



# Japan

## 2011 ARTICLE IV CONSULTATION

### 2011 Selected Issues

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**International Monetary Fund  
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# INTERNATIONAL MONETARY FUND

## JAPAN

### Selected Issues

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Approved by the Asia and Pacific Department

June 28, 2011

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## EXECUTIVE SUMMARY

The Great East Japan earthquake has had a profound impact on Japan's economy and is likely to influence policies for some time. The background papers for the 2011 Article IV consultation focus on the earthquake's implications for fiscal, monetary, and labor market policies.

*Chapter I assesses the risks to the Japanese government bond (JGB) market.* Since the earthquake, yields on JGBs have remained low. Going forward, a decline in fund supply, particularly from the corporate sector as reconstruction spending picks up, spillovers from global financial distress, and higher market volatility could lead to a rise in JGB yields. Over the medium term, population aging and a recovery in risk appetite are also likely to reduce domestic savings and the demand for safe assets. To limit these risks, fiscal policy should aim to reduce public debt quickly and lengthen the maturity of JGBs.

*Chapter II assesses whether the Bank of Japan's (BoJ) recent easing measures are 'powerful and comprehensive' in affecting the financial markets.* Over the course of last year, the BoJ expanded its set of unconventional monetary easing measures to combat deflation and support growth. Using an event study approach, the paper assesses the impact of the new measures—in particular its asset purchase program—on financial markets and finds that they contributed to a moderate decline in long-term interest rates, a rise in equity prices, and reduced downside tail risks. Overall, the impact of the new measures on financial markets has been broad-based and extends beyond the assets purchased by the BoJ.

*Chapter III asks whether the BoJ's recent experience with unconventional monetary easing has been more effective in stimulating economic activity.* Compared to the BoJ's pre-2007 quantitative easing period, the stronger balance sheets of banking and corporate sectors could have increased the effectiveness of the BoJ's new easing measures. Using a VAR model, the paper finds that the monetary easing measures after the global crisis supported economic activity, but have had only a limited impact on inflation and no effect on the exchange rate. While it is too early to make an overall assessment, the preliminary findings suggest that further easing by the BoJ could help stimulate economic activity.

*Chapter IV discusses how labor policies can support employment in the aftermath of the earthquake and boost growth over the medium term.* The earthquake had a significant impact on regional and national labor markets with applications for employment insurance rising sharply. The authorities have responded quickly by providing temporary assistance to firms and workers. Such efforts could be further complemented by targeted training and job search assistance. The earthquake also provides an opportunity to accelerate broader labor market reforms and the chapter discusses measures to raise employment opportunities for women, the young, and the old.

## I. ASSESSING RISKS TO THE JAPANESE GOVERNMENT BOND MARKET <sup>1</sup>

### A. Introduction

1. **Since the earthquake, yields on Japanese government bonds (JGBs) have remained low and stable.** Despite expectations of additional JGBs to finance reconstruction, 10-year JGB yields have remained steady around 1.1–1.2 percent since March of this year. The sizeable financial surpluses of the corporate and household sectors continue to provide steady funds to the JGB market through the banking sector. Recent JGB auctions have been met with robust demand from banks who continue to purchase short-term securities and from life insurers and pension funds looking to lengthen the duration of their bond portfolios (Figure I.1).

2. **These factors holding down JGB yields in the near term, however, could wane even though the risks of a near-term disruption to the market are low.** The supply of funds for financing JGBs could decline as business investment picks up to repair the damaged capital. Given the high correlation of JGB yields with other sovereign yields (such as for U.S. Treasuries), a rise in global financial distress could spillover and affect the JGB market. An unwinding of positions in the futures and swaps markets, where foreign participation is high, could amplify these inward spillovers, and an increase in market volatility or a sudden rise in yields could also push banks to sell JGBs to limit losses. All of these factors could contribute to a rise in yields, worsen the public debt dynamics, and pose a risk to financial stability.<sup>2</sup>

3. **The market's capacity to absorb new debt is also likely to diminish gradually as the population ages and risk appetite recovers.** Japan's large pool of domestic savings, a stable investor base, low share of foreign ownership of JGBs, and current account surpluses have helped maintain stability in the JGB market. But these favorable factors are likely to diminish over time as population aging reduces household saving and a rise in risk appetite lowers demand for safe assets. Without a significant policy adjustment, the stock of outstanding JGBs could exceed the level of household financial assets (currently at 300 percent of GDP) within 5 to 10 years, suggesting that the government may need to turn more to other sources, such as the corporate sector or foreign investors, to help finance its deficits.<sup>3</sup>

4. **To assess the risks to the JGB market, this paper addresses the following questions.**

- What are the key risks to stability in the JGB market? What are the possible channels through which global financial distress could affect JGB yields?
- What would be the implications of high interest rates for public debt dynamics? What should be the policy priority to mitigate the risks to the JGB market?

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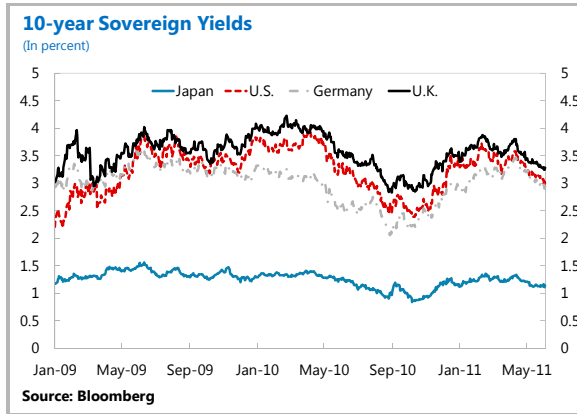
<sup>1</sup> Prepared by W. Raphael Lam and Kiichi Tokuoka.

<sup>2</sup> Yield increases in Japan could also have outward spillovers (see Japan Spillover Report, 2011).

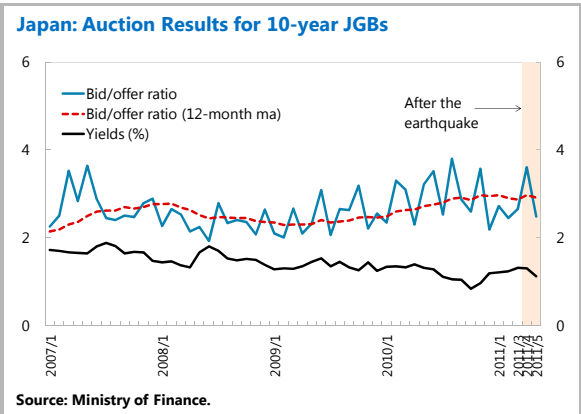
<sup>3</sup> See Tokuoka (2010).

Figure I.1. Overview of the JGB Market

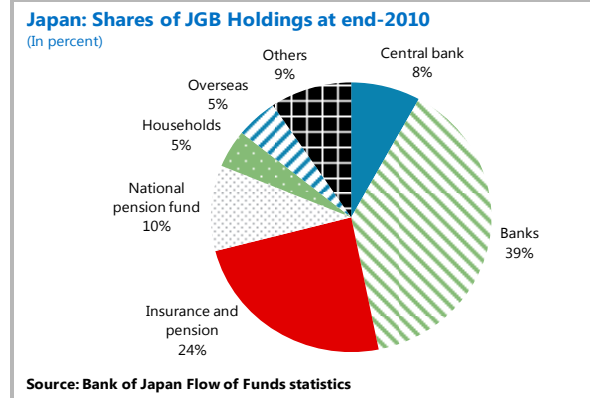
JGB yields have been stable at low levels...



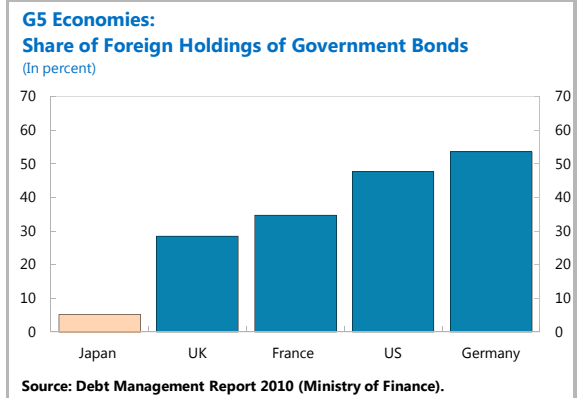
...amid steady demand as shown by strong auctions.



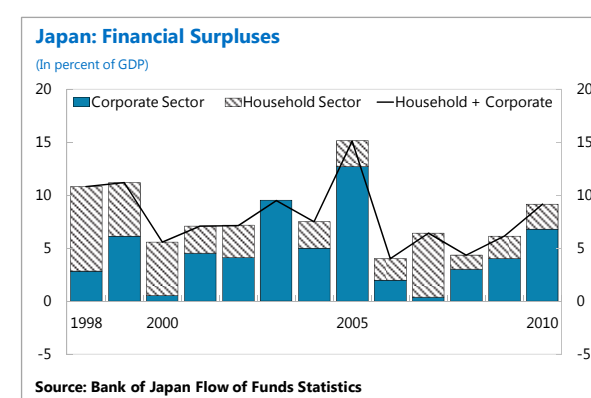
The market has been supported by stable domestic players...



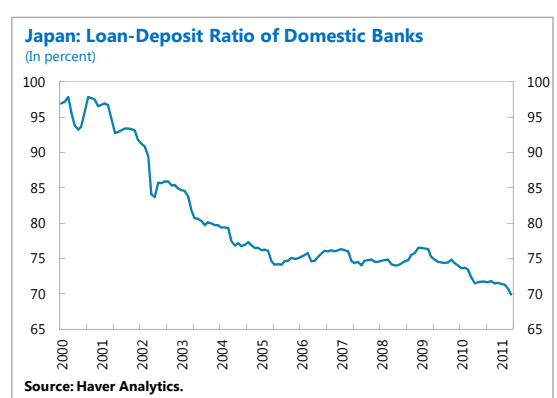
...with low reliance on foreign financing.



Corporate and household sectors have been recording large financial surpluses ...



...which banks have used to purchase JGBs.



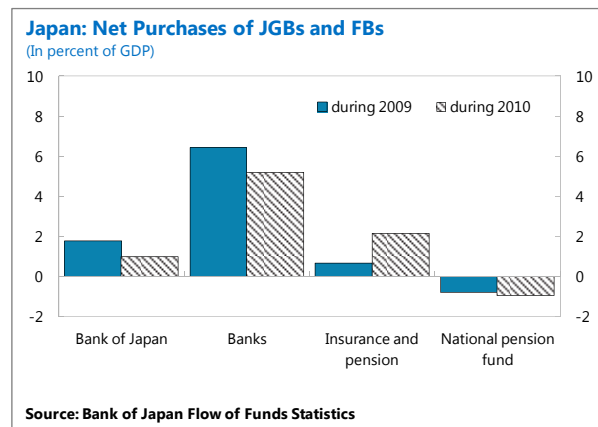
## B. Risks to the JGB Market from Shrinking Fund Supply, Global Spillovers, and Market Volatility

5. In the near term, changes in fund supply, global spillovers, and market volatility could push up interest rates, although these risks appear low at present.

### Decline in Fund Supply

6. Fund supply to the JGB market from the corporate sector, insurers, and pension funds could decline in the near term due to earthquake-related damage.

Corporate financial surpluses, which amounted to 6 percent of GDP in 2010, have been an important source of JGB funding through the banking system. These surpluses could decline as corporates undertake investment for reconstruction or expansion overseas. Demand for JGBs from insurers and pension funds could also weaken if insurers come under pressure to sell JGBs to settle claims, while pension funds could accelerate payouts. One of the largest institutional investors, the National Pension Fund, has already begun reducing assets to make payouts to retirees.



7. Estimating a basic demand function for government securities can help assess the impact of a decline in corporate financial surpluses on banks' JGB holdings. Here we estimate the following equation:

$$govtsec = \beta_1 loans + \beta_2 deposits + \beta_3 \text{ control variables},$$

where *govtsec* is banks' holdings of central government securities (JGBs and FBs),<sup>4</sup> *loans* is the stock of bank loans, and *deposits* is the sum of household and corporate sector deposits (all in percent of GDP). Control variables include real GDP growth, spreads between long-term prime lending rates and 10-year JGB yields, and CPI inflation.<sup>5</sup> Financial surpluses of the corporate and households sectors channeled through the banking sector are observed when *loans* decrease or *deposits* increase, or both. That is, corporates and households can use their financial surpluses either by repaying loans (*loans* decrease) or making additional deposits (*deposits* increase). If financial surpluses of these sectors have a positive impact on banks' holdings of central government securities, the coefficients in the regressions should

<sup>4</sup> Excluding Japan Post Bank due to data constraint.

<sup>5</sup> These variables are included to control for business cycles and risk appetite. Including other variables (e.g., equity returns) to control for risk appetite does not change the results much.

read as  $\beta_1 < 0$  and  $\beta_2 > 0$ . We run regressions in level form assuming cointegration (where estimates are robust to endogeneity).<sup>6</sup>

8. **The results suggest that a decline in financial surpluses of the corporate sector could significantly reduce banks' purchases of central government securities.** The estimates indicate that a 1 percentage point of GDP increase in loans would reduce banks' holdings of central government securities by 0.3–0.6 percent of GDP, while a similar decline in deposits would cut banks' holdings of these securities by 0.7–0.9 percent of GDP (Table I.1). These coefficients in turn imply that if corporate surpluses come down to zero from 6 percent of GDP in 2010, banks' net government security purchases could fall by 2–4 percent of GDP. This would be a sizeable reduction, about one third of annual net government debt issuances in recent years (10 percent of GDP).

**Table I.1. Impact of Loans and Deposits on Banks' Holdings of Government Securities**<sup>1/, 2/</sup>

Sample period: Q4 1997- (quarterly data)			
Dependent variable: banks' holdings of central government securities	(1)	(2)	(3)
loans	<b>-0.56</b> (0.067)	- -	<b>-0.34</b> (0.031)
deposits	- -	<b>0.86</b> (0.065)	<b>0.67</b> (0.044)
Num of obs	53	53	53
R-squared	0.75	0.86	0.96

Source: Bank of Japan Flow of Funds Statistics; Haver; CEIC.

1/ Cointegration is assumed. Other regressors include a lag of quarterly growth (SA), spreads between long-term prime lending rates and 10-year JGB yields, quarterly CPI inflation, and quarter dummies.

2/ Figures in parentheses indicate (robust) standard errors. Numbers in bold indicate the 5 percent level of significance.

9. **Based on historical trends, such a decline in corporate financial surpluses would likely have a modest impact on yields, but a more substantial response cannot be ruled out.** Japan's historical data suggest that the immediate impact on yields from a decline in corporate financial surpluses to zero would be at most about 10 basis points.<sup>7</sup> Moreover, a recovery in tax revenue following a pickup in business activity may also reduce the fiscal deficit and partially offset the impact on yields. However, the response of yields to a funding shock could be nonlinear and become more significant once public debt exceeds a certain threshold.<sup>8</sup>

<sup>6</sup> Unit root is not rejected for *govtsec*, *deposit*, or *loans*.

<sup>7</sup> Estimated using regression results in Tokuoka (2010), which report that a decline in corporate and household financial net worth of 1 percent of GDP would raise 10-year JGB yields by 1–2 basis points.

<sup>8</sup> There is some empirical evidence consistent with the view that the impact of a rise in debt on yields is nonlinear and becomes significant once the debt exceeds a certain threshold (e.g., Faini, 2006; Ardagna, Caselli, and Lane, 2004).



## Global Spillovers

10. **Global financial distress could have negative spillover effects on the JGB market through the banking system.** Japan's sovereign yields are sensitive to global risks, including in the U.S. Treasury and some European sovereign debt markets, where the estimated correlation on 10-year sovereign yields ranges from 0.37 to 0.58 (Table I.2). In response to capital losses on their foreign bond portfolios, Japanese banks could reduce their holdings of JGBs to minimize losses. For example, late last year, the sudden rise in JGB yields mirrored those in U.S. Treasuries (Figure I.1), as Japanese banks pared back their JGB holdings and shortened maturities in response to losses on their U.S. Treasury holdings.

11. **Another channel for global spillover could be through the derivatives markets where foreign participation is high.** Despite low foreign ownership of JGBs (5 percent of the total outstanding), foreign investors are active in the JGB futures market, holding about one-third of outstanding contracts.<sup>9</sup> Compared to domestic players, foreign investors appear to be more sensitive to Japanese sovereign risk, as indicated by the rise in spreads on JGB CDS contracts—traded mostly among foreign investors.<sup>10</sup> Overseas financial distress could lead to a rise in global yields, which could in turn amplify pressures on JGB yields through these derivatives markets (Figure I.2).

12. **Regression analysis confirms that 10-year JGB yields in the short run are largely driven by global risk factors and investor risk appetite.** We estimate the global spillover channel by using a time-series regression and taking into account global factors and investors' risk appetite. The analysis uses daily data from 2005 with an ARIMA specification that accounts for the auto-regressive and heteroscedastic features of short-term yield movements.<sup>11</sup> Granger-causality tests show that movements in global yields generally precede those of JGBs, though the reverse causality from JGB yields to global yields does not appear to be statistically significant.<sup>12</sup> The results indicate that global factors that drive U.S. Treasury and European sovereign yields, which in turn affect the JGB yields, are significant at the 5 percent level (Table I.3). These estimates imply, for example, that a one percentage point increase in U.S. Treasury yields (or a change in global risk factors that raise U.S. Treasury yields by one percentage point) could increase JGB yields by nearly 15 basis points. The last specification includes an interaction of the U.S. Treasury yields with a dummy variable that corresponds to the peak of the global crisis after the Lehman collapse. It shows that the JGB yields were more closely driven by the U.S. Treasury yields during the peak of the global

<sup>9</sup> Statistical analysis, however, does not point to a particular direction of causality.

<sup>10</sup> Japan's CDS market is not very liquid and consists mainly of foreign hedge funds. Foreign investors looking to short JGBs typically acquire short positions on JGB futures, or buy out-of-the-money put options on interest rate swaps.

<sup>11</sup> The regression uses lagged variables as regressors. An autoregressive integrated moving average (ARIMA) model applied as a statistical test on sovereign yields suggests that the time series are non-stationary. The regression includes U.S. Treasury and German yields, and the implied volatility of JGB yields as a proxy for the investor's risk appetite. Other risk factors, including exchange rate volatility and term premia, are also included. These risk factors in essence capture both domestic and external risks.

<sup>12</sup> The hypotheses that 10-year U.S. Treasury yields and 10-year Germany sovereign yields do not Granger-cause 10-year JGB yields are rejected with F-statistics equal to 51.7 and 35.4 (both p-values close to zero), indicating the statistical significance at the 5 percent level. However, the reverse causality from 10-year JGB yields to 10-year U.S. Treasury yields or 10-year Germany yields is not statistically significant, with p-values close to 0.3 and 0.2, respectively.

crisis. The magnitude is statistically significant and generally robust across various specifications. In addition, measures of investors' risk appetite, such as the implied volatility of JGBs, also have a strong impact on JGB yields. For example, a rise of implied volatility, similar to what took place after the Lehman crisis, would push up JGB yields by more than 40 basis points.

**Table I.2. Correlation of Japanese Sovereign Yields**

Correlation with 10-year JGB yields 1/	10-year US Treasury yields	10-year German bond yields	Average yields of adv. countries 2/	Implied volatility of JGB yields 3/
Entire sample: (Jan 2000 - May 2011)	0.58	0.37	0.49	0.33
Before Jan 2008	0.61	0.19	0.44	0.31
After Lehman crisis	0.62	0.87	0.75	0.39

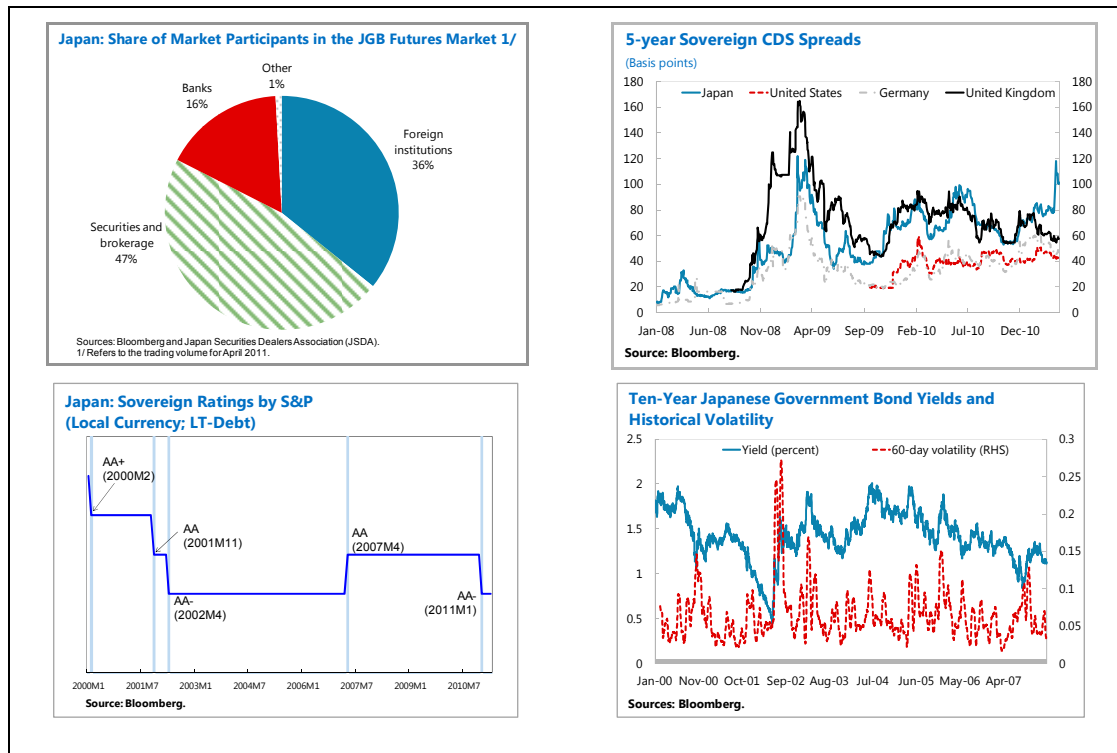
Sources: Bloomberg and Staff estimates.

1/ Correlation coefficients refer to the correlation of 10-year JGB yields in levels and they are all statistically significant at the 5 percent level.

2/ Average yields refer to the average of 10-year yields on U.S. Treasury, German sovereign bonds, and U.K. Treasury bonds.

3/ Implied volatility refers to 30-day implied volatility of 10-year JGBs as calculated based on underlying options.

**Figure I.2. Global Spillovers and Volatility of the JGB Market**



**Table I.3. Factors Influencing Short-term JGB Yield Movements**<sup>1/ 2/</sup>

Sample period: Jan 2006 - May 2011			
Dependent variable: 10-year JGB yields	(1)	(2)	(3)
10-year U.S. Treasury yields	<b>0.16</b> (0.01)	<b>0.13</b> (0.01)	<b>0.12</b> (0.01)
10-year German sovereign bond yields	-	<b>0.10</b> (0.02)	<b>0.10</b> (0.02)
Implied volatility of JGBs 3/	<b>0.05</b> (0.00)	<b>0.05</b> (0.01)	<b>0.05</b> (0.01)
Equity returns (Nikkei) 3/	<b>-0.07</b> (0.03)	<b>-0.09</b> (0.03)	<b>-0.09</b> (0.03)
Term premium 3/	-	<b>0.14</b> (0.05)	<b>0.14</b> (0.05)
Dummy*U.S Treasury yields 4/	-	-	<b>0.01</b> (0.00)
Log likelihood	3312	3338	3340
Num of obs	1407	1407	1407

1/ All variables included in the regression refer to the first lag.

2/ Figures in parentheses indicate the standard errors. Numbers in bold indicate the 5 percent level of significance.

3/ Implied volatility refers to 30-day implied volatility of 10-year JGBs as calculated based on underlying options. Equity returns measured by the first difference in logs of Nikkei. Term premium refers to the slope between 2-year and 5-year JGBs.

4/ The dummy variable spans from September 2008 to April 2009 to include the peak of the global financial crisis.

## Market Volatility

### 13. A rise in market volatility could prompt an unwinding of JGBs held by the private sector.

- Higher interest rate volatility could induce a JGB sell-off by banks if the risk exposures exceed the calculated thresholds of the banks' risk management model. A notable example was the so-called 'VaR shock' in June 2003, when 10-year JGB yields more than tripled over three months, surging from a historically low of 0.45 percent to 1.6 percent (Figure I.2).<sup>13</sup> Although banks have now strengthened risk management practices by including qualitative assessment in addition to the quantitative risk measures in VaR models, banks' JGB holdings are significantly larger, suggesting that a similar shock today could still be disruptive. A possible rating downgrade or weak JGB auctions that pushes up yields or raises volatility could induce a sale of JGBs by banks to limit losses, which in turn could lead foreign investors to unwind their positions in the futures and swaps markets.<sup>14</sup>

<sup>13</sup> This episode was termed the "VaR shock" because the rise in volatility increased risk measures in banks' internal value-at-risk (VaR) models and led to one-sided selling by banks as they attempted to shed risk (Bank of Japan, 2010).

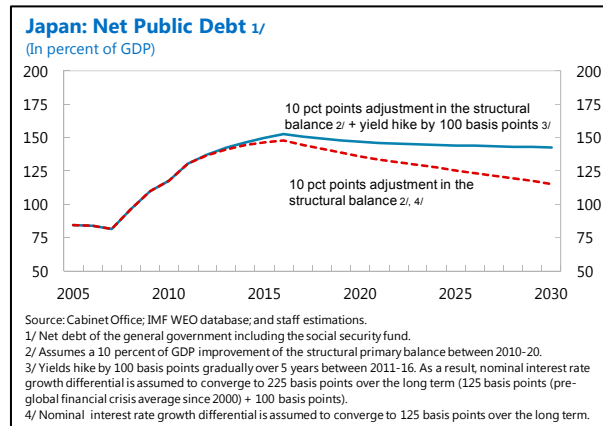
<sup>14</sup> A large portion of JGB holdings are held in banks' balance sheet outside the trading book such that the JGB holdings do not need to be marked-to-market. Banks also tend to select the higher ratings on JGBs from domestic rating agencies in assigning risk weight on their holdings of government securities. For example, Japan Credit Rating Agency and Rating and Investment Information both assign 'AAA' to Japanese sovereign

(continued)

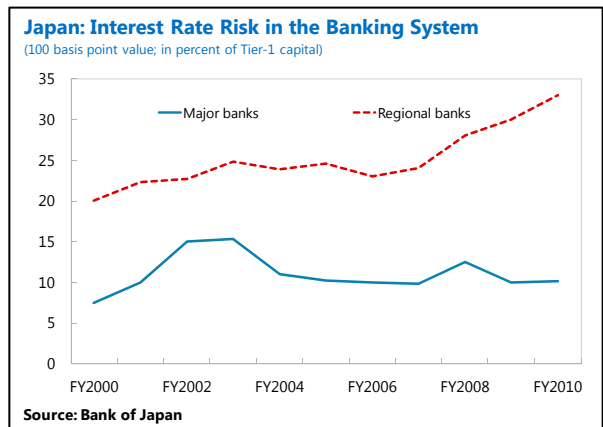
- The rollover risks of JGBs have risen along with the government’s annual financing requirement, which now amounts to about 55 percent of GDP (including financing bills). Given the large amount of bonds that need to be rolled over, uncertainty over the supply and demand of JGBs could disrupt the smooth absorption of new issuances.<sup>15</sup>

### C. Implications of a Rise in JGB Yields

14. **A potential rise in yields arising from these risks would make fiscal consolidation much more difficult.** If sovereign yields rise by 100 basis points over the next 5 years, the net debt-to-GDP ratio would remain at high levels over the long term, even after a 10 percentage points of GDP adjustment in the structural fiscal balance. This would leave the fiscal position vulnerable to interest rate or funding shocks and risk undermining public confidence.



15. **Yield increases could also pose a risk to banks.** With banks holding a large amount of JGBs (more than 15 percent of total assets), a rise in yields would generate capital losses. For example, a 100 basis point increase in interest rates across all maturities would generate capital losses of around ¥250 billion at the major banks and about ¥500 billion at the regional banks. This could reduce Tier 1 capital of major banks by 10 percent and by 30 percent for regional banks who face greater duration risks.<sup>16</sup>



### D. Summary and Conclusions

16. **The JGB market has been stable since the earthquake, but the factors holding down JGB yields could diminish over time.** Since March, JGB yields have been supported by robust demand from banks and insurance companies. However, going forward, a decline

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bonds, higher than the ratings from other international rating agencies. Nevertheless, a sustained rise of sovereign yields is likely to pose significant interest rate risks in banks’ balance sheets from unrealized losses.

<sup>15</sup> For example, so called “FILP shock” took place in 1998 when yields spiked due to confusion over the purchases of JGBs by the Fiscal Investment and Loan Program (FILP) Special Account.

<sup>16</sup> Global Financial Stability Report (October 2010), IMF and the Financial System Report (September 2010) of the Bank of Japan.

in fund supply, particularly from the corporate sector, spillovers from global financial distress, and higher market volatility could create upward pressure on JGB yields. Over the medium term, population aging and a recovery in risk appetite are also likely to reduce domestic saving and the demand for safe assets.

17. **To limit these risks, fiscal policy should aim to reduce public debt quickly and lengthen maturity of JGBs.** Committing to a credible medium-term fiscal strategy based on clear and specific tax and entitlement reforms could help support confidence in public finances. Lengthening debt maturities, such as by shifting to long-dated JGBs, would also help lock in low interest rates and guard against market volatility.

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## II. BANK OF JAPAN'S MONETARY EASING MEASURES: ARE THEY POWERFUL AND COMPREHENSIVE?<sup>1</sup>

1. **The Bank of Japan (BoJ) has expanded its set of monetary easing measures to combat deflation and support growth since late-2009** (Table II.1). The measures included a fixed-rate funds-supplying operation, increased purchases of government securities, and a clearer policy commitment to the zero interest rate policy.
  
2. **Given the limited scope for reducing the policy rate, the BoJ embarked on a new and innovative asset purchase program** under its Comprehensive Monetary Easing (CME) policy. The purchases in this program comprise private sector financial assets—corporate bonds, commercial paper, exchange-traded funds (ETFs) and real estate investment trusts (REITs)—in addition to government securities, which differ from the quantitative easing programs of other central banks that focus more on purchases of government securities. The objectives are to encourage a decline in long-term interest rates and reduce the risk premium. The BoJ also introduced a new lending facility at low cost to support ‘strengthening the foundations of economic growth’. Combined with conventional monetary steps, these measures are broad in scope and potentially powerful, helping to support lending and private demand (Kuttner 2010).
  
3. **After the earthquake, the BoJ expanded its asset purchase program to stabilize financial markets.** It doubled the size of its asset purchases to ¥10 trillion in March with plans to complete the purchases by 2012. The move was to preempt any deterioration in business conditions and a possible rise in risk aversion. Since the earthquake, the BoJ has increased the pace of purchases, reaching half of the target level as of end-May (Figure II.1).
  
4. **Against this background, this note assesses whether the BoJ's easing measures, particularly the asset purchase program, are *powerful and comprehensive* in affecting financial markets.** Using an event study similar to Gagnon et al (2010) and Neely (2010) to assess the impact on a broad range of financial indicators, this note addresses the following questions:
  - *How did financial markets respond following the announcement of the BoJ's easing measures?*
  - *Did the impact come mostly from the announcement of the program or the subsequent asset purchases?*
  - *Which asset purchases, private risky assets or government securities, are most effective in reducing risk premia?*

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<sup>1</sup> Prepared by W. Raphael Lam.

5. **The results suggest that the BoJ's easing measures have had a significant and broad-based impact on financial markets.** The impact stems mainly from the announcement effect rather than from subsequent operations or purchases. The easing measures have eased financial conditions by lowering long-term interest rates and reducing downside tail risks. The financial impact has also been broad-based and comprehensive, extending beyond the assets purchased by the BoJ. These results would suggest that asset purchases, particularly of private risky assets, could be an effective tool for further monetary easing.

**Table II.1. Recent Conduct of Monetary Policy Measures by the Bank of Japan**

Measures 1/	Description	Date	Current target scale (in ¥ trillion)	Actual bal. as of end-May 2011 2/
Outright purchases of government bonds	- expand measures to ensure financial stability	Dec-08	¥21.6 trillion per year	¥61.6 trillion
	Subsequent size expansion on JGB purchases	Mar-09		
Fixed-rate funds-supplying operation against pooled collateral 3/	- provide ample funding at a very low interest rate to banks to ease financing conditions, thereby encouraging the decline of long-term rates.	Dec-09	¥30 trillion	¥29.6 trillion
	Subsequent size expansion and maturity extension	Mar 2010 and Aug 2010		
Providing support to strengthen the foundations for economic growth	- provide long-term funds at low interest rates to eligible financial institutions to finance actual investment projects in selected industries that support the foundations of economic growth.	Apr-10	Not exceeding ¥3 trillion	¥2.2 trillion
	Subsequent announcement of operational framework, principal terms and conditions, and disbursements.	Four times in 2010, and twice in 2011		
"Comprehensive Monetary Easing (CME)"		Oct-10		
Virtually zero-interest rate policy	- guide expectations on the duration of accommodative stance of monetary policy			
Asset Purchase Program 3/	-encourage the decline of long-term interest rates and catalyse investors' risk appetite to reduce risk premia. -pre-empt a deterioration in business sentiment and a rise in risk aversion.	Mar-11	¥40 trillion	¥34.6 trillion

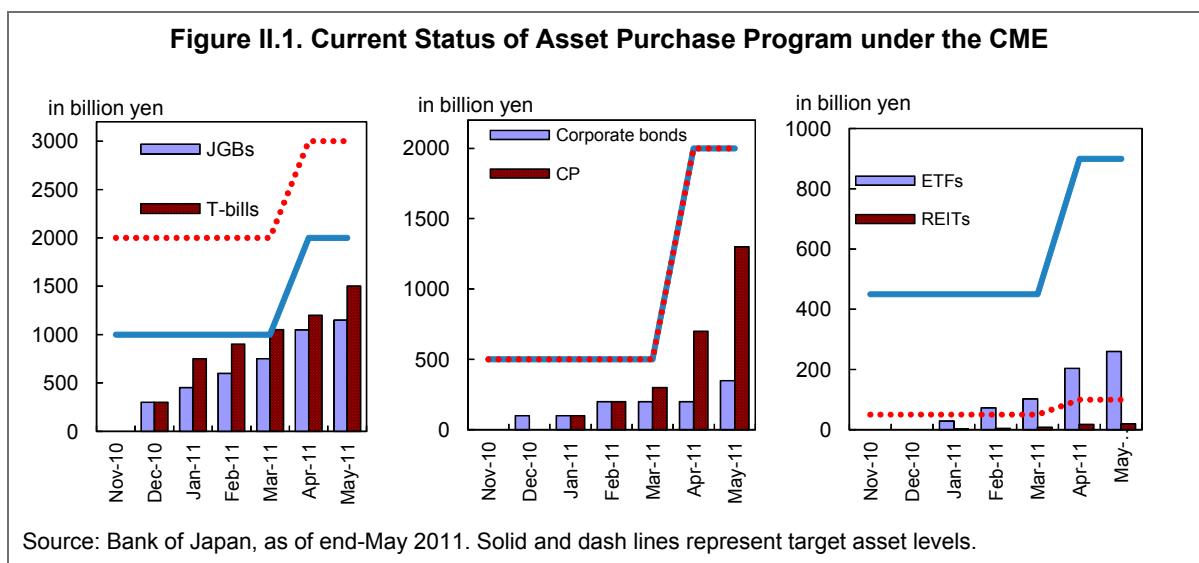
Source: Bank of Japan.

1/ Additional measures following the earthquake in March 2011 were introduced, including funds-supplying operation to support financial institutions in the disaster area (March) and the new lending facility to support asset-based lending (June).

2/ Outstanding balance of government securities include previous purchases before the current easing measures introduced.

3/ The size of the asset purchase program was expanded by 5 trillion yen to 40 trillion yen on 14 March, of which 30 trillion yen is related to the fixed-rate funds supplying operations.





## A. Quantitative Assessment

### Event Study Methodology

6. **Event studies provide a useful approach for assessing the impact of policy measures on financial markets.** The financial markets typically react rapidly to ‘news’ of an event that shapes investor expectations, such as Gagnon et al. (2010), Joyce et al (2010), and Neely (2010), which assess the impact of the U.S. Fed’s quantitative easing. This approach, however, is not able to distinguish between the confluence of other factors, especially those that are beyond the central bank’s control, such as external shocks. Market anticipation before the event may also obscure the true impact, while some indirect effect may take time to develop beyond the event window.<sup>2</sup>

7. **In this event study, the impact of monetary easing is measured as the change in asset returns and volatility.** Financial indicators include equity prices, sovereign and corporate bond yields, exchange rates, inflation expectations, and the term premium. To assess the significance of events, we compare the change of financial indicators around the event window against that in a typical trading day.<sup>3</sup> The events are linked to the BoJ’s monetary easing measures, which include recent measures such as the introduction of the asset purchase program last October (Table II.2). Overall, there are five events related to initial announcements of new programs and over 30 events of subsequent expansion or purchases.

<sup>2</sup> For instance, the Fed’s second phase of quantitative easing in November 2010 was largely anticipated by the market after Governor Bernanke’s speech at the Jackson Hole meeting in end-August.

<sup>3</sup> This note uses two types of event windows: (i) *two* trading days, defined to be  $t+1$  vs  $t-1$  where  $t$  refers to the event day; and (ii) five trading days (a week). The latter allows an assessment whether the initial two-day effect persists or wanes after a week.

Table II.2. Event Classification of the Bank of Japan Monetary Easing Measures

Date	Extraordinary Measures and Powerful Monetary Easing	Introduction of New Measures and Facilities	Program Expansion / Extension	Measure / Program Exits
19-Dec-08	Expansion of measures to facilitate corporate financing and financial stability	Outright purchases of JGBs		
22-Jan-09		Outright purchases of CP	Program expansion on purchases of JGB	
19-Feb-09			Extension of outright purchase of CP, corporate bonds and JGB	
18-Mar-09			Extension of outright purchase of CP, corporate bonds and JGB	
15-Jul-09			Extension of outright purchase of CP, corporate bonds and JGB	
30-Oct-09				Exit of outright purchases of CP
01-Dec-09	Enhancement of easy monetary conditions	Fixed-rate funds supplying operation against pooled collateral (fixed rate operation)		
31-Dec-09				Exit of outright purchase of corporate bonds
17-Mar-10	Measures expanded to encourage decline of long-term rate		Fixed-rate funds supplying operation against pooled collateral (fixed rate operation)	
31-Mar-10				
30-Apr-10		Fund provisioning measure to support growth		
30-Aug-10	Enhancement of easy monetary conditions		Fixed-rate funds supplying operation against pooled collateral (fixed rate operation)	
05-Oct-10	Comprehensive monetary easing	Outright purchases of CPs, corporate bonds, ETFs, J-REITs	Fixed-rate funds supplying operation against pooled collateral (fixed rate operation)	
28-Oct-10			Release of principal terms and conditions on asset purchase	
05-Nov-10			Expand the size of asset purchase program	
14-Mar-11	Enhancement of monetary easing			
28-Apr-11		Funds-Supplying Operation to Support Financial Institutions in Disaster Areas		
14-Jun-11		Establish a new credit line for equity investments and asset-based lending.		

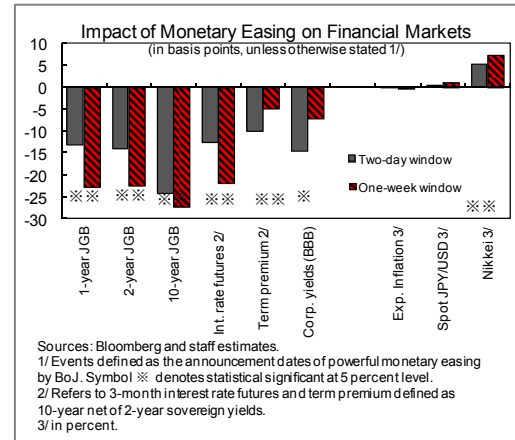
Source: Bank of Japan

1/ The last two events on new operations in disaster areas and credit line for equity investment and asset-based lending are excluded from the analysis.

## Impact of the BoJ's Monetary Easing Measures on Financial Markets

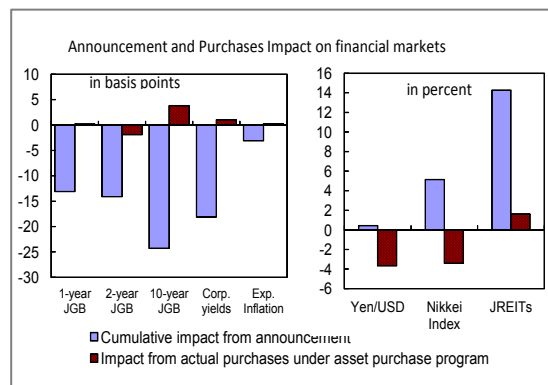
8. **Overall, the BoJ's monetary easing measures have had a favorable impact on financial markets** (text chart). This positive impact is broad-based and extends beyond the assets that the BoJ purchases. Specifically;

- *Government securities.* Sovereign yields across all maturities declined in three out of the five events at the 5 percent significant level. The 10-year JGB yield fell by a cumulative 24 basis points while the 2-year JGB yield fell by 14 basis points compared to a 0.1 basis point of change in a typical trading day (Table II.3a). The initial fall in sovereign yields appears to persist and reinforces the decline in the following week (Table II.3b).
- *Corporate bonds.* Corporate yields across investment grades cumulatively decreased by about 15 basis points in the two-day window, though the impact stayed broadly the same throughout the week. Bond issuance also improved following the announcement of the asset purchase program.
- *Equity markets.* Stock and futures markets strengthened in four out of the five easing events, cumulatively increasing by 5–7 percent, in the following week.
- *Real estate investment trusts (REITs).* Prices of REITs in particular, surged following the monetary easing events, reflecting large BOJ purchases in a relatively small market.



9. **The BoJ's easing measures, however, have had no appreciable impact on the yen exchange rates and inflation expectations.** The spot and forward yen rates against the dollar changed little. Inflation expectations derived from breakeven rates remained unchanged within the event windows.

10. **Most of the impact on financial markets came from the announcement of new easing measures, rather than from subsequent purchases.** Under the asset purchase program, the announcement effect outweighed that of the actual purchases, which often had only a modest impact on financial indicators (text chart). The purchases of ETFs or REITs however, were usually associated with a fall in equity prices during the event windows, possibly suggesting the purchases aim to support asset prices. Announcements to expand the measures (size or duration) or exits from earlier monetary easing measures had a modest impact on financial markets.



**Table II.3a. Impact of the Bank of Japan's Monetary Easing Measures on Financial Markets (Two-Trading Day Window)**

(in basis points, unless otherwise stated 1/ 2/)

Date	Events	Government bond				short-term interest rate	Term premium (yield curve)		Inflation expectation	Exchange rate JPY/USD		Corporate yields 5/		Equity market 5/			
		1-year JGB	2-year JGB	10-year JGB	1-year future	3-month futures 3/	short-end	long-end	5/	4/ 5/	5-year breakeven	3-month forward rates	AA-rated	BBB-rated	Nikkei	Nikkei futures	Implied volatility
19-Dec-08	Outright purchase of government bonds and commercial papers	<b>-7.3</b> (0.00)	<b>-7.7</b> (0.00)	<b>-7.3</b> (0.02)	-2.6 (0.24)	<b>-7</b> (0.00)	0.90 (0.24)	0.40 (0.46)	-	0.93 (0.11)	0.84 (0.13)	<b>-0.06</b> (0.03)	-0.01 (0.38)	0.65 (0.32)	0.92 (0.26)	<b>-7.05</b> (0.00)	<b>3.91</b> (0.00)
01-Dec-09	Enhancement of easy monetary conditions	<b>-4.3</b> (0.00)	<b>-4.5</b> (0.02)	<b>-5.8</b> (0.05)	-3.8 (0.15)	<b>-6.5</b> (0.00)	-0.90 (0.26)	-1.30 (0.34)	-0.03 (0.28)	1.12 (0.07)	1.12 (0.07)	<b>-0.06</b> (0.04)	0.00 (0.48)	<b>2.82</b> (0.03)	<b>3.22</b> (0.01)	-2.53 (0.06)	<b>5.74</b> (0.00)
17-Mar-10	Expansion of measures to encourage decline of long-term rate	-0.1 (0.48)	0.5 (0.37)	2.7 (0.21)	3.4 (0.17)	1.5 (0.09)	-0.10 (0.48)	2.20 (0.26)	0.03 (0.38)	0.08 (0.43)	0.07 (0.43)	0.03 (0.20)	0.00 (0.48)	0.21 (0.43)	0.19 (0.44)	-1.45 (0.19)	1.19 (0.19)
30-Aug-10	Enhancement of easy monetary conditions	-0.3 (0.45)	-1.5 (0.26)	-3.9 (0.14)	-3.5 (0.17)	-0.5 (0.35)	-1.10 (0.21)	-2.40 (0.23)	-0.02 (0.37)	-1.20 (0.08)	-1.20 (0.08)	-0.04 (0.13)	-0.05 (0.14)	-1.86 (0.11)	-1.90 (0.10)	<b>3.20</b> (0.02)	1.17 (0.19)
05-Oct-10	Comprehensive monetary easing	-1.1 (0.23)	-0.9 (0.36)	<b>-10</b> (0.00)	-5.4 (0.07)	0 (0.48)	-0.40 (0.39)	<b>-9.10</b> (0.00)	-0.01 (0.78)	-0.50 (0.29)	-0.50 (0.29)	<b>-0.09</b> (0.00)	<b>-0.09</b> (0.02)	<b>3.31</b> (0.01)	<b>3.74</b> (0.00)	-1.17 (0.24)	<b>2.25</b> (0.05)
	Cumulative sum	<b>-13.1</b> (0.00)	<b>-14.1</b> (0.00)	<b>-24.3</b> (0.00)	<b>-11.9</b> (0.08)	<b>-12.5</b> (0.00)	-1.6 (0.31)	-10.2 (0.07)	-0.03 (0.32)	0.43 (0.34)	0.34 (0.36)	<b>-0.22</b> (0.00)	-0.15 (0.06)	<b>5.13</b> (0.05)	<b>6.17</b> (0.03)	<b>-9.00</b> (0.01)	<b>14.26</b> (0.00)
various dates	Introduction of new measures / facilities (see supp. Table for event classification)	<b>-13.1</b> (0.00)	<b>-15.9</b> (0.00)	<b>-21.8</b> (0.00)	-12.6 (0.07)	<b>-11.5</b> (0.00)	-2.2 (0.25)	-5.9 (0.19)	-0.1 (0.26)	1.3 (0.18)	1.2 (0.20)	<b>-0.2</b> (0.00)	-0.1 (0.16)	<b>6.0</b> (0.03)	<b>7.1</b> (0.01)	<b>-14.2</b> (0.00)	<b>18.5</b> (0.00)
various dates	Expansion of selected easing measures (see supp. Table for event classification)	-1.8 (0.44)	<b>-12.0</b> (0.03)	-1.4 (0.47)	-3.3 (0.41)	4.0 (0.09)	1.5 (0.32)	10.6 (0.15)	0.1 (0.45)	-4.9 (0.03)	-4.8 (0.03)	0.0 (0.48)	-0.1 (0.37)	-0.4 (0.49)	-1.3 (0.40)	-4.5 (0.17)	5.7 (0.07)
various dates	Exits of selected measures / facilities (see supp. Table for event classification)	0.2 (0.39)	-2.7 (0.27)	-2.1 (0.38)	-2.8 (0.35)	1.0 (0.28)	0.1 (0.46)	0.6 (0.48)	0.0 (0.48)	-0.2 (0.49)	-0.2 (0.49)	0.0 (0.49)	0.0 (0.47)	0.0 (0.48)	0.4 (0.43)	-1.9 (0.25)	4.1 (0.04)
	<b>Control groups:</b>																
	<i>Typical trading day</i>																
	mean	-0.2	-0.2	-0.1	-0.1	-0.06	-0.04	0.10	0.01	-0.07	-0.06	0.00	0.00	-0.04	-0.03	-0.01	0.00
	standard deviation	1.31	2.01	3.46	3.60	1.17	1.32	3.31	0.07	0.80	0.80	0.03	0.04	1.47	1.45	1.61	1.35
MPC releases (Jul 08-Dec 10)	<i>MPC meeting releases exclude monetary easing announcements</i>																
	mean	-0.5	-0.9	-1.1	-0.7	-0.34	-0.59	-0.21	0.01	-0.12	-0.12	-0.01	0.00	-0.89	-0.90	1.41	-0.58
	standard deviation	1.96	3.24	3.36	4.65	2.39	2.37	4.67	0.08	1.28	1.31	0.03	0.05	2.61	2.74	3.17	3.06

Source: Bank of Japan, Bloomberg, staff calculations.

1/ Sample period from 1 Jul 2008 to 11 Jan 2011. All changes refer to an event window of 2 trading days, defined as the values at day t+1 net of day t-1 where t denotes the day of event announcement.

2/ Parentheses indicate the p-values relative to typical trading day control group. Numbers in bold if beyond 5-percent (p-value<0.05) significant level.

3/ Constant maturity zero coupon bonds for 2-year and 10-year horizon.

4/ An increase (+) denotes yen depreciation; in percent.

5/ in percent.

**Table II.3b. Impact of the Bank of Japan's Monetary Easing Measures on Financial Markets (Weekly Window)**

(in basis points, unless otherwise stated 1/ 2/)

Date	Events	Government bond				short-term	Term premium		Inflation	Exchange rate JPY/USD			Corporate yields 5/		Equity market 5/			
		1-year	2-year	10-year	1-year	3-month	(yield curve)		expectation	4/ 5/		5/		Nikkei	Nikkei	Implied	J-REITs	
		JGB	JGB	JGB	future	futures 3/	short-	long-end	5-year	Spot rate	3-month	AA-rated	BBB-rated	Nikkei	futures	volatility	J-REITs	
19-Dec-08	Outright purchase of government bonds and commercial papers	<b>-15.7</b> (0.00)	<b>-13.3</b> (0.00)	<b>-16</b> (0.00)	-4.8 (0.20)	<b>-11.5</b> (0.00)	-0.40 (0.42)	-2.70 (0.27)	-	1.35 (0.07)	1.30 (0.08)	<b>-0.17</b> (0.00)	-0.03 (0.32)	1.82 (0.18)	2.10 (0.19)	<b>-12.27</b> (0.00)	<b>2.84</b> (0.04)	
01-Dec-09	Enhancement of easy monetary conditions	<b>-4.9</b> (0.03)	<b>-6.7</b> (0.02)	-7.7 (0.07)	-5.8 (0.15)	<b>-6.5</b> (0.02)	<b>-3.40</b> (0.03)	-1.00 (0.41)	-0.04 (0.31)	0.92 (0.14)	0.90 (0.14)	<b>-0.08</b> (0.04)	0.00 (0.46)	2.41 (0.12)	2.56 (0.15)	-0.14 (0.49)	<b>3.37</b> (0.02)	
17-Mar-10	Expansion of measures to encourage decline of long-term rate	-0.6 (0.47)	0.9 (0.33)	0.8 (0.41)	2.5 (0.29)	-4 (0.11)	1.00 (0.28)	-0.10 (0.49)	0.00 (0.43)	-0.20 (0.46)	-0.21 (0.47)	0.03 (0.20)	0.00 (0.46)	-0.07 (0.47)	0.09 (0.45)	-1.34 (0.28)	<b>2.14</b> (0.10)	
30-Aug-10	Enhancement of easy monetary conditions	-0.5 (0.48)	-0.5 (0.49)	4.9 (0.14)	0.5 (0.43)	0.5 (0.39)	-0.60 (0.38)	5.40 (0.12)	0.00 (0.43)	-0.43 (0.45)	-0.42 (0.46)	<b>0.07</b> (0.04)	0.05 (0.15)	-0.24 (0.50)	-0.34 (0.48)	0.85 (0.33)	1.24 (0.21)	
05-Oct-10	Comprehensive monetary easing	-0.9 (0.42)	-2.9 (0.20)	<b>-9.3</b> (0.03)	-5.7 (0.15)	-0.5 (0.48)	-1.50 (0.21)	-6.40 (0.08)	0.01 (0.93)	-0.69 (0.36)	-0.69 (0.36)	<b>-0.08</b> (0.04)	-0.09 (0.06)	<b>3.44</b> (0.05)	3.63 (0.08)	-3.06 (0.08)	<b>3.40</b> (0.02)	
	Cumulative sum	<b>-22.6</b> (0.00)	<b>-22.5</b> (0.00)	<b>-27.3</b> (0.01)	-13.3 (0.16)	<b>-22</b> (0.00)	-4.90 (0.12)	-4.80 (0.31)	-0.04 (0.32)	0.95 (0.16)	0.89 (0.17)	<b>-0.22</b> (0.02)	-0.07 (0.35)	<b>7.35</b> (0.05)	8.05 (0.06)	<b>-15.96</b> (0.00)	<b>12.99</b> (0.00)	
various dates	Introduction of new measures / facilities (see supp. Table for event classification)	<b>-22.4</b> (0.00)	<b>-24.2</b> (0.00)	<b>-36.2</b> (0.00)	-20.8 (0.05)	-14.5 (0.03)	-6.4 (0.06)	-12.0 (0.12)	0.0 (0.30)	0.9 (0.17)	0.8 (0.19)	<b>-0.4</b> (0.00)	<b>-0.5</b> (0.00)	0.1 (0.40)	0.6 (0.39)	-7.3 (0.07)	<b>13.4</b> (0.00)	
various dates	Expansion of selected easing measures (see supp. Table for event classification)	-2.3 (0.44)	<b>-17.0</b> (0.05)	-3.9 (0.47)	-16.6 (0.18)	-10.3 (0.18)	-2.9 (0.31)	20.9 (0.06)	0.1 (0.49)	-4.2 (0.28)	-4.2 (0.28)	0.1 (0.23)	-0.1 (0.31)	-2.0 (0.49)	-2.1 (0.49)	3.5 (0.24)	<b>15.6</b> (0.00)	
various dates	Exits of selected measures / facilities (see supp. Table for event classification)	0.5 (0.34)	-4.9 (0.23)	3.2 (0.31)	-4.0 (0.38)	1.0 (0.35)	-1.8 (0.29)	8.1 (0.16)	0.04 (0.48)	1.3 (0.13)	1.3 (0.13)	0.0 (0.37)	0.0 (0.44)	-4.2 (0.18)	-4.1 (0.23)	0.9 (0.37)	<b>8.4</b> (0.00)	
	<b>Control groups:</b>																	
Sample period	<i>Typical trading day</i>																	
	mean	-0.4	-0.4	-0.3	-0.4	-0.33	-0.05	0.05	0.02	-0.30	-0.30	0.00	0.00	-0.23	-0.23	-0.09	-0.13	
	standard deviation	2.37	2.95	4.87	5.15	2.96	1.77	4.59	0.11	1.12	1.12	0.04	0.05	2.27	2.69	2.10	1.73	
MPC releases (Jul 08-Dec 10)	<i>MPC meeting releases exclude monetary easing announcements</i>																	
	mean	-0.2	-1.2	-1.0	-0.8	-0.92	-0.70	0.27	0.02	-0.31	-0.31	-0.01	-0.01	-0.84	-0.95	1.74	-1.35	
	standard deviation	3.54	3.24	3.36	4.65	2.39	2.37	4.67	0.08	1.28	1.31	0.03	0.05	4.21	4.68	4.04	3.97	

Source: Bank of Japan, Bloomberg, staff calculations.

1/ Sample period from 1 Jul 2008 to 11 Jan 2011. All changes refer to an event window of 2 trading days, defined as the values at day t+1 net of day t-1 where t denotes the day of event announcement.

2/ Parentheses indicate the p-values relative to typical trading day control group. Numbers in bold if beyond 5-percent (p-value<0.05) significant level.

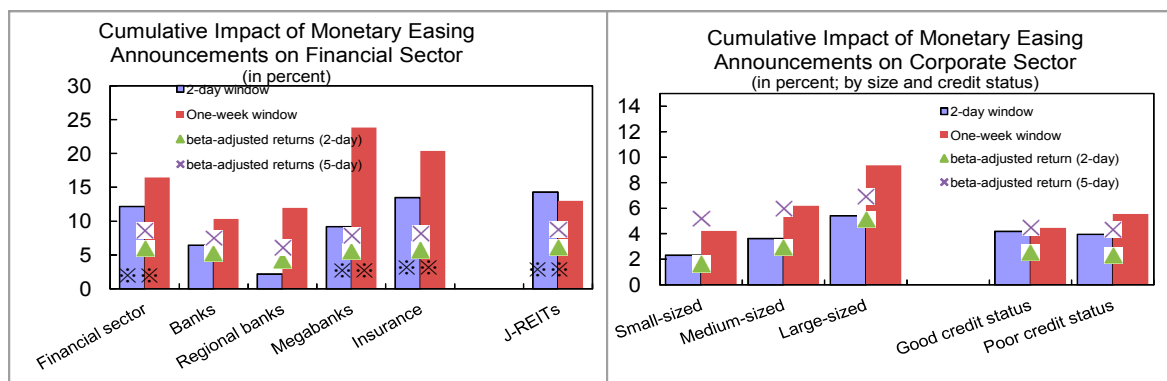
3/ Constant maturity zero coupon bonds for 2-year and 10-year horizon.

4/ An increase (+) denotes yen depreciation; in percent.

5/ in percent.

11. **Across sectors, the BOJ's measures have had the largest impact on the financial and real estate sectors.** Stock prices of the financial sector, notably the major banks and insurance companies, rose strongly relative to the market index (adjusted by the industry beta). This could partly reflect financial institutions' lower financing cost and their large holdings of government securities. By contrast, equity prices in other sectors did not show significant excess returns compared to the overall market, regardless of their size or credit status (Figure II.2).

**Figure II.2: Cross-sectional Cumulative Impact of BoJ's Monetary Easing Measures**



Sources: Bloomberg and staff estimates.

1/ Events are defined as in the text. Beta-adjusted return is calculated as industry beta\*market return. Symbol ※ denotes statistical significant at the 5 percent level from the adjusted returns.

12. **The BOJ's easing measures have generated similar effects on financial markets compared to the actions by the U.S. Fed, but with two notable exceptions.**<sup>4</sup> Asset prices responded strongly in both the United States and Japan following the announcements of their monetary easing measures (Table II.4). By contrast, the Fed's large-scale asset purchases have had a stronger impact on global financial markets, including Japan and the euro-area, compared with no such global spillovers from the BoJ's measures. Second, the Fed's easing measures were found to have influenced the dollar exchange rates and domestic inflation expectations (D'Amico and King 2010, Yellen 2011), while the BoJ's measures appeared to have no such effect. This could reflect greater linkages of the United States to global financial markets.

13. **Besides raising asset prices, the asset purchase program appears to have lowered tail risks in financial markets.** Implied volatility in the equity market fell cumulatively by 10 percent (significant at 5 percent level) after the BoJ's easing, suggesting an improvement of investors' risk appetite. Markets' perceived risk of a double-dip recession also receded, as

<sup>4</sup> The Fed announced purchases of government securities and mortgage-backed securities in December 2008. The Fed purchased securities across the yield curve, with maturities from 3 months to 30 years, but bought most heavily in 4- to 10-year maturities. The rate of purchase was broadly steady and varied with liquidity.

**Table II.4. Impact of the Fed's Quantitative Easing Measures**

(in basis points, unless otherwise stated 1/ 2/)

Date	Events	Government bond				short-term interest rate	Term premium (yield curve)		Expected inflation	Exchange rate 4/ 5/			Corporate yields 5/		Equity market 5/			
		1-year Treasury bonds	2-year Treasury bonds	10-year Treasury bonds	1-year future	3-month futures 3/	short-end	long-end		Spot rate	3-month forward rates	AA-rated	BBB-rated	Stock index	Index futures	Implied volatility	J-REITs	
25-Nov-08	<i>Initial announcement of monetary easing through LSAP</i>																	
	<i>United States</i>	-2 (0.41)	<b>-18.7</b> (0.02)	<b>-41.9</b> (0.00)	<b>-31.6</b> (0.00)	-1.25 (0.47)	-1.6 (0.38)	<b>-23.2</b> (0.00)	<b>0.4</b> (0.00)	0.3 (0.32)	0.3 (0.32)	-0.02 (0.48)	-0.03 (0.47)	<b>4.2</b> (0.00)	<b>4.5</b> (0.00)	<b>-15.1</b> (0.00)	-	
	<i>Japan</i>	<b>3.8</b> (0.00)	<b>4</b> (0.02)	-2.6 (0.23)	-0.2 (0.49)	<b>3</b> (0.04)	0.5 (0.34)	<b>-6.6</b> (0.02)	-	-1.7 (0.06)	-1.7 (0.06)	0.0 (0.18)	0.0 (0.26)	<b>3.8</b> (0.02)	2.4 (0.11)	<b>-5.9</b> (0.00)	<b>7.5</b> (0.01)	
	<i>Euro-area or Germany</i>	0 (0.42)	0 (0.45)	<b>-14.6</b> (0.04)	<b>-16.2</b> (0.02)	7.5 (0.08)	-1.6 (0.38)	<b>-14.6</b> (0.01)	0.079 (0.17)	-0.5559 (0.34)	-0.38015 (0.39)	2.4 (0.29)	-1.8 (0.42)	0.1355 (0.48)	0.3385 (0.44)	-9.2047 (0.13)	-	
21-Sep-10	<i>FOMC release following Bernanke's speech at Jackson Hole</i>																	
	<i>United States</i>	-3 (0.36)	-7.1 (0.22)	-10.5 (0.19)	-10.3 (0.15)	-2.5 (0.41)	-3.7 (0.25)	-3.4 (0.32)	0.0 (0.44)	0.6 (0.16)	0.6 (0.16)	-0.25 (0.15)	-0.24 (0.19)	1.8 (0.12)	2.1 (0.09)	-4.9 (0.12)	-	
	<i>Japan</i>	-0.3 (0.46)	-1.1 (0.33)	-4.4 (0.11)	-4.2 (0.13)	0.5 (0.37)	-0.2 (0.45)	-3.3 (0.15)	-	-1.4 (0.10)	-1.37 (0.11)	-0.04 (0.13)	-0.05 (0.09)	-0.62 (0.37)	-0.52 (0.39)	0.61 (0.35)	1.13 (0.36)	
	<i>Euro-area or Germany</i>	0.2 (0.41)	-6.6 (0.24)	-8.9 (0.14)	-12.1 (0.07)	-3 (0.38)	-2.1 (0.35)	-2.3 (0.33)	-0.13 (0.08)	<b>2.63</b> (0.01)	<b>2.58</b> (0.02)	-5.50 (0.18)	-5.50 (0.18)	-1.37 (0.26)	-1.24 (0.28)	4.15 (0.31)	-	
03-Nov-10	<i>Expansion of monetary easing (QE2)</i>																	
	<i>United States</i>	-1 (0.47)	-1.4 (0.46)	-9.4 (0.21)	-12.2 (0.11)	-0.5 (0.49)	1.6 (0.40)	-8 (0.15)	<b>-0.2</b> (0.02)	0.1 (0.44)	0.7 (0.12)	-0.14 (0.28)	-0.17 (0.27)	2.3 (0.07)	2.2 (0.08)	<b>-14.1</b> (0.00)	-	
	<i>Japan</i>	-0.1 (0.48)	-0.8 (0.38)	-2.4 (0.25)	-2 (0.30)	0 (0.48)	-0.1 (0.48)	1.6 (0.33)	-	0.2 (0.47)	0.2 (0.46)	0.0 (0.38)	0.0 (0.33)	2.2 (0.13)	2.1 (0.14)	-2.4 (0.07)	(0.50)	
	<i>Euro-area or Germany</i>	-3.5 (0.34)	-0.1 (0.46)	2.6 (0.35)	-4.3 (0.31)	-1 (0.50)	1.6 (0.40)	2.7 (0.38)	-0.1 (0.27)	1.2 (0.13)	1.1 (0.16)	-3.5 (0.30)	-4.4 (0.24)	1.2 (0.30)	1.1 (0.31)	-9.5 (0.12)	-	
	<i>Cumulative sum across various announcement dates</i>																	
	<i>United States</i>	-27.0 (0.15)	-45.8 (0.07)	<b>-105.5</b> (0.00)	<b>-93.8</b> (0.00)	<b>-79.04</b> (0.00)	-8.25 (0.30)	<b>-71.88</b> (0.00)	0.40 (0.12)	<b>5.03</b> (0.01)	<b>4.87</b> (0.01)	<b>-1.26</b> (0.05)	<b>-1.52</b> (0.04)	3.73 (0.23)	3.66 (0.24)	-8.76 (0.22)	-	
	<i>Japan</i>	-6.7 (0.11)	<b>-13.0</b> (0.04)	-12.3 (0.15)	-15.6 (0.10)	<b>-26.90</b> (0.00)	-2.70 (0.28)	0.70 (0.48)	-	<b>-11.96</b> (0.00)	<b>-11.80</b> (0.00)	-0.11 (0.17)	0.04 (0.32)	-1.20 (0.42)	-3.06 (0.30)	<b>-13.54</b> (0.00)	<b>19.33</b> (0.02)	
	<i>Euro-area or Germany</i>	<b>-47.4</b> (0.02)	<b>-55.3</b> (0.04)	<b>-73.2</b> (0.00)	<b>-80.5</b> (0.00)	<b>-91.90</b> (0.00)	-11.30 (0.24)	-17.90 (0.13)	<b>-0.62</b> (0.02)	3.57 (0.12)	3.38 (0.15)	-21.00 (0.19)	-28.80 (0.10)	-0.47 (0.46)	0.13 (0.49)	-4.53 (0.42)	-	
	<b>Control group:</b>																	
1843	<i>Typical trading day</i>																	
	<i>United States</i>	-0.6	-0.5	0.0	-0.1	-0.64	0.14	0.46	0.00	-0.02	-0.02	-0.01	-0.01	0.01	0.01	0.17	-	
	standard deviation	6.5	8.6	11.8	9.9	8.08	5.71	8.31	0.10	0.65	0.63	0.23	0.3	1.54	1.57	4.26	-	
	<i>Japan</i>	-0.2	-0.2	-0.1	-0.1	-0.11	-0.03	0.12	-	0.06	0.06	0.00	0.0	0.01	0.01	-0.01	0.02	
	standard deviation	1.3	2.0	3.5	3.6	1.82	1.31	3.33	-	1.15	1.16	0.03	0.04	1.91	1.94	1.61	3.06	
	<i>Euro-area or Germany</i>	-1.1	-1.0	-0.4	-0.5	-1.07	0.14	0.62	0.00	-0.07	-0.05	-0.62	-0.7	0.02	0.03	0.09	-	
	standard deviation	5.7	8.1	7.9	7.69	6.2	5.71	6.73	0.09	1.17	1.22	5.39	5.4	2.21	2.21	8.11	-	

Source: Bank of Japan, Federal Reserve Board, European Central Bank, Bloomberg, and staff calculations.

1/ Sample period from 1 Jul 2008 to 11 Jan 2011. All changes refer to an event window of 2 trading days, defined as the values at day t+1 net of day t-1 where t denotes the day of event announcement.

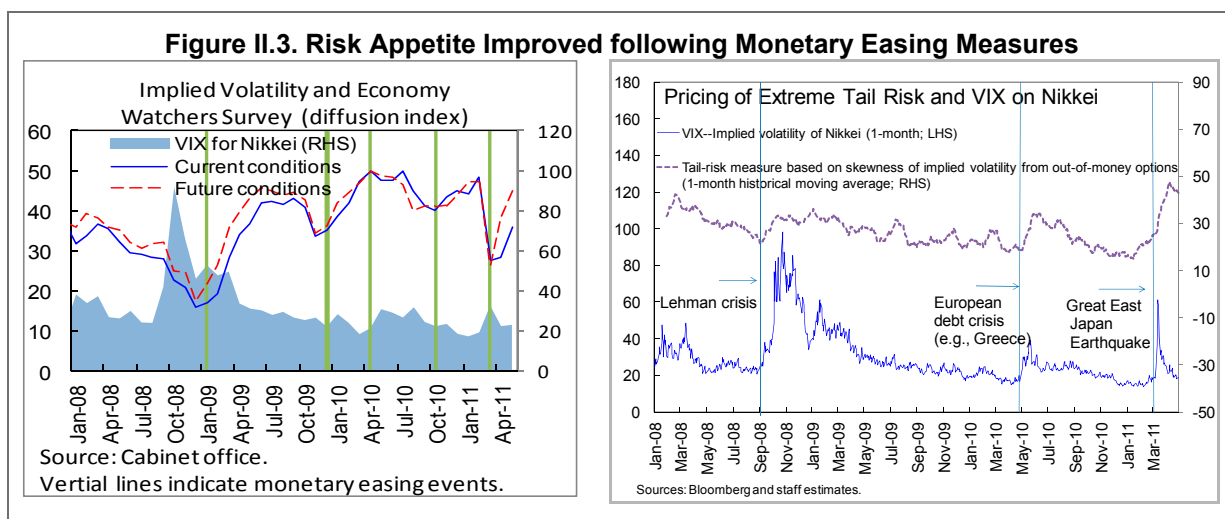
2/ Parentheses indicate the p-values relative to typical trading day control group. Numbers in bold if beyond 5-percent (p-value<0.05) significant level.

3/ Constant maturity zero coupon bonds for 2-year and 10-year horizon.

4/ Percentage increase (+) denotes currency depreciation against USD. For USD, exchange rate refers to nominal trade-weighted rate.

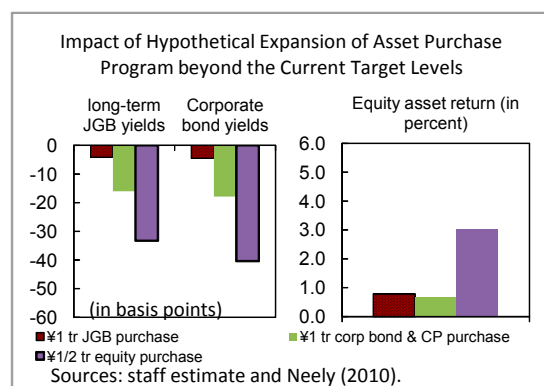
5/ in percent.

indicated by the decline in the implied volatility of out-of-the-money call and put options—a measure of the cost of insuring against extreme tail risk events. And business and consumer confidence generally improved following an easing event (Figure II.3). The BoJ’s easing likely contributed to stabilizing Japan’s economy and narrowing the perceived distribution of risks surrounding the outlook (Baumeister and Benati 2011).



### Possible Impact of Further Asset Purchases

14. **Increased purchases of private assets could further support financial markets.** The evidence suggests that BoJ’s asset purchases have been effective in reducing term and risk premia, and if expanded, could further support asset prices. Using a portfolio rebalancing model similar to Neely (2010), an additional purchase of ¥1 trillion of government securities beyond the current target level would have limited impact on sovereign yields and equity markets, especially given the already-low level of interest rates (see chart). However, the same amount of additional purchases of corporate bonds and commercial paper would have a larger impact by lowering the risk premium in the corporate sector. In addition, based on the above model, purchasing additional ¥½ trillion equities-related assets would reduce long-term sovereign yields by about 30 basis points and raise equity prices by 3 percent (Berkmen, 2011).



15. **Expanding the asset purchase program is unlikely to crowd out private transactions in financial markets.** The BoJ’s asset purchase program is small relative to the total market share, even if it was fully used, perhaps with an exception in the real estate investment trust (Table II.5). Further expansion of asset purchases, particularly corporate



bonds and ETFs, could further ease monetary conditions and support market confidence without crowding-out market investors.

**Table II.5. Asset Purchase Program and Relative Market Size**  
(in trillions of yen)<sup>1/</sup>

	Target level 1/	Amount outstanding (as of end-May 2011)	Market capitalization / outstanding amount
<b>Asset purchases</b>			
Government securities 2/	5.0	3.0	850.0
Commercial paper	2.0	1.2	15.0
Corporate bonds	2.0	0.5	60.8
Exchange-traded funds 3/	0.9	0.3	457.4
Real estate investment trusts	0.1	0.0	3.2
<i>Subtotal</i>	<i>10.0</i>	<i>5.0</i>	<i>-</i>
<b>Fixed-rate fund-supplying operation</b>			
against pooled collateral	30.0	29.6	-
<b>Total</b>	<b>40.0</b>	<b>34.6</b>	<b>-</b>

Sources: Bank of Japan, Tokyo Stock Exchange, Japan Securities Dealers Association.

1/ Target level was raised from ¥35 to 40 trillion after the earthquake in mid-March 2011.

2/ Includes government bonds and Treasury bills.

3/ Market capitalization refers to the equities markets in Tokyo Stock Exchange.

16. **On balance, the purchases of private assets so far represent only a small amount relative to the size of the BoJ's balance sheet.** The outstanding amount of risky assets held by the BoJ is less than ¥1½ trillion as of end-May, and would reach ¥5 trillion when the target level is met. This would amount to about 3½ percent of the total balance sheet, suggesting the risk to its balance sheet from asset purchases would still remain relatively modest. While the risk to the credibility or independence of the BOJ is more difficult to assess, anecdotal evidence from financial markets suggests this risk is also low.

## B. Conclusion

17. **The BoJ's easing measures have had a significant and broad-based impact on financial markets.** The impact stems mainly from the announcement effect rather than from the actual operations or purchases. The easing measures have contributed to a decline in long-term interest rates and lowered downside tail risks, thereby helping to support investors' risk appetite. Furthermore, the impact has been broad-based and comprehensive, extending beyond the assets purchased by the BoJ. These results argue well for further monetary easing through asset purchases, particularly of private sector assets.

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### III. BANK OF JAPAN'S MONETARY EASING: IS IT NOW MORE EFFECTIVE?<sup>1</sup>

#### A. Introduction

1. **Japan has had long experience with quantitative easing, dating back to 2001.**

Following a period of zero interest rate policy (ZIRP) during 1999-2000, the Bank of Japan (BoJ) introduced quantitative easing in March 2001. Under this policy, the BoJ used purchases of JGBs as the main instrument to reach their operating target of current account balances (CAB) held by financial institutions at the BoJ. The BoJ exited quantitative easing in March 2006, amid signs that deflation was easing. Following the global financial crisis, the BoJ increased the pace of its JGB purchases and adopted a number of other unconventional measures to promote financial stability, and then in October last year, it introduced its Comprehensive Monetary Easing (CME) policy in response to the re-emergence of persistent deflation and a slowing recovery. This new policy initiated an asset purchase program involving risky private assets as well as government securities.

2. **Research on the effectiveness of earlier quantitative easing yielded mixed results, with most pointing to limited effects on economic activity.**

While most papers found evidence that quantitative easing helped reduce yields, its effect on economic activity and inflation was found to be small. The reasons cited included a dysfunctional banking sector, which impaired the credit channel, and weak demand for loans during a period when corporates were deleveraging. The situation since then, however, has improved, with a strengthening of banks' balance sheets and restructuring of the corporate sector since the banking crisis of the late 1990s.

3. **This paper revisits the question of whether quantitative easing and other unconventional monetary easing measures in Japan are now more effective given improvements in the banking and corporate sectors.** Specifically, this paper assesses impact of monetary easing on economic activity and inflation taking into account the more recent monetary policy measures. The paper finds that monetary easing has indeed supported economic activity, but with limited impact on inflation. The results here, along with the companion event study analysis of the BoJ's asset purchase program (Lam, 2011), suggest that further easing, including through the purchases of private assets could be more effective compared to the past in stimulating economic activity.

#### B. The BoJ's Experience with Quantitative Easing

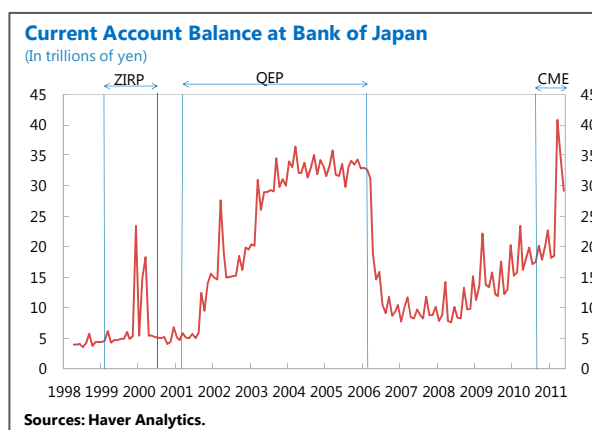
4. **Japan's earlier experience with the quantitative easing suggests that the BoJ's monetary policy actions have helped reduce yields** (see Ugai, 2007 for a survey). During the quantitative easing period 2001—2006, CABs rose gradually from about ¥5 trillion to a peak of ¥36 trillion in 2004 before declining at the end of quantitative easing period in 2006.

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<sup>1</sup> Prepared by S. Pelin Berkmen.

To meet the CABs-targets, the BoJ used mainly purchases of long-term JGBs.<sup>2</sup> Earlier studies focused on various transmission channels, which include: commitment effects to keep expected interest rates low for an extended period; and portfolio rebalancing and signaling effects from the expansion of the balance sheet and increased purchases of long-term JGBs. The commitment effect was found to be the strongest. The evidence on portfolio balancing and signaling effects, however, was mixed with some finding positive evidence that higher CABs and long-term JGB purchases lowered yields and credit spreads.

5. **The impact on economic activity, however, was found to be limited.** While some papers suggested that quantitative easing helped create a more accommodative environment for corporate financing and improved the lending attitude of financial institutions, the impact on economic activity and inflation was rather limited (see Ugai 2007 for a survey). The reason commonly cited was the impaired credit channel due to a weak banking system after the crisis of the late 1990s and corporate deleveraging.



### C. Recent Experience in Japan and Elsewhere with Quantitative and Monetary Easing

6. **More recently, advanced countries' experience with quantitative easing suggests that central bank purchases have been effective in boosting economic activity and avoiding deflation.** Focusing on the Fed's asset purchase program, Chung and others (2011) found that, based on the FRB/US model, the Federal Reserve's holdings of securities since late 2008 lowered the unemployment rate by 1½ percentage points. In addition, they found evidence that the asset purchases helped avert deflation. Liu and Mumtaz (2011) used a change-point VAR model and found that the Fed's asset purchase program reduced 10-year spreads by an average of 90 basis points over the crisis period. Without the spread shock (a proxy for the asset purchase program), the unemployment rate was estimated to be 0.7 percentage points higher and inflation, on average, 1 percentage point lower in 2010.

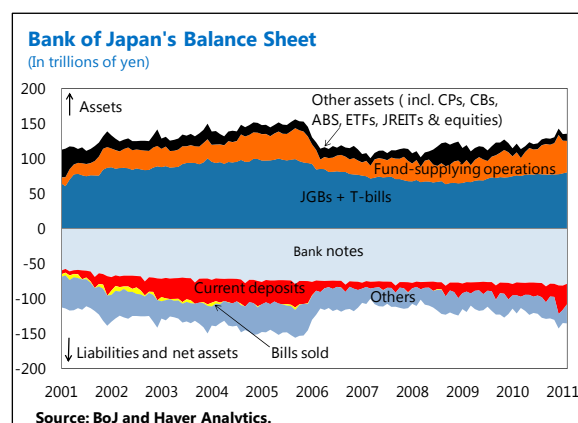
7. **Facing persistent deflation and a policy rate at the lower bound, in 2009 the Bank of Japan expanded its policy toolkit in response to the global financial crisis.** The toolkit included outright purchases of corporate bonds and commercial papers, expansion of outright purchases of JGBs, fixed rate fund supplying operations, and a fund provisioning measure to support growth. While these measures helped weather the impact of the financial crisis, the recovery began to slow during the autumn of 2010, prompting the BoJ to embark

<sup>2</sup> The BOJ also purchased limited amounts of asset-backed securities between 2003 and 2006 to support the development of the asset-backed securities market.

on a new CME policy in October 2010. The CME comprised of three elements: (i) a “virtually zero interest rate” policy, (ii) a commitment to maintain zero interest rates until it judges that price stability is in sight on the basis of its “medium- to long-term understanding of price stability,”<sup>3</sup> and (iii) a new asset purchase program, covering corporate bonds, commercial paper, exchange-traded funds (ETFs), and real estate investment trusts (REITs), in addition to government securities, in an effort to reduce term and risk premia. Following the earthquake, the BoJ doubled the size of the asset purchase program to ¥10 trillion. As a result, the BoJ’s balance sheet, which was already large at about 20 percent of GDP, expanded to about 30 percent of GDP.

**8. BoJ’s easing measures could potentially stimulate economic activity and lift inflation through various channels.**

First, the commitment to a virtually zero interest rate policy could lengthen expectations about the duration of an accommodative monetary policy stance, and therefore reduce long-term real interest rates and help anchor inflation expectations. Second, the asset purchase program could reduce the term and risk premia and lower a broad array of long-term interest rates through portfolio rebalancing effect. The purchases could also serve as a ‘catalyst’ to raise investors’ appetite for risky assets, thereby easing broader financing conditions. Finally, direct purchases could generate wealth effects through higher asset prices.



**9. Analysis of the BoJ’s more recent policy actions shows a statistically significant impact on asset prices.** Lam (2011) uses an event study approach to analyze the impact of the recent monetary policy actions and finds that the cumulative announcement effect of the BoJ’s monetary easing on various financial market indicators was statistically significant. In particular, sovereign yields declined across maturities, and corporate yields cumulatively decreased by about 20 basis points in the two-day window following easing events. Similarly, the stock market improved in four out of five easing events, cumulatively increasing by 5–7 percent.

**10. The Bank of Japan’s monetary policy actions also appear to have had some impact on economic activity, particularly during the latter half of the 2000s.** Baumeister and Benati (2010), using a Bayesian time-varying parameter structural VAR, found that long-term yield spreads—proxies for monetary policy actions under certain identifying

<sup>3</sup> The BoJ’s Policy Board members’ “understanding of medium- to long-term price stability” is for year-on-year change in the CPI “to fall in a positive range of 2 percent or lower, centering around 1 percent.” The BoJ uses the annual headline inflation rate as the primary policy consideration and the policy commitment is conditional on the absence of risk factors, such as financial imbalances, under the BoJ’s second perspective.

assumptions—have affected output and inflation for Japan, the United States, the Euro Area, and the United Kingdom. For Japan, the impact appears to have moderated during the 1990s and the early 2000s and picked up again during the late 2000s.

11. **This paper contributes to this recent set of literature by adopting a broader measure of quantitative and monetary easing measures and expanding the sample period to include more recent BoJ actions.** The recent literature uses mainly spreads under certain assumptions to identify the quantitative easing policies. This paper takes a broader view and directly includes monetary easing measures in the regressions without imposing any specific transmission channel to trace their impact on economic activity. At the same time, it extends the period analyzed to 2010, covering the policy measures taken after the Lehman collapse.

#### D. Data and Estimations

12. **Recent studies measuring the effectiveness of asset purchase programs extend the standard monetary VARs by using spreads as a proxy for quantitative easing.** These papers rely on four sets of variables: i) an economic activity variable, usually growth or unemployment rate; ii) inflation; iii) policy interest rate; and iv) government bond spread over the policy rate. As central bank purchases of government bonds reduce spreads, shocks to spreads are used as proxies for monetary policy intervention. Some papers extend this basic VAR by including various other variables such as stock prices (Liu and Mumtaz, 2011).

13. **For Japan, this paper extends this basic VAR by explicitly using the BoJ's monetary easing measures during 1998-2010 and the nominal exchange rate.** This period covers three distinctive episodes of BoJ's monetary policy: i) the quantitative easing period between 2001 and 2006; ii) post-Lehman policy measures, including JGB and CP purchases and fund supplying operations; and iii) the CME. While policy instruments differ in each period, they all affect the current account balance at the BoJ through changes in liquidity. The regressions trace the impact of monetary easing measures on economic activity directly, and therefore, shocks to spreads are not interpreted as monetary policy actions.<sup>4</sup>

14. **To assess the impact of monetary easing on activity, we use the following set of variables in the VARs.**

- *Economic activity*: real GDP growth rate, unemployment rate, industrial production, and investment.
- *Inflation*: annual core inflation excluding fresh food, and core-core inflation excluding food and energy.

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<sup>4</sup> While the period covers the introduction of the CME, the impact on economic activity may not be fully picked up by the regressions due to monetary policy transmission lags.

- *Policy rate*: uncollateralized overnight call rate.
- *Term spread*: 5-year and 10-year JGB spreads over the call rate.
- *Nominal exchange rate*: yen-dollar rate and the nominal effective exchange rate.
- *Monetary policy measures*: Current account balances at the BoJ (actual amount and in percent of GDP); BoJ's government bond holdings – with maturities shorter than 1 year; with maturities longer than 1 year; total government securities as a share of JGBs outstanding and also in percent of GDP; and the size of the BoJ's balance sheet in percent of GDP.

15. **The exogenous control variables include:** a trend term to account for any omitted variables; GDP of trading partners to account for external shocks; corporate debt to equity ratio as a measure of leverage in the corporate sector; banks' non-performing loan ratio to measure banking sector soundness; and a dummy for the crisis period.

#### E. Impact of Quantitative and Monetary Easing on Activity

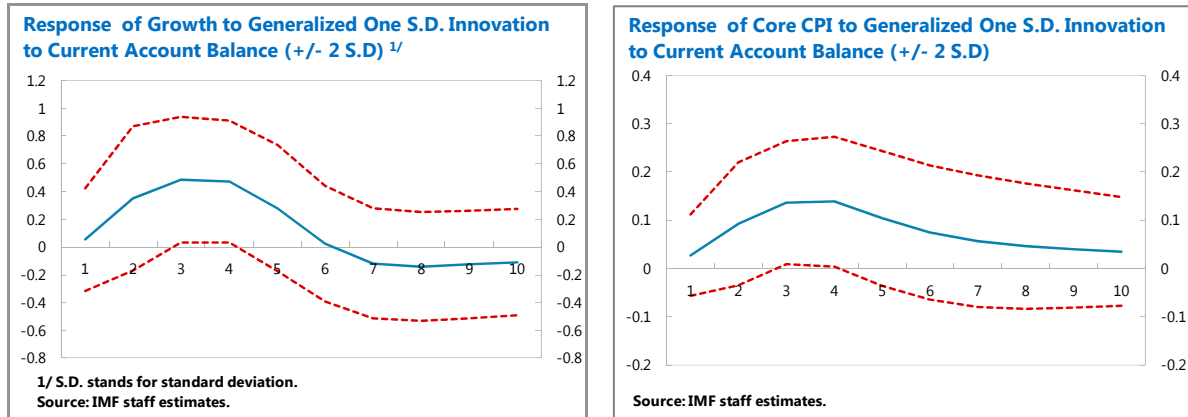
16. **While the monetary easing measures appear to have had a positive but modest effect on economic activity, the effect on inflation is found to be weaker.** Some of the selected impulse responses are presented below.

17. **Regressions using the real GDP growth rate show that quantitative and monetary easing measures affected both activity and inflation.** In particular, current account balances at the BoJ as a share of GDP have a statistically significant impact on both growth and core inflation. The peak occurs after three quarters.<sup>5</sup> The magnitude of the impact, however, given the size of the shock is relatively small. For example, when current account balances increase by about 2 percentage points of GDP (about ¥10 trillion), the growth rate increases by less than a ½ percentage point and core inflation by about 0.1 percentage points at the peak (Figure III.1).

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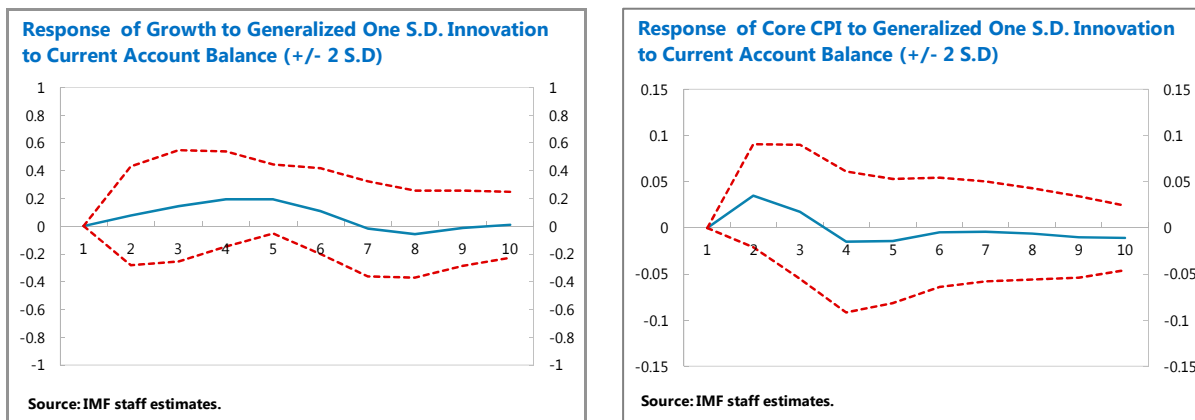
<sup>5</sup> One standard deviation of the current account balances at the BoJ is about 2.1 percent of GDP (with a mean of 3.7 percent of GDP). The last data point in the last quarter of 2010 stands at about 4.7 percent of GDP.

**Figure III.1. VAR with Growth and Current Account Balance at the BoJ; Full Sample**



18. **This relationship, however, disappears when regressions are restricted to the earlier period of quantitative easing.** For example, when the sample period is curtailed to end in 2007, no significant impact on economic activity is detected. This is in line with earlier findings, suggesting perhaps that monetary policy transmission mechanism was not working as effectively during early-2000s (Figure III.2).<sup>6</sup>

**Figure III.2. VAR with Growth and Current Account Balance at the BoJ; QEP Period**

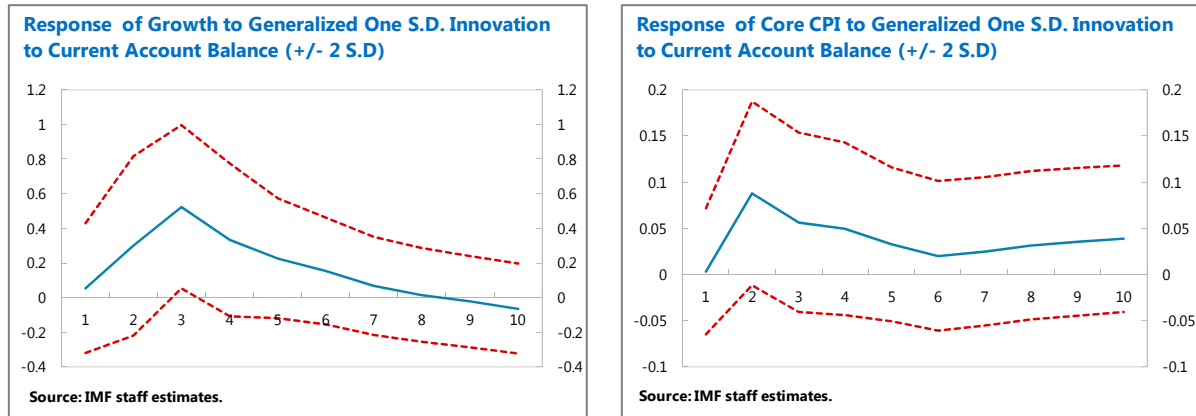


19. **Including the crisis dummy in the VAR does not change the main results.** To check whether the results were driven by the crisis period, a crisis dummy is included in the sample. The qualitative results and the size of the impact remain the same, with only the statistical significance of core inflation declining, suggesting that the crisis period is not driving the results and that the transmission mechanism of monetary policy may have improved during the second half of 2000s (Figure III.3).

<sup>6</sup> As this period is relatively short, the results were also checked using a period covering earlier years.

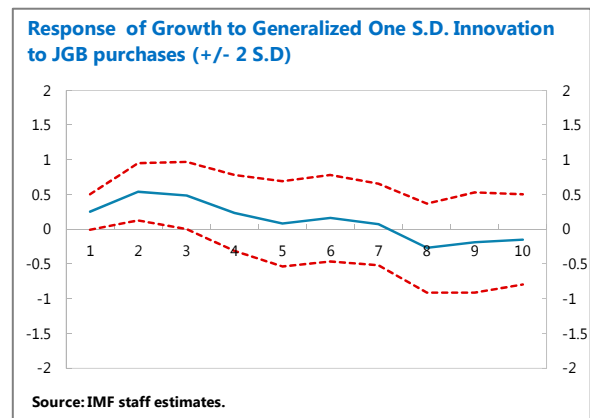


Figure III.3. VAR with Growth and Current Account Balance at the BoJ; with Crisis Dummy



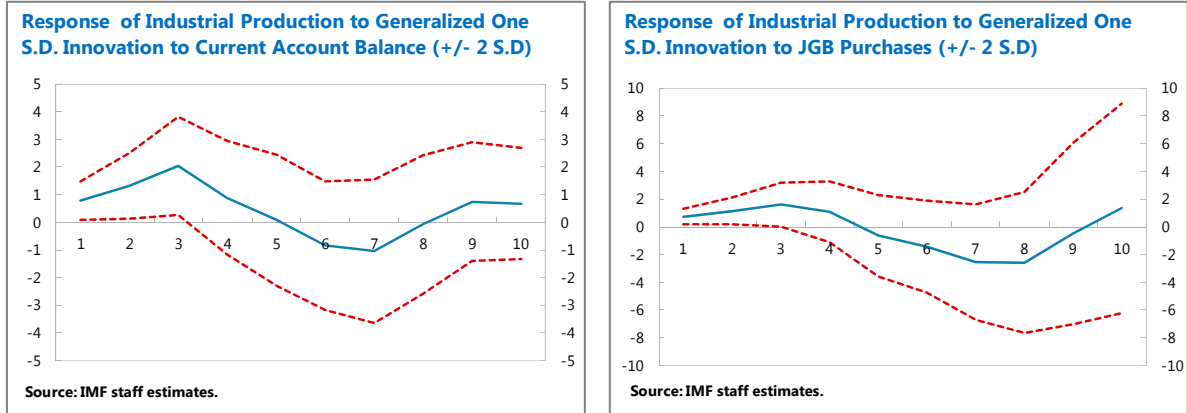
20. **Buying JGBs rather than T-bills appears to have a larger impact.** Focusing on how the current account balances increased, we find that JGB purchases rather than T-bills were more effective in spurring activity. In particular, increases in the BoJ's holdings of government bonds as share of bonds outstanding JGBs appear to stimulate growth, suggesting that the portfolio balance channel may now be operating.<sup>7</sup> The magnitude of the impact is again modest, with an increase of about 5 percentage points in the BoJ's holdings of JGBs stimulating growth by about a ½ percentage point.

21. **Regressions using industrial production yield similar results.** Industrial production increases moderately in response to the BoJ's monetary easing, peaking after 3 quarters (Figure III.4). The economic impact is again moderate, with a 2 percent of GDP increase in current account balances pulling up industrial production by about 2 percentage points. Similarly, an increase of about 5 percentage points in the BoJ's holdings of JGBs stimulates industrial production less than 2 percentage points. While the qualitative results for inflation are similar, they are not statistically significant.



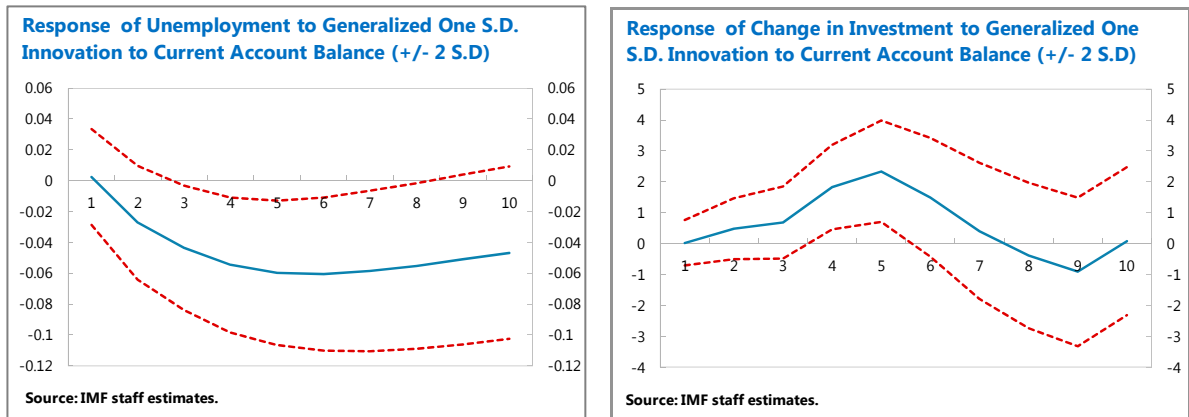
<sup>7</sup> The sample only covers 2002-2010. One standard deviation of the BoJ's holdings of JGBs as a share of outstanding JGBs is about 4.6 percent and the mean is 17 percent.

**Figure III.4. VAR with Industrial Production and the BoJ's Monetary Policy Actions, with Crisis Dummy**



22. **A third set of VARs, using unemployment and investment as economic activity indicators, yields similar results.** Unemployment declines and investment increases in response to the BoJ's monetary easing. The magnitude of the impact is again relatively small. An increase in current account balances of about 2 percentage points of GDP reduces unemployment by less than 0.1 percentage points and stimulates investment by slightly more than 2 percentage points (Figure III. 5).

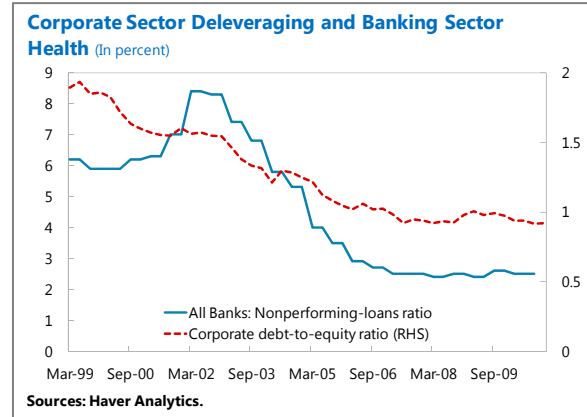
**Figure III.5. VARs with Unemployment and Investment**



23. **Quantitative and monetary easing appears to have no impact on the exchange rate.** This result is also consistent with recent studies. For example, Lam (2011) also finds that the announcement of the CME policy did not have an impact on the exchange rate either. The exchange rate appears to be driven mainly by external factors, particularly by interest differentials and risk appetite.

**24. Improved banking sector health and completion of corporate sector deleveraging may have improved the monetary transmission channel after 2006.**

Non-performing loans declined from 8.4 percent in 2002 to 2.5 percent by 2007 and have remained low since. In addition, the corporate sector reduced its debt-to-equity ratio from about 200 percent to less than 100 percent over the same period. Both of these factors may have helped restore the credit



channel and demand for funds over the period. To test this hypothesis, both variables are included in the regressions as exogenous variables. While they are correctly signed, they are not statistically significant for all regressions. Industrial production in particular, appears to react positively—and in a statistically significant way—to corporate sector deleveraging.

## F. Conclusions

**25. To summarize the results, the paper finds that recent monetary easing by the BoJ have been effective in lifting economic activity.** Using various measures for economic activity, ranging from growth to investment, the VAR regressions pick up a statistically significant but moderate impact on economic activity. The difference compared to the earlier studies may be due to improved monetary policy transmission mechanism as a result of deleveraging in the corporate sector and improvements in the banking sector. When the regressions were run just for the period of 1999–2007, quantitative easing does not appear to affect economic activity.

**26. The impact of quantitative and monetary easing on inflation, however, is weaker, though in the right direction.** This might reflect Japan’s relatively flat Phillips curve, which requires large changes in output to move inflation. Similarly, Lam (2011) finds that recent monetary easing measures had no statistically significant impact on inflation expectations. Given that quantitative easing has had only a modest impact on economic activity, its impact on inflation may not yet be detectable.

**27. BoJ’s monetary policy measures have had no impact on the exchange rate.** Therefore, any impact on economic activity is likely to work through other channels such as portfolio rebalancing or policy commitment rather than the exchange rate.

**28. While it is too early to assess the impact of the CME introduced last October, the results suggest that the BoJ’s policy actions could help stimulate economic activity.** The paper has mainly focused on current account balances and JGB purchases, which work primarily through reducing spreads and term premia. The CME policy, on the other hand, also includes purchases risky assets, targeting risk premia directly. While it is still too early

to assess the economic impact of such purchases, their impact on asset prices may also be promising. In particular, private asset purchases can complement traditional channels by reducing further the term and risk premia, support asset prices, and therefore stimulate investment and consumption. Future research is likely to shed light on the impact of the CME when more data become available. Different identification methods could also help detect the causality running from various easing measures to economic activity and inflation.

29. **The BoJ could help support economic activity and guard against the risk of deflation by further easing measures, particularly given the history of very low and negative core inflation and the risks going forward of persistent deflation.** These results offer some encouragement that the BoJ's recent easing measures could support the recovery and help achieve their objective of price stability.

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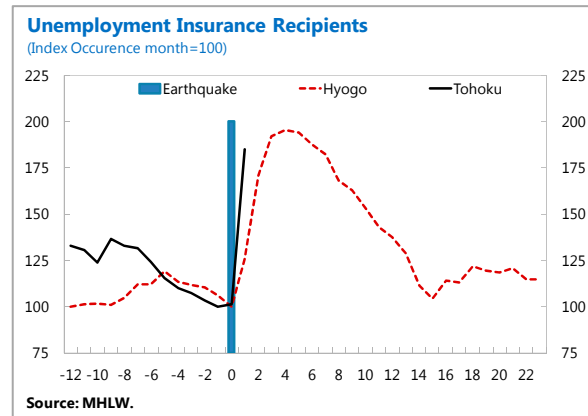
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## IV. LABOR POLICIES TO BOOST EMPLOYMENT AFTER THE EARTHQUAKE<sup>1</sup>

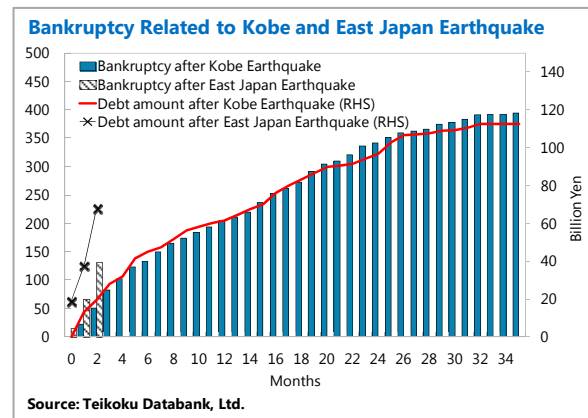
### A. Introduction

#### 1. The Great East Japan earthquake has had a significant impact on labor markets in the region.

Early statistics suggest that the shock is substantially larger than the Great Hanshin earthquake in 1995, with the number of applications for employment insurance rising sharply in the first few months. The Ministry of Health, Labor and Welfare (MHLW) estimates that nearly 841 thousand workers (1 to 2 percent of the national workforce) and 88 thousand establishments (mostly SMEs) were located in the directly affected region.



2. But the disaster also had a nationwide impact. Shortages of key inputs, including electricity, and the ongoing nuclear accident affected businesses and workers across industries and outside the northeastern regions. This resulted in a sharp rise in applications for the employment assistance subsidy across the country (which more than doubled to approximately 2.25 percent of the national labor force through April) and a sharp rise in national bankruptcies related to the earthquake. While the unemployment rate has recently been stable, delays in hiring and business restructuring could dampen labor markets going forward.



3. The new labor market challenges add to the broader need for Japan to raise its growth potential. Since the 1990s, trend growth has been weakening due to a shrinking labor force, which is estimated to deduct approximately ½ percentage points from annual potential GDP growth this decade (Shirakawa 2010). At the same time, the Japanese economy will need to generate sufficient growth momentum to finance fiscal reforms, to meet the demands of an aging population, and to take full advantage of growth opportunities in a rapidly changing regional economic landscape. The earthquake has not only made a commitment to such enabling reforms more urgent—as businesses and households assess their options for reconstruction and relocation—but also provides an opportunity to

<sup>1</sup> Prepared by Chad Steinberg.

accelerate reforms. An important element of the government's new growth strategy should be policies to increase employment opportunities for women, the young, and the old.

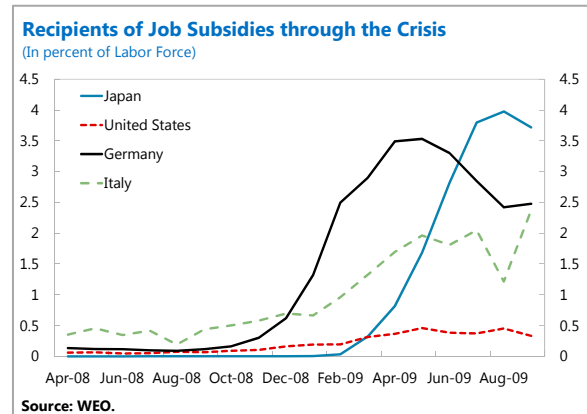
4. **This note discusses how labor policies can support employment in the aftermath of the earthquake and boost growth over the medium term.** The first part of this note discusses near-term challenges to support employment and protect incomes, while the second part of the note discusses medium- to long-term policies that can help restore the economy's growth potential by boosting overall employment.

### B. Supporting Near-Term Employment

5. **The authorities have been quick to provide temporary assistance to firms and workers in the affected region while supporting employment nationwide.** Using pre-existing support systems, the government provided employment adjustment subsidies to firms to help maintain employment levels and relaxed eligibility criteria for unemployment insurance.

#### Employment Support

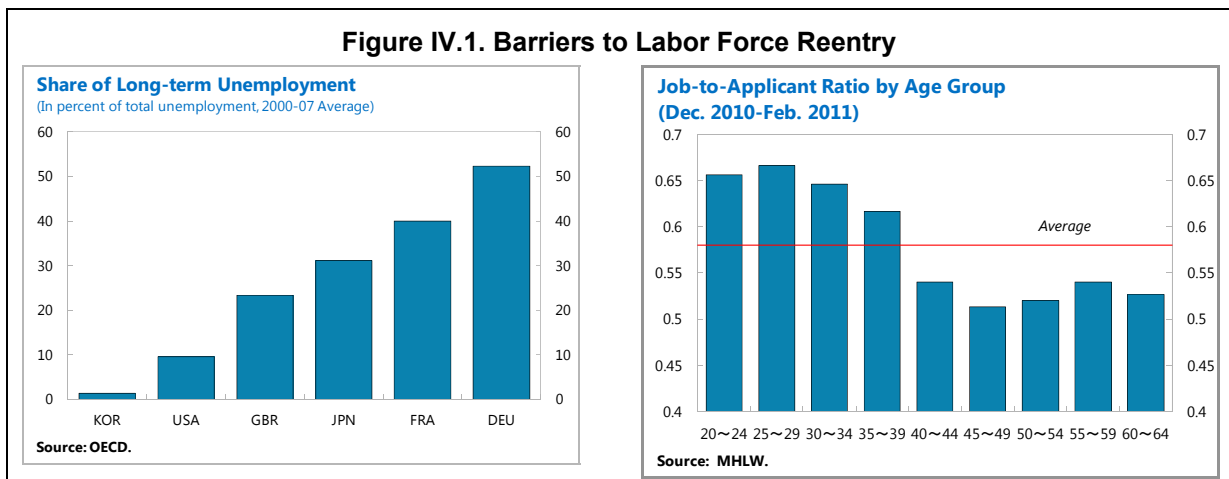
6. **The Employment Adjustment Subsidy program has shown to be an effective tool to help maintain employment during periods of crisis.** This short-term work scheme was first developed during the oil shocks in the 1970s, and during the recent financial crisis, covered at its peak nearly 3.8 percent of the labor force, the largest share amongst industrialized countries. The main recipients were firms in the manufacturing sector and SMEs, with both categories accounting for approximately eighty percent of the subsidy in FY2008–09. The size of the program also far exceeded its utilization in the past.



7. **To meet potential demand for employment support in the disaster region, the government has eased eligibility criteria.** The eligibility criterion on sales was changed from a quarterly to a monthly assessment, such that firms could immediately qualify; subsidies were extended for an additional 300 days regardless of previous usage; and coverage was extended to firms outside of the region that were affected by either shortages in electricity or in critical part supplies. As the subsidy is time bound, it will be phased out as the economy recovers. Through April, uptake has been significant with the share of the labor force covered rising from 1 to 5 percent in the Tohoku region, and from 1 to 2.25 percent nationwide. During Kobe, peak coverage in the Hyogo prefecture was approximately 3 percent.

8. **Reintegrating the unemployed may require further measures that aid with job transition.** Because of existing labor market rigidities and a focus on lifetime employment contracts in Japan, changing career paths is more difficult than elsewhere, with Japan having a relatively high share of long-term unemployed in total unemployment (Figure IV.1). Older and low-skilled workers are likely to have greater difficulties in finding new employment as experienced after the Kobe earthquake. During the recovery, the job-to-application ratio improved steadily for workers under the age of 45 from 0.65 to 0.97 over a span of two years, but remained broadly unchanged between 0.21 and 0.27 for workers over the age of 45. To help workers reintegrate, the government could consider:

- *Job search and relocation assistance:* Local Hello Work offices are now actively advertizing jobs outside of the region and are providing monetary assistance for relocation. The experience from Kobe also suggests that job fairs can be particularly effective. The government could also consider providing residents with direct cash grants that could be used for relocation, with Glaeser (2005) recommending a similar program for the victims of Hurricane Katrina in the United States.
- *Employment subsidies.* Employers could be given incentives to hire and train low-wage workers. Phelps (2010) has recently argued for a program of tax credits for companies employing low-wage workers in the United States and a work opportunity tax credit was used following Katrina. In Kobe, the government implemented an employment subsidy specifically for the hiring of workers between the ages of 45 and 55.
- *Job training.* The government could provide targeted training in new growth sectors, such as medical and child care services.



## Unemployment Insurance

9. **The unemployment insurance system in Japan is broadly similar to that in other OECD countries (Table IV.1).** The system allows for coverage of workers that have worked for at least the last month at a job that requires a minimum of 20 hours a week. The period of



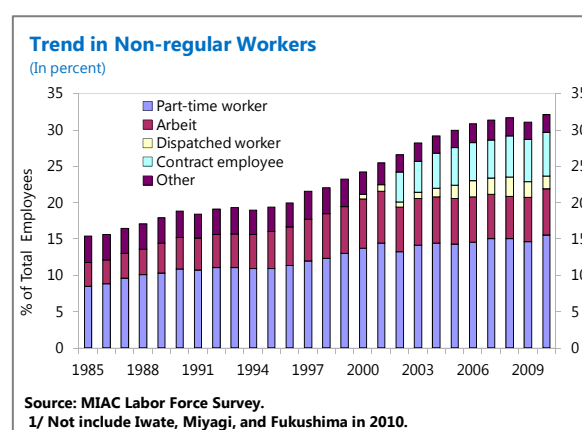
unemployment insurance is between 3 to 12 months with the actual period determined by the length of employment and the age of the worker. In this crisis, the government has further relaxed eligibility requirements by expanding coverage to workers that were not fired but were left temporarily unemployed by the circumstances, and expanded the standard payment period by four months.

**Table IV.1: Unemployment Insurance Schemes**

	<b>JPN</b>	<b>USA</b>	<b>GBR</b>	<b>DEU</b>	<b>FRA</b>
Coverage	50-80% of the previous wages	50% of the previous wages	GBP65.45 per week	67% of the previous wages	57.4-75% of the previous wages
Duration	3-12 months	0-6 months	0-6 months	3-24 months	4-36 months

Source: The Japan Institute for Labor Policy and Training

10. **The growing numbers of non-regular workers, however, remain at risk of not being properly registered under social security due to non-compliance of firms with social security payment obligations.** To assess eligibility for unemployment insurance, officials rely on official business records of their wage bill. To ensure that these records are accurate, the authorities need to be able to compare the wage bill an employer declares when calculating corporate or entrepreneurial taxable income with the wage bill on which social insurance contributions have been paid (OECD 2011). The administration has reportedly been tolerant of companies that evade payments for social insurance premiums, with few criminal indictments against firms evading payments, which may have encouraged lax compliance (Duell, Grubb, and Singh, 2010). Unifying the collection of taxes and social insurance contributions would be one way of improving compliance (OECD 2011).



### Reviving Labor Markets in the Tohoku Region

11. **Tohoku has fewer economic opportunities than elsewhere in Japan.** With Japan being one of the most geographically concentrated countries in terms of both population and GDP, a few city centers—Tokyo, Nagoya, and Osaka— account for nearly one-third of output. The regional economies, in contrast, are on average older, more agrarian, and less educated, with average incomes about one-quarter less than those in the major cities (Table IV.2).

**Table IV.2 Selected Economic Indicators for the Tohoku Region**

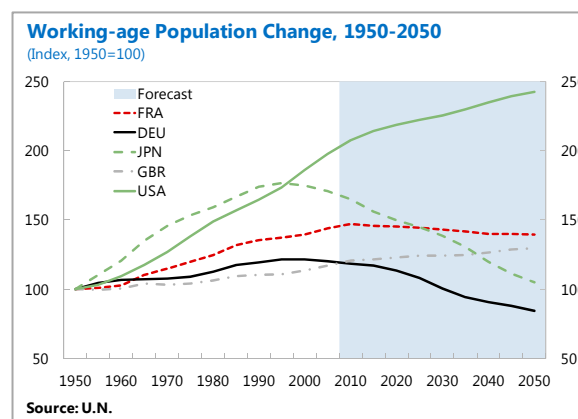
	Iwate	Miyagi	Fukushima	Tokyo	Japan
Unemployment rate, 2001-2005 Average (%)	4.9	5.7	5.0	5.1	5.0
Prefectural income per capita, 2008 (1,000 yen)	2,267	2,473	2,743	4,155	2,916
Household with annual income less than 2 million yen, 2009 (%)	7.1	5.8	3.9	2.9	4.4
Share of agricultural workers, 2005 (%)	13.7	6.2	9.2	0.4	4.8
Share of population with tertiary education, 2000 (%)	16.9	22.0	17.0	38.8	26.8
Share of elderly citizens, 2009 (%)	26.8	22.1	24.7	20.9	22.7

**12. A swift recovery of labor markets in the local economy is thus uncertain.**

Historical evidence and the experience of Kobe suggest that under certain circumstances a rapid recovery is possible; but, economic characteristics in Tohoku resemble those in New Orleans, which had a less successful recovery following Hurricane Katrina (Box IV.1). The possibility of outward migration by skilled and young workers could complicate the region's revitalization.

### C. Boosting Overall Employment

**13. Japan is growing older faster than anywhere else in the world.** After experiencing a demographic dividend of a rapidly growing labor force and falling birth rate in the 1960s to 1980s, Japan is now facing the consequences of a rapidly aging society and a sharp decline in the size of its labor force. The working-age population, aged 15-64, will fall from its peak of 87 million in 1995 to about 52 million in 2050. This is



approximately the same size as the workforce at the end of the Second World War (Economist 2010). Unless output per worker rises at a faster rate to offset the decline in the number of workers, Japan's GDP is likely to fall behind comparator countries. Yet there is much Japan can still do to help mitigate the decline in the size of its workforce apart from encouraging immigration, particularly by tapping underutilized sources of labor, such as women, the young, and the old.

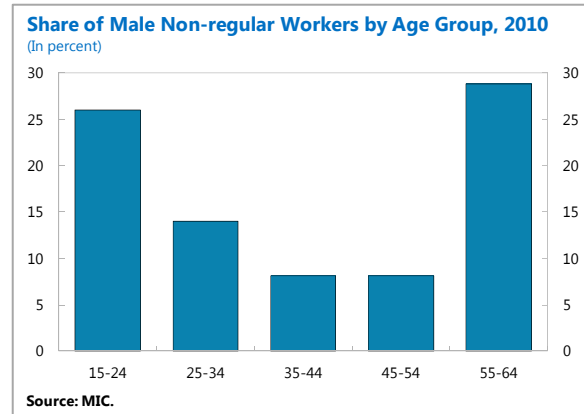
#### **Youth Employment: A New Labor Contract for New Graduates<sup>2</sup>**

**14. The most important individual labor market decision in Japan is typically made following graduation from post-secondary school, with considerable focus on the**

<sup>2</sup> Youth unemployment in Japan at around 11 percent is more than double the national average. But with a relatively low unemployment rate overall and a highly educated labor force, this figure is much lower than youth unemployment rates in other advanced economies.

**attainment of jobs with an implicit lifetime employment guarantee.** As a result, most employees do not expect to reenter the labor market during their prime working years. It is decisions made at this juncture that often lead to the many inequities that exist in the current employment system, including both the high level of non-regular workers amongst the young, and the minimal number of career female employees.

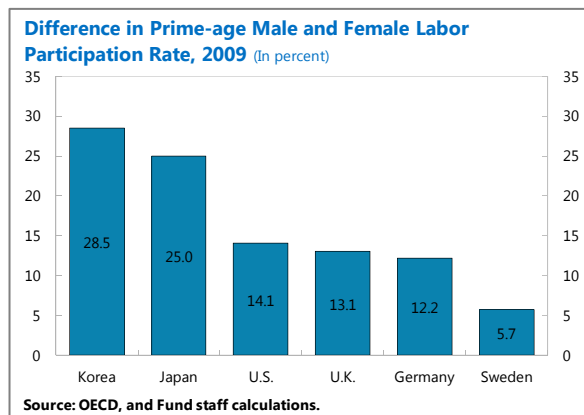
15. **For example, the structural decline in the number of available lifetime employment contracts has led to a growing share of young workers in non-regular positions.** Following the collapse of Japan's asset price bubble, firms began to hire a more flexible labor force that could adjust to changes in demand and rising uncertainty about the future (Asano, Ito, and Kawaguchi 2011). They achieved this through worker attrition by hiring fewer new graduates and offering voluntary retirement packages to their oldest employees. As a result, non-regular employment is now heavily concentrated in the generation of workers that first entered the labor market after the bursting of the bubble and in the oldest cohort.



16. **Reforming this market is key to creating a more flexible and equal labor market overall.** Introducing a new, more flexible labor contract could increase incentives for hiring regular workers and allow a greater number of young and female workers to enter mainstream career paths with established firms. One possible option is to modify regular work contracts to include phased-in employment protection. Such a new regular work contract would gradually increase the dismissal costs to employers over the course of a worker's tenure. This would help reduce hiring risks given unknown skills of new workers (or more importantly, the length of their tenure), while maintaining employment protection for tenured employees.

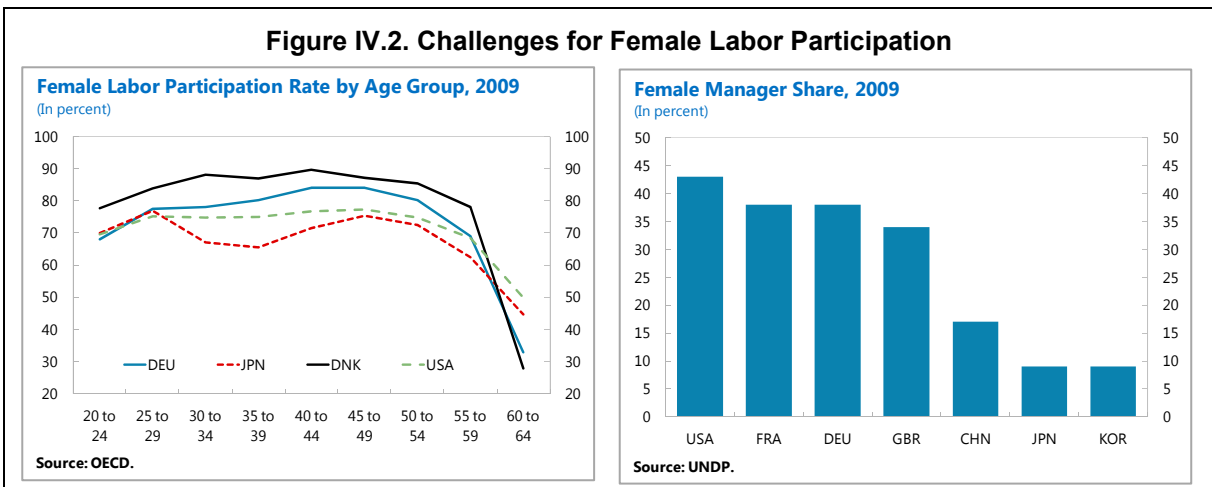
### Female Employment: Support for Working Mothers

17. **Female labor participation (FLP) rates are low compared to other advanced economies, with the difference between male and female participation rates nearly 25 percent.** At the same time, young women in Japan are more educated than both their OECD peers and their male counterparts, with women in their 20s having on average 14.3 years of schooling. Thus, getting more women into the workforce would not only

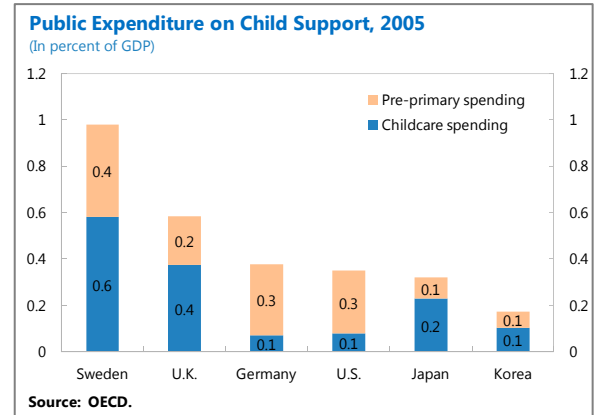


increase the size of the labor force but also possibly increase its skill intensity. We estimate that if Japan was to raise its FLP ratio to the level of the G-7 average, per capita GDP would be approximately 5 percent higher, raising potential GDP growth by as much as a quarter of a percentage point during the twenty year transition period.<sup>3</sup>

18. **One obstacle to higher FLP rates is the high drop-out rate of women from the labor force following child birth (Figure IV.2).** FLP rates for women in their early twenties are similar to comparator countries but then fall off sharply. This reflects both weak support systems for working mothers and the reluctance of firms to hire career female employees at the start of their careers.<sup>4</sup> When women reenter the labor market, they often choose lower-paying non-regular positions<sup>5</sup>, and as a result, Japan stands out in cross-country comparisons of the share of female managers.



19. **Providing support for working mothers may help reduce this disparity in female labor participation and assist more female employees to become future managers.** Previous studies have found that FLP is positively associated with a more neutral tax treatment of second earners, childcare subsidies, and paid maternity leave (Jaumotte 2003); and according to OECD statistics, Japan provides much fewer of these benefits. Public expenditure on childcare and



<sup>3</sup> This calculation assumes that the FLP rate rises from 62 percent in 2010 to 70 percent in 2030.

<sup>4</sup> Despite efforts by the government to reduce gender discrimination—through the passage of two separate equal employment acts in 1986 and 1999—hiring practices by firms continue to be targeted towards male employees.

<sup>5</sup> This also reflects a tax system that is biased towards part-time work.

early educational services is in the bottom one-quarter of the distribution, and informal reports within Japan suggest that demand largely outstrips supply, with potential unmet demand as high as one-third of current childcare capacity.

### **Elderly Employment: Raising the Retirement Age**

20. **Across the OECD life expectancy has risen faster than the average retirement age.** In Japan, the OECD country with the highest life expectancy at 82.6 years, a mandatory retirement age of 60—relative to the OECD average of 64.4 years—is incongruous. A recent law that encourages firms to rehire productive workers on non-regular contracts between the ages of 60 and 64 has helped lift employment rates for workers in this age group from 53 percent in 2006 to 57 percent in 2010. Despite this rise, however, employment rates still fall significantly with age, from 75 percent of the 55-to-59 group in 2010 to 57 percent of the 60-to-64 group and 36 percent of the 65-to-69 group (OECD 2011).<sup>6</sup>

21. **Increasing the average retirement age would help increase labor participation and help reduce pressure on pension systems.** But achieving this under the current lifetime employment system may create inequities for the younger generations, with many firms currently using the early retirement age as a means to reduce the number of workers. Thus, to achieve greater labor participation of the elderly by raising the retirement age requires also a change to the current lifetime employment system to one that places greater weight on performance and flexibility.

### **D. Conclusions**

22. **The earthquake has had an important impact on labor markets at the national level.** In the near term, policies to support employment and protect incomes appear to have been effective, but will need to be phased out as the economy gains strength and complemented with training and job search assistance programs to facilitate a smooth reallocation of labor.

23. **The earthquake provides, however, also an opportunity to accelerate reforms to raise growth.** Policies to increase employment by tapping underutilized sources of labor will be increasingly important to help decelerate the speed at which Japan's labor force declines. Moreover, reforms to Japan's lifetime employment system are needed to help reduce current hiring inefficiencies for the young and old, and to reduce growing inequities between regular and non-regular workers.

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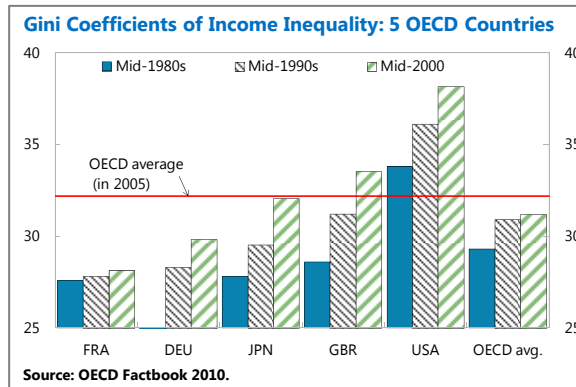
<sup>6</sup> In addition to the retirement age, the sharp drop-off in wages (30-40 percent) after age 60 discourages labor force participation.

**Box IV.1. What are the Prospects for a Recovery in the Tohoku Region?**

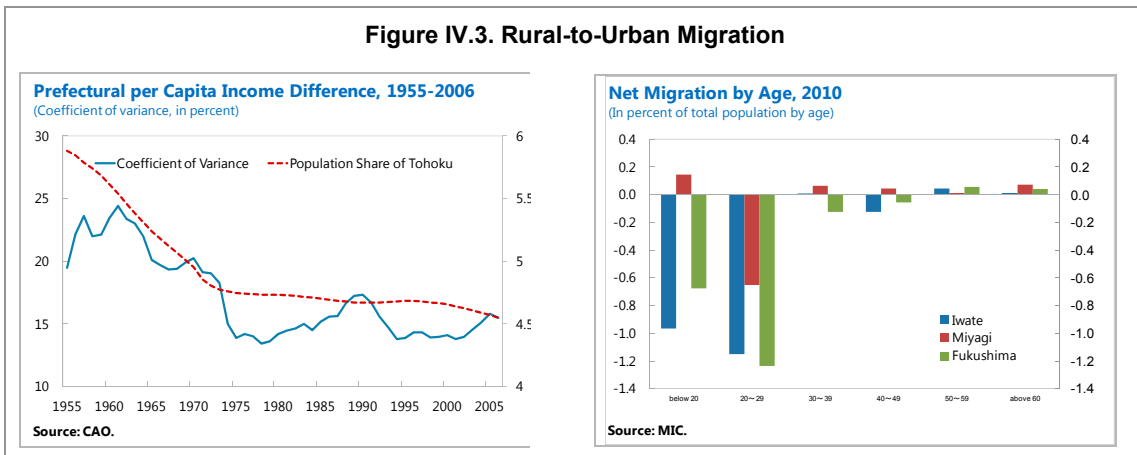
**Historical evidence suggests that cities tend to rebound rapidly from disasters (Vigdor 2008, Davis and Weinstein 2002).** In the case of the Great Hanshin earthquake in 1995, the city of Kobe recovered quickly with most of its industrial sector remaining intact<sup>1</sup>, including the “chemical shoes” industry. This low value added industry—with heavy competition from China—was destroyed by fires following the quake, but contrary to expectations at the time recovered within a few years. The resilience of cities in part relates to the benefits of agglomeration derived from a large pool of diverse skilled labor, while the destruction of physical capital can be of secondary importance given that it can be replaced quickly.

**The U.S. experience with Hurricane Katrina in 2005 provides a useful benchmark to help draw policy lessons for Tohoku’s current challenges.** Similar to the Tohoku region, New Orleans had been in a slow period of decline prior to the disaster with its population as a share of U.S. population peaking in the 1800s. Moreover, the hurricane displaced nearly 650,000 people, with some estimates suggesting that all 400,000 of the downtown residents were evacuated. Thus, like Tohoku, New Orleans faced similar questions about its post-disaster future. Two years after the disaster, an estimated one-third to one-half of the evacuees had not returned to the city. There was also a significant change in the demographics of the city, with the composition of residents becoming slightly more economically disadvantaged. Statistics also reveal that most industries had experienced a fall in employment, with services (for local residents), manufacturing, and transportation experiencing the largest declines.

**Economic differences between Tohoku and the major city centers suggest that Tohoku may not rebound to its pre-quake population level, with higher skilled younger workers possibly choosing to relocate.** Since the late 1950s (Figure IV.3), the population in Tohoku (as a share of Japan’s total population) declined fastest in Japan’s boom years when income differences were the widest. This trend continued into this decade and is reflected in the rise in Japan’s Gini coefficient which captures the growing regional economic differences between urban centers and rural regions. Recent emigration from Tohoku has in large part taken place amongst younger cohorts, with many students seeking better opportunities in the city centers.



**Figure IV.3. Rural-to-Urban Migration**



<sup>1</sup> The damage during the Great Hanshin quake is estimated at ¥9.6 trillion relative to ¥16.9 trillion for the Great East Japan quake. For a discussion of the economic impact on the city of Kobe, see Horwich (2000).

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