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What does the Bank of Japan do to East Asia?

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WHAT DOES THE BANK OF JAPAN DO TO EAST ASIA?

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ABSTRACT. In recent policy debates some have argued that expansionary monetary policy in Japan can increase real output in Japan and in Japan's neighbors, while others have warned that it is a beggar-thy-neighbor policy. In this paper we estimate structural vector autoregressions to assess the effects of Japanese monetary policy shocks. We find that the effects of Japanese monetary policy shocks on macroeconomic variation in East Asia have been modest and difficult to reconcile with the beggar-thy-neighbor view. We estimate that the Asian crisis was preceded by expansionary monetary policy shocks in Japan, but we fail to find support for the view that these shocks contributed to the crisis.

1. INTRODUCTION

This paper is motivated by an ongoing debate about the effects of Japan's monetary policy on Japan and on Japan's neighbors. Economists on one side of the debate argue that expansionary monetary policy in Japan can cause an increase in real output in Japan and positive spillover effects on real output of Japan's neighbors.[1] Economists on the other side of the debate argue that expansionary monetary policy in Japan

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[1]See e.g. Bernanke (2000), Krugman (1998), McCallum (2000), Meltzer (2002), Orphanides and Wieland (2000), Svensson (2001, 2003).

is a beggar-thy-neighbor policy.[2] To give a specific example, a common view is that "loose" Japanese monetary policy aggravated the Asian crisis of 1997.[3]

Each side of the debate invokes theoretical open-economy models to support its claims. Monetary open-economy models predict that an expansionary monetary policy shock causes depreciation of the domestic currency. In addition, models with nominal rigidity predict that an expansionary monetary policy shock causes an increase in domestic real output in the short run. As regards effects of domestic monetary policy shocks on foreign real output, models with nominal rigidity make conflicting predictions. On the one hand, an increase in domestic real output tends to raise the demand for imports, causing a positive spillover effect on real output abroad. On the other hand, expansionary monetary policy causes real depreciation and thus diverts demand to domestic away from foreign goods – this is the beggar-thy-neighbor effect.[4] McKinnon and Schnabl (2002, 2003) argue that the beggar-thy-neighbor effect prevails in East Asia and that the effect can destabilize the region, which will have adverse consequences for Japan itself. Policymakers seem to share this point of view (see e.g. Fischer (2001) and Okina (1999)). Yet which of the effects prevails is ultimately an empirical question.

This paper makes an empirical contribution to the debate. We use structural vector autoregressions (SVARs) to estimate the effects of Japanese monetary policy shocks on Japan and on Japan's neighbors. With SVARs we can estimate the effects of monetary policy shocks with much weaker *a priori* restrictions than are required in calibrated or estimated equilibrium models. To identify Japanese monetary policy shocks, we use four identification schemes. We believe that robust conclusions are best achieved by examining results from more than a single identification scheme. Like both sides of the debate, in assessing the cross-border transmission mechanism for Japanese monetary policy shocks we pay special attention to the external value of the yen and to international trade.

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[2]See e.g. McKinnon and Schnabl (2002, 2003).

[3]See Corsetti, Pesenti and Roubini (1999) for a discussion.

[4]See Corsetti, Pesenti, Roubini and Tille (2000) for a model of international spillover effects of monetary policy shocks.

Both sides of the debate presume that the effects of Japanese monetary policy shocks can be large. We estimate the size of these effects. We find that domestic monetary policy shocks most likely explain at most 10% of the variation in Japan's real GDP and Japan's trade balance and at most 20% of the variation in the value of the yen with respect to the U.S. dollar in the last 40 years. 10% and 20% are non-negligible numbers, but they are modest. We find that the contribution of Japanese monetary policy shocks to the variation in real GDP and trade balances of Japan's neighbors is even more modest, most likely about 5%. Thus Japanese monetary policy shocks have historically played only a modest role as a source of fluctuations in East Asia, contrary to what both sides of the debate presume.

We find that expansionary Japanese monetary policy shocks increase real output in Japan and depreciate the yen vis-à-vis the U.S. dollar, as presumed by both sides of the debate, though these effects are uncertain and do not emerge clearly under all identification schemes.

The sides of the debate differ with respect to the sign of the international spillover effects of Japanese monetary policy shocks. We evaluate the sign of these effects. We find that an expansionary shock in monetary policy causes a decrease in net exports in Japan. Furthermore, net exports of Japan's neighbors increase in the short-run. These results suggest that Japanese monetary policy shocks do *not* have beggar-thy-neighbor effects. If beggar-thy-neighbor effects prevailed, we would expect to see an increase in net exports in Japan and a decrease in net exports in Japan's neighbors. We obtain mixed results regarding the sign of the effects of Japanese monetary policy shocks on real output in Japan's neighbors.

We evaluate the view that "loose" Japanese monetary policy aggravated the Asian crisis. We find that expansionary monetary policy shocks did occur in Japan prior to the onset of the crisis. However, these shocks most likely had economically insignificant effects on exchange rates and real output in the region.

This paper connects with the literature employing SVARs to study the international transmission of U.S. monetary policy shocks. The most important references are Kim (2001) and Canova (2005). Kim (2001) examines the impact of U.S. monetary policy shocks on the non-U.S. G-6 countries, reaching conclusions in broad agreement with ours. He finds that a U.S. expansionary monetary policy shock increases

real GDP abroad, decreases net exports in the U.S. in the short-run and increases net exports abroad in the short-run. Thus his results suggest that U.S. monetary policy shocks do not have beggar-thy-neighbor effects. Kim (2001) estimates the contribution of U.S. monetary policy shocks to the variation in trade balance in the U.S., in trade balances abroad and in real GDP abroad to be about 5%. Canova (2005) finds that U.S. monetary policy shocks have important effects on Latin America, accounting for 20-50% of the macroeconomic fluctuations there. He attributes his finding to the tight financial links between Latin America and the United States, rather than to trade linkages that are at the center of the debate regarding East Asia and of our analysis.[5]

The SVAR literature thus far studies only domestic effects of Japanese monetary policy shocks (Kim (1999)). We extend the analysis to examine the impact of Japanese monetary policy shocks on the entire region of East Asia.

The SVAR methodology relies on weaker identifying restrictions than recent studies of international spillovers in East Asia. Kwan (2001) and McKinnon and Schnabl (2002, 2003) estimate regressions consistent with the view that monetary policy shocks in Japan have beggar-thy-neighbor effects. Recent evidence from large macroeconomic models is mixed. A model of Japan, the United States and the euro area in Coenen and Wieland (2003) suggests that a noticeable recession occurs in Japan's trading partners as a consequence of monetary expansion in Japan. In contrast, the Asia-Pacific model of Callen and McKibbin (2001) predicts that monetary expansions in Japan are neutral for the region.

Section 2 of this paper presents the econometric model. Section 3 shows and discusses the results. Section 4 contains conclusions. Two appendices describe the data and the prior used in our Bayesian analysis.

[5]Cushman and Zha (1997) study monetary policy in Canada which they model as a small open economy dependent on the United States. Cushman and Zha include the Federal Funds rate among their controls but do not assess the impact of U.S. monetary policy shocks on Canada. Similarly, Del Negro and Obiols-Hums (2001) include the Federal Funds rate among their controls in the study of Mexican monetary policy. Kim and Roubini (2000) study the effects of fluctuations in the Federal Funds rate on the non-U.S. G-7 countries.

2. The model

The SVAR model that we use has the form (omitting the constant):

$$\sum_{s=0}^{p^*} A(s)y(t-s) = \epsilon(t), \tag{2.1}$$

$t = 1, .., T$, where $A(0)$ is an $M \times M$ non-singular matrix measuring contemporaneous relations between M elements of $y(t)$. The random variable $\epsilon(t)$ is Gaussian with zero mean and identity variance-covariance matrix, conditional on $y(t-s)$ for all $s > 0$. We denote with p^* the optimal lag length, to be chosen. We can estimate a reduced-form VAR with a one-step-ahead forecast error term $u(t) = A^{-1}(0)\epsilon(t)$, coefficients $B(s) = -A^{-1}(0)A(s)$ and variance-covariance matrix of the one-step-ahead forecast error term $\Omega = A^{-1}(0)\left[A^{-1}(0)\right]'$.

We conduct inference from a Bayesian perspective, as is common in the VAR literature (see e.g. Leeper, Sims and Zha (1996) and Uhlig (2005)). We take draws from the posterior pdf of the parameters of the reduced-form VAR. This pdf is a product of an inverse-Wishart density for Ω and a Gaussian density for the equations' coefficients $B(s)$ for all $s > 0$, conditional on Ω.[6] We use a variant of the prior common in the Bayesian VAR literature since the work of Sims and Zha (1998), discussed in Appendix A.

Our analysis has two steps. First, we estimate SVARs in order to uncover the effects of Japanese monetary policy shocks on real output in Japan and on the exchange rate between the yen and the U.S. dollar. The SVARs differ with respect to identifying assumptions but all include the same six variables (to be discussed below). Second, we add to the six-element-$y(t)$ from the first step a variable that measures international trade flows or economic conditions in Japan's neighbors, e.g. average output in Japan's neighbors. We reestimate the SVARs with the added variable. The goal is to uncover the effects of Japanese monetary policy shocks on trade flows and on Japan's neighbors. We also check that the estimated effects of Japanese monetary policy shocks on real output in Japan and on the value of the yen are not affected.

[6] For robustness, since Gaussianity may not the best assumption due e.g. to the Asian crisis of 1997, we draw from a multivariate t-distribution with 3 degrees of freedom instead of drawing from a Gaussian pdf.

We repeat the second step several times, using different measures of trade flows and economic conditions in Japan's neighbors.[7]

The $y(t)$ vector in the first step includes six variables common in small-size SVARs for monetary policy analysis in open economies (see e.g. Kim (1999) and Sims (1992)): real GDP in Japan, consumer price index in Japan, a world commodity price index, the money-market interest rate in Japan, money stock M1 in Japan, and the exchange rate between the yen and the U.S. dollar. All time series are expressed in logarithm, except that the interest rate is in percentage points at an annual rate. The data run from the beginning of 1963 to the end of 2002. The data are seasonally adjusted. Details of the data are given in Appendix B. We estimate all models twice using, alternatively, quarterly and monthly data.[8]

3. The effects of Japanese monetary policy shocks

3.1. **Impulse responses of real GDP in Japan and the yen-dollar exchange rate.** In the first step, we estimate the six-variable SVAR models of Japan under different identifying assumptions. We employ a number of identifying schemes because we seek robust conclusions regarding the effects of Japanese monetary policy. We begin by choosing the optimal number of lags p^* in the reduced-form version of equation (2.1). We evaluate the Laplace approximation to marginal likelihood for several candidate models with different lag lengths p. This method of choosing among models is consistent regardless of whether data are stationary or nonstationary (see Kim (1998)). We obtain $p^* = 2$ with quarterly data and $p^* = 6$ with monthly data.

Consider the estimated impulse responses of two main variables of interest to an "expansionary" shock in Japanese monetary policy. In Figure 1 we plot the impulse responses of real GDP in Japan and the exchange rate between the yen and the

[7]Kim (2001) uses a similar two-step approach in a study of international spillover effects of U.S. monetary policy. Alternatively, we could imagine estimating SVARs for a long vector $y(t)$ that included all variables of interest, from Japan and from Japan's neighbors. However, in this approach the number of parameters to be estimated would be too large relative to the sample size.

[8]For estimation with monthly data when only a quarterly series is available we interpolate the quarterly series as in Mönch and Uhlig (2005). The interpolation procedure makes use of the Kalman filter to make optimal predictions of, for example, monthly real GDP given quarterly real GDP and monthly real industrial production.

U.S. dollar, under four alternative identification schemes. The results come from estimation with quarterly data. Each column in the figure corresponds to a different identification scheme.

In the first column we plot the results from the identification scheme that we refer to as *CEE identification* after Christiano, Eichenbaum and Evans (1999).[9] These authors argue that a good model of U.S. monetary policy is that current values of some variables are not in the information set of the Federal Reserve. Alternatively, the Federal Reserve takes at least one period to react to certain variables. Here we apply this model to identify Japanese monetary policy. Following CEE, we assume that $A(0)$ is lower-triangular and we order variables in the $y(t)$ vector as follows: real GDP, CPI, commodity prices, interest rate, money supply and exchange rate. We plot the impulse responses to a *negative* shock in the interest rate set by the Bank of Japan. Thick lines are medians and thin lines are 68% and 90% probability bands, computed from 1000 posterior draws. Japan's real GDP is estimated to increase slowly, reaching a maximum about 8 quarters after the monetary easing begins, and then returning to zero consistent with long-run neutrality of money. The yen is estimated to depreciate, although the short-run response is uncertain. Money supply increases on impact and the CPI increases after delay (not shown).

The CEE identification assumes that the interest rate set by the central bank can react to fluctuations in the exchange rate only with a lag of at least one period. If the Bank of Japan in fact decreases the interest rate systematically and without delay in reaction to strengthening of the yen, the CEE identification may lead to incorrect inference. In the second column of Figure 1, we plot the results from the identification scheme that we refer to as *policy-instrument-last identification*. We retain the assumption that $A(0)$ is lower-triangular, but order the interest rate last. The only change in the results is that the yen depreciates also in the short-run. The probability that monetary easing causes an increase in real GDP and the probability that monetary easing causes depreciation of the yen are each close to 1.

In the policy-instrument-last identification all variables, including the exchange rate, are assumed to react to monetary policy shocks only with delay. We now consider an identification scheme that lets the central bank react contemporaneously to

[9] See also Eichenbaum and Evans (1995).

changes in the exchange rate and at the same time lets the exchange rate react contemporaneously to changes in monetary policy. We refer to this identification scheme as *LSZ identification* after Leeper, Sims and Zha (1996).[10] In the LSZ identification, we drop the assumption that $A(0)$ is triangular and we partition the six elements of $y(t)$ into three blocks. The block of "sluggish" variables includes real GDP, CPI and money stock. Variables in this block are postulated not to react contemporaneously to changes in variables in the other two blocks. The block of "fast-moving" variables includes commodity prices and the exchange rate. These variables are allowed to react without delay to all disturbances. The policy block includes the interest rate that is postulated not to react contemporaneously to changes in real GDP and CPI. We use importance sampling to draw from the posterior density of $A(0)$, approximated by a multivariate t-distribution with 3 degrees of freedom (see Sims and Zha (1999)).

In the third column of Figure 1 we plot the results from the LSZ identification. The median impulse responses of real GDP and the exchange rate are essentially the same under the LSZ identification as under both previously used identification schemes. However, probability bands widen. The LSZ identification suggests that the effects of Japanese monetary policy shocks on real GDP in Japan and on the external value of the yen are quite uncertain. Specifically, the probability that monetary easing causes an increase in real GDP drops to roughly 0.8. The probability that monetary easing causes depreciation of the yen drops to 0.5-0.8.

In the fourth column of Figure 1 we show the results from a *sign-restrictions identification* scheme that eschews making any zero restrictions in the matrix $A(0)$. Like Uhlig (2005), we impose identifying restrictions directly on impulse responses.[11] Observe that, in order to identify a monetary policy shock, we need to find only a single column of $A^{-1}(0)$ – call it an *impulse vector* a – that measures how the elements of $u(t)$ react to a change in a single element of the vector $\epsilon(t)$ that corresponds to the monetary policy shock. Let $\widetilde{A}$ denote the lower-triangular Choleski factor of Ω. Uhlig (2005) observes the following: since any $A^{-1}(0)$ must satisfy $\widetilde{A} = A^{-1}(0)Q$ for

[10] See also Sims (1998).

[11] For details see the discussion of identification with "pure" sign restrictions in Uhlig (2005). See also Canova and De Nicolo (2002) and Faust (1998).

some orthogonal matrix Q, it follows that $a = \widetilde{A}\alpha$ where α is a vector with norm unity.

For each of the 1000 draws from the joint posterior density of Ω and $B(s)$'s, we take 100 draws of α from the standard normal pdf, normalizing each α to have unit length. We then compute 100,000 a's and the same number of *candidate* impulse responses to an expansionary monetary policy shock. We define a *monetary policy impulse vector* to be an impulse vector a such that the impulse response generated with a of money supply is positive, of interest rate is nonpositive and of price level is nonnegative at all horizons $k = 1, ..., K$, for K that we choose *a priori*. We retain those of the $100,000$ draws that satisfy the sign restrictions. We use the retained draws to compute median impulse responses and probability bands, and discard the draws that fail to satisfy the restrictions.

We plot the results obtained with $K = 4$ in the fourth column of Figure 1. The increase in real GDP apparent in columns 1-3 vanishes. We thus confirm the insight of Uhlig (2005) that not all plausible identification schemes support the conventional wisdom that real output changes after a monetary policy shock. As regards the impulse response of the exchange rate, the median decreases somewhat while probability bands remain as wide as in column 3. The results remain unchanged when we change the value of K.

3.2. **Variance decomposition of real GDP in Japan and the yen-dollar exchange rate.** Each of the four identification schemes delivers the same conclusion regarding the contribution of shocks in Japanese monetary policy to the variation in Japan's real GDP and in the yen-dollar exchange rate. Only a modest fraction of the variance in either variable can be attributed to Japanese monetary policy shocks. Japanese monetary policy shocks most likely account for less than 10% of the variance in Japanese real GDP and for less than 20% of the variance in the yen-dollar exchange rate.[12]

[12]As a specific example, consider the LSZ identification. The fraction of the variance in Japan's GDP due to monetary policy shocks is estimated to be less than 10% with probability 0.85 at all horizons between 1 and 16 quarters.

3.3. **Discussion of the results from the first step.** The first step of our analysis yields the conclusion that Japanese monetary policy shocks account for a non-negligible but modest fraction of the variation in real GDP in Japan and in the yen-dollar exchange rate. This conclusion is robust with respect to four schemes for identifying monetary policy shocks.

The identification schemes fail to indicate robustly whether a monetary policy expansion in Japan causes an increase in real GDP and depreciation of the yen with respect to the dollar. Two out of four identification schemes indicate that these effects, presumed by both sides of the debate, are in fact uncertain. An increase in real GDP and yen depreciation emerge clearly from the policy-instrument-last identification, which allows the Bank of Japan to adjust the interest rate without delay in reaction to fluctuations in the external value of the yen. However, the effects of monetary policy shocks become uncertain after allowing for simultaneity between the interest rate set by the Bank of Japan and the exchange rate. Uncertainty increases further under the sign-restrictions identification.

3.4. **The effects on trade flows and on Japan's neighbors.** In this section we show the results from the second step of our analysis. We add to the six-element-$y(t)$ vector from the first step a variable that measures international trade flows or economic conditions in Japan's neighbors and we reestimate the SVARs. We continue employing our set of identifying schemes in the search for robust conclusions.

In the first column of Figure 2, we report the results obtained in a seven-variable VAR where the added variable is the exchange rate between the yen and the average of the currencies of Hong Kong, Korea, Malaysia, Philippines, Singapore and Thailand.[13] In the top row we display the impulse response of the added variable to an expansionary Japanese monetary policy shock under the policy-instrument-last identification. In the bottom row we show the impulse response of the added variable under the sign-restrictions identification.[14]

[13]See Appendix B for a description of how all cross-country averages used in the paper were computed. These six countries are used throughout the paper as "the neighbors of Japan". Comparable and complete data series for China, Indonesia and Taiwan could not be found.

[14]In the policy-instrument-last identification, the Japanese interest rate is allowed to react contemporaneously to fluctuations in the added variable. In the sign-restrictions identification, we

We find that the yen depreciates with respect to the currencies of Japan's neighbors by the same amount as it depreciates with respect to the U.S. dollar. The impulse responses are sharply estimated under each identification scheme. Our finding is consistent with the view that the currencies of Japan's neighbors follow the U.S. dollar after a Japanese monetary policy shock.[15] That the currencies of Japan's neighbors strengthen relative to the yen after Japanese monetary expansion plays a crucial role in the theoretical argument why Japanese monetary policy can have beggar-thy-neighbor effects.

In the second column of Figure 2, we show the results obtained in a seven-variable SVAR where the added variable is the ratio of exports to imports in Japan. Under each identification, net exports in Japan are estimated to decrease gradually, reaching a minimum about 8 quarters after the impact of an expansionary Japanese monetary policy shock, and then returning gradually to zero.[16] Under each identification, the decrease in net exports is estimated to occur with probability close to 1. When we rerun the SVARs with Japanese exports and imports entered separately, we find that the decrease in net exports is due both to an increase in imports and a decrease in exports (not shown). Domestic monetary policy shocks are estimated to account for about the same fraction of the variance in net exports in Japan as in Japan's real GDP.

The finding that net exports decrease after domestic monetary expansion is *not* consistent with beggar-thy-neighbor effects of monetary policy. If beggar-thy-neighbor effects prevailed, we would expect to see depreciation of the yen divert demand to domestic away from foreign goods. Thus we would expect to see an increase in net exports (a decrease in imports and an increase in exports). Our finding is consistent with negative comovement between income and net exports at business cycle frequencies, due to consumption and investment demand being higher in expansions

restrict the signs of the impulse responses of money supply, interest rate and price level in Japan (as in the previous sections). Furthermore, we restrict the sign of the impulse responses of the exchange rate between the yen and the U.S. dollar to be nonnegative and of world commodity prices to be nonnegative.

[15]Japanese monetary policy shocks are estimated to account for at most 20% of the variance in the exchange rate between the yen and the average of the currencies of Japan's neighbors.

[16]Net exports are expressed in real terms, so the estimates are not driven by valuation effects.

than in contractions. Observe that the dynamic path of net exports in Japan after a Japanese monetary policy shock – gradual change with maximum impact after about 8 quarters – is the same as the dynamic path of real GDP in Japan, seen in the first three columns of Figure 1.

A depreciation of the yen with respect to the U.S. dollar is often presumed to hurt exporters from Japan's neighbors who sell their products in Japan, Europe and the United States, by making those products less competitive than Japanese goods. We now check if this effect is in the data. In the third column of Figure 2, we show the results obtained in a seven-variable SVAR where the added variable is the ratio of exports to imports in Korea. Korea is by far the largest economy out of the six neighbors of Japan, accounting for about 50% of their joint GDP. The available time series data for Korea are as long as for Japan, from the beginning of 1963 to the end of 2002. In the fourth column of Figure 2, we show the results obtained in a seven-variable SVAR where the added variable is the average ratio of exports to imports in the six neighbors of Japan. Data available for this estimation run from the beginning of 1974 to the end of 2002. The results are as follows. Japanese monetary policy shocks are estimated to account for a small fraction of the variance in net exports of Japan's neighbors, most likely about 5%. As can be seen in columns 3 and 4 of Figure 2, net exports of Japan's neighbors increase initially after an expansionary shock in Japanese monetary policy. It is plausible that this effect is driven by the increase in import demand in Japan we found earlier. After a few quarters, net exports of Japan's neighbors begin to decrease. This is consistent with the initial effect becoming dominated by the appreciation of the currencies of Japan's neighbors with respect to the yen. This pattern suggests the possibility that the beggar-thy-neighbor effect may indeed show up, albeit with delay and in weak form. Unfortunately, the impulse responses in columns 3 and 4 of Figure 2 are not sharply estimated.

In Figure 3 we show the results obtained in seven-variable SVARs where the added variable is a measure of real output in Japan's neighbors. In the first column the added variable is real GDP in Korea. In the second column the added variable is average real industrial production in the six neighbors of Japan – data available for this estimation run from the beginning of 1987 to the end of 2002. The impulse response of Korean real GDP in the first row of Figure 3 is approximately the same

as the impulse responses of Japanese real GDP, shown in Figure 1. This is consistent with positive spillover effects of Japanese monetary policy shocks.[17] The impulse response of average real industrial production in the six neighbors of Japan shows movement in the opposite direction (see the first row of the second column). A possible interpretation is that negative effects of Japanese monetary expansion on industrial production abroad are outweighed by positive effects on other components of aggregate income. Neither impulse response in the first row is estimated precisely. Furthermore, neither impulse response in the second row shows significant effects of Japanese monetary policy shocks. Thus the results regarding the sign of the effect of Japanese monetary policy shocks on real output in Japan's neighbors are mixed and inconclusive. Japanese monetary policy shocks are robustly estimated to account for only a small fraction of the variance in real output of Japan's neighbors, about 5%.

3.5. **Did Japanese monetary policy shocks aggravate the Asian crisis?** Would the Asian crisis have looked differently, had there been no Japanese monetary policy shocks after some date $\widetilde{T}$ prior to the onset of the crisis? An answer is provided by simulating the estimated SVARs, "subtracting" Japanese monetary policy shocks that occurred after $\widetilde{T}$. The simulations assume constant policy, *not* constant policy-controllable variables. Only variation in policy *unpredictable* to agents as of time $\widetilde{T}$ is removed to obtain the simulated data, while keeping the part of the variation predictable as an equilibrium policy reaction function.[18] We are uncertain about the size of Japanese monetary policy shocks that occurred after $\widetilde{T}$. The simulations take this uncertainty into account. The error bands around the simulated data reflect the uncertainty both about the reduced-form parameters and the policy shocks.

The yen, which had followed an upward trend vis-à-vis the dollar, began depreciating in the middle of 1995. The depreciation continued for about three years and was perceived as having aggravated the Asian crisis. The decrease in the external value of the Japanese currency was seen as being caused by an exogenous shift to "loose" policy by the Bank of Japan, as the Bank cut its short-term interest rate during 1995

[17]The impulse response of real GDP in Korea remains unchanged when sub-samples are considered, except that error bands become wider.

[18]See Uhlig (2001) for a discussion of why "on-the-equilibrium" zero-shock projections are preferable to constant-policy-instrument projections.

from about 2.3% to 0.5% in a series of quick moves. Thus a reasonable restriction on $\widetilde{T}$ is "before the beginning of 1995".

We define $\nu(t)$ to be an artificial SVAR "innovation" given that the monetary policy shock is zero: $\nu(t) \equiv u(t) - a\epsilon^j(t)$, where $u(t)$ is the one-step-ahead forecast error term, a is the monetary policy impulse vector and $\epsilon^j(t)$ is the monetary policy shock. Taking as given $y(\widetilde{T})$, we simulate paths of $y(\widetilde{T}+s)$ for $s = 1, ..., T - \widetilde{T}$ using a modified version of equation (2.1):

$$y(t) = \sum_{s=1}^{p} B(s)y(t-s) + \nu(t) \tag{3.1}$$

with $\nu(t)$ being drawn from a Gaussian distribution with zero mean and variance-covariance matrix $\Omega - aa'$.

In Figure 4 we show the actual data (thick lines) as well as the median and 90% probability bands for the simulated data with $\widetilde{T}$ set to December 1994, under the sign-restrictions identification.[19] The probability bands show what actual data would have looked like with 90% probability, had there been no Japanese monetary policy shocks from December 1994 onwards.

The results suggest that expansionary monetary policy shocks did occur in Japan in 1995. By the end of 1995, the interest rate and the money supply in Japan cross the bounds for the projection conditional on the absence of policy shocks (see the top row of Figure 4). However, the results do not suggest that the policy shocks in 1995 made a significant contribution to the depreciation of the yen that began in that year. If anything, we find an appreciation of the Japanese currency caused by policy shocks in the first half of 1995 (see the first column in the bottom row). Most important, the results do not warrant the conclusion that the path of real GDP in Korea would have been different in the absence of Japanese monetary policy shocks (see the second column in the bottom row). The results fail to support the view that expansionary shocks in Japanese monetary policy contributed to the Asian crisis. However, it is possible that our failure to find support for this view is due in part to uncertainty

[19]The results are unchanged under the other identification schemes and for different $\widetilde{T}$'s. Before plotting, the variables in Figure 4 were converted back from logarithms to levels whenever appropriate.

associated with the estimates. Note the wide error bands for the projections in Figure 4.

3.6. **Other experiments and robustness.** We investigate the possibility of reducing the dimension of the estimated models via a Granger causal priority restriction. We test the hypothesis that Japanese variables are Granger causally prior with respect to real GDP in Korea in the seven-variable VAR model used in the second step of the analysis. We evaluate the Laplace approximation to marginal likelihood for the model with the Granger causality restriction and for the model without the restriction. We find that the model without the Granger causality restriction fits the data better. This suggests that there is non-negligible feedback to Japan's economy from Japan's neighbors. At the same time, we find that the effects of Japanese monetary policy shocks on Japanese variables estimated in the first step of the analysis remain unchanged when regional variables are included in the second step. This suggests that Japanese monetary policy does not react in a significant way to regional variables. The feedback to Japan's economy from Japan's neighbors appears to operate via non-policy variables.

Adding variables measuring economic conditions in the United States (the Federal Funds rate and U.S. real GDP) does not affect the estimated effects of Japanese monetary policy shocks. This suggests that the Bank of Japan does not adjust its interest rate systematically in responses to events in the U.S. economy. Alternatively, the events in the U.S. economy relevant for the Bank of Japan's decisions are already reflected in world commodity prices and the exchange rate between the yen and the U.S. dollar.

We investigate stability of the estimated VAR coefficients over time. We find that the models with coefficients restricted to be constant throughout the sample achieve better fit than the models that allow for a break in 1974 (the beginning of the post-Bretton Woods era) or in 1984 (the year in which papers often find evidence of a structural shift, see e.g. McConnell and Perez-Quiros (2000) and Kim and Nelson (1999)). When we reestimate the SVARs in sub-samples, we find that our conclusions regarding the effects of Japanese monetary policy shocks remain the same. The results are likewise unchanged when SVARs are estimated with monthly data instead of quarterly data and adding dummy variables for the period of the Asian crisis.

4. Conclusion

Japanese monetary policy shocks explain only a modest fraction of the variance in real output, trade balances and exchange rates in East Asia. Macroeconomic fluctuations in East Asia would not have been much different in the absence of monetary policy shocks in Japan. This finding holds under several different schemes to identify monetary policy shocks.

This result suggests skepticism regarding the views of both sides of the policy debate. Large effects of Japanese monetary policy shocks presumed in this debate are in fact unlikely. We do find support for the common view that the Asian crisis was preceded by expansionary Japanese monetary policy shocks, but fail to find evidence of significant effects of these shocks on the crisis. The estimated impulse responses suggest that Japanese monetary policy shocks do not have beggar-thy-neighbor effects.

The SVARs estimated here may be used to project the effects of contemplated future changes in Japanese monetary policy so long as such changes can be assumed to be drawn from the historical distribution of policy shocks. The use of our results to project the effects of radical changes in Japanese monetary policy would be unjustified (see Leeper and Zha (2003)).

The next step is to investigate the effects of systematic monetary policy – as opposed to policy shocks – on international transmission of shocks. It is an open question whether macroeconomic fluctuations in East Asia would have been different, had the policy rule pursued by the Bank of Japan been different.

Appendix A. Prior

This paper uses a version of the prior proposed by Sims and Zha (1998). The prior used here is implemented by introducing dummy observations in the dataset and consists of two components. (1) A "cointegration" (a "single unit root") prior is a single dummy observation that has all current and lagged values of each series set to the mean of the initial p observations (where p is the lag length) and the constant vector set to one. (2) A modified version of the Minnesota prior that treats symmetrically coefficients on own lags and lags of other variables. For each m'th variable ($m = 1, ..., M$), there are p dummy observations (indexed by $s = 1, ..., p$) of the form:

$$\begin{array}{cc} y\left(t^*_{m,1}\right) = \pi\sigma_m = y\left(t^*_{m,1} - 1\right) & s = 1 \\ y\left(t^*_{m,1} - v\right) = 0 & v > s = 1 \\ y\left(t^*_{m,s}\right) = 0, y\left(t^*_{m,s} - s\right) = \pi s^{\widetilde{\pi}}\sigma_m & s > 1 \\ y\left(t^*_{m,s} - v\right) = 0 & v \neq s \end{array}$$

where $t^*_{m,s}$ is an artificial date for a dummy observation, and σ_m is set equal to the sample standard deviation of p initial conditions for each m'th variable. All estimates assume, like Sims and Zha (1998), $\pi = 5$ and $\widetilde{\pi} = 1$.

Appendix B. Data

Datastream is the source for all data from Asia and for data on world commodity prices. The website of the Federal Reserve Bank of St.Louis is the source for all data from the United States. All data were downloaded in February 2004. Below is a list of all time series used in the paper, including their Datastream (or the Federal Reserve Bank of St.Louis) symbols.

Japan: money market interest rate JPI60B.., money supply M1 JPI34..BB, consumer price index JPI64...F, real GDP JPI99BVRG, exchange rate yen per U.S. dollar JPI..DE., exports measured in yen JPI70...A (used after seasonal adjustment by the author), imports measured in yen JPI71...A (used after seasonal adjustment by the author). All series except GDP consist of monthly observations running from January 1963 to December 2002; the GDP series consists of quarterly observations running from I:1963 to IV:2002.

Korea: exchange rate domestic currency per U.S. dollar KOI..AE., real GDP KOI99BVPH, industrial production real volume KOI66..CE, exports measured in U.S. dollars KOI70..DA

(used after seasonal adjustment by the author), imports measured in U.S. dollars KOI71..DA (used after seasonal adjustment by the author). All series except GDP consist of monthly observations running from January 1963 to December 2002; the GDP series consists of quarterly observations running from I:1963 to IV:2002.

Other Asian countries, exchange rate domestic currency per U.S. dollar: (1) Hong Kong HKI..AE., (2) Malaysia MYI..AE., (3) Philippines PHI..AE., (4) Singapore SPI..AE., (5) Thailand THXRUSD. All series consist of monthly observations running from January 1963 to December 2002.

Other Asian countries, international trade measures: (1) Hong Kong, exports measured in U.S. dollars HKI70..DA, imports measured in U.S. dollars HKI71..DA. (2) Malaysia, exports measured in domestic currency MYI70..A, imports measured in domestic currency MYI71..A. (3) Philippines, exports measured in domestic currency PHI70..A, imports measured in domestic currency PHI71..A. (4) Singapore, exports measured in domestic currency SPI70..A, imports measured in domestic currency SPI71..A. (5) Thailand, exports measured in domestic currency THI70..A, imports measured in domestic currency THI71..A. All series consist of monthly observations running from January 1974 to December 2002. All series were used after seasonal adjustment performed by the author.

Other Asian countries, industrial production real volume: (1) Hong Kong HKIPMAN.H — this time series consists of quarterly observations running from I:1982, and was interpolated by the author using monthly data on the real volume of retail sales, HKRETTOTH, available from January 1981. HKIPMAN.H and HKRETTOTH were used after seasonal adjustment by the author. (2) Malaysia MYI66...F (used after seasonal adjustment by the author), available monthly from January 1971. (3) Philippines PHI66EY.F (used after seasonal adjustment by the author), available monthly from January 1981. (4) Singapore SPIPTOT.H (used after seasonal adjustment by the author), available monthly from January 1989. A series SPINPROQH is available on a quarterly basis from I:1983 and, after seasonal adjustment and linear interpolation by the author, was used as observations from January 1987 to December 1988. (5) Thailand THIPMAN.G (used after seasonal adjustment by the author), available monthly from January 1987.

World commodity prices: index of export prices of commodities, excluding fuel, U.S. dollar-based, monthly, WDI76AXDF.

United States: real GDP GDPC1, industrial production real index INDPRO, federal funds rate FEDFUNDS. Industrial production and federal funds rate data consist of monthly observations; the GDP series consists of quarterly observations.

Seasonal adjustment, undertaken when indicated above, was performed by the author in RATS using the command X11.

Regional average time series were constructed by the author as linear combinations of time series for six neighbors of Japan: Hong Kong, Korea, Malaysia, Philippines, Singapore and Thailand. The weight for each country in the regional average was the country's share in the sum of the nominal GDP levels of all six countries (measured in U.S. dollars). The share was defined as the average share over the period 1987-2003. Raw nominal GDP series used were annual with the following Datastream symbols: HKGDPD.., KOGDPD.., MYGDPD.., PHGDPD.., SPGDPD.., THGDPD...

References

[1] Bernanke, B.S., 2000. Japanese monetary policy: a case of self-induced paralysis?, in: Posen A., Mikitani, R., (Eds.), Japan's Financial Crisis and Its Parallels to U.S. Experience, Special Report 13, Institute for International Economics, 149-166.

[2] Callen, T., McKibbin, W.J., 2001. Policies and prospects in Japan and the implications for the Asia-Pacific region. IMF Working Paper 131.

[3] Canova, F., 2005. The transmission of U.S. shocks to Latin data. Journal of Applied Econometrics, 20, 229-251.

[4] Canova, F., De Nicolo, G., 2002. Monetary disturbances matter for business cycle fluctuations in the G-7. Journal of Monetary Economics, 49, 1131-1159.

[5] Christiano, L.J., Eichenbaum, M., Evans, C.L., 1999. Monetary policy shocks: what have we learned and to what end?, in Taylor, J.B., Woodford, M. (Eds.), Handbook of Macroeconomics, Elsevier, New York.

[6] Coenen, G., Wieland, V., 2003. The zero-interest-rate bound and the role of the exchange rate for monetary policy in Japan. Journal of Monetary Economics, 50, 1071-1101.

[7] Corsetti, G., Pesenti P., Roubini, N., 1999. What caused the Asian currency and financial crisis? Japan and the World Economy, 11, 305-373.

[8] Corsetti, G., Pesenti, P., Roubini, N., Tille, C., 2000. Competitive devaluations: toward a welfare-based approach." Journal of International Economics, 51, 217-241.

[9] Cushman, D. O., Zha, T., 1997. Identifying monetary policy in a small open economy under flexible exchange rates. Journal of Monetary Economics, 39, 433-448.

[10] Del Negro, M., Obiols-Hums, F., 2001. Has monetary policy been so bad that it is better to get rid of it? The case of Mexico. Journal of Money, Credit and Banking, 33, 404-433.

[11] Eichenbaum, M., Evans, C.L., 1995. Some empirical evidence on the effects of monetary policy shocks on exchange rates." Quarterly Journal of Economics, 110, 975-1010.

[12] Faust, J., 1998. The robustness of identified VAR conclusions about money. Carnegie-Rochester Conference Series on Public Policy, 49, 207-44.

[13] Fischer, S., 2001. Comments and discussion. Brookings Papers on Economic Activity, 2, 161-166.

[14] Kim, J.-Y., 1998. Large sample properties of posterior densities, Bayesian Information Criterion and the likelihood principle in nonstationary time series models. Econometrica, 66, 359-380.

[15] Kim, S., 1999. Do monetary policy shocks matter in the G-7 countries? Using common identifying assumptions about monetary policy across countries. Journal of International Economics, 48, 387-412.

[16] Kim, S., 2001. International transmission of U.S. monetary policy shocks: evidence from VAR's. Journal of Monetary Economics, 48, 33-372.

[17] Kim, C.-J., Nelson, C.R., 1999. Has the U.S. economy become more stable? A Bayesian approach based on a Markov-switching model of the business cycle. The Review of Economics and Statistics, 81, 608-616.

[18] Kim, S., Roubini, N., 2000. Exchange rate anomalies in the industrial countries: a solution with a structural VAR approach. Journal of Monetary Economics, 45, 561-586.

[19] Krugman, P.R., 1998. It's baaack! Japan's slump and the return of the liquidity trap. Brookings Papers on Economic Activity, 2, 137-187.

[20] Kwan, C.-H., 2001. Yen Bloc: Toward Economic Integration in Asia. Brookings Institution, Washington, D.C.

[21] Leeper, E. M., Sims, C.A., Zha, T., 1996. What does monetary policy do?" The Brookings Papers on Economic Activity, 2, 1-48.

[22] Leeper, E. M., Zha, T., 2003. Modest policy interventions. Journal of Monetary Economics, 50, 1673-1700.

[23] McCallum, B. T., 2000. Theoretical analysis regarding a zero lower bound on nominal interest rates. Journal of Money, Credit and Banking, 32, 870-904.

[24] McConnell, M. M., Perez-Quiros, G., 2000. Output fluctuations in the United States: what has changed since the early 1980's?" American Economic Review, 90, 1464-1476.

[25] McKinnon, R., Schnabl, G., 2002. Synchronized business cycles in East Asia: fluctuations in the yen/dollar exchange Rate and China's stabilizing role. Working paper, Stanford University and Tuebingen University.

[26] McKinnon, R., Schnabl, G., 2003. Synchronized business cycles in East Asia and fluctuations in the yen/dollar exchange rate. The World Economy, 26, 1067-1088.

[27] Meltzer, A.H., 2002. Japan's monetary and economic policy. Working paper, Carnegie Mellon University.

[28] Mönch, E., Uhlig, H., 2005. Towards a monthly business cycle chronology for the euro area. Journal of Business Cycle Measurement and Analysis, 2, 43-69.

[29] Okina, K., 1999. Monetary policy under zero inflation: a response to criticisms and questions regarding monetary policy. Bank of Japan Monetary and Economic Studies, 17, 157-182.

[30] Orphanides, A., Wieland, V., 2000. Efficient monetary policy design near price stability. Journal of the Japanese and International Economics, 14, 327-365.

[31] Sims, C.A., 1992. Interpreting the macroeconomic time series facts: the effects of monetary policy. European Economic Review, 36, 975-1000.

[32] Sims, C.A., 1998. The role of interest rate policy in the generation and propagation of business cycles: what has changed since the 30's?, in: Fuhrer, J.C., Schuh, S. (Eds.), Beyond Shocks: What Causes Business Cycles? Federal Reserve Bank of Boston, Boston.

[33] Sims, C.A., Zha, T., 1998. Bayesian methods for dynamic multivariate models. International Economic Review, 49, 949-968.

[34] Sims, C.A., Zha, T., 1999. Error bands for impulse responses. Econometrica, 67, 1113-1156.

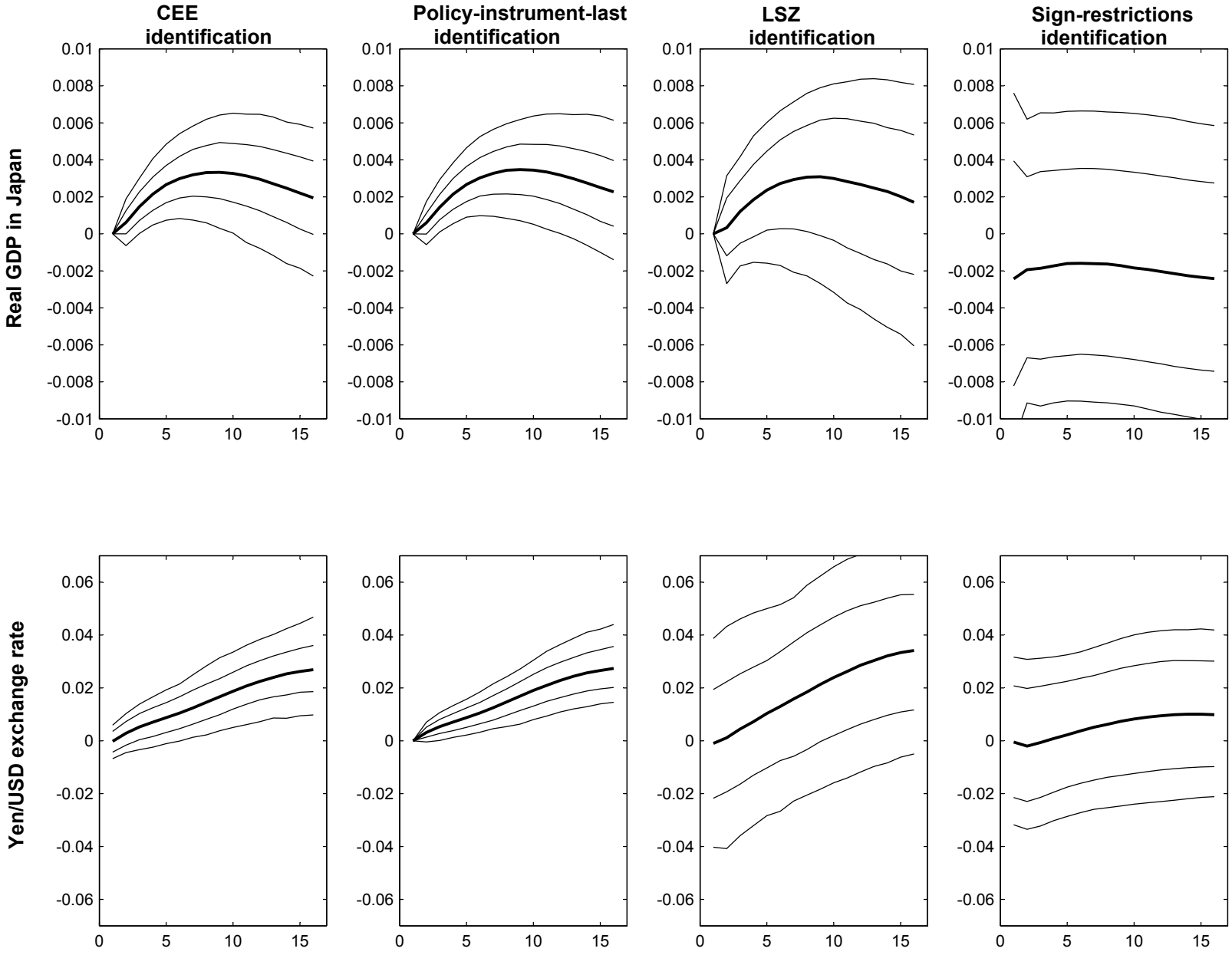
[35] Svensson, L.E.O., 2001. The zero-bound in an open economy: a foolproof way of escaping a liquidity trap. Bank of Japan Monetary and Economic Studies, 19(S-1), 277-312.

[36] Svensson, L.E.O., 2003. Escaping from a liquidity trap and deflation: the foolproof way and others. Journal of Economic Perspectives, 17, 145-166.

[37] Uhlig, H., 2001. Did the Fed surprise the markets in 2001? A case study for VARs with sign restrictions. Working paper, Humboldt University Berlin.

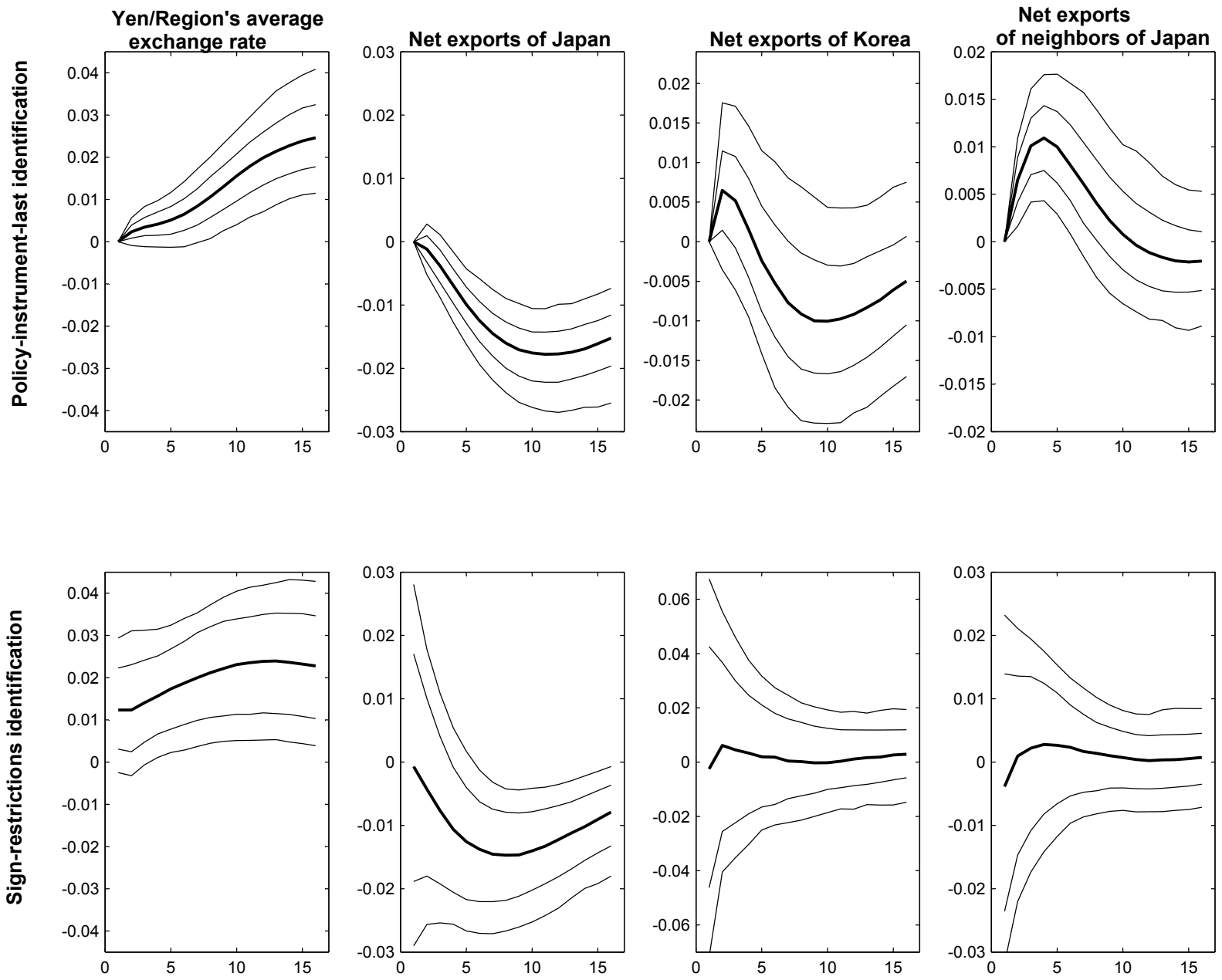
[38] Uhlig, H., 2005. What are the effects of monetary policy on output? Results from an agnostic identification procedure. Journal of Monetary Economics, 52, 381-419.

Figure 1: Impulse responses to an expansionary shock in Japanese monetary policy



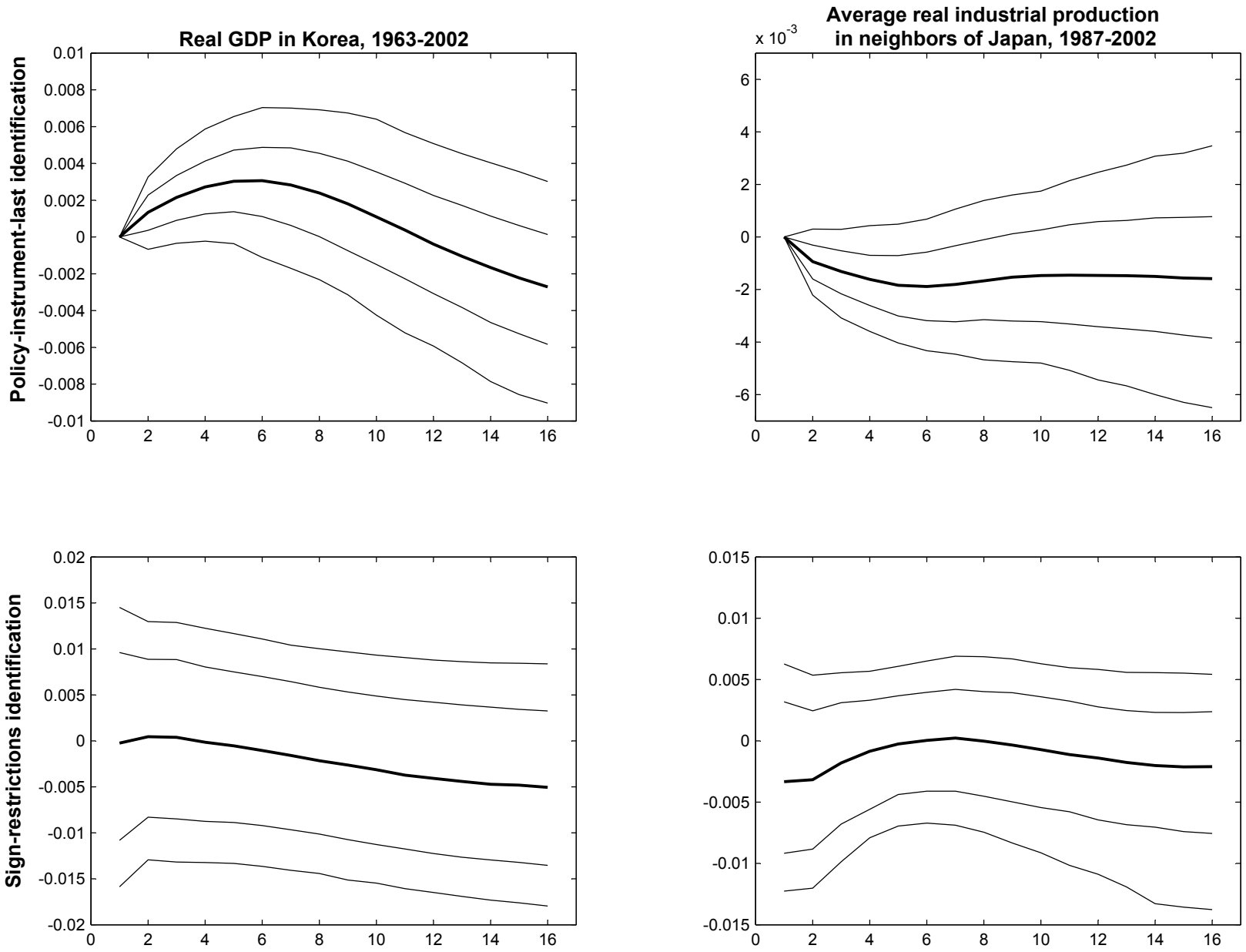
Each column shows impulse responses of real GDP in Japan (top row) and the yen-USD exchange rate (bottom row) over 16 quarters (with 68% and 90% probability bands) to a one-standard-deviation expansionary shock in Japanese monetary policy.
The columns differ with respect to the identifying assumptions.

Figure 2: Impulse responses to an expansionary shock in Japanese monetary policy



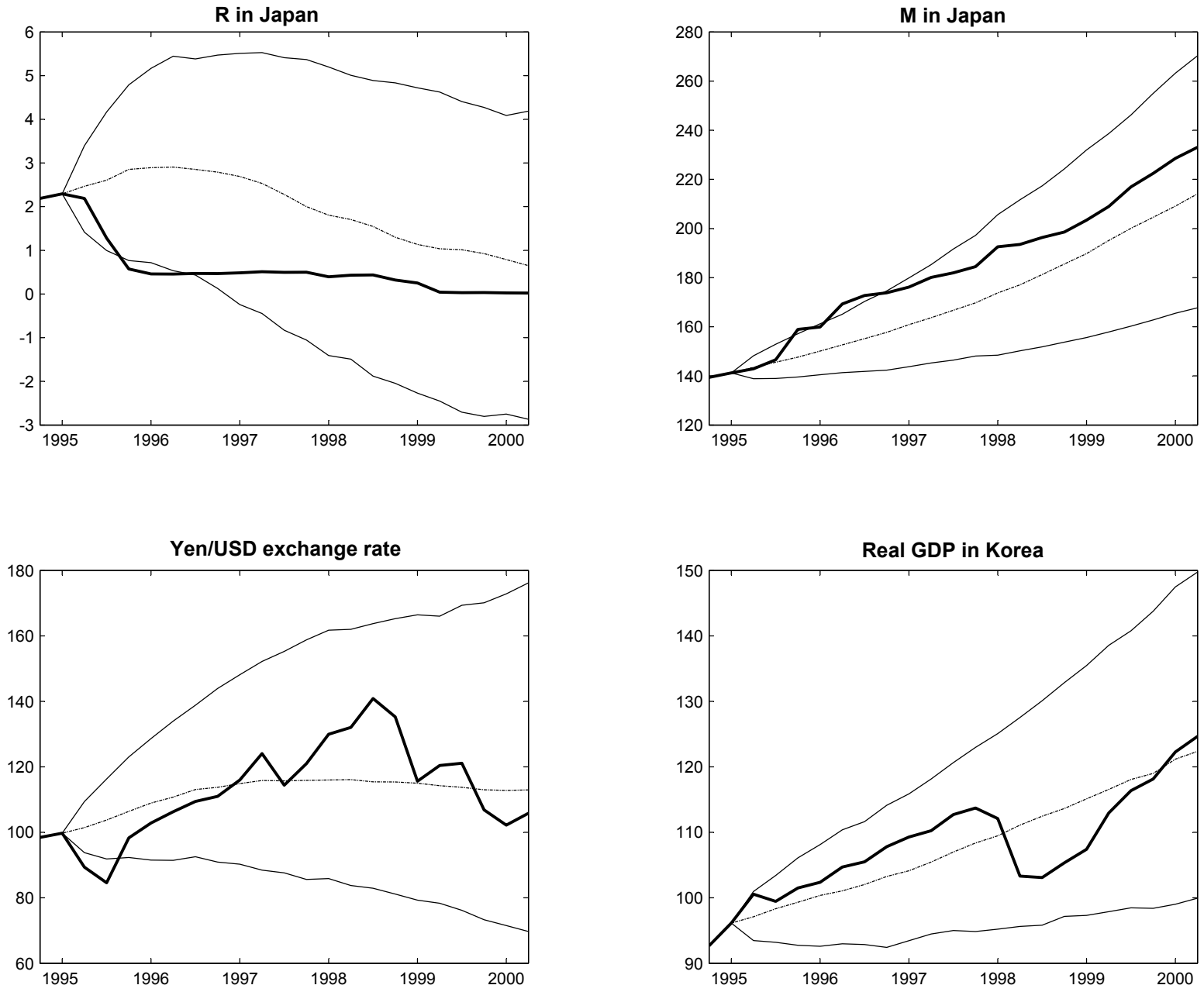
Each row shows impulse responses of measures of currency value and trade over 16 quarters
(with 68% and 90% probability bands) to a one-standard-deviation expansionary shock in Japanese monetary policy.
The rows differ with respect to the identifying assumptions.

Figure 3: Impulse responses to an expansionary shock in Japanese monetary policy



Each row shows impulse responses of real GDP in Korea and of average real industrial production in Japan's neighbors, over 16 quarters (with 68% and 90% probability bands), to a one-standard-deviation expansionary shock in Japanese monetary policy.
The rows differ with respect to the identifying assumptions.

Figure 4: Simulated data without Japanese monetary policy shocks



Thick lines: data. Thin lines: median (dashed) and 90% probability bands for a projection, as of the end of 1994, of what data would have looked like, had there been no Japanese monetary policy shocks from then onwards.

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