



IMF Working Paper

Bank of Japan's Quantitative and Credit Easing: Are They Now More Effective?

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Asia and Pacific Department

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Abstract

This paper asks whether the BoJ's recent experience with unconventional monetary easing has been effective in supporting economic activity and inflation. Using a structural VAR model, the paper finds some evidence that BoJ's monetary policy measures during 1998-2010 have had an impact on economic activity but less so on inflation. These results are stronger than those in earlier studies looking at the quantitative easing period up to 2006 and may reflect more effective credit channel as a result of improvements in the banking and corporate sectors. Nevertheless, the relative contribution of monetary policy measures to the variation in output and inflation is rather small.

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I. INTRODUCTION

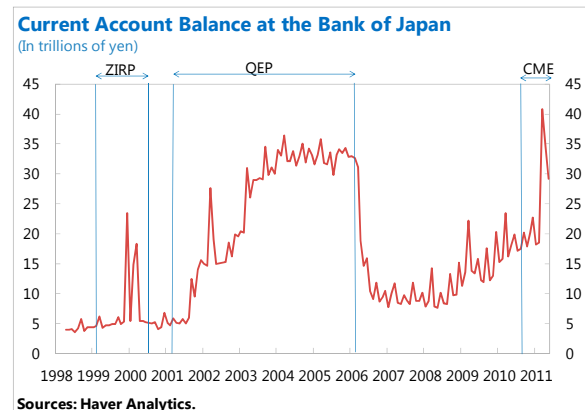
Japan has had a long experience with quantitative easing, dating back to 2001. Following a period of zero interest rate policy (ZIRP) during 1999–2000, the Bank of Japan (BoJ) introduced quantitative easing in March 2001. Under this policy, the BoJ used purchases of Japanese Government Bonds (JGBs) as the main instrument to reach their operating target of current account balances (CAB) held by financial institutions at the BoJ (bank reserves). The BoJ exited quantitative easing in March 2006, amid signs that the economy was emerging from deflation. Following the global financial crisis, the BoJ increased the pace of its JGB purchases and adopted a number of unconventional measures to promote financial stability. In October 2010, the BoJ introduced its Comprehensive Monetary Easing (CME) policy to respond to the re-emergence of deflation and a slowing recovery. One key measure was an asset purchase program involving government securities as well as private assets (see Ueda 2011 for a detailed description).

Research on the effectiveness of earlier quantitative easing has 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 after the banking crisis of the late 1990s.

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 the impact of monetary easing on economic activity and inflation extending the period of analysis to 2010 to include the easing measures after the Lehman collapse. The paper finds that there is some evidence that monetary easing has supported economic activity and to a lesser extent inflation. Nevertheless, relative to all other economic variables included in the VARs a small portion of the variation in output and inflation is explained by the shocks to monetary policy variables.

II. THE BOJ'S EXPERIENCE WITH QUANTITATIVE EASING

The evidence from 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 2001–06, 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. To meet the CABs-targets, the BoJ used mainly purchases of long-term



JGBs.² 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.

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 small (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.

III. RECENT EXPERIENCE IN JAPAN AND ELSEWHERE WITH QUANTITATIVE AND CREDIT EASING

Recent studies on advanced countries' experience with quantitative easing suggest 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 estimated 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 have been 0.7 percentage points higher and inflation, on average, 1 percentage point lower in 2010.

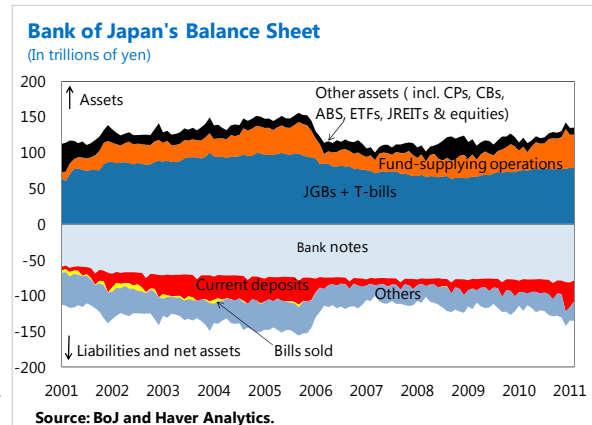
Facing the global financial crisis, persistent deflation and a policy rate at the lower bound, the Bank of Japan in 2009 expanded its policy toolkit to include outright purchases of corporate bonds and commercial papers, expansion of outright purchases of JGBs, fixed rate fund supplying operations, and 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 on a new "comprehensive monetary easing" (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 the BoJ judges that price stability is in sight on the basis of its "medium- to long-term understanding of price stability,"³ and (iii) a new asset purchase program, covering corporate

² The BoJ also purchased limited amounts of asset-backed securities between 2003 and 2006 to support the development of the asset-backed securities market.

³ 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.

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.

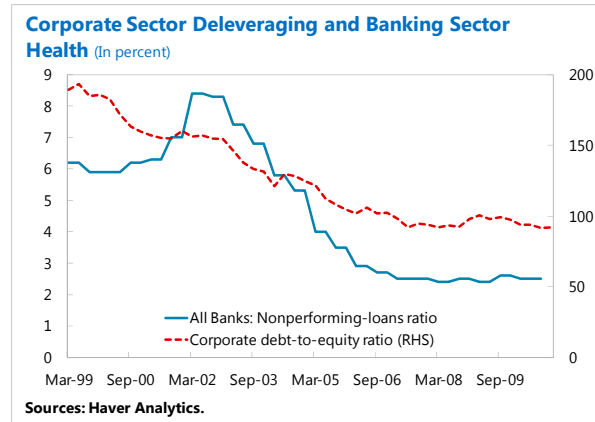
BoJ's easing measures could potentially stimulate economic activity and lift inflation through various channels. First, the commitment to a virtually zero interest rate policy could lengthen expectations about the duration of an accommodative monetary policy stance, and therefore reduce long-term real 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.



Analysis of the BoJ's more recent policy actions shows a statistically significant impact on asset prices. Lam (2011) used an event study approach to analyze the impact of the recent monetary policy actions and found 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. Similarly, Ueda (2011), also using an event study, found that some of the policy measures adopted by the BoJ generated the expected impact on asset prices, with the exception of the exchange rate.

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 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.

In Japan, a healthier banking sector and progress in corporate sector deleveraging may have strengthened 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. 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.



This paper contributes to this research by measuring directly the BoJ's easing measures in quantity terms rather than through their indirect impact on government bond spread for the period covering 1998-2010. The recent literature uses mainly government bond spreads under certain assumptions to assess the impact of quantitative easing policies. This paper takes a broader view and directly introduces 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.

IV. DATA AND ESTIMATIONS

Recent studies measuring the effectiveness of asset purchase programs extend the standard monetary VARs by using government bond 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).

For Japan, this paper extends this basic VAR by explicitly using the BoJ's monetary easing measures in quantity terms. 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.⁴

In particular, to assess the impact of monetary easing on activity, we try the following set of variables in the regressions.

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

- *Economic activity*: real GDP growth rate, unemployment rate, and industrial production.
- *Inflation*: annual core inflation excluding fresh food, and core-core inflation excluding food and energy.
- *Policy rate*: uncollateralized overnight call rate.
- *Term spread*: 5-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 (in percent of GDP); BoJ's government bond holdings – with maturities shorter than 1 year; with maturities longer than 1 year⁵; total government securities as a share of JGBs outstanding and also in percent of GDP.

Growth rate, industrial production and inflation are in annual growth rates. Various exogenous control variables were tried, including a trend term; 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.

The regressions are done for the period of 1998-2010, which covers three distinct episodes of BoJ's monetary policy: i) the zero interest rate policy from 1999 to 2000 and 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, starting in 2010. While policy instruments differ in each period, they all affect the current account balance at the BoJ through changes in liquidity. The period coverage also avoids the problems in estimation that may result from structural breaks usually observed during mid-1990s (Fujiwara 2006, and Inoue and Okimoto, 2008).

While there is no explicit treatment of the zero bound on the interest rate in the VAR restrictions, the contemporaneous impact of the changes in quantitative monetary policy measures on interest rate is assumed to be zero in line with the recent literature. Some papers treat the zero lower bound on the call rate more explicitly in running the VAR (Kamada and Sugo, 2006; Nakajima, 2011; Franta, 2011). For example, Nakajima (2011) extends a time varying parameter VAR model with stochastic volatility by explicitly incorporating the zero lower bound on nominal interest rates. The paper concludes that the assumption of the zero bound has a negligible effect on the rest of the economy, yielding results very close to a model with no explicit treatment of the zero bound.

The paper uses a standard identification assumption that output and inflation do not respond contemporaneously to a monetary shock, which can be interpreted as decisions regarding

⁵ The BoJ's government bond holdings are only readily available for two sets of maturity brackets: maturities shorter than 1 year and maturities longer than 1 year.

pricing and output being made before the realization of the shock (Sims, 1986; Bernanke and Blinder, 1992, Rotemberg and Woodford, 1998; and Christiano et. al., 2005). In addition, as mentioned earlier and similar to recent papers, the VARs assume that the call rate does not respond to shocks to spread or other monetary policy actions (Baumeister and Benati, 2010).

To limit the number of parameters to be estimated, the VARs contain two lags for each endogenous variable. While both generalized and structural impulse responses are calculated, only the results for structural responses are presented in the following section.⁶

V. IMPACT OF QUANTITATIVE AND CREDIT EASING ON ACTIVITY

Main Regressions

A 6-variable VAR is run by using growth, core inflation excluding fresh food, call rate, nominal effective exchange rate, 5-year spread, and current account balances at the BoJ as a share of GDP.⁷

In addition to the identification assumptions explained above, the exchange rate is assumed to be the most endogenous variable, and inflation is assumed to be affected by the growth rate (Peersman and Smets, 2001; Bernanke and Blinder, 1992). The system is identified with the following restrictions on the coefficient matrix, using the order of variables as presented above.

$$\begin{vmatrix} 1 & 0 & 0 & a_{14} & a_{15} & 0 \\ a_{21} & 1 & 0 & a_{24} & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & a_{45} & a_{46} \\ 0 & 0 & 0 & 0 & 1 & a_{56} \\ a_{61} & a_{62} & 0 & 0 & 0 & 1 \end{vmatrix}$$

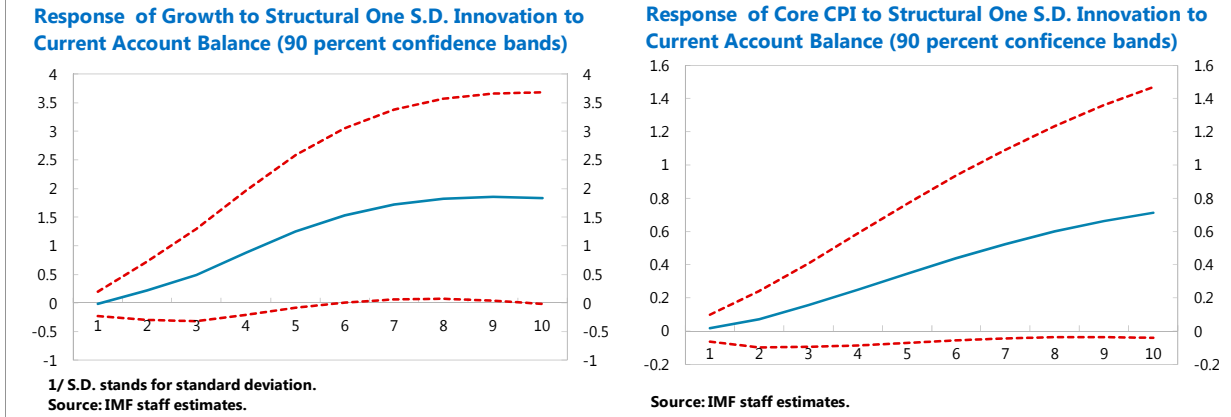
An increase in the current account balances at the BoJ appears to raise both growth and core inflation, but the statistical significance is weak. The peak impact comes at about 3-4 quarters.⁸ The accumulated impulse responses show that an unanticipated increase in current account balances by about 2 percentage points of GDP (about ¥10 trillion) could push up growth rate by about 1.8 percentage points within two years and core inflation by about 0.6 percentage points (Figure 1).

⁶ For generalized impulse responses, please see the Selected Issues Papers for 2011 IMF Article IV Consultation (<http://www.imf.org/external/pubs/cat/longres.aspx?sk=25051.0>)

⁷ The results are for the share of current account balances at BoJ in percent of the contemporaneous GDP, given the identifying assumption that growth is not affected by the contemporaneous monetary policy.

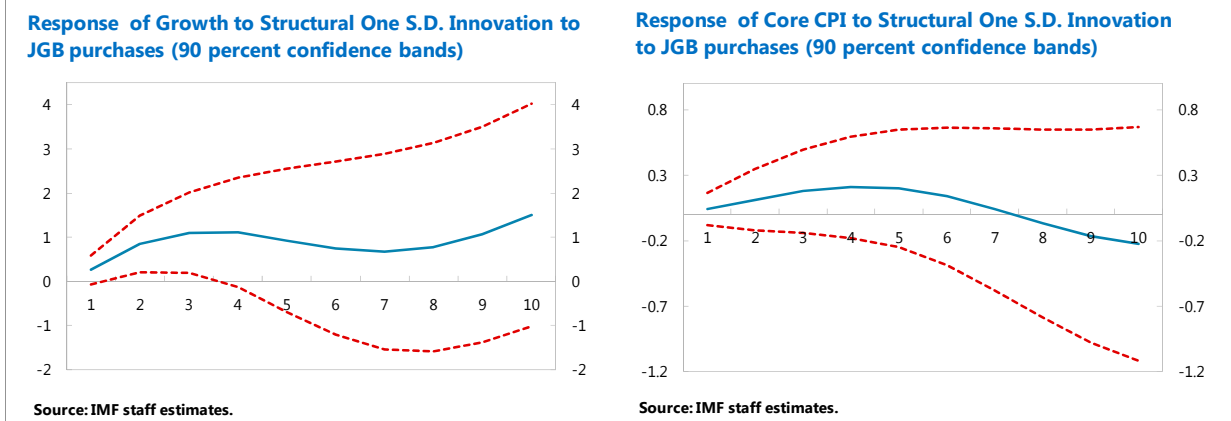
⁸ One standard deviation of the current account balances at the BoJ is about 2.1 percent of GDP (with a mean of 3.7 percent of GDP). The last data point in the last quarter of 2010 stands at about 4.7 percent of GDP.

Figure 1. VAR with Growth and Current Account Balances at the BoJ



Focusing on the instrument for increasing the current account balances, we find that JGB purchases rather than short-term T-bills appear to be more effective in spurring activity. However, as the sample size is much smaller for the composition of the BoJ's assets and only covers 2001Q4-2010, it is not possible to investigate the same period with the previous regression. The above VAR is run using the BoJ's holdings of government bonds as share of outstanding JGBs.⁹ Based on accumulated impulse responses, an unanticipated increase of about 5 percentage points in the BoJ's holdings of JGBs could increase growth by about 1 percentage points within a year, but no is found to have little impact on inflation (Figure 2).

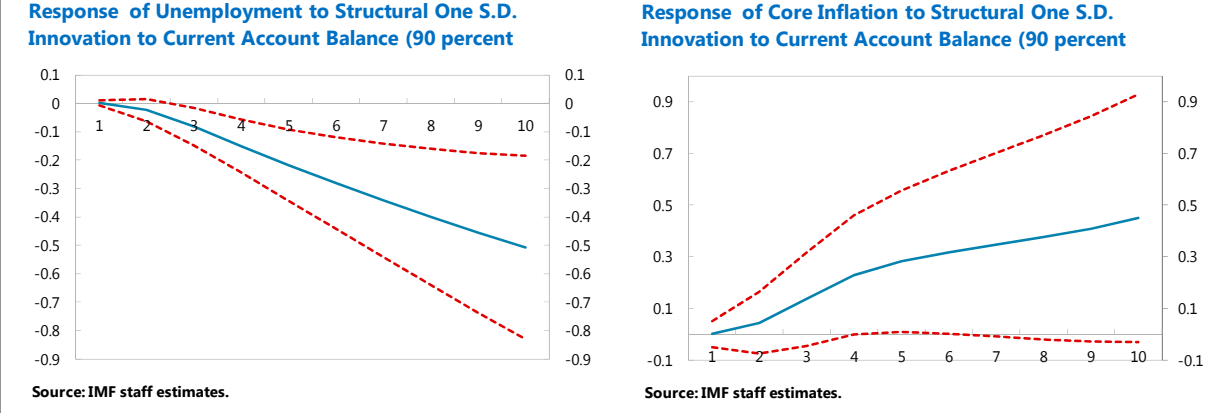
Figure 2. VAR with Growth and the BoJ's Holdings of Government Bonds as Share of Outstanding JGBs



The impact of the BoJ's monetary policy actions can also be measured in terms of unemployment. We rerun the first regression using unemployment as an economic activity indicator and find similar results. Accumulated impulse responses show that unemployment declines by about 0.4 percentage points in two years in response to an unanticipated increase in current account balances of about 2 percentage points of GDP. (Figure 3).

⁹ 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 3. VAR with Unemployment and Current Account Balances at the BoJ



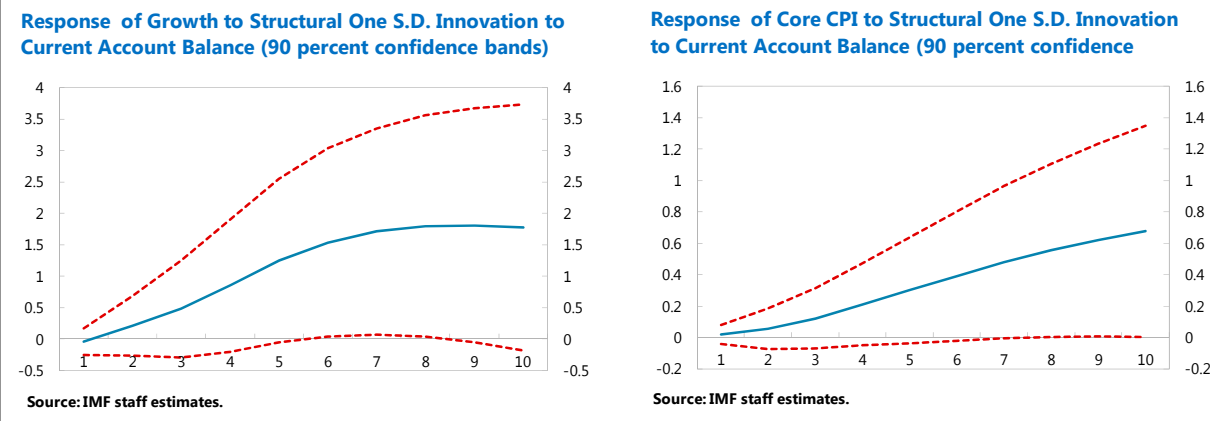
To check whether industrial production reacts to the BoJ’s monetary policy actions, we repeat the same regressions with industrial production as the economic activity variable. As we do not get statistically significant results for the same set of regressions, they are not presented here. Nevertheless, for longer horizons and with generalized impulse responses, we get some statistically significant impact on industrial production.

Alternative Specifications

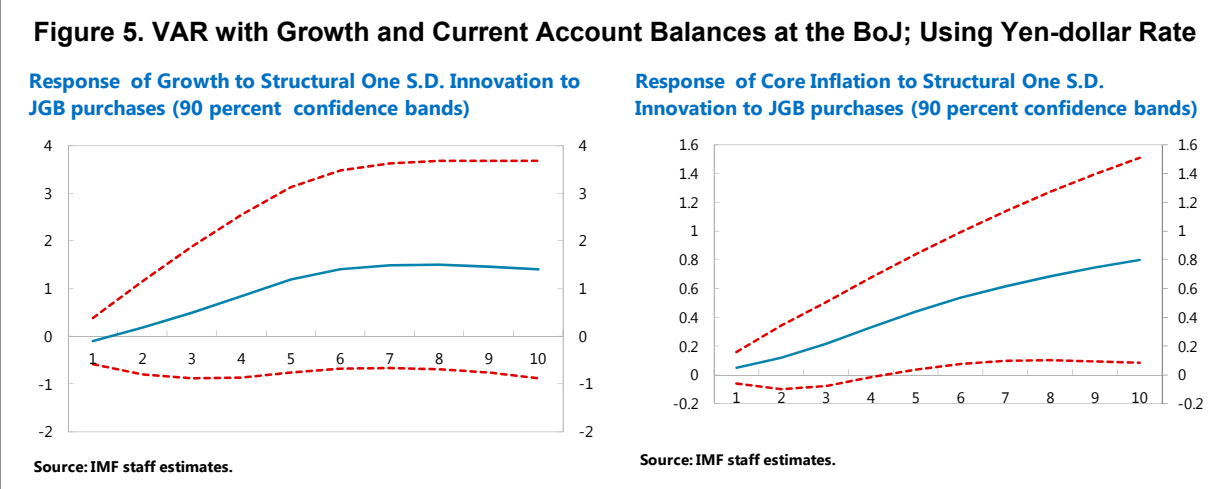
This section explores the impact of the BoJ’s monetary policy actions on economic activity and inflation using alternative specifications.

The first specification uses core inflation excluding food and energy prices rather than core inflation excluding fresh food prices. This difference might be important for the second half of 2000s, which featured sizeable oil prices movements. Figure 4 presents the results for the baseline regression with growth rate and current account balances, which are comparable to results presented in Figure 1. The impact on output is the same, while the impact on inflation is similar but slightly smaller.

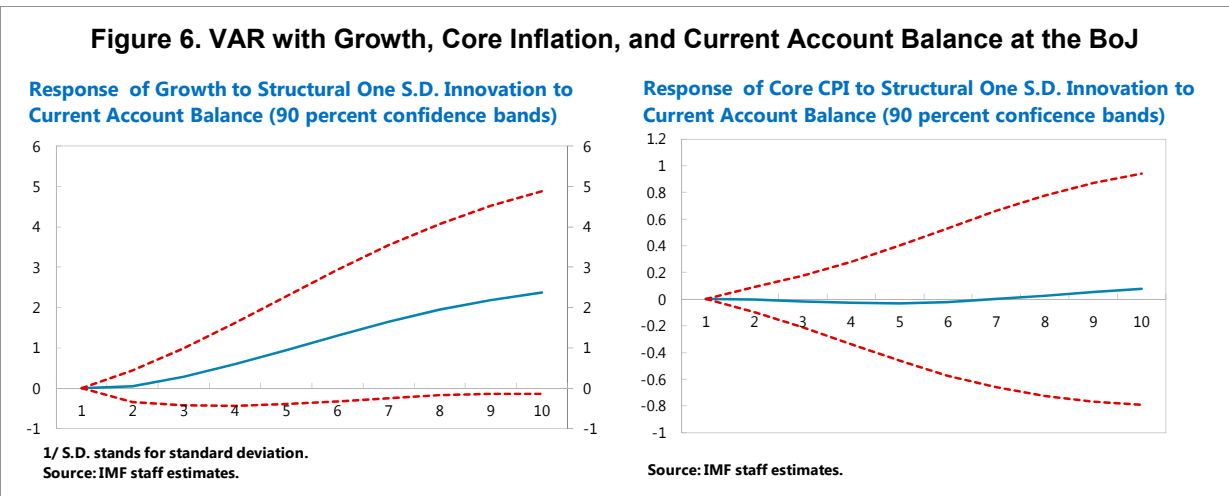
Figure 4. VAR with Growth and Current Account Balances at the BoJ; Using Core Inflation Excluding Food and Energy



Another specification is to use bilateral yen-dollar rate rather than nominal effective exchange rate. While nominal effective exchange rate is important for trade transactions, bilateral yen-dollar rate is more relevant for portfolio allocation as it commonly used for financial transactions. Figure 5 presents the accumulated impulse responses for the VAR using bilateral yen-dollar rate. The main results broadly remain intact. In terms of magnitudes, while response of growth is slightly smaller than in the baseline, the response of inflation is slightly higher.

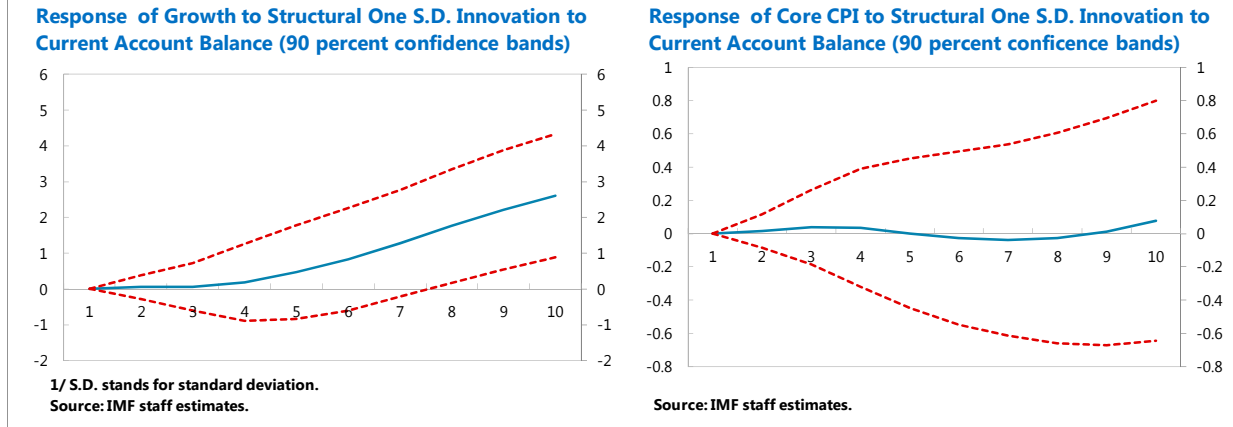


As an alternative to baseline specification, we run a more parsimonious set of VARs, using growth rate, core inflation, and monetary policy action of the BoJ. These regressions omit exchange rate, interest rate, and spreads, but have the advantage of reducing significantly the number of parameters to estimate. The identifying assumption is again that growth and inflation could be observed contemporaneously by the BoJ, but that monetary policy variables affect the endogenous macro variables with a lag. Figure 6 presents the accumulated impulse responses from a VAR using growth, core inflation excluding fresh vegetables, and current account balances at the BoJ as a share of GDP, with the same Choleski ordering. While the growth impact is exactly the same,—but no longer statistically significant—we do not detect any impact on inflation.



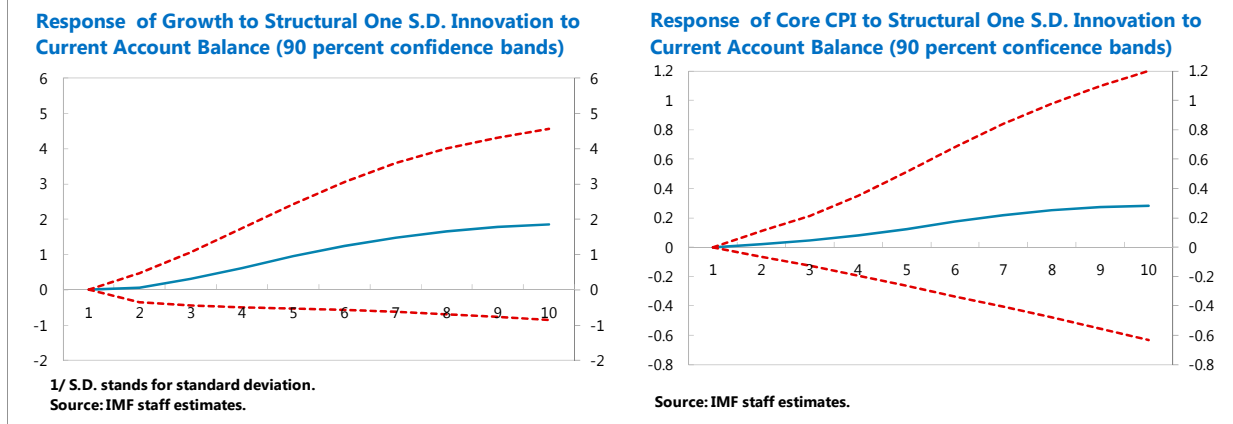
Using fewer variables in the VAR allows us to check the impact of the lag selection. The same regression is run using four lags instead of two lags. The results are similar to Figure 6 but the growth impact reaches its peak at a longer horizon (Figure 7).

Figure 7. VAR with Growth, Core Inflation, and Current Account Balance at the BoJ; Four Lags



Finally, the simple three-variable VAR is extended by adding the nominal effective exchange rate, with a Choleski decomposition ordering of growth, core inflation, current account balances at the BoJ as a share of GDP, and the nominal effective exchange rate (Peersman and Smets, 2001). This assumes that in setting its monetary policy, the BoJ looks at growth and core inflation, but not at the exchange rate, which is affected contemporaneously by all variables. Figure 8 presents the accumulated impulse responses. While the impact on growth is similar, the impact on inflation becomes visible, but still not statistically significant.

Figure 8. VAR with Growth, Core Inflation, Current Account Balance at the BoJ, and NEER



Quantitative and monetary easing appear to have no effect on the exchange rate, as we do not detect statistically significant systematic impact of the monetary policy variable on the exchange rate across the equations. This result is also consistent with recent studies. For example, Lam (2011) finds similarly that the announcement of the CME policy did not have an impact on the exchange rate. Ueda (2011) also finds no evidence that the BoJ's policy actions have had an impact on the exchange rate, which may be driven by external factors, particularly interest rate differentials, risk appetite, and safe haven flows.

In sum, the regressions find some evidence that an unexpected increase in the current account balances at the BoJ has helped support economic activity. While the impulse responses show the marginal impact of such an increase, variance decompositions of the VARs indicate that the contribution of monetary policy measures relative to other variables included in the regressions to the variability of output and inflation is small, usually less than 10 percent. This could reflect the rare occurrence of sudden and large increases in current account balances —of the magnitude of about ¥10 trillion in a quarter—, which generates a relatively small contribution to the variability of growth and inflation.

VI. CONCLUSIONS

The paper finds some evidence that recent monetary easing by the BoJ have supported economic activity, although the statistical significance varies in different estimates. Using different measures for economic activity, ranging from growth to unemployment, the VAR regressions pick up some impact on economic activity. While the evidence is still weak, these results are still an improvement over earlier findings looking at previous QE periods. The results from this paper together with the results from Baumeister and Benati (2010) suggest that the monetary policy transmission mechanism may have strengthened, possibly the result of improvements in the banking sector and deleveraging in the corporate sector.

The impact of quantitative and other monetary easing on inflation, however, is weaker. This might reflect Japan's stable inflation expectations and relatively flat Phillips curve, which requires large changes in output to move inflation. Similarly, Lam (2011) finds that recent monetary easing measures have had no statistically significant impact on inflation expectations.

The paper did not find evidence that BoJ's monetary policy measures have had an effect on the exchange rate. Therefore, any impact on economic activity is likely to work through other channels, which could include portfolio rebalancing, commitment effects, expectations, or reduction in liquidity, term or risk premia rather than the exchange rate channel.

While it is too early to assess the impact of the CME introduced last October, the results suggest that the BoJ's more recent 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 as well as the standard portfolio balancing channel. The CME policy, on the other hand, also includes purchases of risky assets, such as equities and J-REITs. While it is still too early to assess the economic impact of such purchases, their impact on asset prices may 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. Finally, this paper does not differentiate different transmission mechanisms in assessing the BoJ's monetary policy actions on economic activity. Therefore, this paper is a first step in assessing the effectiveness of policies introduced after the first quantitative easing period, and as more data become available, the effectiveness of different transmission channels, particularly through the purchases of private assets, could be better identified.

References

- Baumeister, C. and L. Benati, 2011, “Unconventional Monetary Policy and the Great Recession,” ECB Working Paper Series, No. 1258, October 2010.
- Bernanke, Ben S. and Alan S. Blinder (1992), “The Federal Funds Rate and the Channels of Monetary Transmission,” *American Economic Review*, Volume 82, Issue 4 (September), pp. 901–921.
- Christiano, L., M. S. Eichenbaum, and C.L. Evans, 2005, “Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy,” *Journal of Political Economy*, Volume 113, Issue 1, pp. 1–45.
- Chung, H. and others, 2011, “Have we Underestimated the Likelihood and Severity of Zero Lower Bound Events?” Federal Reserve Bank of San Francisco, Working Paper Series, No. 2011–01.
- Franta, M. 2011, “Identification of Monetary Policy Shocks In Japan Using Sign Restrictions within the TVP-VAR Framework”, The Bank of Japan-Institute for Monetary and Economic Studies Discussion Paper, No. 2011-E-13.
- Fujiwara, I., 2006, “Evaluating Monetary Policy When Nominal Interest Rates are Almost Zero,” *Journal of the Japanese and International Economies*, Volume 20, Issue 3, pp. 434–453.
- Inoue, T. and T. Okimoto, 2008, “Were there Structural Breaks in the Effects of Japanese Monetary Policy? Re-evaluating Policy Effects of the Lost Decade”, *Journal of the Japanese and International Economies*, Volume 22, Issue 3, pp. 320–342
- Kamada, K. and T. Sugo, 2006, “Evaluating Japanese Monetary Policy under the Non-negativity Constraint on Nominal Short-Term Interest Rates”, The Bank of Japan Working Paper Series, No. 2006-E-17.
- Lam, W.R., 2011, “Bank of Japan’s Monetary Easing Measures: Are They Powerful and Comprehensive?,” IMF Working Paper 11/264 (Washington: International Monetary Fund).
- Liu, P, and H. Mumtaz, 2012, “Changing Macroeconomic Dynamics at the Zero Lower Bound,” forthcoming Bank of England Working Paper.
- Nakajima, J., 2011, “Monetary Policy Transmission under Zero Interest Rates: An Extended Time-Varying Parameter Vector Autoregression Approach,” The Bank of Japan-Institute for Monetary and Economic Studies Discussion Paper, No. 2011–E-8.
- Peersman, G. and Smets, F, 2001, “The Monetary Transmission Mechanism in the Euro Area: More Evidence from VAR Analysis,” European Central Bank Working Paper 91.

- Rotemberg, J.J. and Woodford, M., 1998, “An Optimization Based Econometric Framework for the Evaluation of Monetary Policy: Expanded Version,” NBER Technical Working Paper 233.
- Sims, C. A., 1986, “Are Forecasting Models Usable for Policy Analysis?”, Federal Reserve Bank of Quarterly Review, pp. 2–16.
- Ueada, K., 2011, “The Effectiveness of Non-Traditional Monetary Policy Measures: The Case of the Bank of Japan”, CARF Working Paper, CARF-F-252.
- Ugai, H., 2007, “Effects of the Quantitative Easing Policy: A Survey of Empirical Analyses”, *Monetary and Economic Studies*, March.