E C O N O M I C S B U L L E T I N

Are the fiscal and monetary policies of the G-7 countries effective in decreasing the U.S. trade deficit?

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Abstract

The U.S. trade deficit is a major concern for the G-7 countries. However, it is unclear whether their fiscal and monetary policies are effective in this regard. We examine the relationship between the U.S. trade balance and the G-7 countries f policy variables by constructing an eight-dimensional version of the structural vector autoregression (SVAR) model. Our empirical results suggest that a reduction in the U.S. fiscal deficit is not such a reliable instrument for reducing the U.S. trade imbalance. Contrastingly, monetary tightening in the U.S. can reduce its trade deficit. Non-U.S. policy shocks are ineffective, while decline in the U.S. dollar plays an important role in reducing the U.S. trade deficit.

The author gratefully acknowledges the valuable comments of Prof. Eiji Ogawa and the seminar participants. Any remaining errors are the author fs own responsibility.
Citation: Nishigaki, Hideki, (2008) "Are the fiscal and monetary policies of the G-7 countries effective in decreasing the U.S. trade deficit?." *Economics Bulletin*, Vol. 6, No. 27 pp. 1-13
Submitted: May 22, 2008. **Accepted:** July 3, 2008.
URL: http://economicsbulletin.vanderbilt.edu/2008/volume6/EB-08F30043A.pdf

1. Introduction

Recently, the global current account imbalances have attracted considerable attention in the international financial market. The U.S. current account deficit has increased considerably, exceeding 6% of the GDP in 2006. Following the subprime crisis, the U.S. economy has decelerated and the U.S. dollar has declined. On the other hand, the U.S. current account deficit decreased to 5% of the GDP in the third quarter of 2007.

However, the current level of the U.S. deficit remains high, and considerable attention has been paid to the causes and sustainability of the resulting global imbalances.

Global imbalances constitute a key issue in international cooperation, and it has often been a topic of focus among the group of the seven leading industrial nations (known as the Group of Seven or G-7). In addition, many observers have indicated several measures for adjusting the global imbalances. However, they are not necessarily certain as to which measure would be the most effective and the manner in which the related variables could change in case the unwinding of global imbalances occurs.

There exists abundant theoretical and empirical literature regarding the determination of current account balances. In particular, policymakers have considerable interest in the impact that fiscal and monetary policies have on the current account. Several studies consider the U.S. budget deficit to be an important factor in the economy's external imbalances (Cline, 2005; Chinn, 2005; Chinn and Ito, 2005). In other words, it is believed that if the U.S. government reduces its fiscal deficit, the global imbalance will unwind. However, other analyses based on simulation models suggest that the budget deficit may not, in fact, play a central role (Erceg et al., 2005; Ferguson, 2005). For example, Erceg et al. (2005) find that a 1% increase in the fiscal deficit expands the current account deficit by 0.2%. Historically, movements in the general government surplus and the current account balance have rarely been identical (Bems et al., 2007). Kim and Roubini (2004) discovered that government deficits and spending shocks have a positive effect on trade balance. Bussiere et al. (2005) performed a cross-country analysis of current account imbalances and government deficits and discovered that a 1% reduction in a country's government deficit leads to less than a 0.1% improvement in its current account.

The fact that fiscal policy has a fairly small effect on trade balance indicates that private demand is negatively correlated with public demand (government expenditure). In general, it can be considered that larger fiscal deficits tend to penalize growth. Van Aarle and Garretsen (2003) found some favorable evidence supporting the existence of a non-linear effect in the short-run effects of government consumption on private

spending. Carmignani (2008) demonstrates that fiscal policy has Keynesian effects in transition economies and non-Keynesian effects in high-income OECD economies.

With respect to monetary policy, monetary expansion will lead to an increase in the domestic demand for imports, resulting in the short-run worsening of the trade balance. On the other hand, the monetary expansion also leads to a nominal exchange rate depreciation, contributing to the long-run improvement of the trade balance (Kim, 2001).

In this paper, we explore effective measures for reducing the U.S.'s external deficits. In particular, we focus on the policy variables of the G-7 countries, namely, the U.S., Japan, Germany, the U.K., France, Italy, and Canada. Based on our empirical analyses, we will suggest the most effective measures that policymakers should employ.

This paper is organized as follows. Section 2 explains the VAR modeling and empirical methodology. Section 3 presents a preliminary analysis and the estimation results. Section 4 summarizes the results and concludes the paper.

2. Methodology

We take into consideration several factors that are likely to affect the global current account imbalances. We use a structural vector autoregression (SVAR) model to estimate their effects.

In our VAR model, we consider the following eight factors: (1) U.S. fiscal policy (USG), (2) U.S. monetary policy (FF), (3) fiscal policies of the non-U.S. G-7 countries (OGC) (4) policy rates of the non-U.S. G-7 countries (OR) (5) U.S. nominal effective exchange rate (ER), (6) U.S. real GDP (USY) (7) real GDP of the non-U.S. G-7 countries (OY), and (8) ratio of the U.S. trade balance to GDP (BOP).

USG was obtained from the Bureau of Economic Analysis and Table 3.2 of the federal government's records of the current receipts and expenditures. The fiscal balance was calculated as a percentage of the GDP. FF represents the federal funds rate, which was obtained from the Federal Reserve Bank (FRB). Kim (2001) and Bems et al. (2007) used the nominal data to estimate the Fed's monetary policy. OGC represents the ratio of government consumption to GDP for the non-U.S. G-7 countries, obtained from OECD-statistics. To determine OR, we calculated the G-7 countries' policy rates by weighting their individual key rates by their respective nominal GDPs. Each country's policy rate and GDP was obtained from Datastream. ER is the nominal foreign exchange value of the dollar (for the major currencies), acquired from the FRB. BOP represents the net trade balance/GDP ratio. Data on the U.S. balance of goods and services was obtained from the U.S. International Transactions Accounts Data, Bureau

of Economic Analysis.

Our identifying assumptions involve the contemporaneous coefficient matrix and can be summarized in the following equations, which link the reduced-form errors to the structural shocks .

$$Ae = Bu \quad \therefore e = A^{-1}Bu = Cu$$

$$\begin{bmatrix} e^{USY} \\ e^{OY} \\ e^{USG} \\ e^{FF} \\ e^{OGC} \\ e^{OR} \\ e^{ER} \\ e^{BOP} \end{bmatrix} = \begin{bmatrix} c(11) & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ c(21) & c(22) & 0 & 0 & 0 & 0 & 0 & 0 \\ c(31) & 0 & c(33) & 0 & 0 & 0 & 0 & 0 \\ c(41) & 0 & c(43) & c(44) & 0 & 0 & 0 & 0 \\ 0 & c(52) & c(53) & 0 & c(55) & 0 & 0 & 0 \\ 0 & c(62) & 0 & c(64) & c(65) & c(66) & 0 & 0 \\ c(71) & c(72) & c(73) & c(74) & c(75) & c(76) & c(77) & 0 \\ c(81) & c(82) & c(83) & c(84) & c(85) & c(86) & c(87) & c(88) \end{bmatrix} \begin{bmatrix} u^{USY} \\ u^{OY} \\ u^{USG} \\ u^{FF} \\ u^{OGC} \\ u^{OR} \\ u^{ER} \\ u^{BOP} \end{bmatrix} \quad (1)$$

In the above equations, e_j represent the residuals in the reduced-form VAR equations and u_j represent the structural disturbances.

The first equation depicts the U.S. real GDP. We treat USY as being exogenous to the policy variables and assume that

$c(12) = c(13) = c(14) = c(15) = c(16) = c(17) = c(18) = 0$.

The second equation depicts the real GDPs of the non-U.S. G-7 countries. Based on the global business cycle, we consider their GDPs to be correlated with the U.S. GDP ($c(21) > 0$).

The third equation depicts the U.S. fiscal policy. We treat USG such that it is affected by the U.S. business cycle. The government budget balance, particularly the revenues, is pro-cyclical. For example, if the U.S. GDP increases, the U.S. fiscal account will also improve ($c(31) > 0$).

The fourth equation depicts the U.S. monetary reaction function. FF will be raised if the real GDP increases to a level above the target level of the FRB. Thus, the expected sign of $c(41)$ is positive. Further, $c(43)$ depicts the reaction of the monetary policy (FF) to the fiscal policy (USG). The sign can be either positive or negative. If Fed's monetary policy accommodates fiscal expansions, the sign of the coefficient is positive ($c(43) > 0$). However, if the interdependence between the two policies is asymmetric, the sign of the coefficient is negative ($c(43) < 0$). We assume that FF is not directly

affected by foreign factors.

The fifth equation depicts the government consumption levels of the non-U.S. G-7 countries. We regard these to be directly affected by both their respective GDPs and the U.S. fiscal policy. We assume that the U.S. fiscal policy and the non-U.S. G-7 countries' fiscal policies are correlated because the U.S. is the world's largest open economy. The expected signs of $c(52)$ and $c(53)$ are negative.

The sixth equation depicts the policy rates of the non-U.S. G-7 countries. The policy rates are assumed to be directly affected by both their respective business cycles and the U.S. monetary policy. The expected signs of $c(62)$ and $c(64)$ are positive. Furthermore, the policy rates move simultaneously with their fiscal policies. The sign of $c(65)$ can be either positive or negative.

The seventh equation depicts the U.S. effective exchange rate. First, we assume that the movements in the exchange rate reflect the business conditions ($c(71) > 0, c(72) < 0$) or the interest rates ($c(74) > 0, c(76) < 0$). That is, the U.S. dollar will appreciate consequent to both an increase in the U.S. GDP or federal funds rate and decreases in the non-U.S. GDPs or non-U.S. interest rates. Second, we consider that the change in the dollar rate is affected by the U.S. fiscal account. Many empirical analyses demonstrate that fiscal account deficits cause dollar appreciation according to the twin deficit hypothesis. However, Kim and Roubini (2004) find that fiscal account deficit shocks cause dollar depreciation according to the twin divergence hypothesis. Therefore, the signs of $c(73)$ and $c(75)$ can be either positive or negative.

The last equation depicts the U.S. trade balance to GDP (BOP). We treat BOP such that it is affected by all the variables. An increase in the U.S. GDP, a decline in the non-U.S. GDPs, and dollar appreciation will deteriorate the U.S. trade account. Thus, the expected signs are as follows: $c(81) < 0, c(82) > 0, c(87) < 0$.

On the other hand, on the basis of the twin deficit hypothesis or the positive relation that exists between the current account and government saving ($c(83) > 0, (85) > 0$), the current account and fiscal account are correlated in terms of the identity relationship between them.

Moreover, there are co-movements between the financial account (=–current account) and interest rate. That is, an increase in the interest rate will expand the capital inflow, which in turn, will result in an increase in the current account deficit. Thus, the expected signs are as follows: $c(84) < 0, c(86) > 0$.

We added a linear trend in the VAR model. Our VAR model was estimated with four

lags[1]. We used quarterly observations from 1982:2 to 2007:3[2]. The variables USY, OY, and ER are converted into natural logarithms. Prior to conducting the SVAR analysis, we tested the order of integration for all the time series. We considered all the variables to be integrated to the order of one. Our model is estimated in first differences[3].

3. Estimation results

3.1 The estimated contemporaneous effects

Table 1 illustrates the estimated contemporaneous effects of the specification shown in equation (1). The specification is over-identified; however, the likelihood ratio (LR) test for over-identification verifies the validity of our restrictions. Overall, the results support the validity of the proposed model. In the specifications, many coefficients have the expected signs. In particular, the signs of $c(43)$, $c(52)$, $c(53)$, $c(62)$, $c(64)$, and $c(76)$ are significant at the 1% level.

The result wherein the sign of $c(43)$ is positive indicates that the Fed's monetary policy is complementary to the government's policy.

The empirical result wherein the sign of $c(52)$ is negative indicates that the fiscal policies of the non-U.S. countries are correlated with their respective business cycles. Thus, if the economy is robust, government expenditure will be less.

The estimation result wherein the sign of $c(53)$ is significant indicates that the overseas fiscal policies are also complementary to the U.S. government's policy. The result that the sign of $c(62)$ is significant indicates that the non-U.S. monetary policies are affected by the respective business cycles. The sign of $c(64)$ is positive at the 1% significance level. This empirical result indicates that there exists a channel of international spillover effects of monetary policy. Finally, the sign of $c(76)$ is unexpectedly positive at the 1% significance level, which is puzzling. The reason why this paradoxical correlation occurs may be that our specifications are subject to the price puzzle; under monetary contraction, the price level increases unexpectedly.

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[1] Although the lag length tests (Akaike information criterion (AIC) and Schwarz Bayesian information criterion (SBIC)) indicated that such long lags would be optimal, we chose a lag length of four. Our basic conclusion did not depend on lag length.

[2] Several previous studies were conducted from 1982:2 onward. According to Clarida et al. (2000), there has been a change in the formulation of the monetary policy. Fisher (2006) and Bems et al. (2007) examined the factors affecting the U.S. external imbalances based on samples obtained from 1982:2 onward.

[3] We checked for the possibility that a six-variable system might be cointegrated. Vector cointegrating regressions did not indicate stationary residuals based on the augmented Dickey-Fuller (ADF) test suggested by Engle and Granger (1987).

3.2 Impulse response

We consider the policy variables that are important in explaining the policy variable BOP. Figure 1 displays the responses of BOP to a one-standard deviation innovation of a particular structural shock to all the variables over a twenty-quarter period. It includes ±2 standard error bands. With respect to the U.S. fiscal policy shock (Shock 3), a reduction in the U.S. budget deficit could improve the U.S. net trade balance. A 1% increase in USG leads to a 0.1% improvement in the U.S. trade deficit/GDP in the first four quarters and 0.2% improvement in the first 2 years. This estimation result is consistent with that in Erceg et al. (2005). The effect is not statistically significant.

Regarding the U.S. monetary policy shock (Shock 4), tightening of the monetary policy can decrease the U.S. net trade deficit. This result is inconsistent with that in Kim (2001). A 1% hike in the federal funds rate leads to a 0.4% improvement in the U.S. net trade deficit/GDP in the first 2 years.

As regards the non-U.S. G-7 countries' policy shocks (Shocks 5 and 6), the effects are not statistically significant although the signs are as expected. Interestingly, an increase in OGC can expand the U.S. trade deficit. This implies that an increase in OGC can decrease the real GDPs of the non-U.S. G-7 countries (non-Keynesian effects[4]), resulting in improvements in their trade accounts or deterioration in the U.S. trade account. Although monetary easing in the non-U.S. G-7 countries can cause the U.S. dollar to appreciate in the long run, it can also increase domestic demand in the countries in the short run. Thus, monetary easing by these countries can help decrease the U.S. trade deficit. Finally, with an ER shock (Shock 7), the depreciation of the dollar could improve the net trade balance. A 10% depreciation in ER will lead to a 0.7% improvement in the US net trade deficit/GDP in the first 2 years and 1.1% improvement in the first 3 years[5].

The impulse response results indicate that a reduction in the U.S. fiscal deficit is not such a reliable instrument for reducing the U.S. imbalances, since the effect of the adjustment is not significant. However, monetary tightening in the U.S. can help reduce the U.S. trade deficit. Further, the most effective policy appears to be dollar depreciation.

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[4] Giavazzi and Pagano (1996) report on the basis of a sample of OECD countries over the period 1970–1992. While they find that the fiscal policy has Keynesian effects during normal times, it has non-Keynesian effects outside of the normal times. Our estimation result may have been caused by the fact that several of the non-U.S. G-7 countries were experiencing fiscal structural problems and were not within the normal times during our estimation periods.

[5] When we used the real effective exchange rate, we found that the impact on BOP was larger.

Our results are robust for many alternative specifications such as the one in which the order of the eight variables is reversed.

Next, based on the results of the impulse response, we suggest the measures that should be employed for unwinding the U.S. trade imbalance. The forecast error variance decomposition is presented in Table 2. The relatively effective measures for adjusting the U.S. trade account involve the U.S. fiscal policy (shock 3), U.S. monetary policy (shock 4), and change in the U.S. dollar (shock 7).

Policymakers cannot directly affect the GDP. We consider, for example, the combination of U.S. fiscal tightening and a hike in the federal funds rate. Specifically, the sizes of the given shocks of these variables are as follows: 2% increase in USG and 2% increase in the federal funds rate. Should these policy shocks be applied, the U.S. trade deficit/GDP would improve by only 1.2% in 2 years. However, at the same time, if the shock of a 10% depreciation for RE is applied, the U.S. trade deficit/GDP would improve by 1.9% in 2 years.

4. Conclusion

The objective of this paper was to examine the relationship between the U.S. trade balance and the policy variables of the G-7 countries by constructing an eight-dimensional version of the SVAR model. Several important conclusions were derived from our analysis.

First, our empirical results suggest that a reduction in the U.S. fiscal deficit is not such a reliable instrument for reducing the U.S. imbalances, since the effect of the adjustment is not significant. However, monetary tightening in the U.S. can more effectively reduce the U.S. trade deficit.

Second, with respect to non-U.S. policy shocks, reduction in government consumption cannot help reduce the U.S. trade deficit. It is necessary to examine the effect of private demand (investment or consumption) on the U.S. trade account in future studies. In addition, we cannot rely on the adjustment effect of the monetary policies of the non-U.S. countries. The estimation results wherein the policies of the non-U.S G-7 countries are not significant may be consistent with the fact that the counterpart of the large U.S. current account deficit is no longer surpluses primarily in Germany and Japan but rather a surplus in the emerging market countries as a group. An analysis incorporating the policy factors of the emerging countries remains a challenge for future studies.

Third, decline in the U.S. dollar plays an important role in attaining the goal of reducing the U.S. trade deficit. The dollar decline shock implies that the G-7 countries should not intervene either.

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Table 1 Estimated Contemporaneous Effects

	Expected sign	Coefficient	Std. Error	z-Statistic	Prob.	
C(21)	+	0.183	0.079	2.333	0.020	**
C(31)	+	5.321	12.239	0.435	0.664	
C(41)	+	18.409	9.577	1.922	0.055	*
C(43)	?	0.203	0.077	2.624	0.009	***
C(52)	-	-0.733	0.212	-3.468	0.001	***
C(53)	-	-0.006	0.001	-4.648	0.000	***
C(62)	+	20.973	7.050	2.975	0.003	***
C(64)	+	0.204	0.054	3.761	0.000	***
C(65)	?	0.951	2.875	0.331	0.741	
C(71)	+	0.372	0.586	0.635	0.525	
C(72)	-	-1.726	0.775	-2.229	0.026	**
C(73)	?	0.007	0.005	1.430	0.153	
C(74)	+	-0.005	0.006	-0.870	0.384	
C(75)	?	-0.461	0.322	-1.432	0.152	
C(76)	-	0.039	0.010	3.892	0.000	***
C(81)	-	6.483	4.893	1.325	0.185	
C(82)	+	-7.381	6.614	-1.116	0.265	
C(83)	+	0.067	0.043	1.562	0.118	
C(84)	-	-0.051	0.052	-0.982	0.326	
C(85)	+	-3.627	2.714	-1.336	0.182	
C(86)	+	0.144	0.091	1.588	0.112	
C(87)	-	-0.249	0.826	-0.301	0.763	
C(11)	+	0.004	0.000	14.283	0.000	***
C(22)	+	0.004	0.000	14.283	0.000	***
C(33)	+	0.547	0.038	14.283	0.000	***
C(44)	+	0.428	0.030	14.283	0.000	***
C(55)	+	0.008	0.001	14.283	0.000	***
C(66)	+	0.245	0.017	14.283	0.000	***
C(77)	+	0.025	0.002	14.283	0.000	***
C(88)	+	0.209	0.015	14.283	0.000	***

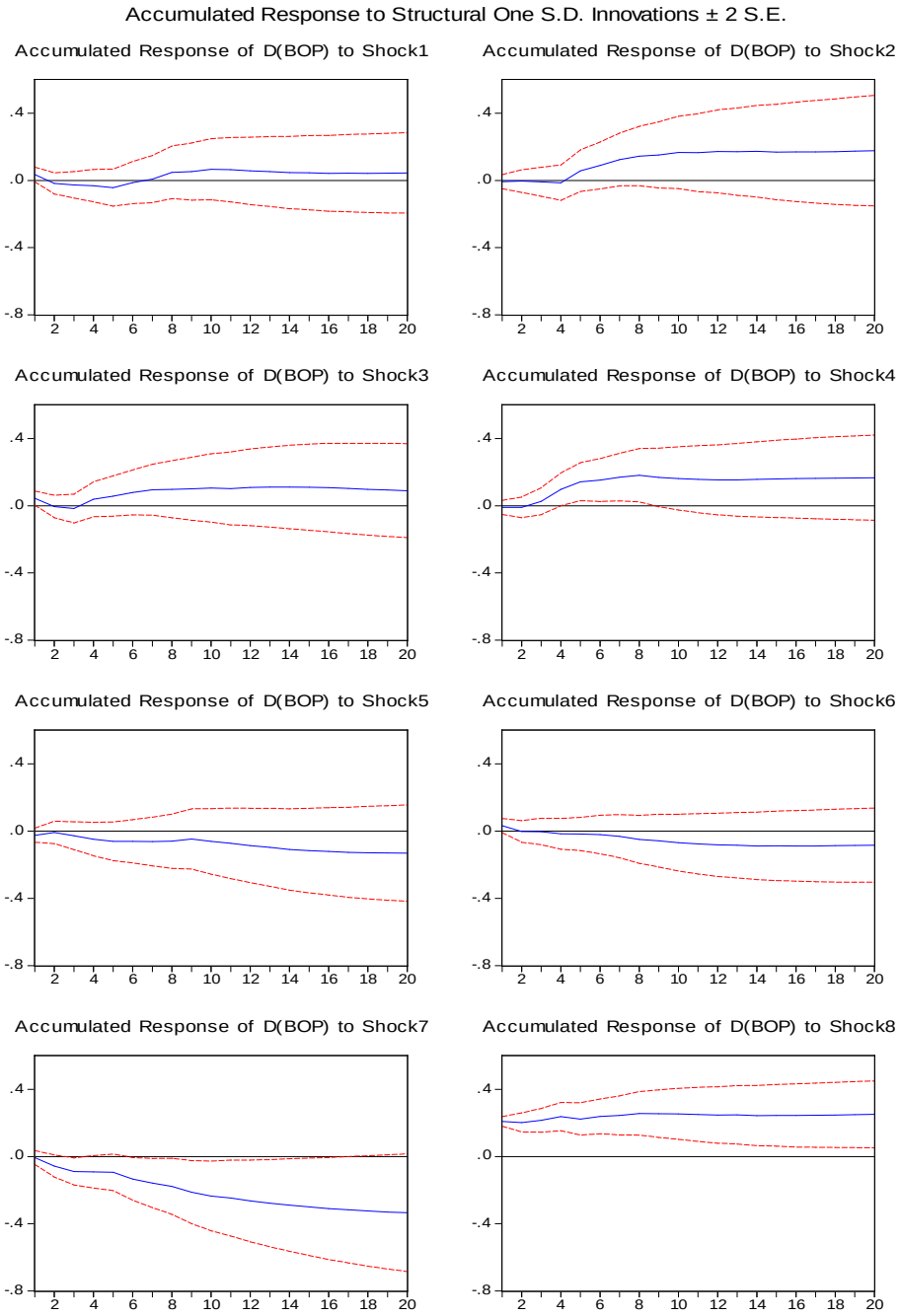
Log likelihood		1294.769	
LR test for over-identification:			
Chi-square(6)	9.306826	Probability	0.157

Note: *significant at the 10% level, **significant at the 5% level
***significant at the 1% level

Table 2 Variance Decomposition of D(BOP): :

Period	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7	Shock8
1	2.58	0.12	4.13	0.20	1.27	2.19	0.08	89.43
2	7.09	0.12	7.74	0.16	1.53	3.92	4.45	74.98
3	6.85	0.14	7.58	2.35	2.04	3.72	5.90	71.42
4	5.99	0.17	10.93	9.10	2.35	3.49	5.14	62.83
5	5.53	6.67	10.28	10.79	2.34	3.13	4.62	56.63
6	6.31	7.51	10.30	10.36	2.22	2.99	6.27	54.04
7	6.60	8.68	10.25	10.33	2.15	2.99	6.76	52.24
8	8.21	8.86	9.91	10.13	2.08	3.28	6.93	50.59
9	8.09	8.75	9.73	10.12	2.23	3.30	8.15	49.64
10	8.17	8.85	9.61	10.01	2.42	3.39	8.59	48.94
11	8.15	8.82	9.58	10.00	2.56	3.43	8.72	48.75
12	8.14	8.82	9.57	9.94	2.72	3.45	8.96	48.40
13	8.13	8.79	9.54	9.90	2.84	3.44	9.14	48.22
14	8.13	8.77	9.50	9.87	3.00	3.44	9.23	48.06
15	8.12	8.77	9.48	9.86	3.04	3.44	9.32	47.97
16	8.12	8.76	9.47	9.85	3.06	3.43	9.43	47.89
17	8.11	8.75	9.49	9.84	3.09	3.43	9.47	47.83
18	8.10	8.74	9.51	9.83	3.09	3.42	9.52	47.79
19	8.10	8.74	9.51	9.83	3.09	3.42	9.55	47.76
20	8.09	8.74	9.53	9.82	3.09	3.42	9.56	47.73

Figure 1　Impulse responses of net trade/GDP (BOP) to each positive shock



Shock 1: US GDP shock; Shock 2: Non-US GDP shock;

Shock 3: Fiscal balance shock; Shock 4: FF rate shock;

Shock 5: Overseas fiscal shock; Shock 6: Overseas policy rate shock;

Shock 7: ER shock; Shock 8: U.S. trade balance shock