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Abstract

This note examines briefly six factors determining the large net capital flow from Japan to the United States in the 1980s: (1) the large Japanese pool of available savings, (2) rates of return in each country, (3) Japanese financial liberalization, (4) country risk and safe-haven factors, (5) expected changes in the yen/dollar exchange rate, and (6) diversification of exchange risk.

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Factors Determining the Flow of Capital
from Japan to the United States

Jeffrey A. Frankel

The outflow of capital from Japan and the inflow to the United States had by 1986 reached torrential levels. Many observers have been worried for some time that if Japanese investors reduce their demand for U.S. assets, U.S. interest rates might rise sharply (prices of U.S. bonds and equities might fall), even as the dollar plummets further against the yen. Something like this may in fact have occurred in 1987. This note examines briefly the major factors that brought about the original shift to U.S. borrowing in the 1980s and that will determine future developments.

1. The Japanese Pool of Savings

   The story of the record capital flows begins with the large pool of savings in Japan. Japanese households save at a rate of 22.5% of disposable income, as compared to 5.1% in the United States, with most European countries somewhere

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   This paper was written for an International Symposium on "Global and Domestic Policy Implications of Correcting External Imbalances", Economic Planning Agency, Tokyo, Japan, March 15-17, 1988. It is forthcoming in a volume edited by M. Yoshitomi. The author would like to thank Helen Popper for the charts of swap-covered interest differentials.
in between.\textsuperscript{1} Others have discussed extensively reasons for the high Japanese saving rate -- the rapidly aging population, the high price of housing, and the Japanese tax system.\textsuperscript{2} Also important for explaining the international capital flow is the fact that a high and increasing share of the Japanese pool of savings takes the form of portfolios held by insurance companies and trust funds. Managers of such funds are considered more ready to explore overseas outlets for their investments than are small individual savers or nonfinancial corporations, while even banks take only limited net open positions in foreign currency.

The Japanese saving rate has been high, and the U.S. rate low, for some time.\textsuperscript{3} We must look at other factors to explain why Japanese residents elected to increase sharply their net claims on Americans in the 1980s.

2. Rates of return

Perhaps the most easily identified incentive for Japanese to begin sending vast amounts of capital to the United States after 1980 was the increase in U.S. rates of return.\textsuperscript{4} U.S. interest rates increased sharply between 1980 and mid-1982, especially long-term. Nominal interest rates declined subsequently, but because expected inflation was declining, long-term real interest rates did not peak until mid-1984. Real interest rates also rose in Japan and other trading partners, but not by as much. Thus the differential shifted in favor of U.S. investments.

Over this same period, the differential yield on equities also shifted in favor of the United States: the differential in dividend yields increased from 2.9 per cent at the end of 1980 to 3.7 per cent in mid-1984, and the differential in earnings/price ratios increased from 4.8 per cent to 6.3 per cent.\textsuperscript{5}

While this shift in real rates of return in the early 1980s can explain the increased attractiveness of investing in the United States as opposed to Japan, two
questions immediately follow. First, what caused the shift? Second, why did the demand for U.S. assets continue to increase after mid-1984, when the real interest differential (and the equity yield differentials as well) began to decline?

To explain the U.S. real interest rate, think of it as determined so that the funds needed for investment do not exceed the funds available from saving, the investment rate depending negatively on the real interest rate and the national saving rate also depending (presumably positively) on the real interest rate. (National saving is defined as private saving plus public saving, that is, private saving minus the budget deficit.) Then the increase in real interest rates could be due either to an upward shift in investment demand, a downward shift in the supply of national saving, or some combination of the two.

The most popular explanation, and the one to which I subscribe, is that the enormous structural increase in the federal budget deficit reduced national savings and forced up the real interest rate. The budget deficit averaged less than two per cent of GNP in the 1970s, but climbed to five per cent of GNP following the 1981-83 tax cuts and defense build-up. According to some theories, there should have been an increase in private saving to offset the deficit. But U.S. personal saving rates have been significantly lower in the mid-1980s than they were in the 1970s, not higher. Total national saving has fallen by three per cent of GNP (as of 1985) relative to the 1970s. At the same time, Japan took substantial steps to reduce its government budget deficit, accentuating the differential in real interest rates and thereby providing further incentive for the flow of capital out of Japan and into the United States. Estimated structural changes in the central government budget deficit between 1980 and 1986 are +2.7 per cent of GNP for the United States and -1.8 per cent of GNP for Japan.
An alternative explanation sometimes given for the increase in U.S. real interest rates is that U.S. investment demand increased in response to the more favorable treatment toward business fixed investment in the 1981 tax bill and to the generally pro-business climate of the Reagan administration. There are several problems with this argument. In the first place, although the investment rate did rise rapidly in 1983-84, the investment rate always rises in expansions, and this increase was no greater than the decline in the 1981-82 recession: by 1986 the U.S. investment rate had only reattained the level of the 1970s. In the second place, calculations of the benefits of the tax incentives suggest that they were smaller than the increase in real interest rates, so that the after-tax cost of capital was not reduced. In the third place, the Treasury tax reform plan of 1984, and the revised tax reform plan actually passed by Congress and signed by the President in 1986, raised corporate income taxes and undid the effects of the 1981 bill. An increase in investment thus seems less able to explain the U.S. demand for funds than does the increase in the structural budget deficit.

3. International Financial Market Liberalization

Before the present decade, one might not have expected shifts in fiscal policy to have such large effects on capital flows to or from Japan. In the 1970s the degree of international capital mobility was much lower, due to controls by the Japanese government, and less well-developed financial markets in Japan generally. Indeed, a fiscal contraction such as that enacted by Japan in the early 1980s would have been predicted by the Japanese macroeconomic models of the time to result in a shift of international demand toward yen, as opposed to the shift toward dollars that in the event became apparent. In other words, these models featured a sufficiently low degree of international capital mobility that effects on the capital
account from changes in interest rates were thought to be outweighed by effects on
the trade account from changes in the level of income.

In 1979-80, the Japanese government removed most of the controls that had
previously prevented foreign residents from buying assets in Japan. A number of
studies have documented that the change in policy actually had the effect predicted
by economic theory. From January 1975 to April 1979 there had been a substantial
differential between the three-month gensaki interest rate that could be earned in
Tokyo and the comparable three-month Euroyen interest rate that could be earned
offshore in London: 1.84 per cent. This differential was evidence that foreign
investors had not been free to hold Japanese assets. Thereafter, the differential
fell sharply. Indeed, it actually turned negative (-0.26 for the period May 1979 to
November 1983), demonstrating that the controls that remained were, if anything,
discouraging capital from leaving the country rather than from entering it. 7

A controversy arose in October 1983 when some American businessmen,
alarmed by devastating competition from Japanese exporters, convinced top officials
in the U.S. Treasury Department, despite the evidence just cited, that the Japanese
Government was still using some form of capital market restrictions to keep the
value of the yen lower than it would otherwise be. There followed a campaign by
the U.S. Government to induce Japan to adopt a whole list of measures further
liberalizing its capital markets. This campaign, which reinforced forces already
underway within Japan, came to fruition in the May 1984 Yen/Dollar Agreement
between the Treasury and the Ministry of Finance.

The predictable result of the liberalization was an increase in net capital
outflows from Japan, attracted by the higher rates of return available in the United
States. The Japanese rate of acquisition of long-term assets abroad jumped from
$32.5 billion in 1983 to $56.8 billion in 1984, the majority of it in the form of
portfolio investment. The offshore-onshore interest differential disappeared altogether. Furthermore, the yen depreciated another 8 per cent against the dollar in 1984. In short, the Yen/Dollar Agreement was successful at increasing Japan's integration into world financial markets, but not at the stated U.S. goal of promoting an increase in the demand for Japanese assets. Indeed, the combination of the increase in U.S. interest rates and the Japanese liberalization -- which has proceeded steadily with further measures such as the liberalization of ceilings on foreign security holdings by Japanese insurance companies and trust banks -- together explains most of the capital outflow.8

4. Country Risk and the Safe Haven Hypothesis

Another important determinant of international capital flows is country risk, the risk attaching to assets issued in a given country (as opposed to assets denominated in a given currency) that their value will be impaired by default, future capital controls, etc. (as opposed to adverse movements in the exchange rate). It has been suggested in particular that the explanation for the enormous flows of capital to the United States in the 1980s is a decrease in investors' perceptions of country risk there relative to the rest of the world. This is the "safe haven" hypothesis. Its proponents are mostly the same observers who would explain the increase in U.S. real interest rates as an increase in investment demand.

It is obvious that ever since August 1982, assets held in Latin America and other debt-troubled regions have been much less attractive than assets held in the United States, from the viewpoint of investors residing in those countries as much as banks residing in the creditor countries. It is much less clear that the perceived safety of assets held in the United States has increased relative to Japan or Europe. Indeed the Japanese financial liberalization just described should, if
anything, have reduced country risk associated with Japan.

The tests of three-month onshore-offshore interest rate parity suggest that, not only do no important barriers remain to separate international investors from the portfolios they wish to hold, but furthermore Japanese assets and U.S. assets (covered to eliminate foreign exchange risk) are close to perfect substitutes in investors' portfolios. Until now, these conclusions have only been established for short-term assets however. It has been argued, for example by Feldstein and Horioka (1980, p. 315), that capital may be less mobile across national boundaries at longer-term maturities:

It is clear from the yields on short-term securities in the Eurocurrency market and the forward prices of those currencies that liquid financial capital moves very rapidly to arbitrage such short-term differentials. There are however reasons to be sceptical about the extent of such long-term arbitrage.

Studies of international interest rate parity have been restricted by a lack of forward exchange rates at horizons going out much further than one year. But even without the use of forward rate data, there are ways of getting around the problem of exchange risk. Frankel (1987, 9.5.1) compares long-term interest rates on Eurodollar bonds with rates on dollar bonds issued in the United States. In 1980-82, U.S. corporations were able to borrow more cheaply in the Euromarket than by issuing bonds domestically. The differential apparently became as large as 3.3 per cent in July 1981.9 It is not clear why U.S. borrowers did not take greater advantage of the cheaper offshore rates than they did. The onshore dollar interest rate fell sharply in mid-1982 relative to the Eurobond rate, which is
consistent with the hypothesis of a safe-haven shift into U.S. assets at that one point in time. But it is also consistent with another hypothesis.

As late as 1982 there remained some frictions that prevented perfect arbitrage between the U.S. and Euromarkets. After U.S. corporate bond rates rose to post-war record levels in 1980 and 1981, and after the LDC debt crisis undermined confidence in the banking system in 1982, a keener interest in issuing bonds directly in the Euromarket sprang up among U.S. corporations. Such innovations as currency swaps, interest rate swaps, note issuance facilities and Eurocommercial paper developed rapidly in 1983 and 1984, making it easier for U.S. corporations to use the Euromarket without the intermediation of banks. This was the international aspect of the well-known trend of "securitization." Securities-market facilities, as opposed to bank loans, rose from 26 per cent of total new lending facilities arranged in international financial markets in 1981, to 59 per cent in 1983 and 91 per cent in 1985, according to Bryant (1987, p. 56). In 1984, foreign purchases of U.S. securities for the first time passed banking flows as the largest component of the U.S. capital inflow, on either a gross or net basis. Foreign net purchases of U.S. corporate securities rose from $15 billion in 1982 to $48 billion in 1985, most of it through the Euromarket.\(^{10}\) Thus the hypothesis is that it simply took several years to arbitrage away the interest differential that opened up in 1980-82. What might at first be regarded as a puzzlingly slow response, could instead be viewed as a relatively rapid response in light of the institutional innovations needed and the large shift in the quantity of Eurobond issues involved. The hypothesis that the last barriers to perfect international financial integration were broken down around 1982 has the advantage that it can explain, not only the sharp fall in the positive Euro-U.S. differential at the long end of the maturity spectrum, but a sharp fall in the magnitude of the short-term dollar differential as well.\(^{11}\)
Even if one instead interprets the mid-1982 fall in the long-term interest
differential as evidence of a safe-haven shift into U.S. assets at that time, this
factor cannot explain the continued increase in the demand for U.S. assets
thereafter. The differential was steady, or if anything rose a little, in 1983 and
1984.

Is it possible that changes in perceived country-risk in Japan are a factor?
Data on currency swap rates can be used in place of forward exchange rates to test
the long-term version of interest rate parity. Popper (1987) finds that the swap-
covered return differential on 5-year U.S. government bonds versus Japanese bonds
averaged only 1.7 basis points from October 3, 1985 to July 10, 1986, and that the
differential on 7-year bonds averaged only 5.3 basis points. The means mask a
little variation in the differential, as can be seen from Figure 1. A band of 46
basis points is large enough to encompass 95 per cent of the observations for the
5-year bonds; the band is 34 basis points for the 7-year bonds. These differentials
are small, relative not only to the equivalent differentials for the United Kingdom,
for example, but relative even to the short-term differentials. Thus the results
have two implications. The wider implication is to refute the Feldstein-Horioka
conjecture that capital is less mobile for long-term assets than short-term. The
implication for the narrower question at hand is that by 1986 there appear to have
been no significant country-risk factors rendering Japanese assets imperfect
substitutes for Euromarket assets. The same was true of U.S. assets by 1986. We
evidently must look somewhere other than to country risk to explain the more
recent Japan-U.S. capital flows.

5. Expected Appreciation of the Yen Against the Dollar

Although the dollar-yen interest differential has declined substantially since
1984, exchange rate expectations are an equally important determinant of the expected rate of return and therefore of the relative demand for dollar and yen assets. Simple notions of long-run purchasing power parity or exchange rate overshooting suggest that the 24 per cent appreciation of the dollar against the yen from 1978 to February 1985 (not to mention the consequent U.S. trade deficit and Japanese surplus) should have generated expectations of future dollar depreciation back toward long-run equilibrium. Indeed surveys of market participants over this period show an increase in the expected future rate of dollar depreciation. A survey conducted annually over the period 1981-84 by American Express Banking Corporation in London, for example, shows that expected year-ahead depreciation of the dollar against the yen averaged 9.25 per cent, up sharply from 1976-78.\(^\text{12}\)

Similarly, a survey conducted every six weeks by the Economist-affiliated Financial Report shows that for the period June 1981 to December 1985, expected year-ahead depreciation of the dollar against the yen averaged 10.67 per cent.\(^\text{13}\) Investors systematically expect the exchange rate to regress toward a long-run equilibrium such as purchasing power parity, at an estimated rate in the American Express data equal to 12 per cent of whatever the current gap is.\(^\text{14}\)

The overshooting theory suggests that the 60 per cent depreciation of the dollar against the yen from February 1985 to October 1986 should have brought the exchange rate much closer to its perceived long-run equilibrium -- if not past it -- and thus should have reduced the expected rate of future dollar depreciation. The American Express survey is no longer conducted. But the Economist survey indeed shows expected year-ahead dollar-yen depreciation declining to 6.2 per cent by October 30, 1986 and almost to zero by February 1988. This decline in expected depreciation furnishes one possible explanation of how international investors would have been willing to continue increasing their holdings of dollar securities after
1984 despite the decline in the nominal interest differential.

Unfortunately for the overshooting theory, the regressive model of expectations does not at all fit the pattern of a shorter-term expectations survey of foreign exchange traders conducted weekly by Money Market Services (MMS). Over the period October 1984 to February 1986, when the dollar was high, the MMS respondents forecast dollar depreciation against the yen at a 4-week horizon equal to 2.99 per cent per annum and at a 1-week horizon of 5.40 per cent per annum.\(^{15}\) But as of February 6, 1987, for example, when the dollar was much lower, the MMS respondents forecast depreciation at an even more rapid rate: 34.57 per cent per annum at the 4-week horizon and 15.15 per cent per annum at the 1-week horizon. The problem is that at horizons of one week to three months, the MMS survey respondents forecast by extrapolating the most recent trend, rather than by a model of regression toward any long-run equilibrium. In a week when the yen appreciates 1 per cent, for example, the MMS respondents forecast a further appreciation of .24 per cent over the coming week (12 per cent per annum). Such estimates are statistically significant at the 99 per cent level.\(^{16}\) Ito (1987) has found similar results using survey data collected from Japanese respondents by the Japan Center for International Finance.

Thus the problem of exchange rate determination is complicated by the fact that short-term "speculators" do not appear to agree on a simple model of regression toward an equilibrium dictated by fundamentals. It is quite possible that their high-volume trading is based on ever-changing and diverse guesses as to what the current market trend is, and that excess volatility in the foreign exchange market is the result. Fortunately for present purposes, we are not trying to explain the yen/dollar exchange rate, but only the flow of capital from Japan to the United States.
The capital flow that we are trying to explain consists overwhelmingly of long-term securities. Indeed, more than 100 per cent of the Japanese capital outflow is long-term: according to Japanese data, short-term capital has on net been flowing the other direction since 1984 (through the first September of 1987).\textsuperscript{17} Thus short-term expectations may be less relevant than long-term expectations for explaining the flow. Over 83 per cent of the long-term net capital flow from Japan to the United States in 1986 consisted of investment in securities, despite the recent growth of Japanese foreign direct investment.\textsuperscript{18} Most consists of purchases of dollar-denominated bonds, and is thus sensitive to exchange rate expectations. Out of the gross Japanese investment in foreign securities in 1986, only 1.9 per cent consisted of yen-denominated external bonds.\textsuperscript{19} Only 6.9 per cent consisted of equities, even with the unprecedented growth in Japanese investment in the U.S. stock market in 1986, and returns on foreign equity investment may anyway be as sensitive to exchange rate changes as are bond returns. Thus for most of the Japan-U.S. capital flow, long-term exchange rate expectations are probably an important determinant. The argument appears intact: the realized depreciation of the dollar since 1985 has reduced investors’ expectations of future depreciation, and thus given them an incentive to continue buying dollar assets.

One might argue further, based on the MMS expectation survey results, that the observed flow of short-term capital into Japan during the recent period of yen appreciation, is due to speculators forming expectations of further yen appreciation by extrapolation of the recent trend. But this argument would itself be rather speculative. It would require that those individuals who engage in short-term speculation form expectations from those who buy and sell longer-term securities on the basis of economic fundamentals, though it is possible that a single bank or other institution does both simultaneously.\textsuperscript{20} An alternative explanation for the
pattern whereby Japan at the short term is borrowing on net, while at the long-term is on net investing abroad, is that Japan is providing the intermediation function of the World Banker, as did the United States in the 1960s.

6. Diversification of Exchange Risk

One way of getting a handle on investors' demand for dollar assets versus yen assets is the theory of optimal portfolio diversification. Even in the absence of factors like capital controls or country risk (factors 2 and 4 above, respectively), investors do not base their demands for yen versus dollars solely on expected returns (interest rates and expected currency depreciation, factors 3 and 5 above, respectively), because they are also concerned about exchange rate risk. The observation that conditional exchange rate variances themselves vary over time has generated a great deal of research in the last year or two. In the present context, Kawai and Okumura (1988, p. 13) find a negative effect of the yen/dollar standard deviation on the Japanese capital outflow for the period 1984.1-1987.9. Can variation in the risk premium explain variation in the Japanese demand for dollars?

Let \( x \) be the share of the portfolio allocated to dollar assets, as opposed to yen. If an investor seeks to maximize a function of the mean and variance of end-of-period wealth, it can be shown that the optimal share is given by:

\[
x = A + B r \rho \]

\[22\]

\( A \) is known as the "minimum-variance portfolio", and the other term as the "speculative portfolio," with
\[ B = 1/[R \ V] \]

\[ r_p = \text{the risk premium (the dollar-yen interest differential minus expected dollar depreciation)} \]

\[ R = \text{the coefficient of relative risk-aversion} \]

\[ V = \text{the conditional variance of the exchange rate.} \]

One can estimate the conditional variance in a number of different ways (e.g., by the now-popular ARCH model, or by extracting implicit variances from options prices). But existing studies of exchange risk have been hampered by the difficulty in knowing whether an increase in uncertainty should reduce the demand for dollar assets or should reduce the demand for the other currency. Kawai and Okumura presuppose that it should reduce the demand for dollars, and thus are puzzled by the fact that their uncertainty term appears with a significant positive coefficient for the period 1982.1-1983.12. But the theory says that if the stock of dollar assets \( x \) falls short of the share given by the minimum-variance portfolio \( A \), at a point in time, then the risk premium on dollars will be negative and an increase in uncertainty \( V \) will indeed raise the demand for dollars. Given the rapid rate at which the U.S. budget deficit has been pumping out dollar assets into the world portfolio, via the U.S. current account deficit, it is possible that \( (x - A) \) has gone from negative to positive since 1983, so that the sign of the risk relationship has flipped.

It may be worth trying some crude calculations. If we are willing to assume that the relevant measure of purchasing power is a basket with weight \( A' \) on goods whose price in the short-run is set (non-stochastic) in terms of dollars and weight \( 1 - A' \) on goods whose price is set in terms of yen, then the minimum-variance portfolio turns out to be given by \( A' \). For Japanese residents, we could
measure A' by the share of imports in GNP, .064 in 1986.23 Data in Kawai and Okumura show the proportion of the securities portfolios of Japanese financial institutions in the aggregate that is held as foreign securities: x = 3.13% in 1980, 9.48% in 1984, and 16.47% as of March 1987. (If one measures the holdings as percentages of total assets rather than just securities, then the numbers are much smaller, and would be still more so if one sought to include the holdings of small investors and non-financial institutions.) Thus it is indeed possible that the amount of dollar assets held by Japanese investors now exceeds the share dictated by the minimum-variance portfolio.

The share of U.S. portfolios allocated to dollars rather than yen is of course far higher than the share of Japanese portfolios. As of 1985, U.S. private residents held only $51.6 billion dollars of Japanese assets (and $821.8 billion of assets of all foreign countries, of which securities are a relatively small part24), out of a total financial wealth in excess of $6,600 billion. Because almost all consumption of U.S. residents falls on goods with prices that are set in dollars, one can explain some relative U.S. preference for dollar assets. But the optimal share for U.S. residents could only exceed that for Japanese residents by \( (1 - .064)/2 = .468 \), using an estimate of 2 for \( R \).25 The actual U.S. share clearly exceeds the actual Japanese share by more than that.

The likely explanation is that Japanese investors, and probably investors residing in the United States (and elsewhere) as well, are in fact less diversified internationally than mean-variance optimization says they should be. Whenever one looks behind the figures on net capital flows, one finds that Japanese investors are increasing their gross claims on the United States much more quickly than their net claims: U.S. residents are simultaneously increasing their gross claims on Japanese residents. This suggests that one could explain the rapid 1980s increase in the
share of Japanese portfolios allocated to dollars as a process of diversification taking place in the aftermath of financial liberalization. It is difficult to tell if this process has run its course; the optimal portfolio calculation is extremely sensitive to small changes in the risk premium that is assumed.²⁶

The yen value of the 1984 Japanese holdings of dollars has fallen by half, so that Japanese investors have had to buy the same amount of dollars all over again just to keep the share constant. The Japanese private sector appears to have faltered in 1987 in its appetite for U.S. assets, and the Bank of Japan has stepped in as major financing source of the U.S. current account deficit. It seems unlikely that the Bank of Japan will want to remain in this role indefinitely. The situation may not be sustainable without some sort of improvement in expectations of future prospects for the dollar. Fortunately such an improvement may be coming soon, in the form of a pronounced downward trend in the U.S. trade deficit in (delayed) response to the three years of dollar depreciation that have already taken place.
REFERENCES


ENDNOTES


2. It will be interesting to see if the abolition of the maruyu system in April, 1988, leads to a reduction in the level of saving in Japan. In light of the lack of evidence that the elasticity of saving with respect to the rate of return is high, or even positive, such a response seems unlikely. (Saxonhouse (1982) argues that Japanese are target-savers, and thus may even increase saving in response to increases in the after-tax rate of return.)

3. Furthermore, the United States has, like Japan, seen an increasing share of its savings pass into portfolio funds that are more prone to invest overseas than individual investors would be acting on their own. Total U.S. pension assets, at $629 billion in 1981, had climbed to $1191 billion by 1986. The figures for Japan are $47 billion and $120 billion, respectively. [The source is Salomon Brothers, 1987, p.14-17.] This trend in both countries helps to explain the large increase in each country's gross claims on the other -- which is discussed further below -- but not the large increase in the net capital flow.

4. Recent econometric studies of the effect of interest rates on Japanese capital outflows include Amano (1986), Ueda (1987) and Kawai and Okumura (1988).

5. The source is Capital International Perspectives.


7. The source is Frankel (1984, p. 23). Other studies documenting this change include Otani and Tiwari (1981), Council of Economic Advisers (1984), and Ito (1986).

8. Ueda (1987) and Fukao (1988) are two econometric studies that find that the combination of interest rate differentials and the relaxation of Japanese portfolio restrictions explains most of the outflow in the early 1980s. Restrictions on the acquisition of foreign assets by insurance companies and trusts were liberalized in

9. The data are from Morgan Guaranty.


11. The differential between the short-term U.S. onshore interbank and Eurodollar interest rates was negative and equal to 90 to 100 basis points in 1980-82. See Frankel (1987).

12. Frankel and Froot (1985), Table 2.


17. The short-term capital flow figures include authorized foreign exchange banks’ balances. The source is Bank of Japan data, as reported, for example, in Kawai and Okumura (1988, Table 1); the U.S. balance of payments statistics no longer recognize the short-term/long-term distinction.


20. Froot and Ito (1988) find in the survey data that the process whereby short-term expectations are formed is not consistent with the process whereby long-term expectations are formed, in that the former iterated forward differs significantly from the latter.

21. Frankel (1988) offers a survey, including the implications for the magnitude of variation in the exchange risk premium. Most of the studies find a lot of short-term movement in the conditional variance, but no longer-term swings or trends that could explain a continued increase in the demand for dollars.

23. This might understate the figure a little because some imports are denominated in other currencies (e.g., 3 per cent in yen), or overstate it to the extent that Japan produces some traded goods with prices determined on world markets.


25. Because of a convexity term in the expected rate of return differential, the U.S. demand for dollar assets exceeds the Japanese demand, not by the full difference in consumption patterns, but by that difference times \((1 - 1/R)\). See Krugman (1981). In 1986, U.S. imports were .114 of GNP. But most U.S. import prices are set in dollars in the short run, especially for that sub-share of imports that come from Japan, so the only safe upper bound on \(A\) for U.S. residents is 1.0.

26. The yen/dollar variance \(V\) is estimated at .01186 in Frankel (1986). Together with the parameter value \(R = 2\), the equation implies that a change in the risk premium of .01 (100 basis points) is enough to change the demand for dollars by \(.01 / 0.02362 = 42.3\) per cent of the portfolio!
Figure 1: Swap-Covered Long-term Interest Differentials: local minus U.S.

UK Swap Premia

Yen Swap Premia
Figure 2: Swap-Covered Long-term Interest Differentials: local minus dollar

DM Swap Premia
Government Assets

SF Swap Premia
Government Assets

Date

DM5
DM7

SF5
SF
Figure 3: Swap-Covered Long-term Interest Differentials: local minus dollar

U.K. Swap Premium

5-year Eurobonds

Canadian Swap Premia

Government Assets

Date

UK5

CD5

CD7
Figure 4: Swap-Covered Long-term Interest Differentials: local minus dollar

**Canadian Swap Premium**

5-year Eurobonds

**DM Swap Premium**

Eurobonds

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**Date**

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