

NBER WORKING PAPER SERIES

THE RISE AND FALL OF FOREIGN
EXCHANGE MARKET INTERVENTION

Anna J. Schwartz

Working Paper 7751
<http://www.nber.org/papers/w7751>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
June 2000

The views expressed herein are those of the author and not necessarily those of the National Bureau of Economic Research.

© 2000 by Anna J. Schwartz. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

The Rise and Fall of Foreign Exchange Market Intervention
Anna J. Schwartz
NBER Working Paper No. 7751
June 2000
JEL No. E5, F3

ABSTRACT

The premise of the paper is that the fervor for foreign exchange market intervention by U.S. and European monetary authorities has ebbed in recent years. A pattern of initial belief in the effectiveness of foreign exchange market intervention has recently been eroded, as is revealed by the absence of intervention in circumstances that in earlier times would have invoked it. Only the Bank of Japan among central banks of the developed world has not thusfar abandoned its faith that intervention can change the relative value of the yen as determined by market forces to conform with its notion of what that value should be. To explain why U.S. and European monetary authorities no longer believe that intervention is a tool that works, I review the equivocal record of past episodes, the inconclusive results of empirical research, and the problems of implementation that intervention advocates ignore.

Dr. Anna J. Schwartz
National Bureau of Economic Research
365 Fifth Avenue, 5th Floor
New York, NY 10016-4309
Tel: (212) 817-7957 / 7955
Fax: (212) 817-1597
aschwartz@gc.cuny.edu

THE RISE AND FALL OF FOREIGN EXCHANGE MARKET INTERVENTION AS A POLICY TOOL*

Anna J. Schwartz
National Bureau of Economic Research

1. Introduction

By intervening in the foreign exchange market in the 1970s in a floating exchange rate regime, US monetary authorities demonstrated their belief that it was an effective policy tool capable of influencing the relative value of the dollar vis-a-vis foreign currencies. US official intervention has been episodic: intense in some subperiods between March 1973 and February 1981, limited thereafter through 1986, and then growing in amount until August 1995. On only one day since then, 17 June 1998, has intervention been reported. The question I hope to answer is why the fervor for foreign exchange market intervention has ebbed.

A pattern of initial belief in the effectiveness of foreign exchange market intervention has also marked past European central bank official actions. That belief has recently been eroded as is revealed by the absence of intervention in circumstances that in earlier times would have invoked it. Only the Bank of Japan among central banks of the developed world has not thusfar abandoned its faith that intervention can change the relative value of the yen as determined by market forces to conform with its notion of what that value should be.

One path I pursue in explaining why US and European monetary authorities no longer believe that intervention is a tool that works is to review the results of past episodes of intervention. Experience has disillusioned them. Another path is the evidence that economic research has produced. Research has not yielded credible support for the belief that by intervening monetary authorities can stabilize or choose what they regard as appropriate levels of exchange rates of their currencies.

Some prominent economists, however, do not accept these results. They are convinced that a fixed exchange rate system is superior to a floating rate non-system, and are generally nostalgic for the world of Bretton Woods. Accordingly, they believe that maintaining the level and stability of the exchange rate should be the highest priority of central banks, and support intervention to this end as an article of faith. Whether intervention is effective is an issue they ignore.

The paper is organized as follows. In section 2, I define official intervention, mainly with reference to US procedures. I distinguish sterilized from unsterilized intervention, and discuss the reasons monetary authorities have intervened in the past. In section 3, after sketching movements in the dollar exchange rate since the end of the Bretton Woods era, I give a potted history of the leading episodes of intervention. In section 4, I report the results of research on intervention. In section 5, I discuss the indictment of floating rates by economists who propose that central banks establish target zones for bilateral exchange rates that they will defend by intervening. I indicate why implementing these proposals would be problematic. In section 6, I conclude, touching on the political economy aspects of exchange rates from national and international viewpoints, and offer some observations on the case of the Bank of Japan.

2. Official intervention

Official intervention involves purchases or sales of foreign currencies, usually in the spot market, with the intention to move the exchange rate of the domestic currency vis-à-vis foreign currencies. If the authorities purchase foreign currency, they thereby increase commercial bank reserves and hence domestic money balances, with the intended effect of depreciating the domestic currency. If the authorities sell foreign currency, they thereby reduce commercial bank reserves and hence domestic money balances, with the intended effect of appreciating the

domestic currency. Domestic monetary policy and unsterilized intervention are alike in that they are expected to work through the monetary channel to influence exchange rates. The problem for intervention is that the monetary channel cannot be relied on to produce its effects in a week, a month, or a quarter, and certainly not in days – the usual time frame for intervention.

2.1 US conduct of foreign exchange operations

Two agencies conduct foreign exchange operations in the US. The Exchange Stabilization Fund (ESF), part of the Treasury Department that was established by the Gold Reserve Act of 1934 with authority to operate in the foreign exchange market to protect the exchange value of the dollar, is the senior agency. The Federal Reserve System is the junior agency. Since 1961 on request it has executed transactions for the Treasury, and since 1962 it has undertaken foreign exchange operations for the System's own account.

US official intervention, when it occurs, is initiated by the Treasury. It consults with the Federal Reserve chairman, when a transaction is to be undertaken, on the amount that they will purchase in dollars or that they will sell in units of individual foreign currencies. A decision is also made about the share of the transaction that will be allotted to the ESF and to the Federal Reserve Banks (Humpage, 1994). A subcommittee of the FOMC, headed by the chairman, decides the amounts of the System's purchases or sales of individual currencies and instructs the manager of the System's foreign account at the Federal Reserve Bank of New York to execute the transaction. The two agencies at times have disagreed about intervention, with the Treasury more favorable and the System less so to undertake it.

Foreign central banks may discuss intervention with their finance ministers, but do not operate with a formal structure comparable to the bifurcated one in the US.

2.2 Sterilized vs unsterilized intervention

US intervention is routinely sterilized, possibly with a lag (Smith and Madigan 1988). The Federal Reserve offsets purchases or sales of foreign currencies with sales or purchases of US government securities because it does not want its foreign exchange market operations to change domestic monetary policy. If there is a question about the effectiveness of unsterilized intervention, over the time horizon within which it operates, there is an even larger question about the effectiveness of sterilized intervention.

Unsterilized intervention is monetary policy conducted by open market operations in foreign rather than domestic securities. A change in the monetary base, however achieved, compared to the change in the base in other countries, might be expected to affect exchange rates. Acceleration of monetary growth in one country relative to monetary growth in other countries would lead to expectations of higher inflation in the first country than elsewhere and a depreciation of its exchange rate. Deceleration would have the opposite effect. Nominal depreciation would be associated with the excess of the inflation rate in the first country over that of its trading partners. Successful control of inflation would alter expectations concerning the future course of inflation and the willingness of authorities to combat it should it again rise. A strong real appreciation would follow. If expectations of inflation are low, then expansionary monetary policy works through the liquidity effect, lowering real interest rates and producing the same effect of monetary growth in one country relative to monetary growth in other countries.

The problem is that economists do not have a firm grasp on the time lags associated with the forces that determine movements in exchange rates. Models of exchange rate determination have failed to explain or predict actual exchange rate behavior. Moreover, while monetary policy changes exemplified by unsterilized intervention seem a plausible candidate determinant of

exchange rates, there is no unanimity among economists as to the primacy of its role (Frankel, 1994). Other factors have also been cited: differences in expected real returns to investment and expected productivity growth; changes in the current account balance; changes in the capital account. So even unsterilized intervention, given the brevity of the intervals during which it occurs, and the uncertainty of the time lags on its effects, does not assure that a central bank will achieve its exchange rate aim. I shall return to this subject at a later point in discussing the Bank of Japan. The success of sterilized intervention is even more in question, as we shall see.

2.3 Why authorities intervene

Monetary authorities cite three motives for intervening: (i) exchange rate markets are disorderly; (ii) the medium-term level of exchange rates is too high or too low; (iii) they are expected to participate when coordinated intervention is undertaken.

2.3.1 Disorderly markets

Financial asset markets are disorderly in the sense of large daily movements above and below the mean daily value of the asset. Examples are equity prices, short-term interest rates, long-term bond yields, and commodity futures. Exchange rates in fact are less disorderly than prices of other financial assets. The three panels of Figure 1 plot daily movements in the Standard and Poor 500 stock market prices, the \$/DM, and the \$/yen exchange rates from 2 January 1995 through 8 February 2000. The daily variability of stock market prices is more than twice that of the exchange rate series (S.D./ mean values are 0.324, 0.127, 0.105).

If exchange rates mirror unanticipated changes in underlying economic factors, volatility must result. If so, foreign exchange markets efficiently spread the effects of economic shocks. Unanticipated change leads to portfolio adjustments by investors that change exchange rates and prices of other financial assets before prices of goods change. If asset markets did not quickly

absorb the initial shock, prices and quantities of goods and labor markets would have to adjust much faster. Monetary authorities, however, may regard exchange rate volatility as evidence of bandwagon effects, destabilizing speculation, or market inefficiency. Tests of market inefficiency, furthermore, are inconclusive, and there is no criterion for determining that volatility is excessive.

2.3.2 Exchange rate fluctuations

Fluctuations in the level of exchange rates cause changes in other economic variables – aggregate and sectoral output, the price level, the volume of international trade, and foreign investment flows. A strong currency stimulates imports and discourages exports. It leads to trade deficits, raises unemployment in export and import-competing industries, and arouses protectionist pressures. A weak currency raises inflationary concerns as prices of imports rise with possible pass-through effects on nontradable goods prices and wages. Fluctuations in the level of exchange rates thus impose adjustment and uncertainty costs on the economy. Shifting resources toward and away from tradable goods industries to adjust to alternating currency weakening and firming is wasteful. Uncertainty about stability of returns on foreign trade and investment also has a resource cost.

2.3.3 Pressure to join in

Monetary authorities feel pressure to participate in programs of coordinated intervention, even if only to a minimal extent, as important for their standing in the international community, and even if they have reservations about the value of coordinated intervention.

These reasons for intervention have recently lost their force in view of the results of intervention in the past quarter of a century, to which I now turn.

3. Record of intervention

3.1 Dollar exchange rate movements

Before discussing the record of intervention, I sketch the movements of the dollar exchange rate since the end of the Bretton Woods era. The two panels of Figure 2 plot end-of-month exchange rates for the DM and yen per dollar from January 1973 through December 1999.

Overall, depreciation has marked the nominal and real value of the dollar over this period. Within the overall movement, alternating phases of appreciation and depreciation occurred. The dollar was weak in the mid- and late 1970s – in the latter period the dollar value reached its all time low -- and in 1981-84 it sharply appreciated against the currencies of US trading partners. The entire upward movement was reversed in 1985-86, and the dollar continued to fall in 1987 to a level not much above that in 1979. In 1989 the dollar appreciated somewhat, followed by renewed weakness in 1990-92. After strengthening in 1993, the dollar fell in 1994 and 1995, particularly against the mark and the yen, and strengthened again in 1996-98. In 1999 the dollar appreciated markedly against the euro, but lost ground against the yen.

3.2 Intervention before 1981

When generalized floating exchange rates got under way in March 1973, US and other monetary authorities regarded intervention as an important policy tool. In July 1973 the Fed intervened with modest sales of D-marks and with the much larger total of foreign currencies available through swap agreements – arrangements with foreign central banks, which allowed the Fed to obtain foreign currency equivalent to a specified dollar ceiling for a designated period. The authorities were then concerned by the fall in the dollar exchange rate as US inflation rose, the prospect of higher oil imports, and the political fallout from the Watergate scandal.

Until September 1974, the authorities intervened sporadically to counter what they regarded as disorderly markets. In May 1974, after several months of dollar depreciation, the US, German, and Swiss authorities undertook concerted intervention. To offset volatility in the dollar-D-mark and dollar-Swiss franc rates, and to slow depreciation of the dollar, from October 1974 to March 1975, the Federal Reserve, the Bundesbank, and the Swiss National Bank coordinated intervention. The System's intervention, drawing on swap lines, amounted to \$1.4 million dollar equivalent, the other central banks making somewhat larger dollar purchases.

From September 1977 to December 1979, the Bank of Japan joined the coordinated intervention team to arrest the decline in the dollar. The ESF reached a swap agreement with the Bundesbank in January 1978 to supplement the Bundesbank swap line with the System, which was doubled. In addition, the Treasury sold SDRs to the Bundesbank for marks. The Treasury auctioned gold to the public, drew on the US reserve position in the IMF, and issued bonds denominated in foreign currencies.

The decline in the weighted average exchange value of the dollar nevertheless accelerated in 1978. An anti-inflation program announced in October (involving fiscal restraints, voluntary wage and price standards, and a reduction in regulatory actions) did not moderate the dollar's slide on the exchange market. In November, foreign exchange resources equivalent to \$30 billion were mobilized to finance intervention to support the dollar, in cooperation with Germany, Japan, and Switzerland. During the last two months of 1978, US exchange market intervention in support of the dollar totaled \$6.7 billion and the three cooperating central banks made significant purchases of dollars.

By June 1979 the dollar's value on a trade-weighted basis had risen by 10% from its 1978 low, and the US authorities had repurchased a greater sum of foreign currencies than they had

sold in the last two months of 1978. The dollar then began to weaken, and US sales of foreign currencies, chiefly marks, resumed. On 6 October 1979, the Federal Reserve announced a wide-ranging set of measures to tighten monetary control, and the dollar began to appreciate. From October 1979 on, the authorities intervened frequently, operating on both sides of the market. When the dollar was in demand, they acquired foreign currencies in the market and from correspondents to repay earlier debt and to build up balances. They were buyers from February to March 1980, and from late March, they sold currencies. By the end of July, the authorities were again accumulating currencies.

One practice that became significant in 1977 was Federal Reserve warehousing of foreign currencies for the Treasury. In January, the FOMC authorized purchase by the System of up to \$1.5 billion of developed country currencies from the ESF for 12 months. The System warehoused proceeds of Carter bonds – bonds denominated in marks and Swiss francs issued in 1978-80. In effect, the System made a loan to the Treasury for loans the Treasury had obtained abroad. The System was ready to warehouse currencies with no time limits, subject only to the Treasury's annual settlement for valuation gains and losses.

By the end of 1980, the Federal Reserve was intervening in the foreign exchange market on a day-to-day basis. To offset disorderly markets, the Trading Desk placed simultaneous bid-and-asked prices. From September 1980 to February 1981, the aim of intervention was to cushion the rise in the dollar, and to acquire hard currencies to pay off swap debts. The authorities bought D-marks, Swiss francs, French francs, more than doubling their foreign currency assets.

3.2 Little intervention, 1981-86

During this period, intervention operations by the US authorities were limited. On 19 February 1981, the Reagan administration halted exchange market operations, intervening later that month to calm a disorderly market, and thereafter only once at the time of the assassination attempt on President Reagan.

European monetary authorities opposed the Reagan administration's support for market determination of foreign exchange rates. At the Versailles Summit of the G-7 in June 1982, it was agreed to sponsor studies by a working group of the effectiveness of intervention in foreign exchange markets. These studies formed the basis for the Jurgensen report the following year, which concluded that intervention could influence exchange rates in the short run, but sterilized intervention which left the monetary base unchanged had no lasting effect unless accompanied by domestic policy changes. The report, however, did not alter the beliefs of European authorities with respect to the value of intervention. They continued to use the System's Trading Desk as their agent when they chose to intervene in the New York market.

The centerpiece of this period was the persistent rise in the market value of the dollar from 1981 until February 1985. It occasioned a debate on whether there was a bubble in the 1984-85 market valuation of the dollar, in view of the easing of monetary policy in mid-1984, which might have been expected to halt dollar appreciation.

In the second Reagan administration, the new Secretary of the Treasury, James A. Baker III, retreated from the position favoring market-determined exchange rates. Although the dollar had begun to weaken in February 1985, the US authorities convened a meeting of G-5 officials at the Plaza Hotel in New York on 22 September, in order to reverse appreciation of the dollar.

Following the Plaza Accord, the G-5 engaged in massive intervention, by selling dollars (buying other currencies).

How much of the dollar's decline between February 1985 and December 1985 would have occurred in the absence of intervention is an open question. Edwin M. Truman, then staff director of the Division of International Finance of the Federal Reserve System, concluded with respect to intervention between January and March 1985 that "intervention per se could not have had much to do with a turn in the dollar that was long overdue" (Truman, 1994, p. 250). Truman regarded the September-November 1985 intervention as "partially successful."

The US authorities did not intervene in 1986, since the continued decline of the dollar was deemed to be orderly. The Japanese, however, bought dollars in the second and third quarters of the year to counter appreciation of the yen.

The G-5 apparently sterilized intervention. Coordination between the Bundesbank and the Federal Reserve was observed, but less so between them and the Bank of Japan (Weber, 1994). No reversal of trends in bilateral exchange rates occurred, one measure by which to judge whether intervention was effective.

3.3 Renewed intervention, 1987-95

During this period, marked by coordinated central bank intervention under G-7 prodding, US purchases of foreign currencies exceeded those of preceding years. Maximum amounts of authorized Federal Reserve foreign currency balances rose from \$12 billion in 1987 to \$25 billion in 1990, and actual balances rose accordingly. From a peak of \$25 billion in March 1995, by the end of the third quarter, foreign currency balances had declined by \$3 billion. Treasury balances also increased, reaching a peak of \$29 billion by the end of the third quarter of 1995.

Researchers have identified 17 individual episodes of coordinated intervention based on daily data between January 1987 and March 1991. They define an episode as temporarily successful if the next episode is of the same sign, and definitely successful if the next episode is of the opposite sign (Catte, Galli, and Rebecchini, 1994). Doubts about the validity of these findings have been expressed (Truman 1994; Weber 1994).

At the end of January 1987, in coordination with Japan, the US authorities sold yen to counter depreciation of the dollar. The G-7 met at the Louvre in Paris on 22 February to foster stability of exchange rates at their current levels. Yet, despite intervention, the dollar continued to decline against the yen. Federal Reserve injection of liquidity into the economy in response to the October stock market crash was accompanied by a further decline in the dollar, the Louvre Accord notwithstanding. Throughout 1987, support of the dollar by major central banks amounted to nearly ten times the size of US intervention. By 1988, although the US both bought and sold foreign currencies, net intervention was moderate.

A stronger dollar in 1989 led to three weeks of coordinated intervention in October to lower its exchange value. US purchases of yen and marks during this episode were on a larger scale than in previous years, and sales of dollars by the G-7 were twice the size of US intervention. Warehousing by the System enabled the Treasury to acquire additions to its holdings.

In 1990, US authorities bought yen and marks. In the middle of the year, the ESF sold its mark balances in order to retire amounts in the warehouse, and the System sold towards the end of the year to counter a bolstered mark. These operations continued early on in 1991 with purchases of yen and marks, followed by spot and forward sales of marks. The pattern of 1992 was much like that of 1991. In 1993 intervention action was limited to the yen, with alternating

sales and purchases. In the first half of 1994, the authorities sold both yen and marks. At the end of 1994 and during the first months of 1995, the fall in the foreign exchange value of the dollar against the yen and the mark led to an organized effort by 13 central banks in addition to the US authorities to support the dollar. This continued in April and May. In early July and August, in coordination with Japan, the authorities sold yen. On 15 August, in coordination with Japan and Germany, the authorities sold both yen and marks. Thereafter the US and other central banks appeared to passively accept the market's verdict on exchange values. The exception was Japan. On 17 June 1998 the US and Japan intervened by buying yen. On 12 January 1999, Japan reportedly sold yen.

4. Research findings on sterilized intervention

Economists have engaged in a quest for ways that might account for successful sterilized intervention. They proceeded from the observation that monetary authorities repeatedly intervened, both when a currency was depreciating in exchange value and when it was appreciating. Economists concluded that monetary authorities must believe that intervention worked. Research was therefore needed to establish the channels by which sterilized intervention empirically could be shown to affect exchange rates.

The literature on foreign exchange market intervention posited three channels: (i) the need for portfolio balance; (ii) announcement effects in the presence of market inefficiencies; (iii) signaling. I first discuss the theoretical content of each of the approaches and then the empirical findings of research studies.

4.1 Portfolio balance channel

The portfolio balance channel assumes that, because of foreign exchange risk, foreign and domestic securities are imperfect substitutes, so investors have to be compensated by a risk

premium for holding foreign securities. Sterilized intervention changes the supply of foreign relative to domestic assets, thus disturbing equilibrium in investors' portfolios. To restore balance, a change is required in the risk premium measured as the deviation from the uncovered interest rate. Hence the realignment of asset returns produces a change in the spot exchange rate.

Empirical evidence however, generally does not support the assumption that private investors distinguish between foreign and domestic assets (Edison 1993; Dominguez and Frankel 1993a). Research in the 1970s tested the joint hypotheses of uncovered interest rate parity – equality of returns between the securities of two countries adjusted for expected change in the exchange rate – and speculative efficiency in the exchange market – the current spot exchange rate is the best predictor of next period's spot rate. The data failed to reject these hypotheses, and early studies concluded in favor of perfect substitution (Mussa, 1979).

Later studies analyzed longer data sets with different econometric techniques, leading to the opposite conclusion, namely, actual returns on securities denominated in different currencies differ by more than a random factor. According to these studies, the returns are separated by a time-varying risk premium, determined by relative supplies of domestic and foreign securities (Hodrick, 1987). Supplies of domestic and foreign assets would have to be changed enough to change the risk premium. These findings in turn were challenged by evidence that the risk premium measure is not significantly affected by relative asset supplies in regressions testing for this effect (Frankel, 1982), for risk premia on six currencies and country securities; for the US and Canadian dollars and their respective bonds (Rogoff, 1984). Perfect substitutability was reaffirmed by regressions of the exchange rate on domestic and foreign money supplies, as well as on domestic and foreign assets and wealth, with coefficients not significantly different from each other.

Recent studies using capital asset pricing models with time-varying risk premia and consumption-based asset pricing models have low explanatory power in validating the portfolio balance justification for sterilized intervention (Obstfeld, 1990). The evidence on risk premia has not been able to account for the deviations from equality of returns on securities of different countries denominated in different currencies and for determining any effects on exchange rates.

Findings generally favorable for the effectiveness of intervention, based on survey data on exchange rate expectations, include statistically significant effects through the portfolio balance channel and also through an expectations channel (Dominguez and Frankel, 1993b). When an equation for the portfolio channel was estimated, using instrumental variables, perfect substitutability of mark and dollar assets was rejected for the sample period, January 1985-December 1988, implying, according to the investigators, that the Federal Reserve and Bundesbank intervention had a significant although small effect on exchange rates even if sterilized. Note that no intervention by the Federal Reserve occurred in 1986, and in 1985 and 1987, when it did occur, the amounts involved were small. The effect, however, according to this study, is heightened if the public has information about the intervention. The expectations channel operates to reduce the ratio of the portfolio demand for marks to the portfolio demand for dollars and thus leads to the depreciation of the mark exchange rate.

Three possible ways of rationalizing the inconclusive results for portfolio balance models have been suggested (Marston, 1988): (a) ex post interest differentials may reflect not risk premia but the failure of traders to take advantage of profit opportunities in the foreign exchange market; (b) risk premia may explain the differentials, but changing asset supplies may have little effect on the exchange rate; (c) economists possibly lack the technical skills to measure the effects of sterilized intervention on portfolio decisions. None of these suggestions is compelling.

4.2 Announcement effects

Sterilized intervention could conceivably affect exchange rates by conveying information that traders otherwise overlook. The reason they fail to recognize profit opportunities, on this approach, is that the foreign exchange market is inefficient. However, if traders are not well informed, why are government bureaucrats, who execute intervention, better informed? Since authorities generally delay announcing intervention until some time after it has occurred, how can traders benefit from the information that it conveys?

4.3 Signaling

On this approach, intervention is supposed to signal a change in the monetary policy intentions of the authorities. The signal activates a response by the private sector to move exchange rates in the direction that the monetary authorities seek. A basic difficulty with this scenario is that announcements are often delayed. If market participants are unaware that intervention has taken place, they will not perceive a signal. On the other hand, if market participants mistakenly believe that intervention is under way, they may detect a signal where none has been sent.

Analysis of intervention signals is opaque. One attempt compares the Carter administration's unsuccessful use of sterilized intervention to support the dollar in late 1978 and the Plaza Agreement, which the author interprets as having succeeded in bringing down dollar exchange rates thanks to credible policy announcements (Marston, 1988).

One econometric study reports evidence that Federal Reserve intervention in the 1977-81 period provided information useful to predict future monetary policy (Dominguez, 1990). The author found a significant relationship from October 1979 to the following spring between money surprises – the difference between weekly money supply growth rates and market forecasts of these growth rates – and the authorities' purchases of foreign currencies between

forecast and actual money announcements. Intervention, according to this study, signaled information about money that the earlier forecast did not contain.

Another study found that though intervention in the period 1985-89 signaled a change in US monetary policy, on average the signals of future monetary policy were opposite in sign to those produced by intervention (Kaminsky and Lewis, 1993).

Obstfeld (1990) suggests that intervention may provide more information than public debt management policies because unanticipated exchange rate changes can have an effect on government's net worth. His example is sterilized purchases of foreign exchange. They signal future depreciation of the domestic currency. However, if the domestic currency appreciates, the government will sustain greater losses than would otherwise have been the case. To avoid this embarrassment, the government's intervention will prove credible to the market even with perfect substitutability of country securities.

In the US case, however, budgetary effects do not appear to act as a strong constraint on intervention. Between 1988 and 1995, US sterilized purchases of foreign currencies were associated with a depreciating dollar. Yet the Federal Reserve's objective of achieving zero inflation over a period of years signaled an appreciating dollar. Dollar depreciation that accompanied the purchase program increased the current market value of the currencies acquired. Possible losses on foreign currencies did not therefore provide the kind of information that Obstfeld envisioned.

In the research on signaling, coordinated intervention is assumed to be more effective than unilateral intervention. It is signaling by several central banks rather than one alone that is said to lead to desired exchange rate changes. A study of daily intervention data supplied by the Bundesbank and the Federal Reserve from 1985 to 1987 shows that coordinated and unilateral

sterilized intervention have different and significant effects on the exchange rate premium (Dominguez, 1990). The investigator finds the stronger effects of coordinated than of unilateral intervention to be evidence that market participants interpret policy coordination as a sign of credible commitment. However, a central bank that participated in a coordinated intervention that signaled a policy change that it did not intend to implement would lose credibility when the foreign exchange market learned of the duplicity.

Obstfeld (1990) has raised three questions regarding a putative signal that sterilized intervention is said to convey: (a) Is the intervention information an addition to the policy announcement that either accompanies or substitutes for intervention? (b) Why is sterilized foreign exchange market intervention more effective as a signal, say, than an open market sale of domestic securities that is sterilized by an increase in central bank loans to commercial banks? (c) If one assumes that signaling is in fact taking place, are the intentions that sterilized intervention signals accepted at face value by the market?

A skeptical answer to these questions reflects the view that central banks need not engage in such a devious way of informing the public of its objectives and the policies it favors to achieve them. Sterilized intervention as a way of signaling or in any other way that has been suggested cannot be shown to change exchange rates.

5. Indictment of floating rates and proposals to stabilize them

5.1 Indictment of floating rates

Some economists find movements of floating exchange rates that cannot be attributed to fundamentals objectionable. They regard them as driven by herd behavior rather than rational expectations. On their view, the foreign exchange market is inefficient. It produces not only volatility but also misalignments that damage macro- and microefficiency of advanced countries.

In addition, emerging market countries that peg their exchange rates to advanced country currencies are victims of the instability of exchange rates (Clarida, 1999). The critics of floating exchange rates believe that intervention works.

5.2 Proposals to counter exchange rate instability

A favorite recommendation of the critics of floating rates is that central banks should establish target zones within which their exchange rates would be permitted to move. The zone would be bounded by a predetermined band width.

John Williamson (1986, 1994, 1998) has been a persistent advocate of target zones with wide bands (plus or minus 10 to 15 percent) that support equilibrium in the current account. In the most recent version, he favors periodically adjusting the parities by small amounts to take account of differences in bilateral inflation, differences in changing aggregate demand, and differences in relative productivity in the traded goods versus the services sector. The central parity would be based on an estimate of the real effective rate that reflects a sustainable current account deficit or surplus representing external balance, and full employment representing internal balance. In earlier versions, Williamson favored bilateral nominal effective exchange rates. With a central parity crawl, the wide band would also move.

Williamson proposes that the central banks announce the band within which they will intervene, not limiting intervention to the edges of the band. He acknowledges that sterilized intervention may not do the job and that monetary policy might need tightening with a weak currency or easing with a strong one. In the latest version, he does not indicate which bilateral currency should respond in this case, although, in an earlier version, he recommended that whichever country's policies posed the worse global threat (inflation or deflation) should be the one to act.

The case for wide bands, according to Williamson, rests on the imprecision of estimates of equilibrium exchange rates, on the scope it provides for central bank cyclical adjustment of interest rates, and on countering speculative pressures.

As a variant of a moving wide band, Williamson suggests a monitoring band – narrower than the wide band – which does not oblige the central bank to defend the edge of the band. Thus, the exchange rate might move outside the monitoring band when market pressures are strong without triggering intervention. Only then would the central bank start defending the wide band. It is not clear what Williamson believes the market reaction would be to this suggestion.

Paul Volcker (1995) has offered another target zone proposal. In his blueprint, central banks are expected to choose equilibrium values of their nominal bilateral exchange rates to form the central parities of the system around which a target zone of plus or minus 10 percent would be defined. Initially, the band might be as much as plus or minus 15 percent. All the participating central banks would be required to intervene on as big a scale as necessary to keep exchange rates within the target zone. The assumption is that firm commitment to intervene will persuade markets of the credibility of the effort, and as a result the market will support, and not resist, the guiding hand of the central banks. The proposal gives the IMF the task of assisting the advanced country central banks to coordinate changes in monetary or fiscal policies needed to achieve the exchange rate objective.

Ronald McKinnon (1998) is an additional advocate of target zones for the bilateral exchange rates of the US, Japan, and the European Monetary Union. In his view, central parities should be announced, based on purchasing power parity for traded manufactures for the three currencies, with a band of plus or minus 5 percent. The central banks would defend these parities with unsterilized intervention. For any bilateral rate, both countries would be expected to

intervene to correct movements in the rate. The countries would publicly announce interventions. The three countries would also pursue a common inflation target for the producer price index and would not permit base drift. McKinnon assumes that the nominal exchange rate target is consistent with the price level target, but provides an escape clause that would allow a country to suspend its obligation to keep bilateral exchange rates within a band defined by purchasing power. The country would then be expected to restore the PPI that prevailed when suspension occurred before resuming the exchange rate commitment at the original parity.

5.3 Problems with implementing target zone proposals

The basic problem is that the authors take for granted that central banks can manipulate exchange rates as they desire and that whatever resources are required for this undertaking are available. There are other no less serious problems related to the design of target zones. The advocates believe that central banks can assign top priority to the external objective of maintaining stability of central parities and at the same time avoid sacrificing internal stability of prices and output. A policy to keep central parities from either appreciating or depreciating could succeed only if the domestic economy required the same expansionary or contractionary actions. The history of currency crises teaches a different lesson: they occur because domestic objectives clash with external ones, and when they do, central banks are constrained to abandon the external objectives. Defending an exchange rate by raising interest rates to astronomical levels soon convinces central banks that the game of shielding the exchange rate at the cost of throttling the domestic economy is not worth pursuing.

There are political overtones to target zone implementation. When one currency appreciates and the other depreciates in a bilateral exchange rate, one country will be expected to ease and the other to tighten monetary policy. For each country adjusting monetary policy for

exchange rate reasons may conflict with domestic goals. It is not at all self-evident that countries will respond to exchange rate perturbations with actions that for other reasons are not in their self-interest.

The target zone advocates presume that the market will respect the choices central banks make about central parities and bands. The market is supposed to behave in a way that will validate the choices, not question them. Once the central banks display commitment to intervene in support of their choices, that is said to convince the market that the parities are invulnerable. The episodes of speculative attack do not bear out this view. In particular, the choice of central parities is suspect. There is no consensus in the profession about the model to use to estimate the fundamental equilibrium exchange rate. The advocates of target zones themselves do not agree on the model: purchasing power parity for traded goods, real exchange rates for equilibrium current accounts, or a structural current account model. The market's equivocal judgment about the validity of central parities leaves target zones wide open to attack.

6. Conclusion

The historical record and the findings of economic research suggest that intervention by monetary authorities have little effect on exchange rates. To judge by their recent behavior, most central banks have also reached the same conclusion. The one exception is the Bank of Japan. A few economists also still advocate intervention.

6.1 What does the record of intervention show?

There is little indication that lasting change has resulted from the frequent occasions on which authorities have taken action to quell disorderly markets. At best, large and reversible transitory movements of some exchange rates and widening of bid-ask spreads have been reduced for minutes or so by intervention. The authorities lack a measure of the true costs of volatility, so

they have no basis for knowing whether the costs are large enough to justify intervention even if it can produce such a temporary reduction in volatility. Is there any more reason for them to attempt to reduce the volatility of exchange rates than to attempt to reduce the volatility of equity prices, bond prices, or primary commodity prices, which is not part of their agenda?

The feared consequences of medium-term variations in the dollar's exchange value have not materialized. The supposedly grossly overvalued dollar in 1981-85 did not deindustrialize the US economy and usher in a service economy of low-income occupations. Shifts in employment from traded to nontraded goods industries occurred, but such shifts among industries are not uncommon even when the exchange value of the dollar is not involved. There are better answers to protectionist antitrade proposals than intervention.

Similarly, concern that a weak dollar would induce domestic inflation has not been substantiated. What may be true for small, open economies does not apply to a large, relatively closed economy like the US. When inflation has at times manifested itself, it has been home-grown by Federal Reserve monetary policy, not an import-driven rise in prices.

Apparent success of coordinated intervention depends less on whether it is undertaken wholeheartedly, because countries want to be known as members in good standing in the international community, than on whether it supports the direction in which the market is moving on its own. The combined country intervention package remains miniscule relative to the size of the financial resources of private agents in foreign exchange markets that can easily overwhelm official attempts to manage exchange rates. Coordinated intervention is a fair-weather instrument because countries have independent interests that they will not sacrifice for the sake of the collectivity.

6.2 What does economic research show?

Despite extensive research, no model has as yet been deployed that can reproduce short-term in-sample exchange rate movements, let alone out-of-sample movements, although variants of the models may be useful for the analysis of longer-run movements in exchange rates. These results give little basis for concluding that authorities can successfully intervene to achieve a target level of exchange rates or to dampen inter-day and intra-day volatility of exchange rates.

Economists have suggested that sterilized intervention works through a portfolio balance channel and a signaling channel. Empirical research, however, has found the portfolio channel implausible. The signaling channel makes incredible assumptions about central banks' motivation to intervene.

The question Andrew Rose (1996) asks sums up the research case against intervention: "Why [has intervention been] taken so seriously by both market participants and central banks when the macroeconomic presumption is that sterilized intervention is almost irrelevant?"

6.3 Why intervention in target zones is problematic

Each of the four underlying premises of the target zone proposals is dubious. (a) The exchange rate is the single most important variable a central bank must control. (b) Monetary policy can simultaneously serve both external and internal objectives. (c) Central banks know the correct foreign exchange values of their domestic currencies. (d) Intervention is effective.

6.4 Evidence that monetary authority belief in intervention has weakened

As noted above, US authorities held peak accumulations of foreign currency balances in 1995, when they were in excess of \$50 billion. By 1999 foreign currency balances had fallen to \$32 billion. These are still large holdings, but I interpret the reduction as signifying that intervention is less desirable currently than previously.¹ Another piece of evidence is the aplomb with which the European Central Bank has ignored the depreciation of the euro since its launching in

January 1999. A depreciating currency that stimulates export growth may be more acceptable to monetary authorities than an appreciating currency. Nevertheless, in view of all the pre-launching suggestions that the euro would quickly become a serious rival to the dollar as an international currency, its actual performance must have been somewhat embarrassing. The Bank of England also has not intervened despite a strong pound.

One interpretation of the Bank of Japan's obduracy with respect to sterilized intervention is that it has never faced up to the central bank's dilemma: monetary policy can support either domestic or external objectives.² Monetary policy cannot serve both. Most advanced country central banks have opted for the domestic objective, concluding that they will aim over the long term to reduce and ultimately eliminate inflation. The Bank of Japan has seen itself as in a different position. It has been trying to nurture an incipient recovery after years of economic free fall. The fear that a strong yen would threaten exports and reverse stock market gains has driven policy. Foreign investment in the stock market in the early months of 2000 strengthened the yen. The Bank therefore sought to weaken the yen by (sterilized) purchase of dollars. However, the strong yen has neither weakened as a result of intervention nor has it undermined exports. The demand for Japan's exports appears to depend more on how well its export markets are doing than on the exchange rate of the yen. Fundamentally, the error of the Bank has been its failure to embrace a policy that would allay what it fears. Monetary policy needs to be eased either by open market purchases of domestic securities, or by unsterilized purchases of foreign exchange, either of which would raise the money supply, deflate the yen, support the export sector, and sustain the recovery.

McKinnon (1999) rejects this prescription. He asserts that Japan is in a liquidity trap with short-term interest rates at zero and the monetary base overexpanded. Japan's dilemma in his

view is the result of market expectations dating from 1971 that the yen is likely to be higher in the long run. As long as expectations governing the exchange rate remain unchanged, he contends, the Bank of Japan cannot itself affect the exchange rate, whether its intervention is sterilized or unsterilized. Upward pressure on the yen reflects mercantile pressure from the US, associated with trade disputes between the two countries, and the current unwillingness of Japanese financial institutions to add to their stock of dollar claims that finances the US current account deficit. However, inflationary expectations in the US have led to lower US interest rates, which in turn, according to McKinnon, have pushed Japanese interest rates 4 percentage points lower by expectations of ongoing yen appreciation. He contends that to escape from the liquidity trap the Bank of Japan on its own can do little. Only a joint US-Japanese program of long-run yen stabilization will assure that Japanese interest rates will rise to international levels. To keep the exchange rate stable, the monetary base might have to contract. So the recommendation of expanding the current monetary base would make adjustment more difficult.³

One challenge to the credibility of the linkages McKinnon asserts exist between zero nominal long-run interest rates in Japan and a level 4 percentage points higher in the US is provided by his Figure 1, which plots the yen/dollar exchange rate and US and Japanese long-term interest rates from 1970 through 1998. From 1986 to 1990, when Japanese monetary policy was expansionary, Japanese interest rates rose and eliminated the gap between them and US interest rates. There was no 4% differential, and for part of this period, the yen weakened. Why would not expansionary monetary policy now have the same effect on Japanese interest rates and the yen exchange rate? But my difference with McKinnon is concerned less with his diagnosis of the Japanese decade-long slump than with his solution. He assumes that Japanese and US authorities in their wisdom can determine the correct value of the yen/dollar exchange rate, and

that they can intervene successfully for 10 to 20 years to maintain it. The history of intervention lends no support to these assumptions.

Both in Japan and in other advanced countries, finance ministers have tended to dominate central bank decisions and to be ardent defenders of intervention. Part of the explanation for a decline in the practice of exchange market intervention may be that some finance ministers have had second thoughts. They may also no longer exercise as much influence: in Britain with an independent Bank of England, in Euroland with one ECB and eleven finance ministers, in New Zealand and elsewhere with the adoption of inflation targets, in the US with Alan Greenspan's prestige and credibility.

Acknowledgments

*This paper updates and revises the paper “US Foreign Exchange Market Intervention Since 1962,” that was published in the *Scottish Journal of Political Economy* 43 (September 1996), 379-397. Thanks to Debajyoti Chakrabarty for preparing Figures 1 and 2. I am indebted to James R. Lothian, Jerry Lee Jordan, Milton Friedman, and Allan H. Meltzer for helpful comments.

Notes

1. Sales of foreign currencies accounted for three-quarters of the reduction from the peak to March 1997. Currency valuation declines account for the balance of the reduction during that period. Thereafter, there were no sales. In some quarters foreign currency balances appreciated and in others depreciated. The net result was a reduction in the aggregate value of the balances.
2. According to Jim Lothian, the Bank of Japan lost faith in intervention after its experience with the practice in the late 1970s. There is evidently no continuity between the beliefs of its policymakers then and those now.
3. Allan Meltzer has noted that the stability of the real dollar/yen exchange rate undermines McKinnon’s argument, and that it also shows how little the real exchange rate is influenced by unsterilized intervention.

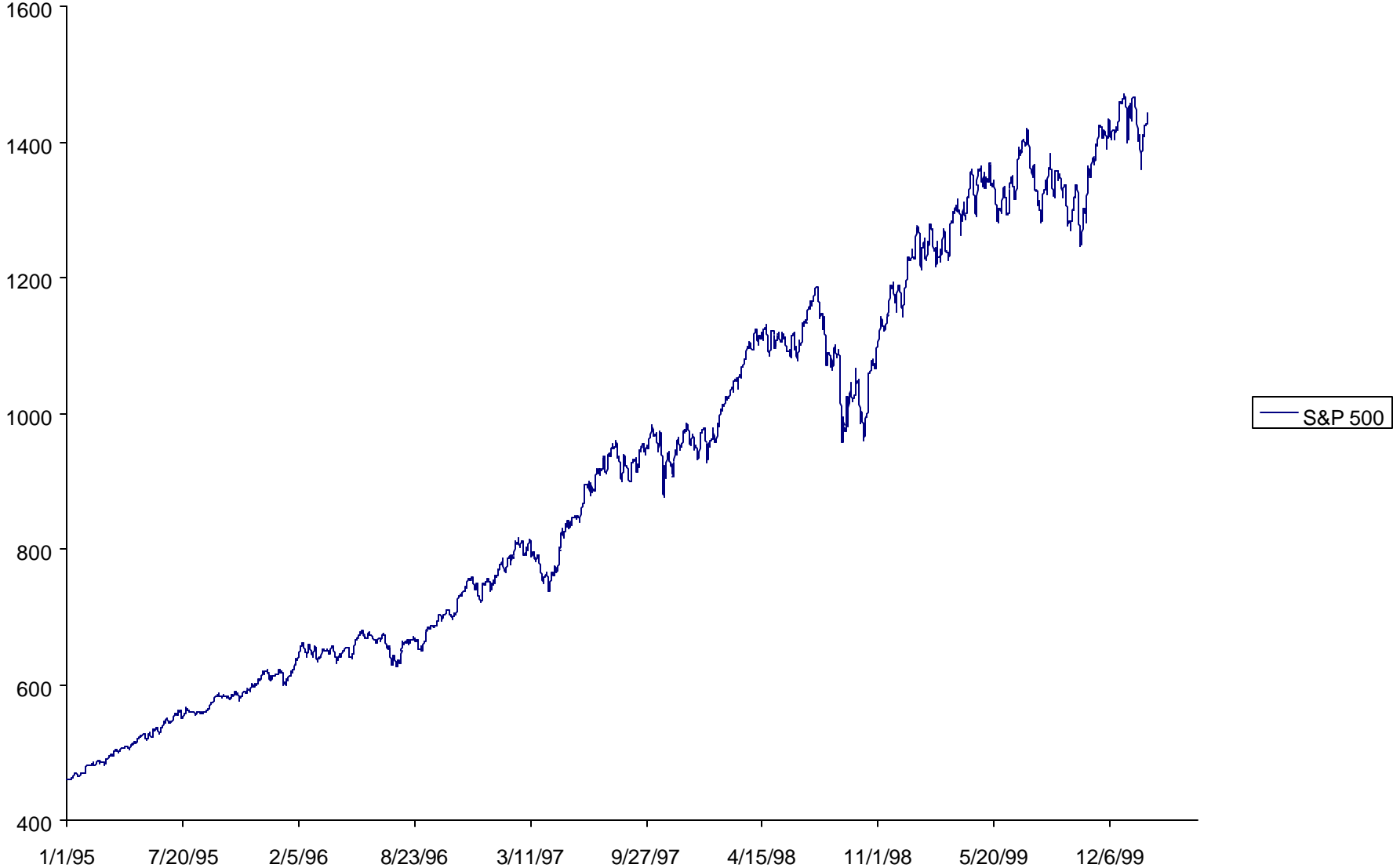
References

- Catte, Piero, Galli, Giampaolo and Salvatore Rebecchini, "Concerted Interventions and the Dollar: An Analysis of Daily Data." In: Peter B. Kenen, Franco Papadia, and Franco Saccomanni, (Eds.), *The International Monetary System*. Cambridge: Cambridge University Press, 1994, 201-239.
- Clarida, Richard H. "G3 Exchange Rate Relationships: A recap of the Record and a review of Proposals for Change." NBER Working Paper 7434, 1999.
- Dominguez, Kathryn M, "Market Responses to Coordinated Central Bank Intervention." *Carnegie Rochester Conference Series on Public Policy* 32 (1990), 121-163.
- Dominguez, Kathryn M. and Jeffrey A. Frankel. *Does Foreign Exchange Intervention Work?* Washington, D.C.: Institute for International Economics, 1993a.
- Dominguez, Kathryn M. and Jeffrey A. Frankel, "Does Foreign Exchange Intervention Matter: Disentangling the Portfolio and Expectations Effects for the Mark." *American Economic Review* 83 (1993b), 1356-1369.
- Edison, Hali J., "The Effectiveness of Central Bank Intervention: A Survey of the Post-1982 Literature." *Special Papers on International Finance* Princeton: Princeton University, 1993.
- Frankel, Jeffrey A., "In Search of the Exchange Risk Premium: A Six-Country Test Assuming Mean-Variance Optimization." *Journal of International Money and Finance* 1 (1982), 255-274.
- Frankel, Jeffrey A., "The Making of Exchange Rate Policy in the 1980s." In: Martin Feldstein (Ed.), *American Economic Policy in the 1980s*. Chicago: University of Chicago Press (1994), 293-341.

- Hodrick, Robert J., "The Empirical Evidence on the Efficiency of Forward and Futures Foreign Exchange Markets." *Fundamentals of Pure and Applied Economics* 24 (1987).
- Humpage, Owen F., "Institutional Aspects of U.S. Intervention." Federal Reserve Bank of Cleveland *Economic Review* 30 (1994), 2-19.
- Kaminsky, Graciela L., and Karen K. Lewis. "Does Foreign Exchange Intervention Signal Future Monetary Policy?" *Journal of Monetary Economics* 37 (1996), 285-312.
- Marston, Richard C. "Exchange Rate Policy Reconsidered." In: Martin Feldstein (Ed.), *International Economic Cooperation*. Chicago: University of Chicago Press (1988), 79-136.
- McKinnon, Ronald I. "International Money: Dollars, Euros, or Yen?" mimeo, Stanford University, 1998.
- McKinnon, Ronald I. "The Foreign Exchange Origins of Japan's Liquidity Trap," Cato Institute 17th Annual Monetary Conference, 1999.
- Mussa, Michael. "Empirical Regularities in the Behavior of Exchange Rates and Theories of the Foreign Exchange Market." *Carnegie Rochester Conference Series on Public Policy* 11 (1979), 9-57.
- Obstfeld, Maurice. "The Effectiveness of Foreign-Exchange Intervention: Recent Experience, 1985-1988." In: William H. Branson, Jacob A. Frenkel, and Morris Goldstein (Eds.), *International Policy Coordination and Exchange Rate Fluctuations*. Chicago: Chicago University Press (1990), 197-237.
- Rogoff, Kenneth. "On the Effects of Sterilized Intervention: An Analysis of Weekly Data." *Journal of Monetary Economics* 14 (1984), 133-150.

- Rose, Andrew K. "Comment." In: Jeffrey A. Frankel, Giampaolo, and Alberto Giovannini (Eds.), *The Microstructure of Foreign Exchange Markets*. Chicago: University of Chicago Press (1996), 294-296.
- Smith, Ralph W. and Brian F. Madigan. "Exchange Rate Management and Monetary Policy in the United States." In: *Exchange Market Intervention and Monetary Policy*. Basle: BIS (1988), 188-200.
- Truman, Edwin M. "Discussion." In: Peter B. Kenen, Franco Papadia, and Franco Saccomanni (Eds.), *The International Monetary System*. Cambridge: Cambridge University Press (1994), 248-254.
- Volcker, Paul. "The Quest for Exchange Rate Stability." Washington, D.C.: Institute for International Economics, 1995.
- Weber, Axel A. "Foreign Exchange Intervention and International Policy Coordination: Comparing the G-3 and EMS Experience." In: Matthew B. Canzoneri, Wilfred J. Eithier, and Vittorio Grilli (Eds.), *The New Transatlantic Economy*. Cambridge: Cambridge University Press (1996), 54-113.
- Williamson, John. "Target Zones and the Management of the Dollar." *Brookings Papers on Economic Activity*, 1986 1, 165-174.
- Williamson, John. *Estimating Equilibrium Exchange Rates*. Washington, D.C.: Institute for International Economics, 1994.
- Williamson, John. "Crawling Bands or Monitoring Bands." *International Finance* 1, 1-24, 1998.

Figure 1
Daily Prices of Equities in Standard Poor's 500 and of Foreign Exchange Rates of
Marks and Yen vs. the U.S. Dollar, 1995.1.2 – 2000.2.8
S&P 500

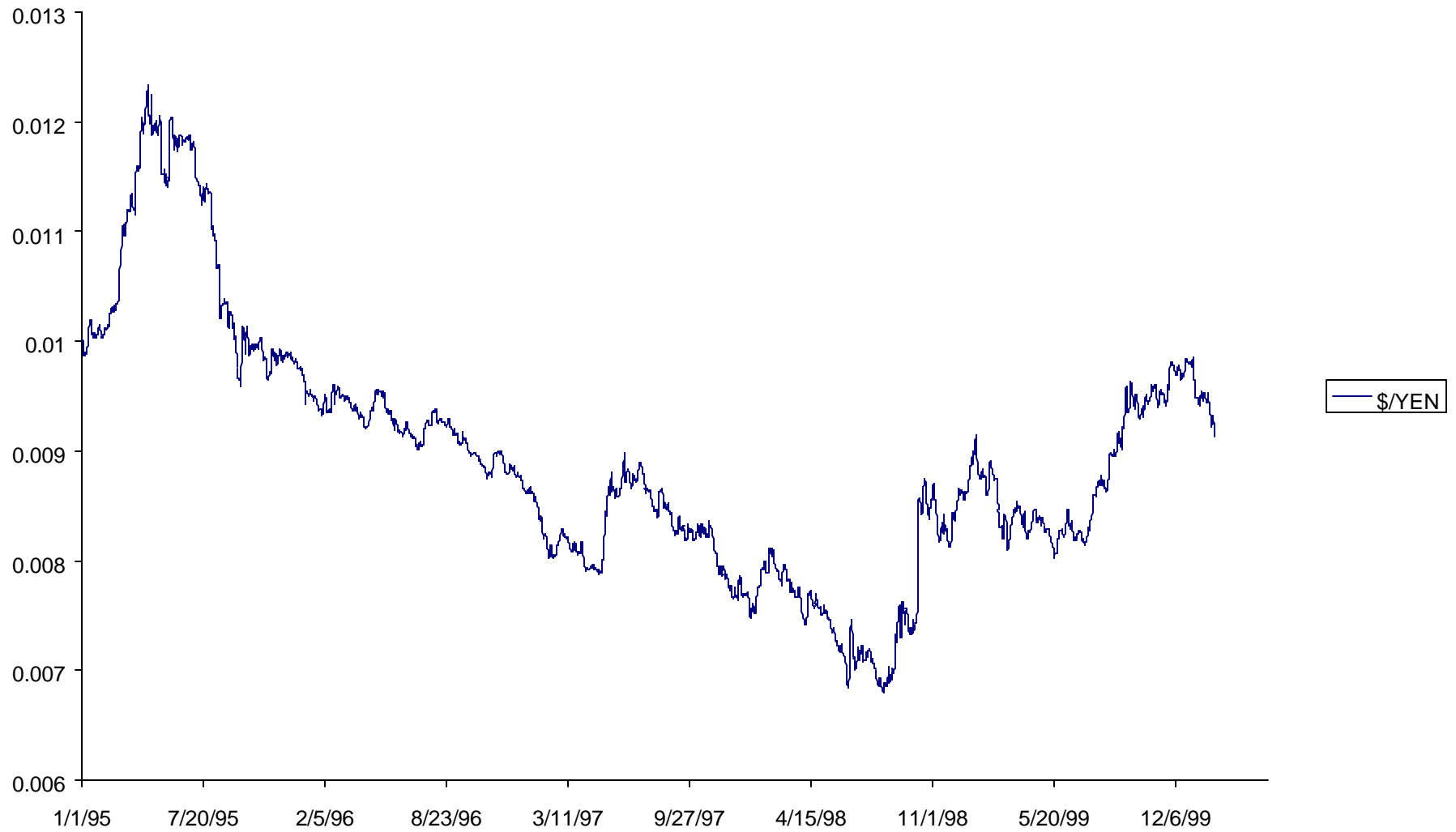


PANEL A

SOURCE: J.P. Morgan

Figure 1 (continued)

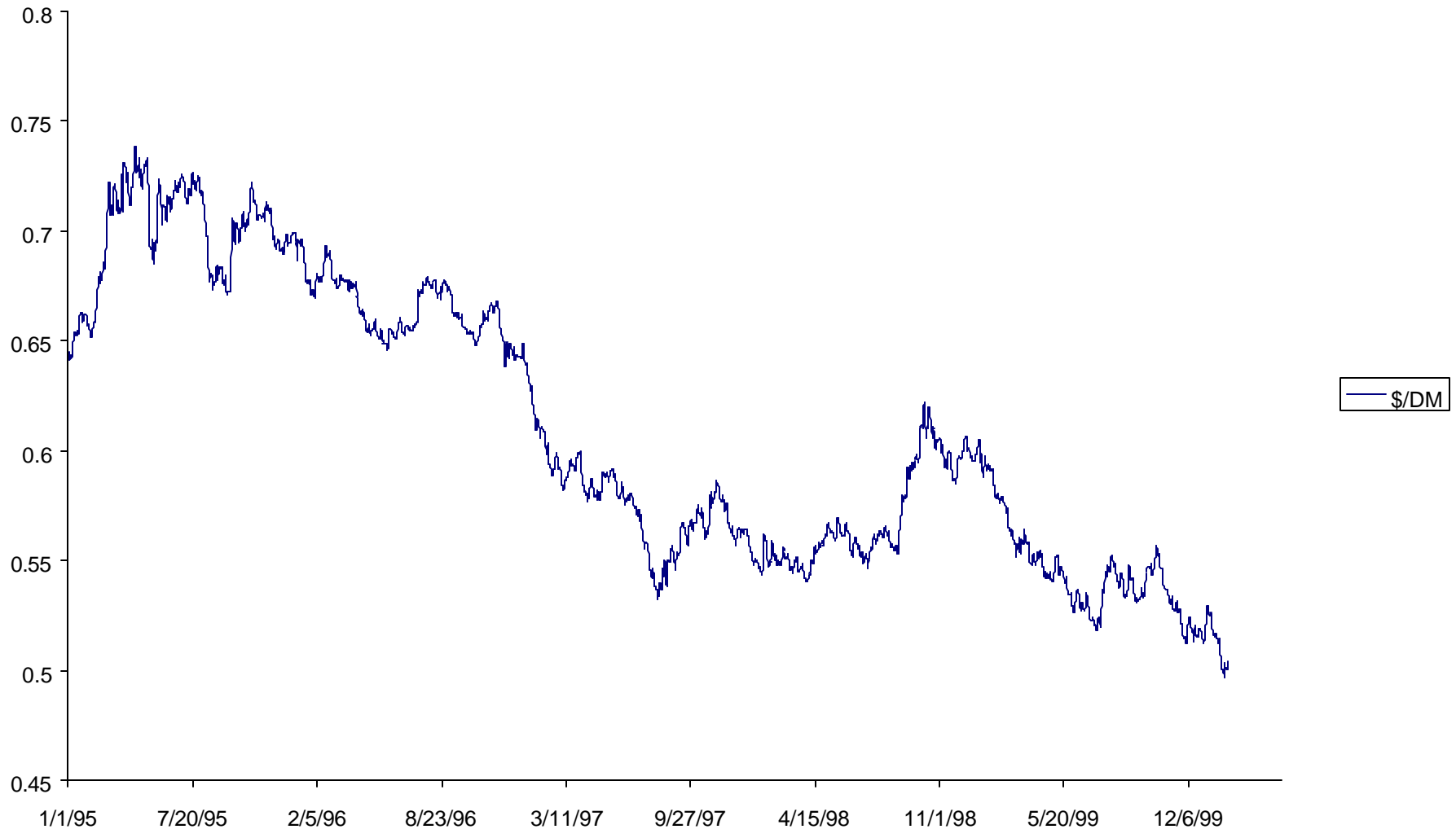
\$/YEN



PANEL B

Figure 1 (continued)

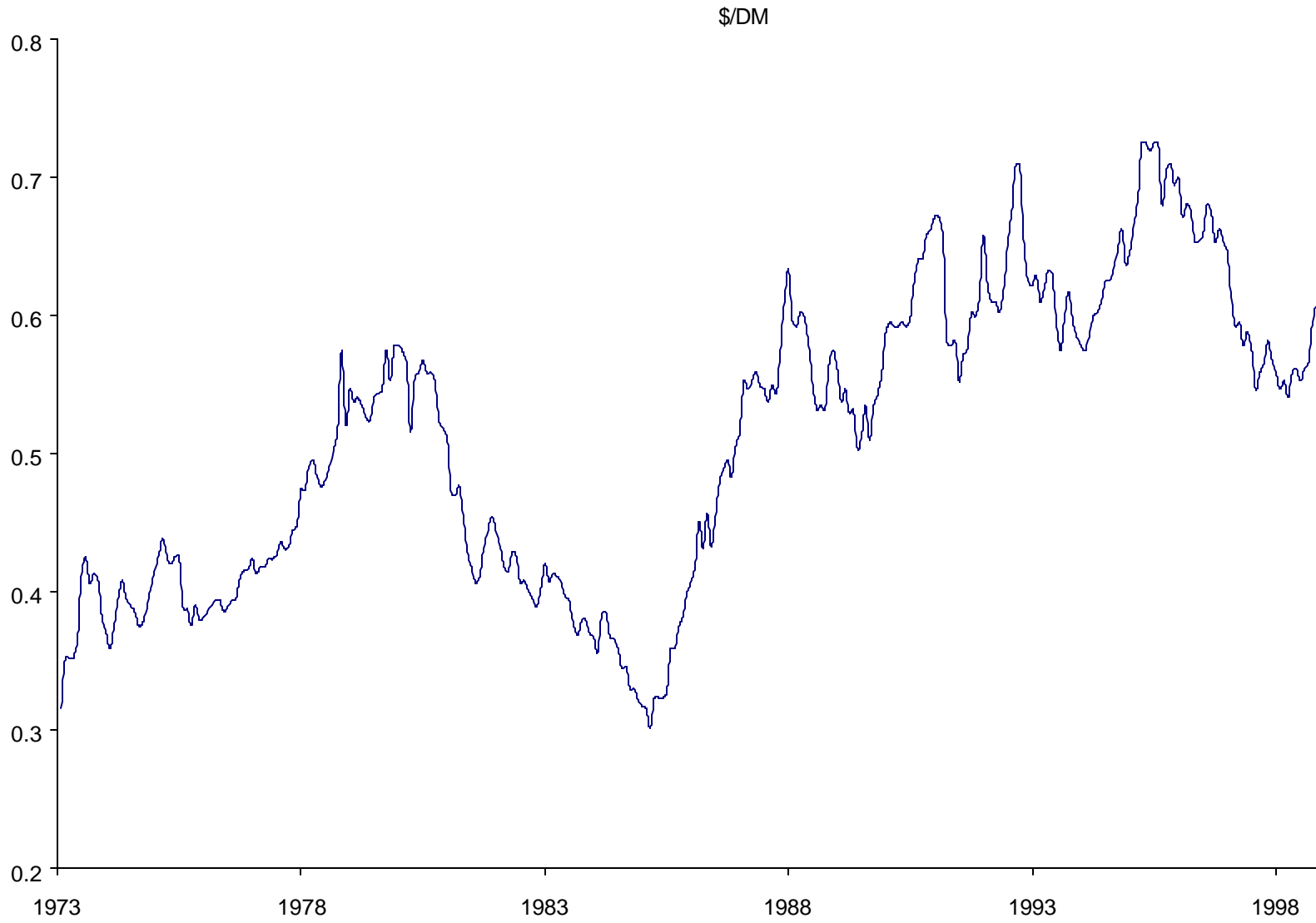
\$/DM



PANEL C

Figure 2

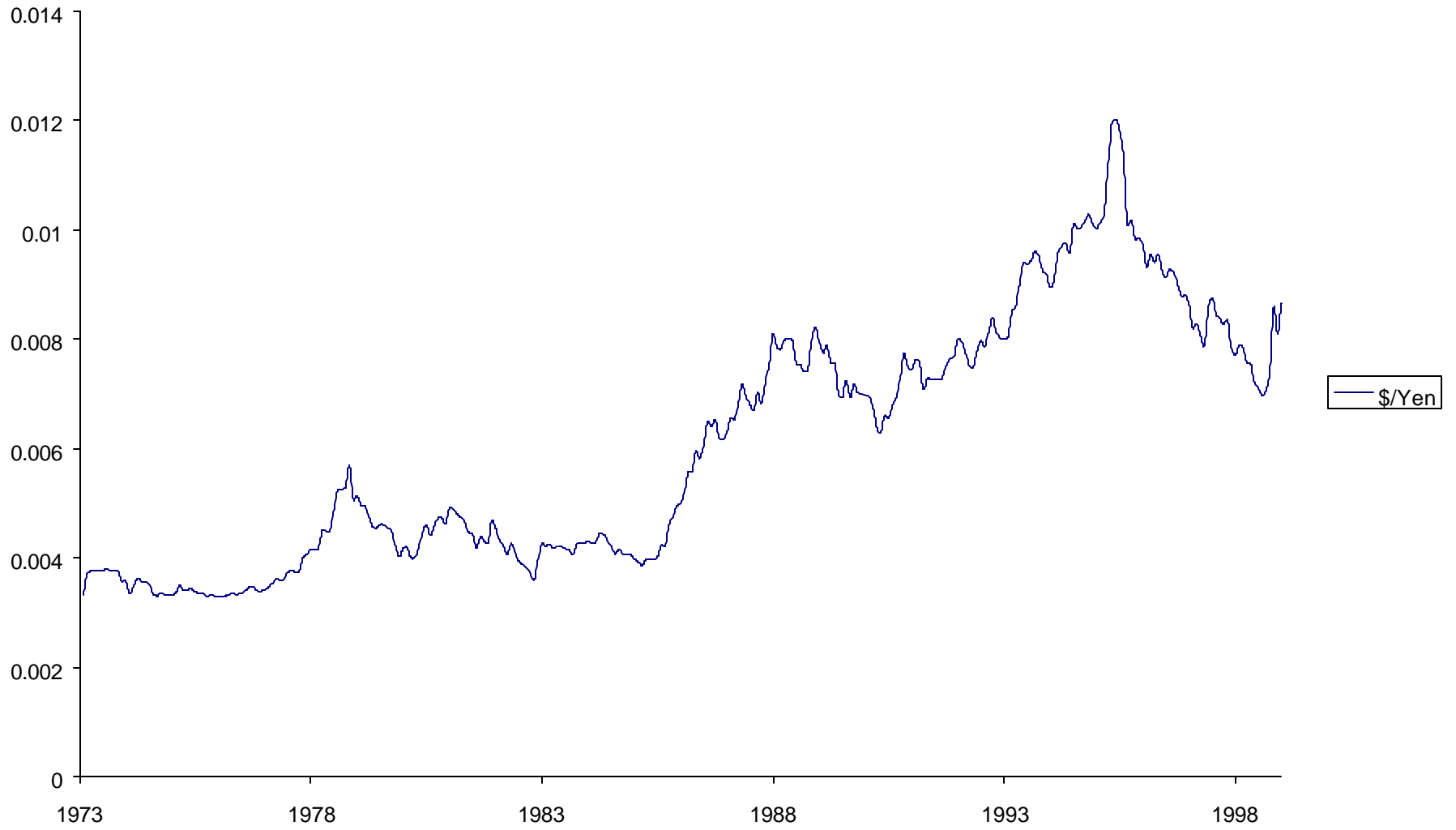
End-of-Month Exchange Rates of Marks and Yen vs. the U.S. Dollar, 1973-1999



PANEL A

Figure 2 (continued)

\$/Yen



PANEL B