have contributed directly to a declining trend in economic growth (these changes are referred to as the population effect, the labor force effect, and working hour effect). At the same time, the per capita, per worker, and per hour growth effects shown in the same charts all revealed declining trends over the same period. The per capita real GDP growth rate is a good proxy for measuring the average living standard of a country. The growth rate per employed worker is a useful indicator related to labor productivity or supply capacity. The growth rate per hour is valuable when one wants to see the impact of changes in hours worked. In the future, this hourly based indicator may become even more important in measuring a country's efficiency; this is because further efforts to raise the labor participation rates for women and elderly people – in addition to a decline in the absolute number of full-time workers – are expected to reduce the total number of hours worked in the whole economy.

Generally speaking, the per capita GDP growth rate tends to become lower than the real GDP growth per employed worker when the working-age population declines or the population ages. In any case, the overall declining trends based on the three indicators could be explained by (a) a decline in the TFP growth rate (which could be explained by, for example, a completion of the catching-up process and a shift in the industrial structure as will be described later) and (b) a decrease in the growth rate of capital stock. Nonetheless, it is important to note that Japan's real GDP growth rate per hour has been comparable to those of the United States and the United Kingdom, and it has been higher than those of Germany and France (Chart 5). At the same time, this implies that Japan needs to raise the per hour growth rate to a level far higher than those of other advanced countries just to maintain the same per capita economic growth rates.

### ***Impact of demographic changes on fixed asset investment demand***

The declining working-age population and ageing population may contribute to sluggish demand for residential housing and fixed-asset investment. In this regard, Dr. Myrdal already thought through the impact of these factors in his 1940 book *Population: A Problem for Democracy*. According to him, a decrease in the population is expected to produce a negative impact on (aggregate) demand, particularly investment (Fujita [2010]). The growth rates of demand are projected to decline mainly because of (a) an increase in investment-related risk (or the heightened possibility of causing over-supply and associated loss) for firms as well as (b) a decrease in investment incentive (for example, a decline in new residential investment owing to a reduction in the working-age population and a drop in replacement demand due to falling housing prices).

The impact of demographic changes on housing investment was also pointed out by Bakshi and Chen (1994). According to their life-cycle investment hypothesis, investors in their 20s and 30s enter the family-building stage, and so housing becomes a desirable investment. During this period, a higher portion of their wealth is allocated to housing and other durable goods. As investors grow older, the demand for housing will stabilize or decrease; instead, the demand for financial assets will rise. This hypothesis was demonstrated to be applicable to the United States, and it implies that an ageing population is associated with declining housing prices. Mankiw and Weil (1989) also showed that the baby-boom generation contributed to the U.S. housing boom in the 1970s.

I believe that some of the impacts discussed by Dr. Myrdal and other researchers are already being felt in Japan. During the bubble period in the second half of the 1980s, for example, the growing size of the working-age population stimulated residential investment demand.

Chart 6 shows a clear positive correlation between the (inverse) total dependency ratio and real land price level. This real demand, fueled by speculative investment activities, contributed to higher real estate prices and a credit boom. The number of housing starts has since dropped constantly, partly because of a decrease in the working-age population – the generation that builds families.

Moreover, Japanese firms increasingly focus on outward foreign direct investment (FDI), and they especially target emerging economies, where the returns on investment are generally higher than in Japan and other advanced countries (Chart 7). Firms continue to invest domestically but not to a great extent, as evidenced by the declining trend of new business fixed investment as a percent of GDP (and cash flow) (Chart 8). In line with this, the main investment incentives for companies are concentrated on upgrading, earthquake-proof strengthening, and energy saving or clean-energy production – rather than bolstering their production capacity.

One plausible consequence of reduced investment demand is weak demand for credit by firms and households, as pointed out later. For example, even though the fund-raising conditions of firms and households have generally been favorable, the loan officer opinion survey on bank lending practices consistently reports weak diffusion indices (DIs) of demand for loans by both firms and households. This result is consistent with the low loans-to-deposits ratios – amounting to only around 70 percent in Japan, which is far below the 200 percent of Sweden and over 150 percent of Finland. And yet the banking sector in Japan still faces an increase in deposits; thus, the issue of how to raise profitability out of ample liquidity is becoming one of the main challenges for this sector. In recent years, the banking sector has increasingly allocated funds toward Japanese government bonds (JGBs) and overseas lending, which reflects the deteriorating fiscal position of the government and the higher potential economic growth in emerging economies.

### ***Impact of demographic changes on consumption demand and employment***

Population ageing may induce a demand shift from manufacturing (and other traditional areas) to nonmanufacturing sectors. This is because the elderly population tends to demand more services (such as medical and nursing care, tourism, and social services) and fewer durable goods (such as cars and home electronics). Given that households whose heads are 60 years and older already account for over 40 percent of total consumption, this shift in preference by ageing is gradually affecting the structure of private sector consumption in Japan, and it is predicted that there will be further expansion of the service-related industry in the near future (Chart 9). A number of studies have identified the possible impact of demographic changes on the demand structure in Canada, Germany, and the United Kingdom (Börsch-Supan [2003]; Fougère *et al.* [2007]; Lührmann [2008]; and Rausch [2009]).

Naturally, this change in the demand structure has also brought about a shift in the employment structure – a growing proportion of workers in the nonmanufacturing sector and a reduced proportion of workers in the manufacturing sector and other traditional areas. At the same time, a shift in the demand structure may result in an increase in structural unemployment unless a smooth relocation of labor resources from manufacturing to nonmanufacturing sectors takes place. Katagiri (2012) points out that a rise in structural unemployment in the 1990s – and the subsequent sustained high level – could be associated with various labor market frictions, triggered by a shift in the population ageing-induced demand structure.

### ***Impact of demographic changes on labor productivity***

I have already noted that the growing demand for services brings in a greater number of workers engaged in the nonmanufacturing sector. However, this may lower the level of labor productivity for the whole economy. This reflects the fact that, as in Japan (Chart 10), the level of labor productivity per employed worker tends to be lower in the nonmanufacturing

than in the manufacturing sector. This is mainly due to the nonmanufacturing sector being more labor-intensive and more regulated while having limited opportunity for exercising economies of scale. Of course, it is possible to raise labor productivity in the nonmanufacturing sector in such ways as intensifying the use of information and communication technology (ICT), improving the quality of services, offering innovative services that stimulate potential demand, and promoting competition through deregulation. However, the fact that the nonmanufacturing sector tends to produce lower labor productivity than the manufacturing sector is a globally observed phenomenon. A low level of labor productivity and sluggish growth could be referred to as the Baumol effect, which focuses on limited growth in productivity in certain nonmanufacturing sectors (public services, such as public hospitals and public colleges).

Thus, population ageing may affect economic growth not only directly through a reduction in the working-age population and employment (as indicated by the labor force effect in Chart 4 [3]), but also indirectly through a constant decline in labor productivity caused by a continuous demand shift – as illustrated by the per worker growth effect in the same chart. Katagiri (2012) demonstrated that the decrease in labor productivity, together with a rise in the structural unemployment rate, contributed to the lowering of Japan's real GDP level. As for the future, the ratio of nonmanufacturing to manufacturing workers (and the ratio of value added in the nonmanufacturing sector to GDP) is projected to rise constantly; thus, the downward pressures on labor productivity may be further enhanced (Sakura *et al.* [2012]).

### ***Possible impact of demographic changes on the financial asset structure***

According to the previously mentioned life-cycle investment hypothesis of Bakshi and Chen (1994), investors gradually shift from housing investment to financial investment for retirement as they get older. These authors showed that when people of the baby-boom generation reached the stage where they changed their asset composition from housing investment to financial asset investment, they helped raise stock prices in the 1980s and 1990s in the United States. At the same time, Bakshi and Chen demonstrated that population ageing tends to raise the market risk premium. This is not only because elderly people are unwilling to take on a lot of financial risk since they have fewer opportunities to use their labor income to cover potential losses, but also because uncertainty related to their remaining lifetime discourages them from accepting such risk. This suggests that population ageing may raise investors' preference toward cash, deposits, and bonds when they are close to or already at retirement age. These demographic movements possibly bring about fluctuations in asset demand on capital markets.

Currently, the size of households' total financial assets in Japan amounts to about 1,500 trillion yen (19 trillion U.S. dollars) – the second largest total in the world after the United States. Despite nearly zero-interest rates, the share of deposits (and cash) accounts for about half of total assets. In general, young households start to accumulate financial assets in the form of deposits. As they become older, they may gradually shift their financial asset allocation toward life insurance and securities (setting aside housing investment). As they become much older, households with extra financial resources may increase their share of relatively safe assets, such as deposits and bonds (for example, JGBs). This makes sense since elderly people are more concerned about the stability of the valuation of their financial assets and thus tend to be more risk-averse than younger people. Regarding stock investment, elderly households hold much larger assets than any other generation, and so they may allocate part of their assets to stock holdings while keeping the ratio of stock holdings at a reasonably contained level. However, if the future elderly generation has readier adaptability to ICT, greater use of online securities trading may promote the investment demand for stocks.

### ***Impact of demographic changes on fiscal balance***

A natural impact of Japan's demographic changes is deterioration in fiscal balance. It is clear that the rapid pace of population ageing in Japan, especially since the 2000s, has been the single driving force behind growing social security-related expenditure (i.e., public pension benefits, elderly care, and medical services) (Chart 11). Meanwhile, population ageing, together with sluggish economic performance, has contributed to low growth in tax revenues. Population ageing tends to reduce not only the income tax base, but also tax income as a result of the downward pressure on economic growth, while raising government expenditure through increased social security costs. It is expected that population ageing will raise the cost of the social security system while reducing the amount of insurance premium contributions paid by the working-age population. This will increase the burden on fiscal balance, which suggests the need for some kind of reform in the future.

## **IV. Demographic changes, the output gap, and mild deflation**

My broad view regarding the impact of population ageing on macroeconomic performance is summarized in Chart 12. Based on this, I would now like to focus on the issues related to the output gap and mild deflation, which will be followed by a brief description of monetary policy conduct.

### ***Presence of the long-standing output gap***

Japan's output gaps have remained negative for almost the entire period since the mid-1990s, although the magnitude varies depending on the methods employed to assess them (Chart 13). Some argue that the output gap has deteriorated following a series of domestic and external shocks, such as the collapse of the asset bubbles in the early 1990s, the Japanese financial crisis and East Asian currency crises in the second half of the 1990s, the collapse of the IT bubble in the early 2000s in the United States, the global financial crisis of 2008, the European sovereign debt crisis since 2010, and the Great East Japan Earthquake of 2011. Looking at this issue from a more academic standpoint, there appears to be consensus among researchers regarding the presence of a long-lasting output gap in Japan. By contrast, little consensus has emerged as to which factors contributed to the phenomenon.

When we plot the relationship between demographic data (e.g., growth rate of the working-age population) and the output gap, we usually do not see a strong direct correlation. This may reflect the fact that the impact on the output gap may be felt indirectly through various complex channels. For example, a number of researchers point out three main factors as having contributed to the negative output gap: (1) a decline in the natural rate of interest and a resultant interest rate gap caused by the zero lower bound on the nominal interest rate; (2) a decrease in economic growth expectations caused by a reduction in potential economic growth; (3) banks' risk-averse lending behavior. Of course, these factors are not necessarily mutually exclusive.

Regarding factor (1), it is possible that population ageing may result in a decrease in the natural rate of interest through various channels – for example, a decline in demand for loanable funds by firms and households, while a lower expected permanent income induces households to accumulate more savings (Ikeda and Saito [2012]). And when the natural rate of interest falls below the actual real interest rate (namely, an interest rate gap emerges), the monetary condition becomes relatively tight and contributes to deterioration of the output gap. Since the natural rate of interest is non-observable, researchers often use (per capita) potential GDP growth as a proxy for the natural rate of interest. Various estimates point to a decline in the potential growth rate over the period of 1985–2011, but none of them show a constantly negative potential growth rate except for a brief interval caused by the 2008 global financial crisis, for example, as shown in Chart 14 (Watanabe [2012]). Therefore, it is not certain whether the natural rate of interest has turned negative on a permanent basis. In

addition, Saito *et al.* (2012) indicated that the effects of the zero lower bound of the nominal interest rate are rather small (based on the dynamic stochastic general equilibrium [DSGE] models, where the estimated monetary policy shocks are assumed to capture the effects of the zero bound). Thus, whether factor (1) provides a convincing reason for the presence of the long-standing output gap remains debatable.

As for factor (2), the declining trend in potential GDP growth, which partially reflects population ageing, may worsen the output gap through a long-term reduction in growth expectations (Chart 15). Provided that growth expectations affect both the supply and demand sides, there could be cases where an adverse impact on demand may be stronger than one on supply – for example, in the case of a permanent negative shock on productivity (Saito *et al.* [2010]). Another example is the case of a slow adjustment of the supply side in response to a demand shift caused by population ageing, as suggested in Part II. This process may exacerbate the output gap in the existing (manufacturing) sector. The services sector is unable to fully exploit the potential demand for services targeting the elderly population owing to inadequate supply of innovative and potentially highly demanded services by firms. The lower potential growth and resultant decline in growth expectations could provide a reasonable explanation for the presence of the negative output gap.

On this matter, I would like to mention the view of Dr. Myrdal, as described in his previously mentioned 1940 book. Although he did not appear to have considered the concept of expectations, I was pleasantly surprised to find that he had already thought through the impact of demographic changes on both the supply and demand sides. According to him, a reduction in the population caused by declining fertility rate would be expected to provide a negative impact on the demand side much earlier than on the supply side. This is because (1) the negative impact on supply capacity could be temporarily offset by technological progress and (2) the impact of the decreased fertility rate on supply capacity will cause a decline in the working-age population with a time lag of about 15–20 years.

Factor (3) sheds light on banks' lending behavior, which could be affected by such factors as tighter financial regulation and the value-at-risk constraint. Those constraints may induce banks to prefer investment in JGBs or other bonds rather than financing the private sector, thereby worsening the output gap (Aoki and Saito [2012]). I am not sure how important this impact is in reality since the DIs of lending attitudes of financial institutions have been very accommodating for large firms and neutral for small and medium-sized enterprises.

Moreover, there is a view that the depressed collateral value may have affected the behavior of the banking sector. The collapse of the real estate price bubble in the early 1990s together with population ageing may have resulted in a permanent decline in the collateral value, thereby reducing banks' incentives to lend. Based on a balance sheet analysis, it has been pointed out that newly established firms tend to possess a limited amount of real estate while holding a relatively large amount of receivables and movable properties. Thus, for new firms, the constraints they face could likely be mitigated if a new lending method or asset-based lending (ABL) were promoted. This would involve a financial institution taking receivables and movable properties that were closely tied to the firm's business cash flow (e.g., accounts receivable and goods in stock) as collateral for a loan. On this issue, the Bank of Japan has been providing funds to financial institutions that undertake ABL in order to promote lending without depending on real estate as collateral, as will be pointed out later.

### ***Presence of mild deflation***

Japan has been facing mild deflation over almost the entire period since the second half of the 1990s (Chart 16). Though the issues related to a flattening of the Phillips curve in Japan and other advanced countries are hotly debated, I will not address this matter today. Rather, I would like to state that a clear positive correlation between inflation and the output gap prevails in Japan. Meanwhile, little correlation has been observed between inflation and money, which suggests that money velocity is not very stable (Nishizaki *et al.* [2012]).

A number of factors have contributed to the mild deflation. One is the presence of the long-standing negative output gap, which could be partially affected by demographic changes, as already described. The other is a long-term decline in inflation expectations.

Since various measures indicate a clear trend, there is growing consensus among Japanese researchers with respect to the long-term decrease in inflation expectations over the period of 1990–2011 (Chart 17). Some argue that this could be related to the Bank of Japan's monetary policy, such as weak inflation forecasts damping inflation expectations. However, I feel that inflation expectations have been affected more strongly by structural factors, including demographic changes. For example, the rapid pace of population ageing and stagnant productivity growth (which contributed to lower actual and potential economic growth) could possibly dampen economic growth expectations of firms and households. This is because firms expect a shrinkage of the markets for goods and services, and households expect lower permanent income growth in the future. Sluggish economic growth expectations may induce an immediate impact on the demand side through weaker investment plans by firms and reduced consumption (and increased savings) by households. This may lead to a long-term decrease in inflation expectations, thus providing downward pressure on the actual rate of price change. In other words, firms that expect lower demand for their products and services and anticipate lower prices demanded by households are likely to set their prices conservatively. A number of surveys have reported that firms tend to anticipate a decrease in their sales prices even though their input prices are expected to rise, which suggests that the degree of passing on the input cost to the final sales prices is limited.

Based on data from many countries, the Cabinet Office (2011) in Japan has reported a positive correlation between inflation expectations and the expected ratio of the working-age population – in addition to a positive correlation between economic growth expectations and the expected ratio of the working-age population. These observations seem to be consistent with my own understanding.

### ***Conduct of monetary policy***

Given this background, the Bank of Japan is naturally concerned about the long-term prevalence of mild deflation. To help the economy overcome this deflation, so-called Comprehensive Monetary Easing has been implemented since 2010 and the Asset Purchase Program (hereafter, Program) has been established.<sup>2</sup> Subsequently, monetary easing has gradually been enhanced through expansion of the program. In February 2012, the Bank introduced its “price stability goal in the medium to long term” to promote public understanding of the Bank's determination to overcome deflation. It was decided to set the goal within a positive range of 2 percent or lower in terms of the year-on-year rate of change in the consumer price index (CPI), and the goal for the time being was set at 1 percent. Moreover, the Bank made it clear that it would continue the monetary easing policy – the virtually zero-interest rate policy and continued implementation of the program – until it judged the 1 percent goal to be within sight (on condition that it identified no significant risk to the sustainability of economic growth, including from the accumulation of financial imbalances). At the same time, the total size of the Program was increased from about 55 trillion to about 65 trillion yen in the same month; it was further lifted to 70 trillion yen this April (Chart 18).

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<sup>2</sup> The comprehensive monetary easing policy consists of (1) the virtually zero interest rate policy, (2) setting the policy time horizon based on the “understanding of medium- to long-term price stability” (commitment policy), and (3) establishment of the Asset Purchase Program. Of these, item (2) was modified to “the price stability goal in the medium to long term,” as indicated above.

## ***Tackling the long-term structural challenge***

Next, I would like to address an issue commonly faced by a number of major central banks in advanced countries and regions. Namely, the extremely accommodative monetary environment has not led to as much increased domestic demand, such as investment and consumption, as had been expected (Chart 19). Though there are structural factors related to this issue, the root causes are country- or region-specific, and thus they differ from one another. In the case of Europe, the short-term depressing impact of the fiscal austerity measures and deleveraging of the banking sector make it difficult to increase bank lending.

In the case of Japan, the ageing population, as discussed throughout this presentation, has contributed to the long-term declining trend in economic growth and mild deflation. To overcome mild deflation, we need to raise economic growth expectations by enhancing productivity growth of the working-age population while increasing the labor participation rates for women and elderly people. However, it may be said that implementation of the necessary structural reforms for boosting growth and productivity has been sluggish – as evident in charts 4 [1]–[4] – and the shift in the economic and industrial structure has been limited. Issues related to mounting government debt and social security reforms have also generated uncertainty over the future economic outlook. Moreover, a series of recent negative shocks, such as the global financial crisis, the European sovereign debt crisis, and the Great East Japan Earthquake, have also worsened this outlook. Despite a very accommodative financial environment driven by monetary stimulus measures, these factors have combined to deter expectations of further rises in growth by firms and households.

To meet the diverse challenges and establish a new basis for economic growth, Japanese firms need to become more innovative and competitive in an effort to add value to their activities and explore new sources of demand, both at home and abroad. The government also needs to support the business community by creating a more business-friendly environment. Financial institutions should strive toward strengthening the foundations for economic growth by giving financial support to innovative, viable firms and providing new types of financial and other services, which are increasingly under demand.

By promoting longer-term economic growth, moreover, the Bank of Japan has been helping to sustain the business community indirectly. It introduced a fund-provisioning measure to help reinforce the basis for economic growth (the so-called Growth-Supporting Funding Facility) in 2010, and it has provided longer-term fixed-rate funds to financial institutions.<sup>3</sup> This facility was expanded in March and April of this year (Chart 20). I believe that it is important to stress that the goal of overcoming deflation can be achieved through such continuous, comprehensive efforts by firms, financial institutions, the government, and the Bank operating within their respective roles.

## **V. Concluding remarks**

After having suffered from declining fertility rates since the second half of the nineteenth century, European countries, especially the Nordic countries, dealt with population ageing issues promptly and acquired considerable know-how and expertise in the process. As a result, European countries enjoy more favorable outcomes and currently manage to maintain higher TFRs than Japan: as of 2010, 1.9 each in Finland and Sweden, and 1.6 in the EU.

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<sup>3</sup> Since June 2010, the Bank of Japan has provided long-term funds, with a maximum duration of four years at a low interest rate of 0.1 percent, to financial institutions up to the actual amount of lending and investment carried out by each financial institution. The areas eligible for investments and loans range, for example, from environment and energy business, medical and nursing care business, and development of social infrastructure to investment and business deployment in Asian countries. In June 2011, this program was extended by providing funds to financial institutions that undertake equity investments and offer ABL. In April this year, a U.S. dollar lending arrangement was also introduced under this framework.

Nonetheless, the rate remains below the replacement rate – the rate that ensures a national population gain.

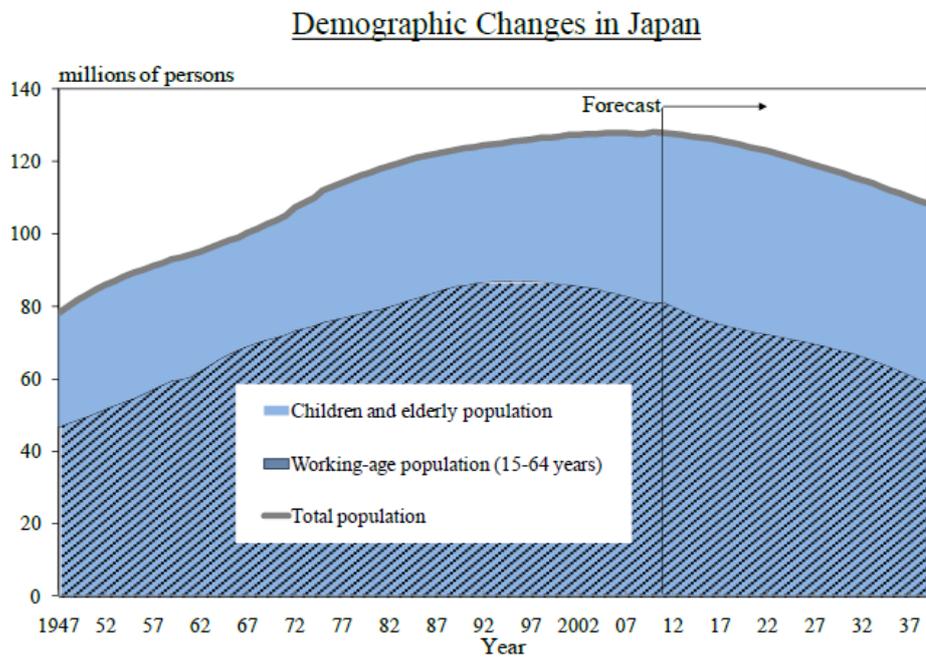
Furthermore, European life expectancy at birth is approaching that of Japan: as of 2010, it is 77 years in Finland, 79 years in Sweden, and 77 years in the EU for men; it is 83 years in Finland and Sweden and 82 years in the EU for women. Thus, Finland, Sweden, and other EU member states are all projected to face a decline in the working-age population ratio after 2012. In Europe, therefore, population ageing and the declining working-age population are becoming important structural issues, as the *2012 Ageing Report*, compiled by the European Commission, warned.

Finally, I would like to emphasize that the impact of demographic changes on macroeconomic performance is a newly emerging issue in the contemporary world. Few research studies have been carried out on the impact of population ageing and depopulation. Since Japan is taking the lead in these demographic changes and there is a possible strong linkage with the monetary policy environment, the Bank of Japan is doing its best to deepen the understanding of this topic. Given our experiences, I strongly believe that we Japanese and Europeans can learn from each other, and this could possibly lead to advances in academic research in the near future.

Thank you very much indeed for your kind attention.

## Charts

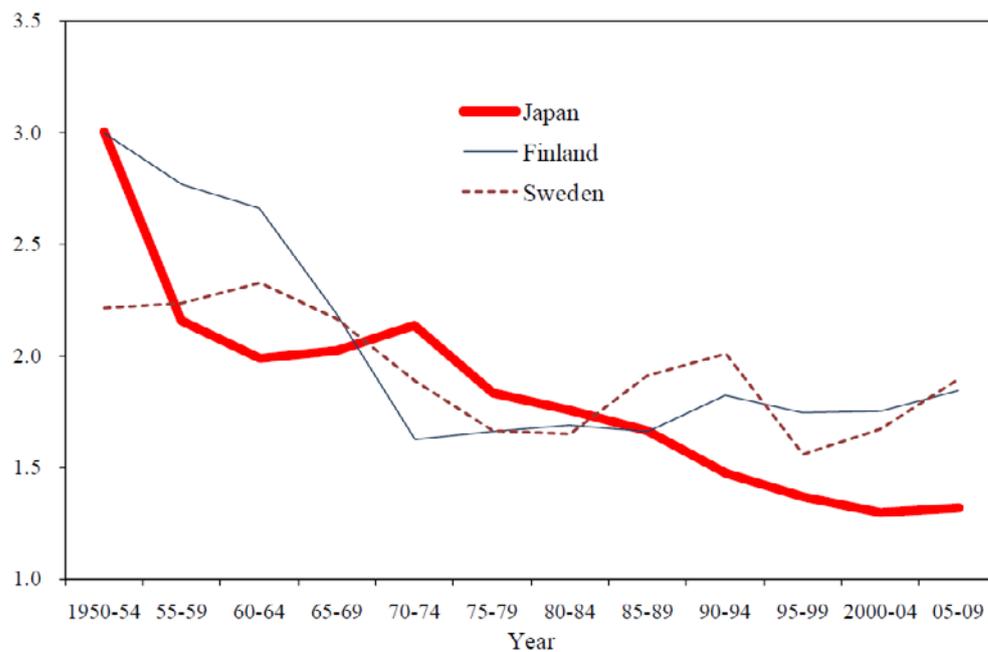
Chart 1



Sources: National Institute of Population and Social Security Research; Ministry of Internal Affairs and Communications.

Chart 2

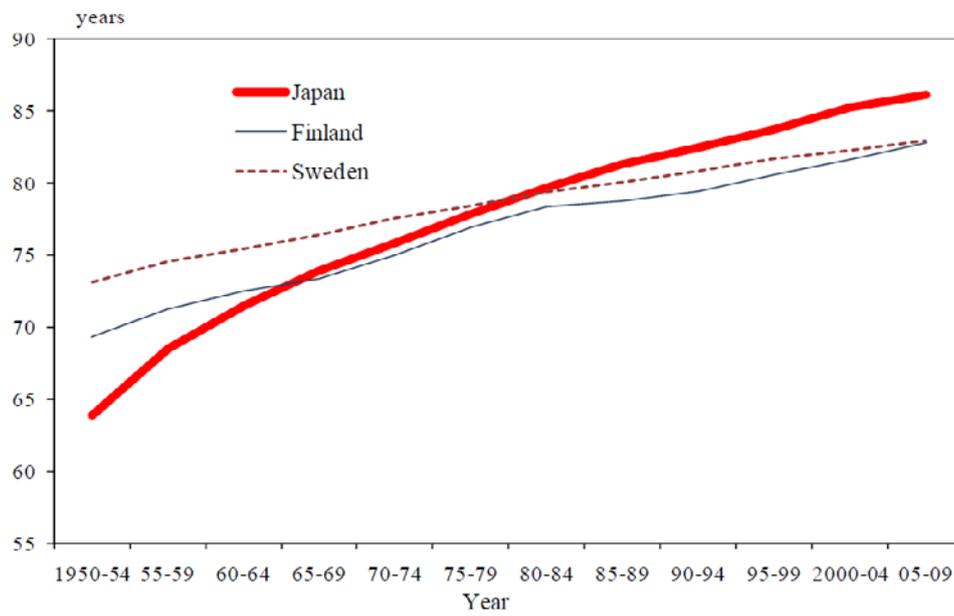
## Total Fertility Rates: Japan, Finland, and Sweden



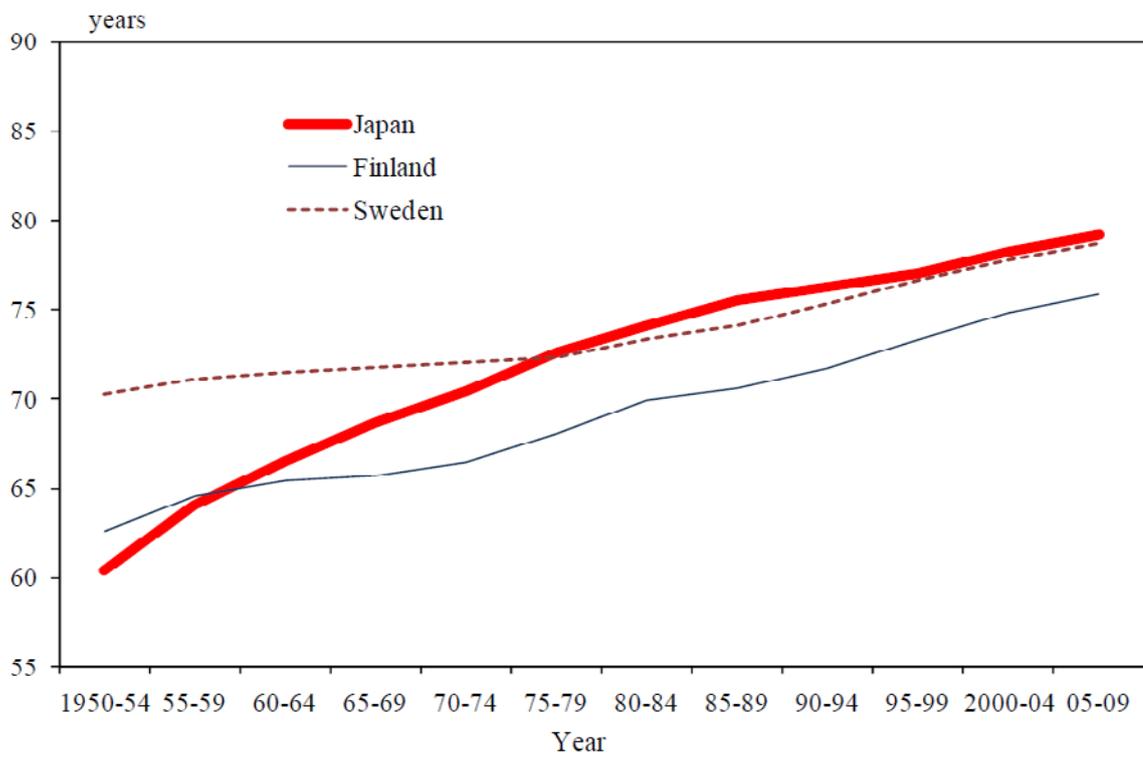
Source: United Nations.

Life Expectancy at Birth: Japan, Finland, and Sweden

(1) Female



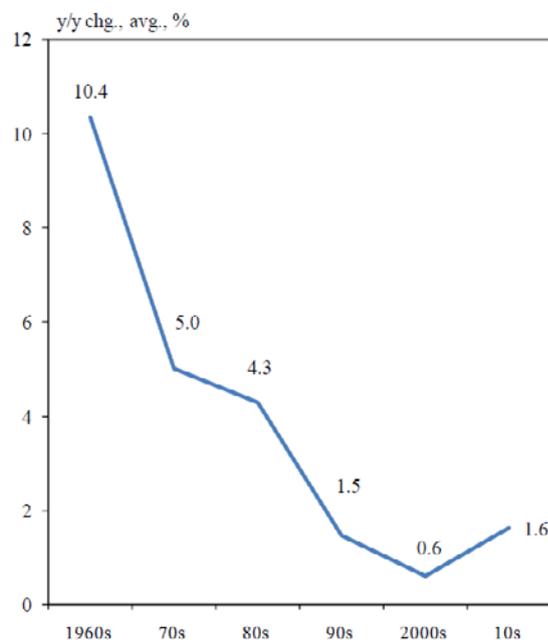
(2) Male



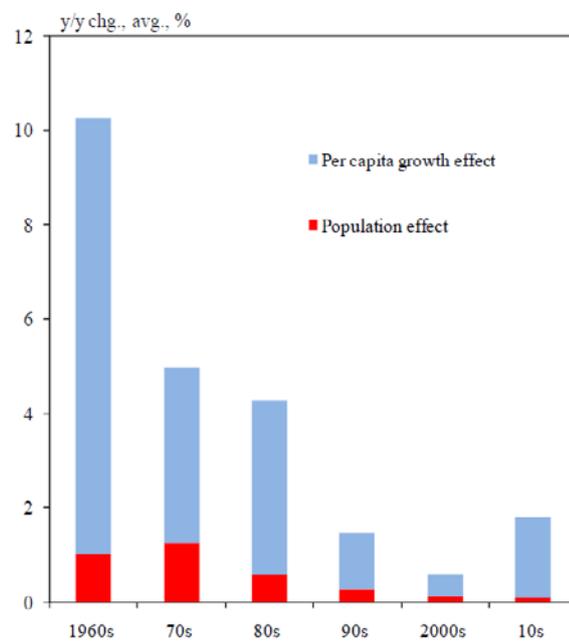
Source: United Nations.

### Real GDP Growth Rate in Japan

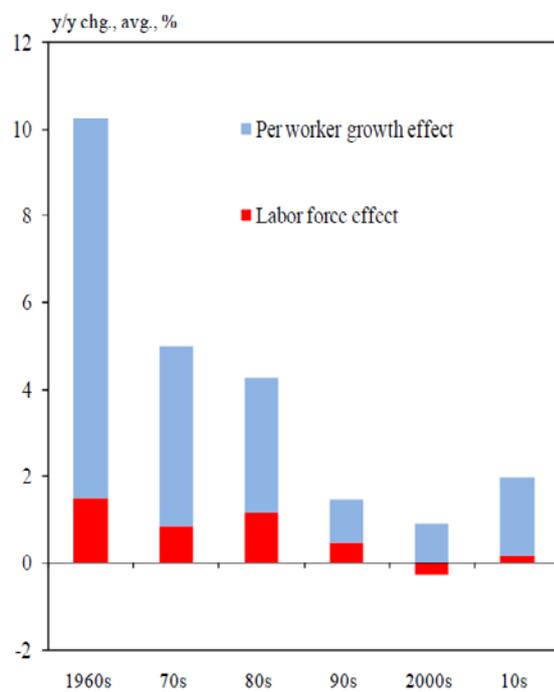
(1) Real GDP Growth Rate



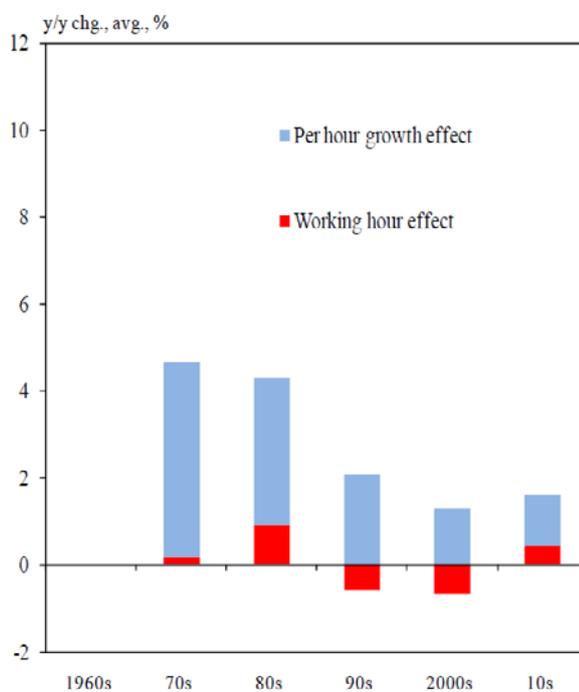
(2) Per Capita Growth Effect and Population Effect



(3) Per Worker Growth Effect and Labor Force Effect

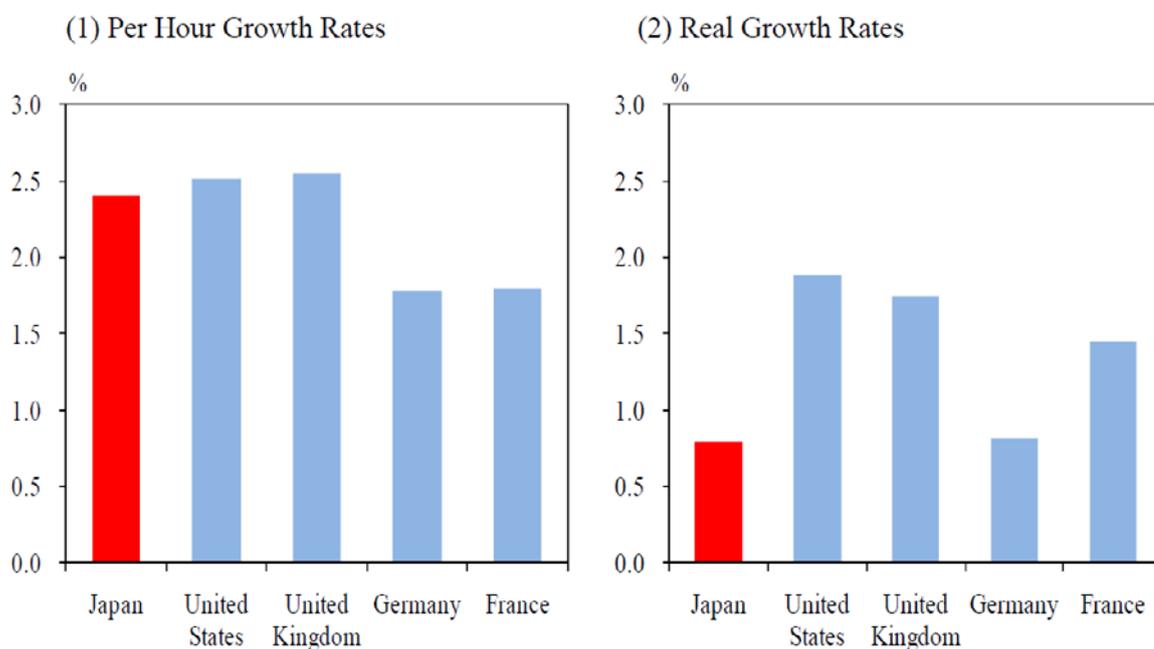


(4) Per Hour Growth Effect and Working Hour Effect



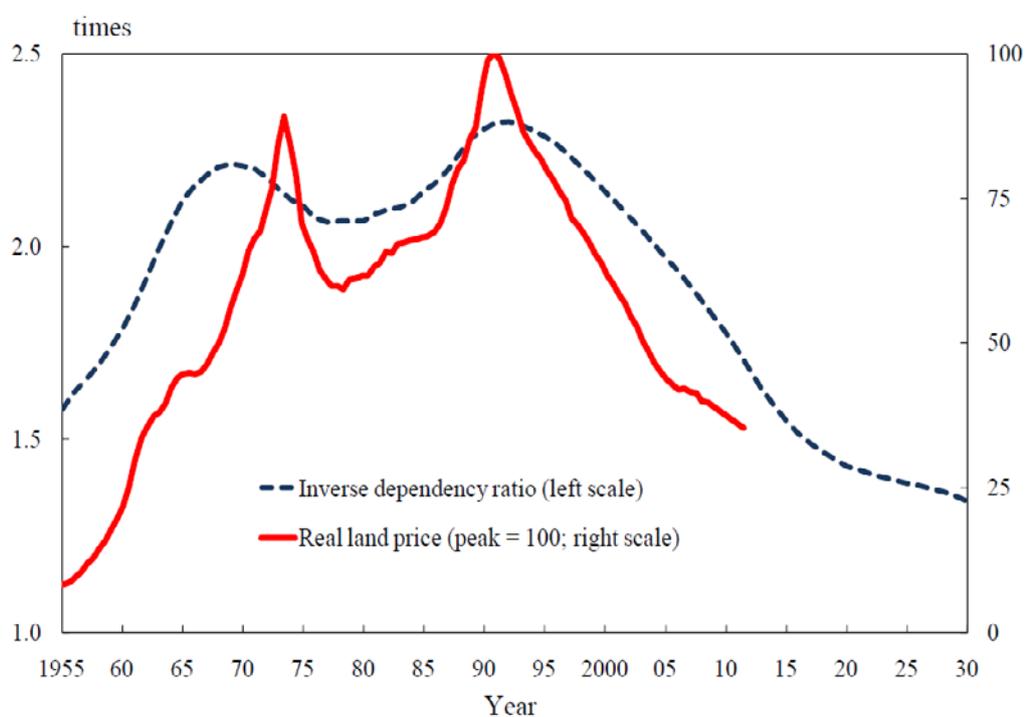
Sources: Cabinet Office; Ministry of Internal Affairs and Communications; Ministry of Health, Labor and Welfare.

Real GDP Growth Rate of Selected Countries (2000-10 Average)



Sources: World Bank; Haver Analytics.

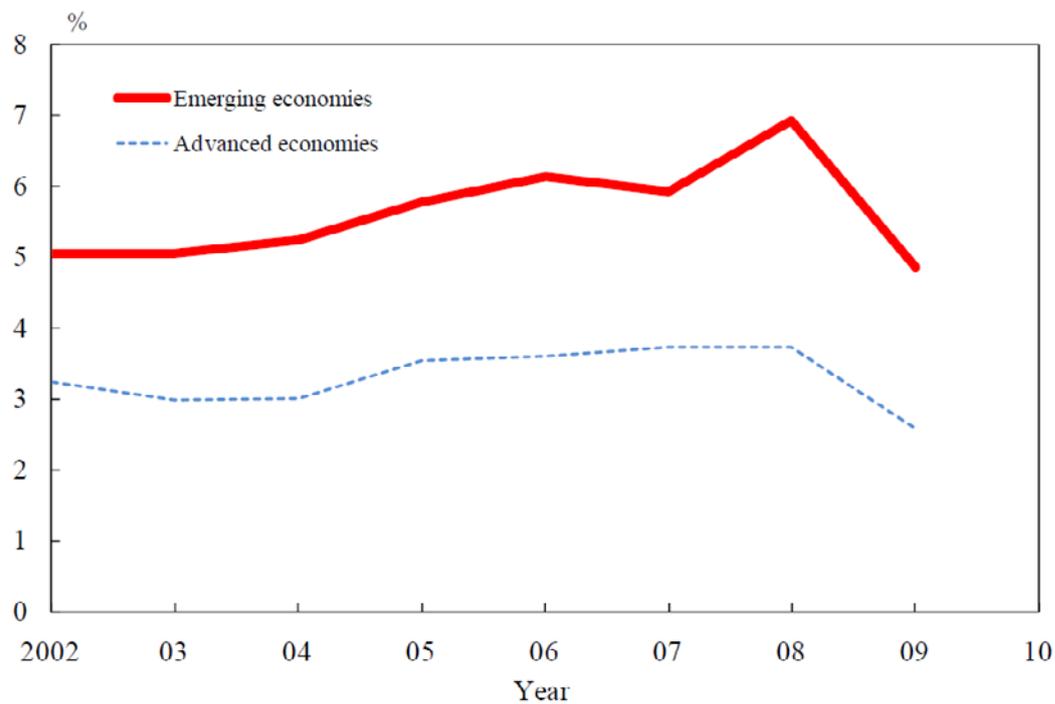
Dependency Ratio and Land Prices in Japan



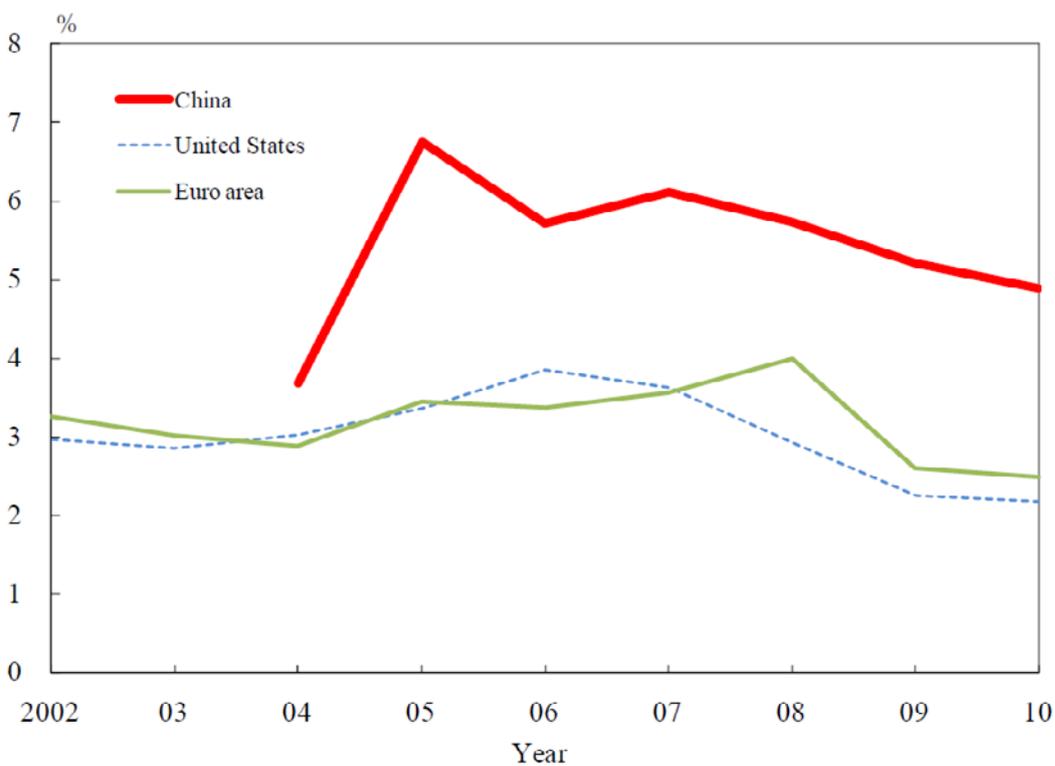
Source: Nishimura (2012).

Rates of Return on Foreign Direct Investment (FDI)

(1) Advanced Economies and Emerging Economies



(2) Major Economies

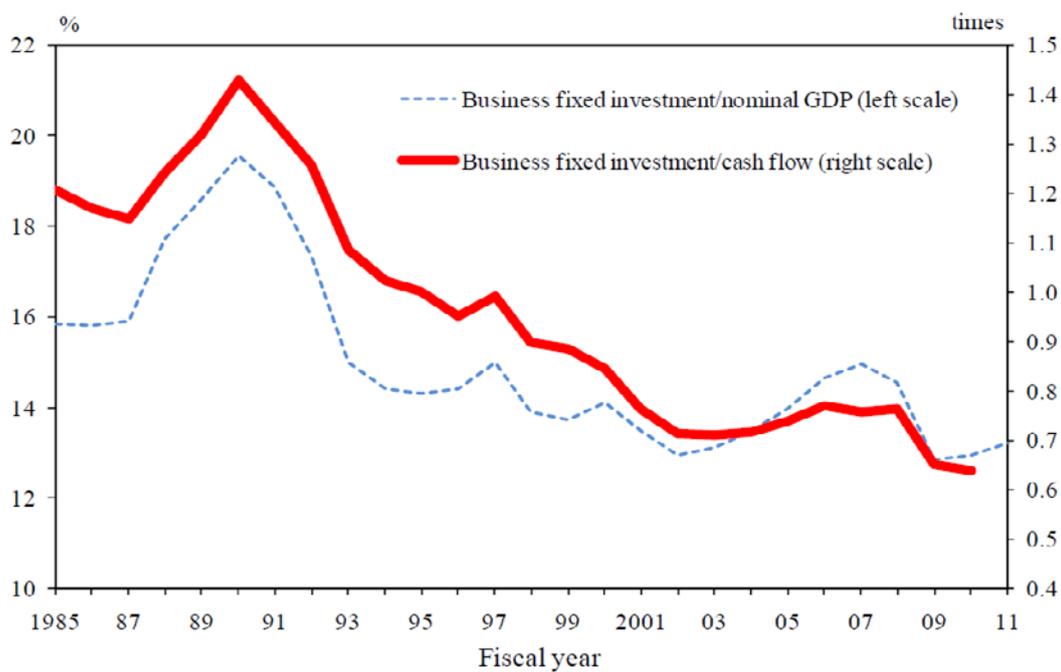


Note: Rate of return = FDI income payments/external liabilities.

Source: International Monetary Fund.

Chart 8

Business Fixed Investment

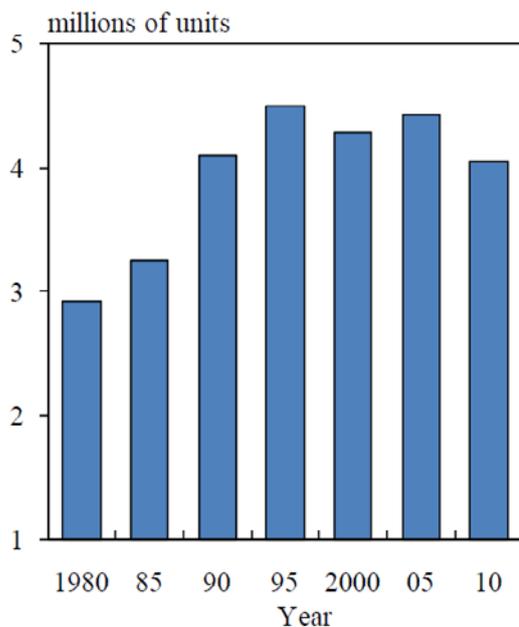


Source: Cabinet Office.

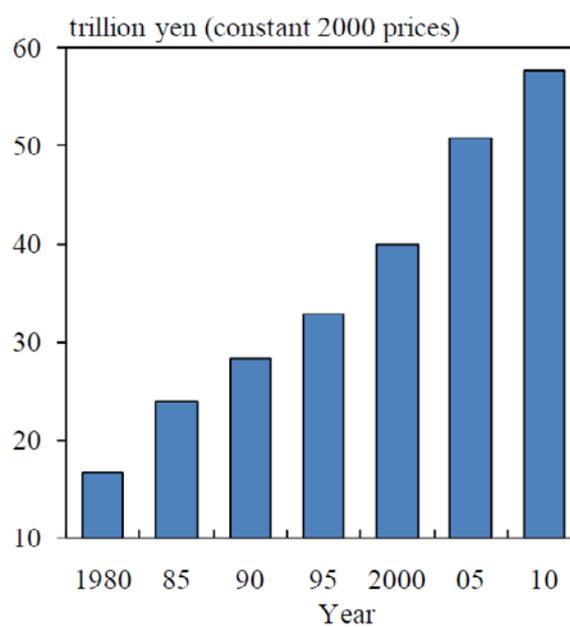
Chart 9

Changing Demand Composition in Japan

(1) Domestic Car Sales



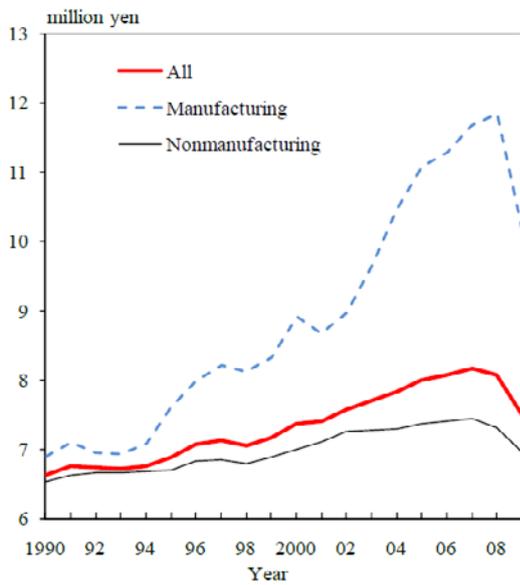
(2) Medical and Health Care Industry Output



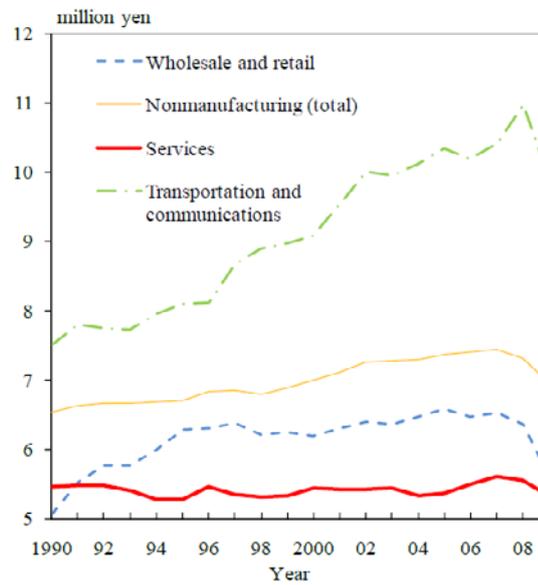
Sources: Japan Automobile Dealers Association; Japan Mini Vehicles Association; Research Institute of Economy, Trade and Industry.

Labor Productivity by Industry in Japan

(1) All Industries



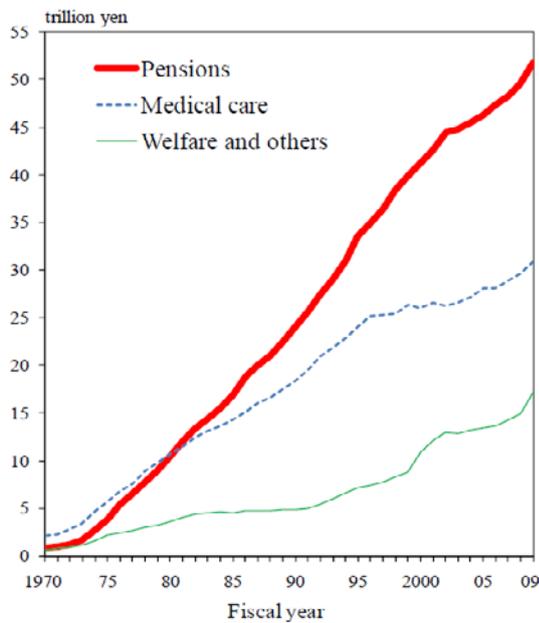
(2) Nonmanufacturing



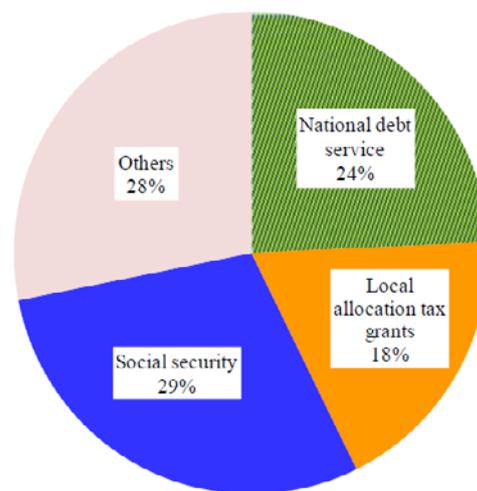
Note: Labor productivity refers to real productivity per employed workers.  
Source: Cabinet Office.

Fiscal Balance in Japan

(1) Social Security Expenditure by Category



(2) FY 2012 Budget (General Account)



Sources: National Institute of Population and Social Security Research; Ministry of Finance.

Impact of Population Aging on Macroeconomic Performance

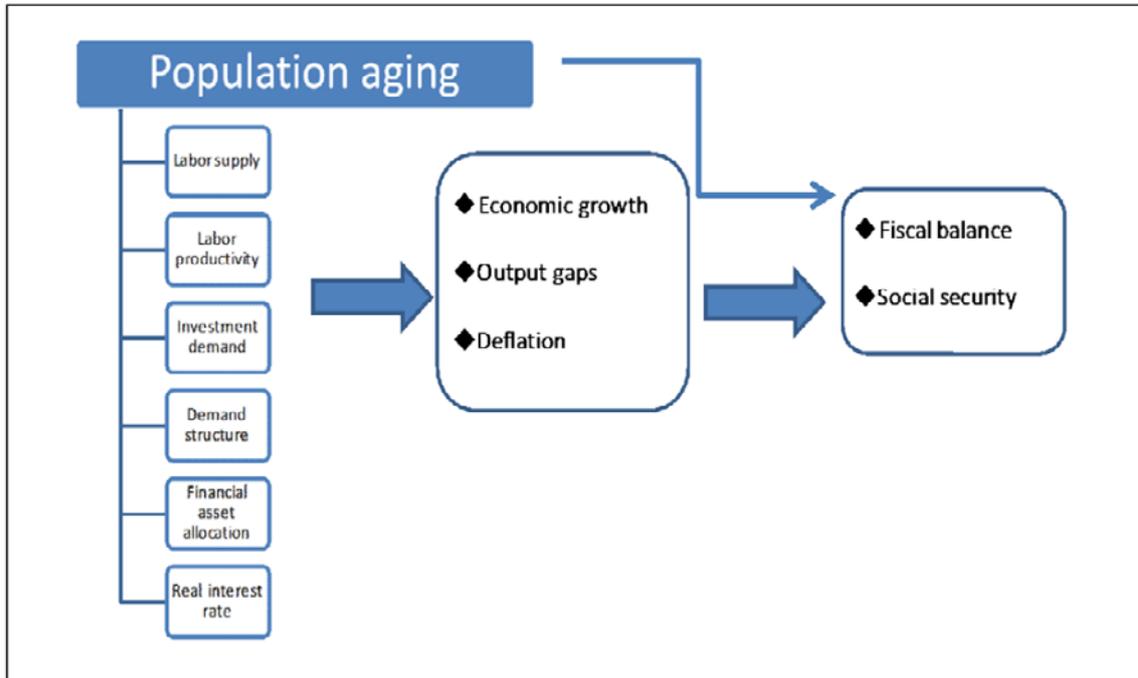
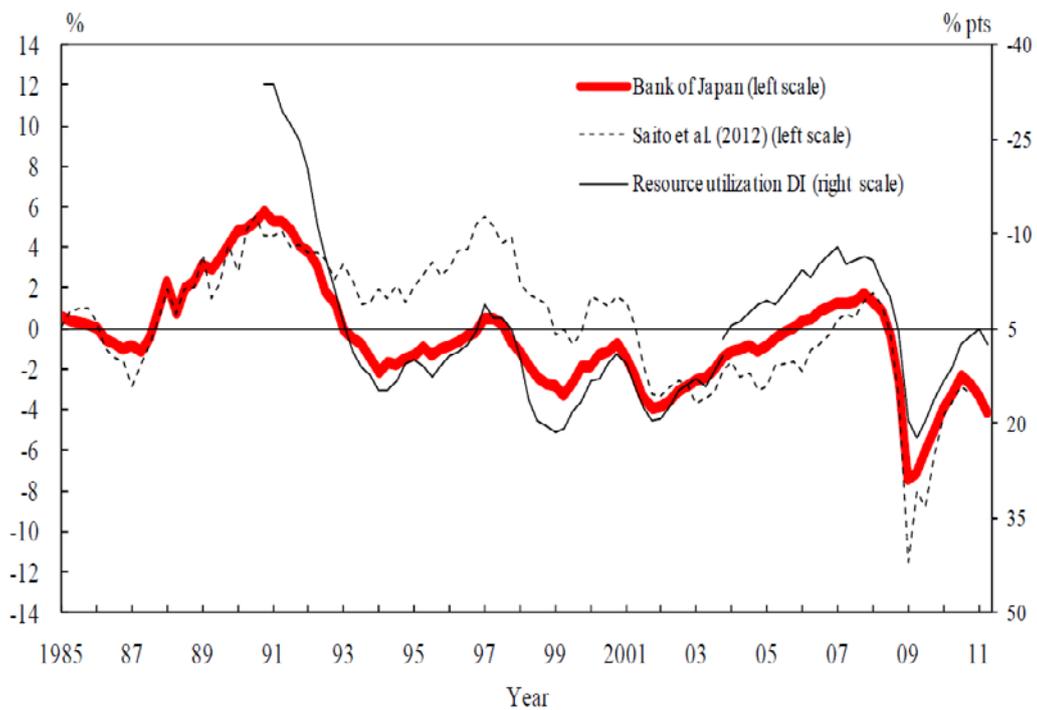


Chart 13

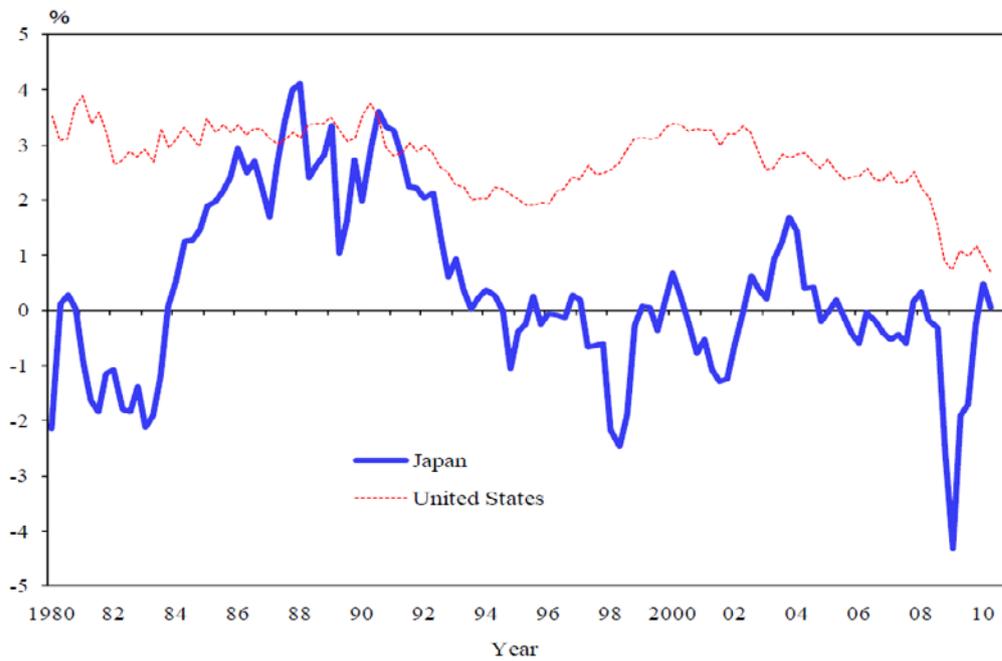
Output Gaps in Japan



Note: Resource utilization DI refers to the weighted averages of the production capacity DI and employment conditions DI in the Bank of Japan corporate survey.  
 Source: Nishizaki *et al.* (2012).

Chart 14

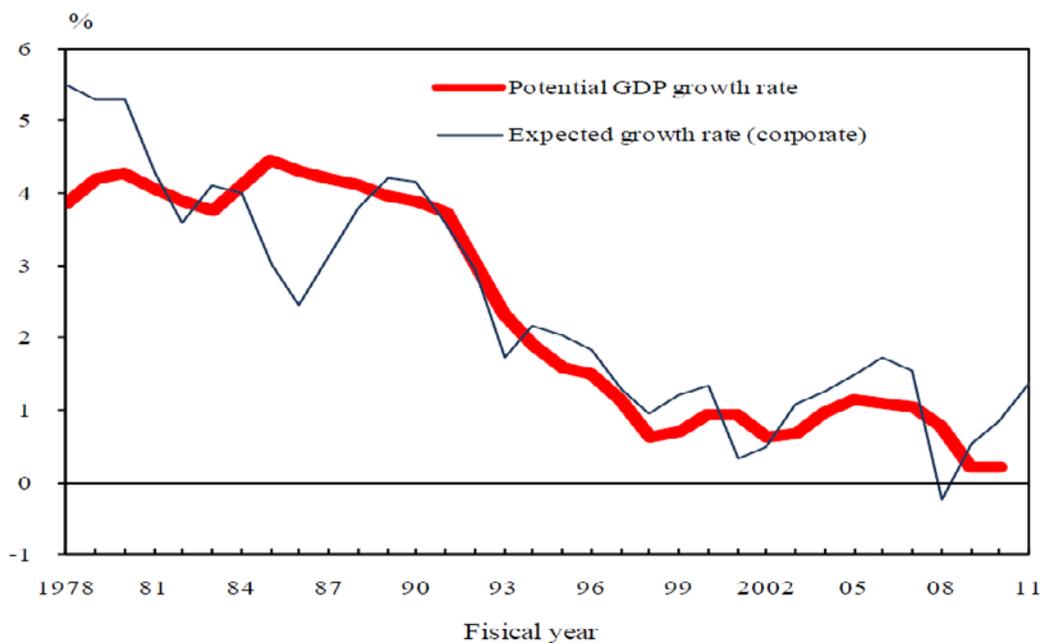
Natural Rate of Interest



Note: Figures for the United States are originally from Williams (2009).  
Source: Watanabe (2012).

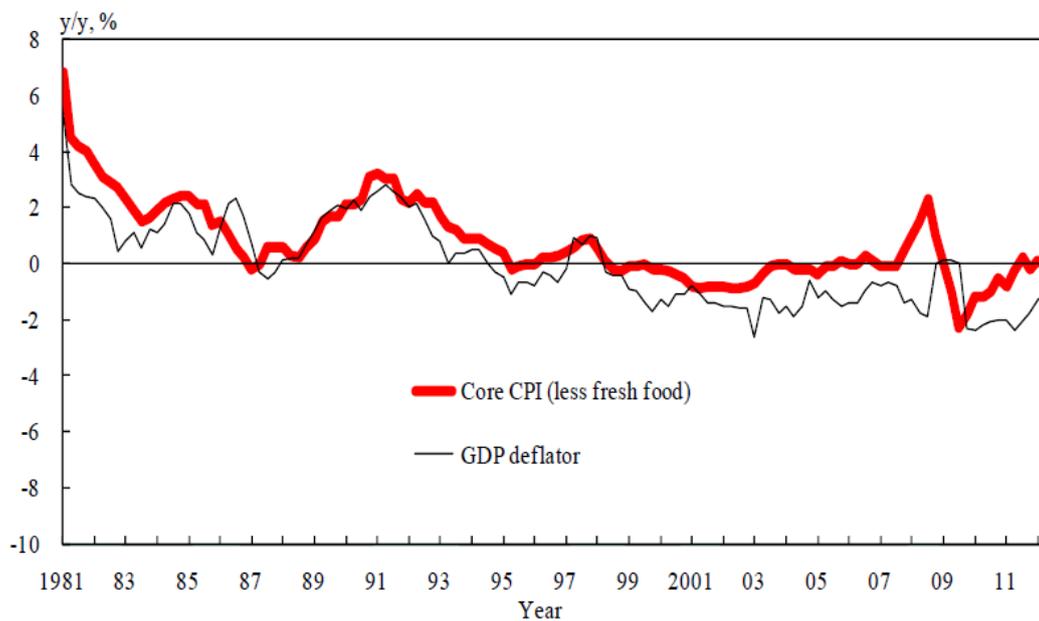
Chart 15

Potential GDP Growth and Growth Expectations in Japan



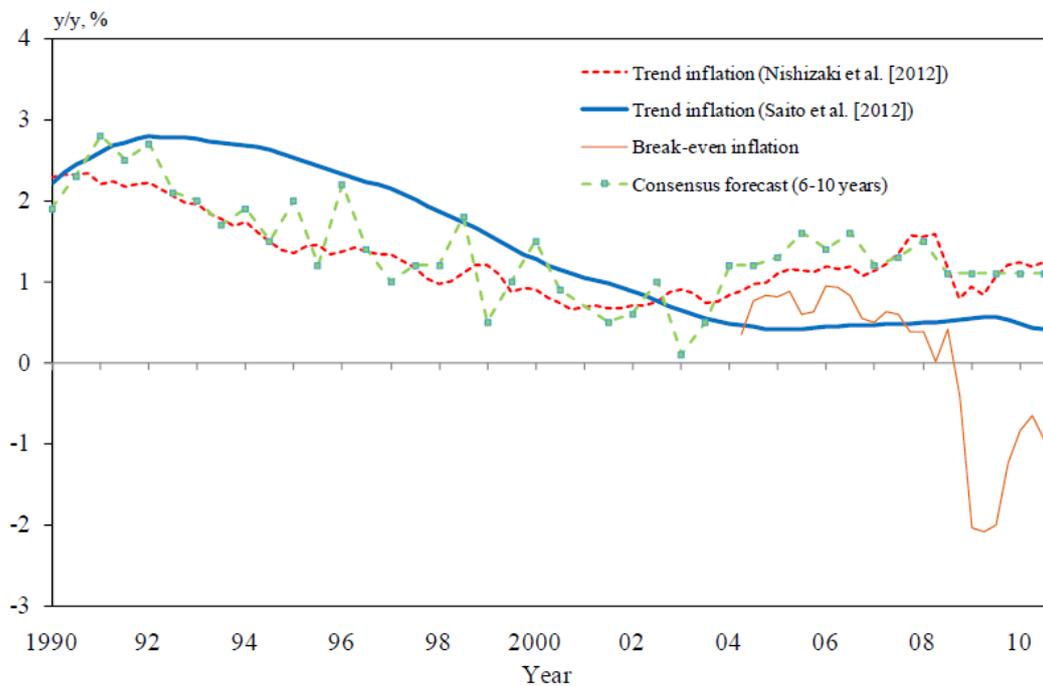
Note: Expected growth rate (corporate) refers to the outlook for real demand growth rate three years ahead for industry in the Annual Survey of Corporate Behavior (Cabinet Office).  
Source: Sakura *et al.* (2012).

### Inflation Rates in Japan



Sources: Cabinet Office; Ministry of Internal Affairs and Communications.

### Inflation Expectations in Japan



Source: Nishizaki *et al.* (2012), Consensus Economics Inc.

The Bank of Japan's Pursuit of Powerful Monetary Easing

1. Introduction of “the Price Stability Goal in the Medium to Long Term”

- ✓ A positive range of 2 % or lower in terms of the year-on-year rate of change in the CPI. A goal of 1 % is set for the time being.

2. Commitment to Maintaining Monetary Easing

- ✓ Continuing Monetary Easing until the goal of 1% is in foresight.
- ✓ With Virtually Zero Interest Rate Policy and the Asset Purchase Program (government bonds, corporate bonds, CP, ETFs, REITs, etc.)
  - On condition that no significant risk to the sustainability of economic growth (including from the accumulation of financial imbalances) is identified

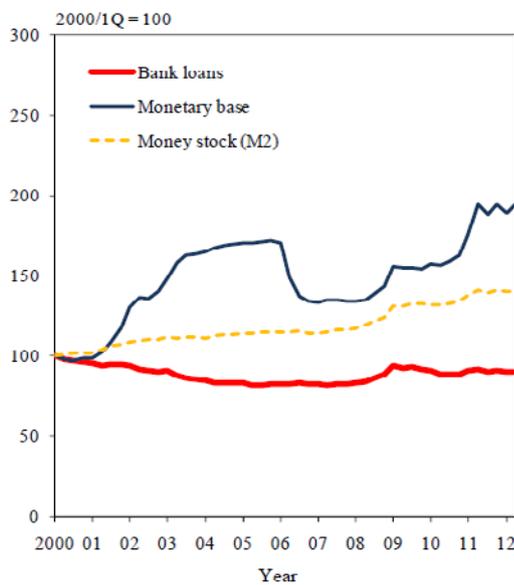
3. Expansion of the Asset Purchase Program

- ✓ Initially about 35 trillion yen (Oct. 2010)
  - about 70 trillion yen (900 billion U.S. dollars) by mid-2013

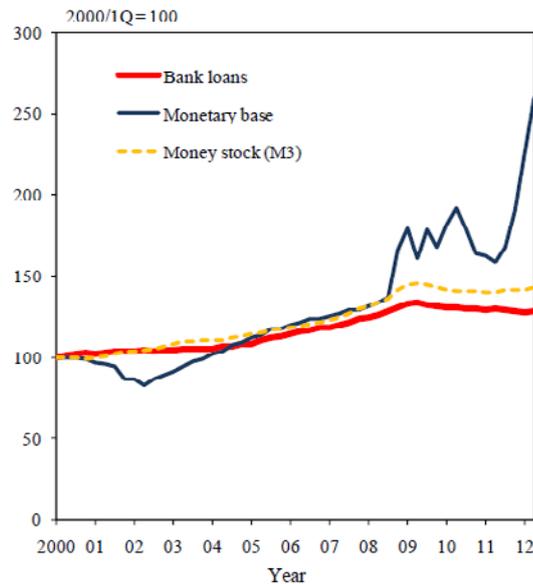
Chart 19

Money Stock, Monetary Base, and Loans: Japan and Europe (Percentage of GDP)

(1) Japan



(2) Euro Area



Sources: Bank of Japan; Cabinet Office; European Central Bank; Eurostat.

## The Bank of Japan's Growth-Supporting Funding Facility

- Providing funds to financial institutions based on their actual lending and investment performance in growth-enhancing sectors
- Total amount prepared: 5.5 trillion yen (70 billion U.S. dollars)
- Duration: maximum up to four years (including rollovers)
- Cost (loan rate): 0.1% per annum (fixed) \*
  - \* The Bank's target for the uncollateralized overnight call rate at the time of loan disbursement

### 【Four Pillars】

#### 1. General features (total: 3.5 trillion yen)

- ✓ Targeting lending and investment projects of 10 million yen or more each

#### 2. Supporting equity investments and asset-based lending (total: 0.5 trillion yen)

- ✓ Supporting financial institutions, for example, if ABL (lending based on receivables and movable properties) is utilized

#### 3. Supporting small-lot projects (total: 0.5 trillion yen)

- ✓ Targeting lending and investment projects of less than 10 million yen each

#### 4. The U.S. Dollar Lending Arrangement (total: 1 trillion yen, market interest rate)

- ✓ Targeting lending and investment projects denominated in foreign currencies

## References

- Aoki, Kosuke and Nao Sudo, "Asset Portfolio Choice of Banks and Inflation Dynamics," paper presented at the conference on "Price Developments in Japan and Their Backgrounds: Experiences Since the 1990s," Bank of Japan, 2011.
- Bakshi, Gurdip S. and Zhiwu Chen, "Baby Boom, Population Ageing, and Capital Markets," *Journal of Business*, 67 (2), 1994, pp. 165–202.
- Börsch-Supan, Axel, "Labor Market Effects of Population Ageing," *Review of Labor Economics and Industrial Relations*, 17, 2003, pp. 5–44.
- Cabinet Office (Japan), *Annual Report on the Japanese Economy and Public Finance 2011: Enhance the Essential Power of the Japanese Economy*, 2011. European Commission and Economic Policy Committee, *The 2012 Ageing Report: Economic and Budgetary Projections for the 27 EU Member States (2010–2060)*, European Economy 2, 2012.
- Fougère, Maxime, Jean Mercenier, and Marcel Mérette, "A Sectoral and Occupational Analysis of Population Ageing in Canada using a Dynamic CGE Overlapping Generations Model," *Economic Modelling*, 24 (4), 2007, pp. 690–711.
- Fujiki, Hiroshi, Naohisa Hirakata, and Etsuro Shioji, "Ageing and Household Stockholdings: Evidence from Japanese Household Survey Data," Paper submitted to the 2012 BOJ-IMES Conference, Bank of Japan, 2012.
- Fujita, Nanako, *Myurudaru no Keizaigaku* (Myrdal's Economics), NTT Publishing Co., Ltd., 2010.
- Ikeda, Daisuke, and Masashi Saito, "The Effects of Demographic Changes on the Real Interest Rate in Japan," Bank of Japan Working Paper Series, No. 12-E-3, 2012.
- Katagiri, Mitsuru, "Economic Consequences of Population Aging in Japan: Effects through Changes in Demand Structure," IMES Discussion Paper Series, No. 2012-E-3, Bank of Japan, 2012.
- Nishizaki, Kenji, Toshitaka Sekine, and Youichi Ueno, "Chronic Deflation in Japan," Bank of Japan Working Paper Series, No. 12-E-6, 2012.
- Lührmann, Melanie, "Effects of Population Ageing on Aggregated UK Consumer Demand," mimeo., 2008.
- Mankiw, N. Gregory and David N. Weil, "The Baby Boom, The Baby Bust, and the Housing Market," *Regional Science and Urban Economies*, 19, 1989, pp. 235–258.
- Nishimura, Kiyohiko G., "How to Detect and Respond to Property Bubbles: Challenges for Policy-Makers," Remarks at the 2012 Reserve Bank of Australia-BIS Research Conference, Bank of Japan, 2012.
- Saito, Masashi, Takuji Fueki, Ichiro Fukunaga, and Shunichi Yoneyama, "*Nihon no Kozo Mondai to Bukka Hendou* (Structural Problems and Price Dynamics in Japan)," Paper presented at the conference on "Price Developments in Japan and Their Backgrounds: Experiences Since the 1990s," Bank of Japan, 2011.
- Sakura, Kenichi, Saori Naganuma, Kenji Nishizaki, Naoko Hara, and Ryuhei Yamamoto, "*Nihon no Jinkodotai to Chuchokitekina Seichoryoku* (Demographic Changes and Medium- to Long-Term Growth Rates in Japan)," Bank of Japan Reports and Research Papers, August 2012.
- Rausch, Sebastian, *Macroeconomic Consequences of Demographic Change*, Springer, 2009.
- Shirakawa, Masaaki, "Demographic Changes and Macroeconomic Performance: Japanese Experiences," Opening remark at the 2012 BOJ-IMES Conference, Bank of Japan, 2012.
- Watanabe, Tsutomu, "*Zero Kinri no Moto no Choki Defure* (Long-Lasting Deflation Under the Zero Interest Rate Environment)," Bank of Japan Working Paper Series, No. 12-J-3, 2012.
- Williams, John C., "Heeding Daedalus: Optimal Inflation and the Zero Lower Bound," Brookings Papers on Economic Activity, 2009.