

## **Masaaki Shirakawa: Bubbles, demographic change and natural disasters**

Opening speech Mr Masaaki Shirakawa, Governor of the Bank of Japan, at the 2011 Annual International Conference hosted by the Institute for Monetary and Economic Studies, Bank of Japan, Tokyo, 1 June 2011.

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### **I. Introduction**

Good morning. I am very pleased to address the Bank of Japan Annual International Conference. On behalf of my colleagues at the Bank of Japan, I welcome all the participants from central banks, international organizations, and academia.

Japan was hit by an unprecedented earthquake and tsunami on March 11th, the day that was etched into our memory. The scars are yet to heal in the quake-stricken regions. In the aftermath of the disaster, however, we Japanese were not in a hopeless situation. We have received lots of support and numerous warm messages from our friends abroad. I express my sincere gratitude to those whose hearts and thoughts have been with us since the day.

The title of this year's conference is "real and financial linkage and monetary policy." Conventional macroeconomics has analyzed macroeconomic dynamics through the two lenses, trend growth and business cycles. While the two lenses remain important, over the past quarter century, the need to incorporate a third lens, rare but large events including financial crises, was increasingly recognized, by policy makers and academics alike. I myself already addressed the issue of bubbles and financial crises in the opening remark at the previous year's conference.<sup>1</sup> This year, through this third lens, I find myself left with no choice but to refer to the repercussions of a natural disaster. At the other extreme compared with sharp, unanticipated shocks like financial crises and natural disasters, I also recognize the fully anticipated development, a demographic change, which Japanese economy is undergoing, as the paramount issue. Today, I will pick three issues, bubbles and resulting financial crises, demographic changes and natural disasters as the factors driving economic dynamics and call for further research on them.

### **II. A retrospective view of the Japanese economy in the past quarter century and research agenda going forward**

#### ***The day after the great east Japan earthquake***

Before we move on, I will brief you on how matters stand in the Japanese economy. In the aftermath of the earthquake, production has declined very sharply due to supply constraints caused primarily by the destruction of capital stock, disruptions in supply chains and a shortage of electric power (Slide 1). As a result, exports have decreased substantially, and domestic private demand has also been weak, partly accentuated by deterioration in business and household sentiment. Those constraints are, however, being relaxed more quickly than expected initially as a result of strenuous efforts by firms. Looking ahead, for the time being, Japan's economy is likely to continue to be under strong downward pressure, mainly on the production side. However, as supply-side constraints ease and production regains traction, the economy is expected to return to the moderate recovery path from the second half of fiscal 2011, backed by an increase in exports reflecting the high growth of the global economy and by a rise in demand for restoring capital stock.

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1 See Shirakawa (2010).

### ***The Japanese economy in the past quarter century***

Beyond the horizons of a short-term economic outlook, the paramount issue for the Japanese economy lies in the medium- to long-term growth prospects. In this regard, a review of the economy over the past quarter-century could benefit us. With this aim in mind, we need to underscore the following five facts.

First, Japan's real GDP growth rate has steadily decreased. Back in the 1980s, Japan was a front-runner in terms of GDP growth among G7 countries while it continued to lose momentum during the 1990s and remained in the most lackluster sub-group in the 2000s (Slide 2).

Second, Japan's per capita GDP continued to grow at a high pace comparable to other G7 economies in the 2000s, although significantly slowed compared with the 1980s. Japan's per-worker GDP growth, in particular, remained in the top sub-group, and in fact it was only slightly less than that of the United States (Slide 3).

Third, after the burst of the bubble, the Japanese economy took a long time to resume its expansion (Slide 4). The protracted period of economic underperformance is by now known as the lost decade. The Japanese economy resumed its expansion finally in 2004. Incidentally, it could be noted that after the burst of the bubble in the 1990s, the decline in Japan's growth rate was relatively moderate compared with the declines experienced by the U.S. and European countries after the collapse of the global credit bubbles in the mid-2000s.

Fourth, the Japanese economy was precipitated into a sharp contraction in the wake of instabilities in financial systems. One occasion was the failure of Yamaichi Securities in 1997 and the other was the Lehman shock. In the latter case, the contraction was more acute than the first case (Slide 5).

Fifth, Japan is facing another sharp decline of economic activity triggered by the Great East Japan Earthquake.

### ***Research agenda going forward***

Admittedly, the global financial crisis in the late 2000s together with the aforementioned five facts left us with no choice but to realize how little we knew about macroeconomic dynamics. Against the backdrop, I put a bubble and a resultant financial crisis at the top of the research agenda. Beyond a variety of discussions prompted by the global financial crises, we need to make further progress on this front. The second issue is economic and social consequences of sizeable demographic changes, such as a declining population and ageing. The third issue is repercussions of natural disasters on economic activity. The second and third issues may look remote to financial systems and monetary policy, but it is a *prima facie* impression as I will flesh out later. A declining population gives rise to an outright reduction in the natural rate of interest and this could constrain monetary policy via the zero lower bound. If the guaranteed return of pension policies did not adequately reflect the anticipated decline in the natural rate of interest due to a decline in the population, the misalignment could spur the search-for-yield which would sow the seeds of a bubble.

### **III. Bubbles and financial crises**

I will start with the first issue on the agenda, that is, bubbles and financial crises. We have commonly observed across countries that economic contractions following the burst of a bubble tend to be protracted and subsequently, the economies hobble at an early phase of recovery.<sup>2</sup> In the aftermath of the two bubbles, namely, one in the U.S. late 2000s and the

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<sup>2</sup> See Reinhart and Reinhart (2010).

other in the Japanese 1990s, both the GDP growth rate and inflation show similar trajectories across the two cases (Slide 6).

The crippled balance sheets can be detected as the primary factors that impede the economic recoveries, while we also need underscore the linkage of low productivity growth and the inefficient resource allocations resultant from the malfunctioning credit intermediation. In fact, to promote economic growth, it is crucially important to maintain economic metabolism by smoothly reallocating economic resources toward the sectors with higher growth potential. In this regard, economists at the Bank of Japan estimated that the distortion in factor markets can account for one-seventh of the total 3.6 percent point decline in the GDP growth rate during the six years in the aftermath of the bubble burst.<sup>3</sup> More research would be called for in an attempt to further elaborate on the effects of the deterioration of banks' balance sheets and the protracted zero interest rates on the efficiency of the resource allocations.

In this context, I would highlight the subtle distinction between money and credit in a period of deflation. Professor Milton Friedman once noted that inflation is always and everywhere a monetary phenomenon, the well-known Friedman's proposition on inflation.<sup>4</sup> With my respect for Friedman whose last class that I took at the University of Chicago, I would suggest asking whether the proposition holds if we replace the term, "inflation," by "deflation" in the proposition. Elaborating on the validity of this seemingly symmetrical proposition would provide a clue to better understanding how a financial crisis interacts with deflation. You may argue that replacing inflation by deflation would simply flip a plus to a minus, but the issue is not as simple as it appears. Whether this deflation version of Friedman's proposition holds or not would depend on how we interpret it.

The proposition holds if the proposition means that destabilized financial systems shrink money stock noticeably, thereby resulting in deflation. In retrospect, we can reaffirm that severe deflation was accompanied by financial crises.<sup>5</sup> Friedman pointed out in his own writing, "A Monetary History of the United States," that during the period of 1929–1933, money stock shrank by 31 percent and the price level declined by 25 percent primarily because the Fed failed to act as the lender of last resort. In sharp contrast to the U.S. experience in the 1930s, helped by such lessons from history, the Bank of Japan acted very aggressively as the lender of last resort. As a result, contraction of money stock was forestalled and the price level dipped by only 0.5 percent per annum at the maximum. It could also be noted that since 1998, the price level has dropped slightly larger than three percent, which is quite different from the U.S. experience in the 1930s (Slide 7). In sum, the experiences of the U.S. and Japan confirm that the proposition holds in line with the aforementioned interpretation.

On the other hand, if we interpret the proposition in a way that central banks can raise the price level at will by flooding the economy with the monetary base, the proposition is, at least, not compatible with the recent experiences in Japan as well as in the U.S. In Japan, between 1997 and 2010, the monetary base soared by 90 percent while money stock increased by 30 percent. Likewise, the U.S. experience between 2008 and 2010 clearly shows that the monetary base soared by 140 percent while, by contrast, money stock increased by only 10 percent. Despite the flooding monetary base, Japan's consumer price level dipped by 3.7 percent for the thirteen years by the end of 2010. The U.S. core CPI inflation rate has decreased by more than one percent point despite the increase in monetary base. To sum up, significant increases in the monetary base neither gave rise to an equally significant rise in money stock nor inflation, let alone proportional increases. Financial systems would

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<sup>3</sup> See Nakakuki, Otani, and Shiratsuka (2004).

<sup>4</sup> See Friedman (1970).

<sup>5</sup> See Bordo and Filardo (2005).

provide a key to better understanding the proposition. In light of the Japanese experiences, I agree with Chairman Bernanke on his remark in his scholarly work, saying, “I doubt that it [money] completely explains the financial sector-aggregate output connection.”<sup>6</sup> Without more in-depth understanding of the subtle intricacy underlying in financial systems and credit markets, we would remain less informed of macroeconomy and transmission channels of monetary policy. Against the backdrop, I am hoping for more research to proceed on this front.

#### **IV. Demographic changes and policy response**

##### ***Keynes’ Perspective***

We move on to the second issue on the agenda, demographic changes. In 1937, John Maynard Keynes gave a lecture titled “Some economic consequences of a declining population.” He noted that “in an era of a declining population, ...demand tends to be below what was expected and a state of over-supply is less easily corrected. Thus a pessimistic atmosphere may ensue.”<sup>7</sup> By suggesting these views, he posed a question mark on the traditional Malthusian view that warns against a population explosion. Neoclassical growth theories tend to focus on per capita economic variables, such as per capita GDP and per capita capital stock. This means that the very challenges that Japan is currently faced with are left outside the scope of their analysis at the outset. Looking ahead, Japan is heading into a demographic vortex, by which, I mean, rapid ageing and a declining working-age population. To deal with the present and forthcoming challenges for Japan, we may need to rely more on the perspective offered by Keynes who tried to elaborate on the size of population itself and changes in its composition. It is fairly certain that not only advanced economies, but also a number of emerging economies are, sooner or later, expected to face the similar challenge as we proceed down the road (Slide 8).<sup>8</sup>

##### ***Demography and aggregate demand***

Demographic changes affect economic growth through a variety of channels. To start with, in a country facing a diminishing population, like Japan, a declining working-age population would rein in growth momentum on the supply-side. Admittedly, because we need to take demographic factors as given for the time being, we should pursue higher labor force participation rates of female workers and the aged people. On top of this, attempts to enhance the quality of the labor force by improving education and vocational training systems are warranted as well.

We may need to recognize the complex fallout of a demographic vortex on aggregate demand. A shrinking working-age population could be an outright factor that reduces aggregate consumption. On the other hand, the life-cycle model of consumption predicts that the ageing of society would spur the consumption of the elderly as they reduce their savings. In fact, a common observation across economies is that, as a general pattern, the elderly tend to cut their spending on durable goods while they increase demand for services to maintain their quality of life, such as medical and nursing services. We may need to bear in mind, however, that provision of these services tends to be subject to intensive government regulations. If the supply that can meet the demand of aged people would be hampered by misaligned regulations which do not reflect the changes in society and technology progress, potential consumption demand would not materialize.

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<sup>6</sup> See Bernanke (1983).

<sup>7</sup> See Keynes (1937).

<sup>8</sup> See Shirakawa (2011).

The foregoing argument reaffirms the importance of the flexibility of the social and economic systems that can ensure their own sustainability in the face of a demographic vortex. We could also bear in mind how the ageing of voters affects the social choices reflecting their preferences (Slide 9).

### ***Demography and business cycles***

As I mentioned at the outset, the third lens suggests that boom-bust cycles and demographic changes could interact with each other. For example, the spending wave hypothesis suggests a possible linkage between the two. This simple-looking hypothesis argues that peaks of business cycle and asset market booms tend to coincide with the years for baby boomers passing their peak spending years, presuming that their consumption reaches its highest for their ages in their late forties. As my colleague, Deputy Governor Nishimura, points out, the inverse dependency ratio, which indicates workers per non-working population, appears to be positively correlated with real estate market fluctuations both in the U.S. and in Japan<sup>9</sup> (Slide 10). Similar studies predict that real estate booms could be driven by increasing young generations when they come in markets as home buyers.<sup>10</sup> All those arguments suggest that demographic factors should not be taken lightly in analyzing bubbles and financial crises.

### **V. Managing disaster risks**

Finally, I take up the last issue in the agenda, management of natural disaster risk in the context of economic activity. Natural disasters are universal risks against which human beings have been fighting since the dawn of history (Slide 11). The tangible capital stock lost in the Great East Japan Earthquake is estimated at five percent of GDP by the Japanese government.

I will highlight, *inter alia*, specific aspects of the issue, that is, how much extra cost firms should bear to forestall a vast disruption in production. To this end, two issues immediately come to mind, inventory management and risk concentration. The Japanese manufacturing firms have been enhancing their competitiveness through constant efforts to minimize inventory of intermediate goods, by developing the sophisticated logistics network known as the just-in-time system. The efforts can be confirmed by the downward trend of the inventory-to-GDP ratio (Slide 12). Being faced with disruptions in the production process precipitated by the natural disaster, firms with a minimum level of intermediate goods inventory were left with no choice but to sharply scale back their production. In the wake of the earthquake, as discussed earlier, the ensuing disruption of the supply-chain revealed the risk of the reduced inventory, which may be described as a dilemma, namely, just-in-time versus just-in-case.

While the level of inventory should remain as an important issue, the earthquake uncovered concentration risks as the linchpin for further assessment. The concentration risks that have been deeply buried under the complicated supply chain were due to overreliance on particular plants located in the particular regions.

There is no free lunch: you need to bear some additional cost in either case, to raise inventory or to diversify procurement. In a related context, Professor Barro pointed out in his paper that the insurance premium that households need to bear at normal times to compensate for the disaster risks would be considerably high.<sup>11</sup> This question regarding the disaster risks needs to be considered at a national level as well as a firm level. For instance,

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<sup>9</sup> See Nishimura (2011).

<sup>10</sup> See Sterling and Waite (1998).

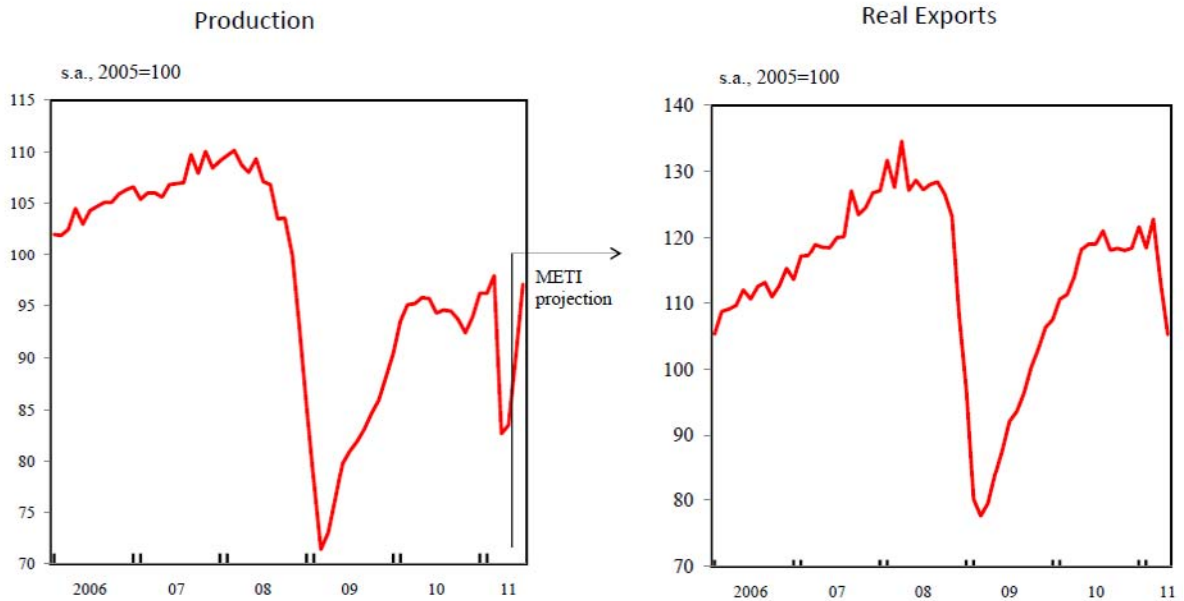
<sup>11</sup> See Barro (2009).

over-concentration of a nation's business activities in particular plants located in a particular region would run a significant risk while its cost of such over-concentration could be hardly internalized by highly competitive markets. As a result, tail risks may be inadvertently elevated. In sum, economists, together with practitioners and policymakers, need to strive for a better design of broadly defined public risk-sharing systems against disaster risks.

## **VI. Concluding remarks**

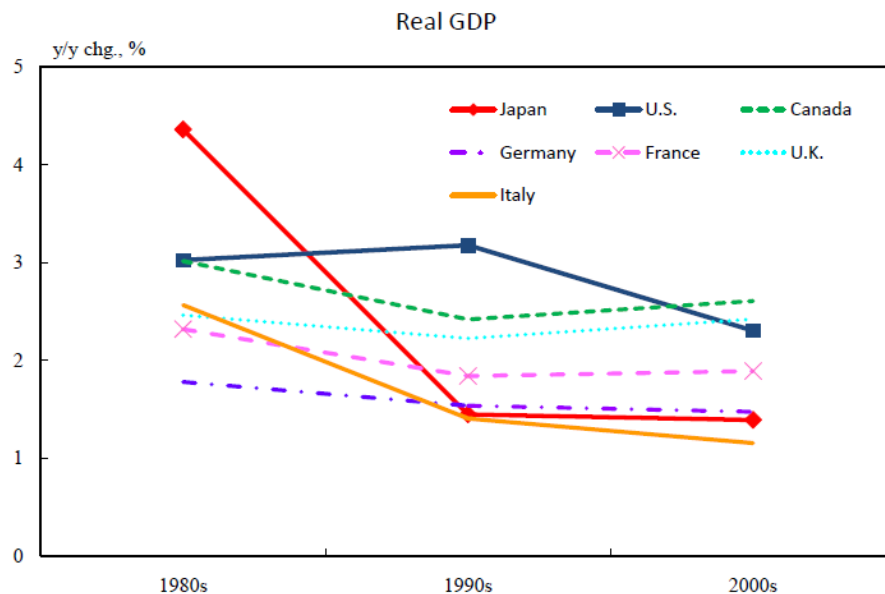
So far, I have discussed the challenges that the Japanese economy is faced with. I would call for further research on tail risks, such as financial crises and natural disasters, which have still relatively been given short shrift in the existing macroeconomics. The consequences of demographic changes are yet to be explored. We could make a stronger case to revamp the present social and economic systems. Those outdated systems, which are not in line with the ongoing demographic changes, could sow the seeds of another bubble because, for example, they could prompt search-for-yields under the low natural rate of interest. Now is the time to explore all these issues. With that perspective in mind, I am convinced that this year's conference will catalyze dialogues between policymakers and academics. Thank you.

Since the March 11 earthquake, the Japanese economy has experienced a sharp economic downturn due to supply-side constraints.



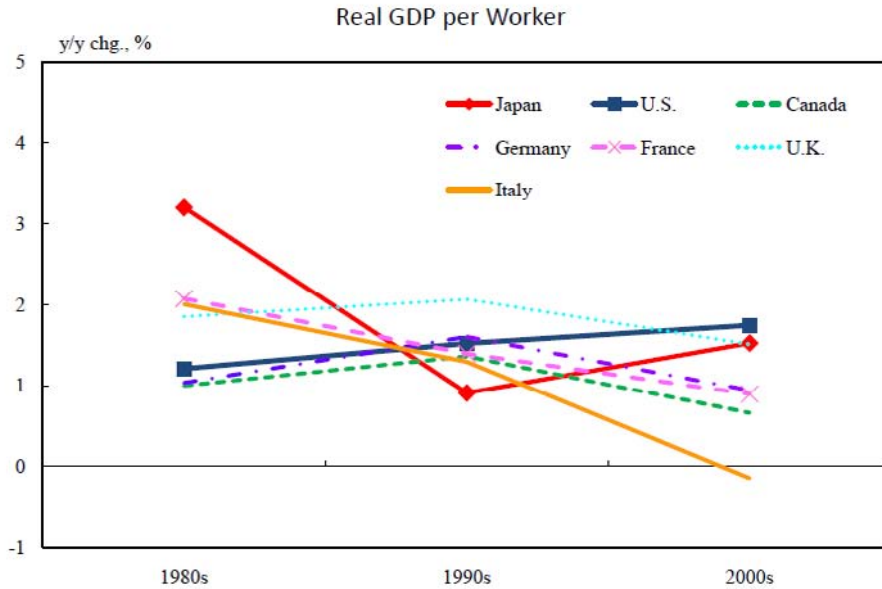
Sources: Ministry of Economy, Trade and Industry, "Indices of Industrial Production";  
Bank of Japan, "Real Exports and Real Imports"

In real GDP growth, Japan has remained in the most lackluster sub-group in the G-7 since the 1990s.



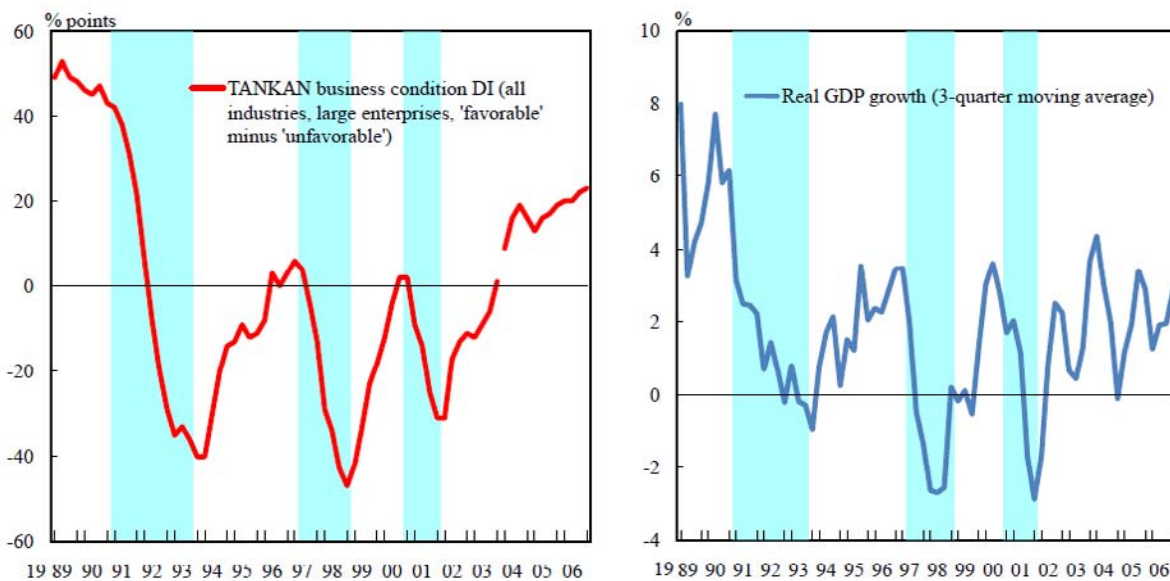
Notes: 1. To eliminate the effect of the financial crisis, the figure for the 2000s is the average from 2000 to 2008.  
2. The figure for Germany for the 1980s is that for West Germany, and that for the 1990s is the average from 1992 to 1999.  
Source: Datastream.

In real GDP growth per worker, Japan remained in the top-subgroup in the G-7.



Notes: 1. To eliminate the effect of the financial crisis, the figure for the 2000s is the average from 2000 to 2008.  
 2. The figure for Germany for the 1980s is that for West Germany, and that for the 1990s is the average from 1992 to 1999.  
 Source: Datastream.

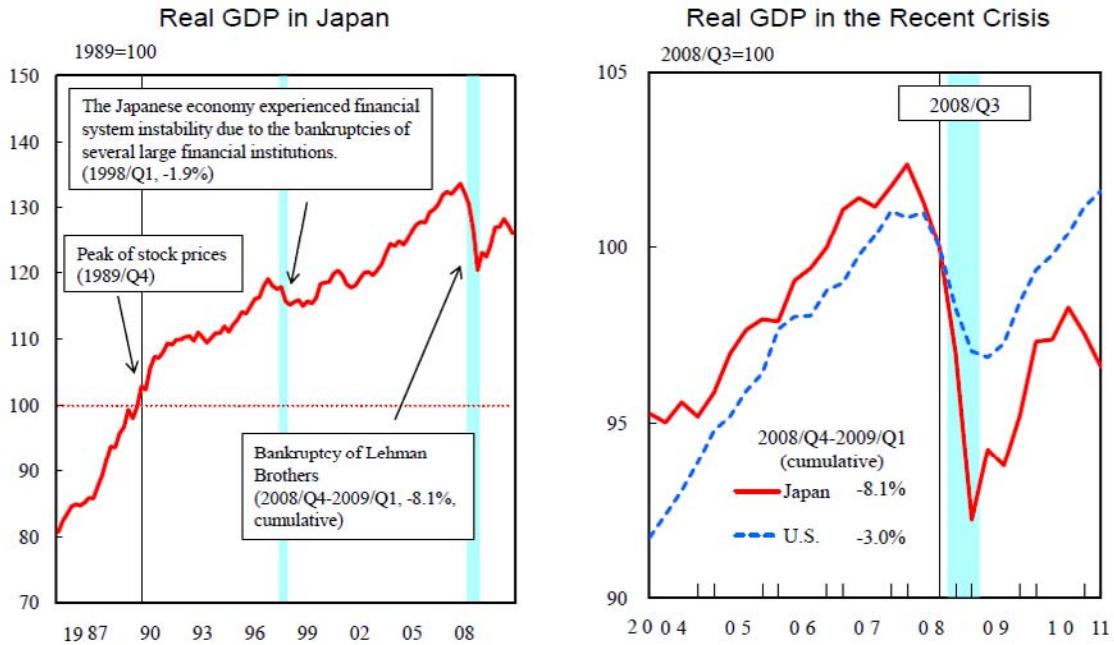
After the burst of the bubble, Japan experienced a protracted period of economic underperformance known as the “lost decade.” The economy started to recover after 2004.



Note: Shaded areas indicate periods of recession.  
 Sources: Bank of Japan, “Short-Term Economic Survey of Enterprises”; Cabinet Office, “National Accounts.”

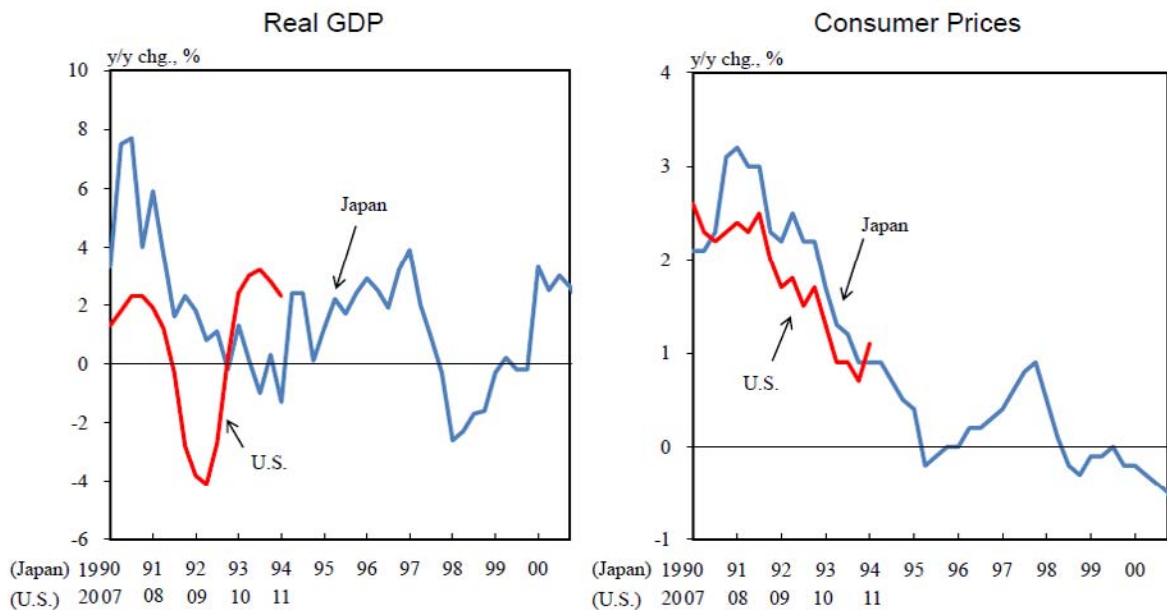


After the two financial crises, Japan experienced a drastic contraction in economic activity: the decline in output after the bankruptcy of Lehman Brothers was much larger than that following Japan's financial crisis from 1997 to 1998.



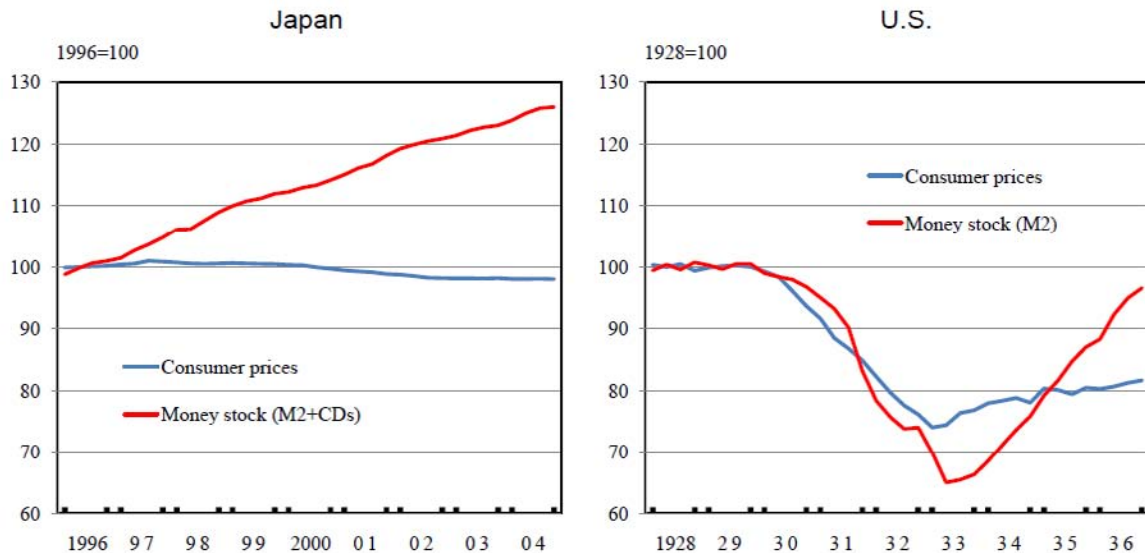
Sources: Cabinet Office, "National Accounts"; Department of Commerce.

So far, developments in Japan and the U.S. in real GDP growth and inflation since the burst of the bubble look similar.



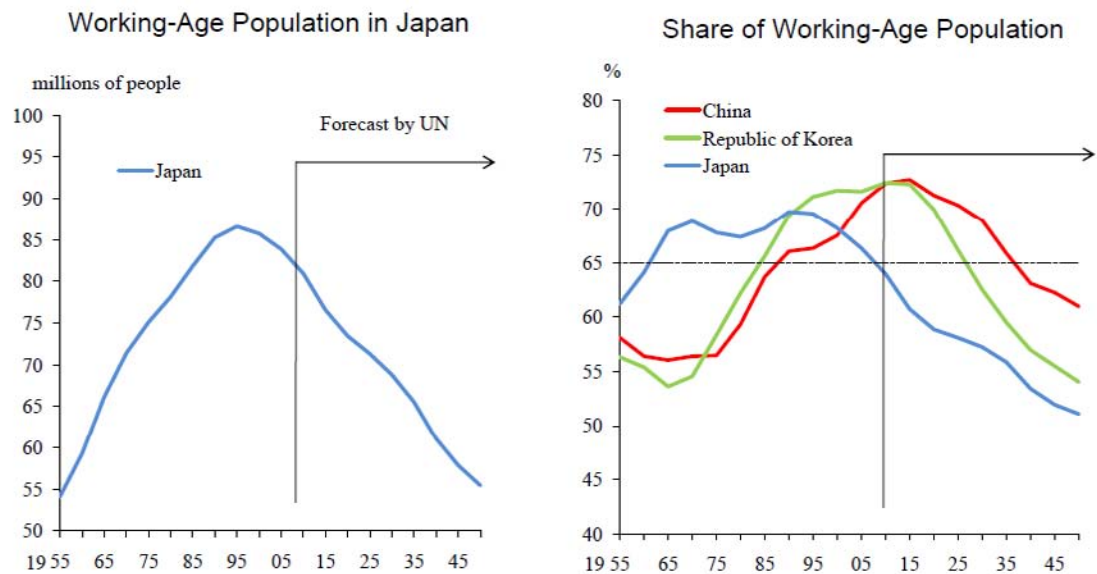
Note: Consumer prices are core CPI. The core CPI in Japan is computed by excluding perishables from headline CPI.  
Sources: Cabinet Office, "National Accounts"; Department of Commerce; Ministry of Internal Affairs and Communications, "Consumer Price Index"; Department of Labor.

Unless central banks take aggressive policy actions as the lender of last resort, prices will drastically decline due to financial crises.



Note: Figures for Japan are adjusted for the changes in the consumption tax rate from 3 to 5 percent in April 1997.  
 Sources: Ministry of Internal Affairs and Communications, "Consumer Price Index."; Department of Labor; Bank of Japan, "Money Stock," "Monetary Base"; N. S. Balke and R. J. Gordon (1986).

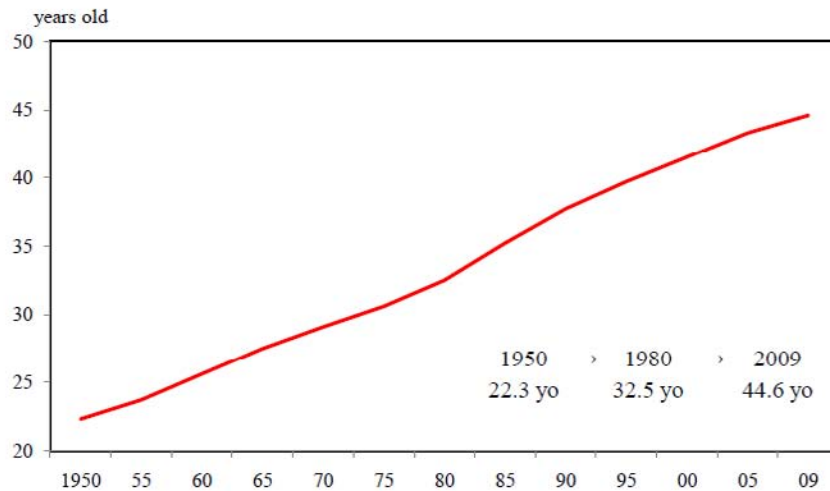
Japan faces a sharp decline in its working-age population. Sooner or later, emerging economies are expected to face the similar challenges.



Note: The working age is from 15 to 64 years old.  
 Source: United Nations, "World Population Prospects: The 2010 Revision."

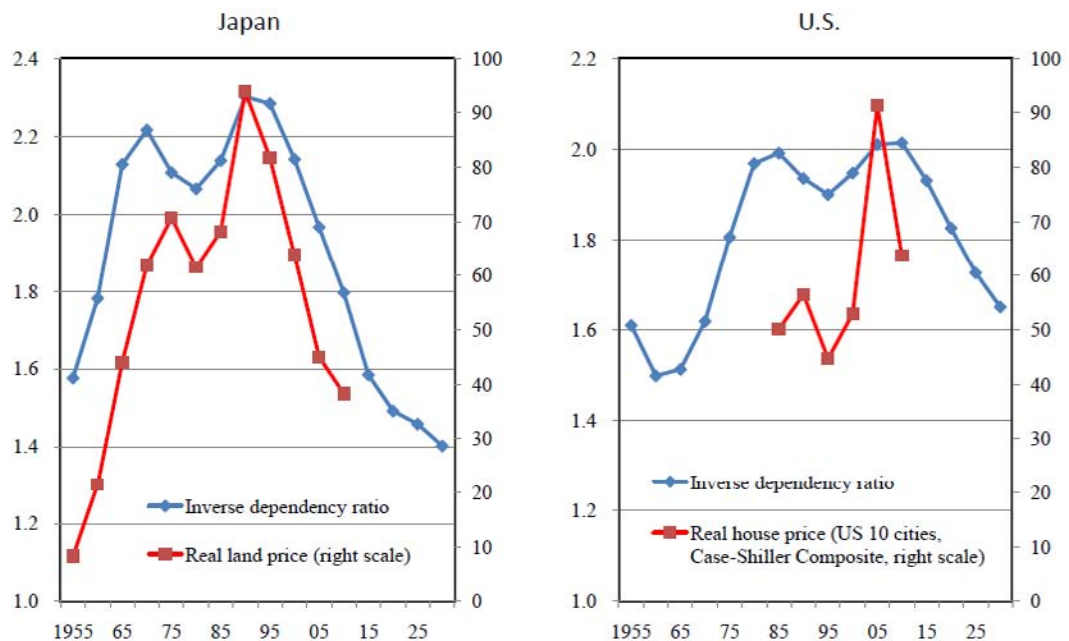
The median age in Japan was 44.6 years in 2009. The median age of voters in Japan is expected to increase.

Median Age in Japan



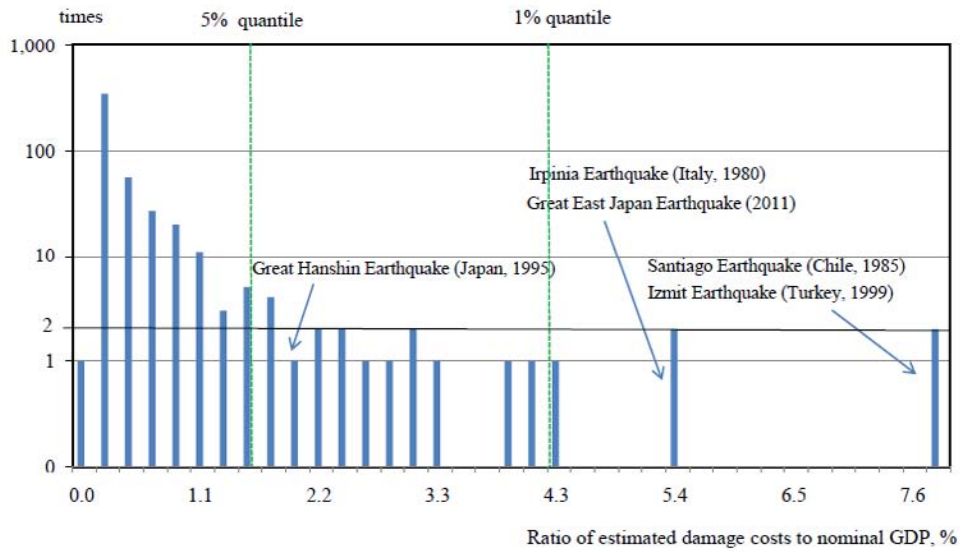
Source: National Institute of Population and Social Security Research.

In Japan, the inverse dependency ratio (the ratio of workers to non-workers) appears to be positively correlated with real estate market fluctuations.



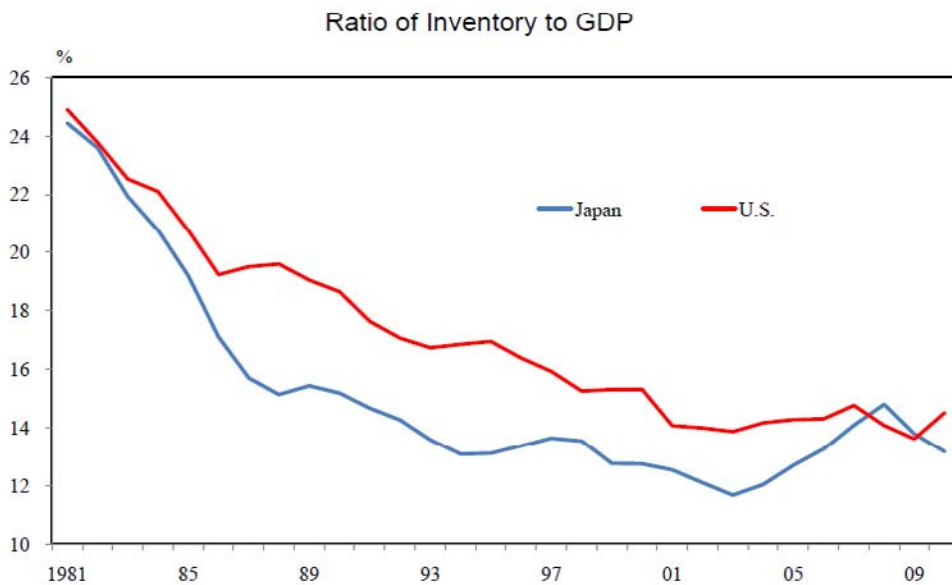
Source: K. G. Nishimura, "This Time May Truly Be Different: Balance Sheet Adjustment under Population Ageing," remarks at the 2011 American Economic Association Annual Meeting in Denver, 2011.

### Frequencies of Natural Disasters



Notes: 1. The damage costs by Great East Japan Earthquake is estimated by the Cabinet Office. It is converted into U.S. dollars at the exchange rate at the end of March 2011 (\$1 = 82.84 Yen).  
 2. Damage costs include the damage to infrastructure, agricultural crops, and buildings.  
 Source: Center for Research on the Epidemiology of Disasters, Universite Catholique de Louvain, "Emergency Events Database (EM-DAT)."

### The ratio of inventory to GDP is decreasing in both Japan and the U.S.



Sources: Cabinet Office, "National Accounts"; Department of Commerce.

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