



October 5, 2017
Bank of Japan

Japan's Way toward Strong, Sustainable, and Balanced Growth:

Assessment of the potential of the Japanese economy suggests
the sun also rises

*Speech at meeting hosted by the Japan Society
and the City of London Corporation in London*

Hiroshi Nakaso

Deputy Governor of the Bank of Japan

(Introduction)

It is a great honor to have the opportunity to speak to you today in this historic Guildhall. I am grateful for the wide-ranging and close relationships that the Japan Society and the City of London Corporation have developed with the Bank of Japan. I am confident that these close relationships have greatly contributed to the mutual understanding between the United Kingdom and Japan.

Moreover, presenting today is also an extremely moving experience from a personal point of view. In my younger days, I made life-long friends and learned so much when I worked in this leading financial center from 1987 to 1989, at the Bank of Japan's London Office.

Today, I would like to talk about how we, in Japan, are trying to achieve strong, sustainable, and balanced growth. Towards that end, I will put a particular emphasis on labor market reforms, because, on a separate occasion, I have already discussed the effects of structural reforms in a broader context, and its relationship to the role of monetary policy.¹ I also take this opportunity to discuss labor market reforms because, for a number of observers and business leaders in Japan, the current labor shortage is a major issue for our entire economy as well as for their individual businesses. By so doing, I intend to assess, or reexamine, the potential of our economy.

I must admit at the outset that some of what I will say today is based on tentative analysis or mere speculation. An emphasis is placed on drawing a big picture rather than pursuing academic rigor.² That said, I believe that my presentation sheds some new light on how we see our economy. Hopefully, it also provides other economies that face similar challenges with insights into identifying the appropriate set of policy measures.

(Reassessing Japan's economy)

Since the bubble burst in the early 1990s, Japan has continued to stagnate — that must be the view that most of you in this hall have regarding our economy and it is a view that the Japanese public also widely share. Our economy and consequently, our standard of life, have not been improving. This perception must be one reason why the share of

¹ H. Nakaso (2016): “Monetary Policy and Structural Reforms,” speech at the Japan Society in New York (February 12, 2016).

² Throughout my presentation, I will use the words “productivity” and “labor productivity” almost interchangeably. Similarly, in the slides, I will also use several measures of labor productivity such as per head versus per labor hour.

people feeling anxiety or uneasiness in their daily life has been elevated since the early 1990s, along with the trend in media coverage alluding to that gloomy view (Slide 1).

In the first part of my presentation, I would like to challenge this negative image. We, Japanese, think that there is virtue in remaining modest or, in Japanese, KENJOU-NO-BITOKU. However, this should not make us draw an unnecessarily pessimistic picture of the situation in Japan.

In fact, people from outside of Japan have already rediscovered the potential of our country. The number of visitors from abroad has skyrocketed over the past five years and by 2016 Japan had climbed to number 16 in the world's top tourist destinations, up from number 31 in 2010 (Slide 2). Given the recent trend, I expect Japan will further nudge toward the United Kingdom at its number 6 position in the forthcoming update. This increase in foreign tourists is partly due to administrative efforts such as the relaxation of visa requirements as well as to the macroeconomic environment including the exchange rate constellation. On top of these factors, there is a potential attractiveness of Japan which we, the Japanese, have seldom noticed. For instance, Michelin nowadays has awarded stars to 221 restaurants in Tokyo, well exceeding that of London (66) and even Paris (101).³ Tokyo is just a part of the story. That is why, although I have been a world business traveller myself, I tend to choose Japan's regional areas for my holiday destinations as they are rich in nature, culture, and gastronomic experiences.

Contrary to the public image, the recent record of Japan's economic growth is far from a picture of stagnation. After the crush associated with the Global Financial Crisis (GFC) in 2008, real GDP has grown at 1¼ percent on average, the pace of which has barely changed from that of the pre-GFC boom period (Slide 3, on the left-hand side). That average growth rate might not be so impressive compared with the UK experience (2 percent), but the post-GFC slowdown in Japan is much less evident than elsewhere (Slide 3, on the right-hand side).

Public perception of stagnation might be partly based on old statistics.⁴ The post-GFC average growth was 1 percent in comparison with the current reading of 1¼ percent.

³ Data are as of October 3, 2017.

⁴ The Japanese Government now endeavors to improve the quality of their statistics under the "Statistics Reform" initiative. The main vehicle of the reform is the Statistics Commission led by Professor Kiyohiko G. Nishimura, who previously held my position, as Deputy Governor, at the Bank of Japan.

Japan's GDP statistics were substantially revised at the time of the introduction of the new standard (called "SNA2008") and associated annual revision in December last year. As a consequence, potential GDP growth estimated by the Bank of Japan staff was revised up by about ½ a percentage point to ¾ of a percent in recent years (Slide 4).

In this speech, I would like to go beyond these GDP statistics. First, the life expectancy for Japanese people is 84 years old or so, longer than that of other G7 peers (Slide 5, on the left-hand side). This longevity is often referred as proof of our rapidly aging society, with implicit negative connotations. Is it such a negative? I would argue that longer life itself should be taken more positively. An average Japanese today has twenty more years of time to enjoy life than people did in the early 1960s.

Second, a similar argument holds for working hours. We, Japanese, still work longer than in most other G7 countries, but have come to work substantially shorter hours today than previously (Slide 5, on the right-hand side). Some may say that, all things being equal, the shorter working hours lowers potential GDP and thus shorter working hours must be bad for our economy. However, on the flip side of the coin, we should not forget that we can enjoy more free time, which itself is again good for us. Compared with the day I entered the Bank almost 40 years ago, Japanese workers now have an extra two hours per business day for their leisure.⁵

These two elements — longer life expectancy and more free time — are not taken into account in GDP statistics. As argued by some economists,⁶ the theory suggests that we should take them into account to measure the welfare level of a country. If I may continue — forgive me if what I am saying sounds too abstract — the theory also suggests that, first, instead of GDP as a whole, we need to calculate GDP per head, or more precisely, lifetime consumption per head, as the total amount of consumption and leisure enjoyed over lifetime matters for one's utility level;⁷ second, generally speaking,

⁵ This calculation assumes 20 business days per month. Strictly speaking, this assumption does not hold because, when I entered the Bank, we used to come to the office for a half a day every Saturday. However, the thrust of the calculation — that is, more free time has become available — would not change irrespective of the assumption of business days per month.

⁶ C. I. Jones and P. J. Klenow (2016): "Beyond GDP? Welfare across Countries and Time," *American Economic Review*, 106(9), pp.2426-2457. B. S. Bernanke and P. Olson (2016): "Are Americans Better Off than They were a Decade or Two Ago?," Blog posted on 19 October, 2016.

⁷ Up to this point, what I am saying can be simply expressed in mathematical terms, as one's expected lifetime utility is $U = E \sum_{t=1}^{Life} \beta^t u(c_t, l_t)$, where E is an expectation operator, β is discount factor, $u(\cdot)$ is utility function, c_t is consumption per capita and l_t is leisure time. The second point (a preference for smooth consumption) requires a further assumption on the specific form of utility function.

we do not want to see our quality of life — in economic terms, the amount of per capita consumption — fluctuate too much. The second point implies that we need to discount inequality in the calculation of welfare, as the existence of inequality indicates that our consumption may fluctuate in a volatile way.

So much for economic theory. Taking into account these points, if we calculate welfare measures instead of GDP, Japan's economic performance appears much better. In 2014, our GDP per capita was less than 70 percent of the US level and we were ranked at the bottom of the G7 countries (Slide 6, on the left-hand side). In contrast, our welfare was much closer to the US level (92 percent) and equivalent to that of the United Kingdom as well as Canada and Italy. Longer life expectancy and lower inequality account for Japan's better performance in terms of welfare.

Furthermore, if we calculate the change in welfare, the performance of Japan stands out (Slide 6, on the right-hand side). Our welfare has improved by 4¼ percent annually since 1985 in comparison with by 2¼ percent in GDP per capita over the corresponding period. This improvement is the fastest among the G7 countries. Longer life expectancy and more free time are the sources of this better performance.

(Labor Market Reforms and Productivity)

Despite all these bright aspects of Japan's economy, going forward, we cannot dismiss how serious the challenges we need to face are. In particular, we are up against a serious demographic headwind. We are in a demographic onus society where the working age population declines at a faster pace than that of the total population (Slide 7).

There may be some additional sources of labor supply available. For instance, the number of foreign workers has already exceeded one million after a remarkable increase in recent years and might increase further (Slide 8, on the right-hand side). We might also be able to expect more female and elderly workers will come into the labor market (Slide 8, on the left-hand side and middle). As a matter of fact, there has been a dramatic increase in the labor force participation rate of females in the age group of 25-34 over the past decades and today more women in this age group work in Japan than in the United States (Slide 9).⁸

⁸ The life-long profile of female labor force participation rate had displayed an M shape in Japan as women tend to leave the labor market at the time of child-bearing. This M shape has become less conspicuous more recently.

However, even if we can rely on these additional labor supplies, we ought to increase labor productivity. As shown in Slide 10, in order to achieve the Japanese Government's aim of two percent growth, we would need an unrealistically high labor productivity annual growth of 2.9 percent, if nothing is done on the labor market front. My admittedly crude, "back-of-envelope", calculation suggests that even if we assume the extreme scenario where a) female labor participation will increase to the level of Sweden; b) all elderly who say they are in good shape will work; and c) the share of foreign workers will reach the level of the United Kingdom, we would still need to speed up annual productivity growth to 1.2 percent from the 1.0 percent observed after the 1990s (Slide 10).⁹ For a country like Japan with a shrinking population, what this calculation underscores is that improving productivity is the number one priority.

So the question is, can we really speed up productivity growth? My answer is, it will be difficult but it is possible, and this conclusion is based on the following three observations.

First, there is ample room for Japan to further increase its level of productivity.

Assuming that the United States is a frontier of technological progress, Japan's labor productivity is still but 60 to 70 percent of the frontier level (Slide 11). The slide shows the process of catching-up in follower countries: productivity increase tends to be more rapid when a country is further from the frontier and vice versa. For a reason which is still unclear, in a wide range of countries, that catching-up seems to have stalled in recent decades and these countries have fallen into something that can be referred to as the "productivity trap".¹⁰ Japan fell into that trap after the 1990s at a relatively lower productivity level than that of the United Kingdom and Germany. I often hear from multinational Japanese manufacturers that the productivity level of their domestic factories is in fact very competitive; therefore, I think this relatively low productivity has to do with the non-manufacturing sector and the headquarters of the manufacturing sector where the white-collar workers, like me, reside.

Within Japan, albeit with this slightly out of date data, the productivity gap between frontier firms and follower firms has become wider (Slide 12). Again, this suggests that there is ample room to exploit in order to improve productivity. At the same time, the

⁹ I must emphasize that some of these assumptions are not necessarily realistic or desirable. The intention of this calculation is to indicate how critical it is to raise productivity.

¹⁰ For one attempt to solve this puzzle, see K. Aoki, N. Hara and M. Koga (2017): "Structural Reforms, Innovation and Economic Growth," Bank of Japan Working Paper Series, 17-E-2.

fact that the productivity of frontier firms has moved almost sideways also indicates that there is also room for these domestic leading firms to catch up with the global frontier.

Second, productivity can be increased with appropriate reforms. Among various reform measures, it seems to me that those which address increasing labor mobility are critical.

Japan's labor mobility, as measured in terms of turnover ratio in unemployment pool, remains low both historically and relative to its peers (Slide 13). This is presumably because of the distinct dichotomous labor markets structure in Japan. Mobility is quite high for non-regular workers and low for regular workers. The share of regular workers, although it has declined, still amounts to about 70 percent of workers. This low mobility of regular workers is thought to be one consequence of the implicit long-term labor contract between management and workers. Regular workers tend to have a higher salary compared with non-regular workers. In order to maintain this privilege, and despite current tight labor market conditions, in exchange for their job security these regular workers do not demand large pay rises (Slide 14, on the left-hand side).¹¹ Wages of non-regular workers are, in contrast, quite responsive to slack in labor market and their wages have increased by about 2 to 3 percent, on a year-on-year basis recently (Slide 14, on the right-hand side).

There is a positive correlation between labor mobility and productivity. The higher labor mobility is, the faster productivity growth tends to be (Slide 15). It is true that we cannot claim some causal relationship from this cross-country comparison. However, I think that low labor mobility is one source of the productivity gap seen above. If mobility were higher, the dissemination of advanced technology or skills from frontiers to followers may well prove much smoother.

The Japanese Government has begun to implement labor market reforms which aim to increase labor mobility. For instance, the initiative of "equal pay for equal work" under the work style reform may obscure the distinction between regular versus non-regular workers discussed above. I hope that steady progress can be made on this front together with the other measures of the government's growth strategy.

Third, the current serious labor shortage could be a catalyst for improving productivity.

The labor market in Japan is literally very tight at the moment. The current reading of the unemployment rate is just 2.8 percent which is the lowest since the mid 1990s.

¹¹ This is nothing but the insider-outsider theory of employment.

Another labor market indicator such as the job openings-to-applicants ratio points to the smallest amount of slack that has been seen even going back to the early 1970s.

How do Japanese firms cope with these tight labor market conditions? Using the business intelligence network of the Bank, between headquarters and the 32 branches all across Japan, I find that firms' responses can be categorized in the following three groups.

The first category of business response is to raise wages and to raise prices. A prime example is a large transportation company in Japan. Because of very serious shortage of drivers, the firm has decided to raise drivers' wages and at the same time increase its transportation fees. This is encouraging from an inflation perspective. However, I must confess that our network has not found so many followers other than those in the transportation industry or some budget chain restaurants thus far.

The second category of business response is to increase capital expenditure to save on the labor force. For instance, retail stores, even in rural areas, have introduced self-serve cash registers. Quite a number of restaurants have adopted a touch-screen ordering system through which you can input your order directly without calling a waiter or a waitress. According to our Tankan survey, firms plan to expand their business investment by as much as about 7 percent compared to ½ percent or so last year. We think labor-saving investments partly account for this increase.

The third category of business response is to reconsider business processes. For instance, some restaurants have ceased operating 24 hours given the labor shortage. The same transportation company I referred to earlier suspended its same day delivery service. I always have a problem of how to translate this word in English, but many of you who have been to Japan must have enjoyed OMOTENASHI service. The spirit of OMOTENASHI is providing extra service without charge to show our good-will or courtesy. But a number of firms in Japan seem to be reconsidering whether they should continue with these services against the backdrop of an acute labor shortage. Some firms may stop providing these extra services in part, while others may begin to charge for them. By doing so, firms can raise productivity because they stop providing services which do not contribute to immediate additional sales or they can raise sales with the same labor cost.

It is always dangerous to read too much from anecdotes, but, as we will see later, the fact that productivity has indeed begun to increase in Japan lends itself well to my assessment: as seen in the second and the third category, labor shortages induce firms to

take some measures to reform themselves endogenously so as to improve productivity. These endogenous efforts can be seen as a part of labor market reforms in a broader sense — reforms are driven not only by government and but also by the private sector. In any event, these episodes lead me to believe that the tight labor market, together with the implementation of government initiatives, will result in a substantial increase in productivity down the road.¹² And improving productivity is precisely what the third arrow of Abenomics has been aiming for.

I understand that productivity growth has decelerated in the United Kingdom as well as the United States in recent years, in contrast to my story today that productivity growth has accelerated in Japan.¹³ I do not intend to pretend that I have a deep understanding of this difference, but my sense is that the following two elements may account for some of the difference. First, Japan has advanced in terms of demographic change and hence the labor supply has become a more scarce resource. This might give Japanese firms more of an incentive to raise their productivity. Second, Japan has more room to increase productivity as seen earlier. There is relatively abundant low hanging fruit for Japanese firms to capitalize on.

(Labor Market Reforms and Prices)

As a professional central banker, I cannot help touching upon the effect of labor market reforms on price development.

Prima facie, progress in labor market reforms and a commensurate increase in productivity exert downward pressure on inflation. On the one hand, as we saw, Japanese firms contain wage increases by restraining the increases of regular workers. So as a consequence, the real wage moves almost sideways (Slide 16, on the left-hand side). On the other hand, these firms improve their labor productivity by increasing labor saving capital expenditure and by reviewing their business processes. On top of

¹² What I am saying is that the business cycle can affect long-term growth. Usually, economists think the business cycle and long-term growth are mutually independent. As an exception, the theory of hysteresis claims that a high unemployment rate, which is assumed to reflect business cycle conditions, lowers growth potential through deterioration in human capital. My story can be seen as the opposite of the hysteresis theory in that low unemployment rate raises growth potential through endogenous reactions of the corporate sector to improve productivity. For hysteresis, see O. J. Blanchard and L. H. Summers (1986): “Hysteresis and the European Unemployment Problem,” *NBER Macroeconomics Annual*, vol.1 pp.15-90.

¹³ A. G. Haldane (2017): “Productivity Puzzles,” speech made at London School of Economics (March 20, 2017) ; S. Fischer (2017): “Government Policy and Labor Productivity,” speech made at a forum by the Summer Institute of Martha’s Vineyard Hebrew Center (July 6, 2017).

this, the wedge between them, which we label here the real wage gap, which is equivalent to the real unit labor cost or the labor income share, has declined (Slide 16, on the right-hand side). This means real wage increases have not caught up with improvements in labor productivity. There is some evidence that the real wage gap lowered the inflation rate by $\frac{1}{4}$ of a percentage point recently (Slide 17).

Since this is not an academic conference, instead of focusing on the technical details or listing all sorts of reservations related to this Phillips curve estimation, I would like to highlight the following three points that may contain some policy implications.

First, in the long run, this downward pressure on prices is expected to dissipate.

Going back to the right-hand side panel of Slide 16, there is a tendency for the real wage gap to revert to zero.¹⁴ That means, in the long run, real wage is equal to labor productivity. For this reason, we can assume that the current weakness in inflation due to the real wage gap is a temporary phenomenon, although we do not know precisely how long it takes to close the gap or how temporary is temporary.

In a similar vein, although I said that there is ample room for Japanese firms to further increase their labor productivity, there must be a point when these firms reach the frontier and begin to pass through wage pressures to prices. That timing will differ from one firm to another and from one industry to another. On this score, I expect that inflation will go up gradually as more and more firms reach the tipping point. It is for this reason that I believe it may only be a matter of time before we see inflation pressures gather momentum towards the price stability target of 2 percent.

Furthermore, demand is supposed to react so as to exert upward pressures on prices. Once people begin to perceive that higher productivity raises the potential growth of Japan's economy, consumption and investment increase as their permanent income and profit outlook improve. The higher potential growth should also feed into the higher natural rate of interest, which would enhance monetary stimulus.

¹⁴ I understand that this point is now under active debate in academic circles. If the elasticity between labor and capital is more than unity, the real wage gap or the labor income share shifts down permanently, i.e., the real wage gap never reverts to zero. Although we have not yet come to a firm conclusion, we have not found this condition of elasticity materialize in Japan (Slide 18). See International Monetary Fund (2017): "Understanding the Downward Trend in Labor Income Shares," *World Economic Outlook*, Chapter 3, April 2017.

Second, higher productivity can largely be regarded as a supply-side shock.

It is conventional wisdom for central bankers to pass through the first-round effects of a supply-side shock to inflation. For instance, in the face of oil price hikes such as those experienced in the 1970s, the monetary authorities may accommodate the direct impact of these oil price increases, although they should proactively prevent long-term inflation expectations from derailing as the second-round effect. In academic literature, there is a body of research that examines whether or not this conventional wisdom can be justified.¹⁵ My take is that all of their conclusions depend on the particular model specifications such as model structures and parameters. However, as a policy practitioner, I do see merits in this wisdom. After all, we cannot neutralize supply-side shocks because what we, central bankers, can handle is the demand side of the economy. For example, in the emergence of a similar supply-side shock like the oil price hikes in the 1970s, the monetary authorities themselves could not increase oil production by influencing OPEC. Furthermore, instead of taking countermeasures, we might want to induce the necessary relative price changes associated with the shock. Following this line of argument, I think that the Bank may well let the effects of higher productivity feed into inflation, as long as there is little concern about the second-round effect.

Third, as labor market reforms proceed, the higher labor mobility discussed earlier should change the Phillips curve relationship.

We, central bankers, conventionally think that inflation is determined by a) past inflation that reflects inflation inertia or adaptive inflation expectations; b) future expected inflation; c) the output gap and d) other factors or an error term that are not captured by the former three determinants (Slide 19).

Japanese inflation dynamics has two distinct features (Slide 20). One is inflation is very sticky as indicated by the larger coefficient (α) on past inflation. On the flip side of the coin, the coefficient on forward-looking inflation expectation ($1-\alpha$) is smaller. That is, adaptive inflation expectations are more prominent in Japan. The other feature is the smaller coefficient (β) on the output gap. This means that inflation is barely responsive to the slack in the economy. These two features may reflect the dichotomous labor market structure in Japan, in which wages of regular workers are unresponsive to labor market conditions and quite adaptive. In the annual spring wage negotiations between regular workers and management, the base salary payment is often determined by past

¹⁵ See, for example, J. Galí (2015): *Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework and Its Applications*, Princeton University Press.

inflation without fully referring to the tightness of the labor market.

The higher labor mobility associated with labor market reforms may alter these characteristics. The higher labor mobility is supposed to lessen the benefit of implicit long-term labor contracts or help blur the distinction between regular workers and non-regular workers. As a consequence, wages of regular workers may become more reflective of labor market conditions and less sticky. In fact, based on Bank of Japan staff analysis, the coefficient on the past inflation would become much smaller and that on the output gap significantly larger, if labor mobility in Japan were raised to the US level (Slide 21). If this were the case, this would also contribute to higher inflation in Japan under the current environment.

(Concluding Remarks)

Let me now wrap up.

We believe that the underlying momentum for inflation dynamics in Japan remains intact, as the output gap and inflation expectations continue to improve. Looking ahead, I think there is a good prospect of inflation pressure building up, as I have argued today. The improving labor productivity that we are witnessing at the moment is exactly what is required for Japan's economic reforms. And as I have also said today, labor market reforms should further help raise labor productivity. The growth strategy remains as important as ever. The very tight labor market at full employment, together with accommodative monetary conditions, should mitigate any frictional costs that might otherwise accompany the necessary structural reforms. What we have now in our hands is a golden opportunity to upgrade Japan's economy.

We have come a long way in our conquest of deflation. Looking back at the policy responses, although there were successes, I have to admit that there were also shortfalls, as well as a couple of false dawns.¹⁶ But we have learned some lessons. This time around, there seem to be more reasons to believe that the true dawn is near.

The final last slide presents a waka-poem by an eighth century Japanese poet, Kakinomoto no Hitomaro (Slide 22). The poem, which is from an ancient anthology called the MANYO-SHU has long been one of my favorites and describes the approaching dawn in glowing purple to the east and a declining moon to the west. Perhaps the present Japanese economic scene can be compared to the spiritual uplift

¹⁶ M. Shirakawa (2009): "Way Out of Economic and Financial Crisis — Lessons and Policy Actions," speech made at Japan Society, New York (April 23, 2009).

before an approaching dawn, as described in the poem. When the morning light arrives, we will know that after a long night the sun also rises, when hopefully we can see more visibly that the Japanese economy is back on track toward strong, sustainable and balanced growth.

Thank you for your attention.

Japan's Way toward Strong, Sustainable, and Balanced Growth:

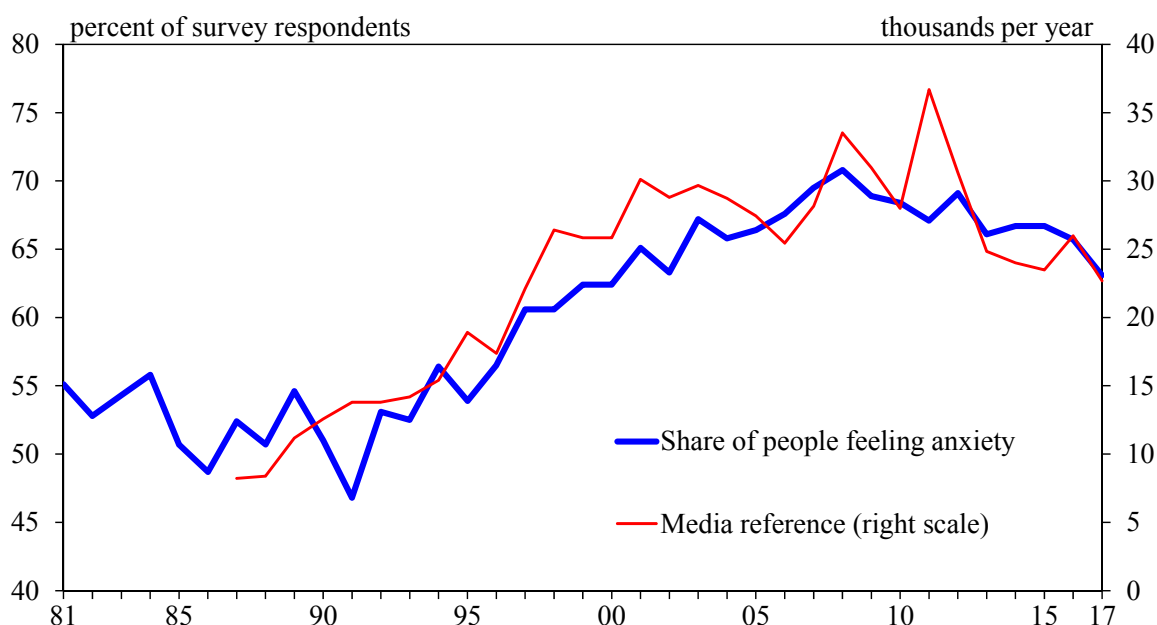
Assessment of the potential of the Japanese economy suggests
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*Speech at meeting hosted by the Japan Society
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Hiroshi Nakaso
Deputy Governor of the Bank of Japan

1. Reassessing Japan's Economy

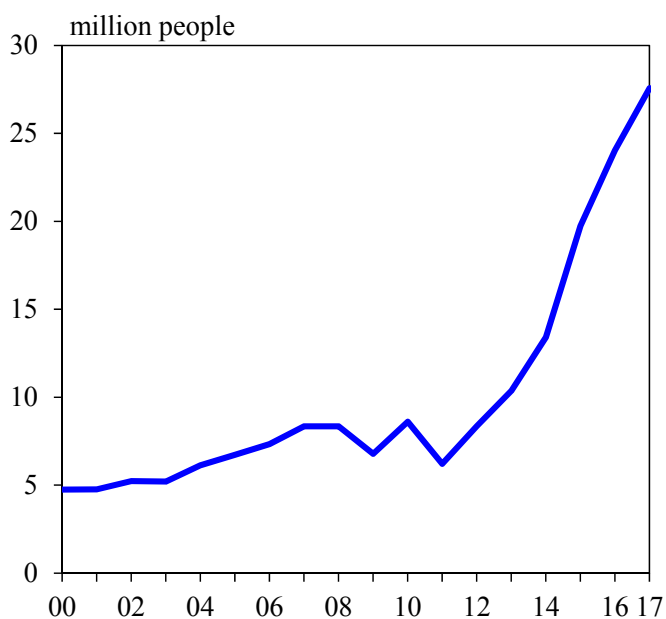
Anxiety



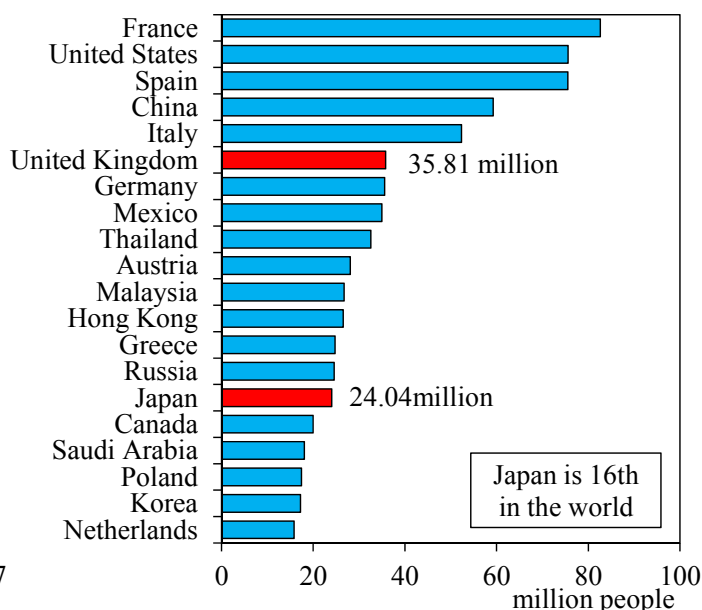
Notes: 1. The share of people feeling anxiety is the share of respondents answering “feeling high pressure or anxiety” of total respondents in the annual Public Opinion Survey on the Life of the People conducted by the Cabinet Office. Until 2015, survey participants are aged 20 and older, and from 2016 onward are aged 18 and older.
 2. Media references to anxiety displays the number of media reports citing anxiety (“fu-an” in Japanese) found in *The Asahi Shimbun*, *The Mainichi*, *The Nikkei*, *The Nikkei Business Daily*, *The Nikkei Marketing Journal*, and *The Yomiuri Shimbun*.
 Sources: Cabinet Office, “Public Opinion Survey on the Life of the People;” Nikkei Telecom.

Foreign Tourists

Foreign Tourist Arrivals in Japan

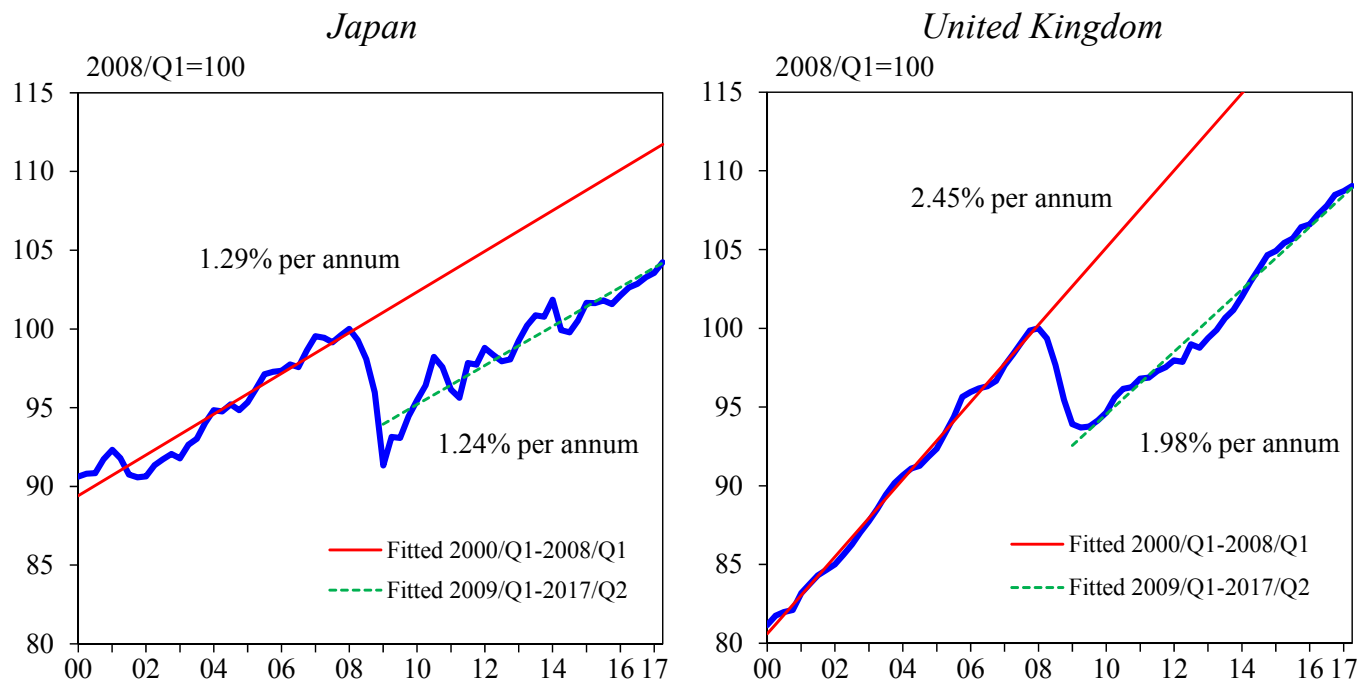


World's Top Tourism Destinations in 2016



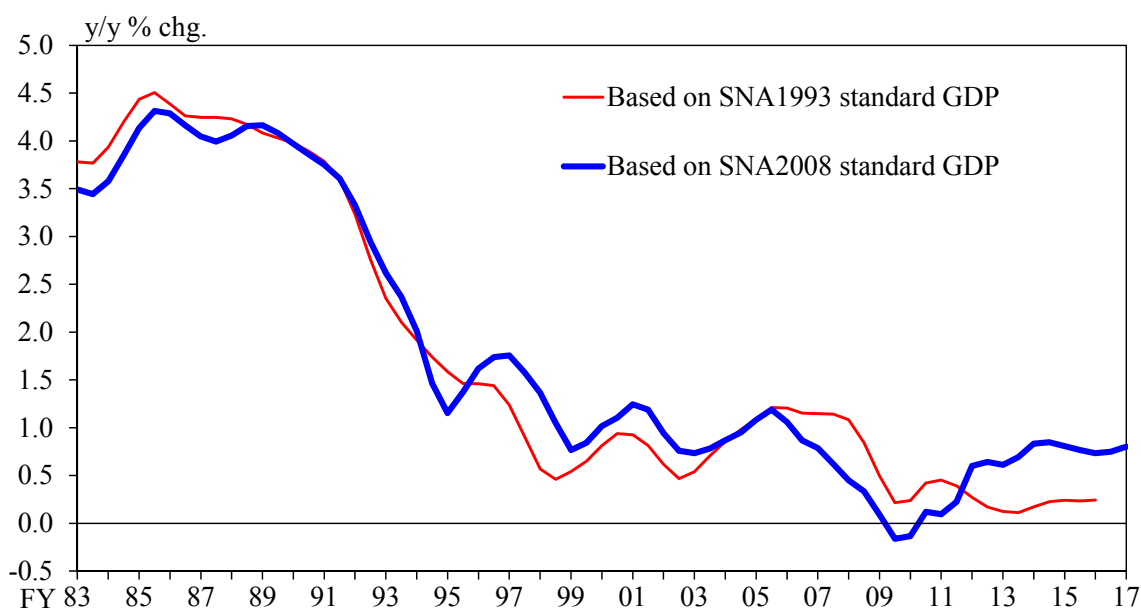
Notes: 1. The observation of foreign tourist arrivals in Japan for 2017 is the annualized level of the January - August average.
 2. While the UNWTO has announced that Turkey ranked 10th in 2016, Turkey is not displayed due to data availability.
 Sources: Japan National Tourism Organization (JNTO); UNWTO.

Real GDP



Note: The GDP series in the figures are seasonally-adjusted.
Source: OECD.

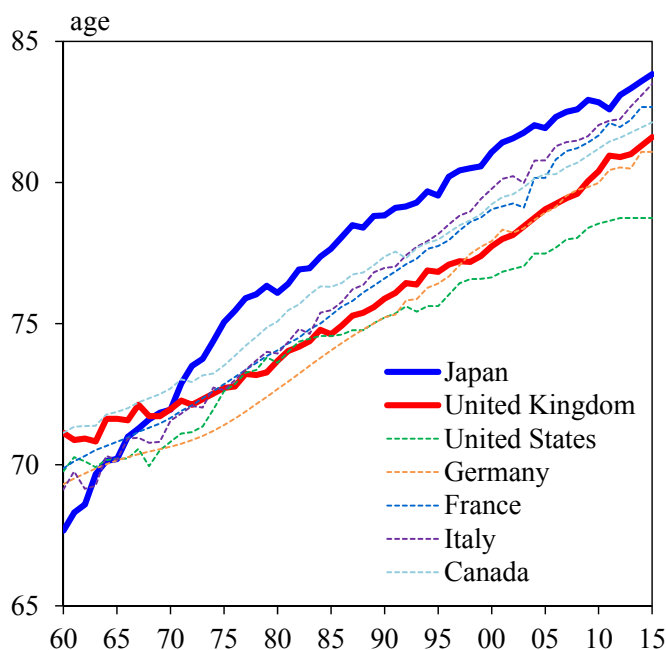
Potential GDP



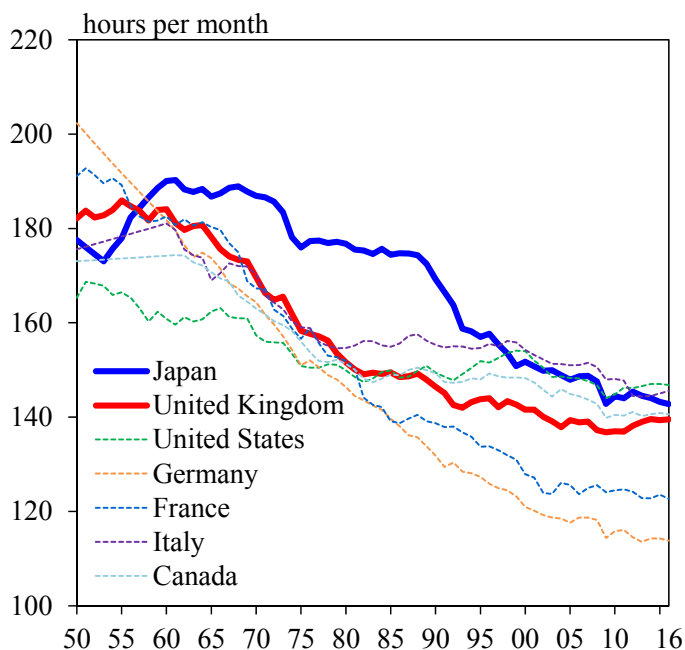
Note: The potential growth rate series are estimated by the Research and Statistics Department, the Bank of Japan.
Source: Bank of Japan.

Life Expectancy and Hours Worked

Life Expectancy



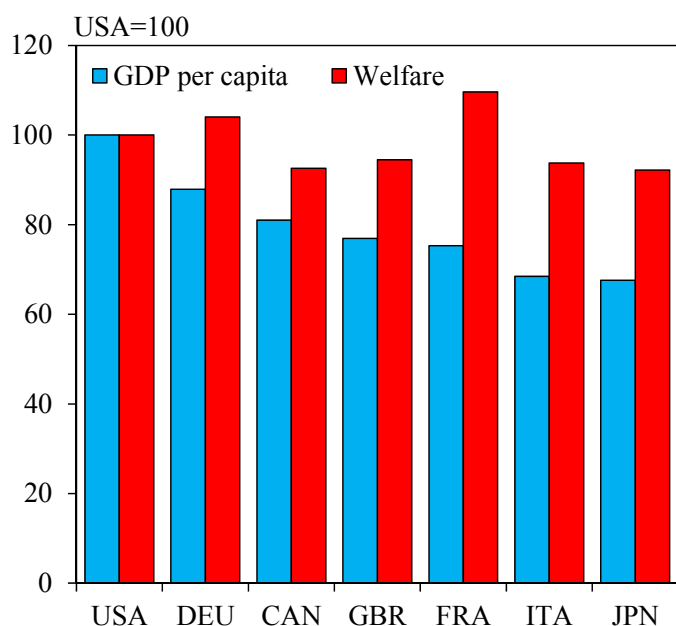
Hours Worked per Worker



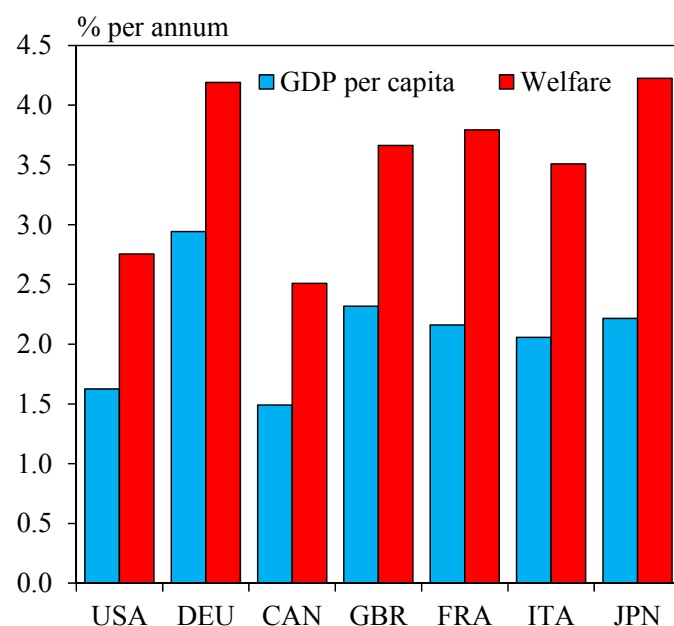
Sources: OECD; Penn World Table; World Bank.

Beyond GDP

Welfare and Income in 2014



Changes in Welfare and Income between 1985 and 2014

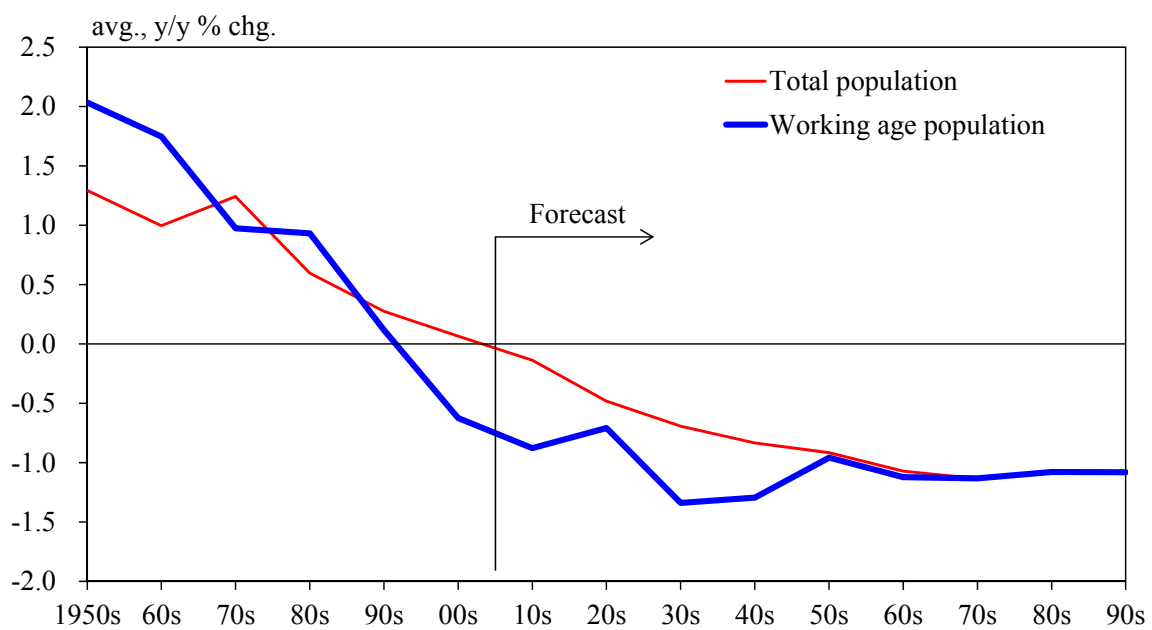


Sources: OECD; Penn World Table; World Bank; Bank of Japan staff calculations based on C. I. Jones and P. J. Klenow (2016): "Beyond GDP? Welfare across Countries and Time," *American Economic Review*, 106 (9), pp.2426-2457.

2. Labor Market Reforms and Productivity

Slide 7

Demographic Outlook



Note: The population data from 2017 onward are the medium variant of the Population Outlook published by the National Institute of Population and Social Security Research.

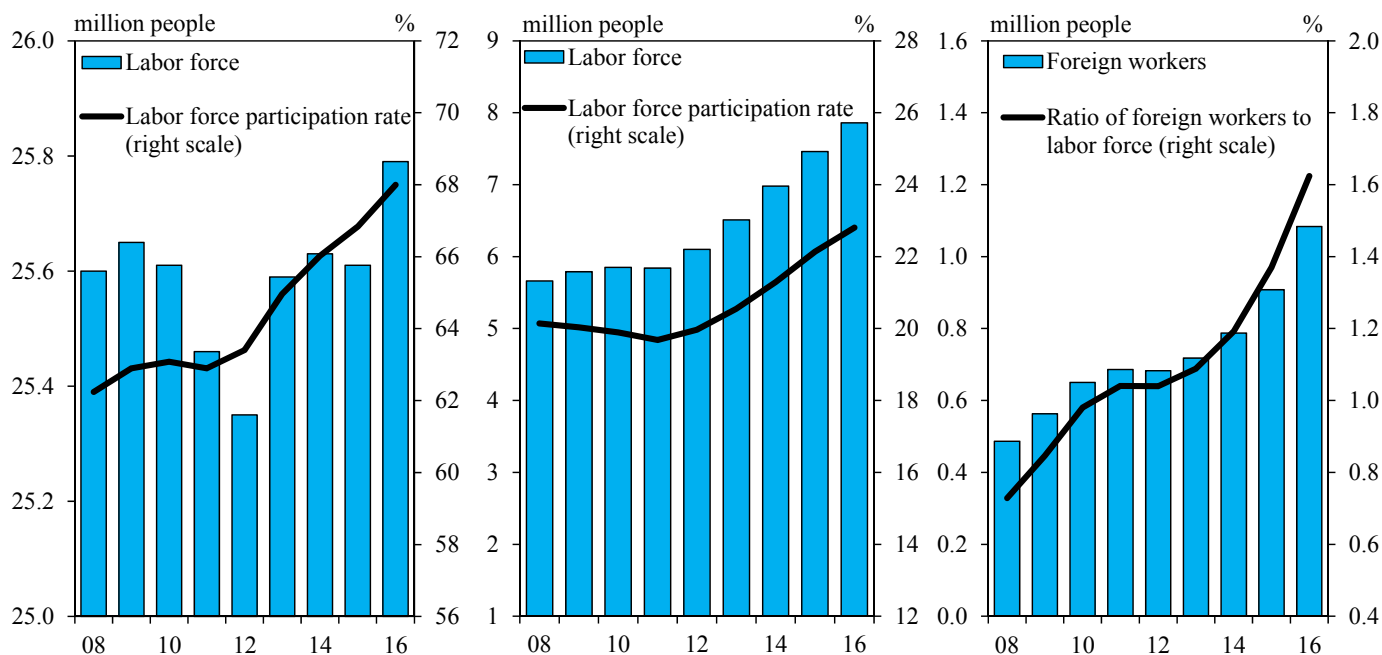
Sources: Ministry of Internal Affairs and Communications; National Institute of Population and Social Security Research.

Sources of Additional Labor Supply

Female (aged 15-64)

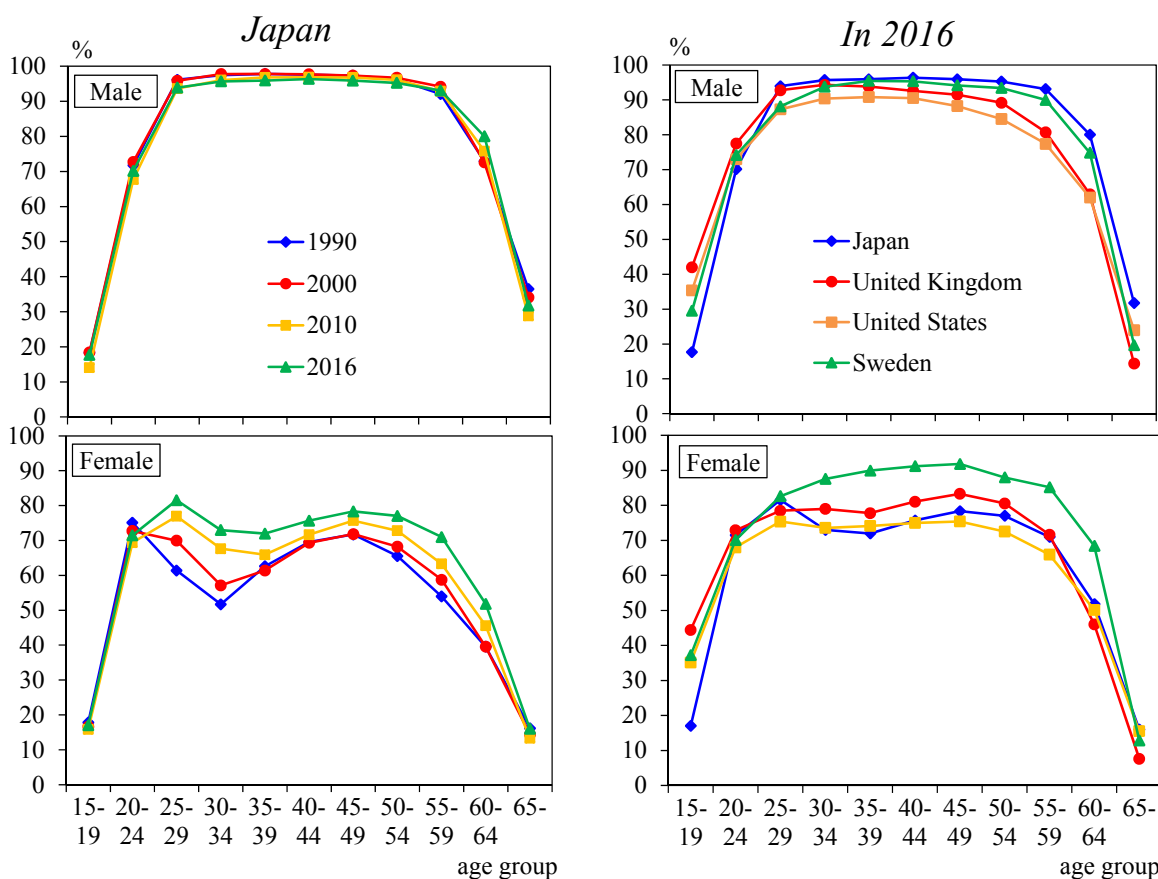
Elderly (aged 65-)

Foreign



Sources: Ministry of Health, Labour and Welfare; Ministry of Internal Affairs and Communications.

Labor Force Participation Rates



Sources: Ministry of Internal Affairs and Communications; OECD.

Back-of-Envelope Calculation

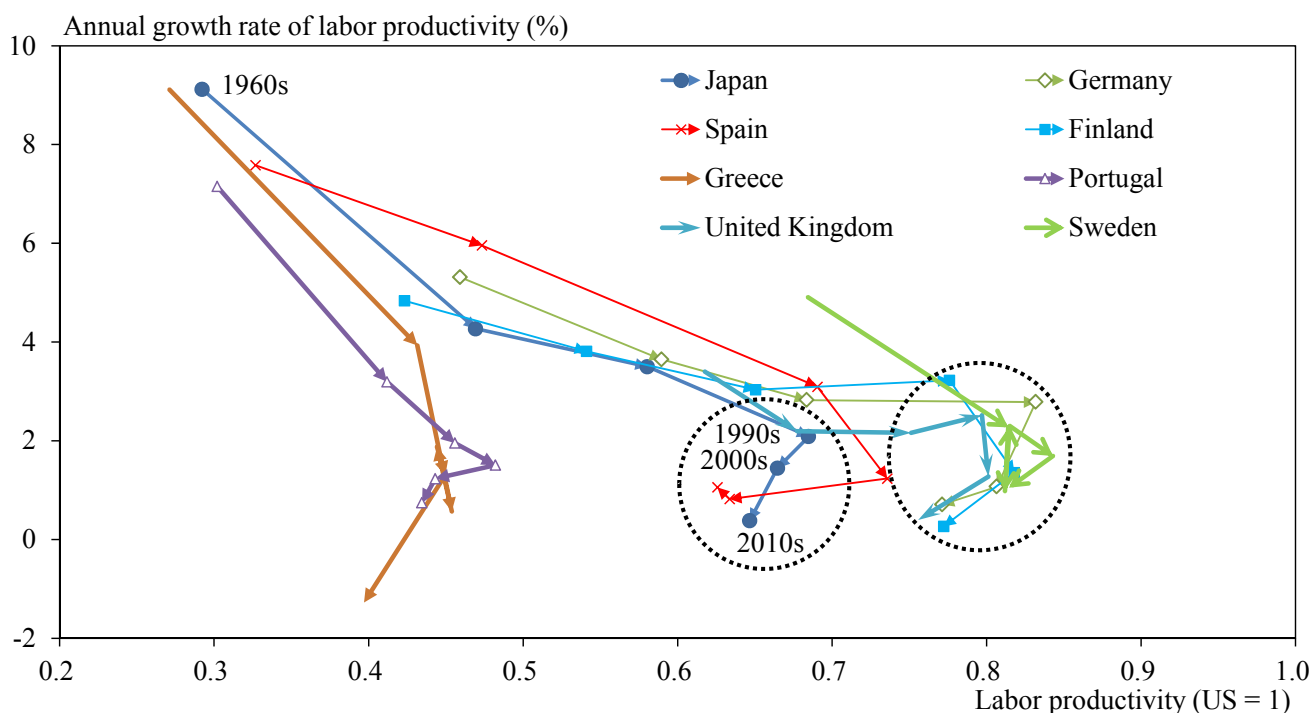
avg., y/y % chg.

	Japan					United States	
	1980-2016	1990-2016	Projection for 2017-2040			1980-2016	1990-2016
			Status quo	More female workers & more elderly workers	More foreign workers		
Real GDP	2.0%	1.2%	2.0%			2.6%	2.4%
Labor productivity	1.6%	1.0%	2.9%	1.4%	1.2%	1.4%	1.5%
Number of employed persons	0.5%	0.2%	-0.9%	0.6%	0.8%	1.2%	1.0%

Notes: 1. The “Status quo” assumes that the labor force participation rate for every age and gender group remains unchanged from that in 2016.
 2. “More female workers & more elderly workers” assumes that by 2040 i) the labor force participation rate for females aged 25-59 is that of the same age and gender group in Sweden in 2010 and ii) all of the healthy people aged 60 and older are in the labor force.
 3. “More foreign workers” additionally assumes that by 2040 the share of foreigners in the labor force will rise to the level of the United Kingdom in 2010.
 Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; Cabinet Office; Japan Institute for Labour Policy and Training; Ministry of Internal Affairs and Communications; National Institute of Population and Social Security Research; OECD.

Productivity Trap

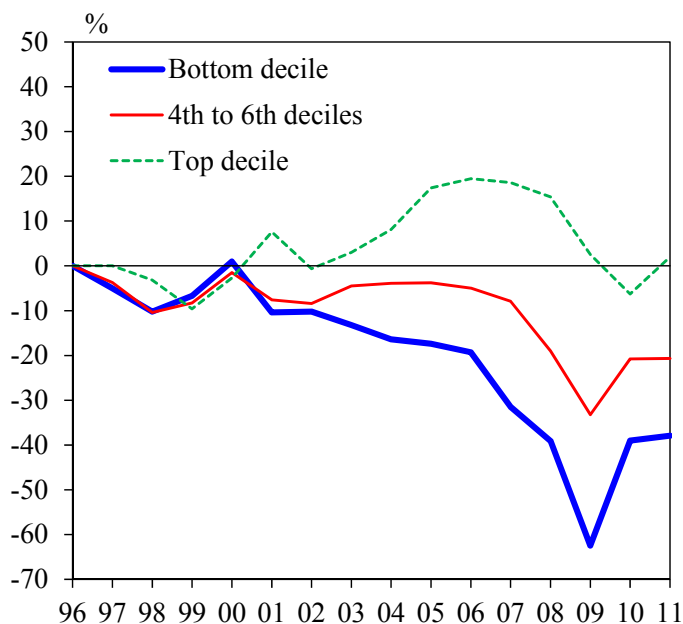
Growth Rate of Labor Productivity and Distance from the World Technology Frontier



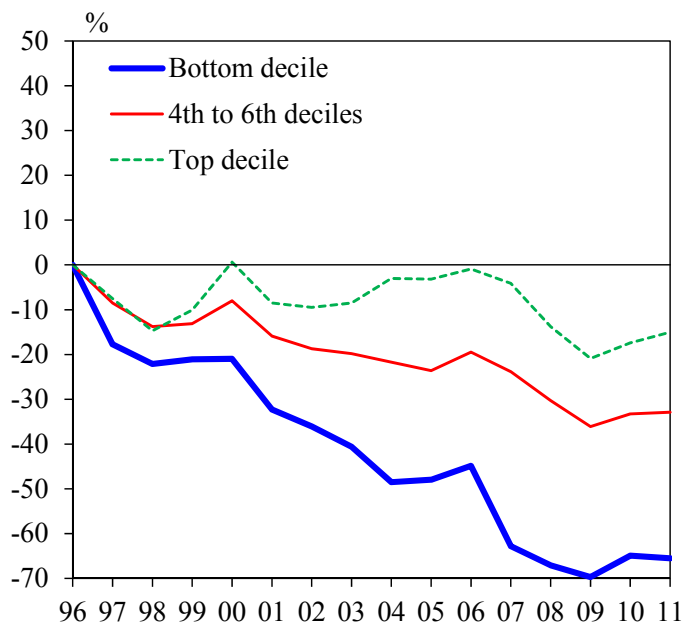
Note: Labor productivity is expressed in terms of per hour worked. Relative labor productivity for each country displays the country’s labor productivity level relative to the United States between the 1960s and 2010s. The data for the 2010s are averages over the years 2010 to 2015.
 Sources: The Conference Board, “The Conference Board Total Economy Database™, May 2016;” K. Aoki, N. Hara, and M. Koga (2017): “Structural Reforms, Innovation and Economic Growth,” Bank of Japan Working Paper Series, 17-E-2.

Productivity Gap at Firm's Level

Manufacturing Sector



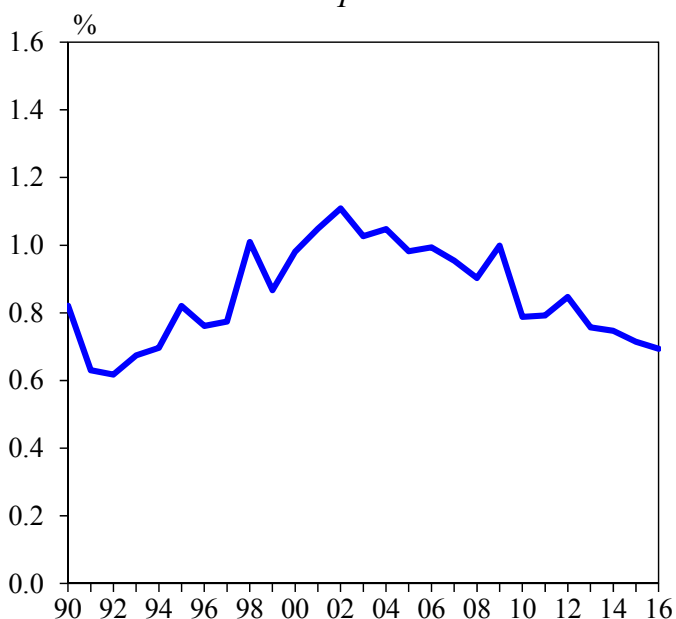
Non-Financial Market Services Sector



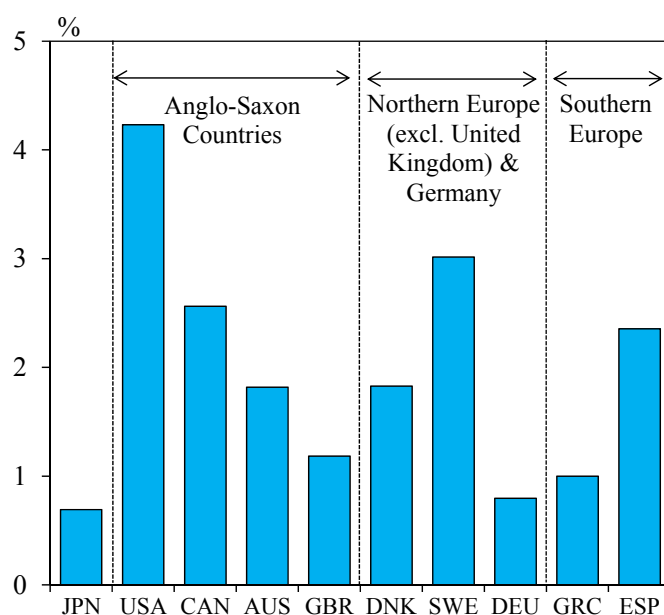
Notes: 1. The figures display cumulated changes of the labor productivity from 1996 for Japanese firms of the corresponding sector in the bottom decile, between the 4th and 6th deciles, and in the top decile of the labor productivity distribution in any given year.
 2. This data only includes firms with more than 50 employees, and covers the period from 1996 to 2011.
 Sources: OECD; G. Berlingieri, P. Blanchenay, and C. Criscuolo (2017): "The Great Divergence(s)," OECD Science, Technology, and Innovation Policy Papers No. 39.

Labor Mobility

Japan

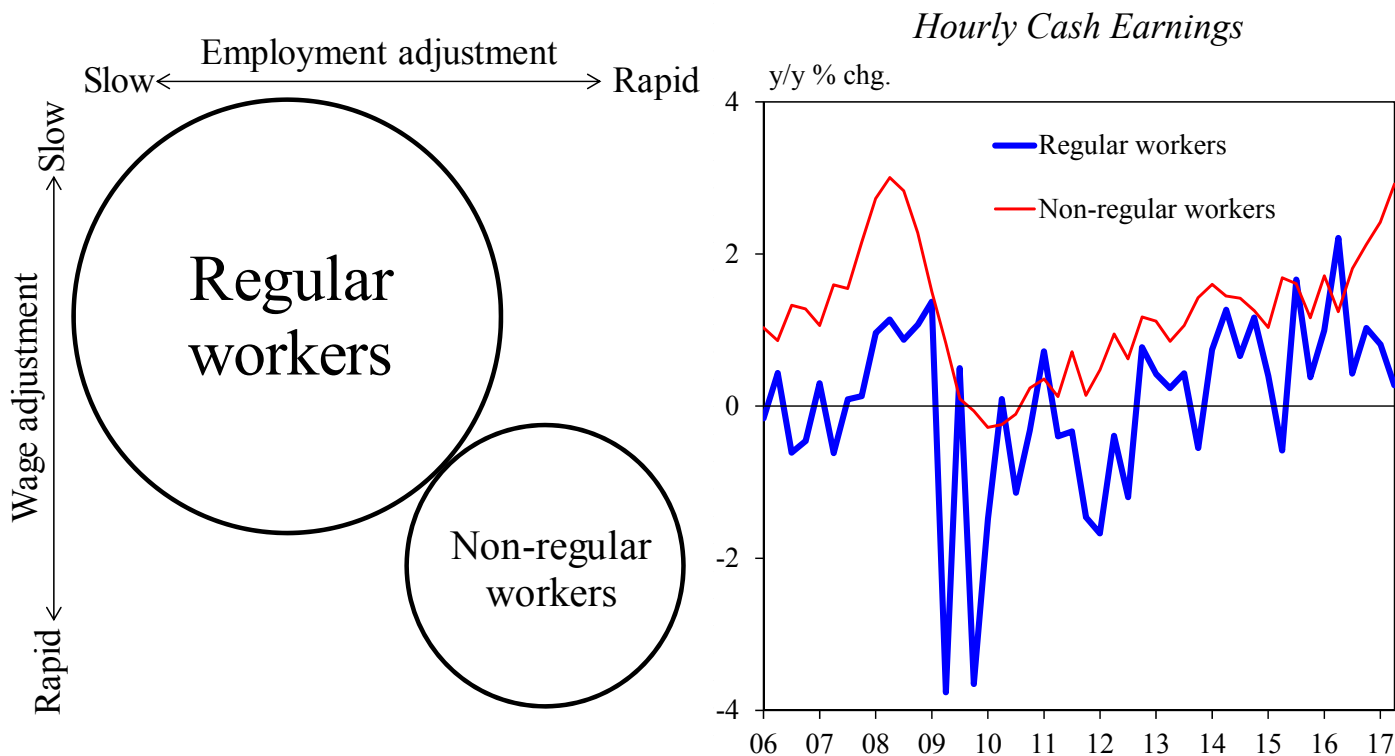


In 2016



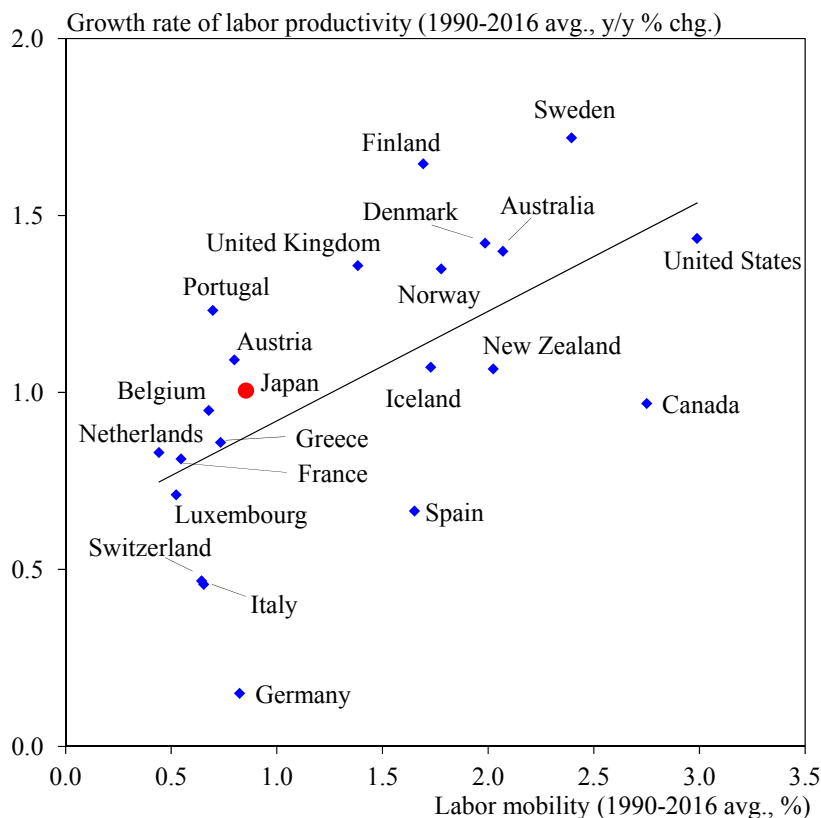
Note: A country's labor mobility is measured by the ratio of the sum of flows in and out of short-term unemployment (unemployed less than one month) for population aged 15-64 in the respective country.
 Sources: OECD; World Bank.

Japan's Labor Market Dichotomy



Notes: 1. For hourly cash earnings, Q1 = March-May, Q2 = June-August, Q3 = September-November, and Q4 = December-February.
 2. Hourly scheduled cash earnings for part-time employees are displayed for non-regular workers.
 Source: Ministry of Health, Labour and Welfare.

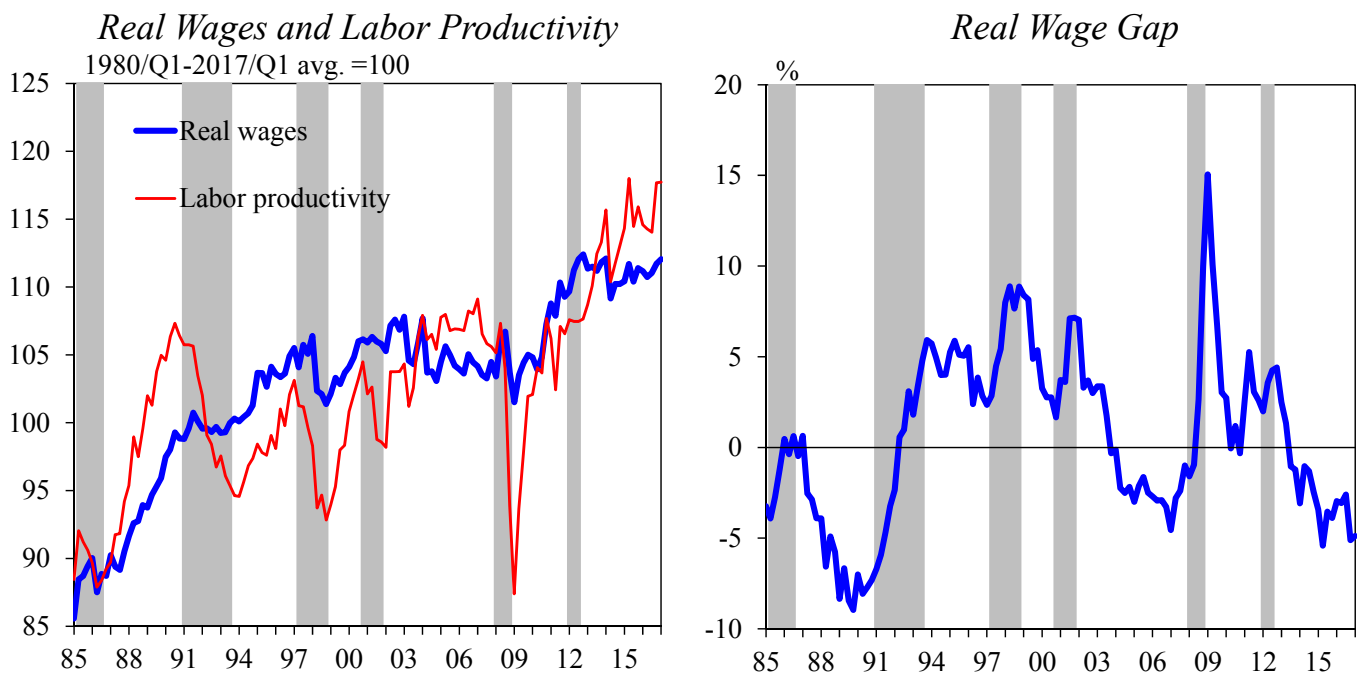
Labor Mobility and Productivity



Note: A country's labor mobility is measured by the ratio of the sum of flows in and out of short-term unemployment (unemployed less than one month) for population aged 15-64 in the respective country.
 Sources: OECD; World Bank.

3. Labor Market Reforms and Prices

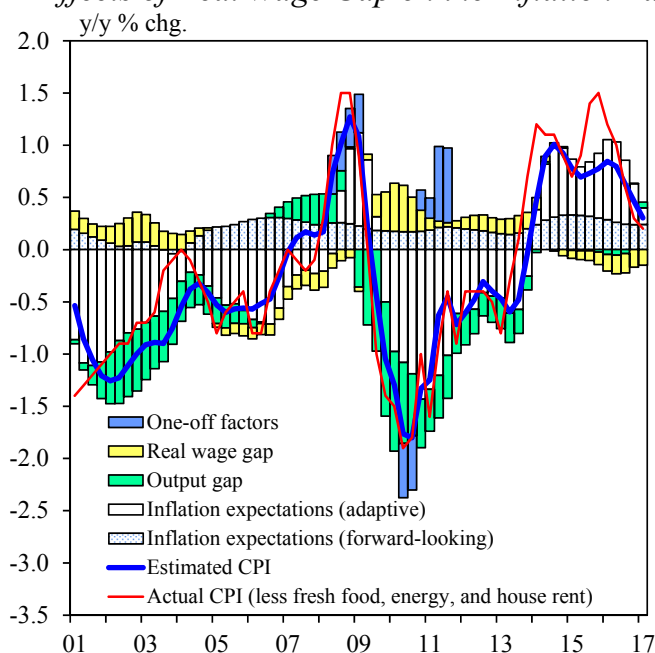
Real Wage Gap



- Notes: 1. Real wages = personnel expenses / number of employees / GDP deflator.
 2. Labor productivity = (operating profits + personnel expenses + depreciation expenses) / number of employees / GDP deflator.
 The data used to compute labor productivity except for the GDP deflator series are based on the “Financial Statements Statistics of Corporations by Industry, Quarterly,” and do not cover the finance and insurance industry.
 3. The real wage gap is defined as the deviation of real wages from labor productivity.
 4. Shaded areas indicate recession periods.
 5. Data for real wages and labor productivity are seasonally adjusted.
- Sources: Cabinet Office; Ministry of Finance.

Augmented Phillips Curve

Effects of Real Wage Gap on the Inflation Rate



(a) Specifications

$$\begin{aligned} \pi_t = & \beta_0 \\ & + \beta_1 \times \pi_t^e \\ & + (1 - \beta_1) \times (\pi_{t-1} + \pi_{t-2}) / 2 \\ & + \beta_2 \times ygap_t \\ & + \beta_3 \times (wgap_{t-2} + wgap_{t-3}) / 2 \\ & + \Omega \times (\text{dummy variables for one-off factors}) \end{aligned}$$

π : CPI less fresh food, energy, and house rent (seasonally adjusted q/q % changes, annualized).

π^e : medium to long-term inflation expectations (%).

ygap: output gap (%). wgap: real wage gap (%).

(b) Estimation Results

β_0	-0.30 **
β_1	0.30 ***
β_2	0.19 ***
β_3	0.05 *
Adj. R ²	0.62
S.E.	0.36

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

S.E. represents the standard errors for the estimated y/y % changes.

Estimation period: 1997/Q1-2017/Q1.

- Notes: 1. Figures for medium to long-term inflation expectations are the expectations for the CPI 6 to 10 years ahead and are based on the "Consensus Forecasts."
 2. In the estimations, dummy variables are included in order to control for the estimated effects of one-off factors such as the introduction of a subsidy for high school tuition.
 3. The output gap is estimated by the Research and Statistics Department, Bank of Japan.
 4. The CPI figures are adjusted for changes in the consumption tax rate.
 5. The effects of the constant term are evenly allocated to the contributions of inflation expectations (forward-looking and adaptive).

Sources: Consensus Economics Inc., "Consensus Forecasts;" Ministry of Finance; Ministry of Internal Affairs and Communications; Bank of Japan staff calculations.

Substitution between Labor and Capital

Estimates of σ , Elasticity of Substitution (Panel Estimation)

$$\ln \frac{K_{it}}{L_{it}} = -\sigma \times \ln \frac{r(K)_{it}}{w_{it}} + \text{Const.} + \text{fixed effect}_i + \varepsilon_{it}$$

		Case of all types of capital	Case of ICT capital
All industries (24 industries)	σ	0.26	0.75
	(S.E.)	(0.03)	(0.04)
	Adj-R ²	0.99	0.95
	S.E. of regression	0.11	0.26
Manufacturing (14 industries)	σ	0.30	1.01
	(S.E.)	(0.04)	(0.06)
	Adj-R ²	0.98	0.95
	S.E. of regression	0.12	0.25
Non-manufacturing (10 industries)	σ	0.22	0.51
	(S.E.)	(0.03)	(0.06)
	Adj-R ²	0.99	0.97
	S.E. of regression	0.10	0.24

Estimation period: 1995-2015. Cross-section fixed effects are included.

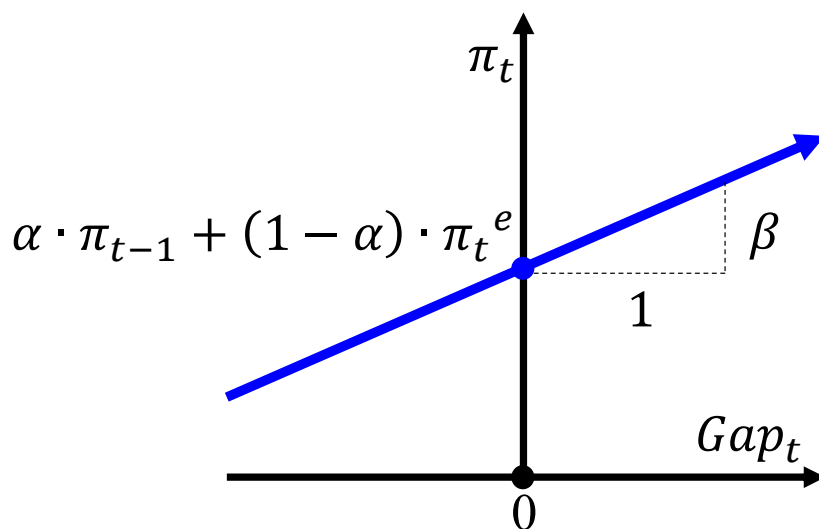
Notes: 1. All types of capital excludes residential and R&D stocks. ICT capital consists of information and communication machinery and software.

2. The following 5 industries are excluded in the analysis above: agriculture, forestry and fishing; mining; public administration; education; and human health and social work activities.

Sources: Bank of Japan; Bloomberg; Cabinet Office; Ministry of Finance.

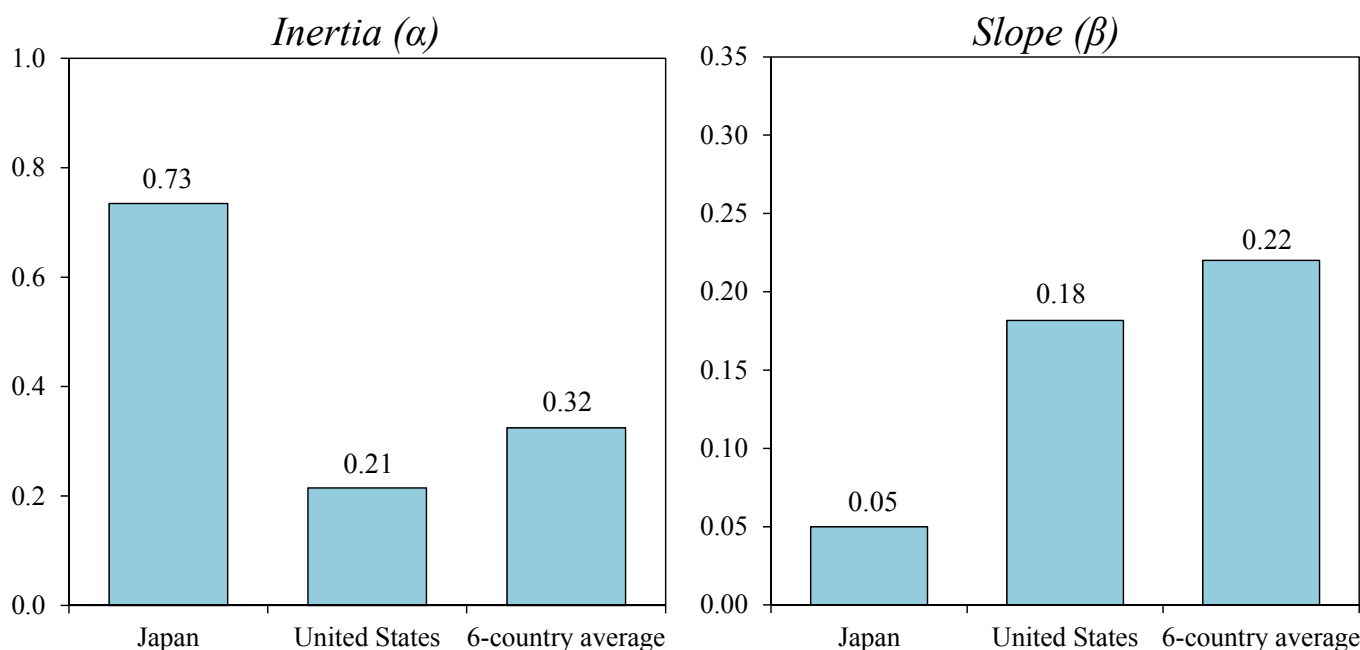
Stylized Phillips Curve

$$\pi_t = \alpha \cdot \pi_{t-1} + (1 - \alpha) \cdot \pi_t^e + \beta \cdot Gap_t + u_t$$



Estimated Phillips Curve

$$\pi_t = \alpha \pi_{t-1} + (1 - \alpha) \pi_t^e + \beta Gap_t + u_t$$



Notes: 1. Data for inflation is the CPI (all items). Data for expected inflation is computed using expectations of the CPI inflation for the next six to ten years published in the Consensus Forecasts.

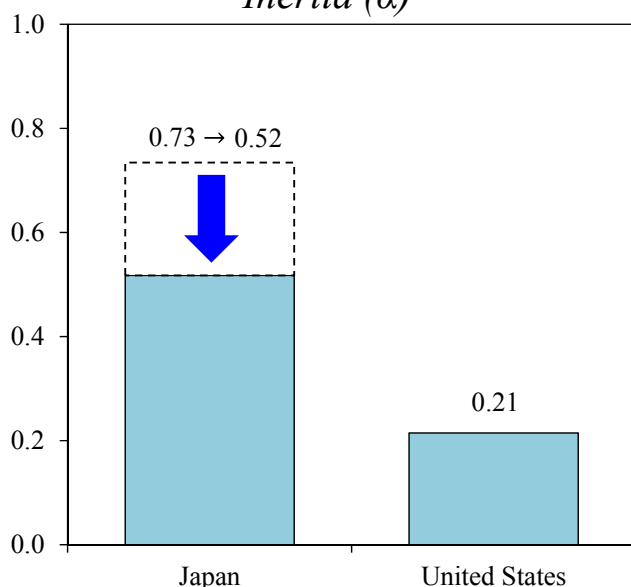
2. The results of 6-country average are those of an estimation using the data for Canada, France, Germany, Italy, Japan, and the United States. The United Kingdom is not included in the dataset due to data availability.

Sources: Consensus Economics Inc., "Consensus Forecasts;" OECD; World Bank; Bank of Japan staff calculations.

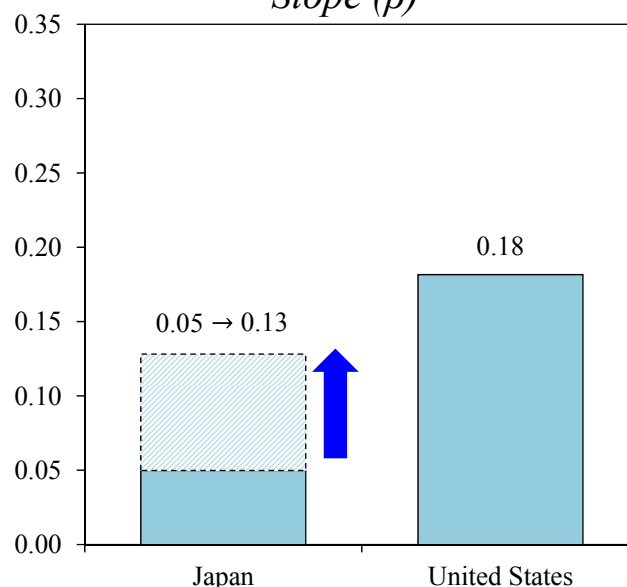
If Japan's Labor Mobility Catches Up with the US

$$\pi_t = \alpha\pi_{t-1} + (1 - \alpha)\pi_t^e + \beta Gap_t + u_t$$

Inertia (α)



Slope (β)



Notes: 1. We calculate impacts of the given rise in Japan's labor mobility on the inertia and the slope based on the following estimation results.

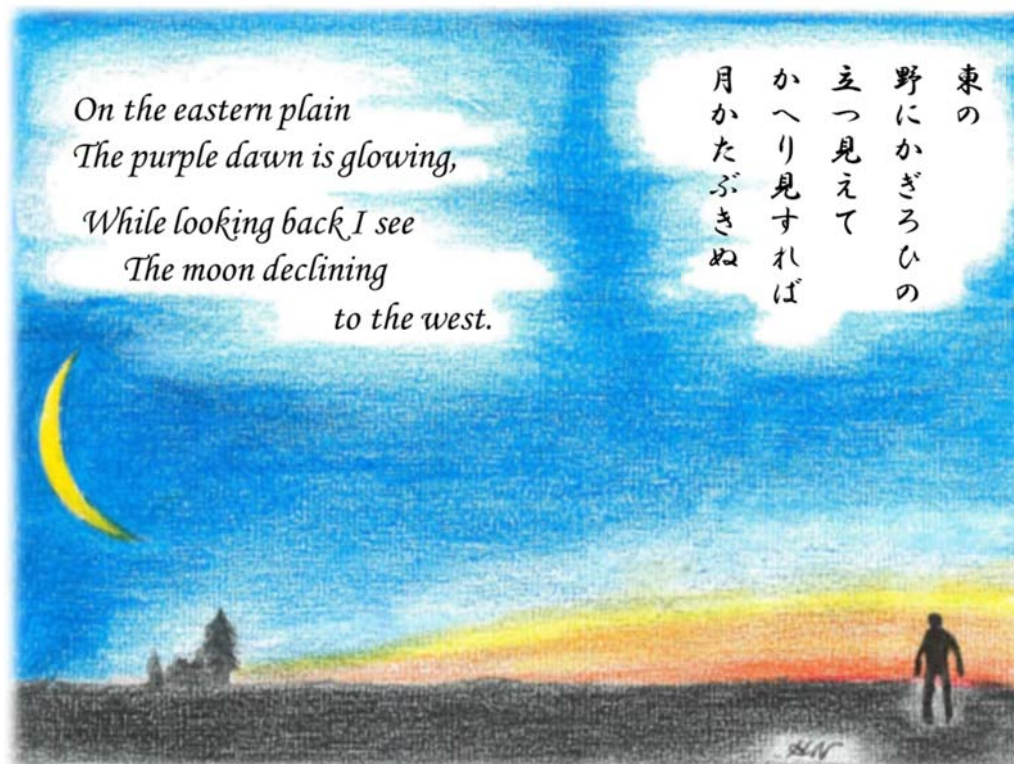
$$\pi_{JP,t} = (0.42 - 0.10 * \bar{m}_{JP}) * \pi_{JP,t-1} + (1 - (0.42 - 0.10 * \bar{m}_{JP})) * \pi_{JP,t}^e + (0.10 + 0.04 * \bar{m}_{JP}) * Gap_{JP,t} + \bar{u}_{JP,t}$$

where \bar{m}_{JP} and \bar{m}_{US} respectively denote the average labor mobility of Japan and that of the United States over the period 1990 - 2016.

The computed changes in the inertia and the slope are $-0.10 * (\bar{m}_{US} - \bar{m}_{JP})$ and $0.04 * (\bar{m}_{US} - \bar{m}_{JP})$ respectively.

2. Data for actual inflation, expected inflation, and output gap are those used in Slide 20. Data for labor mobility are those displayed in Slide 15.

Sources: Consensus Economics Inc., "Consensus Forecasts;" OECD; World Bank; Bank of Japan staff calculations.



A waka-poem by the eighth century Japanese poet, Kakinomoto no Hitomaro.

Note: Translation from Nippon Gakujutsu Shinkōkai, Japanese Classics Translation Committee, 1965, *The Manyōshū, The Nippon Gakujutsu Shinkōkai Translation of One Thousand Poems with the Texts in Romaji with a New Foreword by Donald Keene*, Columbia University Press, New York.