

Sayuri Shirai: Central banks' challenges in a rapidly changing global economic environment

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Accompanying charts can be found at the end of the speech.

I. Introduction

It is a great honor to visit Singapore and have this opportunity to address you today. I am a Policy Board member of the Bank of Japan (BOJ), responsible for making decisions on the conduct of monetary policy with Governor Haruhiko Kuroda and seven other members. Based on the experience I have gained from being in my current position, I would like to express my views on recent issues related to monetary policy and central banks' challenges in the face of a rapidly changing global economic environment.

I will begin my speech by talking about the adjustment process of the global economy. I will then focus on common features observed under the monetary policy framework in advanced economies (namely, the United States, the euro area, Japan, and the United Kingdom), as well as major challenges faced by the central banks in these economies. Next, I will concentrate on emerging (and developing) economies, especially in the Asian region (including India, Indonesia, Thailand, South Korea, and China), and introduce the challenges faced by their central banks in the context of greater linkages with global financial markets. Lastly, I will provide a review of issues related to the effects of monetary policies adopted by these central banks on one another and the ongoing debate on measures to cope with them.

II. Three stages of the adjustment process of the global economy

More than five years have passed since Lehman Brothers' collapse in 2008 and the subsequent global financial crisis, and yet the global economy still faces a negative output gap (or demand shortage). In general, the global financial crisis has exerted relatively large negative effects on advanced economies, while emerging economies have weathered the crisis relatively well. Meanwhile, the global economy has been following the path toward recovery, which can be divided into three stages.

First stage of the economic adjustment process: 2007–09

First of all, the global economy had been highly synchronized, focusing on the start of an apparent slowdown in the U.S. economy from 2007 and on the immediate aftermath of the global financial crisis up until 2009. This is demonstrated by the high level of correlation among countries, and between advanced and emerging economies, in terms of real GDP growth rates (Chart 1). This high correlation reflected the result of the global financial crisis triggered by the largest economy in the world, the United States, from which the contagion spread to the largest economic region, the euro area, mainly through financial linkages. At the same time, the synchronization – together with the collective worldwide efforts to inject monetary and fiscal stimulus – reflects how the global economy overcame a severe recession by the end of 2009.

Second stage of the economic adjustment process: 2010–12

Subsequently, the global economy entered a second stage in which a divergence emerged between the growth paths of advanced economies and emerging economies. This is shown by a sharp drop in the correlation of real GDP growth rates between those economies (Chart 1). Advanced economies remained relatively weak during this recovery, and the

peripheral economies in the euro area began to face severe fiscal austerity and recession with the occurrence of the debt crisis from 2010 (Chart 2). Nonetheless, advanced economies coped with large negative output gaps through unprecedented aggressive monetary easing, thereby preventing these economies as a whole from falling into a double dip recession. In contrast, emerging economies posted relatively high growth, and those in the Asian region in particular gained growth momentum and became the main driving force for global economic growth. The favorable growth performance in emerging economies helped advanced economies by encouraging an increase in external demand, mainly through trade and foreign direct investment (FDI) channels, and this supported activities of multinational firms in advanced economies.

The strong growth dynamics of emerging economies are partly attributable to steady improvement in economic fundamentals achieved after the Asian currency crisis of 1997–98. This is evidenced by, for example, relatively strong fiscal and government debt positions, reduced external debt positions, an accumulation of foreign reserves as buffers, and a relatively resilient financial sector with better prudential regulation and surveillance. Moreover, the emergence of the middle class strengthened these economies' domestic demand for goods and services, offsetting weak external demand deriving from sluggish advanced economies. In addition, China's strong growth – mainly driven by the large-scale fiscal stimulus package implemented in 2009–10 and the accommodative monetary policy – supported other emerging economies through greater intra-regional trade and production linkages, as well as FDI activities in the Asian region. The resilient domestic demand and growing regional economic activities not only allowed many of the Asian emerging economies to achieve above-trend economic growth, but also caused an overheating in some of the economies, a heightening of inflationary pressures, and a rise in international commodity prices.

Third stage of the economic adjustment process: 2013-Present

The third stage of the global economic adjustment process appears to have begun in 2013, as the economic growth landscape had changed. In other words, emerging economies are losing momentum to some extent, while advanced economies are improving (Chart 2). According to the outlook of international organizations, such dynamics will continue and the pace of economic growth is likely to be faster in advanced economies than that in emerging economies for the next few years. The recovery in advanced economies is not particularly robust, however, since their output gaps are likely to remain negative over the next few years.¹ Furthermore, the variance in the pace of growth is likely to become evident among advanced economies, and differences in the monetary policy stances of central banks are projected to gradually become evident. This might cause frequent changes in market participants' views regarding the direction of accommodative monetary policy measures and the interpretations of forward guidance adopted by the central banks in advanced economies. The resulting impact of such behavior of investors on global financial markets and the global economy warrants close attention.

Meanwhile, economic growth in many emerging economies has recently slowed somewhat. This appears to reflect the moderation of the fiscal and monetary stimulus measures and surfacing of structural problems in some economies (such as a deterioration in the fiscal and current account deficits, private-sector debt accumulation, and signs of real estate bubbles) (Chart 2). Over the past decade, the Asian region has strengthened financial linkages with

¹ The International Monetary Fund's (IMF's) *World Economic Outlook* (October 2013) reports that the real GDP growth rate for advanced economies is projected to reach 1.2 percent in 2013, 2.0 percent in 2014, and 2.5 percent in 2015. That for emerging economies and developing countries is projected to reach 4.5 percent, 5.1 percent, and 5.3 percent, respectively. The output gap for advanced economies is projected to be minus 2.9 percent in 2013 and minus 2.5 percent in 2014. The *OECD Economic Outlook* (November 2013) reports that the output gap for the OECD economies is projected to be minus 2.6 percent in 2013, minus 2.3 percent in 2014, and minus 1.8 percent in 2015.

global financial markets through the portfolio investment channel, in addition to the existing FDI channel. This portfolio investment channel has brought new challenges to emerging economies, distinct from those encountered in the 1990s, when loans extended by foreign financial institutions had been a major source of external financing, as will be described later.

III. Central banks' challenges in advanced economies

Next, I would like to talk about the common features observed regarding the monetary policy framework adopted by major central banks in advanced economies, as well as their challenges.

A. Common features related to monetary policy and the role of central banks

Since the global financial crisis, major central banks in advanced economies have actively conducted accommodative monetary policy measures. Over the course of time, some convergences and/or common features have become apparent regarding the conduct of monetary policy and the role expected of a central bank. These are (1) the adoption of 2 percent, or close to 2 percent, as a target or a numerical definition of price stability; (2) the growing importance of anchoring medium- to long-term inflation expectations to achieve price stability; (3) large-scale purchases of financial assets as a nontraditional monetary policy tool; (4) the adoption of forward guidance over the future monetary policy stance as another nontraditional monetary policy tool; and (5) the strengthened role of central banks in light of macroprudential policy. Let me now explain each of these features.

Feature (1): adopting 2 percent as the price stability target

First, the medium- to long-term price stability target for major central banks in advanced economies has converged to 2 percent, or close to 2 percent, as a part of comprehensive efforts to improve transparency over the conduct of monetary policy. The European Central Bank (ECB) and the Bank of England (BOE) were forerunners in this regard, having already adopted this price stability target prior to the global financial crisis, while the Federal Reserve and the BOJ did so after the crisis.

- The Federal Reserve specified the longer-run goal for inflation as 2 percent in January 2012, as measured by the personal consumption expenditure (PCE) deflator.
- The ECB defined price stability as “below, but close to, 2 percent over the medium term” in May 2003, as measured by the Harmonized Index of Consumer Prices (HICP) for the euro area.
- The BOJ adopted the 2 percent price stability target in terms of the consumer price index (CPI) in January 2013. It also stated that monetary easing will be pursued with the aim of achieving this target at the earliest possible time.
- In the United Kingdom, the Chancellor adopted the 2 percent target in December 2003 when the reference indicator was changed from the Retail Prices Index excluding mortgage interest payments to the CPI. The BOE conducts monetary policy to achieve this target.

As one of the monetary policy decision makers at the BOJ, I would like to emphasize that the adoption of the 2 percent target signifies a major transition in terms of Japan's historical conduct of monetary policy. It symbolizes the BOJ's strong determination to overcome mild deflation that has lasted for the past 15 years. During this time, the economy had been quite depressed, with low levels of growth expectations, and a deflation-oriented mindset among households, firms, and financial institutions had been prevalent. In order to avoid a return to such a situation, the BOJ is currently exerting its full efforts to achieve the target, as I will describe later.

The convergence of major central banks' price stability targets to the level of around 2 percent indicates a rather remarkable achievement in the context of the international financial architecture. This is because, according to a remark by Mr. Jean-Claude Trichet, the former President of the ECB, the four key currencies – the U.S. dollar, the euro, the Japanese yen, and the pound sterling – “have now an affirmed global nominal anchor for the first time since the dismantling of the Bretton Woods System.”² Currently, the actual level of inflation in the four economies deviates from 2 percent, partly as the economies are still recovering from the global financial crisis. Nonetheless, once economic conditions are normalized, the central banks are expected to ultimately achieve price stability of around 2 percent.

In this circumstance, more stable developments in foreign exchange rates may be promoted among major currencies in the long term. This may indirectly support the establishment of a more stable international financial architecture. I believe that establishing a global nominal anchor has an important implication for Japan as well, because the yen's long-standing appreciating trend since the 1970s is likely to be closely associated with the consistently low level of inflation relative to other advanced economies.

You may wonder why major central banks have chosen the numerical value of 2 percent. This reflects the fact that central banks commonly believe it is important to have a sufficient buffer with regard to inflation in order to avoid deflation, since deflation is more harmful to the economy than mild inflation. In addition, central banks find it necessary to achieve inflation to some extent in order to avoid the zero lower bound on short-term interest rates, in which there is no room for a further decline in the policy interest rate. In other words, central banks find it necessary to leave sufficient room for the conduct of flexible monetary policy by achieving a certain level of inflation in normal periods, especially to cope with recessionary phases.

Feature (2): anchoring medium- to long-term inflation expectations at around 2 percent

Second, the central banks in advanced economies pay close attention to developments in medium- to long-term inflation expectations, because stability in such expectations is essential to achieving long-term price stability. The Federal Reserve, the ECB, and the BOE have judged that they have successfully anchored medium- to long-term inflation expectations at around 2 percent. They currently hold the view that these expectations remain well anchored although there may be some concerns that the inflation expectations may become unstable. Therefore, one of the main tasks for these central banks is to continue with monetary easing measures to seek economic improvement, while ensuring that the anchored inflation expectations are maintained. Anchoring inflation expectations at around 2 percent implies that actual inflation has a tendency to converge toward 2 percent in the long term – although actual inflation may move above or below 2 percent on a daily basis as a result of various effects, including those of business cycles, and of fluctuations in commodity and food prices.

By contrast, the BOJ has not yet successfully anchored medium- to long-term inflation expectations at around 2 percent. Thus, achieving the 2 percent price stability target is particularly challenging relative to other central banks as this implies that the BOJ must aim at achieving economic recovery and anchoring inflation expectations at a higher level than at present. Achieving this aim of anchoring inflation expectations requires the BOJ to first help transform the deflation-oriented mindset and behavior of all economic entities, and then steadily raise their inflation expectations.

² See Jean-Claude Trichet, “2013 Per Jacobsson Lecture: Central Banking in the Crisis – Conceptual Convergence and Open Questions on Unconventional Monetary Policy,” Lecture at an event for the IMF/World Bank Annual Meetings in Washington, D.C., The Per Jacobsson Foundation, 2013.

Feature (3): large-scale asset purchases as a nontraditional monetary policy tool

Third, the Federal Reserve, the BOJ, and the BOE have adopted nontraditional monetary easing policy through asset purchase operations. This practice substantially differs from the past, when monetary easing was conducted mainly through a reduction in a very short-term nominal interest rate – namely, the policy interest rate. All three central banks and the ECB have faced a situation in which very short-term interest rates declined to nearly zero after Lehman Brothers' collapse in 2008.³ In such a situation, the Federal Reserve, the BOJ, and the BOE have attempted to create an accommodative monetary environment by exerting downward pressure on longer-term interest rates, which remain in positive territory despite the policy rate reaching nearly zero (as pointed out later). For example, yields on government bonds often function as a benchmark for measuring the long-term interest rates related to corporate loans, corporate bonds, mortgages, etc. Therefore, downward pressure on government bond yields is likely to contain funding costs, which may promote firms and households to increase their economic activities.

- The Federal Reserve purchased longer-term Treasury securities at a pace of 45 billion U.S. dollars per month and agency mortgage-backed securities (MBSs) at a pace of 40 billion U.S. dollars per month until December 2013. From January 2014, the pace of its asset purchases will be reduced to 40 billion U.S. dollars and 35 billion U.S. dollars, respectively. Meanwhile, the Federal Reserve is maintaining the existing policy of rolling over maturing Treasury securities at auction and of reinvesting principal payments from its holdings of agency debt and agency MBSs in agency MBSs.
- The BOJ currently purchases Japanese government bonds (JGBs) at an annual pace of about 50 trillion yen (on an outstanding basis) each year to double the amount outstanding in two years (2013–14). It also purchases treasury discount bills (T-Bills), exchange-traded funds (ETFs), Japan real estate investment trusts (J-REITs), and other assets. While the amounts purchased are specified only for two years at this stage, this does not mean that the purchases will end after two years, as specified in forward guidance, which I will describe later in my speech.
- The BOE is maintaining the stock of past asset purchases, mostly consisting of gilts, at 375 billion pounds.

In a statement issued by the Federal Reserve in December 2012, the economic conditions for maintaining these asset purchases were described as “*until such [substantial] improvement [in the labor market] is achieved in a context of price stability.*” In June 2013, Chairman Ben Bernanke provided more comprehensive guidance about the criteria related to the decision to reduce the pace of asset purchases at the press conference. These included (1) continued improvements in the labor market, (2) a moderate pick-up in economic growth, and (3) the outlook that inflation would move back toward 2 percent over time. He also stressed that, if incoming data were consistent with these outlooks, the reduction might begin later in 2013 and the asset purchases might end by mid-2014. In December 2013, the Federal Reserve decided to modestly reduce the pace of its asset purchases beginning in January 2014, in light of the cumulative progress toward maximum employment and the improvement in the outlook for labor market conditions. Also, it was indicated that the pace of asset purchases will likely be reduced in further measured steps at future meetings (the general consensus is that this will be a reduction of 10 billion U.S. dollars per meeting) if

³ The Federal Reserve has maintained the intended federal funds rate at 0–0.25 percent since December 2008. The ECB resumed a cut in the interest rate on the main refinancing operations in November 2011 from 1.5 percent to 1.25 percent, and has steadily lowered the interest rate since then. Most recently, the interest rate was lowered further from 0.5 percent to 0.25 percent in November 2013. The BOE has maintained Bank Rate at 0.5 percent since March 2009. Meanwhile, the BOJ lowered the uncollateralized overnight call rate from around 0.1 percent to around 0–0.1 percent in October 2010. It then shifted to monetary base targeting in April 2013.

incoming information broadly supports the expectation for ongoing improvement in labor market conditions and for inflation moving back toward its longer-run objective of 2 percent.

The ECB's practices differ from those of the three central banks, since its major nontraditional monetary policy tool is the "fixed-rate full allotment liquidity provision," for which the duration is longer than normal open market operations with a wider range of collateral accepted. The three-year longer-term refinancing operations (LTROs) were conducted in 2011 and 2012, in addition to the three-month LTROs. Moreover, the Outright Monetary Transactions (OMTs) were introduced in September 2012 in order to potentially purchase an unlimited amount of sovereign bonds with a remaining maturity of one to three years with a conditionality attached on the basis of a full or precautionary macroeconomic adjustment program.⁴ Since the liquidity injected into the markets will be fully sterilized, this measure is not regarded as a quantitative easing policy. Since 2013, some European banks have started to make early repayments of the three-year LTROs.

Feature (4): forward guidance as a nontraditional monetary policy tool

Fourth, all four central banks have adopted forward guidance, which refers to a communication strategy undertaken by central banks to provide information to the markets and the public (households and firms) on its future monetary policy stance. In general, a central bank uses forward guidance for two main purposes. One is as a communication strategy to inform the markets and the public about the "normal" policy reaction function of monetary policy (such as the Taylor rule). The other is to inform the markets and the public that a central bank at the zero lower bound will pursue further monetary easing than would have been expected under the normal policy reaction function by the markets and the public.

- The Federal Reserve indicated in December 2012 that it anticipated that a target range of the federal funds rate of 0 to 0.25 percent would be appropriate at least as long as "*(1) the unemployment rate remains above 6.5 percent, (2) inflation between one and two years ahead is projected to be no more than a half percentage point above the [Federal Open Market] Committee's 2 percent longer-run goal, and (3) longer-term inflation expectations continue to be well anchored.*" This guidance was further strengthened in December 2013 with the addition of "*it likely will be appropriate to maintain the current target range for the federal funds rate well past the time that the unemployment rate declines below 6.5 percent, especially if projected inflation continues to run below the Committee's 2 percent longer-run goal.*"
- The ECB stated in its introductory statement at a press conference in July 2013 "[it] expects the key ECB interest rates to remain at present or lower levels *for an extended period of time*. This expectation is based on the overall subdued outlook for inflation extending into the medium term, given the broad-based weakness in the real economy and subdued monetary dynamics."
- The BOJ used two descriptions regarding the time span of monetary accommodation when *quantitative and qualitative monetary easing* (QQE) was introduced in April 2013. The first was a statement of its intention to achieve the 2 percent price stability target *at the earliest possible time, with a time horizon of about two years*. To fulfill this objective, the main operating target for money market operations was switched from the uncollateralized overnight call rate to the monetary base; it was then decided that the size of the monetary base would rise at

⁴ In 2010–11, the ECB purchased a limited amount of long-term sovereign bonds under the Securities Markets Programme (SMP), but the equivalent amount of liquidity injected was sterilized. This measure is aimed at improving the transmission mechanism of the monetary policy as a credit easing policy. The OMTs replaced the SMP. Furthermore, a limited amount of covered bonds were purchased in 2009–10 and 2011–12 in order to ease funding conditions for financial institutions. These bond purchases were also regarded as part of an enhanced credit easing policy, not as a quantitative monetary easing policy.

an annual pace of about 60–70 trillion yen, to be doubled in two years (2013–14). The second description was a commitment to continuing with QQE as long as it was necessary for *maintaining the 2 percent target in a stable manner*. This description also added a condition that both upside and downside risks to economic activity and prices would be examined, and that adjustments would be made as appropriate.⁵

- The BOE expressed in August 2013 “[it] intends not to raise Bank Rate from its current level of 0.5 percent at least until . . . *the unemployment rate has fallen to a threshold of 7 percent*, subject to the [given] conditions.⁶ [It also] stands ready to undertake further asset purchases while *the unemployment rate remains above 7 percent* if it judges that additional monetary stimulus is warranted. But until the unemployment threshold is reached, and subject to the [given] conditions, [it] intends not to reduce the stock of asset purchases.”

Here, I would like to highlight ***three differences*** regarding the structure of forward guidance. On ***the first difference***, the forward guidance adopted by the Federal Reserve, the ECB, and the BOJ is used deliberately as an accommodative monetary policy tool aimed at generating downward pressure on long-term interest rates, whereas this is not necessarily the case with regard to the BOE. The BOE’s intention is to clarify its policy reaction function or to provide greater clarity about the Monetary Policy Committee’s (MPC’s) views on the existing trade-off between inflation and unemployment and the associated monetary policy stance. Charlie Bean, Deputy Governor of the BOE, explained in August 2013 that the release of the guidance was to clarify the MPC’s existing monetary policy stance rather than to provide additional monetary accommodation.⁷ By reducing uncertainty, it aimed at lowering term premiums and preventing upward movements in market interest rates.

Regarding ***the second difference***, forward guidance is applied to the policy interest rate in the case of the Federal Reserve and the ECB. The BOE appears to apply forward guidance mainly to the policy interest rate. However, it is also linked to the possibility of further asset purchases as well as maintaining the stock of past asset purchases. Recently, these three central banks have been increasingly emphasizing forward guidance as the key monetary policy tool. The BOJ, meanwhile, applies forward guidance to QQE as a package, not specifically to the policy interest rate. Under QQE, the main operating target for money market operations is the monetary base, and various assets (with JGB purchases being the main operational tool) are purchased under the target.

As ***the third difference***, while forward guidance in the Federal Reserve, the BOJ, and the BOE is commonly regarded as “state-contingent” or “threshold-based,” both the Federal Reserve and the BOE include employment-related thresholds, unlike Japan. The Federal Reserve has a dual mandate of promoting price stability and maximum employment, so the reason for this is clear. The BOE places price stability as its primary mandate; however, the inclusion of employment-related conditions may reflect the need to clarify the MPC’s views

⁵ These two descriptions are mutually non-exclusive. The first description (which is a combination of “state-contingent” and “calendar-based” forward guidance) could be regarded as a *necessary* condition to the second description (which is a combination of “state-contingent” forward guidance and “conditional commitment”). For more details, see Sayuri Shirai, “Monetary Policy and Forward Guidance in Japan,” Speeches at the International Monetary Fund (September 19) and the Board of Governors of the Federal Reserve System (September 20) Held in Washington, D.C., Bank of Japan, 2013.

⁶ The conditions are then defined in the form of the following three “knockouts”: (1) the CPI inflation 18 to 24 months ahead will be 2.5 percent or above; (2) medium-term inflation expectations do not remain well anchored; and (3) the Financial Policy Committee (FPC) judges that the stance of monetary policy poses a significant threat to financial stability that cannot be contained by the substantial range of mitigating policy actions available to the FPC. If any of these knockouts are breached, the above-mentioned guidance will be ceased.

⁷ Charlie Bean, “Global Aspects of Unconventional Monetary Policies,” Speech at the 2013 Economic Policy Symposium, Federal Reserve Bank of Kansas City, 2013.

with regard to the trade-off between inflation and unemployment, in the face of high inflation that is concurrent with a high unemployment rate.

By contrast, the need for the unemployment threshold to be used in the BOJ's guidance is relatively small, owing to the fact that (1) the BOJ's primary mandate is to achieve price stability and that (2) the current unemployment issue is more likely to be structural, rather than cyclical. The unemployment figure for November 2013 was as low as 4 percent, close to the lowest point in recent years of 3.6 percent in July 2007. The reason for the relatively low unemployment rate level is that firms tend to flexibly adjust wages along the business cycle, through bonuses and overtime hours for full-time regular workers and an adjustment of working hours and days for part-time, non-regular workers. There are issues such as differential treatment of regular and non-regular workers, and greater flexibility over labor market regulations demanded by firms. However, these are structural issues that are beyond the scope of monetary policy in Japan.

Regarding the ECB, no specific threshold is provided, unlike the three central banks. The guidance seems to be based on the medium-term inflation outlook (while also paying close attention to the economy as well as monetary aggregates and credit flows). At a press conference held in August 2013, Mario Draghi, President of the ECB, explained that the ECB's policy reaction function is linked to the outlook for price stability in the medium term in a timely manner.

Feature (5): the strengthened role of central banks in light of macroprudential policy

Fifth, the global financial crisis has placed macroprudential policy as an increasingly important policy. This reflects the view that stability in the financial system as a whole may not be achieved solely with the existing "microprudential policy" (which monitors the soundness of individual financial institutions). This arises from the shared view that the "Great Moderation" period – which continued until the mid-2000s – successfully achieved general price stability but failed to prevent a global financial crisis. Macroprudential policy pays greater attention to major financial institutions and markets (and their relationship) as major constituents of the financial system, as well as the relationship between economic activity and the financial system. In this light, central banks closely monitor macroeconomic and financial market developments, collect information regarding financial transactions, and function as the lenders of last resort to individual financial institutions with the aim of achieving financial stability. Thus, the use of these specific skills, knowledge, and functions is considered effective as a means of optimizing the effects of macroprudential policy. In this manner, central banks in some advanced economies have strengthened their role with regard to enhancing macroprudential policy.

For example, in the case of the United Kingdom, the function of supervising financial institutions was transferred from the Financial Services Authority (FSA) to the BOE with the establishment of the Prudential Regulation Authority (PRA) in 2013. Also, the Financial Policy Committee (FPC) was officially established at the BOE in 2013 as an entity to engage in macroprudential policy. The FPC will introduce "countercyclical capital buffers" reflecting the Basel III agreement, and is also expected to utilize "sector-based capital buffers" as major policy tools. Furthermore, the FPC is currently seeking specific means by which to encourage coordination with the Monetary Policy Committee (MPC) – which is in charge of monetary policy conduct. With regard to the European Union (EU), moreover, the European Systemic Risk Board (ESRB) – including the ECB president and vice presidents, as well as the presidents of national central banks – was established in 2010 as a regional entity responsible for macroprudential policy. The ESRB is responsible for identifying various risks associated with the regional financial system, sending warning signals over the fragility inherent in the financial system, and providing recommendations for corrective measures.

In the United States, the Financial Stability Oversight Council (FSOC) – where the Secretary of the Treasury chairs the council and members include Chairman of the Federal Reserve and other regulatory agencies – was established in 2010. The FSOC is responsible for monitoring potential risks related to financial stability and to make recommendations to the

Federal Reserve on prudential regulations and supervision. Meanwhile, in Japan, the BOJ, as the central bank, and the Financial Services Agency, as the primary financial regulatory authority, are making coordinated efforts to promote financial system stability by making contributions in their respective fields of responsibility. In this regard, the BOJ conducts on-site examinations and off-site monitoring of individual financial institutions, and thereby carries out various analyses on financial system stability and related risks from macroprudential perspectives.

B. The major challenges faced by central banks in advanced economies

The nontraditional monetary policy measures are expected to generate positive effects on the economies through various channels. Although they are interconnected, the main channels can be summarized as (1) downward pressure on long-term interest rates; (2) the portfolio-rebalancing effect; (3) wealth effects; (4) foreign exchange rates; and (5) credit easing effects. Downward pressure on long-term real interest rates could be exerted either through downward pressure on nominal interest rates by lowering term premiums or through downward pressure on real interest rates by increasing medium- to long-term inflation expectations. While downward pressure on the term premiums has been somewhat expected by the four central banks, an increase in inflation expectations is expected mainly by the BOJ.

Challenge (1): moderate or sluggish credit growth

In practice, some of these channels have materialized and thus have affected these advanced economies favorably. Nonetheless, one challenge is that private-sector credit growth remains relatively moderate in the United States and Japan, notwithstanding the massive injection of liquidity into the market (Charts 3 and 4). In the euro area and the United Kingdom, credit growth remains in negative territory, although the negative trend appears to have bottomed out recently. The size of the monetary base in the euro area has declined, mainly due to the early repayments of the three-year LTROs by some European banks.

In general, mortgages have been increasing in the euro area, Japan, and the United Kingdom, whereas such a trend is not yet visible in the United States owing to the deleveraging process in the household sector and tight lending conditions for non-prime individual borrowers (Chart 4). In the core euro area and the United Kingdom, the increase in mortgages reflects a hike in housing prices in some cities in addition to the low level of interest rates. In Japan, this is attributable to the front-loaded increase in housing investment caused by a scheduled consumption tax hike in April 2014, employment and income growth, wealth effects, and an expected rise in real estate prices in the Tokyo metropolitan area.

On the other hand, while corporate loans are rising – albeit moderately – in the United States and Japan, those in the euro area and the United Kingdom have continued to decline. Features common to the four economies are ample retained earnings, easy access to bond financing for large firms, and concerns about future economic uncertainty (Chart 5). Credit demand for business fixed investment in the United States and the euro area appears to be sluggish.

Challenge (2): monetary accommodation and growing financial linkages

The second challenge is related to the growing linkages across financial markets. A rise in long-term government bond yields in a major overseas economy may exert upward pressure on the government bond yields of another economy. The upward pressure could reflect the change in economic conditions in the affected economy, but could also be driven by market investors' reactions to various data and news related to the domestic and foreign economies, as well as speculative activities. The upward force may work against the downward pressure maintained by the accommodative monetary policy adopted by an affected economy, thereby possibly weakening the effectiveness of monetary policy.

Given this background, for example, one of the reasons for adopting forward guidance by the ECB was to cope with this unintended upward pressure. At the July 2013 press conference, President Mario Draghi expressed his concerns over increases in various segments of the interest rate curve, in the presence of a by and large continuing weakness in the economy. He then explained that forward guidance was introduced to clarify the ECB's assessment of the medium-term outlook for inflation and what its policy reaction function was. This indicates that the guidance was used to clearly communicate the ECB's accommodative monetary policy stance to market participants that low levels of market interest rates should be appropriate for the time being.

In the case of Japan, the upward pressure on long-term interest rates remains limited so far, since the BOJ's massive purchases of JGBs have helped to generate stronger downward pressure on the interest rates with reduced risk premiums. Chart 6 shows the decomposition of key factors contributing to long-term JGB yields. It indicates that in recent months downward forces caused by "other factors" (which largely reflects domestic factors) have been greater than upward pressure caused by "common factors" (which largely reflects global factors).

Challenge (3): avoiding disinflation or deflation

Regarding the third challenge, some advanced economies have recently suffered declines in both headline and core inflation. For example, the year-on-year rates of change in the PCE deflator in the United States have been at substantially low levels for the past few years, at 0.9 percent in the case of the headline index and 1.1 percent in the case of the core index for November 2013 (the CPI headline index reported at 1.2 percent and the core index at 1.7 percent). In the euro area, a similar trend is observed both in the headline and core HICP. The headline HICP and the core HICP remained low at 0.9 percent and 1.1 percent, respectively, in November (0.7 percent and 1.0 percent, respectively, in October). This decline in inflation, or the so-called disinflationary trend, reflects a decline in energy and food prices, the negative output gap, and a deceleration in wage growth.

The disinflationary trend is somewhat of a concern in the euro area, since the negative output gap had deteriorated until recently and the unemployment rate remains at a high level. On the other hand, the disinflationary concern is rather limited in the United States owing to continued economic recovery in recent quarters. Nonetheless, if the actual inflation rate continues to be below 2 percent for a prolonged period, this may cause a downward shift in medium- to long-term inflation expectations in both the euro area and the United States. In addition, as a medium- to long-term issue, we may need to consider whether the decline in prices, particularly in natural gas prices owing to the increased shale gas development in the United States, would bring down the country's trend inflation rate in the long run.

Among advanced economies, a number have been paying close attention to the deflation experience of Japan since the late 1990s, following the bursting of the real estate and stock price bubbles in the early 1990s and the associated banking crisis. So far, central banks in these economies have promptly taken necessary measures and successfully avoided deflation. While there is no apparent sign of deflation at this stage, these central banks have expressed their intention to take necessary measures whenever judged necessary.

Challenge (4): the BOJ's challenge to achieve the 2 percent price stability target

In Japan, the year-on-year rates of change in the headline and core CPI (excluding fresh food) have turned positive from June 2013, with the pace of increase accelerating since then. The headline CPI inflation for November reached 1.5 percent (core CPI 1.2 percent), exceeding inflation in the United States and the euro area (Chart 7).

Regarding the CPI excluding food and energy (the so-called core index according to the definition adopted in the United States and Europe), the rate of change in Japan improved to 0 percent in September 2013 and turned positive in October 2013 reaching 0.3 percent, and 0.6 percent in November. However, this rate of inflation remains lower than those of the

United States and the euro area. While a wide range of consumption items have shown a mild increase, the major factors contributing to the increase arise from energy prices, administrative prices, and the lagged impact of the yen's depreciation at this stage. The BOJ expects that the price rise will increasingly reflect an improvement in the output gap and a rise in inflation expectations.

The BOJ judged in January 2013 that setting the 2 percent price stability target in terms of the CPI was important for the economy. This judgment was made taking into account, for example, (1) the sufficient room needed to avoid another deflation; (2) the sufficient room needed for the conduct of flexible monetary policy in normal periods to avoid the zero lower bound in the recessionary phase of the economy; (3) the upward bias in the CPI statistics; and (4) the need to align with the global standard of a price stability target, as touched upon earlier. Moreover, achieving sufficiently high nominal GDP growth rates – not only through positive real economic growth but also through moderate increase in the GDP deflator – is essential for the economy to boost expectations for economic growth formed by firms and households.

In general, the duration for achieving the target is about two years within inflation-targeting countries. Thus, the BOJ expressed in April 2013 its intention to achieve the target at the earliest possible time with a time horizon of about two years. I also believe that the BOJ should do its best to achieve 2 percent at the earliest possible time. It is good if 2 percent is achieved within about two years, while ensuring the sustainable growth path and with no serious burden imposed on firms and households by a rapid rise in the inflation rate. Nonetheless, I personally consider that it may take some time before the full impact of QQE materializes, taking into account consumers' concern about a rapid decline in real disposable income as well as firms' cautiousness in raising sales prices (in fear of losing their market shares). Thus, there may be high uncertainty regarding the duration in which to achieve the target.⁸

In the end, what is important is that the BOJ is conducting monetary easing with the aim of achieving 2 percent inflation *in a stable manner* with sustainable economic growth, rather than merely achieving 2 percent in a specific year and failing to meet the target in subsequent years. As a related issue, I believe additional monetary easing measures should be taken without hesitation so as not to jeopardize the BOJ's credibility, whenever downside risks to the BOJ's baseline scenario (of the outlook for economic activity and prices) are judged to have materialized. That said, there could be instances where it may be appropriate to conduct monetary easing aimed at achieving 2 percent at a pace slower than about two years – provided that the pace of inflation is judged to be creating an excessive burden on households and firms.

In addition, I would like to point out that an adequate understanding by the public of the importance of the 2 percent target is a prerequisite to the success of QQE. While most of the public acknowledges the past 15 years of mild deflation as an unfavorable experience, they also consider a rise in inflation as unfavorable because of an associated rise in living expenses. In particular, an increase in the consumption tax rate is scheduled in April this year, and thus, together with the effect of monetary easing, the inflation rate may temporarily exceed 2 percent. It also appears that some in the public feel uncertain about the importance of achieving the target. Thus, it is important for the BOJ to clearly explain and respond to their questions, such as how achieving the 2 percent price stability target will improve their daily lives. On this front, the BOJ has recently upgraded its web site and created a new section on its top page titled "Price Stability Target of 2 percent and Quantitative and Qualitative Monetary Easing" in order to enhance accessibility to relevant documents. While this move is a welcome step, further improvement is necessary with regard to its

⁸ For details, see Sayuri Shirai, "Japan's Economic Activity, Prices, and Monetary Policy: Some Perspectives on the Slope of the Phillips Curve," Speech at a Meeting with Business Leaders in Tokushima, Bank of Japan, 2013.

communication strategy, especially that to the general public. In this regard, I will do my best to continually examine how the BOJ can gain the understanding of the public and thereby achieve the 2 percent target stably.

IV. Central banks' challenges in emerging economies

Now, let's shift to the topic of emerging economies. The Asia region performed well and large capital inflows took place in the second stage of the economic adjustment process in 2010–12, as indicated earlier. Thus, I will focus on the issues faced by emerging economies with regard to capital flows as well as the related challenges faced by their central banks.

A. *The three challenges related to the capital inflows*

Expansion of cross-border capital flows to emerging economies is attributable to (a) high economic growth expectations, higher yields, and favorable economic fundamentals (the so-called “pull factors”); and (b) low yields in advanced economies with accommodative monetary policies and investors' pursuit of higher yields (the so-called “push factor”). Chart 8 indicates that Indonesia and Thailand, followed by India, experienced relatively large-scale capital inflows in recent years – exceeding the level before the global financial crisis. Generally, those capital inflows gave rise to the following three features in the Asian region: (1) “follow-the-leader behavior” in setting short-term policy interest rates; (2) growing importance of macroprudential policy to deal with capital inflows; and (3) growing issuance of local currency-denominated bonds and enhanced linkages with global bond markets.

“Follow-the-leader behavior” in setting short-term policy interest rates

First, large-scale capital inflows, while bringing various favorable effects to emerging economies, put the economies' central banks in a trade-off regarding the decision to set short-term policy interest rates. That is, on the one hand, an increase in the short-term policy interest rates (either as a result of tight monetary policy or of foreign exchange market intervention followed by sterilization) helps to lower inflationary pressures, but may invite a new round of capital inflows by investors in search of higher yields. It may also damage exporting sectors through an appreciation of their domestic currencies. On the other hand, a decline in the short-term policy interest rates (either as a result of accommodative monetary policy or of unsterilized foreign exchange market intervention) helps exporting sectors through a limited degree of appreciation of their domestic currencies and volatility of foreign exchange markets. However, such a decline may increase inflationary pressures and cause deterioration of financial imbalances (such as real estate bubbles and financial instability).

Taking into account this trade-off, some emerging economies tend to choose the latter option – namely, a decline in the interest rates – reflecting concerns over a sharp appreciation and volatile exchange rates. This is because high volatility in exchange rates often leads to heightened volatility in output, which in turn may well amplify the vulnerability of the economies. Consequently, a number of central banks in emerging economies with large capital inflows tend to maintain lower short-term policy interest rates than usual – or lower than the interest rates that would have been adopted on the basis of certain monetary policy rules (such as the Taylor rule).⁹ This phenomenon is also referred to as “follow-the-leader behavior” in setting short-term policy interest rates, since emerging economies tend to set short-term policy interest rates in line with the low interest rates set by major central banks in

⁹ See Dong He and Robert N. McCauley, “Transmitting Global Liquidity to East Asia: Policy Rates, Bond Yields, Currencies and Dollar Credit,” BIS Working Papers, No. 431, Bank for International Settlements, 2013; and Michael Spencer, “Updating Asian ‘Taylor Rules’,” Global Economic Perspectives, Deutsche Bank, 2013.

advanced economies.¹⁰ This may suggest that the price stability target could be challenged over the exchange rate stabilization objective.

Growing importance of macroprudential policy to deal with capital inflows

Compared to advanced economies, a number of emerging economies had already installed some policy measures that are known today as macroprudential policy measures prior to the global financial crisis. This is because it was considered in these economies that preventive measures to contain volatile capital inflows and mitigate resultant adverse impacts were an effective tool for mitigating financial and economic imbalances. This partly reflects the lessons learnt from the Asian currency crisis of 1997–98, when a sufficient structure for regulations and supervision of the banking sector had not yet been established.

Generally, macroprudential measures could be (1) capital-based measures (covering various capital buffers), (2) liquidity-based measures (such as a liquidity requirement, reserve requirement, and limit on net open positions), and (3) asset-side measures. The asset-side measures include a limit on aggregate credit supply, the application of loan-to-value (LTV) ratios and the debt-to-income (DTI) ratios, which are generally applied to the mortgage application, and various types of taxes imposed on real estate purchases. The liquidity-based and asset-side measures are frequently used by many emerging economies. Nevertheless, a consensus regarding the effectiveness of these measures has not yet been established.

Local currency-denominated bonds and enhanced linkages with global bond markets

Third, emerging economies in the Asian region have been shifting from a bank-based system to a more diversified financial system combining bank loans and securities market financing since the Asian currency crisis. A wide range of entities have increased their bond issuance. More importantly, the share of local-currency denominated bonds saw a remarkable increase – for example, from 88 percent in 2000 to 94 percent in 2011, and from about 1 trillion U.S. dollars to 7 trillion U.S. dollars over the same period.¹¹ The amount of issuance continued to grow even after the global financial crisis (with the exception of the turbulence experienced in 2008–09), helping to offset a slowdown in the growth of bank loans. The increase also reflected the active issuance of government bonds to finance expansionary fiscal policy. The maturity of both government and corporate bonds has also lengthened, even after the global financial crisis.

These developments enabled emerging economies to reduce double mismatches (maturity and currency mismatches between assets and liabilities), thereby improving the balance sheets of governments, firms, and financial institutions. These bond market developments are partly attributable to the long-standing initiatives by the governments and central banks in the Asian region to foster local currency-denominated bond markets – such as the Asian Bond Markets Initiative (ABMI) and the Asian Bond Fund (ABF).

Capital inflows have been reversed for some emerging economies since May 2013. This is evident especially for those with relatively weak economic fundamentals (such as the current account deficit, fiscal deficit, and high private-sector debt) or those linked closely with global financial markets (Charts 9 through 11). The reversal was triggered by the change in foreign investors' views over the expected timing for the Federal Reserve to reduce the pace of its asset purchases, and the subsequent interest rate hike in the United States – in addition to the change in their views over the growth expectations for emerging economies. The

¹⁰ See Jaime Caruana, "Ebbing Global Liquidity and Monetary Policy Interactions," Speech at the Central Bank of Chile Fifth Summit Meeting of Central Banks on Inflation Targeting: "Global Liquidity, Capital Flows and Policy Coordination," Bank for International Settlements, 2013.

¹¹ See Iwan J. Azis, Sabyasachi Mitra, Anthony Baluga, and Roselle Dime, "The Threat of Financial Contagion to Emerging Asia's Local Bond Markets: Spillovers from Global Crises," ADB Working Paper Series on Regional Economic Integration, No. 106, Asian Development Bank, 2013.

accumulated large amount of capital inflows to these economies as well as a shift in global financial conditions also contributed to a shift in capital flow movements.

In spite of reduced exposure to the double mismatches, emerging economies suffered from a reversal of capital inflows – mainly through a sudden decline in liquidity in the bond and foreign exchange markets. In May–August 2013 in particular, bond prices dropped and exchange rates depreciated sharply in some of these economies, while some also faced large declines in stock prices (Charts 12 through 14). In other words, the greater linkages with global financial markets through securities market financing might have made emerging economies more sensitive to movements in interest rates in advanced economies. Some foreign investors tend to adjust their long positions relatively quickly by selling their holdings of securities when the volatility of interest rates rises suddenly. Moreover, foreign investors, during periods of reduced liquidity, increasingly take short positions over exchange rates in order to hedge their positions over securities; this may lead to a sudden depreciation of exchange rates without accompanying large-scale actual capital outflows.

B. Diverging economic performance in Asian emerging economies

Capital inflows, together with expansionary fiscal policy and inadequate structural reforms, have in the end contributed to the deterioration in the current and fiscal account balances of some economies in the ASEAN countries and South Asia (Charts 9 and 10). Since the reversal of capital flows in May 2013, these economies have responded with a tightening of monetary and fiscal policies to mitigate capital outflows. Some of them may face a slowdown in their economic growth rates for the time being, considering that such a policy action may be needed for a while. By contrast, other emerging economies, largely in East Asia, have been affected hardly at all by the financial turbulence from May 2013. These economies have generally maintained strong fundamentals, with adequate foreign reserves (relative to short-term foreign loans) as well as surpluses in their current account and fiscal account balances.

This means that foreign investors have begun to differentiate emerging economies, when investing in them, based on the soundness of their economic fundamentals. Thanks to this differentiation, the Asian region as a whole has managed to escape massive capital outflows and contagions, thereby avoiding a sharp slowdown in its overall economic growth performance. This is in contrast with the crisis in the mid-1990s triggered by Thailand, when capital outflows there spread from one economy to another (including Indonesia and South Korea). The greater availability of information about the region and greater soundness with regard to the financial system have contributed to mitigating the herding behavior of investors. Nonetheless, less affected economies also need to be well prepared for a potential rise in volatility in the securities and foreign exchange markets, which may be caused by a sudden change in investors' sentiment and speculative activities.

V. Final remarks

More than five years have passed since the global financial crisis, and yet the central banks in large advanced economies continue to conduct unprecedentedly highly accommodative monetary policy to boost the economy and prevent disinflation. While these policies are necessary and consistent with the mandate of the relevant central bank laws, it is also true that such policies could exert spillover effects on other economies. As a result, each central bank more closely monitors developments of monetary policy adopted by those in major economies. It is also becoming crucial for central banks to monitor global investors' risk appetite as well as capital flows and derivatives activities in considering the transmission mechanism of monetary policy.

The exceptionally low interest rates set by central banks in advanced economies and their supply of ample funds through nontraditional measures they have taken, as well as speculation about their outlook, may have accelerated the pace of capital movements across the globe and enhanced linkages across securities and foreign exchange markets. At the same time, some central banks in emerging economies may be conducting “asymmetric”

monetary policy to mitigate the volatility of exchange rates – that is, the conduct of accommodative monetary policy during a period of capital inflows and high economic growth on the one hand, and that of tight monetary policy during a period of capital outflows and sluggish economic growth on the other. Such asymmetric monetary policy is likely to amplify the boom-bust cycle in emerging economies and contribute to a rapid increase in global commodity prices. There is no consensus among central banks as to whether the major factor contributing to capital flows and related problems arises mainly from the side of advanced economies or the side of emerging economies. Nor is there a consensus with respect to appropriate prescriptions in such circumstances.

In this situation, efforts have been made to cope with the rapidly changing global economic environment. Among advanced economies, for example, the six central banks – the Bank of Canada, the BOE, the BOJ, the ECB, the Federal Reserve, and the Swiss National Bank announced in October 2013 that the existing temporary bilateral liquidity swap arrangements (established in 2007 and due to expire in February 2014) will be converted to standing arrangements and remain in place until further notice. The arrangements allow for the provision of liquidity in each jurisdiction in any of the five currencies foreign to that jurisdiction, should the two central banks in a particular bilateral swap arrangement judge that market conditions warrant such action in one of their currencies. The arrangements have helped to ease strains in financial markets, especially in the euro area.

In the Asian region, meanwhile, the Chiang Mai Initiative Multilateralization (CMIM) has been established from the viewpoint of monitoring capital flow movements and improving crisis prevention and management capacity. In May 2012, the decision was reached to amend the CMIM agreement in order to (1) double the size of the CMIM from 120 billion to 240 billion U.S. dollars, (2) introduce a crisis prevention facility of the Precautionary Line, and (3) minimize the IMF-linked portion from 80 percent to 70 percent (and further to 60 percent in 2014 upon the review of certain conditions). The ASEAN+3 Macroeconomic Research Office (AMRO) was established in Singapore in April 2011 as an independent regional surveillance unit to monitor and analyze regional economies and support CMIM decision-making.

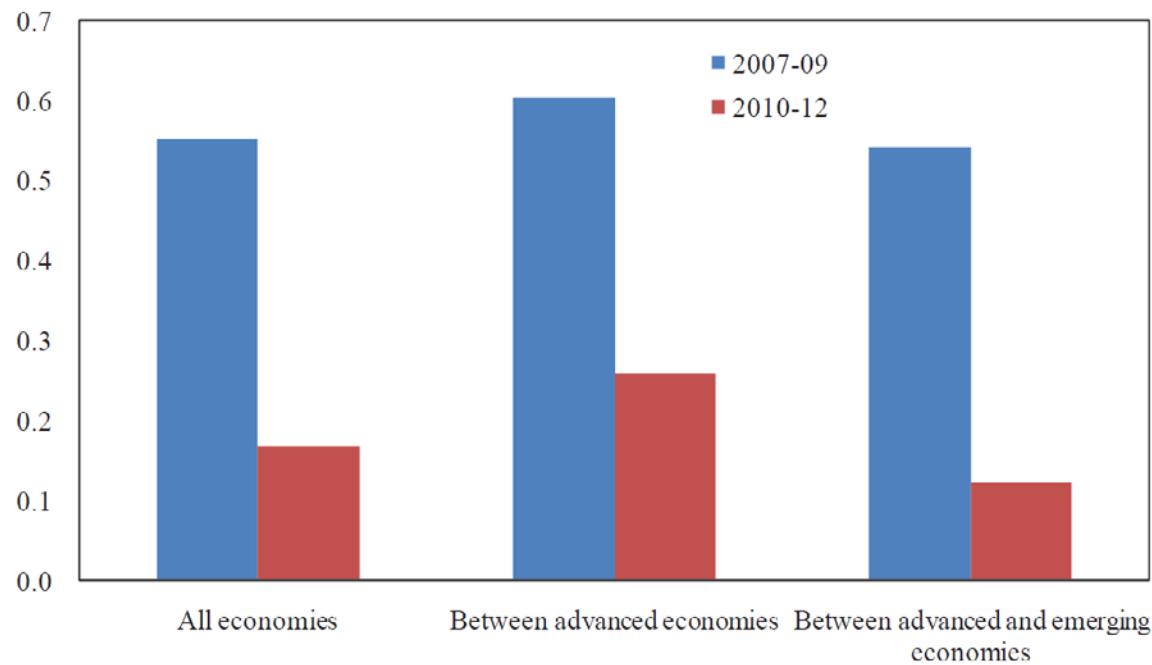
Lastly, I would like to stress that the global financial crisis and the rapidly changing global economic environment have presented new challenges for central banks on a global scale. In this light, it is becoming important to promote communication among central banks, as well as with the markets and the public. Such initiatives will allow for discussion on the development of new systems and mechanisms as well as on appropriate policy methods, and may become an essential step to the search for a better international financial architecture, and ultimately the stability and prosperity of the global economy.

I would like to end my speech here.

Thank you for your kind attention.

Chart 1

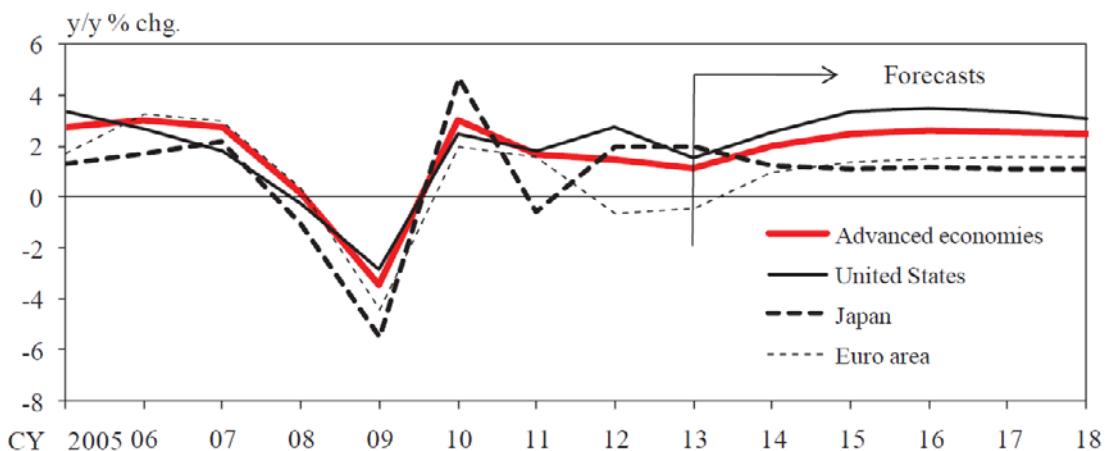
Correlation of Real GDP Growth Rates



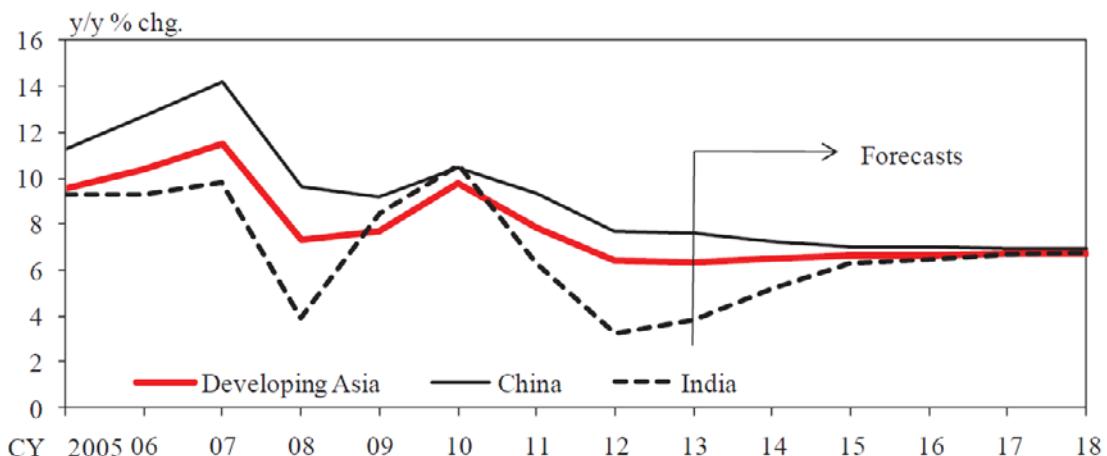
Source: International Monetary Fund.

Real GDP Growth Performance

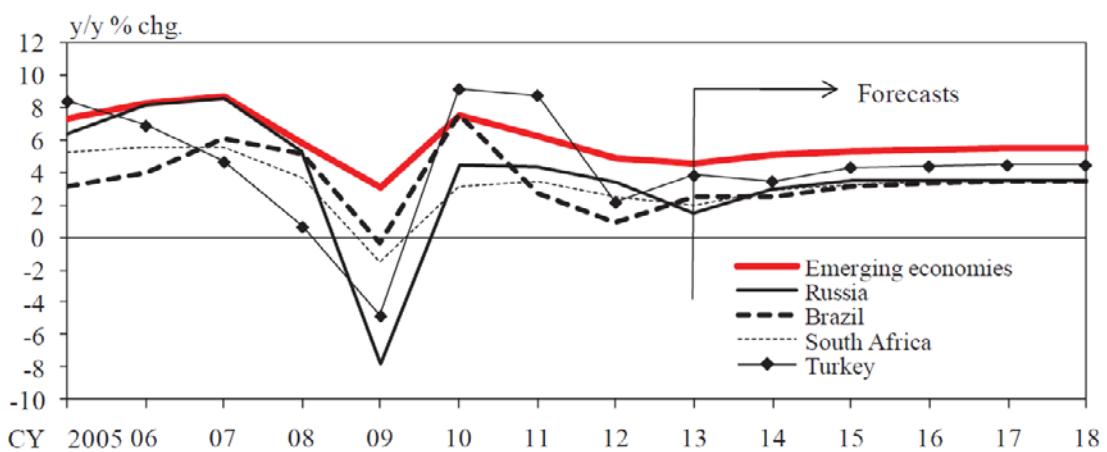
(1) Advanced Economies



(2) Developing Asia



(3) Emerging Economies



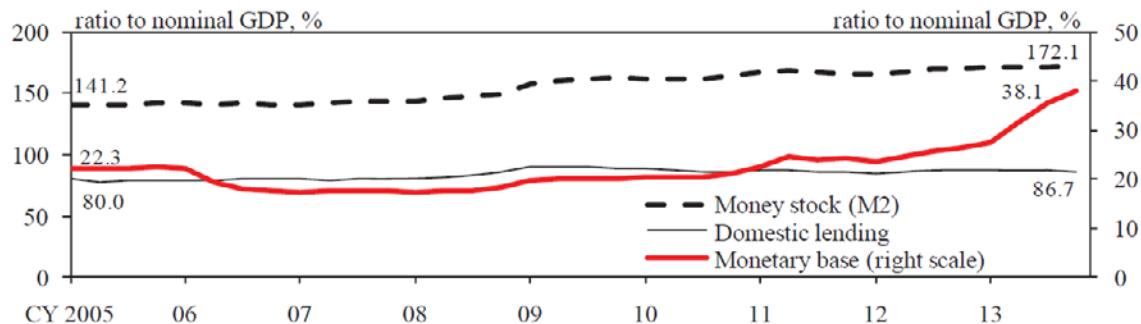
Note: "Emerging economies" includes "Developing Asia."

Source: International Monetary Fund.

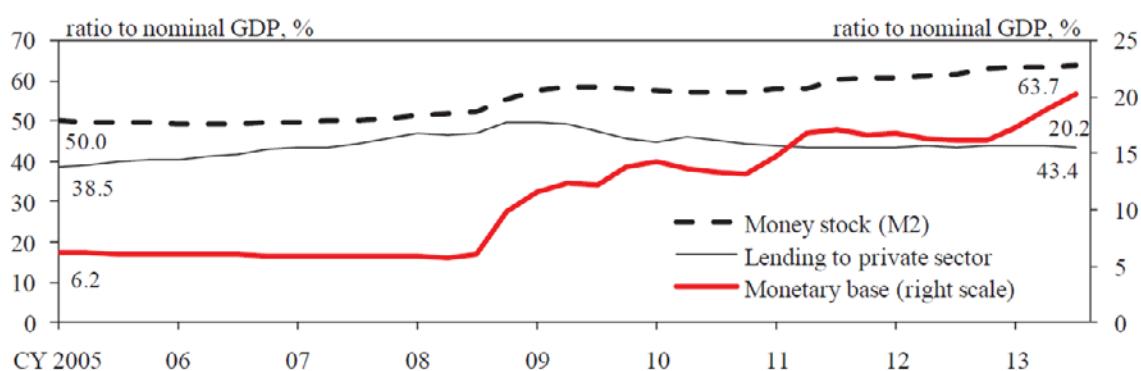
Chart 3

Monetary Base and Money Stock

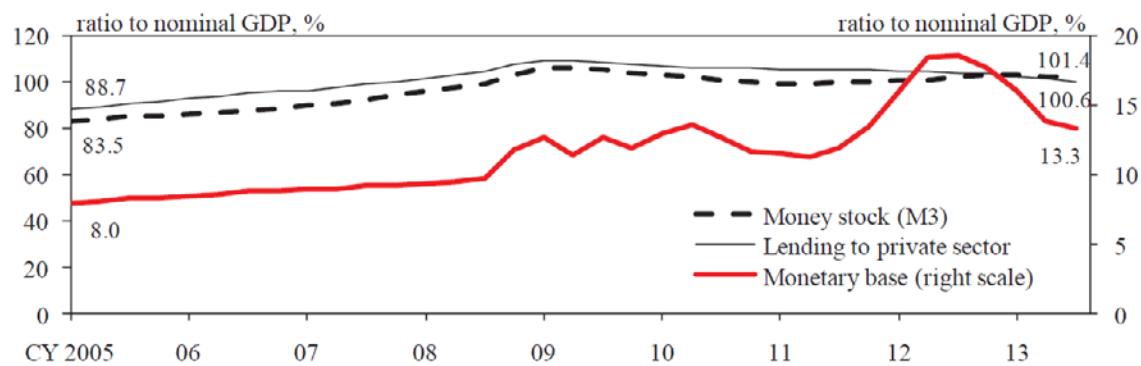
(1) Japan



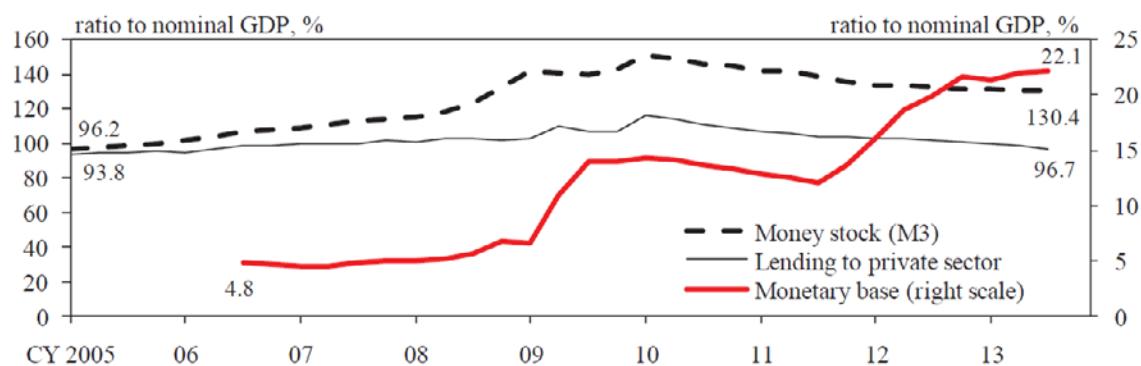
(2) United States



(3) Euro Area



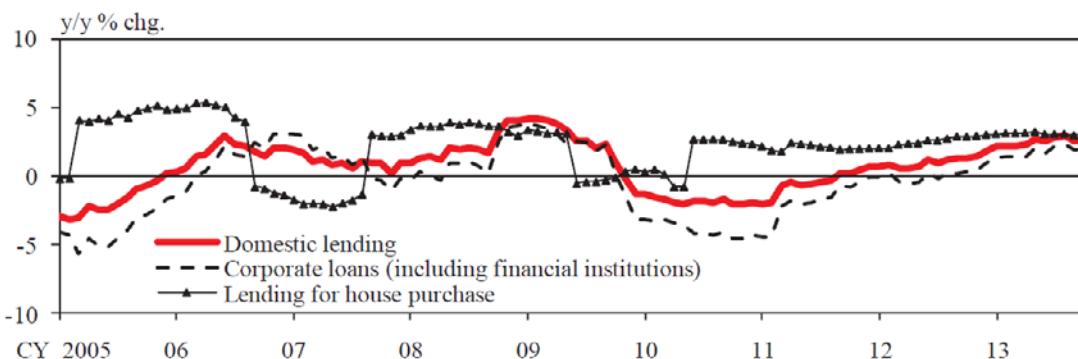
(4) United Kingdom



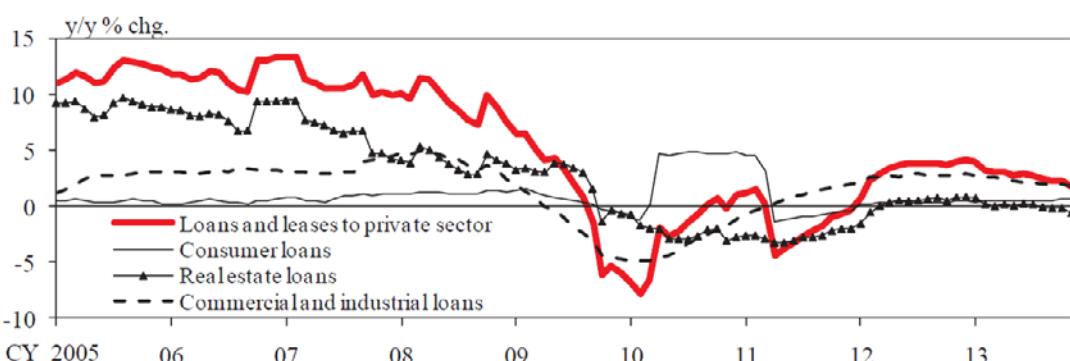
Sources: Bank of Japan; Federal Reserve; European Central Bank; Bank of England.

Bank Lending in Advanced Economies

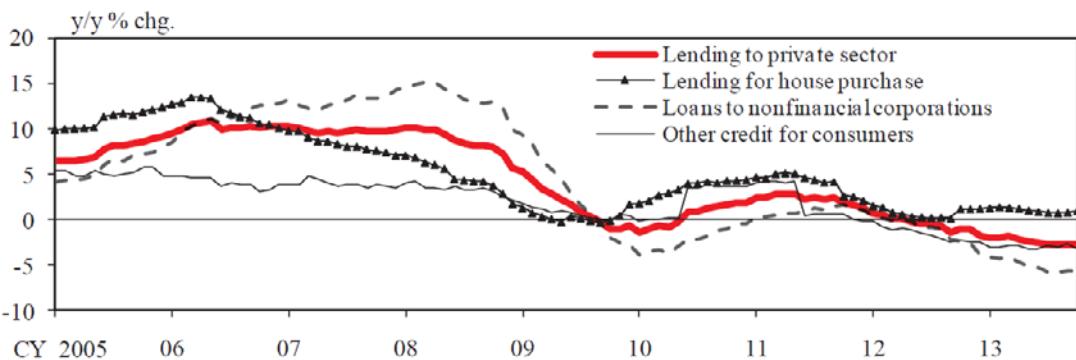
(1) Japan



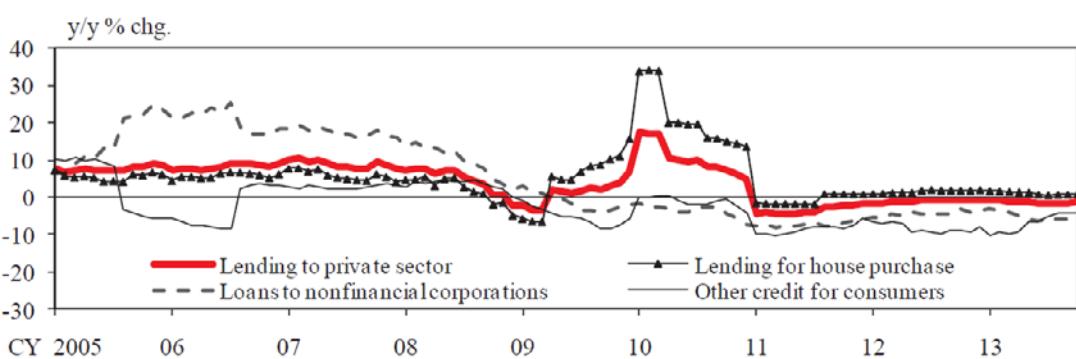
(2) United States



(3) Euro Area



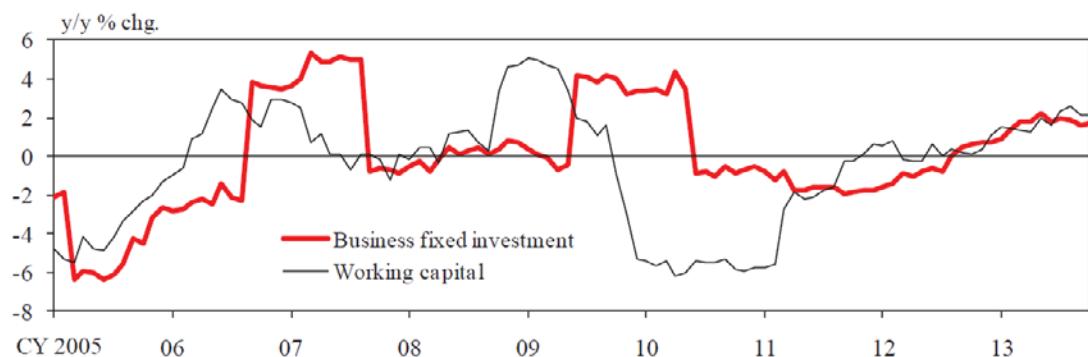
(4) United Kingdom



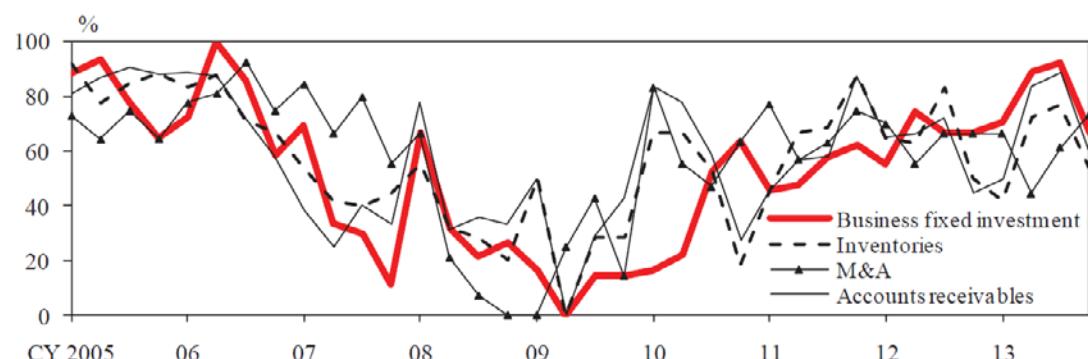
Sources: Bank of Japan; Federal Reserve; European Central Bank; Bank of England.

Factors Affecting Corporate Credit Demand in Advanced Economies

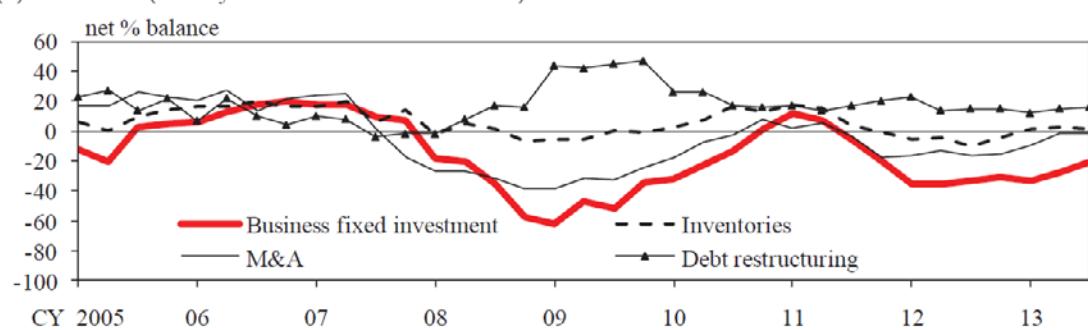
(1) Japan (Actual Lending by Purpose)



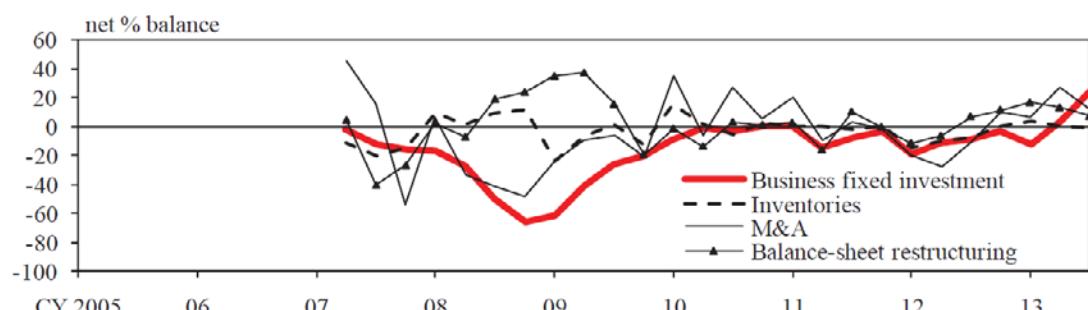
(2) United States (Survey Result of Respondents with Increased Credit Demand)



(3) Euro Area (Survey Result: Credit Demand DI)



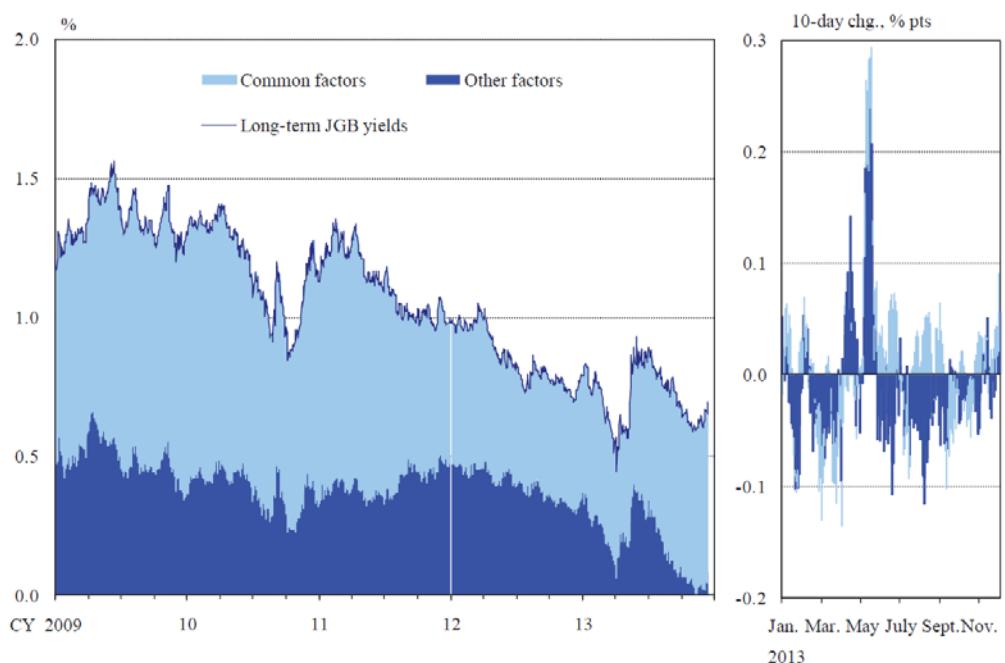
(4) United Kingdom (Survey Result: Credit Demand DI)



Note: For the United States, figures show the percentage of respondents who answered that credit demand increased owing to each factor described. For the euro area and United Kingdom, positive figures indicate that the changes in the factors described have served to increase credit demand.

Sources: Bank of Japan; Federal Reserve; European Central Bank; Bank of England.

Chart 6

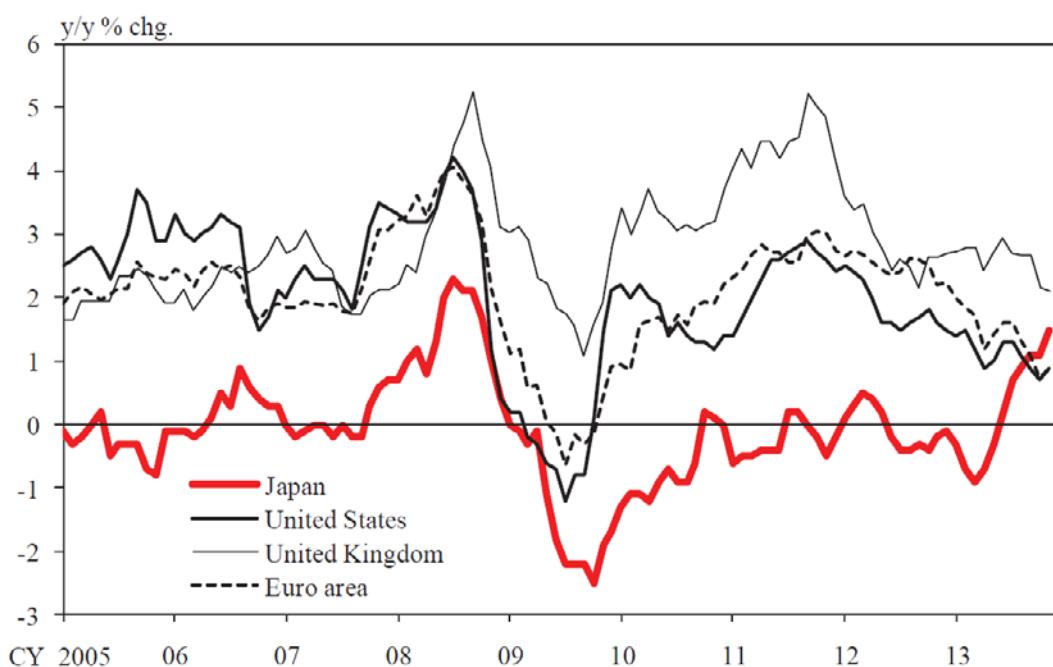
Decomposition of Long-Term JGB Yields

Notes: 1. "Common factors" is defined as the first principal component of U.S., U.K., German, and Japanese government bond yields.

2. "Other factors" is the sum of the constant term and residuals from regression of JGB yields on "common factors" and the constant term.

Sources: Bank of Japan; Bloomberg.

Chart 7

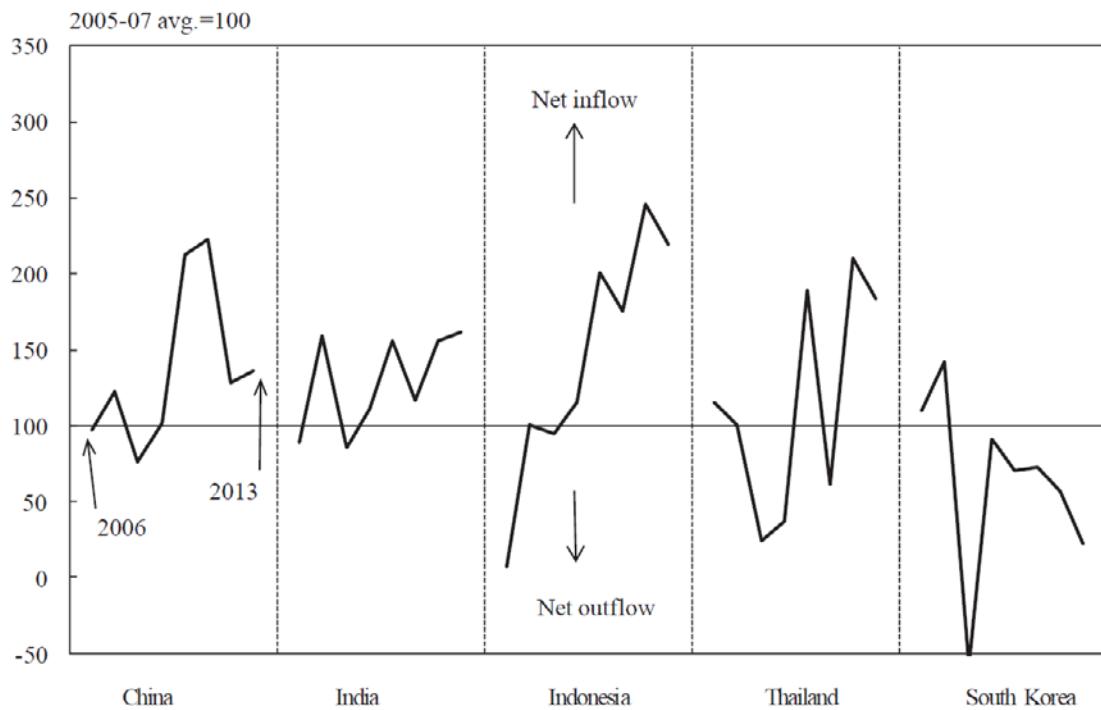
Consumer Price Index (Headline) in Advanced Economies

Note: Figures for the United States are the PCE deflator.

Source: Bloomberg.

Chart 8

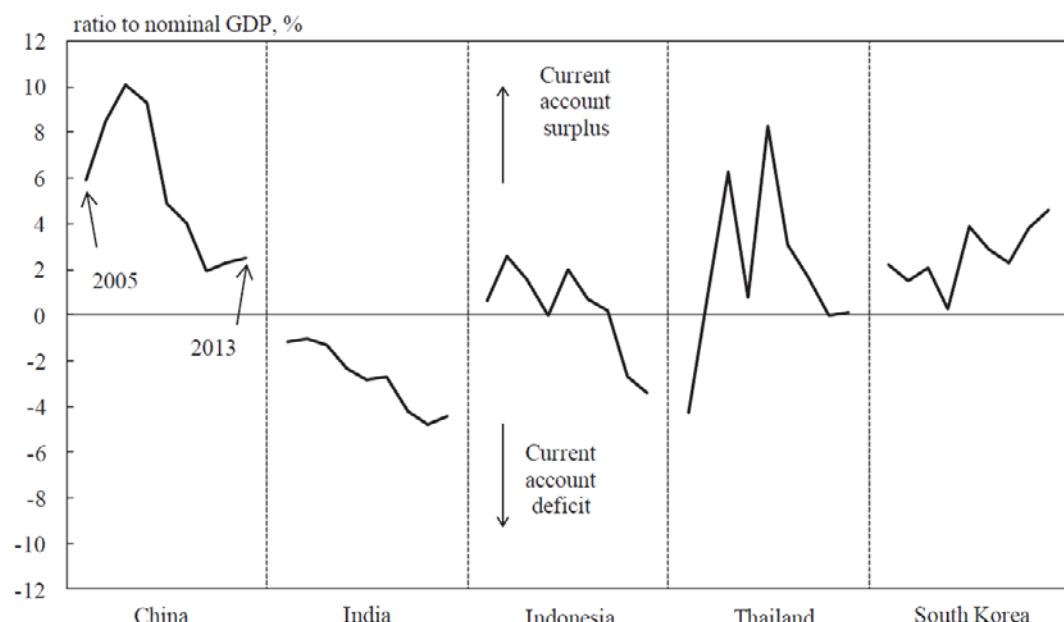
Net Capital Flows to Asian Emerging Economies



Source: HAVER Analytics.

Chart 9

Current Account Balance (Percentage of GDP)



Source: International Monetary Fund.

Chart 10

Fiscal Balance (Percentage of GDP)

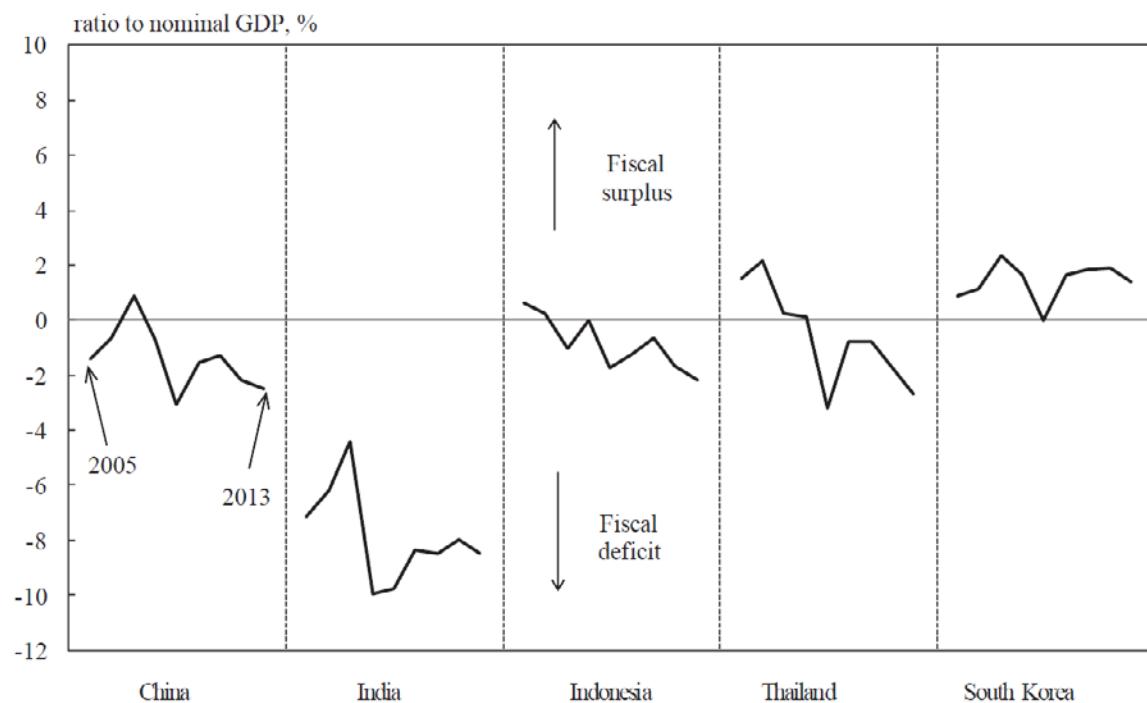


Chart 11

Bank Loans to the Private Sector (Percentage of GDP)

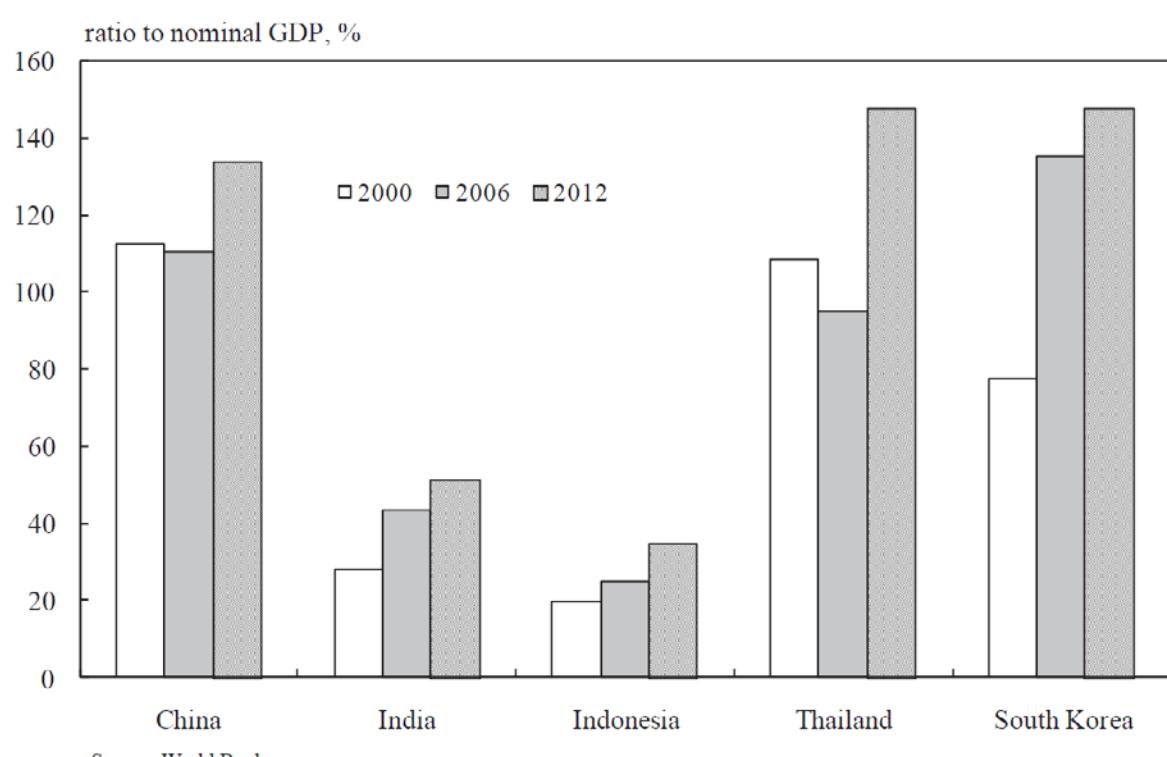
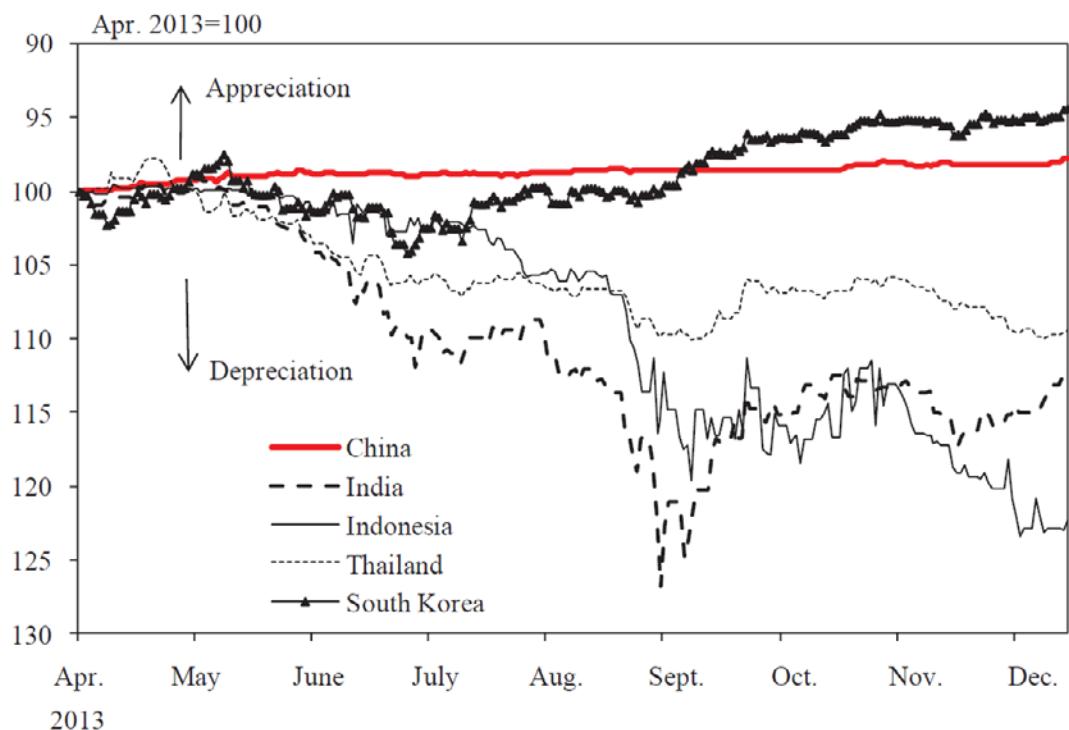


Chart 12

Foreign Exchange Rates

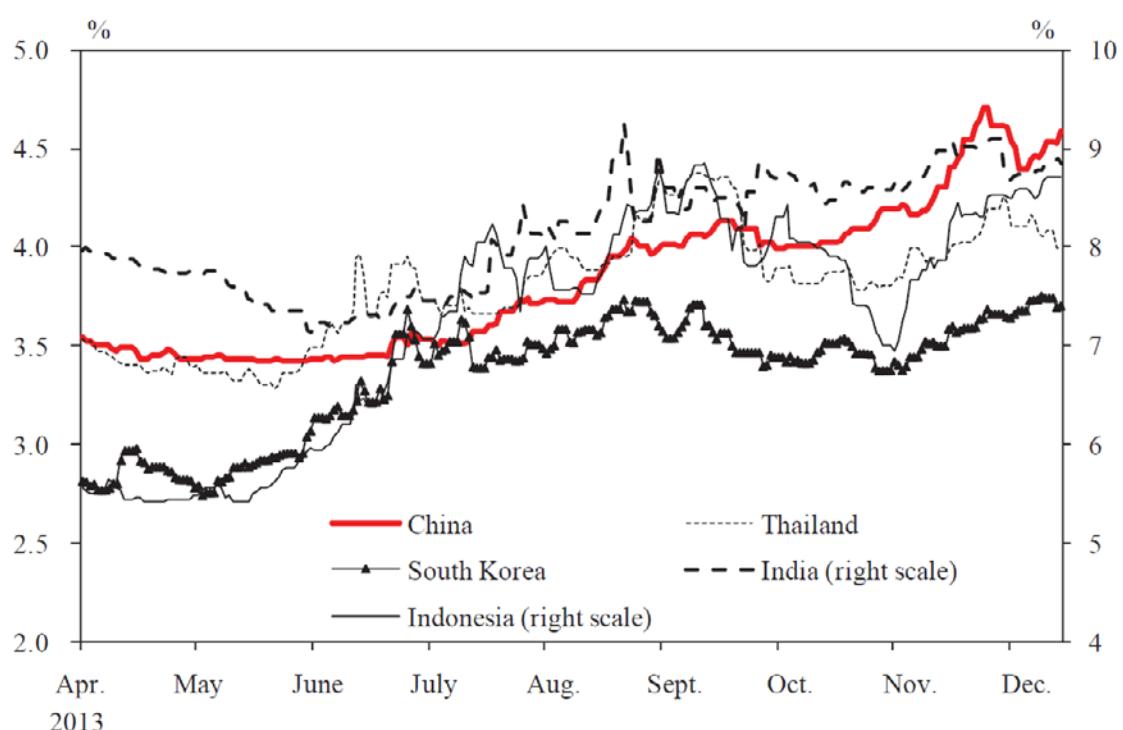


Note: Exchange rates are against the U.S. dollar.

Source: Bloomberg.

Chart 13

Long-Term Interest Rates



Source: Bloomberg.

