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A Preliminary Exploration

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Central Bank Independence and the Signaling Effect of Intervention:
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Shinji Takagi[†] and Hiroki Okada^{††}
Graduate School of Economics
Osaka University

Abstract:

This note explores the signaling effect of foreign exchange market intervention in countries, such as Japan, the United Kingdom and the United States, where separate agencies are responsible for intervention and monetary policy. An important part of the signaling effect operates when an entity conducting intervention makes a credible commitment to a change in future monetary policy, suggesting that its effectiveness hinges upon whether the central bank is independent of government oversight. We test this conjecture by comparing the consistency of intervention and future monetary policy in Japan before and after April 1998, when central bank independence was established by the new Bank of Japan Law. As expected, the signaling effect of intervention weakened after the central bank became independent.

JEL classification: E42, F31, F33

Keywords: foreign exchange market intervention; Japanese intervention; central bank independence; signaling effect of intervention

Running title: Central Bank Independence and the Signaling Effect of Intervention

[†]Shinji Takagi* (takagi@econ.osaka-u.ac.jp; takagishinji@hotmail.com), Professor of Economics and ^{††}Hiroki Okada (okadahiroki0621@gmail.com), graduate student: Graduate School of Economics, Osaka University, 1-7 Machikaneyama, Toyonaka, Osaka 560-0043, Japan; Tel: 81-6-6850-5225; Fax: 81-6-6850-5274

*Corresponding author

I. INTRODUCTION

This note explores the signaling effect of foreign exchange market intervention, an important part of which operates when an entity conducting intervention makes a credible commitment to a change in future monetary policy. If separate agencies are responsible for intervention and monetary policy, as in Japan, Switzerland, the United Kingdom or the United States, it is unclear if the government can credibly commit the central bank to change its future monetary policy. Thus, the validity of the monetary policy channel of signaling must hinge upon whether the central bank is independent of government oversight. We test this conjecture by comparing the consistency of intervention and future monetary policy in Japan before and after April 1998, when central bank independence was enshrined in the new Bank of Japan Law.

The rest of this note proceeds as follows. Section II reviews the conceptual issues discussed in the literature concerning the signaling effect of foreign exchange market intervention. Section III tests the impact of central bank independence on the signaling effect of intervention in Japan, by postulating a simple probit model of the consistency of foreign exchange market intervention and future monetary policy during 1980-2004. Finally, section IV presents concluding remarks.

II. THE SIGNALING EFFECT IN THEORY AND PRACTICE

The signaling effect is considered to be the principal channel through which intervention affects exchange rates. Under the normal operating procedure of contemporary central banks, any impact of intervention on the monetary base is sterilized in order to maintain the policy interest rate (or the monetary base) at a target level. With the direct monetary effect inoperative, intervention can affect exchange rates only

through the portfolio balance or the signaling effect, but empirical work finds only weak support for the portfolio channel (Edison 1993; Sarno and Taylor 2001; Vitale 2007).

Studies of the signaling effect of US intervention in the late 1980s are mixed. While Lewis (1995) identifies Granger causality from intervention to future monetary policy, Kaminsky and Lewis (1996) and Klein and Rosengren (1991) report conflicting or negative findings (see also Fatum and Hutchison 1999 for the period 1989-93). For Swiss National Bank intervention, Payne and Vitale (2003), finding that only government trades, but not customer trades conducted by the central bank, affected the dollar exchange rate during 1986-95, conclude that the signaling effect is the only consistent explanation.

For Japanese intervention, a large empirical literature has emerged since 2001 when official daily intervention data began to be disclosed (retroactive to April 1991). Although studies utilizing different methodologies and samples have come to mixed conclusions about its effectiveness, most of them suggest that intervention was effective, at least during some part of the period (Table 1). Given the likely substitutability between dollar and yen assets, these studies appeal to the signaling effect to explain the impact of intervention.

In Japan, the Ministry of Finance (MOF) intervenes in the foreign exchange market by using a special account of the National Budget, with the Bank of Japan (BOJ) acting as its agent. When purchasing (selling) dollars, the MOF issues (redeems) financing bills (FBs), which are short-term government notes. Once issued, FBs are rolled over continuously as long as the underlying foreign assets are maintained as official reserves. Sale of the underlying foreign assets reduces the outstanding balance of

FBs to the extent that they are redeemed. Because FBs are sold to (or purchased from) the public at market rates, this arrangement ensures that intervention is sterilized.¹

The signaling effect of intervention could conceivably involve several channels (e.g., the perception that the monetary authorities have superior information about the equilibrium exchange rate), we focus here on the monetary policy channel. We conjecture that, in a system where the government conducts foreign exchange intervention, the monetary policy channel of signaling presupposes government oversight over the central bank. In support of such a view, Watanabe (1994) shows that a fall (rise) in the discount rate and an increase (decrease) in the growth rate of money were consistently preceded by purchases (sales) of foreign exchange during a period before 1 April 1998, when the new Bank of Japan Law came into force.

To be sure, even if the central bank were independent, it could still collaborate with the government. In Japan, an informal system of coordination may have existed during the period of quantitative easing (2001-06) when the policy objectives of the government and the central bank coincided (both wanted a weaker yen and an easier monetary policy), even though the central bank was formally independent. Likewise, in the United States, the Treasury and the Federal Reserve usually provide roughly equal amounts of funds when intervention takes place (FRB 2005). But collaboration cannot be a permanent feature of such a system, as separate agencies are bound to develop different objectives from time to time. Kaminsky and Lewis (1996) observe, for example, that a conflict with the US Treasury in the early 1990s led the Federal Reserve to quit intervening on its own account. It is thus worth exploring whether the establishment of

¹ When FBs are issued for intervention purposes, they are initially purchased by the BOJ in their entirety. The BOJ will then unwind the position over time through weekly auctions.

central bank independence in 1998 changed the information content of intervention about future monetary policy in Japan.

III. TESTING THE IMPACT OF CENTRAL BANK INDEPENDENCE ON INTERVENTION SIGNALING

In this section, we test the conjecture that the establishment of central bank independence in April 1998 weakened the consistency of intervention and future monetary policy in Japan, thereby diminishing the signaling effect of intervention.

In particular, we estimate the following probit model:

$$x = \alpha_0 + \alpha_1 \text{IND} + \alpha_2 \text{SEL} + \alpha_3 \text{QE} + u \quad (1)$$

where x is a binary dependent variable that takes the value of 1 when the direction of intervention is consistent with the change in monetary policy over a 12-month horizon and zero otherwise; IND is a dummy variable for central bank independence ($\text{IND}=1$ after April 1998 and zero otherwise); SEL is a dummy variable for yen-selling interventions; QE is a dummy variable for quantitative easing ($\text{QE}=1$ after March 2001 and zero otherwise); α_0 is a constant, α_i ($i=1,3$) is a coefficient to be estimated, and u is a random error term. The QE dummy is intended to capture the possible presence of informal collaboration between the government and the central bank.

The consistency measure, x , is defined in relation to the operating target used by the Bank of Japan, namely: (i) the official discount rate through September 1994; (ii) the unsecured overnight call rate from October 1994 through February 2001; and (iii) under quantitative easing, the current account balances (or deposits held by commercial banks at the central bank), from March 2001 through the end of the sample period.

We have identified as an intervention month any month during which intervention took place. For the January 1980-March 1991 period, prior to the release of official data, we estimated monthly interventions from the corresponding changes in the end-of-month balance of foreign exchange reserves, adjusted for the estimated interest earnings obtained from multiplying the average balance by the US Treasury bill rate. We removed from the sample any estimated intervention smaller than 100 billion yen, lest we falsely ascribe a small change in the balance of foreign exchange reserves to intervention.²

Equation (1) was estimated for January 1980-March 2004, using (i) all intervention months and (ii) only those months during which the amount exceeded 400 billion yen (Table 2). In both specifications, the coefficient of central bank independence is negative and significant at the 5 percent level, suggesting that independence weakened the consistency of intervention and monetary policy over the coming year. The coefficient of quantitative easing is positive and significant at the 1 percent level, suggesting that the MOF and the BOJ may have had similar objectives during March 2001-March 2004, irrespective of central bank independence. These results mean that, once adjusted for the impact of quantitative easing, the establishment of central bank independence in April 1998 diminished the signaling effect of intervention.

IV. CONCLUSION

This note has made a preliminary exploration of the signaling effect of foreign exchange market intervention in Japan, where separate agencies are responsible for intervention and monetary policy. Testing the conjecture that the monetary policy channel of signaling in such an environment hinges upon government oversight over the

² Monthly data on intervention were obtained from the Ministry of Finance (www.mof.go.jp). Except for the US Treasury bill rate (obtained from the International Monetary Fund, *International Financial Statistics*), all other data come from the Bank of Japan (www.boj.co.jp).

central bank, we have found that the consistency of intervention and future monetary policy in Japan indeed weakened after April 1998, when the new Bank of Japan Law established central bank independence.

It should be stressed, however, that the results are only tentative. Most of the post-independence sample (April 1998-March 2004) coincides with the period of quantitative easing (March 2001-March 2004), so that the estimated impact of central bank independence during a “normal” period was based mainly on a rather small number of observations (35 months, from April 1998 to February 2001). Nor does the lack of signaling under central bank independence entirely refute the validity of the signaling effect defined more broadly, which could conceivably involve multiple channels. Even so, we can safely conclude that the signaling effect of intervention lost an important channel of influence in Japan when the central bank became independent.

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Table 1: Selected Empirical Studies on the Effectiveness of Daily Japanese Intervention Using MOF Data

Study	Methodology	Sample period/effectiveness		
1. Nagayasu (2004)	Time-series/ GARCH	April 1991-September 2001		
		Unilateral		Coordinated
		No		Yes, but short-lived
2. Chaboud and Humpage (2005)	Forecast value (if success frequency exceeds random occurrence)	April 1991-June 1995	June 1995-December 2002	January 2003-March 2004
		Limited	Limited	No
3. Galati, Melick, and Micu (2005)	Time-series	September 1993-April 2000		
		No		
4. Fatum and Hutchison (2006)	Event study	April 1991-March 2001		
		Yes		
5. Kim and Sheen (2006)	Exponential GARCH (simultaneous estimation of mean and variance)	May 1991-June 1995	June 1995-March 2004	
		No	Yes	
6. Ito (2007)	Time-series	April 1991-June 1995	June 1995-January 2003	January 2003-March 2004
		Yes, only if coordinated with the US	Yes	Yes
7. Fatum and Hutchison (2010)	Propensity score matching	January 1999-December 2002	January-December 2003	January-March 2004
		Yes	No	No

Notes: Yes=intervention had effect in an intended direction; No=intervention had no or perverse effect.

Table 2: Estimating the Effect of Central Bank Independence on the Consistency of Intervention and Future Monetary Policy

	All interventions			Large interventions of more than 400 billion yen only		
	Coefficient	Std. error	Prob.	Coefficient	Std. error	Prob.
Constant (α_0)	-0.649	0.207	0.002	0.086	0.407	0.832
Central bank independence (α_1)	-0.892	0.432	0.039	-1.044	0.522	0.046
Yen sales (α_2)	1.245	0.287	0.000	0.576	0.500	0.247
Quantitative easing (α_3)	1.482	0.555	0.008	1.568	0.591	0.008
Diagnostic statistics:						
NOB	114			54		
Pseudo R ²	0.205			0.144		
LR statistic (probability)	32.21 (0.000)			9.69 (0.021)		