The Use of the Yen as a Reserve Currency

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The depreciation of the U.S. dollar in 1995 rekindled discussion about the organization of the international monetary system, including calls to expand the roles of the yen and the deutsche mark as reserve currencies. The yen has not assumed a greater role because sufficient yen instruments are unavailable. The measures that make the yen relatively illiquid result partly from public debt management policy and control over the competitive advantage of the government in securities issuance. From a narrow perspective, it is quite easy to expand the role of the yen as a reserve currency: raise the supply of Treasury bills to approximately ¥60 trillion, eliminate the transaction tax on government securities, and let the Bank of Japan be a banker for foreign central banks. Such changes, however, imply a loss of control over the holders of the most liquid instruments in the Japanese money market.

Key words: Reserve currency; Internationalization; Market liquidity; Transaction tax; Securities settlement

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This paper was written while the author was a visiting scholar at the Institute for Monetary and Economic Studies, Bank of Japan. The author is grateful to the institute for the facilities provided and for the helpful comments from the staff, and also thanks two anonymous referees for their extensive comments. Steven Symansky supplied extremely helpful advice, and Yutaka Soejima provided research assistance.

I. Introduction

In any discussion of the internationalization of a currency—and particularly of the yen—various features of a currency that define the degree of internationalization are usually listed.[1] The general principles stated in the literature as necessary conditions for a currency to be used internationally are straightforward. First, the purchasing power of the currency should be relatively stable. Second, it should be supported by deep financial markets with a wide range of instruments with liquid secondary markets, and there should be few capital or exchange controls. In particular, it should have liquid, short-term markets that allow foreigners to move funds in readily, briefly park them, and move them out.

While necessary, these conditions do not imply that a country's currency will be used internationally. To determine if a currency can be categorized as international, the literature imposes several somewhat arbitrary indicators, which can be taken as definitions of the fuzzy term "internationalized": the fraction of trade invoiced in the currency, whether the country as a whole can be considered a bank in the sense described by Kindleberger (1965), and whether the currency is used as an international reserve currency by foreign central banks.[2]

The focus of current professional discussions of internationalization has revolved around the moves in the early 1980s to open the Japanese financial sector to foreign competition and to open the Japanese capital markets so that capital could more readily flow from Japan to other countries. It was believed that the nature of the system channeled the high savings of households into Japanese firms, thereby reducing the cost of capital and giving them a competitive advantage.[3] In turn, that competitive advantage was thought to reflect itself in the high current-account and merchandise trade surpluses that Japan incurred in the first half of the 1980s. At the same time, the Japanese yen was considered to be undervalued.[4]

1. Recent examples of this literature pertaining to the yen are Tavlas and Ozeki (1992), Frankel (1993), and Maehara (1993). The most detailed among these is the paper of Tavlas and Ozeki.
2. The treatment of a nation as a bank—which offers short-term liquid deposits in its currency on net and supplies long-term loans—is an approach that gained impetus from the discussion of the role of the United States in the Bretton Woods system. The rapid accumulation of short-term U.S. dollar claims by foreigners relative to the U.S. gold stock caused Triffin (1960) to argue that the system must eventually collapse. Kindleberger (1965) argued that the United States was simply playing the role of a banker by supplying short-term U.S. dollar liquidity to foreigners in countries where there was a lack of liquid money markets. Simultaneously, the United States was exporting longer-term capital—that is, it was not running a serious current-account deficit. In the event, of course, it turned out that Triffin had the better of the argument, although the U.S. dollar continued to be used as the principal reserve currency after the collapse of Bretton Woods. See Garber (1993) for a description of the collapse.

   At the time that Kindleberger presented his argument, most capital flows passed through banks and took the form of a limited number of banking products. Indeed, the U.S. banks of the 1950s and 1960s really did look like the mindless banks that are still presented as models in money and banking textbooks. Thus, using the on-balance-sheet categories that appear in the capital-account data available to them, Kindleberger et al. could hope to classify the position of the U.S. financial system vis-à-vis nonresidents—a short-term borrower and a long-term lender in U.S. dollars. With the explosion of derivatives products in the past 10 years, however, it is now impossible to determine this position by observing the usual balance of payments capital market subcategories, as I will argue in Section II.
3. Frankel (1992b) reviews the issues associated with the presumed lower cost of capital for Japanese firms in the 1980s. He finds some evidence that cost of capital was lower, but argues that the differential had evaporated by 1990.
4. Frankel (1984) points out the contradiction of arguing for a greater outflow of capital while simultaneously claiming that the value of the yen should rise.

These undercurrents led to the negotiation between Japan and the United States and ultimately to the Yen-Dollar Agreement of 1984, in which Japan agreed to liberalize its financial system.[5] Gradually, the agreement was implemented to the extent that the Japanese financial system can now be regarded as open, at least in terms of the ability to move capital in and out of the country on the part of a wide range of domestic and foreign institutions.[6] Foreign financial firms have located in Japan and operate freely; and, more importantly, large amounts of capital have flowed through Japanese financial institutions and firms to the rest of the world in the decade since the agreement was signed.

The constant in all these changes was the trade surplus—it remained at high, though fluctuating, levels even though the yen swung from being regarded as undervalued to being regarded as overvalued. In this context, the discussion of internationalization should be viewed as a manifestation of the effort to reduce the trade imbalance. Financial market liberalization was one dimension through which it was argued—apparently erroneously—that it might be reduced.[7] Rather than as a means of reducing the trade deficit, however, the agreement was simply packaged as a policy of rationalization of the Japanese financial sector and as a step through which the Japanese financial system and the yen in particular should take its place in "bearing the burden" of being an international reserve currency.[8]

The formal content, however, of the notion of internationalization and the literature that examined it subsequent to the agreement is not especially well defined. The usual properties of money are invoked as the central facet of this literature—unit of account, means of payment, store of value—but the literature does not go much beyond these truisms. Research and categorization of a currency as international or not revolve around various arbitrary indicators of whether foreign addresses make use of these features of the domestically denominated currency in significant amounts. It is well known by now, however, that categorization of transactions by address yields

5. For example, see Frankel's (1984) discussion of this agreement.

6. Changes relevant to the money market took the form of introducing new money market instruments such as Treasury bills, bankers' acceptances, and commercial paper (CP), extending allowable maturities in market paper, creating the Japan Offshore Market, changing market quote increments, and moving to competitive bid-offer systems for market paper. See the Money Market Study Group (1990), Okina (1993), or McKenzie (1993) for details. Fukao and Okina (1989) present an especially detailed analysis of the sequence of regulatory changes and flows and position-taking of the various classes of financial institutions.

   Some institutions such as insurance companies are still limited as to the type of securities they can hold and the nature of participation in primary markets. While this serves to channel capital flows through one institution and not through another, there is little now to hinder broad movements of capital. There always remains, however, the effect of administrative guidance, which may—irrespective of published regulations—channel funds in the form of particular currency denominations, instrument types, and markets.

7. Frankel (1984) is skeptical of this argument.

8. It is often remarked that providing an international currency forces added responsibilities on a central bank. For example, a large-scale use of domestic currency by international entities, particularly central banks, subjects the currency to large shifts in demand. This forces the domestic central bank to adjust to an added source of instability in the demand for its currency. If domestic capital markets are relatively large and supervisors are equipped with instruments to adjust to inflows or outflows, however, the money supply can be adjusted to correct for these flows of funds.

   The holding of a domestic currency by a foreign central bank could lead to instability either if the foreign central bank suddenly implemented a portfolio shift or if it experienced an exchange rate crisis in its own currency. In the case of a currency crisis, the foreign central bank must expend its reserves to buy its own currency. If the

little information about whether the transaction is undertaken by a domestic or foreign market participant.

The depreciation of the U.S. dollar in the spring of 1995 against both the yen and the deutsche mark reawakened the discussion of internationalization—this time from the perspective of a radical restructuring of the international monetary system. It has been argued that the instability signals the end of the use of the U.S. dollar as the key reserve and intervention currency.[9] Many central banks were said to be planning portfolio shifts from the U.S. dollar to the yen or deutsche mark.[10] It has been argued that some replacement should be devised for the U.S. dollar, perhaps a currency similar to special drawing rights (SDRs) issued by the International Monetary Fund (IMF).

The purpose of this paper is to combine all these strands—the notion of internationalization and the current argument for expanded use of the yen emanating from the increased currency fluctuations—as an opportunity to consider the use of the yen as a reserve currency. Thus, I will examine a relatively small subset of the internationalization discussion.

The choice of a reserve currency has long been an issue under consideration in the academic and policy literature. A point of departure in this literature is that a central bank should behave as a portfolio manager choosing an optimal risk-return combination for its holdings of foreign reserves. Typically, gross reserve positions—that is, the foreign reserve assets of central banks—have been examined for their optimality.[11]

It is generally difficult to assess the overall foreign exchange position of the official sector. Traditionally, the composition of the reserves of a country has been a sensitive issue; countries are hesitant to report both the magnitude and the nature of the reserves—the currencies, the maturities, and the types of instruments in which reserves are held.[12] Moreover, central banks and treasuries now can take large

foreign country is small, its crisis will have a small impact on the money market of the reserve currency, and the domestic central bank can readily adjust to insulate its money market.

If the foreign country is large, however, its sudden sale of the domestic currency can have a large impact on the money market and create a serious adjustment problem for the domestic central bank. Nevertheless, stabilizing the exchange rate with the currency of a large country may be an important objective for the domestic central bank. The domestic central bank may itself wish to intervene by selling its own currency if it is suddenly threatened with a large appreciation in an exchange crisis. If the foreign central bank has already accumulated a large amount of domestic currency to throw at the market, it is doing the work of the domestic central bank and taking the risk. Only if the domestic central bank has no interest in stemming the appreciation of its currency will it find this source of instability of foreign demand for its currency problematic.

9. See, notably, the comments of Kashiwagi (1995) and Takahashi (1995).
10. No movement toward effecting this shift is detectable in the Japanese government securities holdings of foreign central banks. Starting from about ¥7 trillion in December 1994, these fell to ¥6.7 trillion in June 1995. Of course, in U.S. dollar value terms, the yen component of foreign reserve portfolios increased in this period because of the depreciation of the dollar and the capital gains on longer-term bonds resulting from the decline in yen market interest rates.
11. Dooley (1982) and Dooley et al. (1989), however, in arguing that this line of research is misguided, show that the optimal risk-return combination of the foreign exchange position *net of liabilities* of the official sector or country as a whole should be the criterion, not the gross asset position.
12. Central bankers worry that the exposure of their foreign exchange portfolios may permit market participants to uncover the dynamics of official intervention and that chosen positions may be interpreted as an official view on the attractiveness of a particular currency.

off-balance-sheet positions in foreign exchange that can be many times the on-balance-sheet position. Therefore, due to this opaqueness and the secrecy about the nature of reserves, it has been difficult to determine the currency breakdown of international reserves.

Nevertheless, the IMF has gathered data and published a summary in its *Annual Report,* and this information has formed the basis for determining which currencies are used as international reserves. These data show that the yen is used relatively little, although its use has been slowly growing in recent years, relative to the size and international stature of the Japanese economy.

I will examine whether the data used to determine the status of the yen as a reserve currency are useful in any way. I will show that the data do not encompass off-balance-sheet activity and lack comprehensiveness in their coverage of the central banks. Notably, many successfully developing countries and some important industrial countries simply do not report to the IMF on their reserve positions—therefore, the coverage is likely to ignore countries that might use the yen in significant amounts.

Notwithstanding the deficiencies in the data, I will take for granted that the yen is in fact underutilized as a reserve currency and will examine the reasons by comparing conditions in the yen money markets to those in the U.S. dollar markets. The yen money market is generally less liquid than the U.S. dollar market, and it is undersupplied with the type of security in which foreign central banks most like to hold their foreign exchange reserves—government Treasury bills. The undersupply is a matter of choice by the Ministry of Finance, stemming from its choice about how to manage the public debt. In addition, other instruments are made undesirable for use as a liquid reserve by foreign central banks because of the existence of various taxes—transaction taxes, stamp taxes, withholding taxes—that hinder money market liquidity.

Conversely, because foreign central banks already have access to the highly liquid New York securities market, it is easy for them to use U.S. Treasury bills as their basic asset and simply to cover against exchange risk by means of forward operations—if portfolio management to obtain an optimal risk-return combination is their operating principle. The forward operations, which may convert the position into a yen position, are off-balance-sheet; and the Treasury bill position is on-balance-sheet. This would appear in the IMF data as a large holding of U.S. dollar securities and not yen securities, even though the yen is the ultimate currency held by the foreign central bank.

I will also consider the nature of central banks' support services of their own currencies for use by other central banks. The Federal Reserve (the Fed) gives substantial support, offering many types of financial and commercial banking services to foreign central banks that hold the U.S. dollar as their reserve. The Bank of Japan does not formally offer similar services.

Finally, I will consider the nature of foreign exchange holdings. Why do foreign central banks want them in the first place? The most basic use of exchange holdings is to settle official payments due in a foreign currency. If a central bank—either on its

own behalf or as fiscal agent for its treasury—is to make immediately foreseeable foreign exchange payments in a foreign center, it must have the good funds required for payment at that center either directly in hand or through credit lines.

Additionally, a central bank would like to have a liquid reserve to serve as a precautionary balance against which to draw in case it must make unforeseen sudden payments. A central bank can provide for such contingencies by having arranged strong lines of credit with large commercial banks in the financial center where it has to make its payment; or, more generally, it may arrange for lines of credit in another currency with commercial banks in a large financial market and then be prepared to convert that currency through the liquid exchange markets into whatever currency is needed to make sudden payments. More securely, in case credit lines dry up, the precautionary reserves should be held as assets. Such a precautionary reserve would be necessary when a central bank wished to make interventions to stabilize its exchange rate, but the currency composition of that reserve would not necessarily consist of the currency in which it wished to intervene.

In addition, foreign central banks may have the optimal portfolio motivation that is typical in the literature—they would then hold a range of securities having declining amounts of liquidity and perhaps some credit risk. Finally, a central bank may be operating a fixed exchange rate policy and experiencing net capital inflows through its banking system. Either for prudential or monetary control purposes, it may wish to sterilize the inflow, which forces it automatically to accumulate a large amount of foreign exchange.

Taken together, all these facets—the existence of a highly liquid U.S. dollar with network externalities and the lack of liquidity of yen money markets—force a conclusion that the yen should not serve as a principal foreign exchange asset. The bulk of precautionary reserves—to the extent that central banks cannot get lines of credit or may experience a drying up of credit lines—should be held in the most liquid item in New York. Even though the yen/U.S. dollar exchange rate may fluctuate significantly, that can be covered through derivatives products.

II. Data on Yen Denomination of Official Reserves

All studies of the currency composition of foreign exchange depend on the data contained in the IMF's *Annual Report.*[13] For the world as a whole, the IMF reports official reserve holdings by currency denomination both in absolute amounts converted into SDRs and as percentages of the world total for the end of each year. It also reports the currency composition of reserves broken down into developing and industrialized country categories. Tables 1 and 2 present recent evidence on the use of the yen in foreign reserve holdings.

13. For example, Tavlas and Ozeki (1993) and Frankel (1984, 1992a), and Maehara (1993) cite and analyze the IMF data.

The data in tables 1 and 2 indicate that in the course of a decade during which it depreciated significantly against other major currencies, the share of the U.S. dollar in foreign exchange reserves reported to the IMF has remained approximately constant at about 55 percent. Conversely, although the yen money markets have been significantly liberalized during the same period, yen reserve holdings have risen only slightly as a percentage of total holdings, to about 8.1 percent at the end of 1994, from 7.1 percent at the end of 1986. Similarly, the use of the deutsche mark increased only slightly, from 13.2 percent to 14.8 percent of the world total, in spite of a liberalization of the German money markets and the tight adherence of other European central banks to European Rate Mechanism (ERM) bands. If U.S. dollar depreciation relative to the yen or the deutsche mark is a serious factor, the motivation to move from the dollar has existed for some time. Because there has been little effect on the weights of each currency held in practice, it is difficult to avoid the

Table 1 Foreign Exchange Reserves by Currency

US$ billions

	1986	88	90	92	94
U.S. dollar	225	322	380	444	585
Pound sterling	9.3	15	25	26	37
Deutsche mark	53	85	135	127	152
Japanese yen	28	41	63	64	83
Ecu	50	69	74	81	80

Source: International Monetary Fund, *Annual Report,* 1995, Table 1.3, p. 162.

Table 2 Foreign Exchange Reserves by Currency

Percentage of world total

	1986	88	90	92	94
U.S. dollar	56.4	54.5	49.1	55.1	57.1
Pound sterling	2.3	2.5	3.2	3.2	3.6
Deutsche mark	13.2	14.4	17.5	13.6	14.8
Japanese yen	7.1	7.0	8.2	7.9	8.1
Ecu	12.5	11.7	9.6	10.1	7.8

Source: International Monetary Fund, *Annual Report,* 1995, Table 1.2, p. 161.

conclusion that the use of a currency for central bank foreign exchange holdings is independent of large secular exchange rate movements. Foreign central banks adhere to the U.S. dollar, while something keeps foreign central banks away from the yen.

A. Quality of the IMF Data

Before inquiring into the reasons for these choices by exchange authorities, it is useful to consider the nature of the data gathered by the IMF. The instructions to authorities in the IMF's questionnaire define those instruments that are to be considered as foreign exchange. In general, the data suffer from an incompleteness of coverage, as some countries that may carry weight in the demand for yen reserves do not regularly respond to the IMF's inquiry.

The data are gathered through a brief questionnaire sent to authorities by the Statistics Department of the IMF, which provides definitions for various categories. For example, for U.S. dollar holdings, claims in dollars are defined to be all gross assets defined in dollars. Claims on U.S. residents include demand and time deposits in the U.S. banking system, including the Fed; certificates of deposit (CDs) and other money market paper such as commercial paper (CP) and bankers' acceptances; marketable U.S. Treasury bills, certificates, and bonds; securities issued by U.S. government agencies; and other U.S. dollar-denominated claims on residents. The questionnaire asks authorities to list such claims on non-U.S. addresses denominated in U.S. dollars as Eurodollar deposits in either U.S. or non-U.S. banks, and claims on the Bank for International Settlements and the International Bank for Reconstruction and Development.

Yen-denominated claims are broken down into claims on Japanese residents and others, which include Euroyen deposits and yen-denominated securities issued by nonresidents. Claims on residents include demand and time deposits in the Japanese financial system, money market paper issued in Japan, and obligations of the Japanese government.

Many countries do not respond to the IMF's inquiry, including some of the developing countries in East Asia most likely to hold the yen and France, an important G-7 country.[14] For such countries, an estimation procedure is used to derive a breakdown of foreign reserves by currency, but it is not clear how the estimation procedure works.

Similarly, a difficulty arises with determining U.S. dollar composition because of the major role the ecu plays in European foreign exchange portfolios. In the portfolios of important European central banks, private ecu-denominated claims can amount to up to one-third of official foreign exchange reserves.[15] In addition, 25 percent of U.S. dollar and gold reserves held by ERM member countries are swapped into official ecu claims with the European Monetary Institute.

14. Reserve management is highly confidential information, though it is difficult to understand why the currency composition of central bank reserves is so sensitive—as long as the currencies are the major ones. One possibility for the reluctance to disclose may be that some of the reserves are held in illiquid items that cannot be easily mobilized.

15. See Goldstein et al. (1993a,b) for a discussion of the nature of the ecu markets.

In their reports to the IMF on ecu holdings, some European central banks report only official ecu claims at the European Monetary Institute, while others report the total of official and private ecu claims—there is no consistency across central banks in the information reported. In addition, one central bank reports only holdings of private ecus and categorizes its official ecu claims in terms of their U.S. dollar or gold asset counterparts in the original swap.

In dealing with ecu claims, the IMF method assumes that all ecus held by a central bank are reported as ecus. Prior to the most recent *Annual Report,* the method required that the gold component of official ecu claims—the gold-swapped component—be subtracted from ecu claims, with the remainder being treated as U.S. dollars. There was also a separate column in the table that excluded ecus. Implicitly, this method treated the private ecu claims of central banks as U.S. dollars and seriously overstated the amount of dollars held as foreign exchange. In the most recent method, the IMF adds to U.S. dollars the dollar-swapped ecus and ignores all other ecu claims. This changes the 1994 dollar, pound sterling, deutsche mark, and yen shares of official foreign exchange reserves to 63.3 percent, 3.8 percent, 15.5 percent, and 8.5 percent, respectively. Nevertheless, this adjustment also creates a serious difficulty because some central banks report their ecu-U.S. dollar swaps as dollars, thereby generating a double-counting of dollar claims involved in ecu swaps. Because it is unclear which central banks do this—or whether they do it consistently—there is no way to avoid the double-counting.

If ecu holdings were small, these difficulties would not affect the general picture of the relative size of U.S. dollar holdings. In the IMF data, however, the ecu is of a magnitude equal to that of the yen. Moreover, private ecu holdings constituted approximately one-third of the official reserves of three of four largest ERM countries in 1992.[16]

B. Denomination in the Presence of Off-Balance-Sheet Positions

The explosive growth of derivatives products and the ability of financial institutions to take opaque off-balance-sheet positions has made problematic the use of standard on-balance-sheet measurements. With the use of derivatives products, the currency composition, interest rate position, and equity position of an on-balance-sheet portfolio can be shifted quickly and at low cost.

In the context of the usual balance of payments statistics, for example, it is well known that the sub-accounts of capital-account data are now uninformative and that the standard accounting practices are obsolescent. In particular, suppose a foreigner trading in the Tokyo markets buys an over-the-counter (OTC) equity index futures contract from a bank and hedges on the spot market in a program trade, leaving the cash from the stock sale on deposit in Tokyo. On Japan's capital accounts, this will appear as a sale of equity from a foreign address in Tokyo and an inflow of a cash deposit of the funds acquired. The other end of the hedge would be a derivatives product whose components would not appear in the accounts. Although these

16. Goldstein et al. (1993b).

transactions imply in fact a net zero change of position for the foreigner and for Japanese residents, it appears from the capital accounts that there are some cash claims flowing in and a net sale of portfolio shares. The net capital account balance is unchanged, but the subcategories of the capital account reflect that some positions have been taken by the foreigner in Tokyo. Similarly, a foreigner might make a direct investment by buying a large block of shares. If he hedges the position with a forward sale of a closely related OTC index futures contract or with the acquisition of an OTC put option on the stock itself, the hedge does not appear in the capital accounts. The direct investment appears, although effectively the investor is holding a fixed interest claim on the economy rather than taking an equity position.[17]

In the same manner, it is impossible to determine the currency position of a portfolio by looking only at on-balance-sheet, gross asset entries, as in the IMF survey. A forward contract will readily convert a portfolio from one currency composition to another. Because the IMF data are composed only of gross, on-balance-sheet reserve holdings, it is impossible to determine the currency breakdown of a central bank's foreign exchange position.

Indeed, a typical operation in money markets is to use a liquid money market in one currency to avoid the problem of an illiquid money market in another currency. For example, suppose that the U.S. dollar Treasury-bill market is highly liquid and the yen Treasury-bill market is not. An institution that wants to hold a liquid short-term yen security can do so by creating synthetic yen. It buys a U.S. dollar Treasury bill outright, thereby holding a dollar instrument as an on-balance-sheet asset. It then sells the U.S. dollar forward for yen at a maturity matching the maturity of the dollar Treasury bill. If the position is held to maturity, the institution will have a net yen receipt. If the yen Treasury-bill market is illiquid enough, the added transaction cost of the exchange operation involved in creating the synthetic yen will be insufficient to deter it.[18]

Of course, the institution wants a liquid instrument to cover the contingency of needing to realize cash before maturity. Yen cash can be realized from the yen Treasury bill by outright sale on the secondary market. Similarly, yen cash can be realized from the synthetic yen position by sale of the U.S. dollar Treasury bill and a spot sale of dollars for yen. The forward exchange position can be covered by undertaking the opposite position at the same maturity. If the cost of these transactions in liquidating the synthetic yen Treasury bill is lower than the cost of liquidating the yen Treasury bill, or if funds can be delivered sooner through the

17. Merton (1995) points out 11 ways of taking a leveraged position in S&P 500 stocks through the use of various derivatives. In our context, many of the 11 ways would not appear in the capital-account sub-accounts. More generally, Merton discusses how the increase in derivatives positions is changing the nature of accounting. On-balance-sheet accounting follows a value accounting principle, in which current book or market values are entered. Balance of payments accounting is an example of value accounting. Value accounting, however, does not indicate risks associated with given positions, which is why there is a strong perception of a need for new risk accounting methods.

18. These transaction costs are not high. The bid-ask spread on U.S. dollar Treasury bills is two basis points, as is the bid-ask spread on dollar/yen spot exchange.

synthetic yen liquidation, institutions seeking liquid yen positions will create them through U.S. dollar gross asset holding.

Central banks frequently use derivatives to alter the currency composition of their portfolios, usually to hedge positions or for liquidity purposes. Of course, the goals of foreign exchange management vary across central banks. Some use swaps or forward contracts to hedge foreign exchange liabilities; others use swaps to create synthetic Treasury bills to improve the liquidity of their net reserves while maintaining a desired currency denomination. Others contract the management of part of their reserves to private institutions and permit the use of options to establish discretionary currency overlays.

III. Money Market Liquidity and the Availability of Yen Instruments

This section addresses the sources of illiquidity in the market for short-term yen-denominated government securities. Illiquidity in the market stems first from a low supply of instruments in keeping with Ministry of Finance principles of public debt management. Second, it arises from the system of transaction and withholding taxes. Third, slow settlement of transactions forces additional layers of trading in place of outright sales for those traders seeking quick access to good funds.

A. Availability of Proper Instruments

The Treasury bill is usually regarded as the proper instrument for foreign exchange holdings.[19] Because it is liquid and entails zero credit risk, the Treasury-bill market enables sudden sales of the large amounts that are often required for market interventions with the minimum perturbation of the market. Markets in Treasury bills are usually deep; and, because Treasury-bill rates are often key rates in monetary policy implementation, home country central banks provide added liquidity both in carrying out monetary policy and as fiduciary agent of their treasuries.

The typical foreign exchange holding by industrial countries in U.S. dollars consists for the most part of Treasury bills. The U.S. Treasury-bill market is for cash—that is, same-day—settlement, so a thick dealer net can provide instant funds for sudden payment requirements if Treasury bills are held. Also, secondary market sales prior to maturity are not costly because bid-ask spreads are typically about two or three basis points.

The situation is different in yen markets. At the end of 1994, of ¥8.3 trillion (US$83 billion) in yen-denominated foreign reserve holdings, ¥2 trillion (US$20 billion) was held as Treasury bills in the accounts of foreign central banks.[20] Indeed,

19. Central banks generally divide their foreign exchange holdings into several accounts—one is operated to ensure liquidity and will typically include Treasury bills or perhaps some liquid commercial bank deposits, one may be an investment account of medium liquidity, and one may be quite illiquid or even include equities.
20. For reviews of the workings of the money market and the nature of the instruments, see the Money Market Study Group (1990), McKenzie (1993), Singleton (1993), Ueda (1993), and Okina (1993).

there was only ¥11 trillion (US$110 billion) in Treasury bills outstanding of a total government debt of ¥201 trillion (US$2.01 trillion).[21] Other major holders of Treasury bills are the Bank of Japan and Japanese financial institutions.[22] Financing bills are quite similar to Treasury bills in their characteristics, but at the end of 1994 nearly all the ¥18.6 trillion in financing bills was held by the Bank of Japan and almost none was held by foreign central banks. Foreign central banks also held about ¥4.8 trillion (US$48 billion) in long-term government bonds. Foreign central banks' total holdings of government bonds and bills were about ¥7 trillion (US$70 billion) at the end of 1994, so of the US$83 billion in yen-denominated reserves accounted for in the IMF survey, about US$70 billion was in the form of government securities.

Typically, yen Treasury bills pay a slightly lower yield than CP or CDs. In the primary market for money market instruments, Treasury bills are auctioned by the Bank of Japan in a normal auction. Only primary bidders can bid in the auction, and these are limited to domestic financial institutions. Foreign central banks can buy only on the secondary market, but they can place an order through a primary bidder and get approximately the auction price. Foreign central banks are major holders of Treasury bills, and tend to hold them to maturity.[23]

Foreign central banks do not bid Treasury bills away from the other holders such as the city banks through their agents in the primary markets, because city banks themselves are strong bidders. Although Treasury bills may pay below CD rates, banks hold Treasury bills for liquidity. Not subject to a transaction tax, they can readily be financed overnight through repurchase agreements (RPs).[24] Therefore, in spite of foreign central banks' complaints about a dearth of supply, there is no excess demand by foreign central banks; the price is bid high enough for them to take the amount of Treasury bills that they want, and then they leave the market. A conservative central bank cannot be aggressive in making a bid, because it generally faces a review by its own supervisory authority of its market trading performance. If a central bank continually bid much higher than the market price, it might create a political problem for itself. Complaints about a lack of supply, therefore, must emanate from a perception of an excessively low interest rate payable on Japanese Treasury bills relative to the U.S. Treasury bill because of the unique characteristics of the Treasury bill on the Japanese market.

21. Data are from the Bank of Japan data set.
22. The small amount of Treasury bills makes it difficult for the Bank of Japan to use them extensively in open market operations. The Bank of Japan therefore uses many markets and instruments for its monetary operations. See Okina (1993) for details of these operations. Bill operations—that is, discounting of private bills—are used to correct daily surpluses or shortages of banking reserves, while seasonal disturbances are addressed by the use of financing bills. To accommodate secular growth in money demand, the Bank of Japan acquires long-term government bonds.
23. In any case, the amount of Treasury bills that can be traded outright in a day is very limited, so the Treasury bill would not be a good intervention medium. Treasury bills are volatile because total outstanding amounts are small.
24. Another advantage is that Treasury bills are not listed on a security exchange, unlike long-term government bonds. According to the accounting rules for financial institutions, listed securities must be marked to market by banks, while non-listed securities are carried at book value. The financial accounting period ends either in March or September; banks tend to hold Treasury bills to just after the end of the accounting term in order to avoid marking to market.

The Bank of Japan sells financing bills to foreign central banks with accounts at the Bank of Japan. Financing bills are issued by the Ministry of Finance to meet temporary shortages of funds in a fixed-rate public subscription. Initially, most financing bills are acquired by the Bank of Japan, which underwrites each issue. The interest rate for underwriting financing bills is just below the official discount rate—that is, below the market rate—and the bills are sold to foreign central banks at the same rate. Prior to the liberalization of money markets and the advent of Treasury bills, there were few attractive instruments in the open markets, so foreign central banks chose financing bills. Treasury bills are now of better quality, but foreign central banks can get only a limited amount.

Foreign central banks still hold financing bills because they need a buffer in case of a shortage of money balances, but in small amounts. They hold yen deposit accounts with the Bank of Japan for their day-to-day business, but if their actual balance is short when a payment instruction arrives, the Bank of Japan cannot execute the order. In preparation for that event, foreign central banks accumulate a certain amount of financing bills, which can be resold directly to the Bank of Japan.

A central bank holds primary cash in yen deposits at the Bank of Japan and secondary cash in the form of financing bills. The third level of liquidity in a foreign exchange portfolio is Treasury bills. A conservative central bank generally does not wish to own private paper, so the fourth level is longer-term Japanese government bonds. This is not a liquid reserve, however, because of the transaction tax—foreign central banks buy and hold these bonds.

B. Transaction and Withholding Taxes

Except for short-term money market instruments, securities are subject to a securities transaction tax, applicable to sellers of the security and including foreign central banks. For securities companies, the tax amounts to 12 basis points, 6 basis points, and 1 basis point, respectively, for sales of shares, convertible bonds and warrant bonds, and other securities. For other investors, the tax is 30 basis points, 16 basis points, and 3 basis points for the same respective categories.[25]

The tax in particular affects *gensaki* transactions of short maturity in Japanese government securities because it applies to both legs of the transaction. For example, it can add 2.92 percent to the cost of funds for five-day repurchases and 1.46 percent for 10-day repurchases.[26] For overnight *gensaki*, the additional cost of funds is 14.6 percent at an annual rate, so that the tax on overnight securities financing through *gensaki* is prohibitive.

The securities transaction tax does not apply to short-term money market instruments—Treasury bills, financing bills, CP, and CDs—which makes these instruments especially attractive to financial institutions. For these securities, the turnover relative to amounts outstanding is much higher than for longer-term

25. See the Japan Securities Research Institute (1994), p. 252.
26. The details of these calculations can be found in the Money Market Study Group (1990), p. 124.

Japanese government securities. For example, in 1994 the ratio of turnover to amount outstanding for the total of CDs, CP, financing bills, and Treasury bills was 70. For Japanese government bonds, the turnover ratio in 1994 was 8.5.[27] Moreover, most transactions in Treasury bills involve financing through RP rather than outright sale, so the volume in Treasury-bill RPs is approximately equal to the volume in RPs for other securities.[28]

Securities traded in the other two major financial centers are not burdened with a securities tax, so it is natural to address the rationale behind the securities transaction tax. First, it may be that there is simply a preference for illiquid markets, and the tax is designed to produce that result. Second, the tax has in the past served as an important revenue source—reaching 4.1 percent of national tax revenues in 1988, though declining since then.[29] Potential revenue reduction is therefore a serious consideration in any proposal to remove the tax.

In this context, however, it is curious that the government's own securities are subject to the tax, because there is no net revenue generation for the government in this dimension. By making its bonds illiquid, the government will be forced to pay a premium interest rate on issue to encourage the purchase of illiquid securities.[30] If the tax is so burdensome that it forces the securities to be held to maturity after initial issue, it will generate no direct revenue while imposing an expenditure increase from the haircut that the government must accept on the issue price. If the tax rate is low enough to permit some trading, the haircut should cover the expected cost of the tax payments plus some additional amount to cover the remaining reduction in liquidity.

That the government imposes the tax on its own securities stems from a desire to level the playing field with private securities: applying the tax to private securities and not to government securities would possibly give an unnatural advantage to the government in raising funds. Typically, however, in other markets government securities are inherently more liquid than private securities because of the size and steady flow of their issue and because of the support that the central bank gives them as the government's fiduciary agent. In environments with a uniform zero transaction tax, therefore, government securities are naturally more liquid than other securities. To impose a uniformity of tax rates that eliminates the liquidity of government issues—far from being neutral—then distorts the financial markets against government issues.

It is frequently argued that the withholding tax on interest earnings is an additional discouragement for central banks to hold yen securities. Under this tax,

27. Data for computations are taken from the Bank of Japan (1995), Statistical Section, pp. 5, 11, and 13. Here, I have adjusted the turnover data to eliminate double-counting.
28. This is to be expected if RPs in Treasury bills are concentrated at the very short maturity end.
29. See the Japan Securities Research Institute (1994), p. 252. After a reduction in the tax rate, revenues from the tax fell to 1.9 percent of national tax revenue in 1990, so securities transaction activity apparently was not so elastic as to put the previous tax rate on the wrong side of the Laffer curve. The collapse of the securities churning associated with the collapse of the asset bubble, of course, was a simultaneous cause of a drop in trading volume, independent of the change in the tax rate.
30. See Amihud and Mendelson (1993) on the effect of illiquidity on yield.

interest income of both residents and nonresidents is subject to a 20 percent withholding tax. Gains on discount securities are subject to a withholding tax of 18 percent payable at the time of acquisition. The final holder of the Treasury bill can deduct the amount withheld from taxes due after the maturation of the Treasury bill, but there is no interest paid on the amount withheld.[31] Foreign central banks that acquire Treasury bills, however, can get an immediate refund of the amount withheld if they deposit the Treasury bills with the Bank of Japan. Nevertheless, there apparently is a need to mobilize some additional liquidity to pay the tax before the refund is delivered.

C. Settlement of Transactions

For most Japanese government securities, there was, until November 28, 1995, no rolling settlement system, in which a day's transactions are settled by convention a fixed number of business days after the trade date. For instance, U.S. government securities are settled on the next business day, which is referred to as a T+1 rolling settlement, where T represents the trade date.

In Japan, securities were settled only six times per month—the fifth day of the month, the tenth day, etc.[32] Trades, therefore, were settled only many days after a transaction. This injected more settlement risk into Japanese government security transactions than U.S. government bonds.

In November 1995, the settlement convention for Japanese government securities was changed to a rolling settlement at T+7—seven business days after the trade. Within a year, it is expected that the settlement day will be T+3.

As an exception to this settlement system, yen Treasury bills have had a rolling settlement at T+3. U.S. Treasury bills are conventionally settled the same day. This difference is relevant in the context of the foreign exchange market, where settlement of spot transactions is at date T+2. A central bank wishing to use its U.S. dollar Treasury bill reserve as an intervention medium for immediate intervention can contract a spot sale of dollars for its currency at date T, sell Treasury bills for cash on date T+2, and settle the spot exchange transaction. A central bank wishing to mobilize its yen Treasury bills for intervention cannot generate cash quickly enough to intervene in the spot market through this simple transaction. Rather, it may sell yen forward for date T+3 settlement and simultaneously sell its yen Treasury bills for settlement on date T+3. Alternatively, it may sell yen spot on date T, engage in a

31. See the Money Market Study Group (1990), p. 33. Outright buyers from intermediate holders of the Treasury bills would have to compensate them for the amount withheld by marking up the price appropriately or by effecting a pass-through side payment. The rationale for this system as applied to Treasury bills is unclear, other than to impose some concept of parallelism with private discount securities. There is a revenue gain to the Ministry of Finance in the form of a zero interest loan of 20 percent of the difference between the face and market value of the Treasury bill. That gain will be directly offset, however, by a reduction by the same amount of the market price that buyers are willing to pay on issue.

    The need to effect a pass-through of the amount withheld on outright sales apparently is a key factor in the dominance of RPs over outright sales in the secondary market trading of Treasury bills.

32. It is possible at times, however, to get same-day settlement for a high price. This settlement system is referred to as *go-tobi—go* is five and *to* is ten. The settlement day is predetermined on the fifth, tenth, fifteenth, etc. Any sale on a particular calendar date will be settled on one of these days.

Treasury-bill overnight RP on date T+2 to get the cash for settlement of the spot sale, and sell the Treasury bill outright on date T for settlement on date T+3. Obviously, the faster settlement of the U.S. dollar Treasury bill allows it to be mobilized to match the tempo of the spot exchange market more easily than the yen Treasury bill.

IV. Central Bank Support Facilities for Foreign Central Banks

The support given to foreign central banks by the Fed in undertaking U.S. dollar money market transactions gives a secondary boost to their choice of the dollar as a reserve currency. From the Fed's point of view, such support—although it involves providing services at cost—is helpful because it provides an incentive for foreign central banks to operate through their accounts at the Federal Reserve Bank of New York (New York Fed). The Fed is therefore well informed about the operations of foreign central banks, which may at times disturb the market. It can then move to counteract the effects of sudden buying or selling by a foreign central bank so that domestic monetary policy is not disturbed. Indeed, having to face occasional disturbances to domestic monetary policy is often cited as one of the burdens that a central bank providing an international reserve currency must bear. By concentrating such trading over its own accounts, it can minimize such effects.

The New York Fed provides correspondents with services to make U.S. dollar payments, manage dollar portfolios, deposit gold, and engage in foreign exchange operations. It enters the market directly for its own operations and therefore provides a confidentiality that would be lacking if the foreign central bank operated through commercial bank correspondents. While many foreign central banks make exclusive use of the Fed for their U.S. dollar banking operations, some use commercial banks, especially for the investment component of their reserve holdings. Others may hold their U.S. dollar reserves as deposits with the BIS, which in turn may manage some of its dollar holdings through the Fed.

In 1986, for example, the New York Fed held more than US$150 billion in securities for correspondents.[33] IMF data for the end of 1986 indicate that official U.S. dollar reserves were US$225 billion; therefore, more than two-thirds of worldwide U.S. dollar foreign exchange was held through the Fed's service accounts.

The Fed makes all transactions at "market prices" and will "execute securities transactions internally" to maintain anonymity and minimize the market impact of a sizable transaction. Thus, the Fed will provide added liquidity to the market when a central bank finds that it must transact U.S. dollar securities in size. The Fed stresses the desirability of liquid and safe assets and discourages a trading strategy for managing its accounts. As a requirement for using the Fed's services, foreign central banks are asked to inform the Fed about large fund transactions that are handled by agents outside the Fed.

33. See the New York Fed's handbook, "Investment and Account Operations for Central Banks and International Institutions," 1986, p. 2, from which this section's description is taken.

A. Basic Securities Transactions

The Fed offers a variety of investment services. The basic service is to buy and sell U.S. Treasury and agency securities and other money market instruments, such as bankers' acceptances and CDs. For the accounts of correspondents, the Fed submits tenders for new issues and transacts on the secondary market for seasoned securities.[34] Transactions on the secondary market may be undertaken with dealers, by matches with other correspondents, or through the Fed's open market account. All transactions are done at "market prices," although matches between correspondent account transactions can occur within the market spread, i.e., at better than market prices. Similarly, transactions with the Fed's open market account are undertaken between the bid and ask spreads available in the market.

B. The RP Pool

For liquid, overnight funds, foreign central banks can place funds into an RP pool operated by the Fed. The Fed creates a pool of U.S. Treasury securities and provides a share to correspondents proportionate to their position in the pool. The Fed then executes RPs from the pool as a whole and pays market overnight RP rates to members of the pool. The Fed limits participations in the pool because of limits to its ability to engage in RPs. Generally, it permits participation for "normal" ebbs and flows of daily payments and receipts of a correspondent; in addition, "substantial" balances may be invested in the RP pool in excess of what is needed for a liquidity cushion. The Fed will also execute reverse RPs and swaps of U.S. Treasury securities for correspondents.

The Fed passes through the market rates that it receives in these RPs after taking a service charge of two basis points at annual rates. Typically, market RP rates are slightly less than unsecured Fed Funds overnight rates.

C. Fed Funds Transactions

Similarly, the Fed places into the Fed Funds market overnight funds that arrive unexpectedly into its cash accounts for correspondents between 11 a.m.—the deadline for placing investment orders through the Fed—and 2:30 p.m. Rates of return are net of broker fees, and the Fed takes a fee of five basis points per annum. Again, correspondent funds for overnight placement are pooled and placed with the 20 largest U.S. banks. Like typical Fed Funds, however, these funds are unsecured. Conversely, the Fed will purchase overnight funds for correspondents to cover payment for investment securities purchased for correspondents by the Fed if sufficient funds unexpectedly do not arrive to cover settlement.

D. Foreign Exchange

The Fed will also engage in foreign exchange transactions on behalf of correspondents if they have on deposit with the Fed either U.S. dollar balances or

34. For new issues of Treasury securities, this may be on a noncompetitive basis, in which the price is the average price of the competitive bids at the auction, or on a competitive basis, so that the correspondent is given the same status as a primary dealer.

securities sufficient to cover a 5 percent margin on the value of the sale. The Fed also provides a custodial service for holding gold reserves of foreign correspondents.

E. Fund Management

The Fed offers an automatic investment program whose parameters are set by the correspondent. The typical program will establish an amount to be held as a cash balance with the Fed and authorizes the Fed to buy or sell securities when the cash balance differs from the specified value. The implicit income from the cash balance is used to compensate the Fed for its services. Additional funds above the cash balance are placed in the RP pool for immediate payment needs. A third tier of funds is placed into Treasury bills or other money market instruments.[35]

F. Bank of Japan Services to Other Central Banks

For cash settlement, foreign central banks have a cash account with the Bank of Japan, and the Bank of Japan offers delivery-versus-payment (DVP) services against Treasury bills and financing bills. Foreign central banks must transact directly with the market, however—the Bank of Japan does not provide a brokerage or dealer service for them.[36,37]

V. Conclusion

The depreciation of the U.S. dollar in the spring of 1995 rekindled the unending debate on the ideal organization of the international monetary system. The discussion includes calls to expand the roles of the yen and the deutsche mark as reserve currencies and even to resurrect the SDR as a key reserve currency, notwithstanding the outcome of the disastrous flirtation of the European central banks with the "cocktail" ecu unit in the run-up to the ERM crises of 1992 and 1993.

The United States is not regarded as having fulfilled its responsibility as a provider of the reserve currency, but on the other hand it is not clear what this responsibility is. Under the Bretton Woods system, the United States was responsible for making the U.S. dollar convertible into gold and readily available as a reserve currency, while the other central banks were responsible for maintaining the fixed rates or their own currencies with the dollar through market interventions. Hardly once in the heyday

35. Japanese foreign exchange reserves are managed through the Fed accounts. A specific list of investment instructions is given to the New York Fed, which acts as an agent according to this contract.
36. The Bank of Japan is now talking with its G-10 counterparts about the possibility of allowing the reciprocal use of cross-border collateral in a liquidity crisis. Suppose, for example, that a Japanese bank in New York experienced a liquidity problem and could not get U.S. dollar funds in New York. If the New York Fed wanted to supply liquidity but the bank lacked collateral in New York, the New York Fed might inquire at the Bank of Japan if the bank had yen collateral. If so, the New York Fed might make a loan on the basis of yen collateral at the Bank of Japan, which would then be earmarked to the New York Fed.
37. In case a country needs yen to intervene, there might be some swap agreement, but this would be on a case-by-case basis. The Bank of Japan could buy back financial bills to provide liquidity, but central banks with Treasury bills would have to go to the market.

of Bretton Woods, however, did the United States act in a manner consistent with maintaining the fixed U.S. dollar value of gold, and the system lurched through a series of breakdowns in 1968, 1971, and 1973, launching itself onto an unprecedented course of peacetime inflation.

Nevertheless, in spite of the U.S. failure of responsibility as the reserve currency provider, other countries have continued to use the U.S. dollar as their principal reserve up to the present day. Indeed, in recent years, the United States has been much less inflationist, so that inflation does not effectively differ from zero at present—that is, the United States has effected a goods standard for the U.S. dollar. Yet, in this environment, the United States is regarded as providing an unstable currency.

What the source of instability is, of course, depends on whether you live on the numerator or denominator of the exchange rate. From the U.S. viewpoint, other countries are deflationist—Japan in prices, Germany in labor markets. It is natural that their currencies will appreciate against the U.S. dollar. Some countries—whose central banks had adopted a more speculative stance—bemoan the profits they could gained had they held the yen. Other countries, such as Indonesia, had actually speculated in the other direction and were net short the yen when the yen appreciated and net long the U.S. dollar.

Many countries also experienced large capital inflows while being tied to the U.S. dollar, and they faced either inflationist pressure or pressure to revalue their exchange rates. If they had revalued, they would not have held an abnormal amount of U.S. dollar reserves. Instead, they sterilized and multiplied their reserves beyond normal levels. When they ultimately imposed the inevitable revaluation, they naturally took capital losses.

The current systemic debate has also revived the discussion of internationalization from the point of view of the useability of the yen. It has been difficult to effect a reportedly desired shift toward the yen because of the lack of sufficient yen instruments, the poor capital position of the Japanese banks as counterparties, and the current stage of the economic cycle in Japan. The artificial measures by which the yen is kept illiquid are the result partly of public debt management policy and a control over the competitive advantage of the government in securities issuance. From this narrow perspective, it is quite simple to make the yen an easily useable foreign exchange reserve currency: raise the supply of Treasury bills to approximately ¥60 trillion, eliminate the transaction tax on government securities, and let the Bank of Japan be a banker for foreign central banks.

From the perspective of other policy goals, however, it is clear that this would cause a loss of control by Japanese authorities over the holders of the most liquid instruments in the Japanese money market, and would impose the "responsibility of the provider of the reserve currency" on the Japanese. Such a responsibility could not be exercised without undermining more important domestic policies. The question then becomes not "Who runs away from responsibility?" but "Who runs from responsibility less rapidly than everyone else?" The answer determines who provides the reserve currency.

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