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July 16, 1990

To: Members of the Executive Board

From: The Secretary

Subject: Review of the Method of Valuation of the SDR

Attached for consideration by the Executive Directors is a paper on the review of the SDR valuation basket and SDR interest rate basket, which will be brought to the agenda for discussion on a date to be announced. A summary and conclusions appear on pages 38-42.

Mr. Roncesvalles (ext. 7800) or Mr. Nocera (ext. 7807) is available to answer technical or factual questions relating to this paper prior to the Board discussion.

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INTERNATIONAL MONETARY FUND

Review of the Method of Valuation of the SDR

Prepared by the Treasurer's Department

(In consultation with the Research Department
and the Legal Department)

Approved by David Williams

July 13, 1990

	<u>Contents</u>	<u>Page</u>
I.	Introduction	1
II.	The Characteristics and Working of the SDR Valuation Basket Since 1986	2
III.	Review of the SDR Valuation Basket	4
	1. Criteria to be observed in revising the valuation basket	4
	2. Composition of the list of currencies	5
	3. Relative weights of currencies	7
	4. Supplementary criteria	11
	5. Other possible modifications to data used in calculations	21
IV.	Proposed SDR Basket for 1991-95	23
	1. Rounding of relative weights	23
	2. Currency amounts	24
	3. Transition to new SDR basket	28
V.	SDR Interest Rate	30
	1. Method of setting the combined market interest rate	30
	2. Review of the instruments in the SDR basket	31
	3. Effect of revisions on the SDR interest rate basket	36
VI.	Summary and Conclusions	38

Contents

Page

CHARTS

1. Indexes of Exchange Rates of Five Major Currencies Against the SDR	2a
2. SDR Interest Rate, October 1986 - December 1989	35a

TABLES

1. Exports of Goods and Services, 1980-89	6
2. Official Holdings of Currencies Included in the SDR Valuation Basket	9
3. Basis for Determining the Weights of Currencies in the SDR Valuation Basket	10
4. A. The Currency Composition of Foreign Exchange Market Turnover	13
B. Currency Composition of Foreign Exchange Market Activity in April 1989: Gross Average Daily Turnover	14
5. Relative Shares Based on External Capital Market Data	16
6. Currency Denomination of Trade Invoicing	18
7. Estimated Currency Denomination of World Trade	20
8. Changes in the Exchange Value of the SDR and Actual Shares of Currencies in the SDR Valuation Basket	26
9. Calculation of Illustrative Currency Amounts - Revised SDR Valuation Basket	27
10. Alternative Short-Term Instruments and their Interest Rates, January 1, 1986 - December 31, 1989	35
11. Shifts in Combined Market Interest Rates on SDR- Denominated Assets Based on Hypothetical Revision of the SDR Valuation Basket	37

APPENDICES

I. Valuation of the Special Drawing Right	43
II. The Effective Yield and Risk-Return Characteristics of the SDR	46
III. Short-Term Interest Rates and Money Markets for the Currencies in the SDR Basket	49
IV. SDR Valuation Basket - Guidelines for the Calculation of Currency Amounts	53

I. Introduction

In September 1980, the Executive Board decided (i) to maintain the principle of valuing the SDR as the equivalent of a basket of currencies containing a specified number of units for each currency included in the basket (i.e., the "standard basket" form of valuation); (ii) to reduce the number of currencies in the valuation basket from sixteen to five; and (iii) beginning January 1, 1981, to provide for future quinquennial revisions of the list of currencies and their percentage weights in the valuation basket in accordance with changes in agreed economic variables, unless the Executive Board decided otherwise. The Executive Board also decided in 1980 that the SDR interest rate basket would be identical with the SDR valuation basket.

The first review of the SDR valuation basket under the 1980 Decision was undertaken in 1985, and the present valuation basket took effect on January 1, 1986. ^{1/} The next quinquennial revision of the basket is thus intended to take effect on January 1, 1991. This paper has been prepared to provide the basis for a review by the Executive Board of its 1980 Decision on the valuation of the SDR and the SDR interest rate. The paper does not deal with the principles underlying the present method of valuation, which have been in effect since 1974, nor does it propose any changes in the fundamental features of the 1980 Decision, for example, to substitute other currencies in the present (standard) basket for valuing the SDR. As regards the SDR interest rate basket, it is proposed to change the financial instruments for the French franc and the Japanese yen components.

The paper is organized as follows: Section II reviews the working of the SDR valuation basket since 1986; in Section III the criteria adopted in the 1980 Decision that are to be used in the quinquennial review of the SDR valuation basket are applied, unless the Board decides otherwise; this section also discusses some of the suggestions made at the 1985 review that were proposed for consideration in connection with the 1990 review of the basket; Section IV discusses the rounding of the weights, the determination of the currency amounts in the new basket, and the procedural matters concerning the transition to the new basket; Section V reviews the SDR interest rate basket; and Section VI summarizes the main conclusions of the paper.

^{1/} See "Review of the Valuation of the SDR," SM/85/163 (6/7/85) and EBM/85/102 (7/1/85).

II. The Characteristics and Working of the SDR Valuation Basket Since 1986

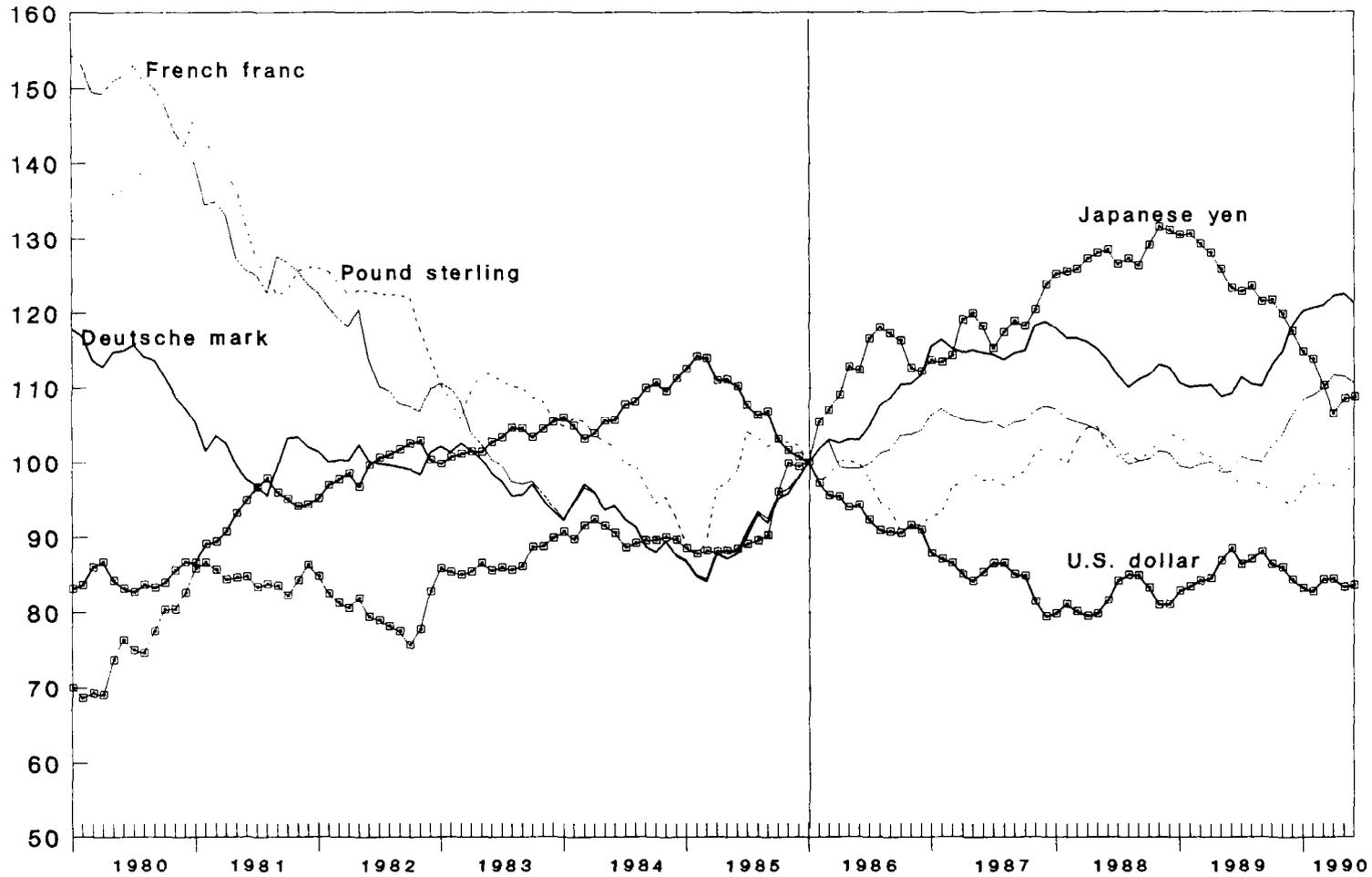
The practical intent of the 1980 Decision as regards the valuation of the SDR and the subsequent review of that decision in 1985 was, inter alia, (i) to keep the composition of the SDR valuation basket stable for a considerable number of years while including the currencies of those members with well-developed foreign exchange markets, and (ii) to improve the attractiveness of the SDR as a reserve asset by increasing its acceptability, both in its official and private forms, through making it easier to cover exchange risks in terms of the SDR and ensure that SDR-denominated claims would be traded at or close to par. ¹/ The SDR has generally worked well in terms of these objectives since 1980.

As noted in the introductory section, the SDR is valued according to the standard basket form of valuation, whereby the exchange rates of the component currencies in the SDR are averaged. This method of valuation tends to assure the stability of the SDR in terms of the major currencies, i.e., the value of the SDR is expected not to change sharply over time in terms of currencies in general. Since the present basket came into effect in January 1986, the overall experience has been one of a cumulative appreciation of the SDR against the U.S. dollar, a depreciation against the Japanese yen, the deutsche mark, and the French franc, and little change on balance in the value of the SDR against the pound sterling (Chart 1). In general, these movements in the valuation of the SDR in terms of the major currencies have been less pronounced than those of the bilateral rates of exchange for these currencies against the U.S. dollar. Furthermore, the change in the value of the SDR in terms of the U.S. dollar has been broadly of the same order of magnitude as the change in the (MERM) effective exchange rate index for the U.S. dollar.

The combined exchange rate performance of the currencies in the SDR basket is an important factor in determining the effective yield of the SDR, i.e., the rate of interest on the SDR adjusted for any change in its exchange rate. More importantly, the relative stability of the exchange rate for the SDR results in a relative performance of the SDR as a reserve asset, measured in terms of effective yield per unit of risk (or the yield divided by its standard deviation), which is generally superior to those of reserve assets in any individual currency (see Appendix II).

¹/ The 1980 Decision was taken in the context of discussions at the time concerning the establishment of a Substitution Account in which large-scale conversion from U.S. dollar-denominated assets to SDR-denominated assets was envisaged (see "Substitution Account - Choice of Number of Currencies on the SDR Valuation and Interest Rate Baskets and Timing of Change," SM/80/60 (3/13/80) and EBM/80/54 (3/26/80)).

CHART 1
INDEXES OF EXCHANGE RATES OF
FIVE MAJOR CURRENCIES AGAINST THE SDR
JAN 1980 - JUN 1990
(JAN 1986 = 100)





The simplification of the method of valuing the SDR (standard) basket that was adopted in 1980 was intended to help improve the attractiveness of both the SDR and officially-created SDR-denominated claims as reserve assets, so as to increase their acceptability by Fund members and prescribed holders, and thereby enhance the role of the SDR in the international monetary system. Though SDRs or SDR-denominated assets, in the form of reserve positions in the Fund, form a relatively small part of members' official reserve assets, the valuation of the SDR can directly affect the attitudes of members as regards the usability and acceptability of such assets in day-to-day transactions. The stock of SDRs in circulation has remained at SDR 21.4 billion through most of the 1980s, while the stock of officially-created SDR-denominated assets, i.e., the total of reserve positions in the Fund (reserve tranche positions and loan claims on the Fund), had risen from SDR 16.8 billion at the end of 1980 to SDR 41.6 billion in 1984, before subsequently declining to SDR 25 billion at the end of June 1990. ^{1/} However, the relatively large-scale volume of transactions in the SDR Department, almost all of which are voluntary transactions between participants, as well as the large volume of transactions in the General Resources Account, all of which are SDR denominated and are effected against currencies using the exchange rates for the SDR as determined daily by the Fund on the basis of the SDR valuation basket, are effected smoothly and promptly. This experience would suggest that the present method of valuing the SDR has continued to function in a manner that is both acceptable and convenient to members in their SDR or SDR-denominated transactions with the Fund and, in so far as the SDR Department is concerned, among members and other prescribed holders.

The 1980 Decision was also aimed at facilitating public understanding of the SDR and thereby increasing its general usability. A number of institutions and agencies, especially in the international official sector, have adopted the SDR as their unit of account and others are contemplating doing so. A market in SDR-denominated assets also emerged in the late 1970s, and in this market, the SDR valuation basket was used to set exchange and interest rates for such assets. The reduction in the number of currencies in the SDR basket in 1980 and the defined periodic reviews of the valuation of the SDR on the basis of agreed criteria not only increased the understanding in the financial world of the SDR system of valuation but also increased its acceptability by private market participants and diminished uncertainty as regards both the system itself, and the frequency of reviews of the

^{1/} Altogether, including SDRs, the stock of official SDR-denominated reserve assets has amounted to as much as 18 percent of total foreign exchange reserves in 1984, though the stock of SDR-denominated assets is at present equivalent to about 8 percent of total foreign exchange reserves in June 1990.

method of valuation. ^{1/} However, the private market in SDR-denominated assets has sharply diminished in scale over the last few years. Outstanding SDR-denominated bonds and notes issued in the 1970s have all been redeemed by May 1989, and outstanding balances of SDR-denominated syndicated loans have reportedly been also fully repaid. The adoption of the five-currency basket initially enhanced the growth of SDR-denominated bank deposits, including certificates of deposit, but since 1982, there has been only a marginal amount of interbank activity in this type of asset. These recent developments in the private SDR market do not, however, appear to have been related to the features of the method of valuation of the SDR, and indeed, quite the contrary, seem to reflect other factors, such as the general appreciation of the U.S. dollar in the mid-1980s, and competition from the officially promoted ECU market in the latter part of the 1980s.

In the light of the above, the staff considers that on balance the standard basket method of valuation of the SDR has continued to work well, and that there would not seem to be any operational reasons to suggest any fundamental changes in the present method of valuing the SDR.

III. Review of the SDR Valuation Basket

This section (i) outlines the specific criteria agreed in 1980 to be followed with regard to future revisions of the method of valuing the SDR, unless the Executive Board decides otherwise; (ii) describes the criteria to be considered in determining the composition and the relative weights of the currencies to be included in the basket; and (iii) discusses the results of applying the economic criteria provided by the 1980 Decision in determining the revised SDR valuation basket to take effect at the beginning of 1991. This section also reviews some suggestions made by Executive Directors at the time of the 1985 discussion for consideration during the present review of the valuation basket.

1. Criteria to be observed in revising the valuation basket

Under the 1980 Decision, which is reproduced in Appendix I, the criteria to be followed for future five-yearly revisions of the SDR valuation basket, unless the Board should decide otherwise, may be summarized as follows:

^{1/} It will be recalled that following the establishment of the standard basket form of valuation for the SDR in 1974, the method of valuation was reviewed in 1976 (with no changes proposed) and, with major changes in the method of valuing the SDR in 1978 and again in 1980, at which time a five-year period for reviewing the method of valuing the SDR was agreed by the Executive Board.

a. The composition of the list of currencies in the valuation basket shall be the currencies of the five member countries of the Fund with the largest exports of goods and services in terms of value, during the five-year period ending 12 months prior to the effective date of the revision;

b. A new currency shall not replace an existing currency in the valuation basket unless the value of exports of goods and services of the issuer of the former currency exceeds that of the issuer of the latter currency by at least one percentage point for the relevant five-year period;

c. Revisions of the percentage weights for the five currencies that are included in the valuation basket shall reflect the values of the exports of goods and services and also the balances of the currencies of the five countries whose currencies comprise the basket that are held by the monetary authorities of other members during the relevant five-year review period. The percentages calculated in this manner are to be rounded to the nearest percentage point, unless decided otherwise by a 70 percent majority of the total voting power of the Executive Board;

d. The amounts of each of the five currencies in the valuation basket shall be determined on the last working day preceding the effective date of the new decision such that, at the average exchange rates for the three-month period ending on that date, the values of the amounts of the currencies in relation to the value of the SDR will equal the new percentage weights for these currencies;

e. The calculation of the new currency amounts will be made in such a manner that on the last business day preceding the effective date of the new basket, the value of the SDR will be the same under the methods of valuation in effect before and after that date.

2. Composition of the list of currencies

The 1980 Decision provides for a replacement of a currency in the SDR basket by another currency if the value of the exports of goods and services of the issuer of the latter currency exceeds that of the issuer of the former currency by at least one percent. Information on *members' exports of goods and services* is presented in Table 1. On the basis of these data, the five largest exporters of goods and services in terms of value during the period 1985-89, inclusive, continue to be the same member countries issuing the currencies which currently compose the SDR valuation basket, and thus the list of currencies in the SDR basket shall remain unchanged according to the selection criteria contained in the 1980 Decision, unless the Executive Board decides otherwise. The exports of goods and services of the fifth largest exporter (France) in 1985-89 are almost 38 percent larger than

Table 1. Exports of Goods and Services, 1980-89 ^{1/}

	1980-84			1985-89			
	Average in billions of SDRs	Percent shares in world exports of goods and services Share	Cumulative share	Average in billions of SDRs	Percent shares of world exports of goods and services Share	Cumulative share	
I. <u>Nine largest members</u>							
United States	312.9	14.7		United States	365.1	13.5	
Germany	193.5	9.1		Germany	269.2	9.9	
Japan	164.3	7.7		Japan	242.4	9.0	
France	138.9	6.5		United Kingdom	165.8	6.1	
United Kingdom	132.7	6.2	44.2	France	162.0	6.0	44.5
Italy	86.9	4.1	48.3	Italy	117.5	4.3	48.8
Saudi Arabia	78.5	3.7	52.0	Canada	97.4	3.6	52.4
Netherlands	78.5	3.7	55.7	Netherlands	91.4	3.4	55.8
Canada	76.3	3.6	59.3	Belgium-Luxembourg ^{2/}	80.5	3.0	58.8
World total	2,120.4				2,706.5		
II. Five countries whose currencies are included in the SDR valuation basket							
		1980-84 average		1985-89 average			
		<u>Relative share, in percent</u>		<u>Relative share, in percent</u>			
United States		33.2		30.3			
Germany		20.5		22.3			
Japan		17.4		20.1			
France		14.7		13.4			
United Kingdom		14.1		13.8			
Memo:							
Share of five countries in world total		44.2		44.5			

Source: IMF Economic Information System (EIS), World Economic Outlook (WEO), and staff estimates.

^{1/} Data for goods and services for the period 1985-1989 include interest on international banking on a net basis, which is consistent with the practice followed in adjusting data to exclude entrepôt trade transactions and in making calculations under the Ninth General Review of Quotas (see EB/CQuota/87/1, 6/5/1987). In the 1985 review of the SDR valuation basket, interest on international banking was included for the United Kingdom on a net basis, and, because of lack of data, on a gross basis for other countries. The international banking interest component of the exports of goods and services for those other countries was small.

^{2/} Exports of goods and services of the monetary union including staff estimates of international bank interest (net) based on the official data of the individual countries.

those of the sixth largest exporter (Italy). This historically substantial gap, between the fifth and sixth ranking countries, continues to reflect a natural break in the ranking of countries after the five largest exporting countries, and it would also appear that the list of five currencies contained in the SDR basket is likely to remain stable over the medium term.

As regards the overall representativeness in world trade of the five currencies in the SDR basket, it may be noted that the total share in world exports of goods and services of the five largest exporting countries has increased slightly to nearly 45 percent in this review period, from 44 percent in the 1980-84 period, partially reversing the decline from 48 percent in the 1975-79 period. The relative importance in the total of world exports of goods and services of the five countries whose currencies are included in the present SDR basket has been broadly maintained during the past five years, which is an indication of the extent to which they may be judged to be representative of global current account transactions.

3. Relative weights of currencies

Since 1980, the weights for the currencies to be included in the SDR valuation basket are based on two economic variables: (i) the average annual value of exports of goods and services of the issuer of the currency over the five-year period ending one year before the effective date of the new valuation basket and (ii) the average value of the amount of each currency included in the basket that is held by the monetary authorities of other members at the end of each year in the relevant review period. In past reviews, Directors have concluded that the use of trade shares and reserve holdings has generally provided a reasonably broad economic base for determining the weights for the individual currencies in the basket, and which has resulted in a method of valuation whereby no one currency could unduly influence the exchange rate for the SDR. ^{1/} It was also agreed in 1980 and again in 1985 that supplementary information would be collected on the use of currencies to be included in the basket both as a unit of account, e.g., for the denomination of external debts, including commercial bank foreign liabilities, and as a means of payment for international

^{1/} The use of financial data has also been regarded as appropriate because the use of exports of goods and services alone for determining the relative importance of the major currencies was thought to underestimate the role of the U.S. dollar in relation to other currencies and its relative importance in the international monetary system. Their use also avoided the necessity of setting the weight of the U.S. dollar in the valuation basket on an ad hoc basis, as had been done in 1974 and 1978 when its weight had been set at 33 percent, or about 50 percent higher than the relative share of the United States in members' exports of goods and services.

transactions arising from exports of goods and services. Data on these supplementary criteria are discussed further below.

Table 2 provides data on the value of members' official holdings of the five currencies included in the SDR valuation basket. As can be seen in the table, the U.S. dollar has continued to be the dominant currency in the foreign exchange holdings of member countries. However, the relative importance of the dollar in total holdings of the five currencies has declined during the past three reviews from 84 percent in the 1975-79 period to 76 percent in the 1980-84 period, and to about 70 percent in the 1985-89 period. The changes in the relative importance of these currencies in members' reserves to some extent reflect the changing pattern of official intervention in the foreign exchange markets, which partly accounts for the sharp increase in foreign holdings of deutsche mark and, in particular, of the Japanese yen. Furthermore, these five currencies continue to comprise the bulk of the non-gold official external holdings of members, accounting for 89 percent of total foreign exchange holdings in the present review period, compared with 86 percent during the 1980-84 period. The total value of these five currencies held by members rose by 37.3 percent over the 1985-89 period, compared with the 27.8 percent growth in exports of goods and services over the same period of the countries issuing the five currencies.

The data on average exports of goods and services for the individual countries and average official holdings of their currencies in the foreign exchange reserves of other members for the 1985-89 review period have been combined to obtain the weights for each of the currencies in the revised valuation basket (Table 3). For ease of comparison, the table also presents the calculations that were made for the 1985 review. 1/

The relative weights calculated using the two economic criteria indicate a decline in the share of the U.S. dollar from 42.0 percent in 1985 to 39.11 percent using the data for the five-year period through 1989. Of the other currencies, the relative share of the deutsche mark increases from 19.24 percent to 21.39 percent, while that of the Japanese yen also increases from 14.93 percent to 17.23 percent. The relative shares of the pound sterling and the French franc both declined, from 11.80 percent to 11.47 percent for the former, and from 12.02 percent to 10.81 percent for the latter.

It may be noted that the relative significance of exports of goods and services in 1985-89 and of reserve currency holdings stood at

1/ Consistent with past practice, the data are expressed in SDRs. The use of another currency to express the data would not affect the calculated weights, which are expressed in terms of relative shares, because consistent market exchange rates are used in the conversion.

Table 2. Official Holdings of Currencies Included
in the SDR Valuation Basket

	Average 1980-84	End of year					Average 1985-89	Average 1985-89 with ECUs treated Separately
		1985	1986	1987	1988	1989		
(In billions of SDRs)								
U.S. dollar <u>1/</u>	185.0	192.6	196.9	241.3	260.7	270.7	232.4	215.0 <u>2/</u>
Deutsche mark	34.5	42.1	41.0	55.4	65.5	89.6	58.7	58.7
Japanese yen	12.6	23.0	22.2	28.3	31.6	37.1	28.4	28.4
Pound sterling	7.1	9.0	7.7	9.2	11.6	12.6	10.0	10.0
French franc	3.5	3.0	2.6	3.1	4.4	5.6	3.7	3.7
Total five currencies	242.7	269.7	270.4	337.3	373.8	415.6	333.2	315.8
All identified currencies <u>3/</u>	281.7	306.7	306.9	382.6	416.3	457.9	374.1	374.1
(Percentage share in five-currency total)								
U.S. dollar	76.2	71.4	72.8	71.5	69.7	65.1	69.8	68.1
Deutsche mark	14.2	15.6	15.2	16.4	17.5	21.6	17.6	18.6
Japanese yen	5.2	8.5	8.2	8.4	8.5	8.9	8.5	9.0
Pound sterling	2.9	3.3	2.8	2.7	3.1	3.0	3.0	3.2
French franc	1.4	1.1	1.0	0.9	1.2	1.3	1.1	1.3

1/ European Currency Units (ECUs) held by EMS countries that correspond to their U.S. dollar deposits in the European Monetary Cooperation Fund (EMCF) are treated as official holdings of U.S. dollars, except in the last column.

2/ Data exclude the ECUs corresponding to U.S. dollar deposits in the EMCF.

3/ Including total ECUs issued against U.S. dollars and gold, Swiss francs, and Netherlands guilders.

Table 3. Basis for Determining the Weights of Currencies
in the SDR Valuation Basket

Currency	Issuing countries' exports of goods and services (1) (In billions of SDRs)	Official holdings of currency 1/ (2)	Total of cols. (1) and (2) (3)	Weights as percentage of totals in col. (3) (4)	Rounded percentage weight 2/ (5)	Percentage weight as decided by Board (6)
I. Latest data for <u>1985-89</u>						
						<u>Proposed</u>
U.S. dollar	367.2	232.4	599.6	39.11	39	40 ^{3/}
Deutsche mark	269.2	58.7	327.9	21.39	21	21
Japanese yen	235.6	28.5	264.1	17.23	17	17
Pound sterling	165.8	10.0	175.8	11.47	11	11
French franc	<u>162.0</u>	<u>3.7</u>	<u>165.7</u>	<u>10.81</u>	<u>11</u>	<u>11</u>
Total	1,199.8	333.4	1,533.2	100.00	99	100
Relative weight, in percent	78.3	21.7	100.0			
II. <u>1980-84 data</u>						
U.S. dollar	312.9	185.0	497.9	42.01	42	42
Deutsche mark	193.5	34.5	228.0	19.24	19	19
Japanese yen	164.3	12.6	176.9	14.93	15	15
Pound sterling	132.7	7.1	139.8	11.80	12	12
French franc	<u>138.9</u>	<u>3.5</u>	<u>142.4</u>	<u>12.02</u>	<u>12</u>	<u>12</u>
Total	942.4	242.7	1,185.1	100.00	100	100
Relative weight, in percent	79.5	20.5	100.0			

1/ Average of year-end figures.

2/ To nearest percentage point.

3/ The weight for the U.S. dollar has been rounded so that the weights sum to 100. The impact of this rounding up, relative to the unrounded weight, is the smallest for the U.S. dollar.

78 percent and 22 percent, respectively, of the total value of the two variables, which was little changed from the amounts calculated using data for the 1980-84 period of 80 percent for exports and 20 percent for reserve holdings, and were almost the same proportions as in the 1976-80 period. ^{1/} The broad stability of the relative importance of the two factors is an important consideration as regards the implementation of the 1980 Decision, which stipulates that the calculation should be such as "would maintain broadly the relative significance of the factors that underlie the percentage weights of the two factors." As can be seen, the broad stability of the relationship of the two factors has been generally maintained for the most recent period of the calculation.

The procedure of adding the totals of the two variables effectively assigns the same (unit) coefficients for the values of annual exports of goods and services and for currency reserves for the purpose of the calculation of the weights, and the small change in the relative significance of the two factors since 1980 would suggest, as noted in the preceding paragraph, that there is no compelling need to make any statistical adjustment to maintain the relative contribution of the two factors at their 1980-84 levels. Indeed, any such changes would introduce only relatively small changes in the unrounded weights shown in Part I, Col. 4 of Table 3. However, suggestions were made in 1985 as regards the possible need to increase the relative importance of the financial factor in these calculations in the light of the relative importance of supplementary financial criteria, which are discussed below. It is concluded below that taking into account the successful working of the 1980 Decision, and that the comparative stability of the relationship between the two factors of exports and reserve holdings, as provided in the 1980 Decision, are reasonably consistent with the relative roles of the major currencies in the SDR valuation basket, there would not seem to be a need, on the basis of available supplementary financial data, to adjust the relative significance of the two factors used for determining the composition of the SDR basket.

4. Supplementary criteria

The Executive Board in concluding its 1985 review of the valuation basket was of the view that the valuation method established in 1980 had worked relatively well, and that it was highly desirable to maintain a stable method of valuing the SDR, in order to maintain continuity and certainty in the value of the SDR. However, a number of Directors suggested at the time that other variables, in addition to exports and reserve holdings stipulated in the 1980 Decision, might

^{1/} For the basket agreed in 1980, the relative significance of exports of goods and services amounted to 77 percent, and that of reserve holdings to 23 percent.

also be considered in determining the relative weights of the component currencies in the SDR basket. In this connection, it was noted that the aggregate flow of annual exports is roughly four times the stock of reserve holdings, and assigning the same coefficient to exports and to reserve holdings implicitly gives a weight to exports of goods and services that is about four times larger than that given to the use of currencies to denominate official reserves, and this distribution of the two factors tended to result in a relatively small weight for the financial factor. Consequently, Directors agreed that the relative importance of supplementary financial indicators should be reviewed in considering the weight to be given to the financial sector relative to the aggregate flow of exports of goods and services. Among the measures of relative financial importance of individual currencies that were considered in 1985, but were not at that time taken into account in determining the weights for the currencies in the basket, were the turnover of currencies in the leading foreign exchange markets, the role of individual currencies in international capital markets, and the relative importance of currencies in the invoicing of international trade. The relative importance of the individual currencies in the light of these supplementary criteria is discussed below.

a. Turnover in foreign exchange markets

Recent data on the turnover by currency (summarized in Table 4A) available from surveys conducted by the Federal Reserve Bank of New York, the Bank of England, and the Bank of Japan of the foreign exchange markets in New York, London, and Tokyo, respectively, indicate that almost all transactions taking place in these markets are between the U.S. dollar and another currency. A more comprehensive survey ^{1/} covering 21 countries indicates that the U.S. dollar is involved in about 90 percent of total foreign exchange turnover (Table 4B). For example, only 3 percent and 9 percent of trades reported by banks in London in 1986 and 1989, respectively, were direct or "cross" currency trades primarily between the deutsche mark and the pound sterling, i.e., trades not involving the U.S. dollar, though the growth in such trading in recent years has been significant.

As the total value of the turnover (except for cross currency activity) equals that of the U.S. dollar, the relative importance of the individual currencies other than the dollar is necessarily one half of the shares reported in Table 4A on the basis of surveys conducted in the exchange markets in New York, London, and Tokyo. These surveys indicate that in recent years, the share for the Japanese yen has increased markedly, rising in the New York market from about 5 percent in 1980 to about 11 percent in the mid-1980s and to about 12 1/2 percent in 1989, while the share for the deutsche mark in the same

^{1/} See "Survey of Foreign Exchange Market Activity," BIS, Basle, February 1990.

Table 4A. The Currency Composition of Foreign Exchange Market Turnover

(In percent)

	New York 1/				London 2/		Tokyo 3/	
	March 1980	April 1983	March 1986	April 1989	March 1986	April 1989	March 1986	April 1989
Deutsche mark	31.8	32.5	34.2	32.9	28.0	22.0	10.4	9.7
French franc	6.9	4.4	3.6	3.2	4.0	4.0	0.3	0.2
Japanese yen	10.2	22.0	23.0	25.2	14.0	15.0	77.0	72.1
Pound sterling	22.7	16.6	18.6	14.6	30.0	27.0	3.4	4.3
Canadian dollar	12.2	7.5	5.2	4.0	2.0	2.0		
Swiss franc	10.1	12.2	9.7	11.8	9.0	10.0	5.6	
Netherlands guilder	1.9	1.6	1.4					
Italian lira	0.9	9.8			2.0			
Belgian franc	1.0	0.4						
ECU					1.0	2.0		
Other currencies	2.3	2.0	4.4	8.3	7.0	7.0	3.3	12.2
Gross currency 4/					3.0	9.0		1.5

1/ From "Summary of Results of U.S. Foreign Exchange Market Turnover Survey" conducted in March 1980, April 1983, March 1986, and April 1989 by the Federal Reserve of New York.

2/ From "The Market in Foreign Exchange in London," Bank of England Quarterly Bulletin, September 1986 and November 1989.

3/ From data supplied by the Bank of Japan.

4/ Transactions not involving the U.S. dollar.

Table 4B. Currency Composition of Foreign Exchange Market Activity in April 1989:
Gross Average Daily Turnover

(In billions of U.S. dollars)

	Gross turnover in all currencies	Total identified business in: 1/					
		U.S. dollars	DM	Yen	Pounds sterling	ECUs	Other
United Kingdom	241	216	70	42	74	4.0	77
United States	174	167	58	48	25	0.5	49
Japan	145	138	14	116	5.4	..	17
Switzerland	68	51	22	5.3	5.2	0.5	52
Singapore	63	60	18	18	11	..	20
Hong Kong	60	56	(12)	15	7.7	0.1	29
Australia	37	36	5.6	3.7	3.1	..	26
France	32	23	14	1.7	0.6	0.7	24
Canada	18	17	2.0	1.1	0.9	..	15
Netherlands	16	11	6.3	0.4	0.5	0.2	14
Denmark	15	(12)	4.7	0.3	0.4	0.1	12
Sweden	14	14	3.3	0.5	0.2	..	10
Belgium	12	(9.8)	5.0	(0.3)	9.0
Italy	11	5.9	2.6	0.1	0.4	1.0	12
Spain	5.9	(4.2)	2.1	..	0.1	..	5.4
Ireland	5.5	3.3	3.1	0.1	2.5	1.1	0.9
Norway	5.4	5.1	1.6	0.2	0.3	0.0	3.6
Finland	4.6	4.3	1.0	0.2	0.3	..	3.4
Bahrain	3.2	3.1	1.3	0.5	0.4	..	1.1
Portugal	1.1	0.8	0.5	0.0	0.1	0.0	0.8
Greece	<u>0.7</u>	<u>0.5</u>	<u>0.3</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.4</u>
Total	932	838	247	253	138	8	382
(Percentage share) 2/	(200)	(90)	(27)	(27)	(15)	(1)	(40)

Source: Reproduced from "Survey of Foreign Exchange Market Activity," BIS, Basle, February 1990.

Note: Figures in parentheses are rough estimates.

1/ Both currencies in individual transactions included.

2/ The total of gross turnover in all currencies has been divided by two in order to reflect the actual value of the transaction. Accordingly, the relative shares of identified transactions in individual currencies adds up to twice the total turnover.

market has remained relatively stable at about 16 percent throughout the 1980s. If the data from the New York and London market surveys were combined, the share for the Japanese yen appears to have increased from 9 percent in 1986 to 10 percent in 1989, with the aggregate share for the other three nondollar currencies in the SDR declining over the same period, of which the share of the deutsche mark would appear to have fallen from about 16 percent to around 14 percent. ^{1/} As noted above, the increased role of the Japanese yen may have reflected the generally persistent, and sometimes large-scale, official intervention involving this currency.

These results help confirm the increase in the relative importance of the Japanese yen indicated by the data on Japan's share in exports of goods and services, and the share of the Japanese yen in reserve holdings. While the survey data on foreign exchange market turnover in London, New York, and Tokyo indicate a slight fall in the relative shares of the deutsche mark, French franc, and the pound sterling in the total turnover in the exchange markets over the 1986-89 period, these data give only limited indications of the relative importance of currencies other than the dollar because of the lack of recent data on foreign exchange turnover in Frankfurt, the partial nature of the Tokyo market survey, and the difficulties in separating out official and private market, especially trade-related, transactions. However, despite these limitations, the compilation made by the BIS in April 1989 suggests that overall the relative share of the deutsche mark may be about the same as that of the Japanese yen, if not larger (see Table 4B). These data also indicate that the pound sterling accounts for about 7 1/2 percent of foreign exchange trading in 21 markets worldwide.

b. Importance in international capital markets

Table 5 presents data that indicate the relative importance of particular currencies in international capital markets in terms of the currency denomination of: (1) external bank loans, (2) external bond issues, and (3) eurocurrency deposits. As can be seen from the table, the U.S. dollar remains the dominant currency of denomination by a considerable margin, accounting for 66 percent of external bank loans, 47 percent of external bond issues, and 62 percent of eurocurrency deposits on average over the 1985-89 period. However, the share of the U.S. dollar relative to that of other currencies for denominating bank loans and bond issues has declined markedly in recent years. The Japanese yen has recorded noteworthy increases in usage in capital

^{1/} As the 1989 survey of the Tokyo foreign exchange market only detailed the currency composition in two categories--the U.S. dollar and the rest of the currencies, it is not possible to include the Tokyo market in this aggregation.

Table 5. Relative Shares Based on External Capital Market Data

(In percent)

	1981-84 <u>1/</u> average	1985	1986	1987	1988	1989 <u>2/</u>	1985-89 average
I. Shares of currencies in <u>external bank loans 3/</u>							
U.S. dollar	83.3	62.5	67.0	65.1	69.9	83.4	69.6
Pound sterling	3.1	3.4	6.4	14.7	14.1	2.6	8.2
Japanese yen	5.9	18.5	16.1	10.8	5.6	5.9	11.4
ECU	1.3	7.1	2.2	2.4	2.8	4.9	3.9
Deutsche mark	1.7	2.1	3.0	2.4	2.2	1.0	2.1
Swiss franc	1.2	3.0	2.1	0.7	0.3	0.4	1.3
Other	<u>3.5</u>	<u>3.4</u>	<u>3.2</u>	<u>3.9</u>	<u>5.1</u>	<u>1.8</u>	<u>3.5</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
II. Currency denomination of <u>external bond issues 4/</u>							
U.S. dollar	63.2	54.0	53.9	38.8	41.2	54.7	48.5
Swiss franc	14.7	11.3	10.7	12.9	11.1	7.4	10.7
Deutsche mark	6.3	8.5	8.0	8.0	10.1	5.9	8.1
Pound sterling	3.4	4.0	4.6	7.8	9.4	7.2	6.6
Japanese yen	5.7	9.1	10.4	13.7	8.4	6.3	9.6
Canadian dollar	1.6	1.6	2.3	3.4	5.7	4.1	3.4
ECU	1.7	5.2	3.4	4.0	4.9	5.1	4.5
Australian dollar	--	1.6	1.5	4.9	3.4	2.5	2.8
French franc	--	1.1	1.7	1.3	1.3	2.2	1.5
Dutch guilder	1.8	1.3	1.3	1.1	1.2	1.0	1.2
Other	<u>1.6</u>	<u>2.3</u>	<u>2.2</u>	<u>4.1</u>	<u>3.3</u>	<u>3.6</u>	<u>3.1</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
III. Currency denomination of <u>eurocurrency deposits</u>							
U.S. dollar	74.0	67.9	63.5	58.2	60.1	59.7	61.9
Deutsche mark	11.4	11.4	12.8	14.2	13.3	13.9	13.1
Swiss franc	5.8	6.4	7.2	7.7	5.4	4.9	6.3
Japanese yen	1.8	3.4	4.5	5.8	5.5	5.5	4.9
Pound sterling	1.4	2.0	2.1	2.8	3.4	3.1	2.7
French franc	0.9	1.2	1.2	1.4	1.3	1.3	1.3
ECU	0.5 <u>5/</u>	2.6	2.6	2.8	3.0	3.2	2.8
Other <u>6/</u>	<u>4.3</u>	<u>5.0</u>	<u>6.0</u>	<u>7.0</u>	<u>7.9</u>	<u>8.4</u>	<u>6.9</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Financial Market Trends, OECD, No. 30. No. 42, International Banking and Financial Market Developments, BIS, various issues.

1/ The average of 1981-84 data are used since the 1980 data are not consistent with the 1981-84 data.

2/ Through August for bank loans and bond issues; through September for deposits.

3/ Foreign and international bank loans, excluding loan renegotiations.

4/ Includes international issues, foreign issues, and special placements.

5/ Included in other category prior to 1983.

6/ Includes foreign currency position of banks in the United States for which no currency breakdown is available.

markets, especially in its use as the currency of denomination of external loans and bond issues, reflecting mainly the process of internationalization of the yen and the progressive liberalization of the Japanese financial system that has occurred since the early 1980s. 1/

An interesting feature of the data in Table 6 is the relative importance of the Swiss franc in international capital markets and the rapid growth in importance of the ECU in such markets. The Swiss franc ranks second in the denomination of external bond issues, significantly above the deutsche mark. The Swiss franc ranks third for eurocurrency deposits, below the deutsche mark but above the Japanese yen. The importance of the Swiss franc appears therefore to be much greater in international capital markets than is indicated, for example, by the size of Switzerland's exports of goods and services, which ranks approximately tenth on the basis of 1985-89 data. As regards the relative importance of the ECU, this appears to have grown sharply in the second half of the 1980s to approximate the relative shares of the major nondollar currencies in their usage in international capital markets.

c. Invoicing of international trade

Another potentially useful indicator of the relative importance of currencies in international trade and payments is their use as a means of denominating the prices of commodities or services or the invoicing of international trade. As was the case for the 1985 review, consistent and up-to-date data concerning the currency denomination of trade invoicing are difficult to assemble, and the data are incomplete and, in many cases, out of date. The available data can, however, give some idea of trends in the use of currencies in denominating international trade and payments. For the currencies included in the SDR basket, the available data are presented in Table 6 from which only broad and tentative indications of relative importance might be drawn. In general, more than half of each country's exports and imports are denominated in its own currency, with the exception of Japan where about two thirds of exports and 85 percent of imports are denominated in U.S. dollars and the remainder in Japanese yen, and the United Kingdom and France where about 40 percent of imports are denominated in the respective domestic currency. Overall, the U.S. dollar plays a dominant role in the currency denomination of the invoicing of international trade of most of the five countries, though its relative share has declined somewhat since the last review in 1985. In the United Kingdom, invoicing of exports in the pound sterling declined slightly during the 1980s.

1/ For a discussion of the role of the Japanese yen, see Y. Ozeki and G. Tavlas, "Internationalization of the Japanese Yen" (forthcoming in the WP series).

Table 6. Currency Denomination of Trade Invoicing

(In percent)

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
United States										
Exports ^{1/}										
Imports ^{2/}										
U.S. dollar			84.7			80.4				82.7
Non-U.S. dollar			15.3			19.6				17.3
Germany										
Exports										
Deutsche mark	82.5	82.2	83.2	82.6	79.4	79.5	81.5	81.5		
U.S. dollar	7.2	7.8	6.7	7.0	9.7	9.5	7.7	7.4		
Japanese yen					0.3	0.4	0.4	0.5		
Pound sterling	1.4	1.3	1.3	1.5	1.7	1.8	1.7	1.8		
French franc	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.5		
Other	6.1	5.9	6.0	6.1	6.1	6.1	6.0	6.3		
Imports										
Deutsche mark	43.0	43.0	44.6	46.1	47.0	47.8	51.7	52.4	52.6	
U.S. dollar	32.3	32.3	31.3	28.8	29.2	28.1	23.1	22.0	21.6	
Japanese yen						1.8	2.6	2.5	2.5	
Pound sterling	3.4	3.7	2.5	2.7	2.4	3.0	2.3	2.6	2.4	
French franc	3.3	3.0	3.4	3.5	3.6	3.8	4.1	3.9	3.6	
Other	18.0	18.0	18.2	18.9	17.8	15.5	16.2	16.6	17.3	
Japan										
Exports										
Japanese yen	29.4		32.2	34.5	33.7	35.9	35.3	33.4		
Non-Japanese yen ^{3/}	70.6		67.8	65.5	66.3	64.1	64.7	66.6		
Imports										
Japanese yen	2.4					7.3	9.7	10.6	13.3	
Non-Japanese yen ^{3/}	97.6					92.7	90.3	89.4	86.7	
United Kingdom										
Exports										
Pound sterling	76.0	74.0	65.0	65.0	63.0	59.0	54.0	57.0		
U.S. dollar	14.0	12.0	22.0	21.0	22.0	28.0	29.0	26.0		
Other	10.0	14.0	14.0	15.0	15.0	13.0	17.0	16.0		
Imports										
Pound sterling	32.0	35.0	34.0	35.0	34.0	37.0	37.0	40.0		
U.S. dollar	36.0	36.0	32.0	28.0	34.0	32.0	24.0	24.0		
Other	32.0	31.0	33.0	37.0	32.0	32.0	39.0	36.0		
France										
Exports										
French franc	64.0	63.9	65.3	65.0	62.4	61.5	62.9	61.6	58.5	
U.S. dollar	13.4	15.9	13.8	13.3	15.5	15.4	11.7	11.8	12.0	
Deutsche mark	8.8	8.1	8.0	8.9	9.3	9.2	10.3	10.2	9.9	
Other	13.8	12.1	12.9	12.8	12.8	13.9	15.1	16.4	19.6	
Imports										
French franc	33.9	35.5	36.6	38.6	39.3	40.9	46.5	46.5	48.9	
U.S. dollar	32.2	35.5	34.1	31.3	31.6	29.2	19.3	18.7	16.4	
Deutsche mark	13.3	12.3	12.4	11.9	11.5	12.4	14.9	15.3	14.3	
Other	20.6	16.7	16.9	18.2	17.6	17.5	19.3	19.5	20.4	

Source: Data supplied by national authorities.

^{1/} U.S. exports are almost completely denominated in dollars.

^{2/} Excludes petroleum imports.

^{3/} Mostly denominated in U.S. dollars.

Table 7 presents the volume of global trade invoiced in each of the five currencies, and which takes into account the use of each currency in a country's own external trade and in the trade of other countries. 1/ As can be seen from the table, the dollar may be judged to have remained the dominant currency for invoicing world trade during the second half of the 1980s, and its relative importance has declined relatively little from 1985 to 1988, particularly as regards the invoicing of imports. The deutsche mark would appear to be the only currency of the five in the SDR basket whose relative importance in invoicing international trade has increased since 1985, while the relative importance of other currencies seem to have been little changed in recent years. It may also be noted that the estimation technique used to derive the data in Table 7 understates the relative importance of the U.S. dollar in the invoicing of world trade as the underlying data exclude petroleum trade which is invoiced primarily in dollars. These data do not, of course, necessarily indicate the distribution of the use of particular currencies in the settlement of payments, though it may be presumed that the distribution of the use of currencies in invoicing would be broadly reflected in the settlement of payments.

d. Overall importance of supplementary criteria

The data on supplementary financial criteria are fragmentary and incomplete, and only broad indications of the relative importance of individual currencies may be drawn from these data. However, as on the occasion of the 1985 review, the predominant role of the U.S. dollar in the international financial system is apparent in each of the categories analyzed. Consequently, if the relative weight of the U.S. dollar were to reflect these supplementary criteria in combination with the two criteria specified in the 1980 Decision, it would increase, other things remaining equal, and the combined weights for some or all of the other currencies would be lower than indicated in Table 3. However, the information presented above does not give a precise

1/ The estimates shown in Table 7 have been "bench-marked" to the overall importance of the five major currencies in invoicing world trade in the late 1970s when the five currencies accounted for a nearly 90 percent share in the invoicing of total world trade (see S.A.B. Page, "The Choice of Invoicing Currency in Merchandise Trade," Economic Review, National Institute of Economic and Social Research, London, November 1981). The overall importance of the five major currencies in trade invoicing does not seem to have changed on the basis of the fragmentary information collected by Fund staff covering the period of the early 1980s for countries other than the five members whose currencies are in the SDR basket (See D. Kar, "Currency Invoicing and Exchange Conversion in International Trade," PIFS/86/1 (2/14/86)).

Table 7. Estimated Currency Denomination of World Trade

(In percent)

	1985		1988	
	Exports	Imports	Exports	Imports
U.S. dollar	46.4	60.5	44.3	54.2
Deutsche mark	17.4	10.0	20.9 <u>1/</u>	12.4
Japanese yen	7.5	1.2	6.7 <u>1/</u>	1.9
Pound sterling	7.1	4.7	6.3 <u>1/</u>	6.1 <u>1/</u>
French franc	7.1	5.1	7.2	7.0

Sources: Table 6 and Balance of Payments Statistics Yearbook. Figures shown are based on data in Table 6, multiplied by each country's share in other countries' merchandise exports and imports, and then benchmarked to total estimated shares in S.A.B. Page, "The Choice of Invoicing Currency in Merchandise Trade," Economic Review, National Institute of Economic and Social Research, London, November 1981. This estimation necessarily introduces asymmetries in the distribution of global trade by currency of denomination, i.e., the estimates shown for exports and imports are not equal, reflecting mainly the partial nature of the component data.

1/ For 1987.

indication of the extent to which the relative weights of the five currencies might be changed if it were decided to include the supplementary financial indicators in the weighting system. Furthermore, it might be noted that changes in the relative importance of currencies, as indicated by these supplementary criteria since the last review, would suggest a decline in the relative weights for the U.S. dollar and the pound sterling, and a corresponding increase in the relative weights of the deutsche mark and the Japanese yen. The changes in the relative importance of currencies based on these criteria are broadly consistent with the pattern of the changes in the weights as calculated in Table 3.

In general, and in line with the views expressed by Executive Directors in 1980 and 1985, the data on supplementary financial criteria could be viewed as broadly confirming the direction of the changes in the relative weights of currencies, as calculated on the basis of the two criteria specified in the 1980 Decision, over the recent five-year period. However, the deficiencies in the data would make it difficult to incorporate directly these supplementary criteria in the calculation of the weights themselves or in adjusting the relative importance of exports of goods and services and financial indicators. Furthermore, the supplementary criteria do not in themselves give a reasonable indication of the extent to which, if any, greater weight might be specifically given to reserve holdings as the proxy for the financial variable in the calculation. On balance, and as indicated above, there would not seem to be an operational need to qualify the results of the calculations of the new weights made on the basis of the economic criteria specified in the 1980 Decision.

5. Other possible modifications to data used in calculations

A number of suggestions were made by some Executive Directors at the 1985 review for considering possible modifications to the data used in calculating the weights for the two variables used for the SDR valuation basket. One Director suggested that the ECU ought to be treated as a separate currency in defining reserve holdings. Some Directors also suggested that in view of the significant volatility in the values of the underlying component currencies in the valuation basket, more frequent revisions of the currency weights of the SDR basket might be considered in order to encourage a more stable valuation of the SDR. These two issues are considered further below.

a. Treatment of ECUs in reserve holdings

As regards the issue of including ECUs in members' reserves holdings for the purpose of measuring the use of currencies as reserves, the staff has, following the practice in prior reviews of the SDR basket, included in the total holdings of U.S. dollars the amount of ECUs that were issued against U.S. dollars. The rationale for this approach is based on the fact that the ECU holdings that are reported

as official reserves are created by means of revolving three-month swaps of U.S. dollars between EMS members and the European Monetary Cooperation Fund (EMCF) and the swap effectively guarantees the value of the ECUs issued against dollars in terms of dollars. 1/ For the same reason, ECU holdings issued against gold are treated as gold holdings but have been included in the total of reserves of foreign exchange shown in Table 2. Excluding ECUs swapped against U.S. dollars from the total of U.S. dollar holdings has only a marginal impact on the shares of each currency in the total, in view of the relatively small amount of ECUs that have been created against the deposit of U.S. dollars with the EMCF. Consequently, the impact of treating ECU holdings separately from holdings of U.S. dollars is not material in the calculation of the weights of the currencies in the SDR basket shown in Table 3 above.

b. Frequency of revision of the SDR basket

In previous reviews of the SDR valuation basket, some Directors have raised the issue of more frequent reviews of the basket in the event that the actual shares of currencies in the basket diverge substantially from their initial weights in the basket because of large movements in exchange rates during the review periods, such as have taken place during the 1980s. Maintaining the initial currency amounts unchanged for five-year periods while allowing the actual currency shares in the basket to change from day to day with the movement of exchange rates has provided overall stability in the exchange value of the SDR. Furthermore, the certainty and predictability of a five-year review period has been beneficial to users of the SDR and SDR-denominated assets, as indicated earlier. The possibility of more frequent reviews, as occurred in the 1970s, could, in contrast, generate uncertainty and could be destabilizing to the SDR system. In addition, more frequent revisions of the SDR basket to reflect changes in currency shares arising from exchange rate movements would not contribute to a greater degree of stability in SDR exchange rates. 2/ Exchange rate movements over the medium term seem to have partly or fully reversed themselves, while any increase in day-to-day volatility in exchange rates would not basically affect the trend of the currency shares in the basket nor the general stability of the SDR in terms of currencies in general. On balance, more frequent adjustments of the weights for the currencies in the basket would not necessarily result in the SDR becoming more stable on a day-to-day basis, and more frequent reviews and updating of the weights for the currencies in the

1/ Activation of the EMS intervention credit facilities gives rise, temporarily, to additional amounts of ECU-denominated official assets and liabilities, which would not affect the calculation of relative weights of currencies for the purpose of the 1980 Decision.

2/ See "Alternative Approaches in the Valuation of the SDR," SM/77/276 (11/28/77).

SDR basket could in fact create uncertainties and operational inconvenience.

IV. Proposed SDR Basket for 1991-95

1. Rounding of relative weights

Paragraph 3(c) of the 1980 Decision states that the new weights for the currencies to be included in the basket shall be rounded to the nearest one percent or as may be convenient. With rounding to the nearest percentage point, the weights that have been calculated on the basis of the specified indicators for 1985-89, and the unrounded results are shown in Table 3 above, would result in a fall in the weight for the U.S. dollar from 42 percent to 39 percent, and a fall in the weights for the pound sterling and the French franc by one percentage point to 11 percent each. There would be a corresponding increase in the weight for the deutsche mark from 19 percent to 21 percent and an increase in the weight for the Japanese yen by three percentage points to 17 percent. These rounded weights sum to 99 percent, and in view of the predominant importance of the U.S. dollar indicated by the supplementary criteria discussed in Section III above, it would seem convenient to round up the weight for the U.S. dollar to the next percentage point, i.e., to 40 percent, as indicated in Col. 6, Table 3. While this approach to rounding would have the smallest impact in relative terms on the unrounded calculations, ^{1/} it is regarded as a legal matter to constitute a change in the method of valuation of the SDR, and will require a decision by the Executive Board to be adopted with a 70 percent majority of the total voting power. Furthermore, it will be necessary to consult with the Fund's lenders under the Enlarged Access Policy and under the borrowing agreement with Japan on options contained in their loan agreements with respect to the method of valuation. The staff has no reason to expect that lenders will wish to exercise these options. The staff will advise the Board of the Consultations at the time this paper will be discussed by Directors.

The Executive Board may decide, by a 70 percent majority of the total voting power, to round the weights in some other fashion, including the maintenance of the weights agreed in 1985. In 1980, the Executive Board decided to round the calculated weights in a manner that made the weights for the Japanese yen (12.3 percent calculated weight), the French franc (11.7 percent) and the pound sterling (11.4

^{1/} Rounding up the weight for the U.S. dollar implies an increase over the calculated weight by 2.3 percent, whereas rounding up the weights for the deutsche mark, the Japanese yen, and the pound sterling would increase the calculated weights by 2.9 percent, 4.5 percent, and 4.6 percent, respectively.

percent) each the same at 13 percent, with a consequent reduction in the weights of the U.S. dollar and the deutsche mark from their calculated weights of 43.9 percent and 20.8 percent, to 42 percent and 19 percent, respectively. In the 1985 review, it may be recalled that the weights of the five constituent currencies in the valuation basket were all rounded to the nearest one percentage point (see Table 3).

The Executive Board's decision in 1980, as regards the rounding of the currency weights, though characterized as within margins of rounding in the shares of the non-dollar currencies, could also be regarded as being part of the major restructuring of the SDR valuation basket that took place at that time. As in 1985, there would not now seem to be any apparent reason to depart from the principle of the 1980 Decision to round the currency weights to the nearest percentage point, with the consequential further rounding needed to make the individual weights sum to 100 percent. Such a rounding procedure would be in keeping with the basic intent of the 1980 Decision that the SDR valuation basket should be adjusted once in five years to reflect changes in underlying economic and financial criteria, as indicated in the calculations presented in Table 3 above. Furthermore, there is also no apparent alternative pattern of rounded currency weights that might be put forward for consideration. In the light of the changes in members' shares in exports of goods and services and in the holdings of their currencies in exchange reserves, it would not seem reasonable to suggest that the weights agreed in 1985 be maintained unchanged. 1/ It is, therefore, proposed that, as provided under the 1980 Decision, the weights for the individual currencies to be included in the SDR valuation basket be rounded to the nearest percentage point, except the weight for the U.S. dollar would be rounded up, as discussed above, to the next percentage point in order to make the individual weights sum to 100 percent.

2. Currency amounts

Given the property of the SDR as a standard basket, which is based on fixed currency amounts and is intended to assure the stability of the SDR in terms of a group of currencies, the percentage share of each currency in the SDR basket will necessarily change both in relation to its initial weight and in relation to the weights for other currencies because of changes in the exchange rates for the currencies in the basket, though the shares of currencies in the basket were initially

1/ In this regard, it is to be noted that the overall deviation of the weights agreed in 1985 and the unrounded percentage shares based on 1985-89 data is larger than that between the 1985 calculated weights and the then agreed weights.

set equal to the weights for the currencies. 1/ In contrast with the 1981-84 period, during which the U.S. dollar appreciated against the SDR, the dollar has since then depreciated against the SDR, as indicated earlier (see Chart 1 above and Table 8). The deutsche mark has appreciated markedly against the SDR during the recent five-year period, after having fallen in the first half of the 1980s, and the Japanese yen has also risen against the SDR since 1985, particularly in the period to the end of 1988. The French franc has also appreciated against the SDR, while the pound sterling has exhibited little movement on balance against the SDR over the same period.

As a result of these exchange rate movements, as of the end of June 1990, the actual share of the U.S. dollar in the current valuation basket for the SDR is of the order of 34 percent, (compared with a weight of 42 percent set at the beginning of 1985), while the actual share of the deutsche mark was 23.8 percent (19 percent), and 16.6 percent for the Japanese yen (15 percent), and 13.7 percent for the French franc (12 percent). The share of the pound sterling in the valuation of the SDR was slightly below its initial weight of 12 percent. At the time of the revision of the basket at the end of 1990, the present actual shares of amounts of currency will be made equal to the initial weights for each individual currency, based on 1985-89 data for exports of goods and services and reserve holdings, while maintaining unchanged the transactions value for the SDR. However, the changes in the amounts of currencies from this present actual shares are not expected to be large.

Table 9 provides an illustrative calculation of the new currency amounts in the SDR basket that would come into effect on January 1, 1991, based on the rounded weights presented in Col. 6 of Table 3 and using end-June 1990 exchange rates. 2/ As can be seen from the table,

1/ It is, of course, possible to construct a valuation basket in which the weights do not vary over time and hence are independent of exchange rate movements. This basket would maintain the relative importance of each currency regardless of changes in exchange rates over time, while the fixed currency component feature of the standard basket allows the weight of each currency to vary with exchange rate variation. Adopting such a fixed weight method of valuation of the SDR was discussed in the early 1970s, but was rejected on the grounds that over time such an approach would effectively reduce the currency amounts of appreciating currencies and increase the currency amounts of depreciating currencies in the basket in order to maintain unchanged weights, and consequently, could jeopardize the market's confidence in the basket. See International Monetary Reform: Documents of the Committee of Twenty (Washington, 1974).

2/ The specific procedures for determining the currency amounts are described in Appendix IV.

Table 8. Changes in the Exchange Value of the SDR and Actual Shares of Currencies in the SDR Valuation Basket

(In percent)

	1986	1987	1988	1989	June 29 1990
	(end of period)				
<u>Change in nominal SDR exchange rate</u>					
Against U.S. dollar	11.4	16.0	-5.1	-2.3	0.1
Cumulative <u>1/</u>	11.4	29.2	22.5	19.6	20.5
Against deutsche mark	-12.2	-5.5	6.8	-6.9	-0.6
Cumulative <u>1/</u>	-12.2	-17.0	-11.4	-17.5	-17.9
Against Japanese yen	-11.6	-10.0	-3.3	11.3	7.4
Cumulative <u>1/</u>	-11.6	-20.4	-23.1	-14.4	-8.1
Against pound sterling	9.1	-8.6	-1.9	10.1	-7.1
Cumulative <u>1/</u>	9.1	-0.3	-2.2	7.6	-0.1
Against French franc	-4.9	-4.1	7.6	-6.7	-2.4
Cumulative <u>1/</u>	-4.9	-8.8	-1.8	-8.4	-10.6
<u>Actual shares in valuation basket <u>2/</u></u>					
U.S. dollar (42)	36.9	31.9	33.6	34.4	34.1
Deutsche mark (19)	22.2	23.5	22.0	23.6	23.8
Japanese yen (15)	17.2	19.1	19.7	17.7	16.6
Pound sterling (12)	10.7	11.8	12.0	10.9	11.7
French franc (12)	12.9	13.5	12.5	13.4	13.7

1/ Percent change from initial value on December 31, 1985.

2/ Initial weights from 1985 review in parentheses.

Table 9. Calculation of Illustrative Currency Amounts
Revised SDR Valuation Basket

(Based on Rounded Percentage Weights and on June 29, 1990 Exchange Rates)

Currency	Current basket		Currency amount	Illustrative basket based on 1985-89 data		Percentage change in currency amount
	Initial percentage weight	Actual percentage share, at June 13, 1990		Rounded percentage weight <u>1/</u>	Currency amounts <u>2/</u>	
U.S. dollar	42	34.5	0.452	40	0.530	+17.3
Deutsche mark	19	23.7	0.527	21	0.465	-11.8
Japanese yen	15	16.5	33.4	17	34.3	+2.7
Pound sterling	12	11.6	0.0893	11	0.0836	-6.4
French franc	12	13.7	1.02	11	0.817	-19.9

1/ See Table 4, Part I, col. (6).

2/ For a given set of weights, the currency amounts shown are indicative amounts, which are likely to be different depending on (i) the average and end-period exchange rates of the base reference period (October-December 1990) to be used for revising the SDR basket's currency components, and (ii) the rounding procedures to be applied to the currency amounts themselves. Appendix IV reproduces the procedure and formulas used for rounding the currency amounts when the new basket is determined.

the initial weights calculated for the U.S. dollar, the deutsche mark, the Japanese yen, and the pound sterling do not call for very substantial changes in the amounts of these currencies in the basket, because the actual shares of the currencies against the SDR since the last review have moved in the same direction as the changes in the calculated weights, and the realignment of currencies' shares in the SDR valuation basket with their initial weights are therefore relatively small. 1/ On the other hand, the decline in the amount of French francs in the basket is relatively large because the calculated initial weight for this currency has fallen and moved away from its actual share in the SDR basket at present, reflecting the appreciation of the French franc against the SDR since January 1, 1986. It should be noted, however, that the changes in the currency amounts are a consequence of the revision of the SDR basket, and these changes would not be expected to exert an impact in any predetermined direction on the future performance of the SDR valuation basket.

3. Transition to new SDR basket

Paragraphs 3b and 4 of the 1980 Decision set out the procedures regarding the transition to the new basket, in particular to ensure that the new currency amounts will yield the same transactions value for the SDR on the basis of the old and new currency amounts on the last business day preceding January 1, 1991. It is proposed that the currency amounts corresponding to the new weights will be calculated on the same basis that was followed in the 1985 review and which are presented in detail in Appendix IV. The initial currency amounts will be calculated on the basis of the new currency weights and the average exchange rates over the three-month period preceding January 1, 1991 subject to the constraint that the value of the SDR on the last business day preceding January 1 on the basis of the new basket will be the same as the one actually prevailing on that day using the old basket. The currency amounts are to be expressed in two significant

1/ In general the currency amounts of the basket will change at the time of the revision of the basket because either the initial weights are changed or the exchange rates have changed since the basket was last revised, or both; but the currency amounts could also be little changed if the changes in the initial weights and in exchange rates are offsetting. The currency amount would remain constant if the initial weight for the currency was reduced in the same proportion as the depreciation of the exchange rate for that currency by the end of the five-year period for the revision of the SDR basket. The larger the depreciation of a currency against the SDR, the greater the corresponding increase in the number of units in the new basket, for a given weight assigned to the currency.

digits, 1/ provided that the resulting weights do not differ from the initial weights by more than one-half percentage point for any currency. If no solution can be found at the two-digit level, the initial currency amounts will all be expressed in three significant digits, and the process may be repeated to find a solution at four significant digits. If multiple solutions are found at any level of significant digits, the solution with the smallest average deviation between the initial currency amounts and the rounded currency amounts will be employed.

In 1985, the revision of the weights of the currencies included in the basket, in accordance with the 1980 Decision, was completed by the end of September and provided a sufficient period for official and private users of the SDR, as well as members and institutions with outstanding loans to the Fund, to be informed of the new weights and to familiarize themselves with the features of the new SDR basket. As noted above, the need for further rounding of the weight for the U.S. dollar constitutes, as a legal matter, a change in the method of valuation of the SDR. This will require the Executive Board to decide on the change by a 70 percent majority of the total voting power. 2/ In this connection, a change in the method of valuation of the SDR 3/ will also require consultations with some of the Fund's creditors on the options which they may wish to exercise with respect to the valuation of outstanding loans to the Fund.

1/ Decision No. 8160-(85/186)G/S, December 23, 1985, provided for a uniform-digits approach in determining the number of digits to be used in finalizing the amount of each currency included in the basket, i.e., if a solution at two digits for each of the five currencies could not be found, the solution would be to determine a new basket in which the currency amounts would be uniformly expressed to three or four significant digits for each currency. Under the 1980 guidelines on rounding (called the minimum-digits approach), if a solution were not found that expressed the currency amounts uniformly in two significant digits, a search procedure was employed to find a solution which maximized the number of currency amounts expressed to two significant digits, and correspondingly minimized the number of currency amounts expressed to three or four significant digits. The differences in technique are mainly presentational.

2/ See SM/85/163, p. 28.

3/ Departures from the formula of the 1980 Decision to derive and round the weights of the five currencies would constitute a change in the method of valuation of the SDR and would require a 70 percent majority of the total voting power.

V. SDR Interest Rate

The SDR interest rate basket is identical to the SDR valuation basket. It is determined by the Fund to be equal to a "combined market interest rate" under Rule T-1, which was modified in September 1980 and May 1981, so as to make the SDR interest rate reflect fully the rates of return on the fixed currency amounts of the SDR valuation basket based on interest rates on short-term domestic money market instruments selected for that purpose. 1/ This section briefly reviews the method of determining the combined market rate on which the SDR interest rate is based, the selection of financial instruments in the interest rate basket, and the likely consequence on the combined market and SDR interest rate when the weights and currency amounts in the SDR valuation basket are revised on January 1, 1991 under the 1980 Decision.

1. Method of setting the combined market interest rate

The combined market or SDR interest rate is constructed to produce an effective yield or total return--interest income plus exchange valuation gain (loss)--which generally does not deviate significantly from a market-determined rate of return on a composite investment comprising the currency components of the SDR valuation basket which are combined in the same proportion and using financial instruments of the same quality and the same maturity. 2/ This convergence with a market-related yield reflects the unification of the valuation and interest rate baskets in 1980 and the setting of the SDR interest rate at 100 percent of the combined market rate since May 1981.

1/ Rule T-1 is reproduced in Appendix I. The method of calculating the combined market interest rate is as follows: for each currency in the basket, the interest rate on the financial instrument is multiplied by the number of units of that currency in the basket, and the product is then multiplied by the value of the currency in terms of the SDR; the resulting products for the five currencies are then added together. Before May 1981, the SDR interest rate was a proportion, less than 100 percent, of the combined market rate.

2/ The determination of the SDR interest rate has so far not been independent of the method of SDR valuation, though it may be argued that the interest rate for an SDR-denominated asset could be determined in a market for this asset, if such a market existed. The use of SDRs is regulated by the Fund's Articles and Rules and Regulations, and it is not possible to effect transactions in SDRs in a manner that would result in a "market" rate of interest on the SDR; instead, the Fund itself has determined the mechanism for establishing the SDR interest rate.

The present method of setting the SDR interest rate is aimed at aligning it closely with the yield on alternative reserve assets. 1/ In this connection, it may be noted that the Committee of Twenty stated that "the effective yield on the SDR will be high enough to make it attractive to acquire and hold, but not so high as to make countries reluctant to use the SDR when in deficit." It is, therefore, important that any revision of the SDR interest rate basket would be consistent with broadly maintaining its effective yield relative to those on comparable reserve assets.

It is not proposed to change the method of setting the combined market and SDR interest rate. Indeed it is highly desirable that the SDR interest rate basket continues to be identical in construction with the SDR valuation basket, and, as indicated above, it is not proposed to change the method of valuing the SDR. It is, however, useful to review the financial instruments included in the SDR interest rate basket, so as to ensure their continued representativeness in the domestic credit markets from which they are drawn and that they continue to be suitable instruments for short-term official investments. The following subsection therefore reviews the financial instruments included in the SDR interest rate basket, and proposes changes in the instruments for the French franc and the Japanese yen; the subsequent subsection deals with the effects of changes in the SDR valuation basket on the SDR interest rate.

2. Review of the instruments in the SDR basket

As described in previous reviews of the valuation and interest rate baskets, the financial instruments included in the SDR interest rate basket are selected so that each instrument is comparable in terms of quality, maturity, and ready availability of quotations with the others. 2/ Furthermore, the selected financial instruments should:

- a. be broadly representative of the range of financial instruments that are actually available to investors in a particular currency and the interest rate on the instrument should be responsive

1/ It may also be presumed that a market-determined SDR interest rate would, if it existed, tend to reflect a weighted average of the interest rates on alternative money market or reserve instruments available to or used by reserve managers and other holders of SDRs. For a discussion of the weighting techniques of the reference formulas for interest rates on SDR-denominated assets, see "A Note on Interest Rates on SDR-denominated Assets," SM/84/68 (3/28/84), Annex IV.

2/ See SM/85/163, p. 27. See also SM/78/8 "The SDR Interest Rate Basket," (1/6/78); SM/79/283 "Substitution Account--Calculation of the Interest Rate to be Paid on SDR-Denominated Claims," (12/10/79); and SM/80/82 "Substitution Account--Choice of Instruments for the SDR Interest Rate Basket and Related Issues," (4/2/80) pp. 1-7.

to changes in underlying credit conditions in the corresponding money market;

b. have risk characteristics similar to the official standing of the SDR itself, i.e., have a credit risk profile of the highest quality fully comparable to that of government paper available in the market or, in the absence of appropriate official paper, comparable to the credit risk on prime financial instruments; and

c. reflect the actual reserve asset choice of reserve managers, for example, as regards the form of the financial instrument, its liquidity, and maturity.

These criteria for choosing the component financial instruments of the SDR basket were generally reaffirmed by Executive Directors during the 1985 review of the SDR valuation and interest rate baskets. The criteria reflect the fact that the particular choice of instruments has a direct impact on the absolute level of the SDR interest rate because the yield on different instruments for the same component currencies could vary according to particular market conditions and institutions. Furthermore, in view of the reserve character of the SDR, the financial instruments in the SDR basket should be primarily (or exclusively) short-term assets which reflect the typical maturity of foreign exchange assets held by central banks in order to ensure the prompt usability of their reserves in case of balance of payments need. In practice, only a limited number of instruments incorporate the specific characteristics of international reserve assets as described above. In addition, the selection of instruments may need also to take into account the fact that central banks have widely different policies and practices with respect to the form, maturity, and denomination of their reserve assets. 1/

The instruments in the present SDR interest rate basket are: market yield on three-month U.S. Treasury bills and market yield on three-month U.K. Treasury bills, three-month interbank deposit rate in

1/ In previous SDR reviews it had been suggested that some member countries also maintained reserves in eurocurrency deposits, particularly in eurodollars, and some consideration was given to the possibility of using the rate on euro-deposits for the determination of the SDR interest rate. However, in most cases, eurocurrency instruments do not meet the criterion of having risk characteristics similar to those of official reserve assets, and they tended to raise both the level and variability of the combined market rate if they were included in the SDR interest basket. These rates were accordingly not considered appropriate for the calculation of the SDR interest rate (see SM/80/82, 4/2/80, pp. 5-7).

Germany, three-month interbank money rate against private paper in France, and discount rate on two-month (private) bills in Japan. In consultation with the authorities of the issuing currencies in the basket, the staff has reviewed the instruments in the SDR interest rate basket in the light of developments in the financial markets of the five major currencies in the basket since the 1985 review of the SDR interest and valuation baskets. The short-term money markets have undergone substantial structural changes resulting from financial innovation and deregulation (see Appendix III). The sizable increase in the outstanding volume of securities and the improved liquidity in these markets as well as the proliferation of certain money market instruments would appear to have a bearing on the representativeness of some of the instruments currently used for the determination of the SDR interest rate. On the basis of the review conducted by the staff, and in consultation with the authorities concerned, it is concluded that despite the rapid financial innovation of recent years in Germany, the United Kingdom, and the United States, there does not seem to be a need to change the financial instruments for the German, U.K., and U.S. components of the SDR interest rate basket. The existing instruments have seemed to remain broadly appropriate in the light of the above-mentioned criteria for inclusion in the SDR interest rate basket.

As regards the financial instruments for the French franc and the Japanese yen, it would appear that the changes that have occurred since 1985 in the French and Japanese money markets, would merit consideration being given to change the financial instruments for these currencies in the SDR interest rate basket. In particular, the staff proposes that the two-month private bill interest rate in Japan currently used in the SDR interest rate basket be replaced by the three-month certificate of deposit (CD) rate, and that the existing interbank deposit rate in France be replaced by the rate on Treasury bills. These suggested changes reflect the financial innovation and deregulation that has occurred within a broader restructuring of the financial markets and which bear on the representativeness of the instruments in France and Japan as well as the changes that have been effected regarding the mechanisms of implementation of monetary policy in those countries which also bear on the suitability of the instruments. 1/

In Japan, the rate on the two-month private bill is no longer explicitly targeted by the monetary authorities in their policies regarding intervention in the domestic money market. Furthermore, the outstanding amount of two-month private bills appears to have declined, and is now only a relatively small percentage of the money market

1/ For a more detailed description of these structural changes see D. Batten, M. Blackwell, I. Kim, S. Nocera and Y. Ozeki, "The Implementation of Short-run Monetary Policy in the G-5", forthcoming (1990) in the Occasional Paper series, IMF, Washington, D.C.

assets and does not seem to be as broadly representative of market conditions as hitherto. Since the monetary reform implemented in 1988, the three-month rate on certificates of deposits (CD) has become the main reference rate for most transactions. The staff would therefore propose the substitution of the three-month CD rate for the present two-month bill rate as the financial instrument for the Japanese yen. This instrument most closely reflects underlying market conditions in the Japanese money market, has a credit rating of the highest quality, and is broadly representative of the range of financial instruments in the market.

In France, the relatively rapid development of the market for Treasury bills would seem to suggest, on balance, that the three-month interest rate on this instrument compares favorably, with, for example, the representativeness of the three-month rate on Treasury bills issued in the United Kingdom in terms of the criteria for inclusion in the SDR interest basket as discussed above. The market for Treasury bills in France has grown substantially in volume since 1985, and provides considerable liquidity in the market, while at the same time, the deregulation of the French financial market has resulted in a close correlation between the interest rate on this instrument and rates on other money market instruments for comparable maturities. It is therefore suggested that the three-month rate for Treasury bills issued in France replace the current three-month rate on interbank deposits for the financial instrument for the French franc used in the SDR interest rate basket.

Table 10 provides summary information on the existing and new financial instruments proposed for the SDR basket. As can be seen from the table, the mean and standard deviation of the alternative instruments proposed for France and Japan are closely comparable with those for existing instruments. Chart 2 shows the actual combined market rate (which equals the SDR interest rate) based on the current set of instruments and the combined market rate calculated on the basis of the proposed modified set, i.e., with the inclusion of three-month Treasury bill and the three-month certificates of deposit for the French and Japanese components, respectively, over the period from October 1986 to December 1989. As can be seen, the proposed changes in the Japanese and French instruments would not have changed the absolute level of the SDR interest rate to any material extent during the period of October 1986 to December 1989. It is estimated that the change in the financial instruments for the French franc and Japanese yen would raise the combined market rate by an amount in the order of 0.02 percentage point. The simulated SDR interest rate is, however, effectively unchanged on average from the level determined on the basis of the current set of instruments. The small marginal impact on the calculations can be attributed to the fact that the change to a somewhat higher-yielding instrument for the Japanese component is effectively offset by the use of a lower-yielding French component of the same three-month maturity as at present.

CHART 2
SDR INTEREST RATE
October 86 to December 89

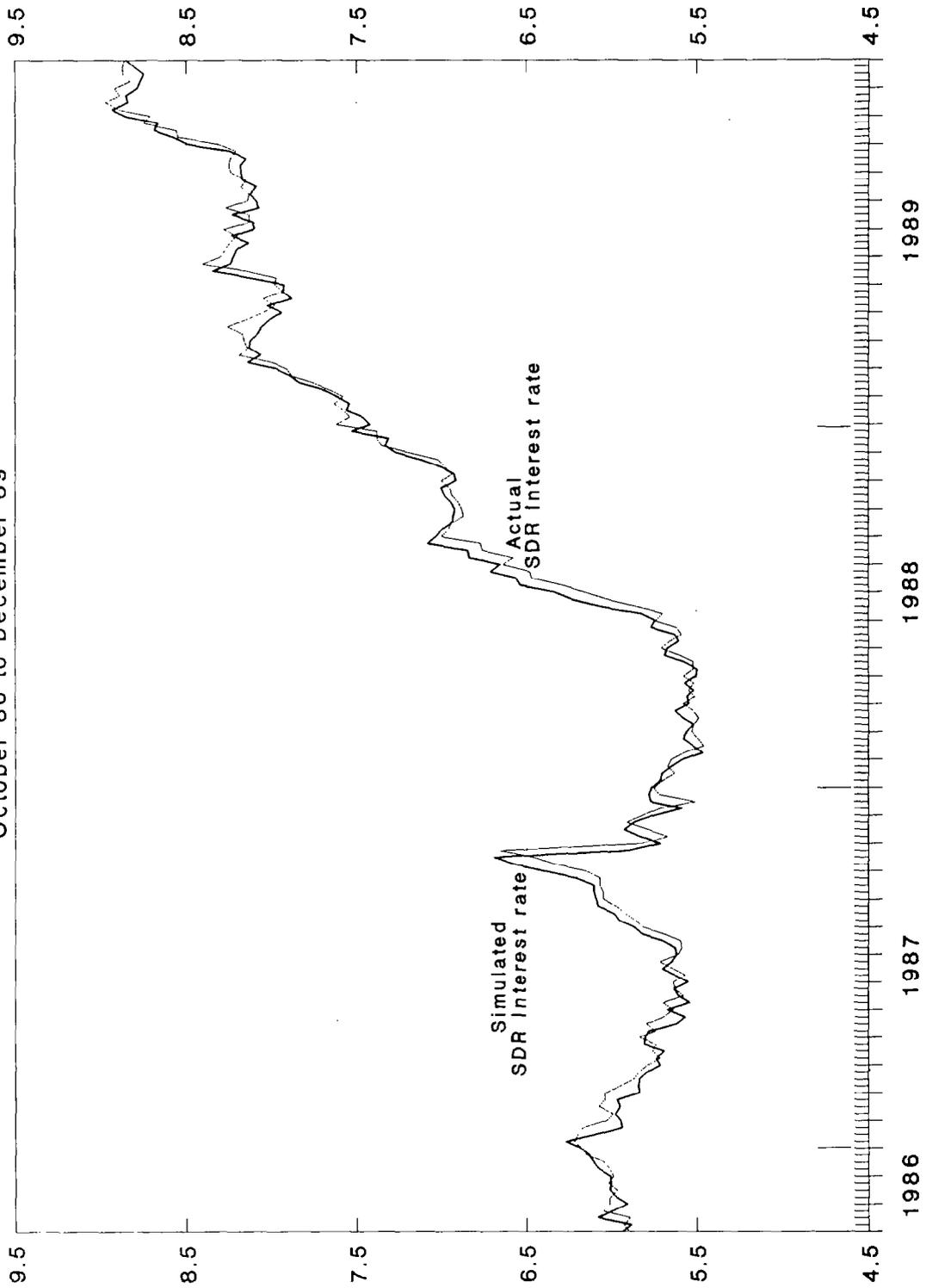


Table 10. Alternative Short-Term Instruments and Their
Interest Rates, January 1, 1986-December 31, 1989

(In percent per annum)

	Average level over the period (1)	Standard deviation from the average over the period (2)
United States		
Three-month Treasury bill	7.07	1.16
Germany		
Three-month interbank rate	5.16	1.55
Japan		
Two-month private bill	4.46	0.83
Three-month CDs <u>1/</u>	4.63	0.68
France		
Three-month interbank rate	8.47	0.79
Three-month Treasury bill <u>1/</u>	8.20	0.77
United Kingdom		
Three-month Treasury bill	11.06	2.25
Memo:		
Actual SDR interest rate	6.78	1.14
Simulated SDR interest rate <u>2/</u>	6.79	1.13

1/ Over the period January 1, 1987-December 31, 1989.

2/ Based on current SDR valuation basket and instruments under Rule T-1, except for Japan and France where the three-month CD and T-bill rates were used, respectively. The simulation was made over the period January 1, 1987-December 31, 1989.

3. Effects of revisions on the SDR interest rate basket

As discussed earlier in this paper, the revision of the SDR valuation basket is made in a manner that realigns the actual shares of the currencies in the basket to an agreed set of initial weights while maintaining unchanged the transactions value of the SDR at the time of the revision. However, the change in the weights and currency amounts in the SDR valuation basket is not reflected in a comparable continuity in the calculation of the combined market rate at the time of the revision, or in the calculations of the SDR interest rate on Fund borrowing, which are computed in the same manner as the combined market rate that determines the SDR interest rate. 1/ The break in continuity in the calculation of the combined market or SDR interest rate arises because changes in the shares of currencies in the SDR valuation basket apply to interest rates that are included in the interest basket that differ from each other because of different expectations about exchange rates and other economic factors. However, to the extent that interest rate differentials reflect expectations of exchange rate movements, the effective yield on the SDR could be expected to be broadly the same on the bases of either the old or new valuation basket. Nevertheless, the effect of a change in the actual share of the relatively high-interest currencies may not always be fully compensated by a corresponding shift in the share of the low-interest currencies.

Consequently, it may again be expected that small discrete changes will occur in the calculation of the level of the SDR interest rate and of the interest rates on Fund borrowing when the SDR valuation basket is revised on January 1, 1991. In addition, it may also be noted that the SDR interest rate is calculated each Friday for the week beginning the ensuing Monday, and the size of the shift in the combined market rate will depend on the exchange and interest rates close to but not exactly on the date the new SDR valuation basket comes into effect.

As indicated in Table 11, if exchange rate and interest rate configurations at around the end of June 1990 were to prevail at end-1990, there would be one-time downward shifts in the combined market interest rate calculations varying from 0.08-0.11 percentage point, depending on the maturity of the instruments used to determine these

1/ Prior to the 1980 decision, the interest rate basket comprised the same five currencies as in the present basket but the weights in the interest rate basket were constant and independent of movements in exchange rates. Up to that time, changes in interest rates on the SDR reflected only the changes in the fixed weights of the SDR interest rate basket, but nevertheless, discrete changes in the absolute level of the combined market rate occurred at the time of revision of the SDR valuation basket. (See SM/85/163, p. 23, footnote 1.)

Table 11. Shifts in Combined Market Interest Rates on SDR-Denominated Assets
Based on Hypothetical Revision of the SDR Valuation Basket

(As of June 29, 1990)

	U.S. dollar (1)	Deutsche mark (2)	French franc (3)	Japanese yen (4)	Pound sterling (5)	<u>Combined market interest rates</u>		
						Present basket (6)	Hypothetical revised basket (7)	Difference cols. (7-6) (8)
<u>Currency amounts</u>								
Present basket	0.452	0.527	1.02	33.4	0.0893			
Revised basket ^{1/}	0.530	0.465	0.817	34.3	0.0836			
<u>Interest rates on Fund-related assets</u>								
SDR:								
Three-month maturity								
Based on current set of instruments	8.00	8.37	10.20	7.50	14.81	9.08	8.97	-0.11
Based on modified set of instruments	8.00	8.37	9.55	7.67	14.81	9.02	8.92	-0.09
Fund borrowing: ^{2/}								
Domestic instruments								
Six-month maturity	8.10	8.50	10.19	7.60	14.94	9.18	9.07	-0.11
One-year maturity	8.14	8.65	10.46	7.05	13.52	9.01	8.90	-0.11
Five-year maturity	8.47	8.93	10.47	6.68	12.02	8.97	8.88	-0.09
Eurocurrency instruments								
Three-month maturity	8.29	8.19	10.00	7.44	13.97	9.01	8.93	-0.08
Six-month maturity	8.36	8.38	10.13	7.50	14.81	9.20	9.11	-0.09

^{1/} Illustrative calculations given in Table 10.

calculations, and after taking into account the very small increase resulting from the increase in the combined market rate resulting from the change in the financial instruments included in the basket. There would be a downward shift of 0.11 percentage point for the SDR interest rate, while the interest rate basket using financial instruments of five-year maturity would fall by 0.09 percentage point. These changes may be regarded as essentially marginal and are broadly of the same relative magnitude as the shifts in the trend of SDR rates that occurred on January 1, 1986 when the SDR interest rate rose by 0.13 percentage point as a result of the implementation of the then new valuation basket. However, at this time it is not possible to project whether the interest rate shift associated with the revision of the basket will be upward or downward.

On balance, and in the light of the above, it can reasonably be expected that the size of the discrete shift in the SDR interest rate basket resulting from both the changes in the interest rates on some of the financial instruments in the basket, and, more importantly, from the changes in the weights for the currencies in the SDR valuation basket, are likely to be relatively small.

VI. Summary and Conclusions

This paper has been prepared as the basis for the quinquennial review of the SDR valuation basket, as called for by Decision No. 6631-(80/145) G/S, which was adopted in September 1980, and the SDR interest rate basket. The new baskets will come into effect on January 1, 1991, unless the Executive Board decides otherwise. The paper does not propose any fundamental change in the present method or the principles of valuing the SDR. The main conclusion of the paper is that the principles of the 1980 Decision have continued to work well and should be applied again, as in 1985, thereby calling only for a new calculation of weights and amounts for the currencies included in the valuation basket, and to apply the appropriate rounding procedures, as agreed by the Executive Board. As regards the SDR interest rate basket, it is proposed that the financial instruments for the French franc and the Japanese yen be changed to the rate on the three-month Treasury bill and to the rate on three-month certificates of deposit, respectively.

The main arguments made in support of these conclusions may be summarized as follows:

1. The standard basket method of valuation of the SDR has continued to work well, and there would not seem to be any operational reasons to suggest any fundamental changes in the present method of valuing the SDR. The SDR valuation has remained generally stable in terms of the major currencies, and the effective yield of the SDR, its interest rate, adjusted for any change in its exchange rate, has

compared favorably with the effective yield for other reserve assets, particularly in terms of risk or the variability of the effective yield. Operations and transactions in the SDR Department, and among participants and prescribed holders, and SDR-denominated transactions in the General Resources Account and with the Administered Accounts, work smoothly and promptly; while activity in SDR-denominated transactions in the private markets has diminished and is now small, the decline would not seem to be attributable to the form of valuation of the SDR.

2. In accordance with the 1980 Decision, the currencies to be included in the basket are those of the five members with the largest value of exports of goods and services during the five-year period ended 12 months before the effective date of the change in the valuation basket, unless the Executive Board decides otherwise. On the basis of this criterion, the currencies to be included in the revised basket to take effect on January 1, 1991 will continue to be the U.S. dollar, the deutsche mark, the Japanese yen, the pound sterling, and the French franc. Taking into account, as provided under the Decision, the relative share of these countries in the total of exports of goods and services and of the balances of these currencies held by other countries as reserves for the period 1985-89, the initial weights in the basket for these currencies have been calculated as follows: U.S. dollar, 39.11 percent; deutsche mark, 21.39 percent; Japanese yen, 17.23 percent; pound sterling, 11.47 percent; and French franc, 10.81 percent. Rounded to the nearest one percentage point, the new weights for the currencies in the SDR valuation basket, would be as follows: U.S. dollar 39 percent; deutsche mark 21 percent; Japanese yen 18 percent; French franc 11 percent; pound sterling 11 percent. However, it is proposed to round up the weight for the U.S. dollar to 40 percent, so that the weights sum to 100 percent. This rounding up of the weight for the U.S. dollar represents the smallest relative increase in the calculated weights. The Executive Board, by a 70 percent majority, could decide on this or an alternative method of rounding, which, as a legal matter, is regarded as constituting a change in the method of valuation of the SDR. However, there would not seem to be a compelling need to propose any alternative method of rounding the calculations.

3. The calculations summarized in paragraph 2 above, generally confirm the general stability of the relative significance of exports of goods and services and currency balances in calculating the initial weights for the currencies included in the basket, as called for by the 1980 Decision. There would not, therefore, seem to be any need to adjust the relative significance of the two factors used to determine the composition of the SDR basket. However, in view of the relatively small weight of currency balances in the basket, a review was made of supplementary financial indicators. These supplementary data cover foreign exchange market turnover, and the currency denomination of international bond issues, international bank lending, eurocurrency

deposits, and trade invoicing. While the available supplementary data vary in coverage and quality, they indicate the predominance of the U.S. dollar in the international financial system. However, since 1985 the relative importance of the U.S. dollar has declined while the deutsche mark and the Japanese yen have increased in relative importance. Changes in the relative importance of currencies in terms of these supplementary data are broadly consistent with the pattern of changes in the weights for the currencies, noted above, and indeed confirm the direction of changes in the weights. On balance, it was concluded that there would not seem to be an operational need to qualify the results of the calculations of the new weights made on the basis of the criteria specified in the 1980 Decision.

4. In accordance with the Decision, the agreed weights for the currencies included in the valuation basket will be applied to the average exchange rates prevailing over the period September - December 1990 to determine the currency amounts in the SDR basket. The initial currency amounts will be calculated so as to ensure that they will yield the same transactions value of the SDR on the basis of the old and new valuation baskets on the last business day preceding January 1, 1991. The currency amounts will be expressed in two significant digits, provided that the resulting weights do not differ from the initial weights by more than one-half percentage point for any currency. Very substantial changes in the amounts of currencies in the basket do not seem to be required because the actual shares of most of the currencies against the SDR have moved in the same direction as the changes in the initial weights since the last revision of the SDR valuation basket, and provided that the pattern of exchange rates in the last quarter of 1990 would be similar to the pattern in the earlier part of 1990. For example, the general depreciation of the U.S. dollar has resulted in a fall in its actual share in the SDR basket to 34.5 percent at present from its initial weight of 42 percent agreed at the 1985 review, though the realignment of its actual share to its initial weight of 40 percent under the present review would require a relatively large increase in the currency amount of the U.S. dollar in the valuation basket. The appreciation of the deutsche mark and the Japanese yen have resulted in an increase in their actual shares at present to 23.7 percent and 16.5 percent, respectively, compared with the new initial weights of 21 percent for the deutsche mark and 17 percent for the Japanese yen. The deviations between the initial weights calculated in 1985 and for the new basket, and the present actual share of the pound sterling are considerably smaller.

5. The revision of the weights for the currencies in the SDR valuation basket will consequently result in a realignment of the amounts of currency in the SDR interest rate basket, because the currency amounts in the interest basket are identical with those in the SDR valuation basket. However, changes in exchange rates and interest rates do not normally offset each other in the short-term and the effect of an increase in the actual weight of a currency with a

relatively high interest rate (and depreciated exchange rate) is not always compensated by a corresponding decline in the weight for a currency with a relatively low interest rate (and appreciated exchange rate). Consequently, as on the occasion of previous revisions of the SDR basket, it is expected that a discrete change in the SDR interest rate will occur at the time when the new SDR valuation basket comes into effect. The size of the change in the SDR interest rate resulting from the change in the valuation basket can be expected to be small. Based on the configuration of exchange rates and interest rates at end June 1990 and using the rounded weights as calculated above, there would be a downward adjustment in the combined market rate of the order of 0.12 percentage point. A small discrete change is likely also to occur in the calculation of the rate of interest paid by the Fund on its borrowing under the Enlarged Access Policy and on borrowing from Japan. At this time it is not foreseeable whether the discrete change in the SDR interest rate or any of the interest rates on SDR-denominated loan claims on the Fund will be upward or downward.

The financial instruments included in the SDR interest rate basket have also been reviewed. After consultation with the authorities concerned, it is proposed that the two-month private bill currently used for the Japanese component be replaced with the rate on the three-month certificate of deposit, and that the rate on the three-month interbank deposit used for the French component be replaced with the interest rate on the three-month Treasury bill. No changes are proposed for the instruments for the United States, the United Kingdom, and Germany. The proposed changes in the financial instruments would seem to be called for in the light of the financial innovation and deregulation that has occurred within a broad restructuring of the financial markets and which bear on the representativeness of these instruments in their respective markets. The proposed changes in the financial instruments included in the basket are likely to result in an increase in the SDR interest rate by approximately 0.02 percentage point; this once and for all effect is included in the size of the discrete change in the SDR interest rate calculated above.

6. It is proposed that the Executive Board in its review of the SDR valuation basket and SDR interest rate basket decide the new weights for the currencies with the majority of 70 percent of the total voting power and agree the rounding procedures for the weights of the five currencies as well as the proposed changes in the financial instruments in the SDR interest rate basket. While the currency amounts for the SDR valuation basket will be determined at the end of 1990, using the average of exchange rates over the prior three months, it would seem appropriate, as on earlier occasions, to agree the new weights well before the end of 1990. It will be recalled that a change in the method of valuation of the SDR will require consultations with the Fund's lenders under the EAR and the borrowing agreement with Japan on the options which they might wish to exercise with respect to the valuation of outstanding loans to the Fund. Furthermore, it would be

appropriate for the prescribed holders of SDRs and other institutions that have adopted the SDR as a unit of account to be informed of the revision of the weights well ahead of the date of a new SDR basket coming into effect.

This Appendix reproduces (i) the 1980 Decision on the method of valuation of the SDR and (ii) Rule T-1 governing the determination of the SDR interest rate.

ARTICLE XV, SECTION 2

Valuation of the Special Drawing Right

METHOD OF VALUATION

1. Effective January 1, 1981, the value of one special drawing right shall be the sum of the values of specified amounts of the currencies listed in 2 below, the amounts of these currencies to be determined on December 31, 1980 in a manner that will ensure that, at the average exchange rates for the three-month period ending on that date, the shares of the currencies in the value of the special drawing right correspond to the weights specified for each currency in 2 below.

2. On the basis of changes in members' exports of goods and services and in official balances of members' currencies held by other members since the previous review of the method of valuation of the SDR conducted in March 1978, that the currencies and weights referred to in 1 above shall be as follows:

<u>Currency</u>	<u>Weight (In percent)</u>
U.S. dollar	42
Deutsche mark	19
French franc	13
Japanese yen	13
Pound sterling	13

3. The list of the currencies that determine the value of the special drawing right, and the amounts of these currencies, shall be revised with effect on January 1, 1986 and on the first day of each subsequent period of five years in accordance with the following principles, unless the Fund decides otherwise in connection with a revision:

a. The currencies determining the value of the special drawing right shall be the currencies of the five members whose exports of goods and services during the five-year period ending 12 months before the effective date of the revision had the largest value, provided that a currency shall not replace another currency included in the list at the time of the determination unless the value of the exports of goods and services of the issuer of the former currency during the relevant period exceeds that of the issuer of the latter currency by at least one percent.

b. The amounts of the five currencies referred to in a. above shall be determined on the last working day preceding the effective date of the relevant revision in a manner that will ensure that, at the average exchange rates for the three-month period ending on that date, the shares of these currencies in the value of the special drawing right correspond to percentage weights for these currencies, which shall be established for each currency in accordance with c. below.

c. The percentage weights shall reflect the value of the balances of that currency held at the end of each year by the monetary authorities of other members and the value of the exports of goods and services of the issuer of the currency over the relevant five-year period referred to in a. above, in a manner that would maintain broadly the relative significance of the factors that underlie the percentage weights in paragraph 2 above. The percentage weights shall be rounded to the nearest 1 percent or as may be convenient.

4. The determination of the amounts of the currencies in accordance with 1 and 3 above shall be made in a manner that will ensure that the value of the special drawing right in terms of currencies on the last working day preceding the five-year period for which the determination is made will be the same under the valuation in effect before and after revision.

Decision No. 6631-(80/145) G/S

September 17, 1980

T—INTEREST, CHARGES, AND ASSESSMENTS IN
RESPECT OF SDRs

- T-1. (a) Interest and charges in respect of SDRs shall accrue daily at the rate referred to in (b) below. The amount that has accrued during each quarter of the financial year of the Fund shall be paid promptly as of the beginning of the following quarter. The accounts of participants shall be credited with the excess of interest due over charges or debited with the excess of charges over the interest due. The accounts of holders that are not participants shall be credited with the interest due.
- (b) The rate of interest on holdings of SDRs for each weekly period commencing each Monday shall be equal to the combined market interest rate as determined by the Fund at the beginning of the period in the manner described in (c) below.
- (c) The combined market interest rate shall be the sum, rounded to the two nearest decimal places, of the products that result from multiplying each yield or rate listed below, expressed as an equivalent annual bond yield, for the preceding Friday by the value in terms of the SDR on that Friday of the amount of the corresponding currency specified in Rule O-1, as determined pursuant to Rule O-2(b). If a yield or rate is not available for a particular Friday, the calculation shall be made on the basis of the latest available yield or rate.

U.S. dollar	Market yield for three-month U.S. Treasury bills
Deutsche mark	Three-month interbank deposit rate in Germany
French franc	Three-month interbank money rate against private paper in France
Japanese yen	Discount rate on two-month (private) bills in Japan
Pound sterling	Market yield for three-month U.K. Treasury bills

- (d) The Fund will review the rate of interest on holdings of SDRs at the conclusion of each financial year.

Adopted September 18, 1969, amended June 13, 1974, June 30, 1976, April 1, 1978, June 15, 1978, effective July 1, 1978, September 17, 1980, effective January 1, 1981, and July 26, 1983, effective August 1, 1983; paragraph (b) amended October 25, 1978, effective January 1, 1979, and April 22, 1981, effective May 1, 1981; paragraph (c) amended April 22, 1981, effective May 1, 1981

The Effective Yield and Risk-Return Characteristics of the SDR

The effective yield of a financial asset is the rate of interest on the asset adjusted for any change in its capital value. In the case of the SDR, the concept of effective yield embraces the change in the value of the SDR in terms of the currency in which the effective yield is calculated. The effective yield of the SDR, when measured in terms of different "base" currencies, provides an indication of the performance of the SDR as a store of value relative to an alternative investment in the base currency. The basket method of SDR valuation and interest rate represents an average of yields that could be obtained if investments were made in the component currencies, and can therefore be expected to provide an important element of stability in the effective yield of the SDR by reducing the volatility of both the interest rate and the capital value of the SDR relative to those on other reserve assets.

An empirical test of the relative performance of the SDR as a reserve asset has been carried out by measuring the ex-post risk-adjusted return on SDR-denominated assets compared with that on major alternative assets denominated in the U.S. dollar, the deutsche mark, the Japanese yen, the pound sterling and the French franc. In this calculation, historical time series of daily effective yields were assembled by simulating an investment in each of the reserve assets reviewed and then rolling over this investment on a daily basis from January 1, 1981 to April 30, 1990. The average and standard deviation of the effective yields were computed for the entire period under review. The comparative calculations are based on the current instruments of the SDR interest rate basket.

The average effective yield measures the total return that would have been obtained if the investment had been maintained for the entire period. This measure does not provide, however, a measure of the risk involved in the investment, or of the potential loss if the investment had to be liquidated at any point in time during the period under review. Such risks can be measured in terms of the standard deviation of the effective yield, i.e., its volatility around the average over the sample period.

Table II.2 shows the average effective yield divided by its standard deviation to yield an index of return per unit of risk for alternative investments in different assets, where the effective yield is measured alternatively in the various currencies. The return-per-unit-risk ratio indicates the profitability of each investment relative to the risk sustained, i.e., the higher this ratio, the higher the return for a given level of risk or conversely, the higher the ratio, the lower the risk for a given level of return. As might be expected, the return per unit of risk is uniformly highest for investments in the

base currency (the currency in which the total return is measured, as listed in the table by column) because the risk involved does not have an exchange rate component. The last row of the table indicates that over the period covered, an investment in the SDR has invariably higher return per unit risk ratios than alternative investments in other assets with the exception of the French franc and the deutsche mark. 1/

These empirical results reflect the characteristics of the SDR as a diversified holding or portfolio of currencies. The relative stability of effective yield on the SDR arises because movements in the exchange rates of each of the component currencies included in the basket have been partially or fully offset by smaller or divergent movements in the exchange rates of the other currencies during the period under review.

1/ The ratios shown in cols. 3 and 4 for the French franc and deutsche mark are biased upward toward the ratios measured in terms of investment in the base currency in light of the participation of these two currencies in the exchange rate mechanism of the European Monetary System which limits the movements of these currencies against each other.

Table II.1 Effective Yield Per Unit Risk for Alternative Investments
 Measured in Terms of Alternative Base Currencies 1/
 January 1, 1981-April 30, 1990

	Base Currency					
	U.S. dollar (1)	Pound sterling (2)	French franc (3)	Deutsche mark (4)	Japanese yen (5)	SDR (6)
<u>Investment in:</u>						
U.S. dollar	3.12	0.50	0.43	0.28	0.23	0.58
Pound sterling	0.32	5.61	0.50	0.31	0.20	0.42
French franc	0.39	0.67	3.73	1.09	0.33	0.63
Deutsche mark	0.38	0.66	1.28	2.48	0.30	0.61
Japanese yen	0.40	0.60	0.65	0.44	4.30	0.59
SDR	0.73	0.76	0.73	0.50	0.36	3.68

1/ Ratio of effective yield to its standard deviation.

Short-Term Interest Rates and Money Markets for the
Currencies in the SDR Basket

1. United States

The United States has a highly developed domestic financial market. The interest rates on the securities and instruments issued and actively traded in this market generally fluctuate closely and in line with each other, and their differentials largely reflect the varying degrees of credit risk of the issuers. The financial innovation and deregulation that has taken place since 1985 has fostered arbitrage between the various securities and instruments, but has not altered the structure of most short-term rates since the time of the last review of the SDR basket. For the purpose of selecting the component for the SDR interest rate basket, U.S. Government securities continue to be the most appropriate instruments as they continue to represent the highest quality paper for investment of official reserves. The secondary market yield on three-month Treasury bills defined on a bond equivalent basis currently utilized in the SDR interest rate basket continues to closely reflect underlying market conditions.

2. United Kingdom

In the U.K. money market, the long-established and well-functioning market for government securities continues to be suitable for the purpose of determining the pound sterling component of the SDR interest rate basket, despite some recent evidence of fluctuation in the spread between short-term government papers and other money market rates.

With the emergence of a government budget surplus in recent years, the three-month Treasury bills appear to have been issued as a security that the Bank of England can buy or sell in its daily conduct of monetary policy. From 1981 to early 1989, the volume of three-month Treasury bills issued had been small, usually £100 million each week. Since Treasury bills are used by the Bank of England in its daily money market interventions, banks characteristically buy and hold Treasury bills in anticipation of purchases by the Bank of England. Foreign central banks frequently invest their pound sterling reserves in Treasury bills, given the risk-free quality of government securities. Thus, domestic banks and foreign central banks have held a disproportionately large share of outstanding Treasury bills (nearly two-thirds at the end of 1989), and because of thinness in the secondary market, the rate on three-month Treasury bills might not on occasion have been representative of overall credit conditions.

Since May 1989, however, and partly because of the relatively small amount of short-term paper (mostly commercial bills) which could be used in the conduct of daily money market interventions, the weekly issue of Treasury bills has been increased to around £500 million per week. Secondary market activity has consequently picked up somewhat even though domestic banks and foreign central banks continue to hold a very large portion of the outstanding stock of Treasury bills. Both the U.K. authorities and market participants consider the current market yield for three-month U.K. Treasury bills to be consistently representative of overall credit conditions in the United Kingdom.

An alternative rate is the three-month interbank deposit rate which has been regarded by private market participants as a reference rate for the operations in the money market. The behavior and level of the interbank deposit rate are however not significantly different from those of the rate on Treasury bill as to warrant a change in the pound sterling component for the SDR interest rate basket.

3. Germany

The money market in Germany is characterized by a relative small number of short-term instruments. The three-month interbank deposit rate currently used for the determination of the SDR interest rate continues to be traded in a fairly active and efficient secondary market which generally incorporates and reflects the conditions of the broader open market.

Short-term government securities with maturities of 60 to 90 days (bills and discount notes) are issued by the Federal Government, Federal Railways systems, the Federal Post Office and others, on an irregular basis and in modest amounts. The overall outstanding volume of these instruments is relatively small relative to other private money market instruments, and there is virtually no secondary market in these government securities.

4. Japan

The rate on the two-month commercial bill presently used in the SDR interest basket continues to be generally responsive to overall credit conditions in Japan. Since November 1988, however, with a change in the mechanism of money market intervention by the Bank of Japan, which is now concentrated in maturities of one-month or less, the outstanding volume of private commercial bills has declined sharply

in relation to overall money market liquidity. ^{1/} The market for an alternative instrument such as the three-month Treasury bill has remained relatively small in Japan in terms of turnover and outstanding volume. In consultation with the Japanese authorities, the staff has considered the alternative of using the rate on three-month certificates of deposit (CD rate) in light of its very broad range of use, high volume of turnover and liquidity, and the fact that this rate is regarded by money market participants as the most appropriate "benchmark" rate for assessing overall conditions in both the interbank and the open money market. The three-month CD rate does not seem to incorporate a spread for credit risk in light of the credit rating of financial institutions that issue certificates of deposit. The CD rate would appear to be the most appropriate rate for use in calculating the interest rate on the SDR.

5. France

Since late 1985, the French authorities have implemented substantial structural changes in the domestic financial system that were aimed at developing a single consolidated financial market. New financial instruments were introduced, including Treasury bills, certificates of deposits, and commercial paper. The rates on most short-term instruments appear to reflect closely both overall market forces and underlying credit conditions, and while spreads among the various instruments may vary, the structure of the rates on these instruments appears to be stationary and determined by structural and normal trading factors.

While the rate on the three-month interbank deposits currently used in the SDR interest rate basket continues to be broadly representative of overall market forces, consideration has been given to the use of the rate on Treasury bills, which were introduced in 1985, and are presently issued weekly in an amount varying from F 3 to F 4 billion. Reflecting the credit rating of government paper, the rate on the Treasury bill tends to be lower than those on other instruments of the same maturity by around three-eighths of a percent. The French authorities consider the rate on the three-month Treasury bill as fully responsive to underlying credit conditions and market forces, with the secondary market for such instruments having gained greater depth and liquidity in recent years, despite occasional fluctuations in the spread between the rate of the Treasury bill and the rates in the interbank deposit market arising in part from the impact of reserve requirements on certificates of deposit. Since

^{1/} According to data provided by the Industrial Bank of Japan, outstanding two-month commercial bills have fallen to about 9 percent of the total outstanding of commercial bills as of March 31, 1989.

January 1, 1990, the Bank of France has published a reference yield curve for government paper which is determined from actual quotations in the secondary market.

This Appendix reproduces the guidelines for the valuation of the currency amounts of the SDR valuation basket (Decision No. 8160-(85/186)G/S and presents the technical formulas for the calculation of the currency amounts of the basket.

SDR VALUATION BASKET—GUIDELINES FOR THE CALCULATION OF CURRENCY AMOUNTS

(1) Under all circumstances, the currency units will be determined in a manner which would ensure that the value of the SDR calculated on December 31 on the basis of the new basket will be the same as that actually prevailing on that day.

(2) The currency amounts calculated for the new basket will be expressed in two significant digits provided that the deviation of the percentage share of each currency in the value of the SDR, resulting from the application of the average exchange rates for October–December, from the percentage weight as determined under paragraph 3(c) of Executive Board Decision No. 6631-(80/145) adopted September 17, 1980 is the minimum on average and will not exceed one half percentage point for any currency.

(3) If a solution cannot be obtained by the application of the principles set forth in (2) above, the calculation shall be made applying the same principles but expressing the amount of each currency in three significant digits, and if no solution is found with three significant digits then the calculation shall be made applying the same principles but expressing the amount of each currency in four significant digits.

(4) If more than one solution is found in the calculation at the level of two, three, or four significant digits, the solution that has the smallest average deviation will be employed.

*Decision No. 8160-(85/186) G/S
December 23, 1985*

Formulas for the Calculation and Rounding of the Currency Components in the SDR Valuation Basket i/

The calculation of the amounts of each currency in the SDR valuation basket is presented algebraically below.

- Let W_i be the weight of currency i, expressed as a proportion;
- BEX_i be the base period average exchange rate for currency i, expressed as U.S. dollars per unit of currency i;
- TEX_i be the exchange rate for currency i on the transition date, the last business day of the base period, expressed as U.S. dollars per unit of currency i; and
- $\$/SDR$ be the value of the SDR in U.S. dollars on the transition date, calculated under the then Rule O-1.

Step A: The components in the basket are determined as:

$$C_i = (W_i/BEX_i) \cdot \frac{\$/SDR}{\sum_{i=1}^5 (W_i/BEX_i) \cdot TEX_i}$$

where C_i is the units of currency i.

Step B: In rounding the results under Step A, the rounded currency amounts RCC_i will be determined in a manner that would ensure that the value of the SDR on the transition date on the basis of the new basket will be the same as that actually prevailing on that day. For each of the baskets that meet the test, the root mean square of the deviations of the rounded currency components (RCC_i) from their previously calculated values, i.e.,

$$\sqrt{\frac{\sum_{i=1}^5 \left(\frac{RCC_i - C_i}{C_i} \right)^2}{5}}$$

is calculated.

1/ See "SDR Valuation Basket - Calculation of the Currency Amount," SM/80/206, Supplement 3 (12/15/80) and Supplement 5 (12/22/80). See also Decision No. 8160-(85/186)G/S, adopted December 23, 1985 (reproduced in this Appendix).

Step C: The currency amounts of the new basket will be expressed to two significant digits, provided that the percentage deviation over the agreed weight for each currency in the value of the SDR resulting from the application of the average exchange rates for the relevant three-month period ending on the transition date is the minimum on average and does not exceed one-half percentage point for any currency.

Step D: If no solution is found under Step C, the significant digits to which all currency amounts will be expressed may progressively exceed two digits (up to four digits) provided that the shares of component currencies over the three-month averaging period, when appropriately rounded, are the same as the agreed percentage weights.

At any level of number of significant digits used to express the currency amounts, the basket that meets the test of equality with the transition value of the SDR in U.S. dollars, expressed to six significant figures, and with the smallest root mean squared deviation is selected.

