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**The Accuracy of Press Reports  
Regarding the Foreign Exchange  
Interventions of the Bank of Japan**

by

**Michael Frenkel, Christian Pierdzioch,  
Georg Stadtmann**

May 2002

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# The Accuracy of Press Reports Regarding the Foreign Exchange Interventions of the Bank of Japan

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May 2002

## Abstract

This paper presents evidence on the accuracy of press reports regarding the foreign exchange market interventions conducted by the Bank of Japan (BoJ) between January 1995 and December 1999. We find that the reports of interventions in the financial press are a relatively inaccurate indicator for the actual interventions of the BoJ. We also find that the accuracy of press reports of BoJ interventions is higher for those interventions which were carried out jointly by the BoJ and the Federal Reserve.

**Keywords:** Foreign exchange market; Central bank interventions; Press reports of interventions; Bank of Japan

**JEL classification:** F31; F33; G14; G15

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# 1 Introduction

A substantial body of research in the international finance literature has analyzed the effects and the effectiveness of foreign exchange market interventions of central banks. This research has not only broadened our knowledge of how central bank interventions affect the level and the volatility of exchange rates but has, thereby, also yielded important insights into how foreign exchange markets work.

A prerequisite for undertaking such research is the availability of high quality intervention data. With respect to the largest economies and the most important currencies worldwide, intervention data, until recently, were made available to researchers only in the cases of the Federal Reserve (Fed) and the Deutsche Bundesbank. In contrast, the Bank of Japan (BoJ) did not release official data on its foreign exchange market interventions. As a consequence, researchers who tried to analyze the intervention behavior of the BoJ had to use intervention reports in the financial press to identify BoJ intervention days without knowing how accurate these intervention reports were (see, e.g., Dominguez (1998) and Ramaswamy/Samiei (2000)).<sup>1</sup> In the academic literature, there is remarkably little empirical evidence on the accuracy of press reports of central bank interventions. Empirical studies addressing this issue are only available for press reports on Bundesbank and Fed interventions (see for example Dominguez/Frankel 1993; Klein 1993;

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<sup>1</sup>Ito (2002) uses the data set we analyze in this paper to study the effect of the interventions conducted by the BoJ in the 1990s on the level of the yen/US dollar exchange rate.

Osterberg/Wetmore-Humes 1993).

This paper goes beyond the earlier studies of the accuracy of intervention reports in the financial press by assessing the accuracy of press reports of BoJ foreign exchange market interventions. To this end, we use the fact that the BoJ recently changed its information policy and released a comprehensive data set on its interventions in foreign exchange markets. This data set has not yet been used to study the accuracy of press reports of BoJ interventions. Comparing the data on actual BoJ interventions with press reports of BoJ interventions published in the financial press during a period from 1995 through 1999, we find that press reports are a relatively inaccurate indicator for the actual intervention behavior of the BoJ. Furthermore, our results suggest that the accuracy of press reports of BoJ interventions is higher for interventions that the BoJ carried out jointly with the Fed.

The remainder of the paper is organized as follows. In Section 2, we use the new data set to provide some descriptive statistics of the actual BoJ and Fed foreign exchange market interventions during the period 1995 – 1999. In Section 3, we analyze in detail the relationship between actual and reported BoJ interventions in the foreign exchange market. In Section 4, we supplement this analysis by estimating a statistical model to test for systematic differences between the actual and reported BoJ interventions. Section 5 offers some concluding remarks.

## 2 The Actual Interventions of the BoJ and of the Fed

To assess the accuracy of press reports of BoJ interventions, we use a recently released data set on the foreign exchange market interventions of the BoJ (BoJ (2002)). This data set contains daily data on the foreign exchange market interventions of the BoJ in the yen/U.S. dollar market and covers the period January 1995 through December 1999. This sample period includes several episodes of significant foreign exchange market interventions. In total, the data set includes 1,305 days of foreign exchange trading. We also include in our data set the interventions of the Fed in the yen/U.S. dollar market, particularly because the BoJ and the Fed carried out some interventions during the period under investigation together. It may be the case that the impact of such bilateral interventions on the probability of an intervention report in the financial press may differ from that of an unilateral intervention.

– Include Table 1 here. –

Table 1 provides descriptive statistics summarizing the main features of the actual foreign exchange market interventions conducted by the BoJ and the Fed during the sample period under investigation. Three points are worth noting:

1. The first point refers to the number, size, and direction of interventions. Table 1 shows that the overall number of intervention days during this period was 66 for the BoJ and only 9 for the Fed. Therefore, the unconditional probability that an intervention took place was only 0.8

percent for the Fed as compared to 7.5 percent for the BoJ. While the mean absolute size of interventions conditional on the fact that an intervention took place was US\$2,466 millions for the BoJ, it amounted to only US\$469.6 millions for the Fed. The total amount of net interventions divided by the number of trading days was US\$69.0 millions for the BoJ and US\$1.9 millions for the Fed. Hence, both central banks bought dollars on a net basis.

2. The second point relates to the probability that an intervention took place on a particular day given that an intervention had occurred on the preceding trading day. This probability was 53.0 percent for the BoJ interventions and 11.1 percent for the interventions of the Fed. Moreover, the probability that no intervention took place on a particular day given that no intervention had occurred on the previous day was 97.4 percent for BoJ interventions and 99.3 percent for Fed interventions.
3. The third point has to do with the coordination of foreign exchange market interventions between the BoJ and the Fed. The conditional probability that the BoJ intervened whenever the Fed was in the market was 100 percent. By contrast, the conditional probability that the Fed intervened on a day when the BoJ intervened was only 13.6 percent. All of the nine coordinated interventions were in the same direction.

### **3 The Accuracy of Press Reports of BoJ Interventions**

Until recently, researchers who were interested in the foreign exchange market interventions of the BoJ could not use official data on these transactions and, therefore, had to approximate BoJ interventions by using other information without knowing how accurate such proxies really were. However, today researchers are in a more comfortable situation because the BoJ recently changed its information policy and released its intervention data. This opens up the possibility to analyze how accurate the proxies are which were commonly used in the earlier empirical literature to predict actual BoJ interventions. To this end, we compare the actual BoJ interventions with a proxy variable recently used in an empirical study by Ramaswamy and Samiei (2000). Their data set, which the authors kindly provided, contains press reports of BoJ foreign exchange market interventions in the yen/U.S. dollar market stored in the electronic archives of the Financial Times and the Wall Street Journal. In addition, their data set contains information on whether it was stated in the press reports that the BoJ had coordinated its interventions with the Fed.

– Insert Table 2 here. –

Table 2 provides a first assessment of the accuracy of the intervention report data compiled by Ramaswamy and Samiei (2000). This table shows that, according to their data on reported interventions, the BoJ intervened on 50 days during the period 1995 – 1999. Since the BoJ actually conducted foreign exchange market interventions on 66 days, this implies that some



interventions (24 %) were not reported in the financial press. This is a first indication that the public and researchers do not get completely accurate information about the intervention activity of the BoJ by relying on newspaper reports of intervention activity.

When breaking up the overall intervention activity with respect to the direction of intervention, the degree of inaccuracy gets even larger. On the one hand, the financial press reported 39 interventions to weaken the yen. Yet, 60 of such interventions actually took place. These figures imply that interventions to weaken the yen are underestimated by 35 %. On the other hand, the press overestimated the intervention activity to strengthen the Yen. While 11 interventions were reported, only 6 interventions actually took place. This means that the press overestimated the attempts of the BoJ to strengthen the yen through foreign exchange market intervention by 83 %.

With respect to the intervention policy of the Fed, one can infer from Table 2 that the reports of Fed interventions published in the financial press are quite accurate. Information on Fed interventions can be inferred from the table because all interventions of the Fed are bilateral interventions. The table shows that only minor inaccuracies with respect to the direction of Fed interventions can be detected. Of the 9 reported Fed interventions only two interventions (1 sell and 1 buy intervention) were classified incorrectly. Overall, the press reports of Fed interventions were correct (incorrect) in 78 % (22 %) of all cases. These results are in line with the findings of Dominguez and Frankel (1993, p. 72 – 74) who report that approximately

80 % of the interventions conducted by the Fed between 1987 and 1992 were reported in the financial press.

Table 2 only provides information about the relative frequency of reported versus actual intervention. It does not include evidence on the question whether the timing of press reports of BoJ interventions is correct. However, obtaining empirical evidence on the accuracy of the timing of press reports of intervention can yield important information for all those researchers who use such press reports of BoJ interventions as a proxy for the actual intervention policy of the BoJ when studying, for example, the effectiveness of the BoJ interventions. Empirical evidence on the accuracy of the timing of press reports of BoJ interventions is contained in Table 3.

As already mentioned above, the financial press reported intervention activity of the BoJ on 50 days. However, as depicted in Table 3, only on 30 days on which a report of a BoJ intervention was published in the financial press a BoJ intervention actually took place. The table further shows that the financial press missed to report 36 BoJ interventions that actually took place. This means that only 45 % of the BoJ intervention days (30 out of 66) are classified correctly when using reports of BoJ interventions published in the financial press. This figure for the BoJ interventions seems to be very low when compared to other studies which analyzed the intervention behavior of other central banks like the Fed or the Deutsche Bundesbank (Dominguez and Frankel 1993; Klein 1993).

– Insert Table 3 here. –

So far, the information collected indicates, as a first hint, that the intervention policy of the BoJ differs quite substantially from the intervention policy of the Fed. Firstly, the intervention frequency is much lower for the Fed as compared to the BoJ. Secondly, all interventions of the Fed are bilateral interventions. This could suggest that the Fed may have intervened only on behalf of the BoJ. Thirdly, because the reports in the financial press are more accurate in the case of Fed interventions, one can infer that the BoJ and the Fed do not only differ with respect to their intervention policy but also with respect to their information policy.

## 4 Actual Interventions and the Probability of Press Reports of Interventions

In this section, we investigate whether the probability of a press report of a BoJ foreign exchange market intervention on a particular day depends on whether or not the BoJ actually intervened on that day.<sup>2</sup> We also examine whether the volume of interventions or Fed intervention activity affects this probability. To this end, we estimate a Probit model and, in a first step, subdivide the sample into days on which a report of a BoJ intervention was published in the financial press and days on which such a report was not published. In a second step, we assign the numerical value 1 to days on

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<sup>2</sup>Our research strategy is similar to the one used by Klein (1993) to assess the accuracy of press reports of Fed interventions. The main difference between our research strategy and his research strategy is that he uses a multinomial Logit model to analyze the accuracy of Fed interventions. Since the number of interventions in support of the yen is relatively small for the BoJ interventions, we do not differentiate the overall intervention activity with respect to the direction of intervention.

which an intervention report was published and the value 0 to the other days. In a third step, we let the unobservable latent variable denote the probability of the financial press to publish a report of a BoJ intervention on a particular day  $t$ . We assume further that the conditional mean of this variable is a linear function of the volume of the actual foreign exchange market interventions of the BoJ,  $|I_t|$ . The Probit model takes on the form:

$$R_t^* = \beta_0 + \beta_1 |I_t| + u_t, \quad (1)$$

where  $u_t$  is a normally distributed disturbance term. Because the BoJ carried out some interventions jointly with the Fed, we also estimate an alternative version of equation (1):

$$R_t^* = \beta_0 + \beta_1 |I_t| + \beta_2 C_t + u_t, \quad (2)$$

where  $C_t$  is a dummy variable assuming the value one if the BoJ coordinated an intervention with the Fed and zero else. Using the notational convention introduced above, the indicator function capturing whether a report of a BoJ intervention is published in the financial press,  $R_t$ , is given by:

$$R_t = \begin{cases} 1 & \text{if } R_t^* > 0 \\ 0 & \text{else} \end{cases} \quad (3)$$

With  $P_R$  denoting the probability that a press report of a BoJ intervention will be published on day  $t$ , it then follows that:

$$P_R(R_t^* > 0) = P_R(R_t = 1) = \Phi(\mathbf{b}'\mathbf{s}_t) \quad (4)$$

where  $\Phi(\cdot)$  denotes the cumulative normal distribution function,  $\mathbf{b}$  is the vector of coefficients to be estimated, and  $\mathbf{s}_t$  is the vector of regressors given

in equations (1) and (2), respectively.

Table 4 reports the results of estimating the models given in equations (1) and (2) by maximum likelihood technique. In specifications 1 – 3, the dependent variable is a dummy variable that equals unity for days on which the financial press reported a foreign exchange market intervention of the BoJ and equals zero otherwise. The absolute volume of intervention serves as an independent variable in specification 1. Specification 2 also includes a coordination dummy that takes on a value of 1 when the BoJ intervened jointly with the Fed. In specification 3, we additionally include a dummy variable that equals one on BoJ intervention days and zero else. Including this dummy variable renders it possible to analyze whether the absolute volume of an intervention or the mere fact that an intervention took place triggered intervention reports in the financial press. The result suggests that it was not so much the absolute volume as the intervention itself that affected the probability of a report of an intervention.

Specification 1 – 3 are estimated using daily data for the full sample and, thus, includes 1,305 observations. As Table 4 shows, the coefficients of the regressors used to estimate specification 1 and specification 2 are significantly different from zero and positive. This suggests that the probability of finding a report of a BoJ intervention in the financial press is in an increasing function of the actual interventions of the BoJ and the Fed. Thus, although being rather inaccurate, the press reports of BoJ interventions did contain some information on the actual intervention behavior of the BoJ. The estimation

results for specification 3 indicate that the probability of finding a press report of a BoJ intervention is mainly influenced by the mere fact that a BoJ intervention took place and that this intervention was coordinated with the Fed rather than by the absolute volume of such an intervention.

– Insert Table 4 here. –

In specifications 4 and 5, we change the focus of our analysis slightly by redefining the dependent variable. In these regressions, the dependent variable is a dummy variable that equals unity for days on which interventions were reported correctly (30 days) and equals zero for days for which an intervention was conducted by the BoJ but a report of a BoJ intervention was not published in the financial press (36 days). Thus, we use specifications 4 and 5 to assess whether the regressors are able to explain why some BoJ interventions were reported while others were not reported.

As the regression results reveal, the coefficient of the absolute volume of intervention turns out not to be significantly different from zero in specification 4 and 5. This means that the absolute volume of intervention did not influence the probability that the newspapers reported the occurrence of an intervention. By contrast, the coordination dummy is still – as in specifications 1 and 2 – significantly positive which is consistent with the implication of the regression result of specification 3. This results suggests that the Fed intervened in a different way than the BoJ. More specifically, it seems that the interventions of the Fed were more obvious to the market

through rumors of a Fed intervention or official announcements about them.<sup>3</sup>

To gain further insight into the goodness-of-fit of specification 5, we produce a so-called expectations-prediction table (see Greene (2000), pp. 831 – 834). This expectations-prediction table is presented in Table 5. The last three columns of Table 5 summarize the fit of a naive forecast model which involves the prediction that no intervention report will occur at all. This hypothesis can be justified by the fact that there were more non-reported-intervention days than correctly reported-intervention days. There is a total of 66 days for which predictions are made.

– Insert Table 5 here. –

The first three columns of Table 5 show the accuracy of predicting interventions using specification 5 of the Probit model. Out of 66 days, the model forecasts a total of 55 non-reported-intervention days and 11 'reported-intervention-days', respectively. The share of non-reported-intervention days which are forecasted correctly is 94.44 percent ( $= 34/36$ ) and the share of incorrectly forecasted non-reported-intervention days amounts to 5.56 percent ( $= 2/36$ ). Similarly, 30 percent of the reported intervention days are estimated correctly. Thus, for the period examined in this paper, the total gain of the estimated model compared to a naive forecast model amounts to 10.61 percent. Nevertheless, because only 30 percent of the days of the

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<sup>3</sup>We also use the non-parametric Wilcoxon-Mann-Whitney U-test (see, e.g. DeGroot 1989) to analyze the robustness of this result. To this end, we subdivide the 66 BoJ interventions days into days on which a press report of a BoJ intervention occurred and days on which such a press report was not published. The test results suggest that there is no statistically significant difference between interventions that are reported and interventions that are not reported with respect to the absolute volume of these interventions.

group with the fewer observations are classified correctly, the model has to be regarded as not having a good fit. This suggests that the link between actual BoJ interventions and the reports of BoJ interventions published in the financial press is not very close.

## 5 Conclusions

In this paper, we analyzed whether the reports of BoJ interventions in the yen/U.S. dollar market published in the financial press are sufficiently accurate so that their use in empirical studies as a proxy for the actual intervention policy of the BoJ yielded reliable results. Press reports were, for example, applied as proxies in studies on the effectiveness of the intervention policy of the BoJ. The use of proxies for BoJ interventions was necessary because, until recently, the BoJ did not publish any data on its intervention policy. Since the BoJ recently released a comprehensive data set on its foreign exchange market interventions, it is now possible to study the accuracy of the press reports by contrasting their content with the actual intervention activity.

The main message of this paper is that one should be somewhat reserved and cautious when using press reports as proxies of intervention activity in empirical analyses of the intervention policy of the BoJ. Our results indicate that press reports may, in fact, provide only a rather crude impression of the actual intervention policy of the BoJ. We found that

- the majority of the interventions conducted by the BoJ during the time



period 1995 – 1999 were not picked up by the financial press, and,

- the financial press frequently reported BoJ intervention activities although no intervention had actually taken place.

Therefore, the recently released official data set of BoJ interventions rather than the proxies should be used in future research of the intervention policy of the BoJ. Given the inaccuracy of the press reports of BoJ interventions documented in this paper, this data set should also be used to reassess the results of earlier empirical studies of the foreign market interventions of the BoJ.

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Table 1: Summary Statistics of the Actual versus Reported Intervention Behavior of the Bank of Japan 1995 – 1999

		Bank of Japan	Federal Reserve
1.	Probability of an intervention	5.1 % (= 66 out of 1,305 days; 60 days of buying dollars, 6 days of selling dollars)	0.7 % (= 9 out of 1,305 days; 8 days of buying dollars, 1 day of selling dollars)
2.	Mean (median) absolute value of interventions on intervention days (in millions of US dollars)	2,466 (975)	459.6 (370)
3.	Change in the reserve position divided by the number of intervention days (in millions of US dollars)	69.0	1.9
4a.	Probability of interventions conditional upon interventions on the previous trading day	53.0 % (on 35 days out of 66)	11.1 % (on 1 day out of 9)
4b.	Probability of no interventions conditional upon no intervention on the previous trading day	97.4 % (on 1,207 days out of 1,239)	99.3 % (on 1,287 days out of 1,296)
5.	Probability of an intervention conditional upon an intervention of the other central bank	100 % ( $I_t^{BoJ} \neq 0   I_t^{Fed} \neq 0$ )	13.6 % ( $I_t^{Fed} \neq 0   I_t^{BoJ} \neq 0$ )

Table 2: Actual Versus Reported Intervention

	Newspaper Reports About Intervention		Actual Intervention Data Set	
Overall interventions:	50		66	
Breakdown:	Unilateral	Bilateral	Unilateral	Bilateral
	41	9	57	9
Number of interventions to weaken the yen (= buy dollars):	39		60	
Breakdown:	Unilateral	Bilateral	Unilateral	Bilateral
	32	7	52	8
Number of interventions to strengthen the yen (= sell dollars):	11		6	
Breakdown:	Unilateral	Bilateral	Unilateral	Bilateral
	9	2	5	1

Note: The table compares the intervention proxy used by Ramaswamy/Samiei (2000) with the actual interventions of the BoJ. Bilateral refers to interventions of the BoJ coordinated with the Federal Reserve. The period under investigation is 1995 – 1999.

Table 3: Accuracy of the Reported Intervention Activity BoJ

	Actual No-Intervention	Actual Intervention	Reported Total
Report says: no-intervention	1,219	36	1,255
Report says: intervention	20	30	50
Actual total	1,239	66	1,305
Correct	1,219	30	1,249
Incorrect	20	36	56
Correct in percent	98.39 %	45.45 %	95.71 %
Incorrect in percent	1.61 %	54.55 %	4.29 %

Note: The table compares the intervention proxy used by Ramaswamy/Samiei (2000) with the actual interventions of the BoJ. The period under investigation is 1995 – 1999.

Table 4: Probit Analysis of Likelihood of Press Reports of BoJ Interventions

Model	Sample	Constant	Absolute Volume of Intervention	Coord. Dummy	BoJ Intervention Dummy	McFadden $R^2$
1	Full sample	-1.8595*** (-27.0)	0.0019** (2.30)	–	–	0.0949
2	Full sample	-1.9299*** (-26.8)	0.0018** (2.32)	2.9247*** (5.10)	–	0.1915
3	Full sample	-2.1409*** (-24.12)	0.00039 (0.86)	1.5718*** (2.70)	1.7335*** (7.67)	0.3260
4	Intervention Days	-0.1853 (-0.98)	0.0003 (0.60)	–	–	0.0055
5	Intervention Days	-0.4073** (-1.96)	0.00039 (0.86)	1.5718*** (2.70)	–	0.1071

Note: <sup>a</sup>The significance of a regressor is analyzed by using the standard normally distributed ratio of the coefficient and its respective standard deviation (z-statistic in brackets). - \*\* (\*\*\*) denotes significance at the 5 (1) percent level. <sup>b</sup>To assess the overall explanatory power of the model, we report the McFadden  $R^2$ . The McFadden  $R^2$ , is defined as  $R^2 = 1 - (L_u/L_c)$ , where  $L_c$  denotes the value assumed by the maximized log-Likelihood in a model in which the press report dummy is explained by a constant only and  $L_u$  denotes the log-likelihood of the unrestricted model. The McFadden  $R^2$  is bounded between 0 and 1.

Table 5: Expectation Prediction Table<sup>1)</sup>

	Estimated Equation <sup>2)</sup>			Naive Forecast Model <sup>3)</sup>		
	No-Reported Intervention	Reported Intervention	Total	No-Reported Intervention	Reported Intervention	Total
Prediction: No-Reported Intervention	34	21	55	36	30	66
Prediction: Reported Intervention	2	9	11	0	0	0
Total	36	30	66	36	30	66
Correct	34	9	43	36	0	36
% Correct	94.44	30.00	65.15	100.00	0.00	54.55
% Incorrect	5.56	70.00	34.85	0.00	100.00	45.45
Total Gain <sup>4)</sup>	-5.56	30.00	10.61			

Note: <sup>1)</sup> Calculations are based on estimated specification 5 of Table 4. <sup>2)</sup> 'Reported intervention' ('no-reported-intervention') is predicted if the estimated probability exceeds (is equal or smaller than) the cutoff point, for which 0.5 is chosen. <sup>3)</sup> Forecast is "no-intervention" for each day. <sup>4)</sup> Gain using estimates from the Probit instead of the naive forecast model.