



# The accuracy of reports of foreign exchange intervention by the Bank of Japan: Does Tokyo know more?

Yuanchen Chang<sup>\*,1</sup>

*Department of Finance, National Chengchi University, Taipei, Taiwan*

---

## Abstract

This paper examines the accuracy of press reports of foreign exchange intervention by the Bank of Japan. We investigate whether the local news wire (JiJi News) reacted differently from the foreign press (Wall Street Journal) between January 2000 and December 2003. Our results show that the likelihood of intervention being reported given that it actually occurred is higher for the JiJi News than for the Wall Street Journal, but the JiJi News has many more instances of false speculative intervention reports. As such, the underreporting by the Wall Street Journal mitigates its overall errors as compared to the JiJi News. We find that the change of Japan's intervention strategy from the beginning of 2003 has a major impact on the accuracy of press reports. Logit analysis also demonstrates that the likelihood of intervention being firmly reported increased with the size of the intervention and the magnitude of appreciation of the Japanese yen.

© 2006 Elsevier Ltd. All rights reserved.

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

*Keywords:* Foreign exchange; Central bank intervention; Bank of Japan

---

---

\* Corresponding author. Tel.: +8862 29393091x81102; fax: +8862 29393394.

*E-mail address:* [yccchang@nccu.edu.tw](mailto:yccchang@nccu.edu.tw)

<sup>1</sup> I am grateful for helpful comments from an anonymous referee, Michael T. Melvin (co-editor) and participants at the 2004 FMA Meeting (New Orleans), the 12th SFM Conference, National Chengchi University, National Taiwan University, National Tsing Hua University and National Central University.

## 1. Introduction

Central bank intervention in the foreign exchange market contains important information to market participants, because it can have a significant impact on the currency values involved. Even when official data on currency intervention by major central banks are released periodically, the only contemporaneous accounts of intervention activity are unofficial reports in the public press. Therefore, it is essential to investigate the accuracy of press reports of central banks' foreign exchange intervention.

With a recently released data set on intervention by the Bank of Japan, this paper provides an empirical study on the accuracy of the market's perception of the Bank of Japan's activities between January 2000 and December 2003. The relevance of the sample period stems from the fact that the Japanese yen was volatile against the US dollar during this period, which resulted in active intervention by the Bank of Japan. In addition, the Japanese monetary authority changed its intervention strategies during this period. Prior to January 2003, large-scale interventions were often accompanied by confirmations from Japanese officials to maximize surprise effects.<sup>2</sup> Japan's Ministry of Finance started to adopt a covert policy with frequent and small-scale interventions from the beginning of 2003.<sup>3</sup> Therefore, our paper provides important documentation of the relationship between the accuracy of press reports and intervention policy changes in Japan.

Evidence about the accuracy of press reports on central bank intervention in the literature is mixed (Dominguez and Frankel, 1993; Klein, 1993; Osterberg and Wetmore-Humes, 1993; Frenkel et al., 2004). Klein (1993) compares newspaper reports of intervention activity with official intervention data. He shows that reports by the *New York Times* and the *Wall Street Journal* on intervention by the U.S. Federal Reserve are correct more than 80% of the time. On the other hand, Osterberg and Wetmore-Humes (1993) compare official data on U.S. foreign exchange intervention with newspaper reports and find that the series are systematically different. They conclude that not all market participants have equally accurate information about exchange market intervention. Frenkel et al. (2004) examine the accuracy of press reports on intervention by the Bank of Japan during the period 1995–1999. They find that intervention reports by the *Financial Times* and the *Wall Street Journal* are a relatively inaccurate indicator for actual interventions by the Bank of Japan.

There is another area of research that focuses on the asymmetric information among market participants in the foreign exchange market when there is a high concentration of market activity. Peiers (1997) finds individual bank quotations in the DEM/USD market around the time of Bundesbank foreign exchange interventions to be consistent with price leadership by Deutsche Bank. Her analysis is consistent with the view that information about intervention operations is asymmetric among market participants. Chang and Taylor (1998) report that the Bank of Tokyo seems to have acquired information about the intervention intentions of the Bank of Japan as early as 60 min before Reuters' intervention reports. Covrig and Melvin (2002) show that Japanese bank quotations tend to lead the rest of the market when informed traders are active in the yen/dollar market. Their results provide additional support for the view that Japanese traders possess superior information when there is a high concentration of informed trading.

---

<sup>2</sup> Japanese officials confirmed yen-selling intervention on January 4, 2000, September 17, 2001, September 26, 2001, September 28, 2001, June 24, 2002, and June 28, 2002 according to the JiJi News reports.

<sup>3</sup> The *Wall Street Journal* reported on February 3, 2003 that the Japanese monetary authority appeared to have adopted a quiet intervention strategy following the appointment of new Vice Finance Minister, Zembei Mizoguchi on January 15, 2003.

An interesting question concerning different results in the literature on the accuracy of intervention reports is whether local news wire reports contain more accurate information than foreign press reports. We contend that, after examining the relationship between the accuracy of reports from different presses, we are able to offer additional evidence on the asymmetric information among market participants during periods of intervention by the Bank of Japan.

Our results contribute in three ways. Firstly, previous studies of intervention by a central bank rely mainly on coverage by the *Wall Street Journal*, the *New York Times*, and the *Financial Times* (Klein, 1993; Frenkel et al., 2004). This paper goes beyond the earlier studies by assessing the accuracy of local and foreign press reports on intervention by the Bank of Japan. Secondly, we compare the accuracy of firmly and speculatively reported interventions by local and foreign presses. We find that the likelihood of intervention being reported given that it actually occurred is higher for the JiJi News than for the *Wall Street Journal*, but the JiJi News has many more instances of false speculative intervention reports. As such, the underreporting by the *Wall Street Journal* mitigates its overall errors as compared to the JiJi News. Thirdly, the evidence provided in this paper demonstrates that the accuracy of press reports on Japan's intervention was affected by its policy to reveal information to the public. Our results show that there were more divergent intervention reports between the JiJi News and the *Wall Street Journal* after Japan carried out secret intervention from the beginning of 2003.

The remainder of the paper is organized as follows. Section 2 describes actual and reported interventions by Japan's Ministry of Finance. Section 3 presents the empirical results of the logistic regression. A final section concludes.

## 2. Actual and reported interventions

In this paper we investigate both qualitative and quantitative evidences on the accuracy of press reports of foreign exchange intervention by the Bank of Japan between the beginning of January 2000 and the end of December 2003. The Japanese yen was volatile during this period, with the Bank of Japan conducting an unprecedented scale of intervention to manage the yen's upswing against major currencies.

We examine the accuracy of press reports of the Bank of Japan's intervention by calculating the percentage of days on which actual intervention was correctly identified by a Japanese news wire, the JiJi News, and a foreign news press, the *Wall Street Journal*. The JiJi News, established in November 1945, is a Japanese news wire with a solid reputation for its reliable reporting of Japan's financial and economic activities. The *Wall Street Journal* is used extensively in the literature by researchers to test the accuracy of intervention by the U.S. Federal Reserve (Dominguez and Frankel, 1993; Klein, 1993; Frenkel et al., 2004).

The first issue we address concerning the accuracy of the reporting of intervention by the Bank of Japan is qualitative. We examine whether days on which intervention occurred were accurately identified by the press reports. Our data consist of daily amounts of intervention in the yen/dollar or yen/euro markets by the Bank of Japan from January 1, 2000 to December 31, 2003. News of intervention by the Bank of Japan was retrieved from the JiJi News and the *Wall Street Journal*.

The yen/dollar rates and monthly intervention volumes during the sample period are given in Fig. 1. A general pattern can be seen from Fig. 1 that interventions are clustered in time. Noteworthy during this period were interventions by the Bank of Japan in the beginning of 2000 when the euro was weak and after the September 11 terrorist attacks in the United States. The size of intervention increased when the yen started to appreciate from May 2002 to June 2002. There was little intervention from July 2002 to the end of 2002. Interventions picked up from January 2003 and

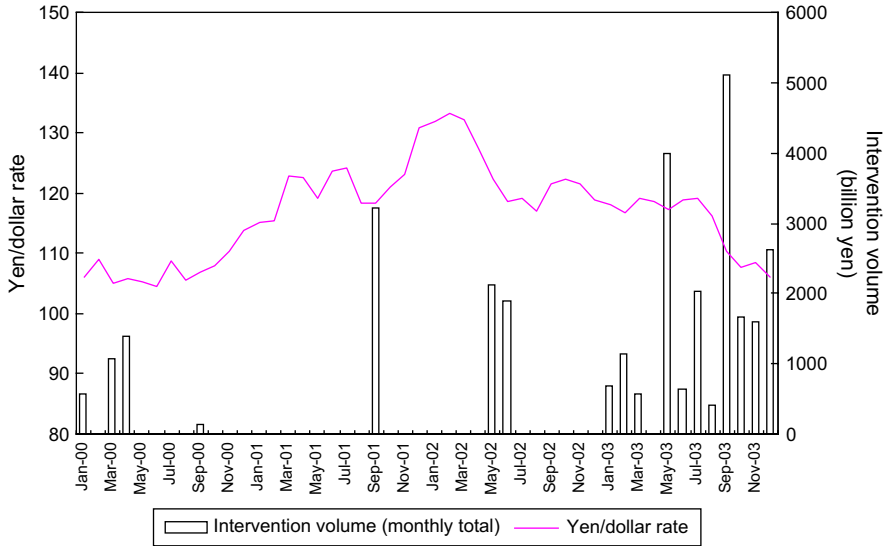


Fig. 1. Japanese interventions and the yen/dollar rate over the period January 2000–December 2003 (note that the scale of monthly intervention volume is on the right-hand side of the figure).

reached a peak in October 2003. The patterns shown on Fig. 1 indicate that the Bank of Japan intervened more often when the yen was appreciating in the sample period.

Following Fatum and Hutchison (2002), we divide news reports into three categories. Category A contains speculations or rumors of intervention by the Bank of Japan and Category B contains verbal intervention by a Japanese official in support of a weak yen. Category C consists of firm reports or those described as apparent interventions. We use keywords to assign news reports into each category. We assume reports in Categories A and C to be mutually exclusive, but allow for overlaps between Categories A and B, and between Categories B and C. Sample reports from the JiJi News and the Wall Street Journal are given in Appendix A.

To enhance our understanding of the divergence of these reports, we also summarize all the firm reports (Category C) in Appendix B.<sup>4</sup> Japan's foreign exchange interventions are usually conducted in the Tokyo market, but as most of the trading shifts to the European and then to the New York market, there are cases when the Bank of Japan considers it necessary to intervene during these hours via foreign monetary authorities.

Intervention operations conducted in different markets create a special problem when we compare the accuracy of intervention reports by local and foreign presses. For example, the Wall Street Journal usually reports interventions with a one-day lag when interventions are on Monday through Thursday, or a three-day lag if interventions are on Friday while the JiJi News reports on the same day. However, there are some exceptions. When the Bank of Japan intervenes in the Tokyo market, the Wall Street Journal may report the activity on the same day.<sup>5</sup> There are

<sup>4</sup> The news reports from Categories A and B are not included in this paper, because of space limitations.

<sup>5</sup> The Wall Street Journal reported on January 4, 2000 that the Bank of Japan greeted the new year with yet another attempt to curb the strengthening yen, intervening against the dollar in Tokyo as financial markets reopened following the holiday. There was another report, which referred to the same intervention on the next day that the Bank of Japan intervened in currency markets Monday (January 4, 2000), buying dollars for yen.

reports by the JiJi News, which refer to intervention by the Bank of Japan in the previous New York market.<sup>6</sup> In addition, reports have appeared in both presses that may refer to interventions by the Bank of Japan a few days ago. We adjust for these cases through a detailed examination of all the news reports during the sample period.

It is seen from [Appendix B](#) that firm reports from January 2000 to December 2002 were all on the same day for the two presses, but there were more divergent firm reports from January 2003 when Japanese officials started to conceal their intervention operations. We find only four firm reports that were on the same day for the two presses from 2003 onwards.

[Table 1](#) presents the summary statistics of Bank of Japan intervention as reported by the JiJi News and the Wall Street Journal. We see that the JiJi News reported intervention by the Bank of Japan on 461 days, while the Wall Street Journal reported on 161 days in the full sample period. The number of firm reports by the JiJi News was slightly less than that by the Wall Street Journal. On the other hand, the number of speculative reports and the number of official comments by the JiJi News were much larger than those by the Wall Street Journal.

We divide the full sample into two sub-periods to explore the impact of policy changes on the accuracy of press reports. Again, there are more divergent reports between the number of speculative interventions and official comments by the two presses in the sub-periods. Evidence shows that the number of firm reports is the same for both presses in the first sub-period, which is due to the fact that Japanese officials often confirmed their intervention operations during this period. The number of firm reports by the Wall Street Journal was slightly higher than those by the JiJi News when Japan conducted secret intervention in the second sub-period. There were many more reports of comments by Japanese officials in support of a weak yen by the JiJi News than the Wall Street Journal in the sub-periods. This is reasonable given that the JiJi News is a Japanese news wire and may focus more on the issues raised by Japanese officials. Because this paper focuses on the accuracy of press reports, all the subsequent tables and analysis use only the data from Categories A (speculative reports) and C (firm reports).

[Table 2](#) reports the actual number of days in which the Bank of Japan intervened in the foreign exchange market, the number of days in which intervention was firmly reported, and the relationship between firm reports and actual intervention by the JiJi News and the Wall Street Journal. Panel A of [Table 2](#) shows that the Bank of Japan intervened on 101 days in the full sample period. There were 26 days when actual interventions were firmly reported by both presses. On the other hand, there were also 75 days when intervention took place, but were not reported by both presses. There was one day when the Wall Street Journal firmly reported intervention when no actual intervention took place,<sup>7</sup> but there was no such case for the JiJi News.

Panel B of [Table 2](#) presents results in the first sub-period. Evidence shows that both presses firmly reported all 19 cases when intervention actually occurred. Panel C of [Table 2](#) provides results in the second sub-period. It is seen that there were 82 days when actual interventions occurred in the second sub-period, which were much more than those in the first sub-period. However, 91% of those days on which Bank of Japan actually intervened were not firmly reported by both presses in the second sub-period. These results indicate that press reports were less accurate when the Bank of Japan changed its intervention policy from the beginning of 2003.

---

<sup>6</sup> JiJi News reported firm interventions on the March 8, 2003 and October 1, 2003, which referred to an intervention on the previous day in the New York market.

<sup>7</sup> The Wall Street Journal reported firm intervention on August 21, 2003 when no actual intervention took place.

Table 1

Summary statistics of intervention reports by the JiJi News and the Wall Street Journal

	Full sample		First sub-period		Second sub-period	
	JiJi	WSJ	JiJi	WSJ	JiJi	WSJ
A	206	76	106	40	100	36
B	229	58	169	47	60	11
C	26	27	19	19	7	8
Total	461	161	294	106	167	55

The sample period is from January 2000 to March 2003. The first sub-period is from January 2000 to December 2002 and the second sub-period is from January 2003 to December 2003. Category A represents rumors and speculations of interventions by the Bank of Japan. Category B represents statements by officials about Bank of Japan's interventions. Category C represents firm reports of interventions by the Bank of Japan.

Table 3 reports the actual number of days in which the Bank of Japan intervened in the foreign exchange market, the number of days in which intervention was suspiciously reported, and the relationship between suspected reports and actual intervention by both presses. Panel A of Table 3 shows that there were 45 days when actual interventions were suspiciously reported by the JiJi News, which were more than those reported by the Wall Street Journal (13 days). This is partly due to the fact that the JiJi News reported much more speculative intervention (206 days) than the Wall Street Journal (76 days). Panel B of Table 3 presents the results in the first sub-period. There was no case when actual intervention took place and it was suspiciously reported for both presses. Panel C of Table 3 shows the results in the second sub-period. There were 45 days when actual intervention occurred and was suspiciously reported by the JiJi News compared to 13 days for the Wall Street Journal. On the other hand, there were also many more instances of false speculations reported by the JiJi News (55 days) than by the Wall Street Journal (23 days).

The data in Tables 2 and 3 are summarized in the conditional probability statistics presented in Tables 4 and 5. The coverage of firm reports by the JiJi News and the Wall Street Journal was generally comparable in its accuracy, as shown by the conditional probabilities in Table 4. The results in Panel A of Table 4 present the probabilities of the actual occurrence of an intervention given a report of an intervention. There is a 97% probability of an intervention actually having occurred given a report of an intervention in either press. The probability of an actual intervention given a report of an intervention in the JiJi News is 100% while the associated probability of an intervention given a report in the Wall Street Journal is 96%.

The entries in the second row of Panel A in Table 4 present the conditional probabilities of a report of an intervention given that there actually was an intervention. The probability of a report of an intervention in either press given the actual occurrence of an intervention is 30%. This probability is higher than the comparable conditional probability of a report in the JiJi News (26%) or the Wall Street Journal (26%) or both presses (22%). The entries in the third row of Panel A in Table 4 present the conditional probabilities of a firm report of an intervention given that an intervention did not occur. The probability for the Wall Street Journal is 0.1% which is slightly higher than the associated probability for the JiJi News. The results in Panel B of Table 4 show that conditional probabilities in the first sub-period are equal to one in the first two rows for the JiJi News and the Wall Street Journal. The probability of a report of an intervention in either press given the actual occurrence of an intervention is much lower (13%) in the second sub-period as shown in the second row of Panel C in Table 4. The comparable conditional probability is 9% for the JiJi News and 4% for both presses. The entries in the third row

Table 2  
Firmly reported and actual intervention by the Bank of Japan

	JiJi	WSJ
<i>Panel A: Full sample from January 2000 to December 2003</i>		
Total actual interventions	101	101
Firmly reported and actual	26	26
Actual, but not firmly reported	75	75
Total firmly reported	26	27
Firmly reported and actual	26	26
Firmly reported, but not actual	0	1
<i>Panel B: First sub-period from January 2000 to December 2002</i>		
Total actual interventions	19	19
Firmly reported and actual	19	19
Actual, but not firmly reported	0	0
Total firmly reported	19	19
Firmly reported and actual	19	19
Firmly reported, but not actual	0	0
<i>Panel C: Second sub-period from January 2003 to December 2003</i>		
Total actual interventions	82	82
Firmly reported and actual	7	7
Actual, but not firmly reported	75	75
Total firmly reported	7	8
Firmly reported and actual	7	7
Firmly reported, but not actual	0	1

of Panel C in Table 4 present the conditional probabilities of a firm report of an intervention given that an intervention did not occur. The probability for the Wall Street Journal is 0.6% which is higher than the comparable probability for the JiJi News.

Table 5 presents the probabilities of the actual occurrence of an intervention given a suspected report of an intervention. The first entry in the first row of Table 5 shows that there is a 21% probability of an intervention actually having occurred given a report of suspected intervention reports in either press. The entries in the second and third rows of Panel A in Table 5 show the differences in the accuracy of reports by the JiJi News as compared to those by the Wall Street Journal. The probability of a report of an intervention in the JiJi News given the actual occurrence of an intervention is 45%. This probability is higher than the comparable conditional probability of a report in the Wall Street Journal (13%) or both presses (6%). The entries in the third row of Panel A in Table 5 present the conditional probabilities of a suspected report of an intervention given that an intervention did not occur. The probability for the JiJi News is 17% while the associated probability for the Wall Street Journal is 7%. It is seen from the second and third rows of Panel B in Table 5 that conditional probabilities in the second sub-period are all equal to zero for the JiJi News and the Wall Street Journal. The entries in the third row of Panel B in Table 5 present the conditional probabilities of a suspected report of an intervention given that an intervention did not occur in the first sub-period. The probability for the JiJi News is 14% which is higher for the comparable probability of the Wall Street Journal (5%).

The results in the second row of Panel C in Table 5 show that the probability of a report of an intervention in either press given the actual occurrence of an intervention is 63% for either press, 55% for the JiJi News, 16% for the Wall Street Journal, and 7% for both presses. The

Table 3  
Suspiciously reported and actual intervention by the Bank of Japan

	JiJi	WSJ
<i>Panel A: Full sample from January 2000 to December 2003</i>		
Total actual interventions	101	101
Suspiciously reported and actual	45	13
Actual, but not suspiciously reported	56	88
Total suspiciously reported	206	76
Suspiciously reported and actual	45	13
Suspiciously reported, but not actual	161	63
<i>Panel B: First sub-period from January 2000 to December 2002</i>		
Total actual interventions	19	19
Suspiciously reported and actual	0	0
Actual, but not suspiciously reported	19	19
Total suspiciously reported	106	40
Suspiciously reported and actual	0	0
Suspiciously reported, but not actual	106	40
<i>Panel C: Second sub-period from January 2003 to December 2003</i>		
Total actual interventions	82	82
Suspiciously reported and actual	45	13
Actual, but not suspiciously reported	37	69
Total suspiciously reported	100	36
Suspiciously reported and actual	45	13
Suspiciously reported, but not actual	55	23

entries in the third row of Panel C in Table 5 present the conditional probabilities of a suspected report of an intervention given that an intervention did not occur in the second sub-period. Again, the probability for the JiJi News is 31% which is much higher for the comparable probability of the Wall Street Journal (13%). We see from Tables 4 and 5 that the likelihood of intervention being reported given that it actually occurred is higher for the JiJi News than for the Wall Street Journal. However, the JiJi News has many more instances of false speculative intervention reports, and the underreporting by the Wall Street Journal mitigates its overall errors as compared to the JiJi News.

We now turn to quantitative comparisons between intervention reports by the two presses. Tables 6 and 7 report the amounts of Bank of Japan intervention and whether two presses firmly or suspiciously reported the intervention. The results in Table 6 show that, in general, intervention is more likely to be firmly reported when the size of intervention is larger for the JiJi News and the Wall Street Journal. The second row of Table 6 shows that the majority of actual intervention is lower than 300 billion yen. The probabilities of these interventions being reported are 14% for the JiJi News and 15% for the Wall Street Journal, but the probabilities increased to 67% for both presses when intervention volume was in the range of 1200–1400 billion yen.

We see from Table 7 that the probability of intervention being suspiciously reported by the JiJi News is more than that by the Wall Street Journal. The last row of Table 7 indicates that the total correct percentage of the actual occurrence of an intervention given a suspected report by the JiJi News (45%) is higher than that by the Wall Street Journal (13%).



Table 4  
Conditional probabilities of firmly reported and actual intervention

	Either JiJi or WSJ or both	JiJi	WSJ	Both JiJi and WSJ
<i>Panel A: Full sample from January 2000 to December 2003</i>				
Prob(actual/firmly reported)	0.97	1.00	0.96	1.00
Prob(firmly reported/actual)	0.30	0.26	0.26	0.22
Prob(firmly reported/not actual)	0.001	0	0.001	0
<i>Panel B: First sub-period from January 2000 to December 2002</i>				
Prob(actual/firmly reported)	1	1	1	1
Prob(firmly reported/actual)	1	1	1	1
Prob(firmly reported/not actual)	0	0	0	0
<i>Panel C: Second sub-period from January 2003 to December 2003</i>				
Prob(actual/firmly reported)	0.92	1.00	0.88	1.00
Prob(firmly reported/actual)	0.13	0.09	0.09	0.04
Prob(firmly reported/not actual)	0.006	0	0.006	0

### 3. Results of the logistic regression

In the logit analysis presented below, we examine the determinants of an intervention being firmly reported or suspiciously reported by the JiJi News and the Wall Street Journal. We hypothesize that the probability of a report of intervention depends on the actual intervention activity undertaken that day, with larger interventions more likely to be reported given the findings in Tables 6 and 7. In the logistic regressions we also take into account the impact of the change in the value of the yen/dollar exchange rate over the previous week and adjust for the impact on error terms caused by the clustering of intervention.

The logit regression considers the possibility of the three distinct outcomes: a firm report of an intervention by the Bank of Japan on day  $t$ ,  $F_t$ , a suspected report of an intervention by the Bank of Japan on day  $t$ ,  $S_t$ , or no or other press reports of intervention,  $N_t$ . There are three explanatory variables,  $I_{i,t}$ , in our analysis, which include size of the intervention on day  $t$  ( $I_{1,t}$ ), the change in the value of the yen/dollar rate over a one-week period ( $I_{2,t}$ ), and a dummy variable showing whether there was an intervention over the previous day ( $I_{3,t}$ ). We consider the relationship between firm or suspected intervention reports and the three independent variables using the logistic distribution as follows:

$$\text{Prob}(F_t|I_{i,t}) = \frac{\exp\left(\beta_0 + \sum_{i=1}^3 \beta_i I_{i,t}\right)}{1 + \exp\left(\beta_0 + \sum_{i=1}^3 \beta_i I_{i,t}\right) + \exp\left(\gamma_0 + \sum_{i=1}^3 \gamma_i I_{i,t}\right)}, \quad (1)$$

$$\text{Prob}(S_t|I_{i,t}) = \frac{\exp\left(\gamma_0 + \sum_{i=1}^3 \gamma_i I_{i,t}\right)}{1 + \exp\left(\beta_0 + \sum_{i=1}^3 \beta_i I_{i,t}\right) + \exp\left(\gamma_0 + \sum_{i=1}^3 \gamma_i I_{i,t}\right)}, \quad (2)$$

Table 5  
Conditional probabilities of suspiciously reported and actual intervention

	Either JiJi or WSJ or both	JiJi	WSJ	Both JiJi and WSJ
<i>Panel A: Full sample from January 2000 to December 2003</i>				
Prob(actual/suspiciously reported)	0.21	0.22	0.17	0.19
Prob(suspiciously reported/actual)	0.51	0.45	0.13	0.06
Prob(suspiciously reported/not actual)	0.21	0.17	0.07	0.03
<i>Panel B: First sub-period from January 2000 to December 2002</i>				
Prob(actual/suspiciously reported)	0	0	0	0
Prob(suspiciously reported/actual)	0	0	0	0
Prob(suspiciously reported/not actual)	0.17	0.14	0.05	0.03
<i>Panel C: Second sub-period from January 2003 to December 2003</i>				
Prob(actual/suspiciously reported)	0.42	0.45	0.36	0.50
Prob(suspiciously reported/actual)	0.63	0.55	0.16	0.07
Prob(suspiciously reported/not actual)	0.40	0.31	0.13	0.03

$$\text{Prob}(N_t|I_{i,t}) = \frac{1}{1 + \exp\left(\beta_0 + \sum_{i=1}^3 \beta_i I_{i,t}\right) + \exp\left(\gamma_0 + \sum_{i=1}^3 \gamma_i I_{i,t}\right)}, \quad (3)$$

We can rewrite these equations in terms of the logarithms of the odds ratios as follows:

$$\log\left(\frac{\text{Prob}(F_t)}{\text{Prob}(N_t)} \middle| I_{i,t}\right) = \beta_0 + \beta_1 I_{1,t} + \beta_2 I_{2,t} + \beta_3 I_{3,t}, \quad (4)$$

$$\log\left(\frac{\text{Prob}(S_t)}{\text{Prob}(N_t)} \middle| I_{i,t}\right) = \gamma_0 + \gamma_1 I_{1,t} + \gamma_2 I_{2,t} + \gamma_3 I_{3,t}, \quad (5)$$

Table 8 reports the results of estimating the logit models using the firm reports as the dependent variable over the full sample and the second sub-period.<sup>8</sup> Panel A of Table 8 shows that the coefficients are significant at the 5% level for the size of actual intervention on day  $t$  ( $I_{1,t}$ ), and the change in the value of the yen/dollar rate over a one-week period ( $I_{2,t}$ ). The point estimates suggest that each additional 1 billion yen intervention increased the probability of a firm report relative to the probability of no report of an intervention by 0.7% in the case of the JiJi News and by 0.63% in the case of the Wall Street Journal in the full sample period. The coefficients on the change in the value of the yen/dollar rate over a one-week period are negative for the JiJi News and the Wall Street Journal. It implies that intervention is more likely to be firmly reported if the Japanese yen appreciated.

The second regression in Panel B of Table 8 estimates results from January 2003 to December 2003. The coefficients of the size of actual intervention are of the correct sign and highly significant for both presses. The point estimates suggest that each additional 1 billion yen intervention increased the probability of a firm report relative to the probability of no report of an intervention by 0.4% in the case of the JiJi News and by 0.3% in the case of the Wall Street

<sup>8</sup> The results for the logit models in the first sub-period are not reported in Table 8, because the probabilities of an actual intervention given a firm report in both presses are 100%.

Table 6

Size of Bank of Japan intervention and the number of firm intervention reports by the JiJi News and the Wall Street Journal

Volume of intervention (in billions of yen)	Actual intervention	Firmly reported		Not firmly reported		Correct %	
		JiJi	WSJ	JiJi	WSJ	JiJi	WSJ
0–300	66	9	10	57	56	14	15
300–600	23	11	10	12	13	48	43
600–900	4	1	2	3	2	25	50
900–1200	5	3	2	2	3	60	40
1200–1400	3	2	2	1	1	67	67
Total	101	26	26	75	75	26	26

The share of correct reports is calculated by dividing the number of firmly reported cases when actual interventions occurred by the number of total actual interventions.

Journal in the second sub-period. We see that the confidence intervals overlap closely for  $\beta_1$  coefficient across the two sets of regressions in Table 8. This indicates that the impact of intervention amount on the probability of firm intervention reports was similar for both presses.

Table 9 reports the results of estimating the logit models using the suspected reports as the dependent variable over the full sample and the second sub-period.<sup>9</sup> The coefficients on the change of the yen/dollar rate are negative for the JiJi News and the Wall Street Journal, which shows that intervention is more likely to be suspiciously reported if the yen appreciated. The  $\gamma_3$  coefficient in Panel A of Table 9 is positive and significant at the 5% level for the JiJi News. It demonstrates that if there was an intervention over the previous day, then it is more likely that a speculative intervention report appeared the next day for the JiJi News. The coefficient of the size of actual intervention in Panel B of Table 9 is positive and significant at the 10% level. It indicates that the size of intervention is positively related to suspected intervention reports by the JiJi News. The results for the Wall Street Journal are insignificant at the 5% level, which implies that an intervention of a larger magnitude does not correspond to a higher probability of being suspiciously reported by the Wall Street Journal in this period.

#### 4. Conclusions

Previous empirical studies on the accuracy of reports of central bank intervention focus mainly on Germany's Bundesbank and the U.S. Federal Reserve's actions, because of the confidentiality of Bank of Japan intervention (Dominguez and Frankel, 1993; Klein, 1993). With the recent release of official Japanese intervention data, we now have the opportunity to gauge the accuracy of press reports of intervention by the Bank of Japan. This issue is important, because market participants rely on press reports to infer the contemporaneous effects of central bank intervention.

The novelty of this paper is that we assess the accuracy of local and foreign press reports by categorizing news into firm and speculative interventions. Our results indicate that the likelihood of intervention being firmly reported given that it actually occurred is higher for the JiJi News than for the Wall Street Journal, but the JiJi News has many more instances of false speculative intervention reports. Logit analysis also demonstrates that the likelihood of

<sup>9</sup> The results for the logit models in the first sub-period are not reported in Table 9, because the probabilities of an actual intervention given a suspected report in both presses are zero.

Table 7

Size of Bank of Japan intervention and the number of suspicious intervention reports by the JiJi News and the Wall Street Journal

Volume of intervention (in billions of yen)	Actual Intervention	Suspiciously reported		Not suspiciously reported		Correct %	
		JiJi	WSJ	JiJi	WSJ	JiJi	WSJ
0–300	66	32	9	34	57	48	14
300–600	23	8	2	15	21	35	9
600–900	4	2	0	2	4	50	0
900–1200	5	2	1	3	4	40	20
1200–1400	3	1	1	2	2	33	33
Total	101	45	13	56	88	45	13

The share of correct reports is calculated by dividing the number of suspiciously reported cases when actual interventions occurred by the number of total actual interventions.

intervention being firmly reported increased with the size of the intervention and the magnitude of appreciation of the Japanese yen.

We see that the accuracy of press reports was affected by changes in Japan's intervention policy in January 2003. Prior to the change of intervention policy in 2003, the JiJi News and

Table 8

Logit analysis of the likelihood of firm intervention reports

$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$N$
<i>Panel A: Full sample from January 2000 to December 2003</i>				
JiJi				
–5.0075**	0.0070**	–49.4520**	0.3475	1042
(–12.45)	(6.57)	(–2.28)	(0.58)	
[–5.80, –4.22]	[0.0048, 0.0092]	[–91.87, –7.03]	[–0.83, 1.53]	
WSJ				
–4.8482**	0.0063**	–61.3218**	0.0918	1042
(–12.79)	(6.52)	(–3.05)	(0.16)	
[–5.59, –4.11]	[0.0043, 0.0083]	[–100.71, –21.93]	[–1.10, 1.29]	
<i>Panel B: Second sub-period from January 2003 to December 2003</i>				
JiJi				
–4.8512**	0.0040**	30.1139	0.9854	260
(–6.38)	(3.41)	(0.58)	(1.04)	
[–6.64, –3.36]	[0.0016, 0.0064]	[–72.15, 132.38]	[–0.88, 2.85]	
WSJ				
–4.1842**	0.0030**	–39.1349	0.0848	260
(–6.97)	(2.82)	(–1.08)	(0.10)	
[–5.36, –3.01]	[0.0010, 0.0050]	[–109.87, 31.60]	[–1.50, 1.67]	

$$\log \left( \frac{\text{Prob}(F_t)}{\text{Prob}(N_t)} \middle| I_{i,t} \right) = \beta_0 + \beta_1 I_{1,t} + \beta_2 I_{2,t} + \beta_3 I_{3,t}$$

Logit models are estimated for the JiJi News and the Wall Street Journal. The logarithms of the odds ratios consist of firm intervention reports on day  $t$ ,  $F_t$ , and no or other press reports of intervention on day  $t$ ,  $N_t$ . There are three explanatory variables, which include size of the intervention on day  $t$  ( $I_{1,t}$ ), the change in the value of the yen/dollar rate over a one-week period ( $I_{2,t}$ ), and a dummy variable showing whether there was an intervention over the previous day ( $I_{3,t}$ ). The numbers in parentheses are  $t$  ratios and the numbers in squared brackets are the 95% confidence intervals.

\*\* Indicates significance at the 5% level, and \* indicates significance at the 10% level.

Table 9  
Logit analysis of the likelihood of suspected intervention reports

$\gamma_0$	$\gamma_1$	$\gamma_2$	$\gamma_3$	$N$
<i>Panel A: Full sample from January 2000 to December 2003</i>				
<i>JiJi</i>				
−1.7062**	−0.0002	−49.4412**	1.4991**	1042
(−17.75)	(−0.41)	(−7.07)	(6.32)	
[−1.89, −1.52]	[−0.0004, 0.0000]	[−69.14, −35.74]	[1.03, 1.96]	
<i>WSJ</i>				
−2.7653**	0.0001	−48.2837**	0.4875	1042
(−19.07)	(0.20)	(−4.95)	(1.42)	
[−3.05, −2.48]	[−0.0001, 0.0002]	[−67.39, −29.17]	[−0.19, 1.16]	
<i>Panel B: Second sub-period from January 2003 to December 2003</i>				
<i>JiJi</i>				
−0.7273**	0.0013*	−33.3813**	0.1887	260
(−4.43)	(1.68)	(−2.56)	(0.63)	
[−1.05, −0.41]	[−0.0002, 0.0028]	[−58.94, −7.82]	[−0.40, 0.77]	
<i>WSJ</i>				
−2.0684**	0.0008	−51.1464**	−0.1468	260
(−8.35)	(0.90)	(−3.01)	(−0.35)	
[−2.55, −1.58]	[−0.0009, 0.0025]	[−84.43, −17.86]	[−0.96, 0.67]	

$$\log\left(\frac{\text{Prob}(S_t)}{\text{Prob}(N_t)} \middle| I_{1,t}\right) = \gamma_0 + \gamma_1 I_{1,t} + \gamma_2 I_{2,t} + \gamma_3 I_{3,t}$$

Logit models are estimated for the JiJi News and the Wall Street Journal. The logarithms of the odds ratios consist of suspected intervention reports on day  $t$ ,  $S_t$ , and no or other press reports of intervention on day  $t$ ,  $N_t$ . There are three explanatory variables, which include size of the intervention on day  $t$  ( $I_{1,t}$ ), the change in the value of the yen/dollar rate over a one-week period ( $I_{2,t}$ ), and a dummy variable showing whether there was an intervention over the previous day ( $I_{3,t}$ ). The numbers in parentheses are  $t$  ratios and the numbers in squared brackets are the 95% confidence intervals. \*\* Indicates significance at the 5% level, and \* indicates significance at the 10% level.

the Wall Street Journal had the same amount of firm intervention reports. From January 2003 to December 2003, there were more divergent data between these two presses on firm reports of interventions. Our findings provide an explanation for the conflicting results in the literature regarding the accuracy of reports of foreign exchange intervention by central banks (Dominguez and Frankel, 1993; Klein, 1993; Frenkel et al., 2004). We show that it is important to consider intervention policy changes when evaluating the accuracy of press reports. Future research could shed more light by incorporating news reports from Reuters and Dow Jones to examine the accuracy of intervention reports.

## Appendix A

Sample intervention reports by the JiJi News and the Wall Street Journal

*Panel A: Rumors or speculation of intervention by the Bank of Japan*

*JiJi News:* Tokyo, March 4, 2003, The dollar was stuck around 117.50 yen in Tokyo Tuesday, as rumored intervention by Japanese authorities discouraged active dollar/yen trading.

*Wall Street Journal:* New York, N.Y., March 4, 2003, Some traders earlier said they suspected Bank of Japan intervention may have been again at work, serving to prop up the dollar against the yen throughout the New York morning.

*Panel B: Statements by Japanese officials about Bank of Japan intervention*

*JiJi News*: Tokyo; March 08, 2002, Japanese Minister of Finance Masajuro Shiokawa said some action may be taken if exchange rates are found to be manipulated, and Vice Minister of Finance for International Affairs Haruhiko Kuroda also reportedly suggested readiness to launch yen-selling intervention.

*Wall Street Journal*: New York, N.Y., Feb. 4, 2003, Against the yen, the dollar was skewed higher after Zembei Mizoguchi, Japan's Vice Finance Minister in charge of international affairs, warned early in the global session that further massive intervention could be launched if needed.

*Panel C: Firm reports of Bank of Japan intervention*

*JiJi News*: Tokyo; April 3, 2000; Tokyo, The dollar gained more than 2 yen to recover 105 yen in Tokyo Monday morning, bolstered by a series of yen-selling intervention by the Bank of Japan.

*Wall Street Journal*: New York, September 18, 2001, The Bank of Japan stepped into the market in Asian trade and bought dollar for yen.

News reports are retrieved from the ABI–BPO and Lexis–Nexis database.

**Appendix B**

Firm intervention reports by the JiJi News and the Wall Street Journal

*Panel A: Firm intervention reports by the WSJ*

- 01/05/2000 Dollars climbs against yen with help from Bank of Japan.
- 03/09/2000 The Bank of Japan intervened in the currency markets.
- 03/16/2000 The Bank of Japan intervened in currency markets.
- 04/04/2000 The Bank of Japan stepped in early in the Asian trading sessions.
- 09/25/2000 The U.S., Europe, Japan, Britain and Canada bought between \$3 billion and \$5 billion of euros on Friday.
- 09/18/2001 The Bank of Japan stepping into the market in Asian trade and buying dollar for yen.
- 09/20/2001 Intervention by the Bank of Japan helped the dollar to edge up a bit.
- 09/24/2001 The Bank of Japan stepped into the market on three different days last week in a bid to weaken the surging yen
- 09/25/2001 The dollar supported by another round of intervention by the Bank of Japan.
- 09/27/2001 The dollar was initially supported by a fresh round of intervention by Japan's central bank.
- 09/28/2001 Japan again intervened heavily in currency market to contain a rise in the yen.
- 10/01/2001 Japan intervened in foreign exchange markets again
- 05/23/2002 Japan's Ministry of Finance intervened through Bank of Japan during Asian session.
- 05/24/2002 A second day of intervention by the Bank of Japan managed to weaken the Japanese currency.
- 06/02/2002 On Friday the Bank of Japan made its third foray into foreign exchange markets in two weeks, helping push the dollar up slightly, to 124.38 yen in New York trading.
- 06/05/2002 The dollar shot higher after the Bank of Japan's fourth recent bout of yen-selling.

- 06/25/2002 The dollar was also given a bit of a helping hand by the Bank of Japan, which intervened during the Asian trading.
- 06/27/2002 The dollar failed even to get lasting respite from several rounds of intervention by the Bank of Japan.
- 07/01/2002 Friday's intervention sent the dollar rising over a full yen.
- 03/03/2003 Bank of Japan data confirmed Friday that the bank had intervened in foreign exchange markets in late February to weaken the yen.
- 08/21/2003 The dollar and euro hit fresh one-month lows against the yen despite apparent intervention by Japan's Finance Ministry aimed at stopping a strong yen from derailing a nascent recovery.
- 09/05/2003 The Bank of Japan's apparent massive intervention to stem the yen's appreciation sent a clear and unequivocal message to the world.
- 09/09/2003 Another round of apparent intervention by Japan's Ministry of Finance failed to stem the yen's appreciation, with the dollar ending the New York day weaker against the yen.
- 09/10/2003 Dollar slips, but gains on yen, amid apparent intervention.
- 10/01/2003 Japan's Ministry of Finance confirmed it intervened — apparently buying dollars for yen — during the New York morning via its account at the New York Federal Reserve Bank.
- 12/09/2003 Thanks to the apparent intervention by Japanese authorities, the dollar edged up to 107.37 yen in New York.
- 12/10/2003 Apparent intervention by Japan's Ministry of Finance late in the day also shored up the dollar against the yen.

*Panel B: firm intervention reports by the JiJi News*

- 01/04/2000 Bank of Japan launches yet another yen-selling action.
- 03/08/2000 Bank of Japan seen buying 1 billion dollars in Tokyo.
- 03/15/2000 BOJ intervention lifts dollar above 106 yen: market sources.
- 04/03/2000 Bank of Japan's action propels dollar above 105 yen in Tokyo.
- 09/22/2000 Japan, U.S., Europe intervene to prop up euro.
- 09/17/2001 Bank of Japan conducts yen-selling intervention again: sources.
- 09/19/2001 Dlr above 117.50 yen after intervention in Tokyo.
- 09/21/2001 Dollar regains 117 yen in Tokyo morning on intervention.
- 09/24/2001 Dlr rises vs. yen in N.Y. after Bank of Japan intervention.
- 09/26/2001 Japan steps in euro/yen, dollar/yen trading.
- 09/27/2001 BOJ selling yen for dollar in Tokyo.
- 09/28/2001 Dollar firm above 119 yen in Tokyo morning on intervention.
- 05/22/2002 Dollar jumps on intervention in Tokyo.
- 05/23/2002 Dollar rises close to 125 yen on intervention.
- 05/31/2002 Bank of Japan seen selling yen for dollars in London: sources.
- 06/04/2002 The dollar soared above 124 yen in New York Tuesday, after Japanese monetary authorities launched yen-selling, dollar-buying intervention.
- 06/24/2002 Japan conducts yen-selling market intervention.
- 06/26/2002 Japan conducts yen-selling market intervention.
- 06/28/2002 Dollar-buying intervention done at 119.85–119.90 yen: market sources.
- 02/28/2003 MOF source confirms secret forex intervention in late Feb.
- 03/07/2003 The yen was lifted by Japanese market interventions.

- 09/10/2003 The dollar moved narrowly just below 117 yen in morning trading in Tokyo Wednesday, after rising modestly overseas on Japan's apparent yen-weakening interventions.
- 09/12/2003 The Bank of Japan apparently carried out yen-selling, dollar-buying market intervention in London Friday.
- 09/30/2003 Japanese monetary authorities conducted yen-weakening market. intervention in New York Tuesday through the Federal Reserve Bank of New York, a Ministry of Finance source said.
- 12/09/2003 The Japanese monetary authorities apparently conducted yen-selling, dollar-buying intervention in overseas trading.
- 12/11/2003 The dollar's rise sparked by the Bank of Japan's large-scale currency market intervention helped lift export-oriented issues on the Tokyo Stock Exchange. News reports are retrieved from the ABI–BPO and Lexis–Nexis database.

## References

- Chang, Y., Taylor, S.J., 1998. Intraday effects of foreign exchange intervention by the Bank of Japan. *Journal of International Money and Finance* 17 (1), 191–210.
- Covrig, V., Melvin, M., 2002. Asymmetric information and price discovery in the FX market: does Tokyo know more about the yen? *Journal of Empirical Finance* 9 (3), 271–285.
- Dominguez, K.M., Frankel, J.A., 1993. *Does Foreign Exchange Intervention Work?* Institute of International Economics, Washington, DC.
- Fatum, R., Hutchison, M.M., 2002. ECB foreign exchange intervention and the EURP: institutional framework, news and intervention. *Open Economies Review* 13 (4), 413–425.
- Frenkel, M., Pierdzioch, C., Stadtmann, G., 2004. The accuracy of press reports regarding the foreign exchange interventions of the Bank of Japan. *Journal of International Financial Markets, Institutions and Money* 14 (1), 25–36.
- Klein, M.W., 1993. The accuracy of reports of foreign exchange intervention. *Journal of International Money and Finance* 12 (6), 644–653.
- Osterberg, W.P., Wetmore-Humes, R., 1993. The inaccuracy of newspaper reports of U.S. foreign exchange intervention, Federal Reserve Bank of Cleveland. *Economic Review* 29 (4), 25–33.
- Peiers, B., 1997. Informed traders, intervention and price leadership: a deeper view of the microstructure of the foreign exchange market. *Journal of Finance* 52 (4), 1589–1614.

## Further reading

- Galati, G., Melick, W., 1999. Perceived Central Bank intervention and market expectations: an empirical study of the yen/dollar exchange rate. BIS working paper No 77.
- Ito, T., 2002. Is foreign exchange intervention effective? The Japanese experiences in the 1990s. NBER working paper No 8914.
- Ramaswamy, R., Samiei, H., 2000. The yen–dollar rate: have interventions mattered? IMF working paper 95.
- Sarno, T., Taylor, M., 2001. Official intervention in the foreign exchange market: is it effective and, if so, how does it work? *Journal of Economic Literature* 39 (3), 839–868.