

Federal Reserve Bank of Cleveland

Why Intervention Rarely Works

by Owen F. Humpage and William P. Osterberg

In the late 1980s, the United States frequently intervened in the foreign-exchange market with the objectives of encouraging a dollar depreciation in 1985 and stabilizing its value from early 1987 through early 1990. Unconvinced of the effectiveness of such operations and worried about possible conflicts with monetary policy, the United States curtailed its interventions during the early part of the last decade and has intervened on just one occasion since August 1995.

As time has passed, the reasons for shunning intervention seem to have been forgotten, and we hear again calls for action. Last year, Japan, which has intervened in foreign-exchange markets in an attempt to halt or reverse the yen's appreciation against the dollar, suggested that the United States and other advanced countries act in concert. With the euro now edging below parity with the dollar, others have suggested that the European Central Bank intervene. In addition, some economists continue to advocate target zones for dollar exchange rates, which implies a commitment to exchange-rate management.

Most economists now regard foreign-exchange-market intervention as generally ineffectual. As this *Economic Commentary* explains, intervention cannot systematically affect a nation's exchange rates when undertaken independent of its monetary policy, and when undertaken as a goal of monetary policy, exchange-rate management can compromise price stability and create confusion about long-term policy objectives. These observations, of course, do not mean that intervention never has an effect on exchange rates, but they do show that the anticipated result is not a certainty.

■ Intervention and Monetary Policy

Although the Federal Reserve System (FRS) and the Treasury's Exchange Stabilization Fund (ESF) share responsibility for intervention in the United States, the ESF usually takes the initiative. The ESF maintains a portfolio of foreign-exchange reserves that it can sell to promote a dollar appreciation, and it holds a limited amount of dollar assets that it can sell to promote a dollar depreciation. Separately, the FRS keeps its own portfolio of foreign exchange for a dollar defense and can create an unlimited amount of dollars to foster a dollar depreciation. Typically—but not always—the ESF and the FRS intervene in concert, contributing equally. The Foreign Exchange Desk of the Federal Reserve Bank of New York executes all transactions for both accounts.

If, for example, the United States wished to stem an appreciation of the yen against the dollar, the Federal Reserve Bank of New York would sell yen to commercial banks and receive payment in dollars, which is achieved by debiting the banks' reserve accounts at the Federal Reserve. While one might expect this transaction to increase the amount of yen and to decrease the amount of dollars in financial markets, it will not, because central banks that conduct their monetary policies under an interest-rate target, like the Federal Reserve, the European Central Bank, or the Bank of Japan, automatically neutralize—or sterilize—the impact of intervention on their interest-rate targets. If, for example, the open-market desk believes that the injection of \$600 million in reserves on a specific day is consistent with maintaining the current federal funds rate target, and if the foreign-exchange desk has separately withdrawn \$200 million in

Foreign-exchange-market intervention is generally ineffective when undertaken independent of monetary policy. But when undertaken as a goal of monetary policy, exchange-rate management can compromise price stability. This *Economic Commentary* explains the difficulties of implementing an intervention policy.

reserves through the sale of Japanese yen, the open-market desk will increase its injection to \$800 million. Unless one or both of the central banks that are party to an intervention adjust their interest-rate target in a manner consistent with the objectives of intervention, they automatically sterilize any foreign-exchange-market interventions.

Ironically, however, if a central bank is willing to alter its interest-rate target and monetary base in pursuit of an exchange-rate objective, transacting in foreign exchange becomes completely unnecessary to achieve that end. If, for example, the Federal Reserve sought a dollar depreciation against the yen, it could easily lower the federal funds rate target and inject reserves into the banking system through standard open-market purchases of Treasury securities. One might think that expanding the monetary base through yen purchases would have a faster and bigger impact on the yen-dollar exchange rate than expanding the monetary base through standard open-market operations, but recent empirical research does not support this hypothesis.¹ Nonsterilized intervention seems completely redundant to open-market operations in domestic securities.

Whether through domestic open-market operations or through interventions, adjusting the monetary base in pursuit of an exchange-rate objective can jeopardize the attainment of a central bank's price-level objective. If, for example, a depreciation of the dollar against the yen stemmed from a decline in world demand for U.S. goods, a contraction of the U.S. money supply to bolster the dollar could translate this export-demand shift into a more broad-based deflationary pressure. In this case, then, what the United States gains in exchange-rate stability, it loses in price stability.

Such conflict between policy objectives is not always a problem for monetary authorities. The above example assumed that the depreciation of the dollar against the yen resulted from a "real," as opposed to a monetary, event: Foreigners reduced their purchases of U.S. goods and services. If the underlying cause of the dollar's depreciation were, instead, an excessively expansionary U.S. monetary policy, then no incompatibility would follow. This seemed to have been the situation in the United States last year. With the dollar depreciating and domestic inflationary pressures rising, a federal funds rate hike seemed consistent with attaining both a stable exchange rate and price level.

Even if the Federal Reserve did not operate under a federal funds rate target, the System would have a second, equally important reason for routinely sterilizing the monetary effects of U.S. intervention—its independence. As noted earlier, the ESF of the U.S. Treasury has primary responsibility for intervention in the United States. Under these circumstances, if the Federal Reserve permitted ESF interventions to affect the monetary base, it would provide the Treasury with a means, albeit limited, of compromising the independence of the Federal Reserve's monetary policies. The autonomy of monetary policy seems crucial to central banks' credibility.

■ Intervention as Information

Although sterilized intervention affects neither the monetary base nor other fundamental determinants of exchange rates, empirical research does not dismiss intervention as totally ineffective. It portrays, instead, a rather haphazard relationship between intervention and exchange rates, which varies across time periods for any single exchange rate and across exchange rates within many individual time periods. Intervention's effec-

tiveness seems to depend on some unspecified aspect of the market, which many economists believe to be the state of private expectations.² If intervention actually does operate on market expectations, rather than on market fundamentals, then it provides policymakers with only a rather tenuous influence over exchange rates, since success requires authorities to possess better information than the market and to convey this information through official transactions.

Foreign-exchange markets are highly efficient processors of information, but they cannot be perfectly so. Exchange rates will instead reflect information up to the point where the benefits from acquiring and trading on new information just equal the added costs of doing so. In a less than perfectly efficient market, access to information differentiates traders, and exchange-rate changes serve as news conduits between more and less informed market participants. Under such circumstances, central banks could affect exchange rates through intervention if their actions revealed private information to the market, or if they possessed a clearer understanding of current market fundamentals than less informed private traders. This seems a tall order.

Nevertheless, some economists have suggested that central banks might signal future changes in monetary policy through their interventions, with sales or purchases of foreign exchange implying, respectively, prospective federal funds rate increases or decreases.³ Such signals could be particularly credible because the intervention would give the monetary authorities an exposure in a foreign currency that would result in a loss, if they failed to validate their signals. Of course, if central banks eventually accommodated their signals, intervention would not exist as a process distinct from monetary policy—it would no longer be sterilized. The issues raised in the previous section about the nature of the underlying disturbance to the exchange market and about the redundancy of intervention to standard open-market operations again become relevant. Moreover, policy signaling would only influence exchange rates if the market did not already anticipate a change. Evidence from the federal funds futures market suggests that participants predict policy moves fairly accurately within a two-month horizon.⁴ More direct tests of the monetary signaling hypothesis, while mixed, do not strongly support it.⁵

The information that a central bank conveys need not only be about future monetary policies; monetary authorities could conceivably have a better understanding than the private sector about any and all market developments and, therefore, a more informed judgment about the consistency of exchange rates. This may sound reasonable, but is it likely?

■ Do Central Banks Routinely Possess Better Information than the Market?

If U.S. monetary authorities possess better information than the market and if they can convey this information to the market through intervention, then predictable changes in dollar exchange rates should accompany U.S. interventions. Table 1 presents a statistical test of this proposition. It essentially asks if the exchange-rate changes around intervention events are consistent with the intended effects of the policy more often than chance.

Since we do not know the precise policy intentions of specific intervention episodes, we offer four reasonable, albeit somewhat arbitrary possibilities, and we compare all interventions since 1985 against each of these. The possible policy intentions appear as questions in table 1. (The examples below elaborate on their meaning.) The second column of the table shows the total number of U.S. interventions that occurred over the sample period, which runs from January 4, 1985, to March 3, 1997. Over the 3,072 business days in the sample, the United States sold German marks on 76 days and bought German marks 138 days. Similarly, the United States sold Japanese yen on 82 days and bought yen on 108 days.

The next column, labeled "intervention successes," shows the percentage of foreign-exchange purchases or sales that were consistent with each of the specific success criteria. Out of a total of 76 official U.S. sales of German marks, for example, 46 percent were associated with a same-day appreciation of the dollar. We consider these successful according to our first success criterion. Out of these same 76 interventions, however, only 32 percent were associated with a same-day appreciation of the dollar when the dollar had depreciated over the previous day. These 32 percent were successful according to criterion two. Similarly, 35 percent of the 82 official U.S. sales of yen were associated with a

**TABLE 1 SUCCESS OF U.S. INTERVENTION,
JANUARY 4, 1985, TO MARCH 3, 1997^a**

Possible Policy Intention #1: Dollar appreciation or depreciation. Does a dollar appreciation follow a U.S. sale of marks or yen? Does a dollar depreciation follow a U.S. purchase of marks or yen?			
	Interventions	Intervention successes	Virtual successes
Against MARKS			
Sales	76	46%	48%
Purchases	138	37%	51%
Against YEN			
Sales	82	41%	50%
Purchases	108	46%	48%
Possible Policy Intention #2: Reversal in the current trend in the dollar. Does a depreciating dollar appreciate following a U.S. sale of marks or yen? Does an appreciating dollar depreciate following a U.S. purchase of marks or yen?			
	Interventions	Intervention successes	Virtual successes
Against MARKS			
Sales	763	32%	24%
Purchases	138	26%	25%
Against YEN			
Sales	822	29%	25%
Purchases	108	28%	24%
Possible Policy Intention #3: Moderation of the current trend in the dollar. Does a depreciating dollar depreciate by less following a U.S. sale of marks or yen? Does an appreciating dollar appreciate by less following a U.S. purchase of marks or yen?			
	Interventions	Intervention successes	Virtual successes
Against MARKS			
Sales	76	20%	15%
Purchases	138	20%	14%*
Against YEN			
Sales	82	35%	15%*
Purchases	108	21%	16%*
Possible Policy Intention #4: Intensification of the current trend in the dollar. Does an appreciating dollar appreciate by more following a U.S. sale of marks or yen? Does a depreciating dollar depreciate by more following a U.S. purchase of marks or yen?			
	Interventions	Intervention successes	Virtual successes
Against MARKS			
Sales	76	4%	8%
Purchases	138	4%	9%
Against YEN			
Sales	82	1%	8%
Purchases	108	4%	8%

Observations = 3,072

a. In all cases, the success criterion measures the change in the exchange rate over the current business day and compares it, when appropriate, with changes over the previous business day. Criterion three does not include criterion two. Asterisks indicate that the number of successful interventions is greater than the expected or mean value at a 95 percent confidence level. Tests assume that successful interventions follow a hypergeometric distribution. **SOURCE:** Authors.

same-day dollar depreciation that was smaller than the previous day's dollar depreciation; they were successful according to criterion three. Of these same interventions, 1 percent were associated with a same-day appreciation of the dollar that was larger than the appreciation on the previous day. They accord with success criterion four.

The normal day-to-day movements in dollar exchange rates virtually guarantee that some of the interventions will appear successful under any criterion purely by chance. To separate effective policy from good fortune, we provide a count of how frequently various success criteria naturally occur in the sample data, whether or not intervention takes place. We call these "virtual successes"

and report their frequency in column three of table 1. The dollar, for example, appreciated against the German mark on 48 percent of 3,072 days in the sample period. These days would please any official who thought the dollar should appreciate against its German counterpart, hence their "virtual-success" name. The table presents similar "virtual-success" percentages for each type of transaction and for each currency under each success criterion.

Only in one-half of the 16 cases presented in table 1 does the percentage of actual successes in the sample exceed the percentage of virtual successes. These are concentrated under criteria two and three in table 1. Many of these same differences, however, seem rather small, and we cannot place much confidence in them. They could easily represent a peculiarity of the sample period and not a general property of intervention. After applying statistical tests, however, we can conclude with a high level of confidence—95 percent—that the actual intervention successes exceed virtual successes in only 3 of these 16 cases.⁶ These appear in table 1 with an asterisk.

The tests suggest that U.S. intervention has value to foreign-exchange traders only as a signal that the dollar's recent movements will moderate. When, for example, the dollar is depreciating against the yen, and the United States sells yen, chances are good that the dollar will immediately depreciate by a smaller amount than traders observed on the day before the intervention. The dollar, however, is unlikely to appreciate following the official sale of yen. Similar conclusions apply to official U.S. purchases of yen and marks, but not to official sales of marks. A more detailed analysis of these data suggests that these successes were concentrated in late 1985 following the Plaza agreement and in late 1987 following the U.S. stock-market crash. Uncertainty about monetary policy and economic conditions seemed to characterize both of these periods.⁷ Intervention may have clarified private traders' beliefs about monetary policy or simply about the steady-state path of the dollar during these times.

Conclusion

Central banks cannot regularly influence day-to-day exchange-rate movements through sterilized intervention because they do not customarily possess an information advantage over private-sector

traders. From time to time, most likely when markets are uncertain about the future direction of monetary policy, sterilized interventions may prove successful. These instances, however, are the exception, not the rule. Even in these fortuitous cases, intervention will probably produce only a moderation in the exchange rate's trend, not a reversal in its direction. A change in one country's monetary policy relative to another's could probably achieve an exchange-rate objective, but often at the loss of domestic price stability. In any case, such a policy requires no intervention at all.

■ Footnotes

1. Catherine Bonser-Neal, V. Vance Roley, and Gordon H. Sellon, Jr., "Monetary Policy Actions, Intervention, and Exchange Rates: A Reexamination of the Empirical Relationships Using Federal Funds Rate Target Data," *Journal of Business*, vol. 71, no. 2 (April 1998) 147-77.

2. See Richard T. Baillie, Owen F. Humpage, and William P. Osterberg, "Intervention as Information: A Survey," Federal Reserve Bank of Cleveland, Working Paper no. 9918 (December 1999).

3. See Michael Mussa, "The Role of Official Intervention," Occasional Paper no. 6, New York: Group of Thirty, 1981.

4. See John B. Carlson, Jean M. McIntire, and James B. Thomson, "Federal Funds Futures as an Indicator of Future Monetary Policy: A Primer," Federal Reserve Bank of Cleveland, *Economic Review* (Quarter 1 1995), pp. 20-30.

5. One might compare "Monetary Policy Actions, Intervention, and Exchange Rates" (footnote 1) with Rasmus Fatum and Michael Hutchison, "Is Intervention a Signal of Future Monetary Policy? Evidence from the Federal Funds Futures Market," *Journal of Money, Credit and Banking*, vol. 31, no. 1 (February 1999), pp. 54-69.

6. Details of these tests along with a more thorough analysis of various time periods is found in Owen F. Humpage, "The United States as an Informed Foreign Exchange Speculator," *Journal of International Financial Markets, Institutions and Money*, (forthcoming).

7. See Humpage, footnote 6.

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