Volume Title: Changes in Exchange Rates in Rapidly Development Countries: Theory, Practice, and Policy Issues (NBER-EASE volume 7)

Volume Author/Editor: Takatoshi Ito and Anne O. Krueger, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-38673-2

Volume URL: http://www.nber.org/books/ito_99-1

Publication Date: January 1999

Chapter Title: The Syndrome of the Ever-Higher Yen, 1971-1995: American Mercantile Pressure on Japanese Monetary Policy

Chapter Author: Ronald McKinnon, Kenichi Ohno, Kazuko Shirono

Chapter URL: http://www.nber.org/chapters/c8625

Chapter pages in book: (p. 341 - 376)

13 The Syndrome of the Ever-Higher Yen, 1971–1995: American Mercantile Pressure on Japanese Monetary Policy

Ronald I. McKinnon, Kenichi Ohno, and Kazuko Shirono

As defined by *Webster's Tenth New Collegiate Dictionary*, a *syndrome* is 1: a group of signs and symptoms that occur together and characterize a particular abnormality; and, 2: a set of concurrent things (as emotions or actions) that usually form an identifiable pattern.

From 1971, when the yen-dollar rate was 360, through April 1995, when the rate briefly touched 80 (fig. 13.1), the interactions of the American and Japanese governments in their conduct of commercial, exchange rate, and monetary policies resulted in what we call "the syndrome of the ever-higher yen." Our model of this syndrome is unusual because it links "real" considerations—that is, commercial policies, including threats of a trade war—with the monetary determination of the yen-dollar exchange rate and price levels in the two countries.

We hypothesize that the yen continually appreciated against the U.S. dollar because the Japanese and American governments were caught in a mutual policy trap. Since the late 1960s, the United States faced continual erosion of its worldwide market share in manufactures—often losing ground to Japanese competitors—in one market after another. This erosion was exacerbated by a fall in the American savings rate that led to large current account deficits in the early 1980s and subsequently. Although high-saving Japan began to run correspondingly large current account surpluses, it still used "invisible" regulatory restraints to protect some of its more backward sectors in industry, agriculture, and services. This appearance of unfair trading by Japan infuriated

Ronald I. McKinnon is professor of economics at Stanford University. Kenichi Ohno is professor of economics at the National Graduate Institute for Policy Studies, Japan. Kazuko Shirono is a graduate student of economics at the University of Tokyo.

Thanks to Takatoshi Ito for helpful comments, and to the discussants and conference participants.

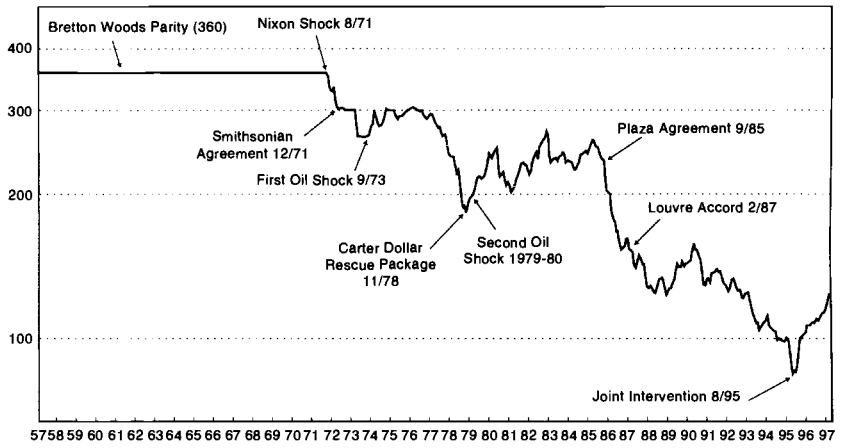

Fig. 13.1 Nominal yen-dollar exchange rate (semilog scale)
Source: International Monetary Fund (IMF 1997).

American businesspeople and government officials and led to numerous trade disputes. Repeated American threats of a trade war caused the yen to ratchet up in 1971–73, 1977–78, 1985–87, and 1993–mid-1995 (fig. 13.1). While ameliorating commercial tensions by temporarily making Japanese industry less competitive, these great appreciations imposed relative deflation on Japan without correcting the trade imbalance between the two countries.

Why, asymmetrically, should continual yen appreciation against the dollar be a forcing variable in determining the Japanese price level but not the American one? Because of the United States' large size and history as the center country in the world payments system, the U.S. Federal Reserve System (Fed) independently determines American monetary policy—sometimes with high price inflation as in the 1970s, but also with greater price stability after the early 1980s (fig. 13.2).

In contrast, Japanese monetary policy has not been independently determined. When American mercantile pressure—arising out of continual trade disputes—drove the yen up episodically, the Bank of Japan (BoJ) was reluctant to enter the foreign exchange market, or adjust domestic monetary policy, strongly enough to drive the yen back down and thus antagonize the Americans further. Although often resisting yen appreciation in the short run, the BoJ allowed the Japanese economy to deflate relative to the American economy in the longer run—and thus validated the yen's increase. In effect, the BoJ was forced to follow a dependent monetary policy that after 1985 led to absolute deflation and to serious macroeconomic disturbances in Japan: the now famous *endaka fukyos* (high-yen recessions) in 1986–87 and more severely in 1992–95. Figure 13.2 shows the Japanese wholesale price index (WPI) rising more slowly than the American index after 1975 and then falling absolutely from

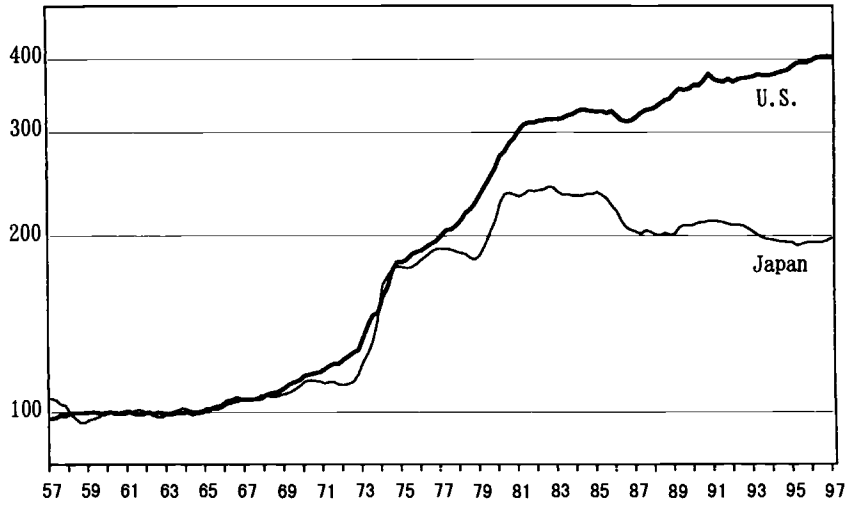

Fig. 13.2 WPI price level of tradable goods (semilog scale, 1960: 1 = 100)
Note: Each graph is taken from line 63 of IMF (1997). In March 1978, the U.S. WPI was reorganized as the U.S. PPI.

1985 through 1995—when the yen remained seriously overvalued by the purchasing power parity (PPP) criterion.

These contractions in the Japanese economy then led to a fall in imports such that the Japanese trade surplus with the United States (and rest of the world) widened. Concerned with the increase in its trade deficit, the American government applied more mercantile pressure on Japan to do something about it—including pressure for further yen appreciation! And so the cycle continued—thus reinforcing the syndrome.

In effect, the U.S. government initiated mercantile actions—whose consequences it did (does) not fully understand—that promoted the syndrome. Nevertheless, the Japanese government was very slow to learn how its own reactions supported or validated the yen's continual appreciation. It tolerated relative deflation in the Japanese price level and only reluctantly liberalized its protected sectors. Thus the two countries were trapped in a mutual interaction that generated political discord and undermined economic efficiency in both.

Fortunately, in April 1995 officials at the U.S. Treasury finally realized that further deflation and exchange rate overvaluation might cause a serious macroeconomic breakdown in Japan with a slump in investment and a major banking crisis. They relaxed commercial pressure on Japan, and the BoJ worked with the Fed to depreciate the yen and reexpand the Japanese economy from mid-1995 to mid-1997 (McKinnon and Ohno 1997, chap. 11). The consequent dramatic fall in the yen, from 80 yen per dollar in April 1995 to close to PPP at 125 yen per dollar by May 1997 (fig. 13.3), effected an easing of Japanese monetary policy and a modest economic recovery. (Unfortunately, Japan's sharp tax increase in April 1997 aborted this recovery.)

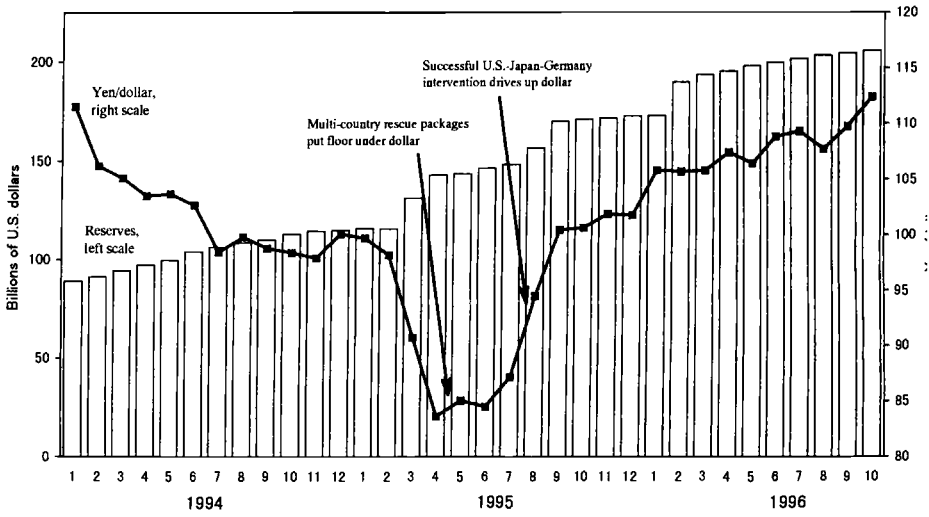

Fig. 13.3 Yen-dollar exchange rate and Japanese foreign exchange reserves, 1994–96
Source: IMF (1997).

Although this remarkable fall in the yen confirms our mercantile pressure theory of the yen-dollar exchange rate, we do not yet know whether this remission from the syndrome from mid-1995 to mid-1997 is temporary or permanent. Mercantile pressure from the United States to appreciate the yen, with deflationary repercussions in Japan, could well up again.

Thus this paper focuses on how the syndrome worked up to early 1995. In section 13.1 we describe the origins of American mercantile concerns and episodic pressures resulting in yen appreciations after 1970. In section 13.2 we use more recent data from 1985 to early 1995 to design an econometric test to show how yen appreciation was a "forcing" variable for determining commodity price deflation in Japan, and how this was sometimes resisted, but not fully offset, by the Japanese monetary authorities.

The problem posed by the ever-higher yen for financial adjustment between the two countries has many facets. These include labor market and wage adjustment, trade imbalances and capital transfers, the speed of induced prices changes, asset bubbles, and the generation of business cycles in both countries. In particular, by 1978 the expectation that the yen would go ever higher became firmly embedded in nominal interest rates: yields on yen bonds were driven down so that they have averaged about 4 percentage points less than those on dollar bonds ever since. All of these, as well as other related issues are covered in McKinnon and Ohno's (1997) book *Dollar and Yen: Resolving Economic Conflict between Japan and the United States.* In this paper, we focus more narrowly on the mercantile origins of the upward pressure on the yen, and its implications for relative and absolute price deflation in Japan.

13.1 Mercantile Pressure on the Yen-Dollar Exchange Rate

When President Nixon closed the gold window in August 1971, he also imposed a tariff surcharge on imports of manufactured goods and demanded that trading partners in Europe and Japan appreciate the dollar value of their currencies. They all formally appreciated by 10 to 20 percent (the yen by 17 percent) in the famous, but temporary, Smithsonian Accord of December 1971—at which time Nixon removed the surcharge.

We hypothesize that after 1971 the United States pursued a similar policy—but one increasingly narrowly focused on Japan—of coupling protectionist threats with demands, implicit or explicit, for yen appreciation. (The major exceptions were the strong dollar policy of the first Reagan administration from 1981 to 1984 and the fall of the yen after April 1995.) Figure 13.4 shows that the yen's 250 percent appreciation against the dollar from 1970 to 1994 was the greatest among the currencies of U.S. trading partners.

No matter how much the dollar fell (fig. 13.1), at least some U.S. government officials typically saw further room for yen appreciation. Since the Nixon shock in 1971, various secretaries of the treasury—notably Blumenthal in 1977, Baker in 1985–87, and Bentsen in 1993—have suggested that the dollar was too high against the yen and in each of these cases the dollar subsequently fell. These attempts to "talk" the dollar down were accompanied by intense trade negotiations aimed at forcing the Japanese to open or share this or that market.

But talk is cheap. Why should it force the yen up over the long term? Although the exchange rate is a forward-looking asset price, the (forward) "fundamentals" are difficult to define, let alone model by foreign exchange traders

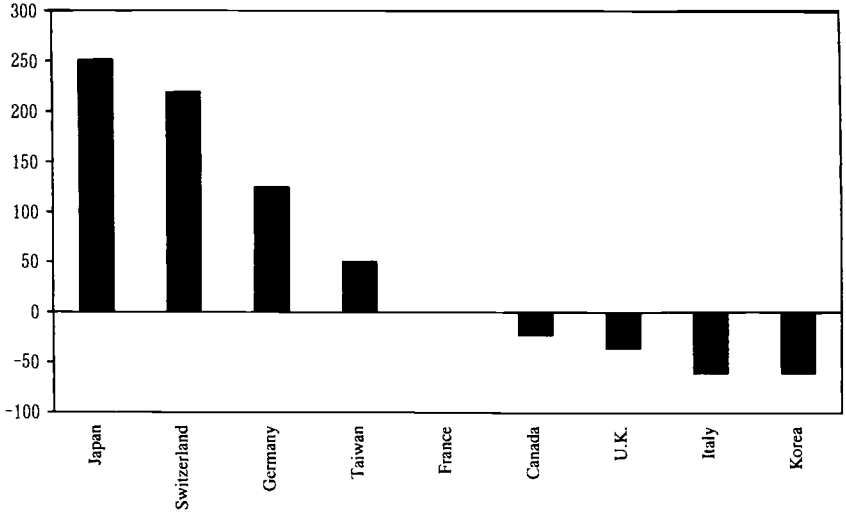

Fig. 13.4 Nominal appreciation against the dollar, 1970–94
Sources: IMF (1997) and Bank of Japan, *Economic Statistics Monthly* (Tokyo, various issues).

or econometricians. Thus, under certain circumstances, talk on exchange rates by treasury secretaries, and the commercial disputes themselves, can affect peoples' perceptions of future relative monetary policies in the two countries. The anxiety that Japanese investors feel about continually adding to their portfolios of dollar assets is then heightened, and actual or incipient portfolio readjustment then causes the yen-dollar rate to fall.

More precisely, we identify two concerns that have induced American governments to pressure, sometimes only implicitly, Japan to appreciate its currency:

1. The perception, since the late 1960s, by individual business interests in the United States that Japan was an "unfair" international competitor. Let us call these microeconomic concerns *commercial pressure.*
2. Deteriorating U.S. current account balances, beginning in the late 1970s but burgeoning in the 1980s and 1990s: the counterpart of Japan's current surpluses. Conventional academic wisdom held that this called for dollar devaluation or yen appreciation. Let us call this macroeconomic concern *academic pressure.*

The exchange markets perceive that sudden yen appreciation reduces the competitiveness of Japanese exporters worldwide against their American counterparts in the short run and thus will temporarily relieve commercial pressure on the exchange rate. The markets also perceive that many (academic) economists and policymakers believe that yen appreciation will reduce the American trade deficit in the future. So when it does appreciate, academic pressure will also temporarily slacken. Thus, in times of intense American concern over the U.S. trade position, market makers find a consensus for driving the yen-dollar rate down (the yen up) to alleviate that concern. Although commercial pressure and academic pressure on the yen-dollar rate are hardly independent of one another, let us discuss each in turn.

13.1.1 Commercial Pressure

Why should commercial tension be (have been) more intense between Japan and the United States than between other pairs of industrial countries? Since the early 1950s, productivity and output growth in Japanese manufacturing industries was much higher than in their more mature American counterparts. And this growth was highly uneven: more explosive in Japanese industries such as electrical machinery, automobiles, and consumer electronics than in others. The overall Japanese economy, now the world's second largest, grew rapidly: total Japanese exports were only about one-quarter of the American level in 1964 but had risen to well over three-quarters by 1995. Thus, whether the exchange rate was fixed or floating, or trade imbalances were present or absent, and no matter how assiduously each country's diplomats had sought political harmony, a serious problem of mutual economic adjustment would still exist.

But adjustment was also complicated by unfortunate trends in the political

economy of each country. On the Japanese side, the government operated too long under the principle of "developmental authoritarianism," or more simply what Murukami (1992) calls "developmentalism," for promoting the industrial sector—well past the point when such action might have been needed to support recovery from wartime devastation. For the next several decades, the government targeted—although not always successfully or accurately—particular industries to be internationally competitive. To prevent the domestic distribution of income from being unduly skewed by such favoritism, the government then used a complex regulatory apparatus to cosset or shield many other "disadvantaged" industries—often outside the manufacturing sector—from the rigors of international and domestic competition (McKinnon and Ohno 1997, chap. 2).

To foreigners trying to sell in Japan, the concerted regulatory power of the various ministries, often operating through industry-wide trade associations of domestic Japanese business firms, appeared to be a formidable barrier, and a possible shield for collusive behavior in other international markets. Whence the proliferation of books on Japan as an "unfair" international competitor. Upscale in this genre, Laura Tyson—President Clinton's principal economic advisor from 1993 to 1996—published the book *Who's Bashing Whom? Trade Conflict in High-Technology Industries.* After several chapters documenting extreme regulatory hurdles facing American producers of semiconductors, cellular telephones, supercomputers, and other high-technology goods trying to sell in the Japanese market—and the intense political confrontations arising out of these disputes—Tyson concludes: "The[se] cases of U.S.-Japan trade competition . . . provide compelling historical evidence of the persistence of structural and policy impediments to the Japanese market. Although formal protection has been phased out, primarily in response to American *gaiatsu* (pressure), the peculiar features of Japanese capitalism impede access to foreign suppliers to shape competition to the advantage of their Japanese rivals" (1992, 266).

Similarly, in a more extensive review of industry studies covering Japanese manufacturing, primary products, and services in their book *Reconcilable Differences? United States–Japan Economic Conflict,* C. Fred Bergsten and Marcus Noland conclude:

> In Japan there is scant evidence of significant tariffs and quotas outside of agriculture. Nevertheless, it is widely believed that the Japanese market is effectively closed to manufactured imports. The methods of import control include discriminatory networks of affiliated firms (*keiretsu*); administrative guidance on the part of government officials to intimidate importers; misuse of customs procedures and product standards, testing, and certification procedures to discourage imports; incomplete enforcement of patent and trademark rights; government procurement procedures that advantage domestic suppliers; and restrictions on the distribution channels for imported products, to name a few. (1993, 72)

But airport newsstands sport plenty of downscale versions of how Japan Inc. was conspiring to undermine the American economy through collusive trading practices. Although in the 1990s Japan has liberalized many of its more restrictive regulatory barriers to foreigners selling in the Japanese market—such as the opening of large-scale discount retailers (Organization for Economic Cooperation and Development 1995)—the idea of an overly intrusive Japanese bureaucracy persists in the minds of foreign protagonists in trade disputes.

American concern with commercial pressure from its faster growing political allies goes back a long way. As early as 1956, the United States put pressure on Japan to impose a "voluntary" export restraint (VER) on Japanese cotton textiles entering the American economy. In 1966, a number of European countries and Japan were persuaded to impose a VER on steel exports to the United States, which spread to specialty steels in the 1970s. In 1968, U.S. television producers filed antidumping suits against Japanese producers—and the U.S. government imposed substantial antidumping duties on imports of Japanese televisions in 1971. In the late 1960s, severe measures to protect all manufacturing industries were introduced in the U.S. Congress. These ultimately failed but nevertheless put pressure on the American government to "do something" to help American manufacturing industries (Baldwin 1988).

As long as the Bretton Woods system of par values for exchange rates was firmly in place and the U.S. current account showed a surplus—as was generally the case in the 1950s and 1960s—the dollar's exchange rate was insulated from protectionist pressure. This was a great strength of the par value system (McKinnon 1996). However, this pressure intensified when inflation in the United States increased after 1968: U.S. wholesale prices began drifting upward relative to those in Germany and Japan. President Nixon responded by devaluing the dollar in August 1971.

But this one-time dollar depreciation did not end the protectionist pressure. In the late 1970s, the U.S. government introduced trigger prices on steel imports, which, when VERs expired, were (and are) associated with a variety of antidumping suits filed by American steel companies against foreign steel producers in general, and against Japanese producers in particular, throughout the 1980s into the 1990s. The American government increasingly focused on Japan as it made its way up the ladder from simple to more complex industrial goods. Voluntary restraints on Japanese exports to the American market proliferated: televisions beginning in the 1970s, machine tools in the 1970s and 1980s, and automobiles in the 1980s.

The U.S. government made it increasingly easy for American firms to prove allegations of "dumping" against foreigners, particularly those with appreciating currencies. The procedures used by the U.S. Department of Commerce in evaluating "fair" foreign prices for selling in the U.S. market became increasingly arbitrary with incredible bookkeeping (discovery) costs imposed on foreign firms victimized by antidumping suits—whether successful or not. The standards for determining material injury to American producers became ever weaker (Krueger 1995).

Before the mid-1980s, government-to-government negotiations to relax commercial pressure on the United States took the form of ad hoc VERs. These were certainly outside the spirit of the General Agreement on Tariffs and Trade (GATT) but were not inconsistent with any of its specific articles. Similarly, private antidumping suits were potentially consistent with the antidumping articles of the GATT.

By the late 1980s, however, the retreat of international communism as an organized economic and military threat to the United States made it even more difficult for the American president to suppress domestic protectionist interests, which had always been heavily represented in Congress. By 1988, aggressive unilateralism outside the rules of the GATT had become firmly institutionalized in American trade law under what is now popularly called "Super 301." In her book *American Trade Policy: A Tragedy in the Making,* Anne Krueger suggests that

> the Omnibus Trade and Competitiveness Act of 1988 extended Section 301 of the Trade Act of 1974 to broaden considerably the scope of the unfair trade procedures and took it well beyond procedures that are consistent with the GATT in principle. In particular, Congress instructed the USTR [U.S. Trade Representative] to take an inventory of other countries' unfair trading practices . . . in a report to Congress by the end of May each year. . . . The 1988 trade act also instructed the USTR to take retaliatory action against imports from the named country (or countries) in the event that the USTR could not negotiate for the removal of the named practices. (1995, 64)

Without requiring reciprocity by the United States, Section 301 cleared the way for the USTR to demand unilaterally that other countries take action to open their national markets to American goods if the USTR believed that "structural impediments" existed (Ito 1992, 376). One result was to demand specific shares in foreign markets through so-called voluntary import expansions. The first was negotiated in 1986 in semiconductors to assure foreign producers (imagined to be mainly American) 20 percent of the Japanese market, with riders for keeping Japanese prices sufficiently high that American producers could compete more easily at home and in third markets. There have been recriminations and subsequent renegotiations into the 1990s over whether or not the Japanese were violating these riders (Itoh 1994).

Krueger notes that Super 301 was not renewed by the Bush administration when it expired at the end of 1990. But she also notes that

> by the winter of 1994, however, bilateral trading relations with Japan had deteriorated under the Clinton Administration's pressure for "quantitative targets." In March 1994, President Clinton reinstituted Super 301 by executive decree. He insisted that the bilateral trade balance with Japan, and even the magnitude of Japanese imports of individual items, were legitimate subjects for bilateral bargaining. He threatened retaliation (presumably punitive tariffs) if Japan did not address to the satisfaction of the United States, the "unfair trading practice" of a large bilateral trade imbalance. (1995, 67)

This reinstituted Super 301 was the basis for acrimonious discussions in the first four months of 1995 on opening Japanese markets to American automobiles and components when the yen ratcheted up sharply from 100 to 80 yen per dollar (fig. 13.3).

3.1.2 The Great Relaxation of Commercial Pressure, 1995–96

Only in April 1995 did the American government finally realize that something had gone terribly wrong with its commercial and exchange rate policies toward Japan. At 80 yen per dollar, the greatly overvalued yen (PPP was closer to 125 yen per dollar; McKinnon and Ohno 1997) threatened a collapse in the Japanese financial system, and a much deeper depression than the *endaka fukyo* the Japanese economy was already suffering from in 1993–95.

So what was the American response? On the commercial side, U.S. officials abandoned further significant pressure on Japan. The dispute over automobile components was settled quietly in July 1995 with no fixed numerical targets, and with Japan promising only to simplify bureaucratic restraints on importing while encouraging dealers to stock a wider range of foreign vehicles and parts. Afterward, new potential flashpoints for invoking Super 301 against Japan were ignored for at least a year. Most important, because of its great symbolism, the long-simmering dispute between Eastman Kodak and Fujifilm over Kodak's alleged inability to market its film in Japan (because of Fuji's alleged monopolization of the Japanese market) was defused by finally sending it to the World Trade Organization after the American government pointedly decided *not* to invoke Super 301:

> In May of last year [1995], Kodak officials were brimming with confidence when their new Chairman, Mr. George Fisher, announced that the company had filed a complaint against Japan's Fuji with the U.S. Trade Representative. . . .
>
> A year after the filing, the world's two photographic giants—having spent untold millions on lawyers, lobbyists, and public relations—have fought each other to a standstill. Yesterday the U.S. Trade Representative's office announced not threats or sanctions in the usual U.S. government fashion, but a decision to take Kodak's complaints to a multilateral forum—the World Trade Organization. (*Financial Times,* 14 June 1996)

For Japan's partial recovery in 1996 into early 1997 from the mid-1995 crisis, this relaxation of American commercial pressure was necessary—but not itself sufficient to reexpand the economy. In mid-1995, no formal commercial compact ensured that the United States would tolerate a fall in the yen toward PPP over the coming year. We show that concerted joint interventions by the BoJ and the Fed in summer 1995 were also needed to drive the yen-dollar rate to 100 by the end of the year (McKinnon and Ohno 1997). This signaled to the markets that the American government would not complain if the yen depreciated further. Thus the BoJ could successfully reflate, with the yen further de-

preciating to about 108 per dollar in summer 1996 and to 125 per dollar in early 1997 (fig. 13.3), to promote Japan's modest economic recovery.

3.1.3 Academic Pressure: The Trade Balance Approach to the Exchange Rate

In addition to the political influence wielded by individual American companies, pressure to appreciate the yen from 1971 to mid-1995 was also partly conceptual or "academic." It arose out of a particular interpretation of economic theory. Most economists espouse an exchange rate doctrine based on the elasticities model of the balance of trade. They convinced American policymakers that devaluing the dollar would, in itself, reduce the U.S. trade or current account deficit—and that exchange rate changes can be treated as a rather clean and acceptable instrument of economic policy. And because Japan has had the biggest current account surpluses—until 1994, about the same size as the U.S. deficit (fig. 13.5)—the yen-dollar rate becomes the focal point of attempts by the American government to reduce the trade deficit by talking the yen up.

But when applied to mature industrial economies that are financially open and would otherwise be stable, this elasticities approach for correcting a trade imbalance is misplaced (Komiya 1994). The persistent overall current account surplus of Japan, and the overall deficit of the United States, reflects Japan's saving surplus on the one hand, and abnormally low saving by the United States on the other. Exchange rate changes, arising out of perceived changes in (future) national monetary policies, cannot systematically affect these national

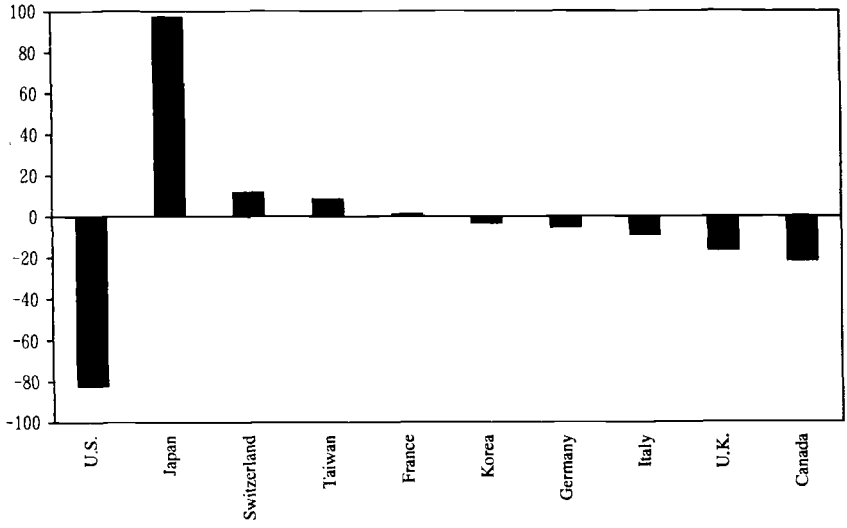

Fig. 13.5 Average current account balance, 1990–94 (billions of dollars)
Sources: See fig. 13.4.

saving-investment balances (McKinnon and Ohno 1997). Instead, as interdependence grows, changes in nominal exchange rates begin to affect the domestic economy through multiple channels, and the presumption that devaluation improves the trade balance becomes tenuous.

True, devaluation immediately makes domestic products cheaper than foreign products. This *relative price effect* certainly works to improve the trade balance—as the elasticities approach would have it—as long as the Marshall-Lerner elasticities condition holds. (We assume throughout that this condition is satisfied.) But in a highly open industrial economy, there are several other effects that may partly or completely offset the favorable relative price effect.

The first is the *reverse absorption effect:* devaluation tends to stimulate part of domestic spending—particularly investment by tradable industries—and worsens the trade balance. Conversely, appreciation dampens domestic investment, causes recession, and perpetuates a trade surplus—*endaka fukyo*, in Japan. As Kawai (1994) shows, when the adverse effect of exchange movement on macroactivity is present, the impact of real devaluation on the trade balance cannot be theoretically ascertained. In their empirical work, Miyagawa and Tokui (1994) estimate that a 1 percent real effective appreciation of the yen reduces domestic investment by about 0.7 to 0.9 percent of the total capital stock—although there is a partial offset through a reduction of imported material prices.

Second, there is the *pass-through effect.* If the home currency is kept substantially undervalued (overvalued), in view of the law of one price, imported inflation (deflation) will arise through commodity arbitrage, which dilutes and eventually eliminates the initial international price gap in tradable goods. In the long run, the price advantage of domestic industries will disappear, and the real exchange rate is unaffected by manipulation of the nominal exchange rate. That is, there is mean reversion toward PPP.

Third, and closely related to the pass-through effect, an engineered depreciation of the dollar against the yen is typically validated ex post, involuntarily or even imperceptibly, by the *Bank of Japan's tightening its long-term monetary policy* relative to that of the United States. Historically, the BoJ accepts a higher yen (which is assumed, in American minds, to reduce Japan's surplus) so as to placate the U.S. Congress and trade officials. This subtle deflationary bias imposed on Japan's monetary policy will, sooner or later, reduce absorption (i.e., domestic spending) in Japan relative to what it would have been without such monetary adjustment. This tends to keep Japan's production above its spending, thus perpetuating its current account surplus which the cheaper dollar was originally supposed to eliminate, and also speeds mean reversion to PPP.

Fourth, the *J-curve effect* is known to increase the trade gap at least temporarily, before the quantities of exports and imports have had time to respond to the change in the relative price. The adverse effect lasts all the longer if the country starts with the position of a substantial trade gap. In the very long run,

Kawai (1994) suggests that the trade balance would return to the original level so that the curve is an elongated S rather than a J.

Fifth, a continued overvaluation of the yen prompts an exodus of Japanese manufacturing bases to China and Southeast Asia, that is, the *hollowing-out phenomenon.* This increases Japanese exports of capital and intermediate goods in order to build and operate new factories in these countries. Over time, the country origins of "Japanese" brand products will shift from Japan to the rest of Asia, with probably only a minor impact on the global trade balance of the United States.

But there is much opposition to this idea that the elasticities approach to the trade balance does not work for financially open, mature industrial economies like Japan and the United States. For example, using data since the late 1970s, Cline (1995) shows a remarkable correlation of the Japan-U.S. bilateral trade gap with the real yen-dollar rate lagged two years. Ito (1992) also finds a similar lagged correlation of 12 to 24 months. Bergsten and Noland (1993) invoke Cline's diagram to make the same point. In figure 13.6, we have replicated this diagram with our own data extended to include earlier years. Following Cline, the bilateral trade balance (T) is defined in percent of total bilateral trade; that is,

$$T = \frac{X - M}{X + M}, \tag{1}$$

where X is Japan's exports to the United States and M is Japan's imports from the United States. Here the real exchange rate is defined as the relative price of tradables between the two countries (deflated by bilateral wholesale prices).

We immediately notice that the cyclical movements of the bilateral trade balance and the real yen-dollar rate are, if the best-fitting lag structure is cho-

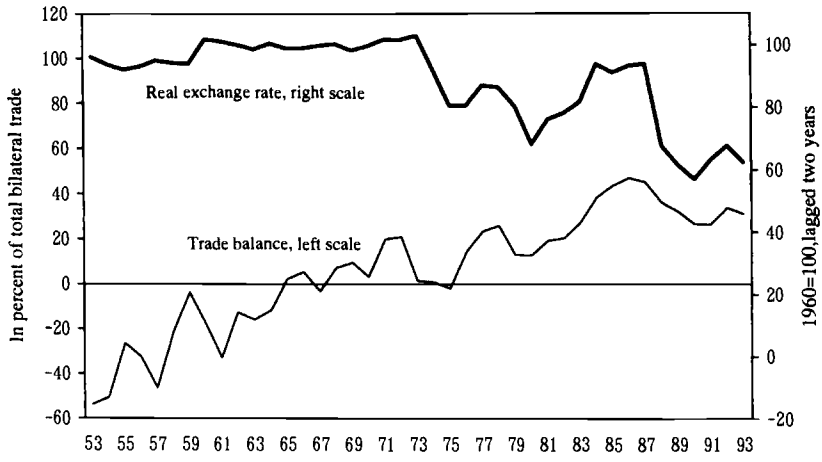

Fig. 13.6 Japan-U.S. trade balance and real yen-dollar rate

sen, highly synchronized during the floating rate years. But this two-year lag need not reflect delayed relative price effects as the elasticities approach would have it. Instead, fluctuations in national income and absorption, also associated with exchange rate changes, could be responsible.

To illustrate this last point, consider the Japanese experience from 1993 to 1996 with income fluctuations. In 1993 to mid-1995, when the yen was high and rising and domestic prices falling, this inadvertent "tight money" situation caused the Japanese economy to slump and its current account surplus to balloon as the demand for (net) imports fell. But with the relaxation of American commercial pressure allowing the BoJ to reflate the economy with incidental yen depreciation beginning in mid-1995 (fig. 13.3), Japan's current account surplus fell dramatically in 1996 as its recovering economy sucked in imports. However, a naive econometrician, wedded to the elasticities approach with a two-year lag, would attribute the 1996 decline in Japan's current surplus to the delayed relative price effects from yen overvaluation in 1994! For example, in explaining the sharp fall in the Japanese trade surplus in 1996, "Fred Bergsten, director of the Institute for International Economics, a private Group, says that 'the main reason the Japanese trade surplus is down is because of the sharp rise of the dollar against the yen in 1993 and 1994.' He adds that it takes about two years for these currency changes, which made Japanese goods more expensive in the U.S., to influence the trade figures" (*Asian Wall Street Journal*, 21 August 1996, 1).

From the perspective of the elasticities model based on relative price effects that so influences Bergsten, this correlation between Japan's overall trade surplus and the lagged yen-dollar rate is spurious. Rather than price effects, it is fluctuations in Japanese income and absorption from changes in monetary policy forced by fluctuations in the yen-dollar rate (see section 13.2 below) that dominate fluctuations in the trade surplus. Even so, over the whole half-cycle (about two years) from depression to recovery, the impact of the exchange rate on Japan's *cumulative* current surplus is ambiguous.

More fundamentally, figure 13.6 also uncovers two further facts that are not favorable to Bergsten's and Cline's interpretation: (i) apart from cyclical movements, the long-term declining trend in the real exchange rate has no explanatory power over the rising structural surplus of Japan vis-à-vis the United States; perhaps more important, (ii) in earlier years of the Bretton Woods fixed-rate dollar standard, movements in the trade balance occurred without any perceptible changes in the real exchange rate. Clearly, there exists a persistent upward trend in the bilateral trade balance over the past 40 years (at least to mid-1995) spanning two different international monetary regimes. All this points to the strong possibility that changes in the trade balance need not be triggered by movements in the real exchange rate. Independently of the real exchange rate, the structural trade balance can shift smoothly with changes in national saving-investment balances when capital markets are integrated (McKinnon 1996, chap. 4).

In general, exchange appreciation by a financially open economy does not alter its cumulative trade balance in any predictable way. Thus it is not surprising that from 1971 to mid-1995, academic pressure to appreciate the yen against the dollar failed to "correct" the bilateral trade imbalance between the two countries. However, we suggest that American mercantile pressure (academic and commercial pressure together) did succeed in (i) appreciating the yen after 1971 and (ii) forcing relative deflation on Japan after the early 1970s. This led to serious macroeconomic instability in Japan after 1985.

13.2 A Causality Analysis of Yen Appreciation and Japanese Monetary Policy

Suppose that price inflation in American tradable goods was given exogenously. Can we then demonstrate empirically our proposition that the yen-dollar exchange rate was indeed the forcing variable "causing" the relative price deflation in Japan? (The alternative interpretation is that under floating exchange rates after 1971, the BoJ freely determined Japanese monetary policy and the Japanese price level according to domestic economic conditions. In this more traditional view, the yen-dollar rate would then adjust passively to be consistent with the independently chosen Japanese monetary policy.)

Consider first the question of causality in long-term PPP. The concept of purchasing power parity was originally proposed by Gustav Cassel in the early twentieth century. According to his formulation, the exchange rate is determined by the ratio of the "purchasing powers" of two national currencies. The purchasing power of a currency in turn is determined by the inverse of the price of a typical goods basket. Thus the PPP exchange rate (E^{PPP}) is shown by the following equation:

$$E^{PPP} = P/P^*, \tag{2}$$

where P is the price level in the home country and P^* is the price level in the foreign country. Suppose Japan is the home country and the United States is the foreign country, and (for example) let the price of a certain goods basket be 100,000 yen in Japan and $1,000 in the United States. Then the PPP yen-dollar exchange rate for this basket is 100 (= 100,000/1,000). According to the original interpretation of PPP by Cassel, an increase in the Japanese price level would proportionally depreciate the yen against the dollar, and an increase in the American price level would proportionately depreciate the dollar against the yen.

It is important to distinguish tradable goods from nontradable goods when we discuss PPP. For tradable goods, PPP holds in the long run—aside from temporary deviations and when transportation costs, tariffs, and other frictional factors are taken into account. Because industrially diversified economies, like Japan and the United States, each produce thousands of similar goods and are not specialized in a few products, persistent shifts in their overall

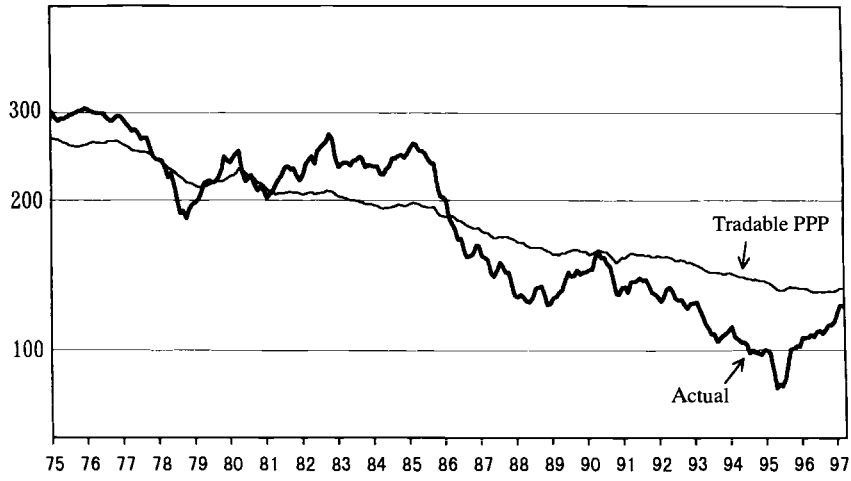

Fig. 13.7 Actual and PPP yen-dollar exchange rates (semilog scale)
Note: Tradable PPP is based on the price survey of manufactured goods conducted by the Research Institute for International Price Mechanism (in 1993). For the fourth quarter of 1992, its estimate of the tradable PPP yen-dollar exchange rate was 150.5. This benchmark has been updated and backdated using the Japanese overall WPI and the U.S. PPI.

terms of trade are unimportant. Thus, in the long run, commodity arbitrage will align their average price *levels*—as represented by P and P^*—internationally. In contrast and by definition, such commodity arbitrage does not occur over nontradable goods and services. Therefore, internationally divergent movements of nontradable prices do not necessarily indicate goods market disequilibrium. In what follows, we focus on the PPP relationship among tradable goods.

Under floating exchange rates since the early 1970s, *short-term* PPP seldom holds. Frequent exchange rate bubbles and overshooting keep the actual exchange rate mostly away from the PPP level. For the yen-dollar exchange rate, the short-term violation and the long-term validity of PPP are depicted in figure 13.7. (See McKinnon and Ohno 1997 for alternative methods of computing PPP rates.) During the past two decades, both the actual and PPP yen-dollar exchange rates had declining trends (fig. 13.7) reflecting the long-term yen appreciation against the dollar and the relative fall in the Japanese price level. In the short run, however, deviations occur because the actual exchange rate changes much more rapidly than the PPP rate, whose movement depends on the more slowly evolving national price levels.

13.2.1 Three Hypotheses

Although many studies on the validity of long-term PPP exist, how to investigate the mechanism by which such a relationship holds between major currencies has not been fully established. Generally speaking, the causality between two endogenous variables, such as the exchange rate and the relative

price—that is, the ratio of relative price levels P/P^*—is mutual. The empirical observation of long-term PPP only demonstrates correlation; it does not prove causality. Understanding the dominant causality, which is unlikely to be unilateral, requires another set of empirical inquiries.

Following Cassel, the traditional interpretation of PPP presupposes that the main causality runs from prices to the exchange rate: autonomous changes in domestic price levels induce proportional changes in the exchange rate. The assumption of such one-way causality is still widely accepted. Dornbusch (1988) defines the concept of PPP thus: "Purchasing power parity (PPP) is a theory of exchange rate determination. It asserts (in the most common form) that the exchange rate change between two currencies over any period of time is determined by the change between two countries' relative price levels." Also, in an empirical study of PPP in the 1970s, Frenkel (1981) estimates a traditional PPP equation with the exchange rate as the dependent variable and the relative price as the independent variable.

However, the exchange rate may also cause the movement of relative national price levels. In this case, the PPP relationship becomes an equation determining domestic prices. If the home currency *accidentally* appreciates, independent of the fundamentals, the residents will find that imported goods are now cheaper—and this will exert downward pressure on the domestic price level. Causality is reversed from the previous case: the exchange rate movement is causal to the changes in the fundamentals. For instance, empirical studies by Helkie and Hooper (1988) and Ohno (1990) treat the exchange rate as an explanatory variable that determines domestic prices. In addition, practically all contributions to the literature of exchange rate pass-through treat the exchange rate as an exogenous shock.

Because the exchange rate is an asset price dominated by expectations, it could also *anticipate* future changes in the fundamental variables and move first. Then true causality runs from Japanese monetary policy to the yen-dollar rate—although the time sequence is reversed from the traditional Cassel case.

In sum, there are three alternative and mutually exclusive interpretations of the fact that the nominal exchange rate and relative national price levels move in the same direction in the long run:

Hypothesis 1. The exchange rate is an "adjusting variable" that passively accommodates changes in the fundamentals (prices, monetary policy, etc.). In this case, the flexibility of the exchange rate—despite short-term volatility—contributes to economic adjustment in the medium to long run. Causality runs from the fundamentals to the exchange rate.

Hypothesis 2. The exchange rate is a "forward-looking variable" that anticipates future autonomous changes in the fundamentals. In this case, the true causality is from the fundamentals to the exchange rate, but the movement of the exchange rate precedes the fundamentals in the observed time-series sequence.

Hypothesis 3. The exchange rate is a "forcing variable" that produces changes in relative national price levels, monetary policies, and so forth. In this case, the exchange rate is causal in the true as well as the time-series sense. These changes in the fundamentals would not occur without the initial change in the exchange rate.

Under the maintained assumption that the U.S. price level is independently determined by the Fed, hypothesis 3 corresponds to our basic proposition that the appreciating yen caused the Japanese price level (rate of relative price deflation) and the BoJ's long-run monetary policy.

13.2.2 An Economic Model of Domestic and External Shocks to the Japanese Price Level

In this section, we first model the causal relationship between the yen-dollar rate and Japanese prices (hypothesis 1 vs. hypotheses 2 and 3) theoretically by positing an economic structure unique to the problem at hand—unlike the popular Granger and Sims tests or vector autoregression methodology. We then test this economic model empirically by looking at the price behavior of Japanese manufactured goods. We ask the question: when general inflation or deflation occurs, did domestic prices or internationally exposed prices change first? By comparing the prices of similar goods destined for home or foreign markets, we can show whether recent Japanese inflation—or, more often, deflation—is homemade or externally imposed.

The model can be construed to describe either the entire economy or individual industries. Like us, Marston (1991) also uses Japanese sectoral data to see how yen appreciations affect the relative price structure—namely, how Japanese firms set their export price relative to the same good's domestic price. Marston defines this exchange-rate-induced price discrimination as the "pricing to market" effect. While his and our studies have similar data sets, Marston begins his investigation by assuming causation from the exchange rate to prices. In contrast, our aim is to test for the direction of causality itself.

All goods are assumed to be tradable, differing only in degree. All variables are in logarithms and refer to the manufacturing sector of the Japanese economy.

Let the *average* (i.e., domestic sales and exports combined) price level be

$$P = \theta P_D + (1 - \theta) P_X, \tag{3}$$

where P_D is the domestic sales price, P_X is the external price (export or import price, depending on whether the good is mostly exported or imported), and θ is the share of domestic sales in total sales. Assuming for simplicity that PPP always holds for the external price, we have

$$P_X = E + P_X^*, \tag{4}$$

where E is the nominal exchange rate (domestic currency per foreign currency). P_X^* is the foreign (dollar) price, which is assumed—or controlled—to be given.

We assume that the interaction of domestic aggregate demand and aggregate supply determines the domestic price as in the standard macroeconomic model. Thus the domestic price can be written in a reduced form,

$$P_D = P_D(\alpha, \gamma), \tag{5}$$

where α and γ are various shift parameters of the aggregate demand and supply functions, respectively. For example, α includes fiscal and monetary policies and autonomous changes in consumption and investment; γ includes productivity shocks, wage push, and so forth.

In this simplified framework, let us consider whether domestic price changes are driven mainly by domestic shocks or by exchange rate shocks. Two cases are examined below: (i) price changes precede exchange rate changes as in hypothesis 1; (ii) exchange rate changes precede price changes as in hypotheses 2 and 3. In distinguishing these two cases, we confine our empirical analysis to the period from 1985 to early 1995—when yen appreciation and Japanese price deflation were most severe.

Case (i): $P \rightarrow E$

In this case, representing hypothesis 1, an initial shift in the domestic parameter (either α or γ) lowers the domestic price. Subsequently, the exchange rate gradually adjusts to reflect the new relative price between home and abroad: the change in P precedes the change in E. This exchange rate dynamics can be described as follows:

$$\dot{E} = \lambda(P - E), \qquad \lambda > 0, \tag{6}$$

where $P - E$ is the deviation from tradable PPP and λ is the adjustment speed. (Recall that the foreign price is assumed to be fixed throughout.) Suppose, for instance, that monetary tightening causes absorption (total domestic spending) to contract. This will lower P_D according to equation (5). Since P_D is part of P (eq. [3]), P also declines. This creates a temporary deviation from PPP ($P - E < 0$), prompting E to passively and gradually adjust to the new relative price between home and abroad. P_X also moves in tandem with E, because of equation (4).

The entire sequence can be summarized as

$$(\alpha, \gamma) \rightarrow P_D\downarrow \rightarrow P\downarrow \Rightarrow E\downarrow \rightarrow P_X\downarrow,$$

where $\rightarrow$ indicates an immediate effect and $\Rightarrow$ a lagged effect. Figure 13.8 depicts the movement of each variable after a domestic shock induced domestic price deflation. Note that the average price level (P) and the internal relative

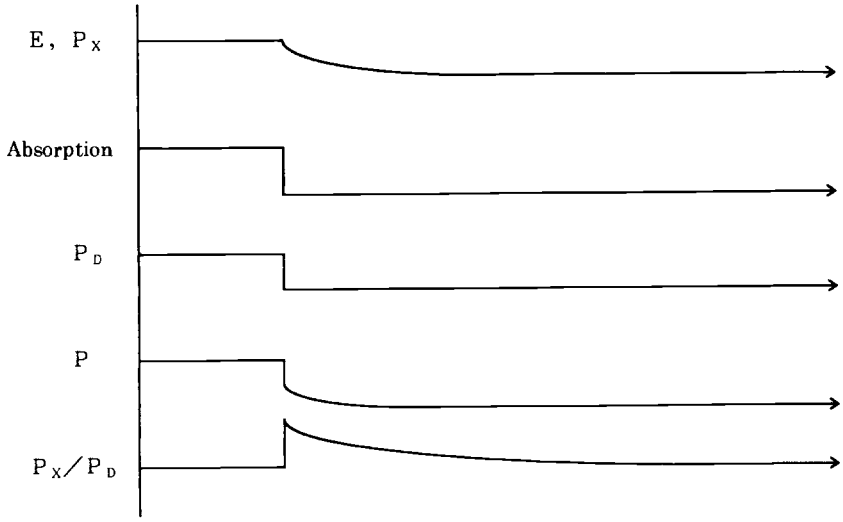

Fig. 13.8 ***P*** **precedes** ***E***

price (P_X/P_D) move in opposite directions—that is, they are negatively correlated.

Case (ii): $E \rightarrow P$

In this case, representing hypotheses 2 or 3, the exchange rate first appreciates independent of the current fundamentals, lowering P_X according to equation (4). Since the reduction in P is proportionally not as large as the appreciation of E, this creates an overvaluation of the home currency ($P - E > 0$). Assuming Japan to be the home country, the yen's overvaluation leads to *endaka fukyo* (high yen-induced recession) and the hollowing-out of domestic industries, both of which reduce absorption (especially investment)

$$\dot{A} = -\mu(P - E), \qquad \mu > 0, \tag{7}$$

where A is absorption. As A declines, P_D also falls due to equation (5)—currency overvaluation is part of the demand shift parameter α.

The causal sequence can be summed up as follows:

$$E\downarrow \rightarrow P_X\downarrow \rightarrow P\downarrow \Rightarrow A\downarrow \rightarrow P_D\downarrow.$$

This is consistent with hypothesis 3. Solid lines in figure 13.9 describe the changes in the key variables after an exogenous exchange rate shock. At the time of the shock, the movements of the average price level (P) and the internal relative price (P_X/P_D) are positively correlated—unlike case (i).

Alternatively, if hypothesis 2 is true when the exchange rate appreciates, the key variables behave according to the dotted lines in figure 13.9. In this case,

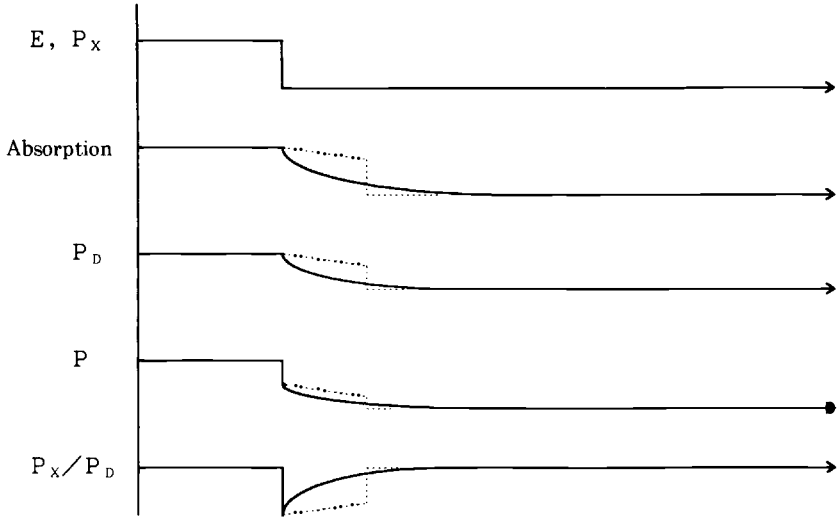

Fig. 13.9 ***E* precedes *P***

the exchange rate changes in anticipation of the future downward jumps in A and P_D. P_X immediately declines proportionally to the appreciation, but the domestic price does not change very much until the fundamentals actually change later. (However, from the initial overvaluation, absorption and P_D begin to adjust downward slowly.) In this case also, the average price level and the internal relative price are positively correlated.

The Dornbusch overshooting model is perhaps the most famous of the exchange rate as a forward-looking variable. However, the assumptions of our model differ from Dornbusch's. Most important, prices are sticky in his model, but prices in immediately affected markets are assumed to be flexible in ours. In other markets, however, the dynamics of our model allow for a lagged response of the exchange rate to the relative price as in equation (6), or for a slow change in absorption due to exchange rate overvaluation as in equation (7). The assumption that prices in directly affected markets can change fairly fast is not inconsistent with Japanese data. A large movement of the yen-dollar exchange rate is passed through—albeit incompletely—to yen export or import prices rather quickly.

13.2.3 Data Analysis

Using our economic model, we can distinguish hypothesis 1 from hypotheses 2 and 3 by examining the correlation between the average price level (P) and the ratio of the export price relative to the domestic price in the same product category (P_X/P_D).

In order to remove global price drift, the Japanese "average" price level, including both domestic and export goods as in equation (3), is deflated by the

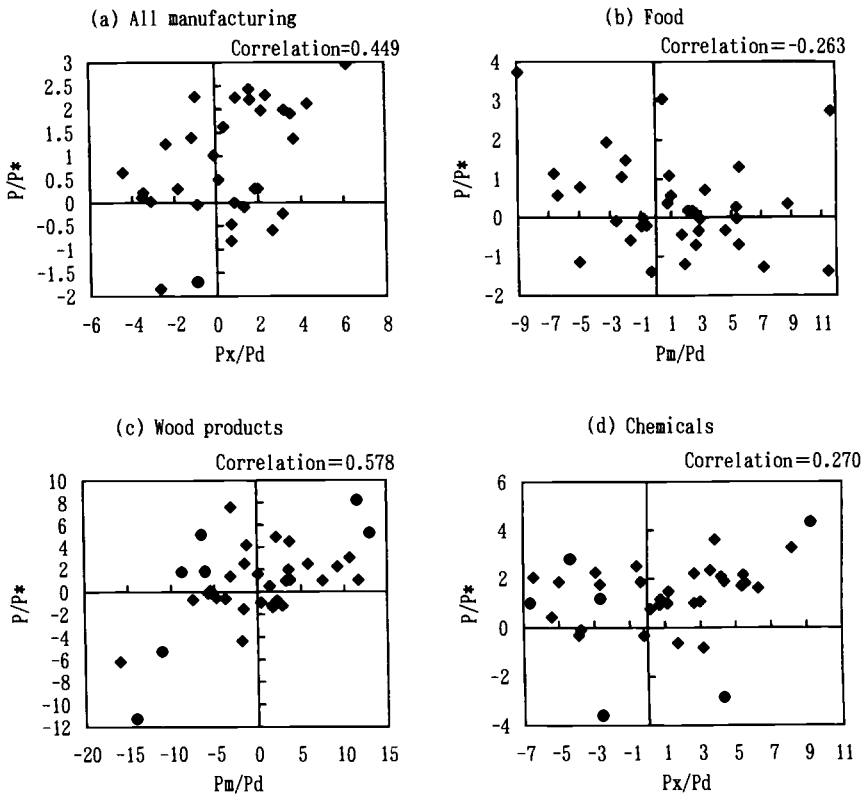

Fig. 13.10 Correlation between price movements and internal relative price
Note: A, all manufacturing; *B*, food; *C*, wood products; *D*, chemicals

U.S. producer price index for the corresponding industry. Thus the corrected P, now really P/P^*, measures Japanese inflation relative to U.S. inflation. If P/P^* and P_X/P_D are negatively correlated, hypothesis 1 is accepted. If they are positively correlated, we accept hypothesis 2 or 3.

The WPI for the entire manufacturing industry, as well as WPIs for seven two-digit-level industries (food, wood products, chemicals, general machinery, electrical machinery, transport machinery, and precision machinery) are examined. Selection of individual industries is dictated by the comparability of Japanese and U.S. price indexes.

The domestic price data are taken from the BoJ's "domestic wholesale price index." For the external price, the BoJ's "export price index" is used. Because imports are greater than exports for food and wood products, we use instead the BoJ's "import price index" for these industries.

To capture causality between the yen-dollar rate and Japanese prices when deflationary pressure on Japan was greatest, that is, after the Plaza Agreement,

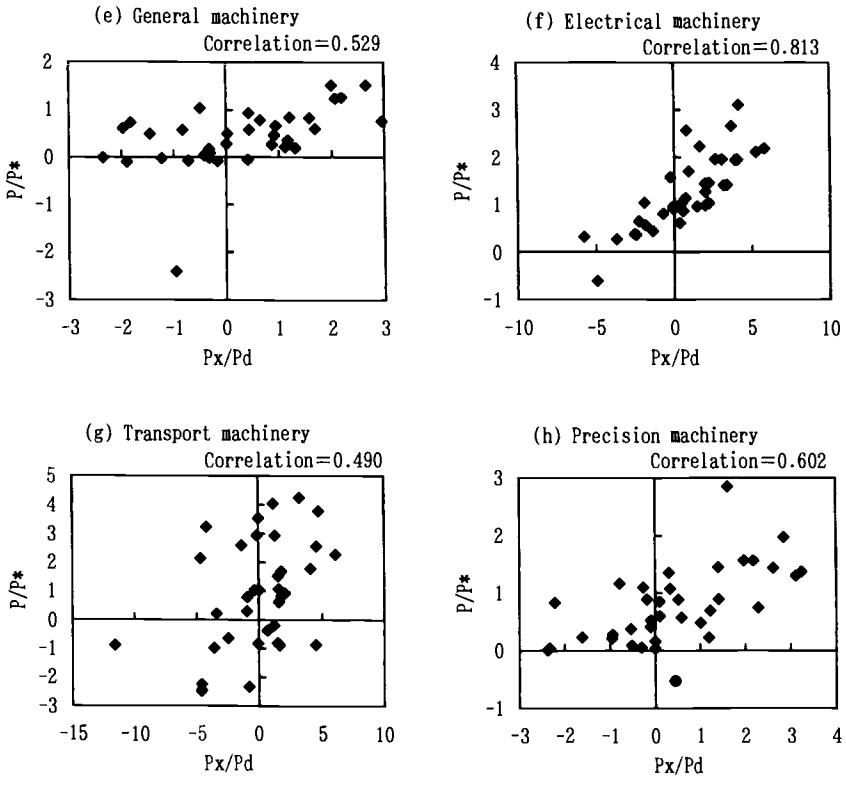

Fig. 13.10 (cont.)
Note: *E*, general machinery; *F*, electrical machinery; *G*, transport machinery; *H*, precision machinery.

the sample period is 1985:4–1994:4. Observations are based on quarterly rates of price change, from the last month of the previous quarter to that of the current quarter. Figure 13.10 plots P/P^* against P_X/P_D for all these time-series observations and also displays the overall correlation coefficient between the two within each product category.

Figure 13.10*A* shows the plot for the whole of the Japanese manufacturing industry, while figures 13.10*B* through 13.10*H* show those for individual industries. For all industries except food and chemicals, the correlation between P/P^* and P_X/P_D is positive and statistically significant at the 5 percent level (the critical value is ± 0.35). In particular, electrical machinery—a key export industry of Japan—carries a high positive correlation coefficient of 0.813. For all of manufacturing together, this correlation is 0.449 and statistically significant.

These results confirm the existence of positive correlation between the Japa-

nese price level and its internal relative price (with a few exceptions)—and thus support hypotheses 2 and 3. In the decade before 1995, a large part of Japanese price instability originated in externally exposed prices, and major inflations and deflations rarely began with domestic price changes. Thus we can safely reject hypothesis 1.

13.2.4 Distinguishing Hypothesis 2 from Hypothesis 3: The Monetary Reaction of the Bank of Japan

But is the true causation from anticipated domestic prices (as determined by future fundamentals such as monetary policy) to the exchange rate, as under hypothesis 2, or from the exchange rate to future prices, as under hypothesis 3? In other words, is the yen-dollar rate an "anticipatory" variable or a "forcing" one for determining macroeconomic conditions in Japan?

To answer this question, we focus on the monetary policy of the BoJ as the key fundamental variable. While there are other fundamentals (fiscal policy, current account balance, product innovation, demand shift, etc.), it is not unreasonable to single out the BoJ's monetary policy because (i) it is widely recognized that monetary policy is one of the most important determinants of the exchange rate and aggregate demand, (ii) monetary policy is more flexibly implemented than fiscal policy, and (iii) changes in the monetary stance of the BoJ can be measured—albeit imperfectly.

Monetary policy is part of α (the shift parameter in the aggregate demand function) represented in equation (5) above. If the exchange rate moves in anticipation of a future change in monetary policy, the subsequent change in monetary policy must be consistent with the initial exchange rate movement. For example, if the market expects a monetary tightening by the BoJ and therefore appreciates the yen, and assuming that expectations are on average correct, we should see an actual tightening. When the policy is later implemented, interest rates will rise and prices will fall. These reinforce and validate the initial exchange rate appreciation.

In contrast, if the exchange rate is an exogenous shock that truly causes undesirable price variation, the subsequent monetary policy should tend to offset the exchange rate impact on the macroeconomy. In this case, the exchange rate is the cause and monetary policy the effect.

We propose to distinguish hypothesis 2 from hypothesis 3 by observing the typical monetary policy reaction immediately after a large change in the yen-dollar exchange rate. More specifically, we will first investigate informally the policy intentions of the BoJ when it changes the official discount rate. Second, we will statistically estimate the monetary reaction function of the BoJ to see whether its policy tends to validate or offset the yen's preceding movement.

The existing literature (Yoshino and Yoshimura 1995) shows that the BoJ's principal policy instrument is the manipulation of short-term interest rates, changes in the official discount rate, and guidance of the call money rate, rather

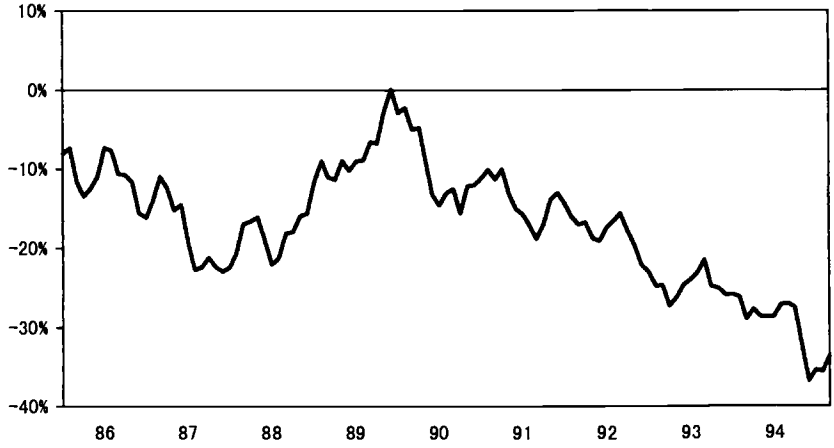

Fig. 13.11 Real exchange rate (deviation of yen-dollar rate from tradable PPP)

than high-powered money. Nor, according to Takatoshi Ito (1992, 132), did the BoJ aim in practice to control systematically any monetary aggregate as an intermediate target—even the "official" target of growth in M2 + CD. Our study also accepts that changes in short-term interest rates are the best representation of the BoJ's policy intentions and examines their correlation with the exchange rate.

Figure 13.7 plots the actual and PPP yen-dollar exchange rates since 1975, while figure 13.11 displays the divergence between these two exchange rates since October 1985. The decade 1985–94 can be divided into three distinct periods: the first period, beginning in the spring of 1985, in which the yen appreciated sharply above PPP and continued appreciating into 1988; the second period of moderate yen depreciation from 1989 to a brief return to PPP by mid-1990; and the third period of prolonged yen appreciation from 1990 through 1994, taking the yen even further above PPP—until the joint interventions of May–August 1995 finally reversed this trend (fig. 13.3).

Over the same decade, the BoJ's policy toward the discount rate and the call rate was correlated with these large movements in the yen-dollar exchange rate. Between 1986 and 1995, the discount rate was changed 19 times. The call rate was also guided to trace the changes in the discount rate—as can be seen in figure 13.12. The discount rate was lowered in steps from 1986 to early 1987 then kept constant at a low level until mid-1989 (it was maintained at 2.5 percent for 27 months), followed by rapid increases up to the summer of 1990. After that, a long period of discount rate reduction ensued.

Comparing figures 13.11 and 13.12, yen appreciation and the falling discount rate roughly coincide, as do yen depreciation and the rising discount rate. Moreover, turning points in the real exchange rate precede those in short-term

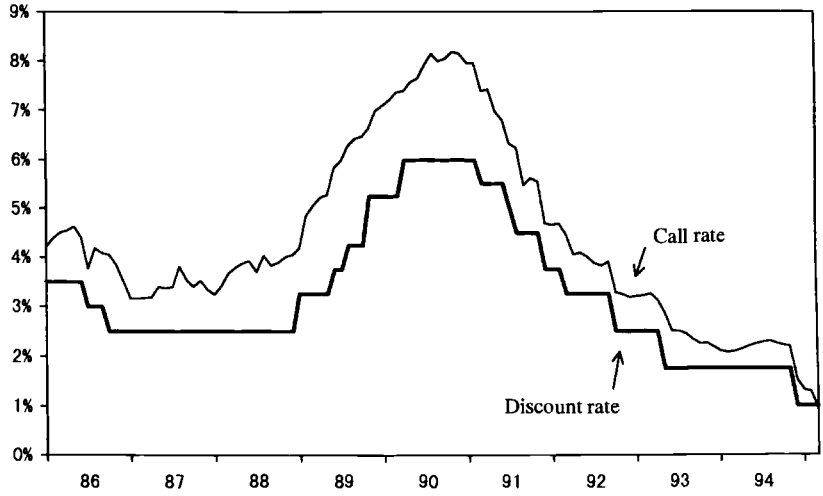

Fig. 13.12 Discount rate and call rate

interest rates by a few months to a year. We conclude from these figures that, since the Plaza Agreement, the BoJ conducted interest rate policy to offset, rather than validate, movements in the yen-dollar rate. It has attempted to slow down or reverse sharp movements in the yen, and to alleviate the deflationary impact of yen appreciation on the macroeconomy.

The BoJ's concern over exchange rate shocks is also documented by its official statements when the discount rate was changed—see table 13.1. During the period of yen appreciation in 1986–87, the BoJ sought to counter the high yen and weak domestic business conditions. Increased interest rates in 1989–90 were designed to prevent inflation caused by the now lower yen. (This monetary tightening in the late 1980s was also intended to end the domestic asset bubble, which was the delayed consequence of the BoJ's trying to dampen the yen's appreciation in the mid-1980s and the first *endaka fukyo;* Ueda 1992.) Subsequently, discount rate reductions, which took the entire interest rate structure to historically low levels by 1994, were designed to stimulate a domestic economy reeling from the bursting of the asset bubble and the second *endaka fukyo.*

We conclude that the BoJ regards the movement of the yen-dollar rate as an exogenous shock to the Japanese economy and reacts to stop its trend or to ameliorate its more extreme effects—but without succeeding in preventing them altogether. These results support hypothesis 3: that yen appreciation was a forcing variable in causing price deflation in Japan. Indeed, it is hard to believe hypothesis 2: that the BoJ intended to allow the WPI to fall from 1985 to 1995 (fig. 13.2) and that the exchange rate was just anticipating this deflationary policy.

Table 13.1 Changes in the Discount Rate

Date	New Rate (%)	Reason(s) for Change
30 Jan 1986	4.50	To stimulate domestic demand
7 Mar 1986	4	To counter yen appreciation, stimulate domestic economy
19 Apr 1986	3.50	To counter yen appreciation, participate in global monetary coordination
1 Nov 1986	3	To counter yen appreciation, stimulate domestic economy
21 Feb 1987	2.50	To counter yen appreciation, stimulate domestic economy
31 May 1989	3.25	To check inflation in advance
11 Oct 1989	3.75	To check inflation caused by yen depreciation in advance
25 Dec 1989	4.25	To check inflation in advance
20 Mar 1990	5.25	To check inflation in advance, calm financial and security markets
30 Aug 1990	6	To check inflation in advance
1 July 1991	5.50	To stimulate domestic economy
14 Nov 1991	5	To prevent recession
31 Dec 1991	4.50	To stimulate domestic economy
1 Apr 1992	3.75	To stimulate domestic economy
27 July 1992	3.25	To stimulate domestic economy
4 Feb 1993	2.50	To stimulate domestic economy
21 Sept 1993	1.75	To stimulate domestic economy
14 Apr 1995	1	To stimulate domestic economy, counter yen appreciation
8 Sept 1995	0.50	To stimulate domestic economy, promote yen depreciation and stock market recovery

Source: Japan Economic Journal (various issues).

13.2.5 Estimating the Bank of Japan's Reaction Function

But to confirm our intuition, we need a more precise statistical technique for showing how the BoJ reacts to, and tries to offset, what it regards as exogenous shocks in the yen-dollar rate. We shall directly estimate the policy reaction function of the BoJ to test whether it guides short-term interest rates to offset-exchange rate movements.

The policy reaction function, estimated by Yoshino and Yoshimura (1995), shows that the BoJ responded *both* to domestic business conditions and to the exchange rate. Ueda (1992, 1995) even accuses the BoJ of overreacting to the current account surpluses and yen appreciations of the early 1970s and the mid-1980s by creating the excessive domestic liquidity that ignited domestic inflation and the asset bubble.

Let us estimate the BoJ's policy reaction function with a slightly different specification than Yoshino and Yoshimura's. Let the monetary policy reaction function be

$$(8) \qquad i_t^s = \beta_0 + \beta_1 i_{t-1}^s + \beta_2 \pi_{t-1} + \beta_3 y_{t-1} + \beta_4 s_{t-1} + \eta_t,$$

where i^s is the call rate, π is the inflation rate, y is the output gap, s is the real exchange rate, and η is the error term. The output gap is the deviation of the

index of industrial production from its log-linear trend. The real exchange rate is measured as the deviation of the actual exchange rate from PPP—as shown in figure 13.11. An increase in s indicates yen depreciation against the dollar, and vice versa.

Monthly data are used, and all explanatory variables are lagged one month in equation (8). Alternatively, if two-month lags are taken for the explanatory variables (except the lagged call rate itself), we have

$$(9) \qquad i_t^s = \delta_0 + \delta_1 i_{t-1}^s + \delta_2 \pi_{t-2} + \delta_3 y_{t-2} + \delta_4 s_{t-2} + \nu_t .$$

The explanatory variables are lagged because of the delays in recognition and action associated with interest rate policy. These lags reflect the time required for the BoJ to collect the data needed to initiate an action, and they are perhaps a month or two in duration. Although inflation and business statistics are officially announced after two months or so, the BoJ usually has earlier access to preliminary data. As to the real exchange rate, the nominal exchange rate is known without delay, but the prices with which to deflate it also come with lags. Technically, these lags also enable us to lessen the simultaneous equation bias in the estimation of any policy reaction function.

For price data, the WPI and the CPI, up to $t - 1$ or $t - 2$, are used as alternatives. We posit that the BoJ does not react to a temporary blip but does react to a sustained movement in the price level. How many months constitute a "sustained" period cannot be determined a priori. Experimentation showed that monthly price variation contains too much noise, while a twelve-month movement would be too long because the BoJ reacts sooner. Somewhat arbitrarily, we choose the cumulative change over either three-month or six-month intervals to be the "sustained" price movement to which the BoJ reacts. For example, in equation (8), π_{t-1} is the cumulative price change from four months before to one month before, or from seven months before to one month before. Tables 13.2 and 13.3 report the results of estimating equations (8) and (9), respectively, by the method of ordinary least squares.

In table 13.2, where the explanatory variables are lagged one month, parameters in all specifications carry the correct signs (they should all be positive) regardless of whether the WPI or CPI is used. In response to inflation, a business boom, or yen depreciation, the BoJ raises the short-term interest rate—and vice versa. Although the coefficients of the inflation indexes are statistically insignificant at the 5 percent level, the output coefficient is generally significant—except under specifications 1 and 2 where the WPI, but not the real exchange rate, is included.

The outstanding feature of table 13.2 is that the real exchange rate induces a positive and significant policy reaction in all cases. The importance of the real exchange rate is also revealed in Durbin's h statistics. Without inclusion of the real exchange rate, h is significant at the 5 percent level (exceeding 1.96) and points to the possibility of misspecification or a missing variable. The adjusted R^2 also improves slightly when the real exchange rate is included.

Table 13.2 **Policy Reaction Function of the Bank of Japan: Explanatory Variables Lagged One Month**

	Using WPI Inflation				Using CPI Inflation			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.00086	0.00075	0.00954	0.00937	0.00134	0.00131	0.00997	0.00997
	[0.86]	[0.74]	[3.94]	[3.93]	[1.40]	[1.37]	[4.51]	[4.50]
Call rate (−1)	0.997	0.981	0.848	0.854	0.955	0.950	0.835	0.830
	[42.9]	[41.2]	[21.6]	[21.7]	[47.3]	[46.1]	[24.6]	[24.4]
Inflation (−1)	0.0579		0.0230		0.0605		0.0520	
3-month moving average	[1.91]		[0.77]		[1.61]		[1.49]	
Inflation (−1)		0.0387		0.0110		0.0705		0.0611
6-month moving average		[1.95]		[1.03]		[1.56]		[1.45]
Output gap (−1)	0.0081	0.0049	0.0319	0.0290	0.0156	0.1350	0.0345	0.0328
	[1.03]	[0.54]	[3.32]	[2.79]	[2.53]	[2.05]	[4.75]	[4.30]
Real exchange rate (−1)			0.0199	0.0198			0.0206	0.0207
			[3.90]	[3.95]			[4.27]	[4.27]
$\bar{R}^2$	.976	.976	.978	.978	.975	.975	.979	.979
S.E.	0.00297	0.00297	0.00280	0.00279	0.00298	0.00299	0.00278	0.00278
h	1.872	1.878	1.546	1.490	2.249	2.116	1.600	1.426

Note: Dependent variable is call rate. Sample period is October 1985 to July 1995 ($n = 118$). Numbers in brackets are t-statistics.

A possible reason for the insignificance of the inflation indexes in table 13.2 is that the real exchange rate already provides the information needed to forecast future price movements. Thus the actual (lagged) price data become superfluous. This interpretation is consistent with hypothesis 3, which states that exchange rate shocks are the primary cause of (future) domestic inflation.

Table 13.3 extends the lags on the explanatory variables (except on the call rate itself) to two months as in equation (9). Here, all parameters also carry the correct signs—except for the output gap in specification 2, which is insignificant. Inflation now seems to be more significant. However, in the BoJ's reaction function, the main story again is the importance of the yen-dollar rate's deviations from PPP. Not only is the real exchange rate highly significant when measured by its *t*-statistics, but the adjusted R^2 and Durbin's h both improve—and the effects of the output gap become more positive—when the exchange rate is included.

Like the results found by Yoshino and Yoshimura (1995) and Ueda (1992, 1995), our results for the 1985–94 period also show that the BoJ reacts systematically to the exchange rate, as well as to domestic output and inflation. In the short run, movements in the yen-dollar rate are not accommodated but instead are partially counteracted.

How then does our statistical study differ from these earlier ones? We consider these reactions of the BoJ *together with* with our finding of positive correlation between P and P_X/P_D. Together, these confirm the validity of our hypothesis 3.

13.3 Conclusion

The second part of this paper presented a series of new causality tests for price movements and exchange rate fluctuations based on Japanese monetary and price data since the Plaza Agreement. We discovered that exchange rate movements precede changes in relative national price levels, and that any initial movement of the exchange rate not only anticipates the BoJ's long-run policy but actually causes it. True, in the short run, the BoJ reacts by adjusting its call money rate to resist these exchange rate movements. But this resistance was insufficient to prevent a long-term downward trend in Japanese prices relative to those in the United States, with a parallel downward drift in the PPP value of the yen-dollar exchange rate, at least through 1995.

We showed that, on net balance, flexibility in the yen-dollar exchange rate should not be considered an automatic stabilizer. Quite the contrary. The erratically appreciating yen has been an independent (or exogenous) source of disturbance—and imposed undue deflation on the Japanese economy in the past 10 years.

The first part of the paper offered an explanation of why the yen rose in such a puzzling fashion since 1971—despite some resistance from the BoJ in the short run, particularly in the past decade. Mercantile pressure from the United

Table 13.3 **Policy Reaction Function of the Bank of Japan: Explanatory Variables Lagged Two Months (except call rate)**

	Using WPI Inflation				Using CPI Inflation			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.00044	0.00040	0.00867	0.00887	0.00114	0.00104	0.0102	0.00991
	[0.44]	[0.40]	[3.49]	[3.60]	[1.17]	[1.08]	[4.36]	[4.30]
Call rate (−1)	0.989	0.991	0.863	0.862	0.960	0.948	0.827	0.820
	[43.47]	[42.20]	[21.06]	[21.03]	[46.25]	[45.15]	[22.37]	[22.41]
Inflation (−2)	0.0812		0.0546		0.0634		0.0638	
3-month moving average	[2.75]		[1.88]		[1.67]		[1.80]	
Inflation (−2)		0.0485		0.0342		0.117		0.112
6-month moving average		[2.51]		[1.83]		[2.61]		[2.66]
Output gap (−2)	0.0017	−0.0009	0.0261	0.0245	0.0130	0.0087	0.0357	0.0312
	[0.22]	[−0.097]	[2.60]	[2.28]	[2.07]	[1.33]	[4.48]	[3.84]
Real exchange rate (−2)			0.0182	0.0188			0.0207	0.0203
			[3.58]	[3.74]			[4.20]	[4.18]
$\bar{R}^2$	.976	.976	.978	.978	.975	.976	.978	.979
S.E.	0.00295	0.00297	0.00281	0.00281	0.00301	0.00296	0.00282	0.00277
h	1.932	1.975	1.789	1.818	2.238	2.364	1.885	1.954

Note: Dependent variable is call rate. Sample period is October 1985 to July 1995 ($n = 118$). Numbers in brackets are t-statistics.

States, consisting of commercial pressure from individual American companies affected by Japanese competitors and academic pressure to devalue the dollar (appreciate the yen) to "correct" American trade deficits, created a climate where the yen would increase episodically. Caught up in this syndrome at least up through early 1995, the Japanese authorities were too inhibited by this mercantile pressure, that is, by threats of trade war, to act—or be able to act—decisively to stop the yen's appreciation. And thus Japan suffered *endaka fukyo.*

Only the American government's sudden relaxation of mercantile pressure in spring and summer 1995, the suspension of trade hostilities combined with joint action by the Fed and BoJ to drive the yen back down that signaled to the markets that the American government would now tolerate a lower value for the yen, allowed the yen to depreciate and the Japanese economy to recover somewhat in 1996. And this relaxation of commercial pressure (no new trade disputes) has continued through 1998. (The downturn in Japan's economy in 1997–98 was triggered by the April 1997 tax increase.) But whether this remission from the syndrome of the ever-higher yen is temporary or permanent remains to be seen.

References

Baldwin, Robert E. 1988. *Trade policy in a changing world economy.* Chicago: University of Chicago Press.

Bergsten, C. Fred, and Marcus Noland. 1993. *Reconcilable differences: United States–Japan economic conflict.* Washington, D.C.: Institute for International Economics, June.

Cline, William R. 1995. *Predicting external imbalances for the United States and Japan.* Policy Analyses in International Economics, no. 41. Washington, D.C.: Institute for International Economics, September.

Dornbusch, Rudiger. 1988. *Exchange rates and inflation.* Cambridge, Mass.: MIT Press.

Frenkel, Jacob. 1981. The collapse of purchasing power parity during the 1970s. *European Economic Review* 16:145–65.

Helkie, William L., and Peter Hooper. 1988. An empirical analysis of the external deficit, 1980–86. In *External deficits and the dollar: The pit and the pendulum,* ed. R. Bryant, G. Holtham, and P. Hooper. Washington, D.C.: Brookings Institution.

International Monetary Fund (IMF). 1997. *International financial statistics.* Washington, D.C.: International Monetary Fund, March. CD-ROM.

Ito, Takatoshi. 1992. *The Japanese economy.* Cambridge, Mass.: MIT Press.

Itoh, Motoshige (with the Ministry of International Trade and Industry). 1994. *Misperceptions of the trade surplus: What is wrong with the Japanese economy?* (in Japanese). Tokyo: Toyo Keizai Shinposha.

Kawai, Masahiro. 1994. *International finance* (in Japanese). Tokyo: Tokyo University Press.

Komiya, Ryutaro. 1994. *Economics of trade surpluses and deficits, absurdity of Japan-U.S. friction* (in Japanese). Tokyo: Toyo Keizai Shinposha.

Krueger, Anne. 1995. *American trade policy: A tragedy in the making.* Washington, D.C.: AEI Press.
Marston, Richard. 1991. Pricing behavior in Japanese and U.S. manufacturing. In *Trade with Japan: Has the door opened wider?* ed. P. Krugman. Chicago: University of Chicago Press.
McKinnon, Ronald I. 1996. *The rules of the game: International money and exchange rates.* Cambridge, Mass.: MIT Press.
McKinnon, Ronald I., and Kenichi Ohno. 1997. *Dollar and yen: Resolving economic conflict between the United States and Japan.* Cambridge, Mass.: MIT Press.
Miyagawa, Tsutomu, and Joji Tokui. 1994. *Economics of yen appreciation: Changing international competitiveness and the problem of current account surplus* (in Japanese). Tokyo: Toyo Keizai Shinposha.
Murakami, Yasusuke. 1992. *Anti-classical political economy* (in Japanese), 2 vols. Tokyo: Chuo Koronsha.
Ohno, Kenichi. 1990. Estimating yen/dollar and mark/dollar purchasing power parities. *IMF Staff Papers* 37:700–25.
Organization for Economic Cooperation and Development. 1995. *Japan.* OECD Economic Surveys. Paris: Organization for Economic Cooperation and Development.
Tyson, Laura D'Andrea. 1992. *Who's bashing whom? Trade conflict in high technology industries.* Washington, D.C.: Institute for International Economics, November.
Ueda, Kazuo. 1992. *Monetary policy under balance-of-payments disequilibrium* (in Japanese). Tokyo: Toyo Keizai Shinposha.
———. 1995. Japanese monetary policy: Rules or discretion? Part II. Paper presented at Bank of Japan's seventh international conference, Tokyo, 26–27 October.
Yoshino, Naoyuki, and Masaharu Yoshimura. 1995. The exogeneity test of monetary policy: Instrumental targets and money supply (in Japanese). Tokyo: Bank of Japan, Monetary Research Institute.

Comment

Kazuo Ueda

The paper addresses basically two issues: long-run movements in the yen and the Japanese current account, on one hand, and the current *endaka fukyo* (recession as a result of yen appreciation) on the other. I will concentrate on McKinnon, Ohno, and Shirono's analysis of the first issue in the following. I believe that the explanation of the 1991–93 recession requires a more complete treatment of the bad loan problem than do the authors.

The basic logic of the paper runs as follows: The Japanese current account has been mainly determined by long-run trends in U.S.-Japanese savings but has been largely independent of real exchange rate movements. In periods of large Japanese current account surpluses the United States adopted a policy of "talking down" the dollar. This has had strong effects on the yen-dollar rate, but not on the Japanese current account. The appreciation of the yen, after the fact, has been validated by the tight monetary policy of the Bank of Japan.

Kazuo Ueda is a member of the policy board of the Bank of Japan.

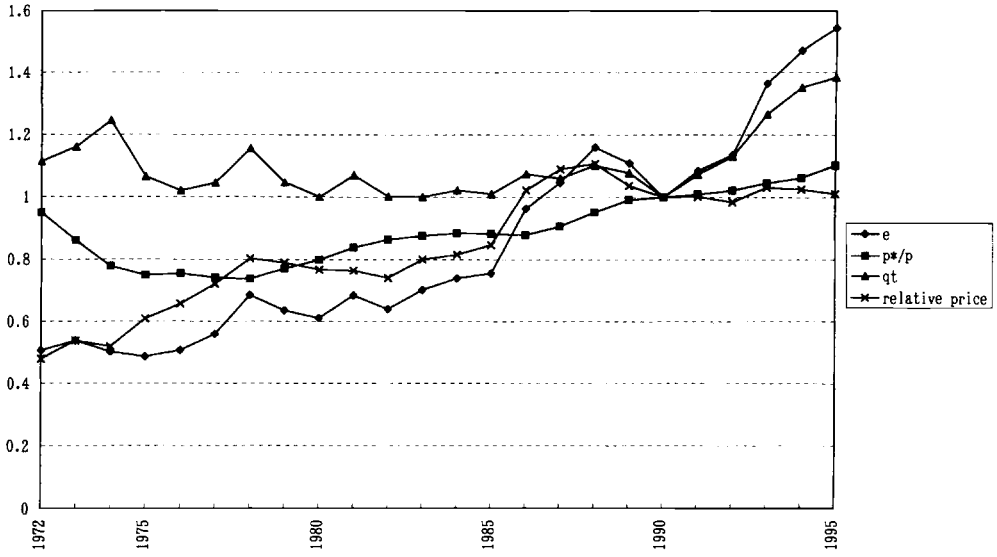

Fig. 13C.1 Determinants of yen movements

I agree with some of these assertions, but not with all of them. Here is why. Let us note the convenient identity:

$$e = (p^*/p)(q_T)[(p_T^*/p^*)/(p_T/p)],$$

where e, p, p_T, and q_T are the nominal effective yen, CPI, export unit value, and real effective yen, respectively, measured in export unit value. Asterisks indicate weighted averages of foreign variables, with the weights being the same as those used in the calculation of the effective exchange rates. Simply put, the equation decomposes the movements in yen into monetary factors, real yen in terms of traded goods, and the Balassa-Samuelson effect.

Figure 13C.1 shows the decomposition.[1] It reveals a number of interesting things about the yen during the past two decades. First, the most important determinant of the yen appreciation has been the Balassa-Samuelson effect. Between 1972 and 1990, the yen appreciated by 68.5 percent (in log difference terms), of which only 5.5 percent is explained by monetary factors, −11 percent by movements in real yen, and 74 percent by the Balassa-Samuelson term. Figure 13C.2 shows that the majority of the Balassa-Samuelson effect took

1. The nominal and real effective rates are from the IMF's *International Financial Statistics,* with some of the 1995 data being rough estimates by myself. The real rate using the CPI does not exist before 1977. For 1972–77, it was identified with the bilateral U.S.-Japan real rate. The equation holds as an identity in this estimation because the foreign relative price between traded and nontraded goods has been calculated from the values of other variables using the equation.

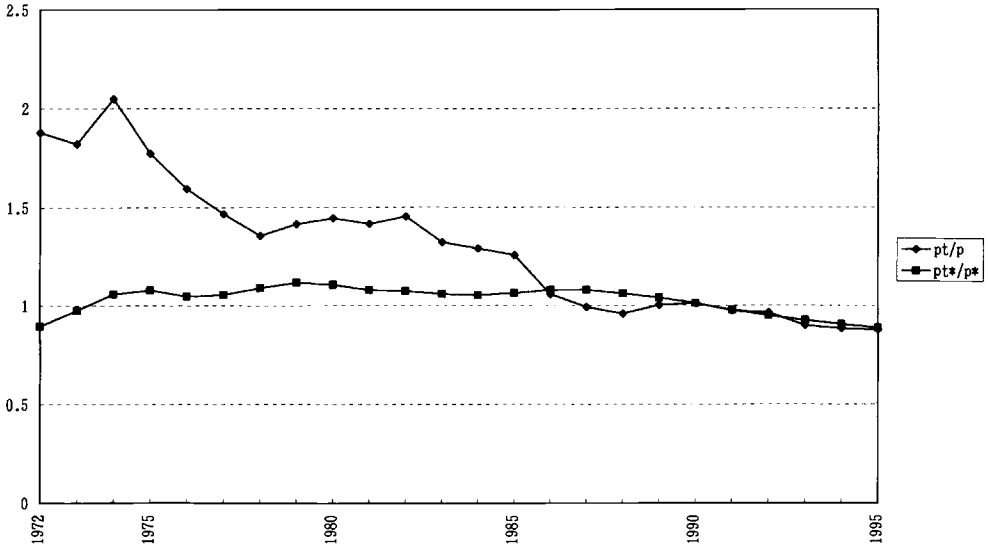

Fig. 13C.2 Traded versus nontraded goods price movements

place in Japan. Hence, the major determinant of the yen appreciation up to 1990 was the productivity improvement in the Japanese traded goods industries. There could have been instances when the "talking down the dollar" policy of the United States worked, but this does not seem to have been the major reason for the yen appreciation.

Interestingly, the real effective rate was almost constant between 1972 and 1990. Hence, I agree with the authors that exchange rate movements were not a major determinant of the long-run trend in the current account.

Since 1990, the nominal effective yen has appreciated by 43 percent, of which 32 percent is explained by the appreciation of the real effective rate. The contribution of other factors is small. Thus the appreciation of the yen since 1990 may have been different in nature than that in previous periods. Therefore, I disagree with the paper's presumption that the appreciation since 1990 has been created by the same mechanism as before.

Another strong assertion of the paper is that in most cases the appreciation of the yen was "supported" by subsequent monetary tightening by the Bank of Japan. This is hard to agree with. First, as shown above, the relative monetary policy movements as reflected in relative CPI movements have not been a major determinant of the yen.

Second, as I have argued elsewhere (Ueda 1996), the Bank of Japan has consistently responded with monetary expansion to strong appreciation of the yen. Figure 13C.3 shows periods of loose monetary policy, identified by the

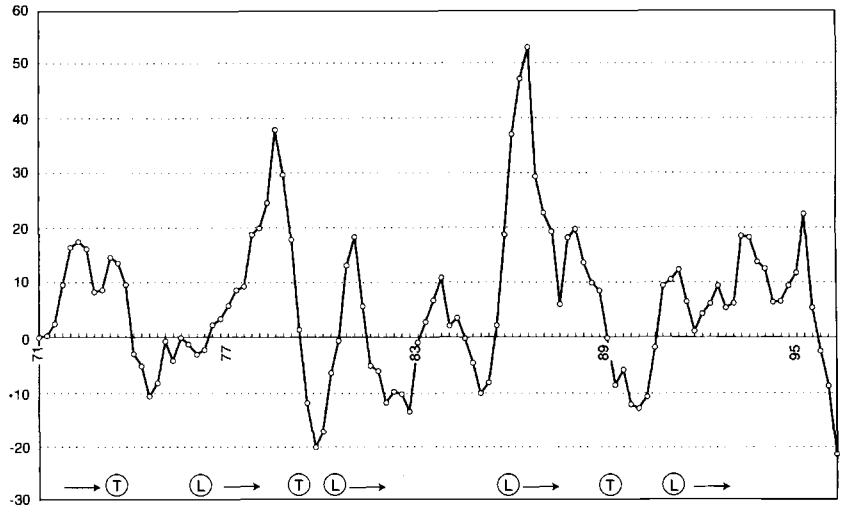

Fig. 13C.3 Monetary policy and rate of yen appreciation
Note: Circled *L*s with rightward arrows indicate periods of loose monetary policy. Circled *T*s indicate the start of periods of tight monetary policy.

Bank of Japan's discount rate changes (indicated by circled *L*'s and rightward arrows; a circled *T* indicates the start of a period of tight monetary policy). All four periods of monetary expansion during the past 25 years coincided with yen appreciation (upward movements in the graph). It is rather difficult to find a causal link between yen appreciation and "tight" monetary policy.

Reference

Ueda, K. 1996. Japanese monetary policy: Rules or discretion, Part II. IMES Discussion Paper no. 96-E-16. Tokyo: Bank of Japan.