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To: Members of the Executive Board

From: The Secretary

Subject: SDR Valuation - Exchange Rates for the Five Currencies
Comprising the SDR Basket

Attached for consideration by the Executive Directors is a paper on procedures for the valuation of the SDR in terms of the exchange rates for the five currencies comprising the SDR basket, which will be brought to the agenda for discussion on a date to be announced.

Mr. Zavoico (ext. 7626) or Mr. Tran (ext. 7820) are available to answer technical or factual questions relating to this paper prior to the Board discussion.

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INTERNATIONAL MONETARY FUND

SDR Valuation - Exchange Rates for the Five
Currencies Comprising the SDR Basket

Prepared by the Treasurer's Department

(In consultation with the Legal Department)

Approved by W. O. Habermeier

July 1, 1985

I. Introduction

It was indicated in "Review of the Valuation of the SDR" (SM/85/163, 6/7/85), that a staff memorandum would be issued for the consideration of the Executive Board which would deal with some issues arising from the use of different exchange rate collection procedures for valuing the SDR in terms of the U.S. dollar (and pound sterling) on the one hand, and other currencies on the other hand. The use of these different procedures gives rise to some operational difficulties which are discussed in Section II; possible alternative approaches to alleviate the cause of the difficulties are discussed in Section III; and some conclusions are drawn in Section IV.

II. Procedures for the Valuation of the SDR in
Terms of Different Currencies

The exchange rates used for the purpose of determining the currency value of the SDR are the middle rates between the buying and selling rates against the U.S. dollar of the currencies in the SDR valuation basket in the London foreign exchange market at noon, as determined by the Bank of England. The Fund calculates the value of the SDR in terms of the U.S. dollar and uses the reciprocal to determine the equivalent in SDRs of a given amount of U.S. dollars. The value of the SDR in terms of another currency is determined on the basis of the representative rate for that currency against the U.S. dollar and the SDR value of the U.S. dollar (Rule 0-2, which is reproduced in Attachment I). Under present arrangements, only the representative rate for the pound sterling coincides with the rate for that currency which is used to calculate the value of the U.S. dollar in terms of the SDR when the London market

is open. 1/ The representative rates for the deutsche mark, French franc and Japanese yen are determined in their respective domestic markets at varying times and they generally differ from the exchange rates in London that are used to determine the SDR/U.S. dollar exchange rate. 2/ As indicated earlier, the representative rates for other countries are also normally determined in their respective domestic foreign exchange markets. 3/

As a consequence of the present arrangements, the SDR values of currencies are not based on a necessarily consistent set of market exchange rates at one common point in time. In these circumstances some, normally small, divergencies arise between the Fund's official SDR exchange rates (except for the U.S. dollar and pound sterling) and the SDR value of currencies using market rates of exchange at the time the official value of the SDR is established. (Official SDR exchange rates also obviously diverge from market rates soon after their determination in view of the continuous changes in exchange rate quotations in active foreign exchange markets.) While such divergencies could give rise to some difficulties, for example, members could prefer a particular currency on the grounds of the exchange rate arrangements for the conversion of the currency, the Fund's procedures governing the use of currencies and SDRs, as well as members' cooperativeness that underlies

1/ When the London market is closed, the Fund uses the exchange rates at noon in New York or, if the New York market is also closed, the fixing rates in Frankfurt, as communicated by the respective central banks (Executive Board Decision No. 6709-(80/189)S, adopted December 19, 1980).

2/ The representative rate for the deutsche mark against the U.S. dollar is established at about 1:00 p.m. in Frankfurt, and that for the French franc, at around 1:30 p.m. in Paris. Thus, for most of the year, the representative rate for the deutsche mark is set at about the same time as noon in London, and that for the French franc about half an hour later; for the period from the last weekend in September to the last weekend in October, when continental Europe returns to Standard Time earlier than the United Kingdom, the representative rates for the deutsche mark and French franc are set an hour, and an hour and a half, later than noon in London, respectively. The representative rate of the Japanese yen against the U.S. dollar is the rate at which the largest volume of interbank trading has taken place during the day in the Tokyo market. Therefore, this rate, which can only be established after interbank trading ceases, is set 8 hours before the London noon exchange rates for two thirds of the year, and 9 hours ahead, for most of the first four months of the year. (See texts of Executive Board decisions on representative rates for the deutsche mark, French franc, Japanese yen and pound sterling which are reproduced in Attachment II.)

3/ In countries where no exchange market exists, the Fund determines the exchange rate for that currency to ensure that the "representative exchange rate" reflects the value of a country's currency.

their relations with the Fund, do not give rise to difficulties as regards the Fund's operations and transactions with members. 1/ Nevertheless, it would be a logical step in the evolution of the SDR if there was a greater consistency in the determination of SDR exchange rates for the currencies that comprise the SDR valuation basket. It is also noteworthy that each of the five currencies that comprise the SDR valuation basket is a freely usable currency in the Fund. Determination of the SDR exchange rates for these currencies on the basis of the London noon rates would effectively eliminate the existing differentials between the SDR exchange rates for some of these currencies. This would facilitate the use of each of these currencies as a vehicle currency for making SDR-denominated investments in the market. It would also help reduce present difficulties, which result in a higher exchange risk and, therefore, cost, in arranging cover for those investors, including the Fund, which receives funds at the official SDR exchange rate and needs to invest them in the SDR-denominated asset market on the basis of market exchange rates. 2/ It might also facilitate the use of the SDR as a unit of account and of the Fund's official exchange rates in, for example, determining the currency value of SDR-denominated obligations.

The difficulties in effecting SDR-denominated investments arise because the official SDR rates for some currencies in the SDR basket, as indicated above, are not fully consistent with the market exchange rates that are used to value an SDR investment, and, as a consequence, market participants cannot arrange cover on the basis of official SDR exchange rates. This long-standing difficulty may have acted as an impediment to the growth of the market for SDR-denominated assets. Furthermore, the Fund has itself experienced such difficulties in connection with the temporary investment of currencies, other than the U.S. dollar and pound sterling, which are held in the Borrowed Resources Suspense Accounts. 3/ The issue has also arisen in connection with the use of currencies for making payments by the Fund under the 1984 short-

1/ The Articles of Agreement provide that a member using SDRs shall receive the same value whatever currencies might be provided. In the General Resources Account, the Fund's procedures ensure that a currency purchased from the Fund, which is not a freely usable currency, can be exchanged for a freely usable currency at an exchange rate between the two currencies corresponding to their values in terms of the SDR, provided the purchasing member requests the exchange at the time of the purchase.

2/ It should be noted that many investors in this market can invest without loss at going SDR exchange rates because the resources to be used for investment are not themselves SDR-denominated in the first place.

3/ This may occur, for example, in connection with drawings under the borrowing agreement with SAMA effective May 7, 1981. See EBS/82/145, "Borrowing Agreement with the Saudi Arabian Monetary Agency - Proposed Change in Conversion Arrangements," dated August 13, 1982.

term borrowing agreement with the BIS. 1/

Pending use by the Fund of the currencies held in the Borrowed Resources Suspense Accounts, the Fund makes SDR-denominated deposits to avoid exchange risk. The discrepancy between the SDR value of the currency received by the Fund, on the basis of the representative rate for the currency, and the market exchange rate for that currency results in exchange gains or losses and therefore makes it more costly for the Fund to cover its exchange risks in the SDR-denominated investment market. The net cumulative exchange gains and losses that have been experienced by the Borrowed Resources Suspense Accounts are shown in Appendix Table 1. As can be seen from that Table, there has been a net cumulative exchange loss of about SDR 0.5 million since December 1982 and this has arisen from a loss on the investment of Japanese yen that has been only partially offset by a small net gain on the investment of deutsche mark and French francs. The greater variability of the gain (loss) is due in part to the substantially greater period of time that elapses, relative to the deutsche mark and the French franc, between the setting of the representative rate for the Japanese yen and the determination of its exchange rate for the valuation of the SDR at noon in London. It also reflects the fact that in converting Japanese yen received for investment in the Borrowed Resources Suspense Accounts, the BIS cannot sell the Japanese yen at the representative rate in the Tokyo market. As a consequence, valuation differences arise between the official value of the currency received by the Fund and the value of the counterpart SDR-denominated asset deposited with the BIS. Since

1/ The Fund's borrowing agreement with the BIS provides for payment under the agreement in currencies other than the U.S. dollar, if the representative rate for the other currencies, in particular the yen, were changed to eliminate the exchange risk. In "Borrowing by the Fund from the Bank for International Settlements" (EBS/84/11, 1/13/84), it was explained as follows:

The Fund and the BIS would be able to agree to payments in SDRs, or in currencies other than U.S. dollars at an agreed exchange rate. The reference to "an agreed exchange rate" reflects the fact that the Fund's official SDR rates for some currencies, calculated on the basis of representative rates, are not fully consistent with the market exchange rates used to calculate the SDR rate for the dollar and available to the BIS or other market participants for operational purposes. It is understood that the BIS would not be prepared to agree to use of other currencies for payments under the facility unless such consistency was assured; and the Fund would not be prepared to agree to payment under the facility except on the basis of official SDR rates. This provision is therefore a contingency provision. In the view of the staff, greater flexibility in the choice of currencies would be very desirable, and the staff intends to pursue this matter with the members concerned.

EAR charges are based upon the cost of borrowing, less investment income (net of operational expenses and exchange valuation adjustments) plus a margin, the net exchange losses have been reflected in slightly higher charges paid by members making use of the Fund's borrowed resources under EAR.

Another practical difficulty that can arise because the Fund's representative rates for some currencies are not fully consistent with market exchange rates used to calculate the SDR rate for the U.S. dollar is with respect to the determination of the representative rate for the ECU. This rate is calculated by using the reciprocal of the U.S. dollar value of the ECU and the SDR value of the U.S. dollar. ^{1/} This calculation gives rise to differences in the cross rates for the ECU and SDR in terms of other currencies which raises issues as regards the value of the local currency equivalent of SDRs needed to settle ECU-denominated debts that have arisen from official intervention by European Commission central banks in their exchange markets.

III. Possible Solutions

To avoid the difficulties discussed above, the following conditions need to be fulfilled: (a) the exchange rates for the basket currencies that are used to calculate the U.S. dollar value of the SDR should be the same as the market or the representative exchange rates used for valuing SDR transactions in those currencies, and (b) the exchange rates used should be the result of active trading and fully arbitrated exchange rates, i.e., rates at which those currencies are actually traded in active two-way markets.

A number of solutions can be considered in order to achieve these aims, at least to an approximate extent:

(i) These conditions are likely to come closest to being fulfilled if the exchange rates used to calculate the U.S. dollar value of the SDR were also used to determine the representative rates for the respective currencies in the basket or if the exchange rates for both purposes would be taken from the same active market to which there is free access and that such determination would be contemporaneous.

On the basis of current procedures for valuing the SDR, the representative exchange rates for all the basket currencies would be derived from a common foreign exchange market--i.e., London, or, if closed, New York or Frankfurt.

(ii) An alternative, though less than optimal, set of solutions, which are not necessarily mutually exclusive, would be to determine SDR

^{1/} "Representative Rate for the European Currency Unit (ECU)" (EBD/82/6, 1/12/82).

exchange rates of those currencies in the basket simultaneously, even if the rates are taken from different markets:

(a) One approach would be to determine the representative rate for a currency in a foreign market in which conditions for exchange rate arbitrage with other major exchange markets exist or are more favorable than the domestic exchange market. While the differences between the SDR basket rates and the representative rates for the deutsche mark and French franc are generally, but not always, small, they tend to be larger in the case of the Japanese yen. ^{1/} Furthermore, the representative rate for the yen, which is ascertained only after trading has ceased in the Tokyo market, is not a rate that can be arbitrated or matched by contemporaneous trading, i.e., the amount of yen provided in Fund transactions on the basis of the representative rate for that currency generally cannot be converted into U.S. dollars at that same rate. The main implications of this approach would be (i) that the representative rates for the French franc and deutsche mark would need to be determined at the same time as the determination of the representative rate for pound sterling and the calculation of the SDR in terms of the U.S. dollar in London; and (ii) that the representative rate for the Japanese yen against the U.S. dollar would be determined at a time when other major markets are open, e.g., at noon in London. Given the current ease of intra-European communications and the absence of restrictions, cross rates are practically fully arbitrated as between the major European foreign exchange markets so that the representative rates for the deutsche mark and French franc might continue to be taken from their domestic markets. It would be important, however, to ensure that the exchange rates for all currencies would be established simultaneously.

(b) Another approach would be for the Fund to adopt the system used by the European Commission to determine the daily value of the ECU in terms of the EC currencies and the U.S. dollar. Under the EMS, exchange rates are provided by the participating EMS central banks to the National Bank of Belgium at a "concertation session" at 11:30 a.m. or 2:30 p.m. each business day. The central banks of the issuing currencies in the SDR valuation basket could similarly provide, say, the Bank of England at noon in London with their representative rate of exchange for their currency. If the rate could not be communicated at

^{1/} Despite the fact the London noon rates and the fixing rates for the deutsche mark and the French franc are not set exactly at the same real time as mentioned earlier, the average absolute percentage difference between the rates over the four-year period 1981-84 has been small, 0.03 and 0.09 for the deutsche mark and the French franc, respectively. However, there have been individual instances when the difference was quite large, 1.51 and 1.24 for the deutsche mark and the French franc, respectively. For the Japanese yen, the average absolute percentage difference was 0.24 during the same period, with the maximum reaching 1.76.

the agreed time, the rate for the currency would be taken from the market conducting the "concertation." In view of the time differences, this type of approach implies that the representative rate for the Japanese yen would be determined in the London exchange market. An important consequence of this approach is that the rates for the SDR basket valuation would not come from a single market. However, the SDR basket and representative rates would be determined at the same time and they would be fully arbitrated rates, provided there were free access to the markets of the participating countries.

IV. Summary and Conclusions

The following are the main points discussed above:

1. The exchange rates used to determine the value of the SDR in terms of the U.S. dollar are obtained from a single foreign exchange market at the same time. The SDR value for other individual currencies are determined on the basis of representative exchange rates against the U.S. dollar which, for most currencies, are derived from the domestic foreign exchange market of the issuing country and the U.S. dollar value of the SDR, as determined on the basis of exchange rates for the currencies in the SDR basket at noon in London. As a consequence, a divergence arises for a currency in the SDR valuation basket (other than the U.S. dollar and pound sterling) as between the SDR value calculated from the noon exchange rates in London and the SDR value of the currency calculated on the basis of its representative rate.
2. This divergence in value, which normally is small, could cause some operational difficulties as regards the currencies in the SDR valuation basket, and in the determination of the appropriate amounts of SDRs to be used in settlement of ECU-denominated debt by EC central banks. A more significant problem arises for those investors, including the Fund, who wish to arrange cover for their SDR-denominated investments on the basis of market exchange rates that differ from the representative rates because of time differences. This discrepancy increases the difficulties, which are reflected in higher cost, in arranging appropriate SDR cover for the investments.
3. A number of solutions to overcome these difficulties can be considered, each of which essentially involves deriving representative rates for the currencies in the SDR valuation basket simultaneously and using these rates to determine the U.S. dollar value of the SDR. Ideally, all rates might be taken from a common exchange market, and this would be the staff's preference. Alternatively, the representative rates for the currencies in the SDR valuation basket could be determined simultaneously in different but fully arbitrated exchange markets. In the event that such a rate could not be obtained because of time differences, it would be possible for the issuer of the currency to determine the representative rate in another active exchange market.

4. On the basis of the outcome of a discussion of this issue by the Executive Board and of the suggested solutions, the staff would prepare a revised draft Rule 0-2 for the Board's consideration, and if required, and after consultation, new draft decisions for establishing the representative rates for the currencies of members that would be affected by any changes in Rule 0-2.

Rule O-2

Valuation of Currencies in Terms
of the SDR

- O-2. (a) The value of the United States dollar in terms of the SDR shall be equal to the reciprocal of the sum of the equivalents in United States dollars of the amounts of the currencies specified in Rule O-1, calculated on the basis of exchange rates established in accordance with procedures decided from time to time by the Fund.
- (b) The value of a currency other than the United States dollar in terms of the SDR shall be determined on the basis of the value of the United States dollar in terms of the SDR in accordance with (a) above and an exchange rate for that other currency determined as follows:
- (i) for the currency of a member having an exchange market in which the Fund finds that a representative spot rate for the United States dollar can be readily ascertained, that representative rate;
 - (ii) for the currency of a member having an exchange market in which the Fund finds that a representative spot rate for the United States dollar cannot be readily ascertained but in which a representative spot rate can be readily ascertained for a currency as described in (i), the rate calculated by reference to the representative spot rate for that currency and the rate ascertained pursuant to (i) above for the United States dollar in terms of that currency;
 - (iii) for the currency of any other member, a rate determined by the Fund.
- (c) Procedures to establish exchange rates under (b) above shall be determined by the Fund in consultation with members.

Adopted September 18, 1969; amended June 13, 1974, effective July 1, 1974; July 1, 1974; April 1, 1978; and July 26, 1983

Representative Exchange Rates
for the Deutsche Mark, French Franc, Japanese Yen
and Pound Sterling

Deutsche Mark

The Fund finds, after consultation with the German authorities, that the representative rate for the Deutsche mark under Rule 0-3 (ii) is the middle rate determined officially during the official session of the Frankfurt market. The Deutsche Bundesbank will ascertain this rate each business day. If the exchange rate cannot be ascertained for a date required by Rule 0-4, the exchange rate for that date shall be the rate ascertained for the preceding business day. (Executive Board Decision No. 2962-(70/8)S, adopted February 2, 1970.)

The German authorities indicated that since May 3, 1971, the start of the official session of the Frankfurt exchange market had been changed from 12:45 p.m. to 1:00 p.m. It is the staff understanding that the official middle rate continues to be established in the first quarter hour after the start of the official session. (See "Special Drawing Account - Representative Rates for the Belgian Franc, the French Franc, the Deutsche Mark, the Netherlands Guilder, and the Italian Lira", EBS/71/153, June 8, 1971).

French Franc

The Fund finds, after consultation with the French authorities, that the representative rate, under Rule 0-2 (b)(i), against the U.S. dollar is the interbank rate set at the Paris stock market around 1:30 p.m. under the joint responsibility of the Bank of France and the Chambre Intersyndicale Des Agents De Change. The Bank of France will inform the Fund of any change in the arrangements for determination of the representative rate. (Executive Board Decision No. 7387-(83/65)G/S, adopted April 21, 1983.)

Japanese Yen

The Fund finds, after consultation with the Japanese authorities, that the representative exchange rate for the Japanese yen under Rule 0-3 (ii) against the U.S. dollar is the middle rate on the Tokyo market. The Bank of Japan will ascertain this rate each business day. If the exchange rate cannot be ascertained for a date required by Decision No. 3537-(72/3) G/S, the exchange rate for that date shall be the rate ascertained for the preceding business day. (Executive Board Decision No. 3551-(72/5), adopted January 17, 1972.)

The middle rate on the Tokyo market is the rate at which the largest volume of interbank tradings have taken place during the day to which it pertains. (See "General Account: Representative Rate for the Japanese yen", EBS/72/9, January 17, 1972.)

Pound Sterling

The Fund finds, after consultation with the United Kingdom authorities, that the representative exchange rate for sterling under Rule 0-3(ii) is the middle rate between the spot buying and selling rates for transactions quoted by dealers and brokers at noon in the London market. The Bank of England will ascertain this rate each business day. If the exchange rate cannot be ascertained for a date required by Rule 0-4, the exchange rate for that date shall be the rate ascertained for the preceding business day. (Executive Board Decision No. 2956-(70/8)S, adopted February 2, 1970.)

Table 1. Investments of Borrowed Resources Under Enlarged Access--
Exchange Gains and Losses Resulting from the Receipt by the Fund
of Non-U.S. Dollar Currencies

(In SDR millions)

Date	Japanese Yen			Deutsche Mark			French Francs		
	Amount	Exchange	as	Amount	Exchange	as	Amount	Exchange	as
	Con- verted	Gains or Losses	Percent of (1)		Gains or Losses ^{1/}	Percent of (4)		Gains or Losses ^{1/}	Percent of (7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
12/15/82	37.7	-0.12	-0.31%	37.5	--	--	--	--	--
4/18/83	6.6	0.01	0.10%	39.5	--	--	10.2	0.01	0.10%
4/19/83	23.4	-0.02	-0.09%	143.3	0.04	0.03%	12.6	0.01	0.10%
4/21/83	19.5	0.02	0.09%	85.4	0.03	0.04%	12.5	0.02	0.16%
4/25/83	24.4	-0.02	-0.09%	200.0	-0.02	-0.01%	12.6	--	--
4/27/83	39.0	-0.02	-0.05%	201.5	--	--	12.6	0.02	0.13%
5/04/83	174.5	-0.33	-0.19%	54.5	--	--	12.5	0.01	0.07%
5/06/83	174.5	-0.06	-0.04%	--	--	--	--	--	--
10/31/83	--	--	--	64.0	--	--	--	--	--
1/31/84	49.2	-0.03	-0.06%	20.6	0.01	0.04%	--	--	--
2/29/84	--	--	--	46.8	--	--	--	--	--
6/18/84	26.5	-0.01	-0.05%	80.3	--	--	--	--	--
7/2/84	98.2	-0.02	-0.02%	101.8	0.01	0.01%	--	--	--
3/15/84	70.1	-0.02	-0.03%	78.2	--	--	--	--	--
4/15/85	46.4	-0.04	-0.08%	50.1	--	--	--	--	--
4/30/85	40.5	--	-0.01%	49.5	--	--	--	--	--
	430.5	-0.67	-0.08%	1,253.0	0.08	0.01%	73.0	0.07	0.09%

^{1/} The amounts shown for Deutsche mark and French francs are those that were not converted into dollars because the transaction costs involved were judged to exceed the expected exchange gains or losses arising from the difference between the representative rates for those currencies and London noon exchange rates.