FOR
AGENDA

EBS/87/165
Supplement 1

CONFIDENTIAL

July 30, 1987

To: Members of the Executive Board

From: The Secretary

Subject: Review of the Compensatory Financing Facility — Annexes

      The seven attached annexes provide additional material to the review paper on the compensatory financing facility (EBS/87/165, 7/28/87).

      Mr. Kaibni (ext. 7721) is available to answer technical or factual questions relating to this paper prior to the Board discussion scheduled for Monday, August 24, 1987.

Att: (7)

INTERNATIONAL MONETARY FUND

<u>Review of the Compensatory Financing Facility:</u>   Annexes

Prepared by the Research Department

(In consultation with other Departments)

Approved by Jacob A. Frenkel

July 28, 1987

Access under the CFF

This annex examines access under the compensatory financing facility with respect to both the size and utilization of the facility in relation to the economic circumstances faced by member countries and to the relationship of access under the CFF to that under other Fund facilities.

As regards the circumstances surrounding use of the CFF, with the onset of the international debt crisis, developing countries's current account balances in relation to their external debts and international reserve holdings have become particularly important. Between 1980 and 1986 the combined debt of all developing countries, measured as a pro- portion of GDP, increased over 50 percent, and the burden of their debt service payments exhibited a similar significant increase (Table I.1). Their current account deficits also increased sharply, but mainly as the result of deficits accumulated by fuel exporting countries. Though non-fuel exporting countries experienced increased current account deficits over the period 1981-83, their deficits in relation to GDP declined substantially thereafter to levels similar to those observed in the early and mid-1970s.

Against this background, the use of the CFF in proportion to developing countries' exports, debt service requirements and holdings of international reserves has remained rather stable, with cyclically high rates of CF usage observed in 1976 and most recently in 1982-83. A somewhat similar cyclical pattern is apparent when use of CF credit is compared with the use of total Fund credit (Chart I.1 and Table I.2). Though credit extended under the compensatory financing facility is an appreciable part of total Fund credit, the greatest part of recent increases of total Fund credit is accounted for by purchases under the credit tranches. The ratio of outstanding CF purchases to total use of Fund credit reached a cyclical high of 28 percent in 1982 before falling to 16 percent in 1986, when CF purchases were at their lowest level since 1978.

Access to the CFF has evolved considerably since the facility was created in 1963, as has access to Fund resources under credit tranche policies (Table I.3). Periodic reviews of the CFF in the 1970s resulted in a liberalization of access limits under the facility, in an attempt to enhance the CFF's role in meeting large payments deficits encountered by members during the period. The ratio of purchases outstanding under the CFF to purchases outstanding under the credit tranches reached a peak of 0.50 in 1969 and has declined since then. CF access limits were raised to 75 percent of quota in 1975 and further to 100 percent of quota in 1979. They remained at this level through 1984 when they were lowered to 83 percent of quota at the time of the eighth general review of quotas; they have remained unchanged since then. Maximum cumulative access limits governing the use of ordinary and borrowed resources under the credit tranche were increased to 600 percent of quota in 1980 before being reduced to 500 percent in 1984 and to 440 percent

Table I.1. Current Account Balances, External Debts, and International Reserves of
Developing Countries, 1975-86

(In billions of U.S. dollars; percentage of GDP) 1/

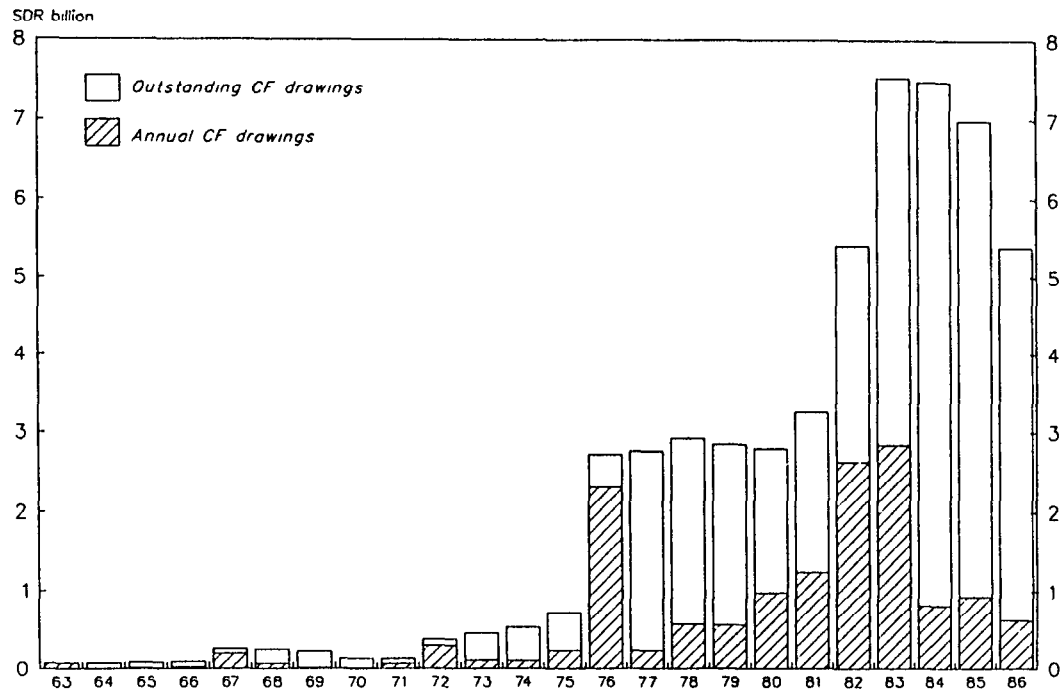|	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Exports												
Developing countries	245.5	288.6	329.8	355.6	478.8	630.6	619.8	546.5	521.2	555.6	534.6	501.4
	(19.7)	(21.3)	(21.3)	(19.9)	(22.2)	(24.2)	(22.9)	(20.6)	(19.9)	(20.7)	(19.9)	(18.2)
Fuel exporting countries	119.6	144.0	159.3	158.0	232.4	328.1	310.6	251.4	215.1	213.3	193.3	128.3
	(34.4)	(34.8)	(34.3)	(30.7)	(35.7)	(38.0)	(32.7)	(28.2)	(26.4)	(24.7	(22.5)	(16.9)
Non-fuel exporting countries	125.8	144.6	170.5	197.6	246.4	302.5	309.2	295.1	306.1	342.3	341.3	373.2
	(14.0)	(15.4)	(15.7)	(15.6)	(16.4)	(17.4)	(17.6)	(16.7)	(16.9)	(18.8)	(18.7)	(18.7)
Imports												
Developing countries	233.8	251.7	293.9	348.2	422.5	535.7	583.2	539.7	505.0	506.2	488.2	492.7
	(18.8)	(18.6)	(19.0)	(19.5)	(19.6)	(20.6)	(21.6)	(20.3)	(19.3)	(18.9)	(48.2)	(17.9)
Fuel exporting countries	68.4	80.0	97.8	114.3	124.6	160.0	190.3	180.9	157.2	144.4	125.5	109.7
	(19.7)	(19.4)	(21.0)	(22.2)	(19.1)	(18.5)	(20.0)	(20.3)	(19.3)	(16.7)	(14.6)	(14.5)
Non-fuel exporting countries	165.4	171.7	196.0	233.9	297.9	375.7	393.0	358.8	347.8	361.9	362.7	383.1
	(18.4)	(18.2)	(18.1)	(18.4)	(19.8)	(21.6)	(22.4)	(20.3)	(19.3)	(19.9)	(19.8)	(19.2)
Current account balances												
Developing countries	-6.0	8.2	1.2	-36.0	6.1	30.1	-48.7	-87.3	-63.8	-34.2	-23.8	-47.6
	(-0.5)	(0.6)	(0.1)	(-2.0)	(0.3)	(1.2)	(-1.8)	(-3.3)	(-2.4)	(-1.3)	(-0.9)	(-1.7)
Fuel exporting countries	27.7	31.0	21.4	-6.1	51.4	95.9	34.8	-18.2	-18.7	-5.4	2.6	-35.7
	(8.0)	(7.5)	(4.6)	(-1.2)	(7.9)	(11.1)	(3.7)	(-2.0)	(-2.3)	(-0.6)	(0.3)	(-4.7)
Non-fuel exporting countries	-33.6	-22.8	-20.2	-29.9	-45.3	-65.8	-83.5	-69.1	-45.1	-28.8	-26.5	-11.9
	(-3.7)	(-2.4)	(-1.9)	(-2.4)	(-3.0)	(-3.8)	(-4.8)	(-3.9)	(-2.5)	(-1.6)	(-1.4)	(-0.6)
External debts												
Developing countries	207.0	281.9	348.5	427.3	533.4	633.9	745.5	849.6	898.4	946.8	1,009.1	1,094.9
	(16.6)	(20.8)	(22.5)	(23.9)	(24.7)	(24.4)	(27.6)	(32.0)	(34.3)	(35.3)	(37.6)	(39.8)
Fuel exporting countries	52.7	71.2	93.9	122.7	147.0	174.6	216.6	250.0	259.9	266.8	277.0	296.1
	(15.2)	(17.2)	(20.2)	(22.6)	(22.6)	(20.2)	(22.8)	(28.0)	(31.9)	(30.9)	(32.2)	(39.1)
Non-fuel exporting countries	154.3	210.6	254.6	304.6	386.4	459.3	528.9	599.6	638.4	679.9	732.2	798.8
	(17.2)	(22.4)	(23.5)	(24.0)	(25.6)	(26.4)	(30.2)	(33.9)	(35.3)	(37.4)	(40.1)	(40.1)
Debt service												
Developing countries	32.4	36.9	45.6	60.2	82.6	100.5	127.4	138.1	127.6	142.1	140.3	146.5
	(2.6)	(2.7)	(2.9)	(3.4)	(3.8)	(3.9)	(4.7)	(5.2)	(4.9)	(5.3)	(5.2)	(5.3)
Fuel exporting countries	9.9	11.8	14.3	17.3	27.0	29.9	38.4	41.6	40.5	47.4	43.1	41.6
	(2.9)	(2.8)	(3.1)	(3.4)	(4.1)	(3.5)	(4.0)	(4.7)	(5.0)	(5.5)	(5.0)	(5.5)
Non-fuel exporting countries	22.5	25.1	31.3	42.8	55.6	70.7	88.9	96.5	87.1	94.6	97.1	105.0
	(2.5)	(2.7)	(2.9)	(3.4)	(3.7)	(4.1)	(5.1)	(5.5)	(4.8)	(5.2)	(5.3)	(5.3)
International reserves												
Developing countries	102.1	121.1	143.6	146.3	179.4	209.5	189.7	161.2	164.2	177.8	196.5	201.9
	(8.2)	(8.9)	(9.3)	(8.2)	(8.3)	(8.1)	(7.0)	(6.1)	(6.3)	(6.6)	(7.3)	(7.3)
Fuel exporting countries	60.6	69.2	80.6	69.2	93.3	124.3	105.7	77.1	73.0	72.9	79.9	60.2
	(17.4)	(16.7)	(17.3)	(13.4)	(14.3)	(14.4)	(11.1)	(8.6)	(9.0)	(8.4)	(9.3)	(8.0)
Non-fuel exporting countries	41.5	51.9	63.0	77.1	86.1	85.2	84.0	84.1	91.0	105.0	116.6	141.7
	(4.6)	(5.5)	(5.8)	(6.1)	(5.7)	(4.9)	(4.8)	(4.8)	(5.0)	(5.8)	(6.4)	(7.1)
Memorandum Items:												
Debt service ratios 2/												
Developing countries	10.9	10.6	11.5	13.7	14.1	12.9	16.2	19.5	18.9	20.1	20.5	22.4
Fuel exporting countries	7.3	7.2	7.8	9.3	10.1	7.9	10.3	13.6	15.2	18.1	18.1	24.4
Non-fuel exporting countries	13.8	13.7	14.5	16.9	17.4	17.7	21.4	24.0	21.3	21.2	21.8	21.7
Reserve ratios 3/												
Developing countries	3.9	4.2	4.2	3.6	3.6	3.3	2.7	2.4	2.6	2.8	3.2	3.3
Fuel exporting countries	7.1	6.6	6.3	4.6	5.6	5.6	4.0	3.0	3.3	3.5	4.3	3.7
Non-fuel exporting countries	2.4	2.8	3.0	3.0	2.6	2.1	1.9	2.0	2.2	2.5	2.8	3.2
CFF use relative to selected international account items of non-fuel exporting countries (in percent)												
Exports	0.7	2.2	1.9	1.9	1.5	1.2	1.2	2.0	2.6	2.2	2.1	1.7
Imports	0.5	1.8	1.6	1.6	1.2	1.0	1.0	1.7	2.3	2.1	2.0	1.7
Debt service	3.9	12.5	10.3	8.5	6.6	5.1	4.3	6.2	9.2	8.1	7.3	6.0
International reserves	2.1	6.0	5.1	4.7	4.3	4.3	4.6	7.1	8.8	7.3	6.1	4.5

Source   IMF, International Financial Statistics and World Economic Outlook.

1/ In billions of U.S. dollars, in parenthesis, in percentage of GDP.
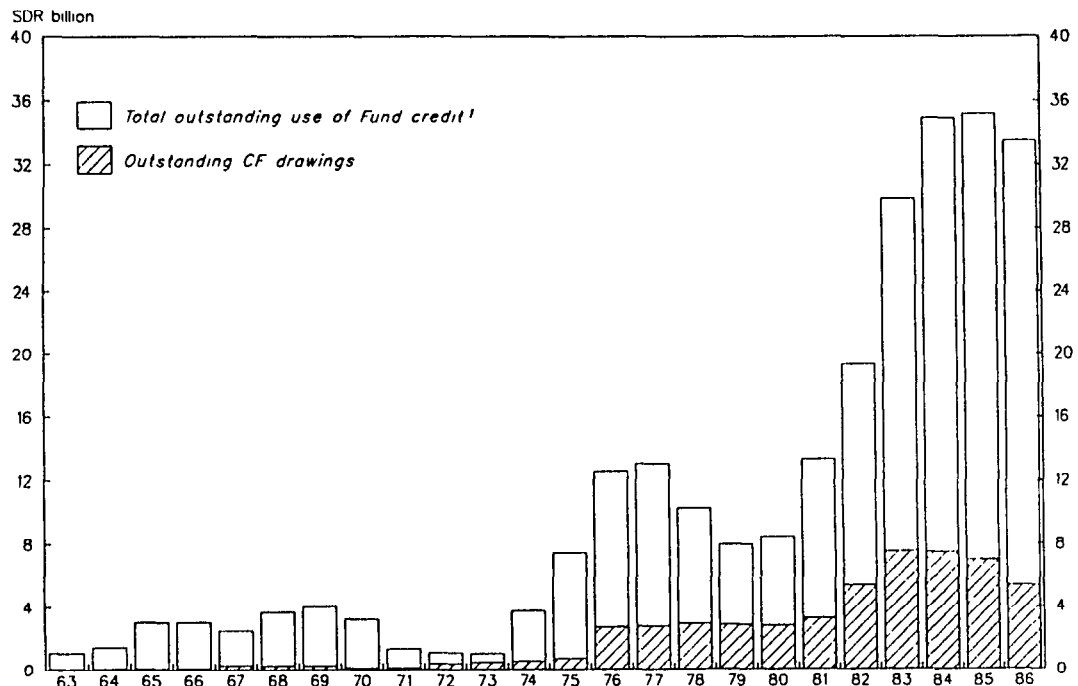2/ Debt service relative to exports of goods and services, in percent.
3/ International reserves relative to average monthly imports of goods and services, in months of reserves.

CHART I.1
ANNUAL DRAWINGS AND OUTSTANDING AMOUNTS UNDER THE CFF, 1963–1986

SDR billion

OUTSTANDING USE OF FUND CREDIT AND CF DRAWINGS, 1963–1986

SDR billion

[1]Excluding use of the reserve tranche and Trust Fund loans.

Table T.2. Use of Fund Credit, 1975-86

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
						(In billions of SDRs)						
All member countries												
Total outstanding year-end	7.44	12.61	13.08	10.28	7.98	8.49	13.37	19.31	29.90	34.91	35.18	33.42
Of which:												
Compensatory financing facility	0.72	2.71	2.76	2.92	2.85	2.79	3.27	5.40	7.53	7.48	6.99	5.40
Credit tranche	1.83	3.15	4.12	2.28	2.14	3.73	9.16	13.62	21.99	27.06	28.01	27.98
Oil facility	4.76	6.70	6.42	5.00	2.82	1.91	0.93	0.15	--	--	--	--
Non-oil developing countries												
Total outstanding year-end	4.14	6.91	6.62	6.17	6.32	7.44	12.82	19.18	29.45	34.46	35.12	33.36
Of which:												
Compensatory financing facility	0.67	2.22	2.26	2.41	2.38	2.59	3.22	5.38	7.15	7.10	6.92	5.35
Credit tranche	0.82	1.44	1.63	1.49	2.14	3.73	9.16	13.62	21.99	27.06	28.01	27.88
Oil facility	2.52	3.21	2.95	2.21	1.66	1.07	0.44	0.07	--	--	--	--
						(Annual percentage change)						
Memorandum items												
World output 1/	1.3	4.9	4.3	4.3	3.4	2.1	1.8	0.6	2.6	4.4	3.1	2.9
World exports 1/	-4.4	11.0	4.9	6.7	6.4	1.2	0.7	-2.2	2.9	8.6	3.2	4.9
Price of oil 2/	5.1	6.3	9.4	22.8	45.9	63.6	9.8	-4.3	-11.4	-2.5	-4.3	-48.3
Price of non-oil primary commodities 2/	-17.1	16.2	23.4	10.4	17.9	5.5	-13.5	-9.9	6.9	4.1	-12.9	-1.1

Sources: IMF, International Financial Statistics and World Economic Outlook.

Note: Total Fund credit includes credit extended under the buffer stock financing facility, but excludes reserve tranche purchases.

1/ Output and exports in real and volume terms respectively.
2/ Prices in terms of U.S. dollars.

Table I.3. Evolution of Access Limits for Drawings Under the Special Facilities
and Use of Ordinary Resources, 1963-86

(In percent of quota)

	Special Facilities					Credit Tranches	
	Compensatory financing facility				Buffer stock financing facility	Use of ordinary and borrowed resources 1/	
	Cumulative			Tranche conditionality limits			
	Exports	Exports plus cereal imports	Annual			Cumulative	Annual
February 1963	25	25	--	--	--	100	25
September 1966	50	50	25	25	--	100	25
June 1969	50	50	25	25	50 2/	100	25
December 1975	75	75	50	50	50 2/	165 (Sept. 1974)	25
August 1979	100	100	--	50	50	305 (Feb. 1979)	n/a
May 1981	100	125 3/	--	50	50	600 (July 1980)	150
January 1984	83	105 4/	--	50	45	408-500 5/	102-125 5/
January 1985	83	105 4/	--	50	45	408-450	95-115 5/
January 1986	83	105 4/	--	50	45	400-440	90-110 5/

1/ Prior to September 1984 the data refer to limits under stand-by arrangements; after September 1984 they refer to maxima under extended arrangements. The original Articles of Agreement (Article V, Section 3) provided for an annual access limit--which was often waived-- of 25 percent of quota. Quota limits for shorter periods of time were also in effect. The cumulative limit of 165 percent of quota was raised to 176.25 from January 1976 through March 1978, after which it was reinstated at 165; however, the annual limit of 25 percent of quota was then dropped, effective April 1978. The cumulative limit of 305 percent of quota was amended to 465 from September 1979 to July 1980 when it was dropped and an annual limit of 200 percent of quota was reinstated.

2/ A joint limit of 75 percent of quota on CFF and BSFF purchases was in effect from June 1969 until December 1975.

3/ Refers to joint quota limit for.CF purchases in relation to cereal imports and to merchandise exports; a separate limit of 100 percent applies in respect of each component.

4/ Separate limit for cereal imports is 83 percent of quota.

5/ Depending on the seriousness and strength of the member's adjustment effort.

in 1986. 1/ Thus, the ratio of CF access to access under the credit tranches reached a low of 0.17 in 1981 before rising to its current level of 0.21. 2/ When yearly access limits under the enlarged access policy were introduced in 1981, the ratio of maximum access under the CFF to maximum yearly access under tranche policies was 0.81. This ratio is currently 0.83. It should be noted, however, that actual use of Fund credit under the enlarged access policy has been considerably less than the maximum, averaging only about 45 percent in 1985/86.

A better measure of the extent to which the facility meets the compensatory financing needs of individual countries could be gauged by the extent to which actual CF purchases cover calculated shortfalls. Table I.4 details the utilization of the facility by non-fuel exporting developing countries over the period 1975 to 1986, by reference to all countries and to the subset of countries actually drawing on the facility. Because not all countries experiencing shortfalls meet the criteria for, or request use of the CFF, the compensation ratios computed for countries actually drawing on the facility are clearly much higher than those computed for the group of all non-fuel exporting countries. The compensation ratio for countries actually drawing on the facility has ranged from a low of about 40 percent to a high of about 75 percent. 3/

Overall, it is clear that the CFF has provided a useful additional source of finance for those countries that have experienced shortfalls and have met the criteria for use of the facility. However, the low rate of compensation in relation to total shortfalls in some periods when these shortfalls were large, has also reflected the difficulties that some members have had in fulfilling all the conditions for use of the facility, particularly the test of cooperation. As balance of payments problems have become more intractable it has been increasingly necessary to require fundamental changes of policy to accompany CF purchases as a means of safeguarding the revolving character of the Fund's resources.

1/ The corresponding lower access limits on outstanding purchases were 408 percent and 400 percent of quota respectively in 1984 and 1986.

2/ The comparisons use the lower access limit under the enlarged access policy as the upper limit has not been applied.

3/ As reported, the compensation ratio is a weighted average measure of compensation—the sum of purchases as a percent of the sum of short-falls. A simple average indicates higher rates of compensation. The weighted average includes a relatively small number of large drawings involving substantial undercompensation.

Table I.4.   Utilization of CF Quota Limits by Non-Fuel Exporting
Developing Countries, 1975-86

(In billions of SDRs)

Year	Quota (CF limit, in percent)	Potential CF Resources (Unutilized balances)	Export Earnings (Annual percentage change)	Earnings Shortfalls	CF Drawings	Compensation Ratio In percent		
						All countries Weighted average	Drawing countries Simple average	Weighted average
1975	6.7 (50)	3.5 (3.0)	103.6 (0.1)	7.3	0.2	--	--	--
1976	6.7 (75)	4.1 (3.4)	125.2 (20.9)	3.6	1.7	31.2	62.2	50.3
1977	6.7 (75)	5.4 (3.4)	146.0 (16.6)	1.8	0.2	7.4	62.3	44.2
1978	8.9 (75)	6.9 (4.9)	157.9 (8.1)	9.3	0.5	9.0	63.7	58.0
1979	8.9 (81)	9.4 (7.2)	190.7 (20.8)	4.5	0.6	8.7	65.1	54.1
1980	15.3 (100)	14.9 (12.7)	232.4 (21.8)	1.7	1.0	32.3	71.8	75.4
1981	15.3 (100)	14.6 (12.1)	262.2 (12.8)	2.6	1.2	55.8	76.5	49.7
1982	15.7 (100)	13.5 (10.3)	267.3 (1.9)	9.3	2.6	43.7	79.0	63.2
1983	21.3 (100)	16.0 (10.6)	286.4 (7.1)	10.0	2.4	24.9	73.7	75.2
1984	21.5 (83)	17.9 (10.9)	333.9 (16.6)	0.2	0.8	15.7	60.2	40.5
1985	21.5 (83)	18.1 (11.0)	336.1 (0.7)	1.9	0.9	85.7	78.7	76.2
1986	22.2 (83)	20.2 (13.3)	318.1 (-5.4)	14.0	0.4	5.0	74.9	59.9

Sources: IMF, International Financial Statistics, World Economic Outlook, and Fund staff computations.

Notes: Potential CF resources are CF access limits, times the general CF quota limit in any given year. Export earnings shortfalls are calculated by country as the difference between actual exports, on annual basis, and a 5-year geometric average of historical export earnings centered on the indicated year, except for 1985 and 1986 when shortfall estimates employ World Economic Outlook export earnings projections for 1987 and 1988. Compensation ratio is computed as CF purchases relative to export earnings shortfalls. Because lags typically exist between shortfalls and drawings, the weighted average compensation ratios for the group of all non-fuel exporting countries are estimated by matching drawings in each year with the simple average of shortfalls in the current and preceding year. Rates of compensation for drawing countries are averages computed from official CF records.

The Stabilizing Role of CFF

This annex examines the role of the compensatory financing facility (CFF) in stabilizing export earnings. It first considers the extent to which the CFF may be expected to exercise a stabilizing role. It then discusses the approach used to assess its stabilizing effect over time. This is followed by an analysis of the actual contribution of the CFF to stabilizing export receipts, and how this contribution would have been affected if CF purchases had been phased.

1. The expectation of stabilizing role

One of the principal factors underlying the introduction of the CFF was that it would help maintain the import capacity of members, particularly the primary commodity exporting countries, by reducing fluctuations in the availability of foreign exchange receipts. Purchases under the CFF supplement earnings from merchandise exports while repurchases diminish such earnings. While the magnitude of purchases has always been determined in relation to a member's quota, with the consequence that purchases have not necessarily been sufficient in all cases to compensate for export shortfalls, it is clearly the timing of these purchases and associated repurchases in relation to the profile of exports over time that are the crucial factors in an assessment of the stabilizing role of the facility.

There are a number of aspects of the CFF which suggest a stabilizing influence. First, under normal circumstances, once a shortfall is identified the member's request can be processed relatively quickly. Secondly, since 1979 the shortfall year may include projected exports for up to six months if it is expected that a shortfall will emerge, thus increasing the timeliness of assistance. Thirdly, the computation of the shortfall is not based on past data alone but is calculated as a deviation from trend using two years of projected exports. Assuming correct forecasts, this is likely to favor an accurate identification of the shortfall period and, therefore, enhance the stabilizing effect of the CFF.

There are, however, a number of other factors which might destabilize earnings. First, CF purchases may be made up to six months after the end of the shortfall year, with the effect that the time lag between the middle of the shortfall year and the purchase could be up to one year or more. Secondly, repurchases under the facility are usually made in equal quarterly installments during the period beginning three years and ending five years after the date of purchase—a time frame which may or may not correspond to an upturn in export receipts. Thirdly, if there are errors in forecasting, purchases may have taken place in periods with export excesses rather than shortfalls, thereby destabilizing receipts.

2. Methodology

The approach taken in this annex is to compute for the 79 countries which have made CF purchases since 1975 an index of stability of exports with and without CF transactions. There are many available measures

which could be used for this purpose. This analysis focusses on one index of export earnings instability computed as follows:

$$ I \; = \; \frac{100}{n} \; \cdot \; \Sigma \; \left| \frac{\overline{X} - X}{\overline{X}} \right| $$

where $\overline{X}$ = centered 5-year geometric moving average of export earnings

X = export earnings in the shortfall year

n = Number of years over which deviations from $\overline{X}$ are computed.

As equation (1) indicates, the index is based on the average of the annual absolute percentage deviations of exports from its centered 5-year moving average. 1/ This index was computed for each of the 79 countries in the sample for the period 1975 to 1985. The index has the advantage of allowing for a non-linear trend.

The formula is first used to derive a measure of stability based on export earnings without CF transactions. This is then compared with an index that takes account of purchases only, and another that includes both purchases and repurchases. Since repurchases are not necessarily made when there is an upturn in export receipts, it is conceivable that they could have a destabilizing influence. It is therefore useful to examine separately the effect of purchases and repurchases on earnings stability. The time period over which purchases are regarded as supplementing export earnings is obviously an important element. In this annex it has been assumed that purchases can be allocated across the shortfall year and the year in which they occur. This is done by taking into account the interval between the middle of the shortfall year and the month in which the purchase occurred. 2/ The main reason for allocating the purchase in this manner is that the knowledge of the possible availability of compensation, even if it is obtained in the year following the shortfall, means that in the shortfall year itself the adverse effect of shortfall may be mitigated by other factors. For instance, a country may draw down its international reserves on the expectation that they can be

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1/ The absolute deviation was used since it is the most straightforward measure of instability. The lower the instability, the lower will be the value of the index, with the value of 0 indicating no instability.

2/ For example, if a purchase is made in March 1986 for the shortfall year January to December 1985, then 1/3 of the purchase is considered to have taken place in 1986 and 2/3 in 1985 (taking the time period from the middle of the shortfall year to end of calendar year and three months from end of shortfall year to purchase). The total interval from the middle of the shortfall year is nine months.

built up as soon as the CF purchase is made, or it may be able to borrow
on the international capital market on the basis of the expected
compensation. In either case, its ability to import need not be adversely
affected by the export shortfall. Two other schemes for allocating
purchases were also used and are discussed below.

3.   Estimates of stabilizing influence

        The main results of the analysis are provided in Table II.1. The
first column reports the value of the export instability Index I without
any CF transactions for each of the 79 countries. 1/ Not surprisingly,
this varies very considerably across countries with the value of index
ranging from 2.36 to 24.95. The second and third columns report,
respectively, the values of the index based on export earnings plus CF
purchases, and the values of the index based on export earnings plus
purchases minus repurchases. The last two columns indicate the difference
between column (1) and (2) and between column (1) and (3), both as a
percentage of column (1).

        Consider, for example, the first row. Column (1) shows that over the
11-year period 1975 to 1985, the instability index for Argentina had a
value of 9.54. Taking into account the CF purchases made over this entire
period, the index had a value of 8.79 and with repurchases the value was
9.02. This indicates that CF purchases had reduced the instability of
earnings over this period. Even though the repurchases by themselves
increased instability marginally, purchases and repurchases taken together
still had a stabilizing influence. As columns (4) and (5) for Argentina
show, purchases decreased instability by 7.87 percent, and purchases and
repurchases together decreased it by 5.42 percent.

        As the last row of the table indicates, the average value of the
instability index for the 79 countries was 9.80; with purchases it
declined to 9.14 and with purchases and repurchases it was 9.17. The
average decrease in instability as a proportion of the original value of
the index was 5.37 percent for purchases and 5.31 percent for purchases
and repurchases respectively. From the table it can also be computed
that of the 79 countries 64 had a decline in instability and that the
decline was 5 percent or more in 34 of these 64 countries. 2/

        It is worth emphasizing that the measured decline in instability is
the result of CF drawings that were, for most countries, a small proportion
of total export earnings or even of export shortfalls. Furthermore the
drawings were made, on average, only two or three times during the 11-year
period. So for most of the years the fluctuations in earnings from the
trend, resulting in surpluses or shortfalls, were not dampened in any way.
Given this, one would not have expected the decline in instability to have
been very large. Nevertheless, the magnitude of the decline is far from

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1/ The index is computed for the period 1975-1985.
2/ An analysis was also conducted using an alternate specification of
Index I similar to the "root mean square error" formula. The conclusions
obtained from this exercise were very similar to the above.

Table II.1. Estimates of Stabilizing Influence of CFF:
79 Countries, 1975-85

Country	Instability Index I 1/			Percentage Change	
	(1)	(2)	(3)	(1-2)/1	(1-3)/1
Argentina	9.54	8.79	9.02	7.87	5.42
Australia	6.30	6.45	6.35	-2.40	-0.78
Bangladesh	5.76	5.65	5.27	1.85	8.44
Barbados	13.20	12.09	12.16	8.44	7.93
Belize	10.56	9.90	10.02	6.24	5.12
Bolivia	7.77	7.47	7.59	3.90	2.28
Brazil	10.29	9.67	9.75	5.97	5.23
Burma	7.51	7.36	7.29	2.00	2.90
Burundi	17.63	18.94	18.79	-7.40	-6.35
Cameroon	7.33	7.03	7.01	4.00	4.27
Central African Rep.	7.87	8.00	7.87	-1.58	0.00
Chad	19.77	18.32	18.83	7.35	4.77
Chile	8.07	8.04	8.07	0.38	0.08
Congo	14.63	14.47	14.42	1.12	1.45
Costa Rica	6.01	5.69	5.72	5.23	4.85
Cote d'Ivoire	8.04	8.08	7.89	-0.53	1.90
Cyprus	10.28	9.38	9.30	8.81	9.57
Dominica	16.36	13.43	13.62	17.89	16.71
Dominican Rep.	12.44	11.43	11.56	8.11	7.05
Ecuador	8.89	8.46	8.56	4.89	3.73
Egypt	10.62	10.48	10.50	1.25	1.09
El Salvador	10.99	10.29	10.25	6.30	6.70
Equatorial Guinea	24.95	22.35	21.95	10.41	12.03
Ethiopia	9.70	8.80	9.02	9.22	6.97
Fiji	8.73	9.06	9.10	-3.78	-4.23
Gambia, The	14.15	11.83	11.65	16.40	17.67
Ghana	8.63	7.72	7.87	10.56	8.80
Greece	4.53	4.80	4.72	-5.96	-4.22
Guatemala	7.73	8.47	8.18	-9.49	-5.72
Guyana	12.95	12.54	12.54	3.13	3.10
Haiti	11.25	10.70	10.37	4.93	7.86
Honduras	6.11	5.91	5.88	3.27	3.78
Hungary	2.36	2.36	2.37	-0.09	-0.33
Iceland	6.26	5.73	5.66	8.48	9.56
India	4.02	3.87	3.81	3.57	5.08
Indonesia	10.97	10.73	10.80	2.20	1.60
Israel	4.44	4.44	4.49	0.10	-1.08
Jamaica	7.84	7.83	7.79	0.04	0.65
Kenya	9.15	7.99	8.10	12.67	11.41
Korea	5.74	5.61	5.62	2.20	1.98
Lao People's Dem. Rep.	19.11	13.76	14.01	28.02	26.69
Madagascar	6.10	6.24	6.36	-2.28	-4.22
Malawi	11.99	11.05	11.49	7.85	4.17
Malaysia	9.32	9.16	9.10	1.70	2.37
Mali	11.85	11.80	11.64	0.40	1.82
Mauritania	10.67	10.25	10.28	3.94	3.60
Mauritius	6.38	6.15	6.03	3.69	5.62
Mexico	11.02	10.92	10.93	0.98	0.88
Morocco	7.40	6.78	6.69	8.42	9.59
New Zealand	4.47	4.45	4.30	0.46	3.82
Nicaragua	10.48	10.59	10.62	-1.05	-1.31
Niger	10.72	11.10	10.96	-3.56	-2.26
Pakistan	6.98	6.43	6.14	7.83	12.04
Panama	7.54	6.06	6.34	19.59	15.90
Peru	10.24	9.56	9.67	6.66	5.59
Philippines	6.72	6.05	6.04	10.00	10.14
Portugal	7.04	6.79	6.82	3.60	3.05
Romania	3.76	3.87	3.77	-3.11	-0.41
Senegal	14.58	9.71	9.76	8.24	7.76
Sierra Leone	10.91	8.60	8.84	21.16	18.97
Somalia	12.68	10.01	10.01	21.09	21.09
South Africa	6.73	6.12	6.09	9.09	9.53
Spain	4.20	4.16	4.17	1.06	0.76
Sri Lanka	7.52	7.11	6.99	5.36	6.98
Sudan	11.80	10.38	10.41	12.10	11.82
Swaziland	12.78	12.82	12.81	-0.33	-0.23
Tanzania	10.26	9.42	9.44	8.25	7.99
Thailand	5.61	5.87	5.80	-4.61	-3.44
Togo	10.58	10.13	10.23	4.28	3.37
Tunisia	8.38	8.13	8.07	2.89	3.53
Turkey	12.97	12.40	12.49	4.46	3.70
Uganda	15.91	14.10	14.04	11.37	11.77
Uruguay	8.38	7.46	7.62	10.91	9.10
Viet Nam	11.66	12.03	12.43	-3.11	-6.57
Western Samoa	24.92	20.41	21.27	18.08	14.63
Yugoslavia	6.24	5.76	5.81	7.71	6.93
Zaire	9.17	7.52	7.83	17.98	14.58
Zambia	13.74	11.48	12.12	16.41	11.77
Zimbabwe	7.69	7.61	7.62	1.12	0.94
Mean	9.80	9.14	9.17	5.37	5.31
Standard error	0.52	0.46	0.47	0.75	0.68

1/ Column (1) reports index without CFF; Column (2) reports index with
CF purchases; and Column (3) reports index with CF purchases and repurchases.

negligible. Over an 11-year period the decline is over 5 percent on
average, which given the size of CF drawings in relation to exports and
shortfalls noted above can be regarded as significant.

In order to examine the extent to which these results are robust to
the use of different schemes for apportioning purchases with respect to
different time periods, a further analysis was carried out. This entailed
a simulation exercise similar to the above, but this time adding the
entire purchase to the year in which the purchase was made. A third
possiblity, that the purchases should be regarded as available only over
the shortfall year regardless of when they were made, was also examined.
Here the purchases were added to export earnings by prorating the purchases
over the 12 months of the shortfall year.

The summary results of these two exercises, together with the earlier
results, are given in Table II.2. These results report the values of the
instability indices with and without CFF transactions averaged over the
79 countries. The first row indicates that, as before, without the CFF
the average value of the instability index was 9.80. With drawings added
to the purchase year the index declines to 9.53 and although with
repurchases there is a small increase, there is still a clear stabilizing
effect. Compared to the earlier results (row 3.1), the decline in insta-
bility is now lower, but it is still unambiguous and statistically
significant. 1/

Similarly when purchases are added to the shortfall year rather than
to the purchase year (row 2.1), there is again a clear decline in the
instability index with purchases alone and with purchases and repurchases.
The results of this simulation exercise indicate that the conclusions
obtained earlier are not significantly affected by different schemes for
allocating CF purchases to countries' export earnings.

In the above analyses we have examined all the CF cases for which
the relevant data were available. These include a considerable number of
cases which were overcompensated in the light of ex post data on export
earnings. 2/ The reason for examining all cases was to obtain as com-
prehensive a picture as possible of the stabilizing consequences of CFF.
It can be argued, however, that inclusion of overcompensated cases may in
fact bias the results towards finding, on average, unduly small stabiliz-
ing effects. This is because in these cases the actual CF drawings may
have had a destabilizing effect since at the time of the drawings in
reality there would have been a smaller shortfall or even an excess. This
would have amplified the fluctuations in export earnings rather than
dampen them. This suggests that the exclusion of overcompensated cases

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1/ Note that the percentage difference in column (4) and column (5) are
computed from percentage differences for individual countries and are not
simple differences between column (1) and columns (2) and (3).

2/ This "overcompensated" category does not include early drawing cases
where prompt repurchases are mandatory if estimates of export earnings in
the shortfall year turn out to be too low.

Table II.2. Earnings Instability and Timing of Purchases

		Index			Percentage Change	
		Without CFF (1)	Purchases only (2)	Purhases and repurchases (3)	(1-2)/1 (4)	(1-3)/1 (5)
1.	Purchases added to purchase year 1/					
	1.1 Mean	9.80	9.53	9.55	1.81	1.82
	1.2 Standard error	0.48	0.44	0.45	0.91	0.85
2.	Purchases added to shortfall year 2/					
	2.1 Mean	9.80	9.24	9.27	4.58	4.49
	2.2 Standard error	0.48	0.43	0.43	0.76	0.71
3.	Purchases distributed over shortfall and purchase year 3/					
	3.1 Mean	9.80	9.14	9.17	5.37	5.31
	3.2 Standard error	0.52	0.46	0.47	0.75	0.68

1/ For this simulation, the entire purchase is added to a country's export earnings in the year it is made.

2/ In this case, the entire purchase is allocated to the shortfall year, regardless of when it was made. The purchase is added to export earnings by prorating it over the twelve months of the shortfall year.

3/ The distribution of purchases is as in Table II.1. It is done by taking into account the interval between the middle of the shortfall year and the drawing month.

or the use of ex post drawings (that is, drawings which would have resulted
on the basis of shortfalls using actual rather than projected exports)
would lead to finding, on average, a stronger stabilizing influence. The
results of an additional exercise using ex post drawings seemed to bear
this out with the average decline in instability now greater than obtained
previously (the average decline was 6.4 percent compared to 5.3 percent
earlier). This result strengthens further the conclusions obtained
earlier.

4.   Phasing of purchases

        One of the major differences between the use of the CFF and use of
Fund resources in the upper credit tranches is that purchases under the
CFF (as those in the first credit tranche) are not phased. Under the CFF
a member can purchase the full amount for which it qualifies as soon as
the Board approves a request. In contrast, purchases under the stand-by
and extended arrangements are invariably phased and subject to performance
criteria. This had led to questions concerning whether the immediate
availability of a relatively large amount of resources may undermine the
incentive to members to follow through with adjustment. In this context,
a system of phasing CF purchases has been suggested, with CF access linked
directly to purchases under a stand-by arrangement and subject to the
same conditions. Phasing could, however, be considered to run counter to
one of the central objectives of the facility, that is, that compensation
should take place as closely as possible in time to the shortfall to
which it relates. This suggests that there may well be a trade-off in
phasing--it may have the benefit of increasing the incentive to pursue
adjustment, but also have the cost of reducing the effectiveness of the
facility in stabilizing foreign exchange earnings.

        An estimate of the magnitude of this risk is clearly important in
this context. In the following analysis two different types of phasing
schemes were employed and their impact on stabilization assessed:

        (1) The purchases were phased over four quarters. The procedure was
as follows: the actual purchase was divided into four equal installments.
The first installment was allocated over the shortfall and purchase year
in the manner noted earlier. The second installment was allocated three
months after this, and so on.

        (2) As under (1), but purchases phased over eight quarters.

The values of indexes obtained from these were compared with an index
without CF purchases. (In order to focus on the impact of phasing only
the impact of CF purchases was examined and that of repurchases was not
considered). The results of this exercise are given in Table II.3.

The first two columns in this table report the value of the insta-
bility index without CF transactions and with unphased purchases
respectively. (These two columns reproduce the results presented earlier
in Table II.1). The third and fourth column indicate the value the
instability index would have taken if the purchases had been phased over
four and eight quarters respectively. In the case of phasing over four
quarters, comparing the index with the case of no CF, there is a stabi-
lizing effect for most years. However comparing it to unphased purchases,
it is very clear that the stabilizing effect is markedly less. For a
large proportion of the countries phasing over four quarters would have
led to increase in instability compared to no phasing. 1/ When purchases
are phased over eight quarters, this conclusion is even stronger. For
most of these countries, phasing leads to considerably increased instabi-
lity when compared to unphased access. Furthermore, in this case for
several countries even compared to no CF purchases at all, there is either
no decline in instability or there is an actual increase.

5. Conclusion

This annex has examined a number of issues related to the role CFF
has played in stabilizing foreign exchange earnings. The main conclusion
to be drawn from the above findings is that the CFF has performed a clear
role in stabilizing fluctuations in foreign exchange earnings of developing
countries. The reason for this has been the availability of substantial
compensation close in time to shortfall in earnings. In this context,
phasing of purchases was shown to have a cost in reducing the effectiveness
of the facility.

1/ Instability is increased for 54 of the 79 countries. For an additional
6 there is either no or negligible change.

Table II.3. Effect of Phasing on Stability

	Instability Index 1/			
	(1)	(2)	(3)	(4)
Argentina	9.54	8.79	8.56	9.09
Australia	6.30	6.45	6.50	6.33
Bangladesh	5.76	5.65	5.80	5.39
Barbados	13.20	12.09	12.45	12.83
Belize	10.56	9.90	10.19	10.47
Bolivia	7.77	7.47	7.41	7.52
Brazil	10.29	9.67	9.77	10.11
Burma	7.51	7.36	7.72	7.58
Burundi	17.63	18.94	18.07	17.25
Cameroon	7.33	7.03	7.07	7.26
Central African Rep.	7.87	8.00	7.47	7.50
Chad	19.77	18.32	19.83	19.82
Chile	8.07	8.04	8.55	8.33
Congo	14.63	14.47	14.50	14.52
Costa Rica	6.01	5.69	5.94	5.96
Cote d'Ivoire	8.04	8.08	7.69	7.72
Cyprus	10.28	9.38	10.18	10.47
Dominica	16.36	13.43	14.96	15.88
Dominican Rep.	12.44	11.43	11.40	11.62
Ecuador	8.89	8.46	8.74	8.96
Egypt	10.62	10.48	10.29	10.70
El Salvador	10.99	10.29	10.13	10.52
Equatorial Guinea	24.95	22.35	21.32	22.45
Ethiopia	9.70	8.80	9.33	9.69
Fiji	8.73	9.06	8.99	8.36
Gambia, The	14.15	11.83	13.04	14.15
Ghana	8.63	7.72	7.69	8.60
Greece	4.53	4.80	4.67	4.50
Guatemala	7.73	8.47	7.95	7.44
Guyana	12.95	12.54	12.35	12.44
Haiti	11.25	10.70	11.12	11.07
Honduras	6.11	5.91	5.69	5.63
Hungary	2.36	2.36	2.36	2.37
Iceland	6.26	5.73	5.89	6.00
India	4.02	3.87	4.01	4.01
Indonesia	10.97	10.73	10.80	10.96
Israel	4.44	4.44	4.49	4.45
Jamaica	7.84	7.83	8.14	7.66
Kenya	9.15	7.99	8.35	9.18
Korea	5.74	5.61	5.69	5.78
Lao People's Dem. Rep.	19.11	13.76	17.89	19.98
Madagascar	6.10	6.24	6.41	5.82
Malawi	11.99	11.05	11.41	12.05
Malaysia	9.32	9.16	9.22	9.24
Mali	11.85	11.80	12.14	11.95
Mauritania	10.67	10.25	10.46	10.95
Mauritius	6.38	6.15	5.71	6.26
Mexico	11.02	10.92	10.95	10.96
Morocco	7.40	6.78	6.85	7.02
New Zealand	4.47	4.45	4.55	4.52
Nicaragua	10.48	10.59	10.56	10.34
Niger	10.72	11.10	10.94	10.79
Pakistan	6.98	6.43	6.92	6.92
Panama	7.54	6.06	6.03	6.43
Peru	10.24	9.56	10.18	10.09
Philippines	6.72	6.05	6.17	6.66
Portugal	7.04	6.79	6.95	7.01
Romania	3.76	3.87	4.03	3.99
Senegal	14.58	9.71	10.04	10.72
Sierra Leone	10.91	8.60	8.53	9.35
Somalia	12.68	10.01	12.12	12.97
South Africa	6.73	6.12	6.36	6.58
Spain	4.20	4.16	4.15	4.17
Sri Lanka	7.52	7.11	7.28	7.13
Sudan	11.80	10.38	11.24	11.50
Swaziland	12.78	12.82	12.87	12.89
Tanzania	10.26	9.42	10.12	10.39
Thailand	5.61	5.87	5.97	5.83
Togo	10.58	10.13	10.45	10.71
Tunisia	8.37	8.13	8.12	8.17
Turkey	12.97	12.40	12.93	12.89
Uganda	15.91	14.10	14.35	15.25
Uruguay	8.38	7.46	8.28	8.65
Viet Nam	11.66	12.03	11.97	11.92
Western Samoa	24.92	20.41	22.41	23.26
Yugoslavia	6.24	5.76	5.99	6.20
Zaire	9.17	7.52	8.04	8.67
Zambia	13.74	11.48	12.60	13.59
Zimbabwe	7.69	7.61	7.32	7.59
Mean	9.80	9.14	9.41	9.62
Standard error	0.52	0.46	0.48	0.50

1/ Column (1) reports index without CFF; Column (2) reports index with unphased CF purchases; and Columns (3) and (4) report index with purcahses phased over 4 and 8 quarters respectively.

The Formula

This annex examines several possibilities for modifying the formula used for measuring export shortfalls. The modifications would address shortcomings of the present formula raised by Executive Directors, namely, that (1) the formula allows compensation of shortfalls when the underlying trend of export earnings is either falling or rising sharply, which is perceived as being contrary to the intent of the CFF, and (2) because the formula relies on forecasts, overcompensation can occur as a result of forecasting errors. 1/ Section 1 provides a brief description of issues concerning the formula; Section 2 discusses the main features and implications of the current formula; Section 3 discusses the shortcomings of the formula; Section 4 examines possible modifications to the formula and compares their effectiveness; Section 5 summarizes the findings.

1.   Issues raised by Executive Directors

At the recent Executive Board meeting on the review of the CFF in March (EBM/87/36-37, 3/3/87), several Executive Directors expressed concern over the appropriateness of providing CF assistance when shortfalls are associated with one or more of the following:

(1) Positive export growth from the two preshortfall years to the shortfall year;

(2) Excessive growth projected from the shortfall year to the two post-shortfall years;

(3) Steeply rising trend of exports over the 5-year trend period;

(4) Steeply declining trend of exports over the 5-year trend period; and

(5) Insufficient recovery of exports projected for the post-shortfall period.

A detailed examination of the precise condition that governs the existence of a shortfall under the current formula, as well as the development of a set of criteria to assess whether projected growth is excessive or insufficient, are contained in later sections of this annex. In this section, it is shown that the compensation of shortfalls associated with situations identified above need not always be in conflict with the basic objectives of the CFF.

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1/ A detailed examination of the incidence of overcompensation, as well as a procedure for its alleviation in connection with the overlapping of the shortfall year in a CF purchase with the projection period of an earlier purchase, can be found in Annex V. In the present annex, overcompensation is discussed only in terms of how its incidence would be affected by alternative modifications to the current formula.

Table III.1 illustrates three hypothetical export profiles, each giving rise to a shortfall under the current formula. In Profile I, the decline in exports in year (-1) is followed by a gradual but sustained recovery so that by year 2 exports are at about the same level as before the decline. Even though year (-1) is clearly the year with maximum shortfall, delays in presenting the CF request resulted in the case being assessed a year later, which corresponds to the tail end of the shortfall. However, exports in the shortfall year are still below average exports in the two preshortfall years; they are also lower than average exports in the two post-shortfall years. In this case, the shortfall conforms to the classic export pattern of a decline followed by a recovery. It is only the mistiming of the request in relation to the period in which the shortfall was at its peak that has resulted in the request being made in the year when export growth is positive by reference to the year immediately preceding (year (-1)); the shortfall for that year is 14 compared with 9 for the year on which the request is based.

Table III.1. Shortfalls Under Alternative Export Profiles

Export Profile	Export Earnings 1/						Average Growth 2/ (Percent)	Shortfall 3/
	X_{-3}	X_{-2}	X_{-1}	X	X_{+1}	X_{+2}		
I	120	120 (--)	95 (-21)	100 (5)	110 (10)	121 (10)	3	9
II	200	200 (--)	200 (--)	100 (-50)	130 (30)	200 (54)	-7	60
III	120	120 (--)	160 (33)	100 (-38)	283 (183)	376 (33)	33	83

1/ X is export earnings in shortfall year. Percentage changes in parentheses.
2/ Annualized growth rate from average exports in the two pre-shortfall years to average exports in the two post-shortfall years.
3/ Shortfall calculated using geometric average.

In Profile II, the timing of the CF request coincides with the year during which exports fall by 50 percent and the shortfall is at a peak. The downturn in exports is, however, expected to be temporary with full recovery by the second post-shortfall year. Again, this case satisfies the classic export pattern for CF purchases (a decline followed by a recovery). Although the projected export growth in the post-shortfall period seems relatively high when compared with the shortfall year, it

is not so when compared with average exports in the preshortfall years; in
this sense, it is the steepness of the decline in the shortfall year that
makes the recovery from that year seem excessive.

Profile III illustrates a case with export earnings increasing at a
constant average rate of 33 percent per annum, exclusive of the shortfall
year; in the, shortfall year exports decline by 38 percent. Had exports
in the shortfall year been at 213 rather than at 100 as shown, exports
would have grown at a constant annual rate of 33 percent over the entire
5-year trend period and no shortfall would have been calculated. Hence,
the shortfall stems entirely from a temporary downward deviation from
trend exports which would otherwise have been rising at a constant rate.
Projected growth rates in this example may be considered to be too high
to merit compensation when compared with the depressed value in the short-
fall year, but it is this depressed value in relation to past standards
that makes this case consistent with the intent of the CFF.

Historical experience demonstrates that CF purchases associated with
steeply declining trends of exports have been rare and have little practical
significance. This experience as well as that involving recoveries
considered insufficient is examined in Section 3.

2.   Main features of formula

Under the current formula the export shortfall is defined as the
downward deviation of export earnings in a given year from the geometric
average of earnings over a 5-year period centered on that year. 1/ Calcula-
tions are based on nominal values expressed in SDRs.

The main features of the present formula, which was adopted in 1979,
and the implications of its use may be summarized below.

a.   Use of the geometric average results in a balance between short-
falls and excesses over time. This feature reflects the fact that exports
tend to grow at an exponential rate--or constant rate--rather than at an
arithmetic rate--or by a constant amount. When exports grow exponentially,
use of the arithmetic average would bias the result toward more shortfalls
than excesses. The arithmetic average was used until 1979 when it was
replaced by a geometric average.

1/ Centering of the shortfall year in the period over which the geometric
average ($\bar{X}$) is calculated implies that the norm from which the shortfall is
calculated is identical to the computed value of earnings in the shortfall
year from least squares calculations of a semilogarithmic trend equation
for the same period of the following form:

$$\ln X_t = a+bt.$$

Hence, $\bar{X}$ can be conveniently interpreted as trend earnings in the shortfall
year, and the shortfall as the downward deviation of actual from trend
earnings in that year.

b.   In order for a shortfall to materialize, the rate of growth of
exports (g^-) from the average level in the two preshortfall years (X^-) to
the shortfall year (X) must be lower than the rate of growth (g^+) from the
shortfall year to the two post-shortfall years (X^+). 1/ This implies
that a shortfall would occur even if exports were to grow in the shortfall
year ($g^->0$) so long as growth in that year is smaller than the projected
growth in the two post-shortfall years ($g^+>g^->0$); it also implies that a
shortfall would occur even if projected exports in the two post-shortfall
years were to decline ($g^+<0$) provided that it is preceded by a greater
decline in the shortfall year ($0>g^+>g^-$). Thus a shortfall may result even
if earnings rise or fall continuously during the entire 5-year trend
period; what determines a shortfall is the downward deviation of the
growth rate in the shortfall year from average growth rate during the
5-year trend period. 2/

3.   Shortcomings of the current formula

This section analyzes a sample of 117 CF purchases 3/ by reference
to the growth pattern of export earnings and to the incidence of over-
compensation. In practice, some error of compensation is unavoidable
when shortfall calculations involve projections of export earnings, as is
the case under the current formula. However, for the sample period under
examination, the magnitude of the net amount of overcompensation due to
projection errors amounted to SDR 2.7 billion or 36 percent of total
purchases by the 92 CF cases for which errors in compensation can be
determined (Table III.2). Moreover, of the 52 CF cases involving over-
compensation, almost half (23) relate to cases with a growth pattern of
export earnings that could be considered questionable for the purposes of
compensation under the CFF. As a group, these cases are associated with
a more than proportionate incidence of overcompensation (65 percent of the
total amount of net overcompensation). Thus, the concern over access to
the CFF on the basis of growth patterns deemed questionable is compounded
by the association of these cases with overcompensation.

1/ Under the current formula, the shortfall is positive if and only if
the following condition holds:

$$(X_{-2} \cdot X_{-1} \cdot X \cdot X_1 \cdot X_2)^{0.2} > X.$$

Raising each side of the inequality by a power of 2.5 and rearranging,
the condition can be restated as

$$(X_1 \cdot X_2)^{0.5}/X > X/(X_{-1} \cdot X_{-2})^{0.5}, \text{ or } X^+/X > X/X^-.$$

2/ These conditions are illustrated in a numerical example in Table 3
of the main text of the present paper.

3/ The sample consists of all CF purchases made prior to 1987 under
Decision No. 6224-(79/135) adopted August 2, 1979; shortfall calculations
since then have been based on the geometric average.

Table III.2. Classification of CF Cases by the Profile of Their Export Growth and Related Overcompensation

Export Earnings Profile [1]		Number of Cases			Total Purchases		Overcompensation [5]		
		Ex ante [2]		Ex post [4]	Amount	Percent of total	Number of cases	Gross amount	Net amount [6]
		All	Sub-group [3]						
					(SDR billion)			--(SDR billion)--	
A. Continuing decline	$(0>g^+>g^-)$	3	2	19	0.3	3	1	--	--
Of which:									
A.1 Pronounced	$(2g^+<g^-)$	--	--	16	--	...	--	--	--
B. Recovery	$(g^+>0>g^-)$	74	55	38	3.4	38	29	0.9	0.9
Of which:									
B.1 Small	$(2g^+<-g^-)$	4	2	4	1.0	...	--	--	--
B.2 Pronounced	$(-2g^-<g^+)$	39	32	20	1.4	...	--	--	--
C. Continuing growth	$(g^+>g^->0)$	40	35	29	5.2	59	22	1.9	1.8
Of which:									
C.1 Pronounced	$(2g^-<g^+)$	26	23	17	3.9	...	15	1.3	1.3
Total		117	92	92	8.8	100	52	2.8	2.7

[1] g^+ refers to growth rate of exports from shortfall year to average of two post-shortfall years; g^- refers to growth rate of exports from average of two preshortfall years to shortfall year.

[2] Based on projected earnings in the post-shortfall period.

[3] Excludes 25 cases for which ex post data are not available (which includes all 13 CF purchases made in 1985-86).

[4] Based on actual earnings in the post-shortfall period.

[5] Actual CF purchases less purchases computed on the basis of ex post earnings data.

[6] Gross overcompensation less gross undercompensation.

The condition which governs the existence of a shortfall as discussed in the previous section can be used as a basis for developing a simple scheme to classify each of the 117 sample cases into one of three categories distinguished by the growth pattern of export earnings: (1) continuing decline $(0>g^+>g^-)$, (2) a decline followed by a recovery $(g^+>0>g^-)$, and (3) continuing growth $(g^+>g^->0)$. A graphic illustration of the three profiles is provided in Figure III.1, and the frequency distribution of the cases according to each profile is tabulated in Table III.2.

Of the three earnings profiles described above, it has been suggested by some Executive Directors that compensation for shortfalls involving continuing decline (Profile A) and continuing growth (Profile C) runs counter to the objectives of the CFF. On the basis of ex ante data, only 3 of the 117 CF cases show continuing decline and 40 cases show continuing growth, the remaining 74 CF cases fall under Profile B, where a reduction in earnings in the shortfall year is followed by a recovery in the post-shortfall period. 1/ Thus in practice the concerns associated with growth patterns are largely confined to the 40 cases involving continuing growth.

However, because there are often large differences in the behavior of exports within each of the three profiles, an attempt has been made to differentiate between pronounced differences in growth patterns. In Profile B a recovery is defined as being insufficient (or small) if growth in the post-shortfall period is less than half the rate of decline in the shortfall year (from the average in the two preshortfall years) (i.e., $2g^+<-g^-$); on the other hand, a recovery is deemed pronounced when the post-shortfall year growth is more than twice the rate of decline in the shortfall year (i.e., $-2g^-<g^+$). On this basis, only 4 of the 74 Profile B cases are classified as having small recoveries (Profile B.1), while 39 cases are classifiable as having pronounced recoveries (Profile B.2). The same measure has been applied to the other profiles, namely cases involving pronounced decline (Profile A.1) and those with pronounced growth (Profile C.1). With this procedure, 26 of the 40 Profile C cases are classified under Profile C.1, and none of the 3 Profile A cases fits the definition of a pronounced decline.

As regards the relative importance of CF purchases by category, Table III.2 reveals that the 40 cases of continuing growth (Profile C) amounted to SDR 5.2 billion (59 percent of the total), of which the 26 cases involving pronounced growth rates (Profile C.1) amounted to SDR 3.9 billion. In the 3 cases of continuing decline (Profile A), purchases amounted to a mere SDR 0.3 billion, while purchases of the remaining 74 cases involving a decline followed by a recovery (Profile B) totaled SDR 3.4 billion. Thus, the bulk of CF purchases in the sample were associated with continuing or pronounced growth patterns.

1/ While this is the profile most commonly associated with the CFF, some Executive Directors thought that in some cases the extent of the recovery was either insufficient or excessive.

As regards overcompensation and its relationship to growth patterns, sufficient data are presently available to enable examination of 92 cases. For these 92 cases, actual purchases and the number of overcompensated purchases have been so organized as to correspond to each of the three growth profiles. The largest amount of overcompensation (SDR 1.9 billion) is shown to be associated with 22 purchases involving shortfalls with continuing growth in exports (Profile C); of this amount, SDR 1.3 billion is related to 15 purchases with pronounced growth (Profile C.1). Under Profile B (a decline followed by a recovery), there were 29 cases of over-compensation (SDR 0.9 billion), but none of these was associated with a pronounced recovery. There was one case of overcompensation in Profile A (continuing decline), but the amount involved is relatively small (SDR 19 million). Hence, the incidence of overcompensation is significantly more relevant for cases of continuing or pronounced growth patterns than for the other growth profiles.

It is clear from the above analysis that, in the search for modifica-tion of the current formula, the focus should be on one that is capable of reducing compensable shortfalls in cases with continuing or accelerating growth, particularly those where growth in the shortfall year, as well as in post-shortfall years, is high in absolute terms. In this connection it is relevant to note that of the 40 cases under Profile C, 15 have growth of 10 percent or higher in the shortfall year and 23 have growth of 20 per-cent or higher in the post-shortfall period. At the same time, half of the 26 Profile C.1 cases have growth in the post-shorfall period exceeding 20 percent.

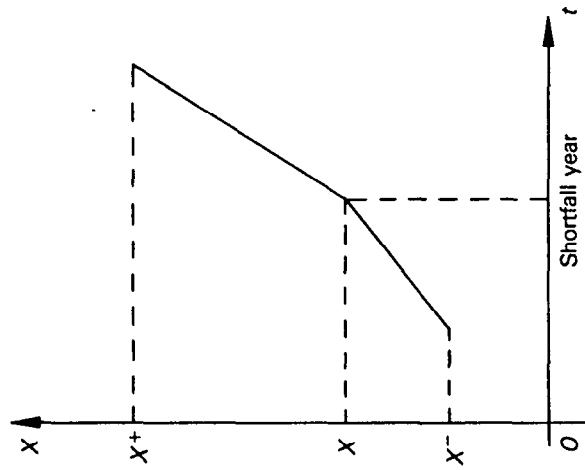## 4. Possible modification of the current formula

In searching for possible modifications to the formula, two broad approaches have been explored: the first would preserve the present formula, but would introduce certain restrictions to reduce the number of cases associated with export growth patterns for which it is deemed questionable to provide compensation as well as reduce the effects of forecasting errors on the calculation of shortfalls; the second would use a different formula that does not involve the judgmental forecasting of exports. Using the first approach, two ways of modifying the present formula have been examined: use of deductible amounts, and placing limits on projected exports. Using the second approach, alternative methods of calculating the shortfall on the basis of past exports only have been explored: (1) with reference either to the geometric averages or to the estimated trends (based on least squares computations) over the two and three years prior to the shortfall year (backward-looking formulae), 1/ and (2) with reference to the geometric average (of the 5-year period centered on the shortfall year) based on extrapolating past export movements into the post-shortfall period. 2/

1/ The backward-looking formulae would, by definition, eliminate the overcompensation issue associated with the use of the judgmental projections.
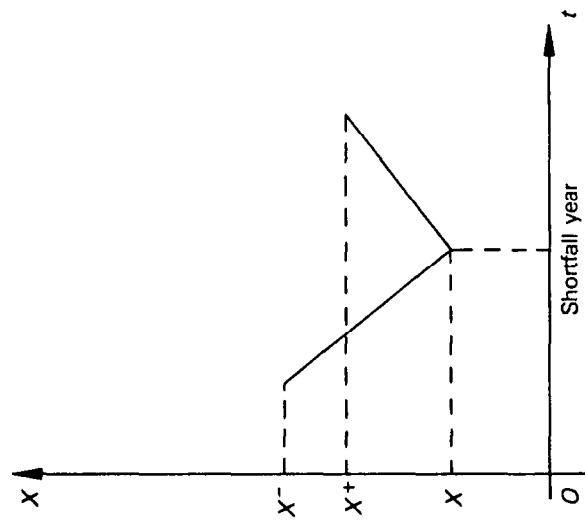   2/ Computationally, these different methods of calculating the shortfall on the basis of past exports differ from each other only in terms of the weighting pattern on past exports.
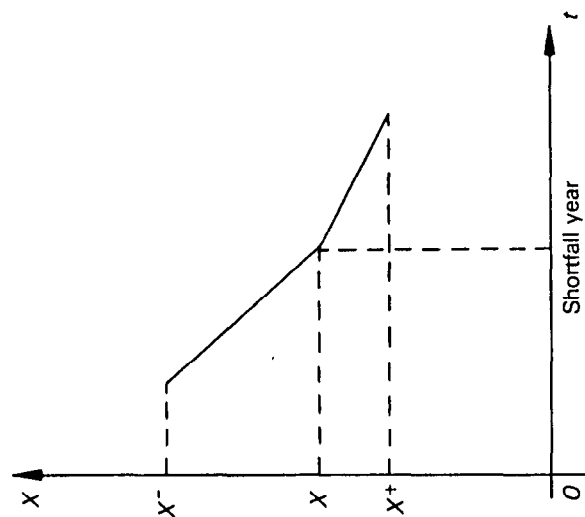
FIGURE III.1

CONTINUING DECLINE

RECOVERY

CONTINUING GROWTH

a.   Deductibles

The idea of a deductible may be appealing on at least three grounds:
(1) a deductible would in effect provide assistance only for shortfalls
above a certain threshold, (2) a deductible would reduce overcompensation,
and (3) it could eliminate access to the CFF of cases involving growth
patterns for which it is deemed questionable to provide compensation.

Under a deductible scheme the calculated trend value of exports in
the shortfall year would be reduced by a certain percentage, and this
adjusted trend value would be the basis from which the compensable short-
fall is derived. Thus, the compensable shortfall would always be smaller
than the shortfall calculated under the current formula, but the amount
of purchase may or may not be affected depending on the size of the
compensable shortfall in relation to quota limits. The compensable
shortfall would be eliminated if it were smaller than the amount by which
the calculated shortfall is reduced on account of the deductible. In
general, therefore, a deductible would have the effect of reducing all
shortfalls from their calculated levels, and would reduce purchases to
the extent that the adjusted shortfalls are within the quota limit.

By lowering access to the CFF, a deductible scheme would act directly
to reduce the net amount of overcompensation. Since the reduction of
access is across-the-board, the reduction of net overcompensation would
be achieved through either a decrease in the amounts by which a purchase
was found to have been overcompensated (gross overcompensation) or an
increase in the amounts by which a purchase was found to have been under-
compensated (gross undercompensation). It also implies that the reduced
access to the facility would be shared by all countries requesting CF
compensation, irrespective of the particular growth pattern involved.
Hence, use of a deductible scheme is not targeted to any particular
profile of growth patterns. Clearly the preferred method of applying the
deductible should be one that most effectively lowers gross overcompensa-
tion by proportionately more than it raises gross undercompensation, and
at the same time reduces shortfalls associated with growth patterns that
some Executive Directors consider should not lead to compensation under
the CFF.

Table III.3 summarizes the results of a simulation exercise that
examines the comparative effects of three different rates of deductible--
2 percent, 3 percent, and 4 percent, applied uniformly to the trend value
of exports in the shortfall year of the 117 cases in the sample, and
shortfalls and purchases are simulated on this basis. The results are
examined in terms of total purchases, the number of cases that would
have been excluded from CF compensation under each growth profile, and
the incidence of overcompensation for the 92 cases where such determination

Table III.3. Comparative Effects of Different Rates of Deductible

Rate of Deductible 3/	Purchases 2/				Gross Amt.	Net Amt.4/	Overcompensation 1/ Number of Cases 2/							Number of Cases Excluded 2/						
	Total	A	B	C					B			C				B			C	
							Total	A	Total	B.1	B.2	Total	C.1	Total	A	Total	B.1	B.2	Total	C.1
	(SDR billion)																			
2 percent	8.4	0.3	3.4	4.7	2.2	1.1	46	1	27	—	20	18	14	5	—	—	—	—	5	—
3 percent	7.4	0.3	3.4	3.8	1.8	—	38	—	27	—	20	11	3	13	—	—	—	—	13	3
4 percent	6.3	0.3	3.0	3.1	1.4	-1.5	35	—	26	—	20	9	7	23	—	3	1	1	20	8

1/ Actual CF purchases less purchases computed on the basis of ex post earnings data.
2/ Classification is based on earnings profiles as follows: (A) continuing decline, (B) recovery, of which (B.1) small and (B.2) pronounced, and (C) continuing growth, of which (C.1) pronounced.
3/ Rate is applied to trend earnings in the shortfall year.
4/ Gross overcompensation less gross undercompensation.

is now possible. 1/ The results show that the 3 percent rate of deductible
is more effective than the other two rates in achieving a balance between
reducing overcompensation and excluding cases involving growth patterns
that are deemed questionable for CF compensation; it would eliminate net
overcompensation altogether and exclude 13 of the 40 cases with continuing
growth patterns. With the 3 percent rate of deductible, the associated
gross undercompensation is not significantly higher than that of the 2 per-
cent rate, but is substantially below that of the 4 percent rate. Although
the 4 percent rate of deductible would exclude 10 additional cases relative
to the 3 percent rate, 3 of them are Profile B cases, which are not in the
targeted group.

The major drawback of applying a deductible is that it affects com-
pensation across-the-board so that the reduction of overcompensation is
achieved at the expense of increasing the amounts by which some members
were undercompensated.

b. Limits on projected exports

A conceptually different modification to the formula from that of the
deductible is to place limits on the projected average level of earnings in
the post-shortfall period, in relation to the actual average level of
earnings in the preshortfall period, expressed as a ratio k ($k = X^+/X^-$).
Two different values of the ratio, one on each side of unity, chosen
possibly but not necessarily in a symmetrical fashion, could be set
independently of the level of actual exports in the shortfall year. 2/ The
purpose of the upper limit ($k^U > 1$) would be to set a ceiling on permissible
growth in post-shortfall exports relative to exports in the preshortfall
period, thus addressing the concern expressed by some Executive Directors
in connection with providing CF assistance when shortfalls are associated
with excessive growth projected for the two post-shortfall years. It would
also address their concern regarding cases involving positive export growth

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1/ An alternative method of determining the amount of the deductible,
based on some measure of the instability in earnings of each country over
the same 5-year trend period used under the current shortfall formula,
was also examined in the simulation exercise. The rationale for this
method is that a country should be compensated only for that portion of
its shortfall which exceeds the level that it normally could be expected
to finance out of its own resources. Since any measure of instability
would vary from country to country as well as from period to period, this
instability-based deductible method would produce differing rates of
deductible across countries and time periods. Three different measures
of instability were examined: (a) the average downward deviation from
trend earnings in the shortfall year, (b) the average downward deviation
from trend earnings in each of the five relevant years, and (c) the
downward standard deviation from trend earnings. In general the results
produced by this method were less satisfactory than those of the uniform
rates of deductible.
2/ Thus, given any set of limits, the greater the decline in exports
in the shortfall year, the larger the amount of compensable shortfall.

in the shortfall year, since the placement of an upper limit on exports
in the post-shortfall period would imply a threshold on the growth rate
in the shortfall year above which a case would be excluded from access to
the CFF. 1/ The purpose of the lower limit ($k^L < 1$) would be to place a
floor on the permissible decline in post-shortfall exports relative to
exports in the preshortfall period, below which compensation would not
occur. The limits would in effect confine full compensation (subject to
quota limits) of. calculated shortfalls under the current formula to only
those cases for which projected exports on a judgmental basis lie within
a wedge-shaped range (Figure III.2) whose sides are bound by the lower
and upper projection limits. Hence, the limits are designed to deal with
cases involving growth patterns that are deemed questionable for CF com-
pensation more directly than with the problem of overcompensation.

For the projection limits to meet their intended purpose, an adjust-
ment factor would be required in cases where the judgmental projections
lie outside the specified limits, so that the compensable shortfalls would
be reduced from levels calculated on the basis of judgmental projections.
A possible procedure for determining the magnitude of the adjustment
factor would be to set it equal to the difference between two shortfall
amounts, one calculated with exports projected on a judgmental basis (SF)
and the other with exports projected equal to the upper (SF^U) or the
lower (SF^L) limit. When the judgmental projection exceeds the upper
limit, the shortfall calculated with the upper limit is less than that
with the judgmental projection ($SF > SF^U$); when the judgmental projection
is below the lower limit, however, the shortfall calculated with the lower
limit is greater than that with the judgmental projection ($SF^L > SF$). 2/
For this reason, the adjustment factor applicable to a case with a projected
increase in post-shortfall exports relative to preshortfall exports ($k > 1$)
is suggested to be ($SF - SF^U$), and the adjustment factor applicable to a
case with a projected decline in post-shortfall exports relative to pre-
shortfall exports ($k < 1$) is suggested to be ($SF^L - SF$). It then follows that
a case whose level of exports in the post-shortfall period is projected (on
a judgmental basis) to decline significantly from that in the preshortfall

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1/ The threshold rate of growth in the shortfall year (g_h^-) is equal
to the square root of the upper limit less one, i.e., $g_h = (k^U)^{0.5} - 1$.
A case would be excluded if its actual growth in the shortfall year (g^-)
is greater than this threshold rate, i.e., if $g^- > g_h^-$. An upper
limit of 1.2, for example, would imply a threshold of $g_h^- = 9.5$ percent.
Since the rate is measured in relation to the average level of preshortfall
exports, the implied annualized growth rate in the shortfall year associated
with the threshold is $(g_h^-)^{2/3}$, or 6 percent with an upper limit of 1.2.

2/ This is because, for given exports in the shortfall year, the
substitution of the higher value of the lower limit for the judgmental
projection of post-shortfall exports in the current shortfall formula
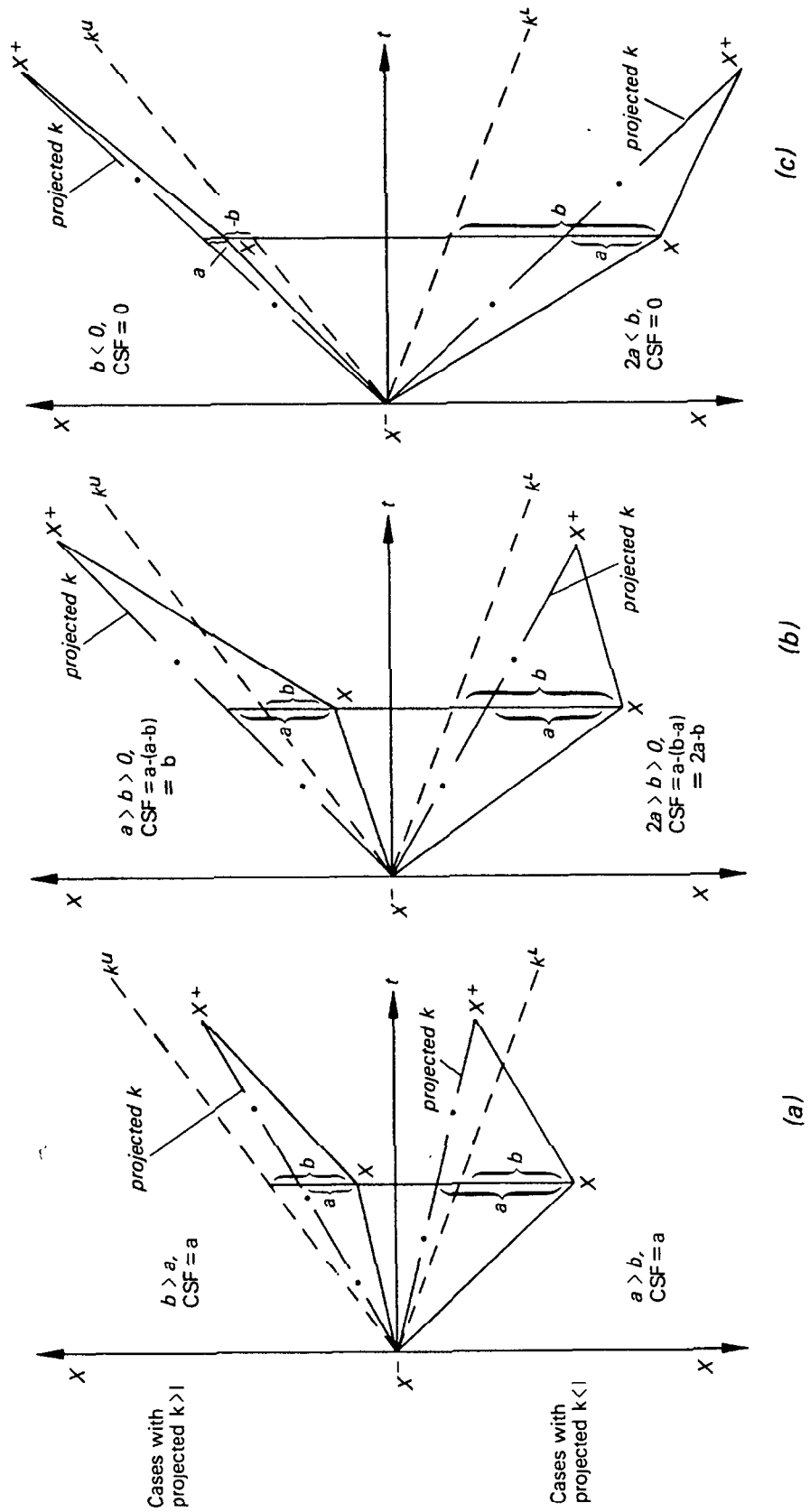would result in a larger calculated shortfall.

FIGURE III.2

period could be excluded from access to the facility if the adjustment
factor exceeds the calculated shortfall based on the judgmental
projection. 1/

Although the computational procedure stated above for determining
the magnitude of the adjustment factor is mechanical, it does possess
two desirable properties: (1) it deals with cases involving projected
increases and declines in exports from the preshortfall to post-shortfall
period in a symmetrical manner, and (2) its application would not give
rise to discontinuities in CF compensation, that is, for a given level
of exports in the shortfall year, the magnitude of the adjustment factor
increases smoothly with the degree to which the projected exports on a
judgmental basis exceeds the upper limit or falls below the lower limit.

The relationship between a country's export earnings profile and
the calculation of its compensable shortfall with and without projection
limits are illustrated numerically in Table III.4 and graphically in
Figure III.2. 2/ If the level of projected exports (on a judgmental
basis) lies within the wedge-shaped range specified by the upper and
lower projection limits, the compensable shortfall would be equal to the
calculated shortfall under the current formula based on the judgmental
projection (panel (a) in Figure III.2 and rows 1 and 4 in Table III.4).
However, if the projected exports lie outside the specified range, the
country would either be totally excluded from access to the CFF
(panel (c) in Figure III.2 and rows 3 and 6 in Table III.4) or find the
amount of its compensable shortfall reduced relative to the judgmental
shortfall (panel (b) in Figure III.2 and rows 2 and 4 in Table III.4).
For cases where compensable shortfalls are smaller than the judgmental
shortfalls (Figure III.2, panels (b) and (c) and the corresponding rows
(2)-(3) and (5)-(6) in Table III.4), the amount by which the judgmental
shortfalls is reduced is equal to the difference between the judgmental
shortfall itself and the shortfall based on the projection limit. Where
this difference is larger than the judgmental shortfall, the case would
be excluded.

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1/ Stated more generally, in cases for which the adjustment factor is
applicable (cases with projected post-shortfall exports that lie outside
the upper or the lower limit), the compensable shortfall (CSF) would be
less than the judgmental shortfall (SF) by the adjustment factor,
computed as follows: (1) for cases whose projected post-shortfall exports
exceed the upper limit, $CSF = SF-(SF-SF^U) = SF^U$, and (2) for cases whose
projected post-shortfall exports fall below the lower limit,
$CSF = SF-(SF^L-SF) = 2SF-SF^L$. Hence, the compensable shortfall is equal
to the calculated shortfall using the upper limit in the former instance,
but requires a more involved computational procedure for its determination
in the latter instance. A case is excluded from CF compensation when its
compensable shortfall is less than or equal to zero ($CSF < 0$).

2/ To simplify illustration, the graphical representation of shortfall
calculations only approximate the true calculations based on the formula.

Table III.4. Calculation of Compensable Shortfalls with Limits on Projected Exports

| | Export Earnings | | | | Shortfall | | Adjustment to Shortfall (ADJ) [4] | Compensable Shortfall (CSF) [5] |
| | Actual | | Projected X^+ | | | Shortfall with | | |
	X^-	X	Judg-mental	Projection limit [1]	Judg-mental [2]	Imposed Limit (SF^U or SF^L) [3]		
Cases with projected $k > 1$ [6]								
(1) Compensation unaffected	100	80	120	140	22.9	29.4	--	22.9
(2) Compensation reduced	100	80	160	140	35.4	29.4	6.0	29.4
(3) Case excluded	100	120	160	140	5.2	-1.3	5.2	--
Cases with projected $k < 1$ [6]								
(4) Compensation unaffected	100	20	90	80	49.5	46.3	--	49.5
(5) Compensation reduced	100	20	50	80	34.9	46.3	11.4	23.5
(6) Case excluded	100	20	10	80	8.9	46.3	8.9	--

[1] The upper limit for k (k^U) and the lower limit for k (k^L) are set, respectively, at 1.4 and 0.8. k is defined in footnote 6 below.

[2] $SF = [(X^-)^2 \cdot X \cdot (X^+)^2]^{0.2} - X$, which is the current formula.

[3] For cases with projected $k > 1$, shortfall with imposed upper limit for k (k^U) is $SF^U = [(k^U)^2 \cdot (X^-)^4 \cdot X]^{0.2} - X$; for cases with projected $k < 1$, shortfall with imposed lower limit for k (k^L) is $SF^L = [(k^L)^2 \cdot (X^-)^4 \cdot X]^{0.2} - X$.

[4] For cases with projected $k > 1$, ADJ = 0 if $SF < SF^U$ (row 1), ADJ = $SF - SF^U$ if $SF > SF^U > 0$ (row 2), ADJ = SF if $SF^U < 0$ (row 3); for cases with projected $k < 1$, ADJ = 0 if $SF > SF^L$ (row 4), ADJ = $SF^L - SF$ if $2SF > SF^L > 0$ (row 5), ADJ = SF if $2SF < SF^L$ (row 6).

[5] CSF = SF - ADJ.

[6] $k = X^+/X^-$ is the ratio of average exports in the post-shortfall to preshortfall period.

The comparative effects of various upper and lower projection limits, set symmetrically around unity, have been examined in a simulation exercise and the results are summarized in Table III.5. For ease of comparison with the earlier deductible method, Table III.5 has the same format as Table III.2. Of particular interest is the limit range of k^U=1.2 1/ and k^L=0.8, which would reduce the number of overcompensated cases from 52 to 42 and net overcompensation from SDR 2.7 billion to SDR 0.6 billion; also it would exclude a total of 15 cases, 14 in Profile C (continuing growth) and one in Profile A (continuing decline). These results are generally comparable to those of a 3 percent uniform rate of deductible. Indeed, a common group of 8 Profile C cases with an average projected post-shortfall growth of 26 percent are excluded under either method.

If the limit range for k is narrowed to k^U=1.15 2/ and k^L=0.85, the ability of this method to exclude cases increases; the number of cases excluded would rise to 21, and net overcompensation would be eliminated (SDR -0.3 billion compared with SDR 0.6 billion associated with the limit range of k^U = 1.2 and k^L = 0.8). The adjustment is almost entirely borne by Profile C cases, with their total purchases as a group decreasing by 52 percent from SDR 5.2 billion (under the current formula) to SDR 2.5 billion. With the exception of one case, the 6 additional Profile C cases excluded by setting the limits at this range all have projected postshortfall growth rates of about 20 percent.

Table III.6 provides a detailed listing of all cases excluded under the two sets of projection limits discussed above (1.2-0.8; 1.15-0.85). For comparison purposes, cases excluded under the 3 percent uniform rate of deductible are also listed. The 20 Profile C cases excluded under the more restrictive limit range (k^U = 1.15, k^L = 0.85) all have export growth of about 10 percent or higher in the shortfall year (except Brazil (1984)) and about 20 percent or higher in the post-shortfall period (except Hungary (1982)). These excluded cases therefore include all of those in the entire 117 sample CF cases with export growth exceeding 10 percent in the shortfall year. In contrast, under the 3 percent uniform rate of deductible, 3 cases (Solomon Island (1982), Portugal (1984), Mauritius (1985)) with relatively low export growth rates (in terms of absolute magnitudes) in both the shortfall and the post-shortfall periods are excluded, whereas 10 other cases with relatively high export growth rates are not. This result demonstrates a drawback of the deductible method noted above, namely that it affects cases across the board irrespective of their growth patterns.

1/ An upper limit of 1.2 (that is, average post-shortfall exports are 20 percent higher than the average of preshortfall exports) implies permissible growth at an annual average rate of 6 percent in the shortfall year.

2/ An upper limit of 1.15 implies permissible annual growth rate of 5 percent in the shortfall year.

Table III.5. Comparative Effects of Different Limits on Projected Post-shortfall Earnings

Limit Range of k 3/	Purchases 2/				Gross Amt.	Net Amt. 4/	Overcompensation 1/ Number of cases 2/							Number of Cases Excluded 2/						
	Total	A	B	C			Total	A	B Total	B.1	B.2	C Total	C.1	Total	A	B Total	B.1	B.2	C Total	C.1
	—————(SDR billion)—————																			
k^U=1.05, k^L=0.95	4.8	0.2	3.4	1.2	0.6	-2.1	27	--	25	--	17	2	2	35	2	--	--	--	33	19
k^U=1.1, k^L=0.9	5.9	0.2	3.4	2.3	0.9	-1.3	32	--	27	--	19	5	5	26	2	--	--	--	24	10
k^U=1.15, k^L=0.85	6.1	0.3	3.4	2.5	1.3	-0.3	39	1	29	--	21	9	9	21	1	--	--	--	20	7
k^U=1.2, k^L=0.8	7.4	0.3	3.4	3.8	1.7	0.6	42	1	29	--	21	12	12	15	1	--	--	--	14	2

1/ Actual CF purchases less purchases computed on the basis of ex post earnings data.
2/ Classification is based on earnings profiles as follows: (A) continuing decline, (B) recovery, of which (B.1) small and (B.2) pronounced, and (C) continuing growth, of which (C.1) pronounced.
3/ $k=X^+/X^-$ is the ratio of average earnings in the post-shortfall to preshortfall period. k^U and k^L are, respectively, the upper and lower limits placed on k.
4/ Gross overcompensation less gross undercompensation.

Table III.6. Excluded CF Cases Under Alternative Modifications to the Formula

| CF Case | | Growth In Exports | | Excluded Cases 1/ | | |
| | | | | Limit range on k 2/ | | |
		g^- 3/	g^+ 4/	$k^U = 1.2$ $k^L = 0.8$	$k^U = 1.15$ $k^L = 0.85$	3 Percent uniform rate of deductible
		(Percent)				
Profile A 5/						
1. Dominica	(1979)	-38	-14	Y	Y	
Profile C 6/						
1. Yugoslavia	(1980)	15	21	Y	Y	Y
2. Philippines	(1980)	22	23	Y	Y	Y
3. Romania	(1980)	17	24	Y	Y	Y
4. Korea	(1980)	24	29	Y	Y	Y
5. India	(1980) 7/	9	22	Z	Y	Z
6. St. Lucia	(1981) 7/	12	27	Y	Y	Z
7. Jamaica	(1981)	19	26	Y	Y	Y
8. Sri Lanka	(1981)	14	23	Y	Y	Z
9. Romania	(1981)	17	34	Y	Y	
10. Thailand	(1981)	24	45	Y	Y	
11. Malaysia	(1981) 7/	15	34	Y	Y	
12. Honduras	(1982) 7/	9	19	Z	Y	Z
13. Jamaica	(1982)	19	24	Y	Y	Y
14. Sri Lanka	(1982)	9	13	Z	Y	Y
15. Barbados	(1982)	10	19	Y	Y	Z
16. Solomon Islands	(1982) 7/	1	8			Y
17. Hungary	(1982)	12	15	Y	Y	Y
18. Brazil	(1983) 7/	5	18		Y	Y
19. Brazil	(1984) 7/	5	19		Y	
20. Portugal	(1984) 7/	5	13			Y
21. Argentina	(1985) 7/	10	19	Z	Y	Z
22. Mauritius	(1985)	6	12		Z	Y
23. Thailand	(1985)	18	27	Y	Y	Y
Total Y 1/				15	21	13
Total Z 1/				4	1	6

1/ Y denotes cases excluded under the specific modifications to the formula; Z denotes cases for which the modifications result in compensable shortfall less than 10 percent of quota.

2/ k = X^+/X^- is the ratio of average exports in the post-shortfall to preshortfall period.

3/ g^- = $(X/X^- - 1)$ is the rate of growth of exports from the average level in the two preshortfall years (X^-) to the shortfall year (X).

4/ g^+ = $(X^+/X - 1)$ is the rate of growth of exports from the shortfall year to the average level in the two post-shortfall years (X^+).

5/ Profile A refers to cases with continuing decline in exports.

6/ Profile C refers to cases with continuing growth in exports.

7/ Profile C.1 cases, which refers to cases whose growth in the post-shortfall period exceeds twice that of the shortfall year.

The difference in the number of the cases excluded under the above modifications is somewhat reduced if note is taken of those cases for which the modifications result in a reduction in the amount of the compensable shortfalls to a small percentage of their respective quotas, say below 10 percent. On the assumption that such very small compensable shortfalls will not result in purchases, their inclusion in the list of excluded cases would narrow the differences in the total number of cases excluded by the three modifications--19 cases with both the 3 percent deductible and the projection limits of 1.2-0.8, and 22 cases with the limits of 1.15-0.85. However, 3 cases with high rates of export growth in both the shortfall and the post-shortfall periods (Romania (1981), Thailand (1981), Malaysia (1981)) would still qualify for CF compensation under the 3 percent uniform deductible rate, providing further evidence of the relative weakness of this method in dealing with cases with a pattern of high growth.

It is also worth noting that none of the 74 Profile B cases--cases involving a decline in exports followed by a recovery--are affected by any of the limit ranges examined in the simulation exercise. This result represents a desirable feature of this approach in that it leaves unaffected the cases associated with a growth pattern for which CF compensation may be considered appropriate.

c.   Formulae based on past exports

Two categories of formulae which make use of past exports only, but differing from each other in terms of the weighting pattern attached to those exports, are examined in this section: one involves calculating shortfalls with respect to the behavior of exports in historical periods, i.e., formulae which are completely backward-looking, and the other projects exports for the two post-shortfall years on the basis of export movements in the period prior to and inclusive of the shortfall year, i.e., extrapolation formulae.

Table III.7 summarizes the effects of simulations of shortfalls and purchases using alternative formulations of the backward-looking formula for a sample of 88 CF cases over the period 1979-86 for which relevant export data are available. Two reference periods of past exports--two years and three years prior to the shortfall year--are used, and shortfalls are simulated under each with respect to (1) average exports of the reference period, and (2) the trend value of exports in the shortfall year. 1/

1/ Average exports of the reference period refer to the geometric average of exports of that period. Trend values of exports in the shortfall year are computed from least squares estimation based on exports in the reference period. For a 2-year reference period, least squares estimation is equivalent to the procedure of extending the (log-linear) trend line joining the two observations.

Table III.7. CF Purchases Under Alternative Backward-Looking Formulae, 1979-86 1/

Formula Description	Formula	Shortfall	Purchases	Number of Cases Excluded 2/						
				Total	A	B Total	B.1	B.2	C Total	C.1
		----(SDR billion)---								
Two years prior to shortfall year										
Geometric average	$(X_{-2} \cdot X_{-1})^{0.5} - X$	5.7	2.1	37	--	2	--	2	35	23
Least squares trend 3/	$X_{-1}^2 / X_{-2} - X$	42.3	6.3	26	--	14	--	9	12	6
Three years prior to shortfall year										
Geometric average	$(X_{-3} \cdot X_{-2} \cdot X_{-1})^{1/3} - X$	1.2	0.8	58	--	23	2	16	35	23
Least squares trend	$(X_{-2} \cdot X_{-1}^4 / X_{-3}^2)^{1/3} - X$	52.1	7.4	14	--	6	--	6	8	3
Memorandum item:										
Current formula, ex post	$(X_{-2} \cdot X_{-1} \cdot X \cdot X_{+1} \cdot X_{+2})^{0.2} - X$	10.1	4.6							

1/ The sample consists of 88 cases for which historical and ex post data are available for calculations under all shortfall formulae considered.

2/ Classification is based on earnings profiles as follows: (A) continuing decline, (B) recovery, of which (B.1) small and (B.2) pronounced, and (C) continuing growth, of which (C.1) pronounced.

3/ For a 2-year reference period, the least squares estimation of the trend value of exports in the shortfall year is equivalent to the procédure of extending the (log-linear) trend line joining the two observations.

No substantive differences emerge between the two-year and the three-year versions of the formula. Under either version, aggregate shortfalls and related purchases are substantially larger if they are computed relative to the trend value of exports in the shortfall year rather than to average exports in the reference period. Using as a benchmark the actual (ex post) shortfall under the current formula, the backward-looking formulae either overstate (with trend exports as reference) or understate (with average exports as reference) shortfalls by significant margins. Furthermore, when shortfalls are understated, an unreasonably large number of cases are excluded from use of the facility. 1/

Simulation results based on extrapolation formulae are provided in Table III.8. Two formulations are examined: one adopts the procedure stated in the 1975 decision 2/ and the other utilizes least squares computations to extrapolate exports into the two post-shortfall years. As is evident from Table III.8, both formulations result in significant overstatement of aggregate shortfalls relative to the benchmark for the 85 sample cases for which relevant export data are available. At the same time, neither is effective in excluding cases involving growth patterns that are deemed questionable for CF compensation.

4.   Summary of findings

Three classes of possible modification to the current formula intended to alleviate the concern raised by Executive Directors are examined and evaluated in this annex. This section briefly reviews the merits and shortcomings of each and summarizes the important findings.

For the deductible method, the particular rate of deductible for a country should in principle be dependent on some of the characteristics of that country's own export instability. In this sense, a deductible rate based on a country-specific index of instability could be conceptually superior to a uniform rate applicable to all the countries. However, simulations based on variable deductible rates derived from country-specific instability indices have demonstrated that this method

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1/   Simulations based on real exports also show that aggregate short-falls would have been much higher for the 88 CF cases in the sample period using backward-looking formulae than the current formula (based on ex post calculations) and the number and distribution of cases that would have been excluded for CF access are generally unfavorable relative to the desired outcome.

2/   Paragraph 6 of Decision No. 4912-(75/207): "The shortfall for the purposes of this Decision shall be the amount by which the member's export earnings in the shortfall year are less than the average of the member's export earnings for the 5-year period centered on the shortfall year. In computing the 5-year average, earnings in the two post-shortfall years will be deemed to be equal to earnings in the two preshortfall years multiplied by the ratio of the sum of earnings in the most recent three years to that in the three preceding years. . . ."

Table III.8. CF Purchases Under Alternative Extrapolation Formulae, 1979-86 1/

| Method of Extrapolation | Shortfall | Purchases | Number of Cases Excluded 2/ | | | | | | |
| | | | Total | A | B | | | C | |
					Total	B.1	B.2	Total	C.1
	--- (SDR billion) ---								
1975 decision 3/	37.6	8.0	7	--	4	--	4	3	--
Least squares	24.2	7.3	6	--	3	--	3	3	--

Memorandum item:
  Current formula,
    ex post
	10.0	4.5							

1/ The sample consists of 85 cases for which historical and ex post data are available for calculations under all shortfall formulae considered.
2/ Classification is based on earnings profiles as follows: (A) continuing decline, (B) recovery, of which (B.1) small and (B.2) pronounced, and (C) continuing growth, of which (C.1) pronounced.
3/ Average exports in the two post-shortfall years (X^+) are extrapolated as follows:

$$\ln X^+ = \frac{\ln(X_{-1} \cdot X_{-2})}{2} \cdot \frac{\ln(X \cdot X_{-1} \cdot X_{-2})}{\ln(X_{-3} \cdot X_{-4} \cdot X_{-5})}$$

This formula differs slightly from that stated in the 1975 Decision No. 4912-(75/207) in that extrapolations are calculated on the basis of the logarithms rather than absolute levels of past exports, on account of the current shortfall formula, which uses the geometric rather than the arithmetic average.

is relatively inefficient in dealing with the twin concerns of cases involving growth patterns that are deemed questionable for CF compensation and cases involving overcompensation. Simulations also show that a 3 percent uniform rate of deductible would produce the most balanced outcome in terms of alleviating the two concerns stated above. However, because a uniform deductible rate reduces compensation indiscriminately, it can reduce net overcompensation, but achieving it partly at the expense of increasing gross undercompensation.

Placing limits on projected exports for the two post-shortfall years is found to be a more effective method for dealing directly with cases involving growth patterns that are deemed questionable for CF compensation; to the extent that these cases are also overcompensated, the projection limits would also be effective in reducing overcompensation. In cases where projected levels of exports lie within the specified limits, their compensable shortfalls would not be affected. Simulations of various ranges of possible upper and lower projection limits reveal that a range of 1.20-0.80 or 1.15-0.85 is effective in excluding cases involving growth patterns that are deemed questionable for CF compensation and at the same time reducing overcompensation. A summary comparison of the simulated outcomes between the 3 percent uniform deductible rate and the above limits placed on projected exports is provided in Table III.9. In both problem areas of overcompensation and questionable growth patterns for CF compensation, the projection limit method seems to outperform the deductible method.

Although the use of backward-looking formulae avoids use of judgmental projections, simulation results of the approaches explored show that they suffer from one major drawback: depending on the formula chosen, shortfalls are either overstated or understated by significant margins (relative to benchmark calculations based on ex post data). Substantial experimentation with alternative weighting schemes for past exports would be necessary to come close to benchmark levels. However, it does not follow that a weighting scheme, even if found appropriate for past relationships, would continue to be appropriate for the future. If information is available such that a view could be formed on the prospects of a country's exports in the immediate post-shortfall period, such information should be given some weight in the determination of the norm against which the outcome of the shortfall year is assessed. This is the rationale which underpins the current formula (or any formula involving judgmental projections) but denied by backward-looking formulae.

Shortfalls are also significantly overstated (relative to benchmark calculations) if an extrapolation formula is used to project exports for the post-shortfall period. As a consequence, it tends to increase the amount of overcompensation, compared to that based on judgmental projections under the current formula. Moreover, simulation results show that it is generally ineffective in excluding cases involving growth patterns that are deemed questionable for CF compensation.

Table III.9. Comparison of Simulated Outcomes Under the
Deductible and Projection Limit Methods 1/

| | Total CF Purchases | Overcompensation | | | | | | Number of Cases Excluded | | | |
| | | Gross amount | Net amount | Number of Cases | | | | | | | |
				Total	A	B	C	Total	A	B	C
	------(SDR billion)------										
3 percent uniform rate of deductible	7.4	1.8	--	38	--	27	11	13	--	--	13
Projection limits											
k^U=1.15, k^L=0.85	6.1	1.3	-0.3	39	1	29	9	21	1	--	20
k^U=1.2, k^L=0.8	7.4	1.7	0.6	42	1	29	12	15	1	--	14
Memorandum item:											
Current formula	8.8	2.8	2.7	52	1	29	22	--	--	--	--

1/   Adapted from Tables III.2, III.3, and III.5.

Calculations in Real Terms

This annex examines some of the likely implications for the compensatory financing facility (CFF) of undertaking shortfall calculations in terms of the import purchasing power of exports; that is by deflating the nominal value of exports by some index of import prices (henceforth referred to as "real" calculations). It first notes the a priori arguments for and against real calculations; it then discusses the procedure for such calculations and the difference that this is likely to make to the size of shortfalls. This is followed by a discussion of the data requirements for the analysis and the results of a simulation exercise comparing shortfalls calculated in real and nominal terms.

1.   The arguments for and against "real" calculations

In the existing formula for the CFF, both the medium-term trend and the shortfall are computed in nominal terms. There have often been suggestions that these computations should be undertaken by reference to the import purchasing power of exports, but the nominal method has been preferred for several reasons. First, it has been regarded as a relatively simple method using readily available data. Secondly, the use of "deflators" for undertaking analysis in real terms has been thought to be akin to some form of indexation. It has been argued that this would in some sense be tantamount to sanctioning inflation. Thirdly, it has been argued that in any case, on average, both the real and the nominal methods yield roughly similar shortfalls and so, in view of its simplicity, the nominal method should be used. To the extent that calculations in real terms have the effect of compensating for variations in import prices, use of real calculations would be tantamount to expansion of the CFF coverage beyond its intended scope, namely compensating for temporary deviations in export earnings.

The advocates of a change to a real basis, on the other hand, emphasize first that conceptually it is more appropriate to compensate for the shortfalls in the purchasing power of exports rather than just in nominal exports. Real calculations would improve the timing of purchases in relation to the country's balance of payments need; it would raise shortfalls when the average price paid by the country for its imports is high and reduce shortfalls when the price paid is lower. Secondly, it has been suggested that if import price movements are not taken into account this will tend to bias the shortfalls against those countries which suffer a long-run deterioration in their terms of trade.

2.   The procedure and likely effect

The procedure for undertaking the analysis in real terms essentially entails obtaining an appropriate import price index which can be used as a deflator for a country's export earnings. Using this deflator the trend in exports in real terms can be estimated and the "real" shortfall can be computed. Since the current formula is based on export projections for the two post-shortfall years, the deflator would also have to be projected for the same period.

The difference between the nominal and real shortfalls depends on the value of the price index in the shortfall year in relation to its 5-year average. The amount of shortfall is larger with real than with nominal calculations when the index in the shortfall year is above its trend value—that is, the price level is abnormally high in the shortfall year. The amount is smaller if the index is below its trend value. In terms of the rate of inflation in import prices it can be shown that if the average post-shortfall inflation (i.e., from shortfall year to post-shortfall years) is lower than the preshortfall rate (i.e., from preshortfall years to shortfall year) conducting calculations in real terms raises the amount of the shortfall. However, if inflation is accelerating, conducting calculations in real terms will reduce the amount. From this, it may be intuitively concluded that since periods of high and low inflation tend to alternate, the shortfalls calculated over a sum of years would be roughly the same whether the calculations are based on real or nominal terms. The distribution of shortfalls between years will, however, be different. 1/

The relationship between real and nominal shortfalls and the rate of inflation can be illustrated by three numerical examples (Table IV.1). In these examples, nominal export earnings and the import price indices are known for three years, including the shortfall year. They are projected for the two following years. In the first example (first column of Table IV.1), calculations are shown in nominal terms and give a shortfall of 10.6. In the second example an import price index (column 2) is used to do the calculations in real terms (column 3). The index shows inflation accelerating in the shortfall year, with its value in the shortfall year above trend. This leads to a shortfall in real terms of 14.3 which is greater than the shortfall in nominal terms. In the third example real calculations are based on an index showing inflation decelerating in the shortfall year (column 4). In this case, the shortfall in real terms, at 7.9, is less than the shortfall of 10.6 in nominal terms (column 5).

1/ Suppose that the deflator can be projected with perfect foresight. Denote this by P_t and nominal export earnings by X_t where $t=1,2,...5$ and $t=3$ is the shortfall year. To obtain the shortfall in nominal terms, first

obtain a trend value, $TN = (X_1 \cdot X_2 \cdot X_3 \cdot X_4 \cdot X_5)^{1/5}$. Shortfall in nominal terms

is then $SN = TN - X_3$. Shortfall in real terms, $SR = TN/PE - X_3/P_3$,

where $PE = (P_1 \cdot P_2 \cdot P_3 \cdot P_4 \cdot P_5)^{1/5}$.

In terms of prices in the shortfall year, the real shortfall is

$SR \cdot P_3 = SR' = P_3 \cdot TN/PE - X_3$.

The excess of nominal over the real shortfall relative to trend is

$E = $ excess $= (SN-SR')/TN$. Substituting for SN and SR' defined above,

it can be shown that $E = 1 - P_3/PE$.

Table IV.1. Illustrative Calculation of Shortfall
in Real and Nominal Terms

Year	Nominal Values (1)	Decelerating Inflation		Accelerating Inflation	
		Import price index (2)	Real values 1/ (3)	Import price index (4)	Real values 1/ (5)
t_{-2}	90	73	123	90	100
t_{-1}	95	86	110	93	102
0	85	100	85	100	85
t_{+1}	100	110	91	110	91
t_{+2}	110	120	92	125	88
Trend value	95.6	96.3	99.3	102.9	92.9
Shortfall	10.6	––	14.3	––	7.9
Shortfall as percentage of trend	11.1	––	14.4	––	8.5

1/ Real value of export earnings is computed by dividing the nominal values in column (1) with the import price indices in column (2) or column (4).

3. Data and methodology

The most suitable deflator for conducting calculations in real terms would be a country-specific import unit value index available on a monthly basis. Very few primary producing countries compile satisfactory indices on a timely basis. For the purpose of the simulations, it is more practical to construct price indices for the imports of primary producers based partly or wholly on export unit values of exporting countries and on market prices for internationally traded goods. An index was constructed along these lines which can be so weighted as to relate to the pattern of imports of primary producing countries as a group or as to apply individually to each of the countries. Table IV.2 shows an index constructed by using six commodity groups of imports by primary producing countries. For each commodity group, the weights are given in the first column, and the average yearly values of the series (from 1974 to 1986) in the following columns.

Table IV.2. Import Price Index 1/

(In terms of SDRs; base year 1980=100)

Commodity Groups	Share of Imports 2/	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Cereals	3.2	116.6	95.5	88.6	73.6	81.0	90.7	100.0	114.6	101.9	113.3	115.2	100.1	72.0
Other food	5.8	77.5	62.3	81.2	110.0	93.9	101.8	100.0	95.4	92.6	104.5	115.9	99.5	87.6
Fertilizers	3.8	122.3	156.1	86.5	73.2	64.5	71.2	100.0	117.0	107.0	96.2	104.0	93.1	81.6
Crude materials	7.9	60.3	50.9	68.5	69.2	69.3	92.7	100.0	96.5	98.6	103.8	116.0	99.6	87.6
Manufactures	22.4	60.7	68.0	71.9	77.3	82.9	91.3	100.0	106.1	110.9	111.3	112.5	115.0	117.4
Oil	56.9	37.0	38.5	43.0	46.5	43.6	61.6	100.0	121.2	123.9	113.4	115.3	111.3	49.8
Total import index	100.0	51.3	52.3	55.7	59.5	60.7	75.4	100.0	113.4	116.2	111.1	114.2	109.8	72.5

Source: Commodities Division, Research Department.

1/ The price indices for the first four commodities were derived from the disaggregated commodity data and are based on the indices of international market prices of these commodities. The price index for manufactures is the unit value index for exports of manufactures of the 19 major industrial countries. The oil price is an export unit value index of the 12 major oil exporting countries.

2/ Different weighting procedures were tried and the procedure adopted was to use import shares of developing countries in 1974 for years 1974 to 1977, in 1978 for years 1978 to 1981, and in 1982 for years 1982 to 1986. The weights shown in this table are averages of 1974, 1978 and 1982 weights.

The weights relate to primary producing countries as a group, but country indices could be computed by replacing in the first column the average weights by the specific set of weights applicable to each country concerned. 1/

It is worth emphasizing that country-specific indices derived in this way are likely to have a number of biases which the group index avoids. For example, since shortfalls are computed on the basis of exports net of re-exports, import price indices have to be computed on the same basis. The errors made in estimating import weights net of re-exports may be substantial for particular countries but are negligible for the primary producing countries as a group. Similarly, the import price series selected in the index may not be representative of the prices paid by particular countries although they measure well enough the average price paid by primary producing countries.

Given these considerations the group index was used in the empirical exercise reported below. The basic procedure for the exercise was to compute for a constant set of 105 developing countries shortfalls in real and nominal terms over the period 1962 to 1984, from annual data for the period 1960-86. This was the maximum number of countries for which data were available for each of these years. For each country the initial step was to compute a 5-year geometric moving average of export earnings over this period. Positive deviations (shortfalls) from this moving average were obtained for each country for each year, and were summed across countries. This was repeated for nominal earnings deflated by the import price index, and the two sets of values were compared.

4.   Real and nominal calculations

Consider first some preliminary analysis of the effect on the computed shortfall of replacing nominal by real export earnings. The procedure here was to use the formula noted in Section 2 above which relates the excess of nominal over real export earnings to the import price index. This exercise can be undertaken solely on the basis of a given import price index--it is not dependent on the actual value of nominal shortfall. The results of this exercise are given in Table IV.3. The first column of the table lists the value of the price index in the current year. The second shows a 5-year geometric moving average centered on year t. Columns (3), (4), and (5) show the percentage annual rate of price increase from given years. The last column shows the "excess"--the nominal shortfall minus the real shortfall as percent of nominal trend. This table illustrates the main propositions noted above. For instance, if 1982 was a shortfall year for a particular country the real shortfall would have been greater than the nominal one by 4.8 percent of the nominal trend. This is because the average inflation in import prices from 1980-81 to 1982 (6 percent) was considerably greater than the inflation from 1982 to 1983-84 (-2.1 percent). On the other hand, consider the

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1/   Since the data on export earnings used in the analysis are in SDRs the index is also based on prices in SDRs.

Table IV.3. Shortfall Calculations in Real and Nominal Terms, 1960-87 1/

| | Import Price Index | | Percentage Annual Rate of Price Increase From | | | Nominal Shortfall (SN) Minus Real Shortfall (SR) |
	Current year (t) (1)	Five-year average centered on (t) (2)	Preceding year (3)	The two preshortfall years to the shortfall year 100·(p⁻) (4)	The shortfall year to the two post-shortfall years 100·(p⁺) (5)	As percent of Nominal Trend (TN) [1-(1)/(2)]·100 (6)
1960	26.7	--	--	--	--	--
1961	26.7	--	--	--	--	--
1962	26.5	26.7	-0.7	-0.5	1.0	0.9
1963	26.7	26.9	0.8	0.3	1.4	0.7
1964	27.1	27.2	1.5	1.2	1.6	0.2
1965	27.4	27.4	1.1	1.2	1.3	-0.1
1966	28.1	27.6	2.6	2.1	-1.2	-2.0
1967	27.8	27.7	-1.1	0.1	-0.2	-0.2
1968	27.4	28.1	-1.4	-1.3	2.9	2.5
1969	28.0	28.5	2.2	1.0	4.0	1.8
1970	29.2	29.1	4.3	3.6	2.7	-0.5
1971	30.2	31.3	3.4	3.7	10.0	3.5
1972	30.6	35.3	1.3	2.0	29.6	13.4
1973	39.7	39.7	29.7	19.5	19.4	--
1974	51.3	44.9	29.2	29.4	3.4	-14.4
1975	52.3	51.2	1.9	10.3	6.6	-2.1
1976	55.7	55.8	6.5	5.0	5.2	0.1
1977	59.5	60.2	6.8	6.7	8.9	1.2
1978	60.7	68.6	2.0	3.6	27.0	11.5
1979	75.4	79.1	24.2	16.3	25.9	4.6
1980	100.0	90.4	32.6	29.8	9.6	-10.6
1981	113.4	102.0	13.4	19.5	0.1	-11.2
1982	116.2	110.8	2.5	6.0	-2.1	-4.8
1983	111.1	112.9	-4.4	-2.2	0.5	1.6
1984	114.2	103.3	2.8	-0.3	-15.2	-10.6
1985	109.8	93.5	-3.9	-1.7	-24.8	-17.5
1986	72.5	--	-34.0	--	--	--
1987	70.6	--	-2.6	--	--	--

1/ For any year from 1962 to 1984, the relative excess of nominal over real shortfalls given in column (6) can be derived from the current and trend values of the price index given in columns (1) and (2) according to formula given in the text, or from the rates of price increases before and after the shortfall year given in column (4) and (5).

shortfall year 1979; here the real shortfall would be less than the
nominal one because inflation in the post-shortfall years was considerably
greater than the inflation in the preshortfall years. This table clearly
illustrates that when periods of high and low inflation alternate, the
difference in shortfalls calculated in nominal and real terms alternates
accordingly.

This conclusion is supported by analysis of the shortfalls for the
105 developing countries over the period 1962 to 1984. The results of
this analysis are shown in Table IV.4. For each of the years the table
provides the total of shortfalls in nominal and real terms, and the ratio
of real to the nominal. The differences between the real and nominal
vary considerably from year to year with the ratio ranging from 36.0 in
1974 to 0.64 in 1968 and 0.38 in 1978. Over the 23-year period, real
shortfalls were larger than nominal shortfalls in 10 years, nominal was
larger in 12 years and the two were almost identical in one year. For
the period as a whole, the aggregate of real was larger than nominal
shortfalls by just under 7 percent. It should be stressed, however, that
the terminal year in this exercise makes a considerable difference to the
result. If 1984 is excluded from the analysis, for the period 1962 to
1983, the aggregate shortfalls in real terms would have been less than
the nominal shortfalls by 3 percent. This serves to emphasize the fact
that the choice of time period can exercise a critical influence over the
magnitude of differences in real and nominal shortfalls. In general,
however, the above exercises show that when periods of higher and lower
inflation alternate, for many consecutive years, the average shortfalls
calculated in real and nominal terms are about the same.

Table IV.4. Magnitude of Differences in Real and Nominal
Shortfalls: Sum for 105 Countries, 1962-84

(In millions of SDRs)

Shortfall Year	Shortfall 1/		Ratio of Real/Nominal
	Nominal	Real	
1962	1,747	1,550	0.89
1963	753	647	0.86
1964	694	639	0.92
1965	800	808	1.01
1966	717	1,090	1.52
1967	1,859	1,917	1.03
1968	2,530	1,611	0.64
1969	1,698	1,291	0.76
1970	1,535	1,630	1.06
1971	3,813	2,044	0.54
1972	13,383	3,833	0.29
1973	11,017	11,018	1.00
1974	104	3,763	36.00
1975	7,691	9,922	1.29
1976	4,070	3,969	0.98
1977	3,988	3,027	0.76
1978	38,803	14,561	0.38
1979	12,266	6,094	0.50
1980	4,842	15,198	3.14
1981	5,622	20,515	3.65
1982	12,755	26,312	2.06
1983	24,578	19,199	0.78
1984	898	16,082	17.90
All years	156,163	166,720	1.07

1/ Sum of shortfalls of countries actually experiencing shortfalls.

The Incidence of Overcompensation

This annex considers the incidence of overcompensation based on historical experience. The first part discusses the extent of over-compensation and analyzes its causes; the second proposes a procedure to rectify overcompensation in a special situation, namely, when an over-compensating purchase is followed by another CF purchase before it is entirely repaid.

1. Overcompensation

It is now possible to assess ex post the impact of forecasting errors on shortfalls and purchases in 168 CF cases processed since 1976. 1/ The results are shown in Table V.1. The sum of shortfalls calculated ex post amounted to SDR 19.8 billion, some SDR 0.5 billion larger than the ex ante estimations, whereas purchases involved overcompensation of about SDR 3.5 billion, or nearly one third of total purchases. This aggregate presentation, however, conceals a number of important features. This becomes clear when the totals are disaggregated according to whether ex post simulations indicate that the purchases involved substantial over- or undercompensation or whether compensation was approximately correct. 2/ Of the 87 cases that were overcompensated, it is evident that there was a considerable overestimation of aggregate shortfalls, amounting to SDR 5.7 billion, with the effect that purchases exceeded the correct amount by SDR 3.8 billion. 3/ Overcompensated cases are of two types: (1) 39 cases that have been overcompensated completely (i.e., ex post cal-culations show an excess rather than a shortfall) for a total amount of SDR 2.3 billion; and (2) 48 cases that have been partially overcompensated (i.e., where the ex post shortfall is smaller than the actual purchase) for a total amount of SDR 1.5 billion. Thus, with perfect foresight, the 39 purchases making up SDR 2.3 billion would not have taken place and the SDR 3.4 billion purchased by the other 48 countries would have been reduced to SDR 1.9 billion.

There were 34 cases where the ex ante estimation of shortfalls was lower than that revealed by ex post data; in the aggregate, the under-estimation of shortfalls in this category amounted to SDR 2.5 billion. However, this underestimation did not result in a similar underestimation of drawings, as quota limits would have allowed only a small increase in ex post compensation, amounting to SDR 0.3 billion. In the remaining 47 cases, despite a considerable underestimation of shortfalls, the amount of compensation would not have been affected because of quota constraints; in other words, ex ante shortfalls were such as to result in purchases that exhausted the quota limit.

1/ Since data comparable to those used in CF cases are not routinely provided after the CF purchase, for the purpose of this exercise, the country data provided in the IFS have been used.

2/ Overcompensation occurs when actual drawings exceed simulated drawings based on ex post shortfall calculations, and the converse for undercompensation.

3/ The overestimation of purchases is lower than the overestimation of shortfalls due to the effect of quota limits.

Table V.1. Impact of Projection Errors on Shortfalls and Purchases

(Shortfalls and drawings in billions of SDRs)

| | Shortfall/Purchases | | | | | |
| | Ex ante | | Ex post | | Ex ante – Ex post | |
	Number of cases (1)	SDR billion (2)	Number of cases (3)	SDR billion (4)	Number of cases (5)=(1)-(3)	SDR billion (6)=(2)-(4)
All cases						
Shortfalls	168	19.3	129	19.8	39	−0.5
Purchases	168	10.8	129	7.4	39	3.4
Overcompensated cases 1/						
Shortfalls	87	8.5	48	2.8	39	5.7
Purchases	87	5.7	48	1.9	39	3.8
Of which:						
Simulated shortfall/						
purchase, positive						
Shortfalls	48	5.1	48	2.8	0	2.1
Purchase	48	3.4	48	1.9	0	1.5
Simulated shortfall/						
purchase, zero						
Shortfalls	39	3.5	0	0	39	3.5
Purchases	39	2.2	0	0	39	2.3
Undercompensated cases						
Shortfalls	34	3.0	34	5.5	0	−2.5
Purchases	34	1.8	34	2.1	0	−0.3
Exactly compensated cases						
Shortfalls	47	7.8	47	11.5	0	−3.7
Purchases	47	3.3	47	3.3	0	0
Memorandum item:						
Overestimated shortfalls	96	10.1	57	3.5	39	6.6
Underestimated shortfalls	72	9.2	72	16.3	0	−7.1

1/ Actual (ex ante) purchase exceeds simulated (ex post) purchase.

It is clear from the above that the largest overcompensation error arise when the ex ante shortfall is revealed by ex post data to have been in excess. An analysis of the 39 such cases indicates that over one third of the overcompensation is attributable to 8 cases where overestimation of purchases ranged from about SDR 100 million to SDR 275 million. When 5 other cases involving overcompensation in excess of SDR 100 million are included, the total amount of overcompensation for the 13 cases accounts for nearly two thirds of the SDR 3.8 billion of overcompensation in the 87 cases.

One of the major causes of overcompensation is the difficulty of determining accurately the turning point in the projection of export earnings. An incorrect judgment concerning the timing of a recovery has led to a mistiming of shortfalls in certain periods. The discrepancy was particularly large during the 1981-82 recession, with overcompensation estimated at SDR 2.1 billion (Table V.2). Of the 87 cases of over-compensation, 40 cases 1/ occurred during those two years, and the total amount of overcompensation for those cases in 1981-82 amounted to SDR 2.1 billion. To a large extent this reflected the difficulty of predicting accurately the turning point of the recession, a difficulty encountered by most forecasters at the time.

The causes of overcompensation by reference to forecasting errors of the two components of export earnings, namely unit value and volume, have also been examined. Of the 87 cases of overcompensation since 1976, there are 31 cases from 1981-84 for which the existence of data on the unit value of exports allows an examination of price and volume forecasting errors; aggregate overcompensation in this sample (SDR 2.3 billion) accounts for about two thirds of total overcompensation. Table V.3, compares the shortfalls on account of unit value projections at the time of the CF purchases with the ex post shortfall in unit value and also reports the implicit contribution of volume to overcompensation. It can be seen that in many cases ex ante assessment of the size of the shortfall due to unit value movements was revealed by ex post data to have been considerably in error. As the shortfall calculation involves two years of projected unit values, it is clear that erroneous projections underlay this overestimation. In total, errors in projecting unit values resulted in overcompensation for the 31 countries of SDR 2.3 billion, which was slightly offset by undercompensation on account of errors in projecting export volumes of SDR 28 million.

The table reveals that unit value forecasting errors were quite wide-spread across countries. As the sample is limited to shortfalls calculated for the 1981-84 period, it is perhaps not surprising that there are many egregious examples of overestimation of the unit value contribution to the shortfall, as calculated ex ante. The difficulties in predicting the 1981-82 recession's turning point noted above, meant that commodity price projections were particularly difficult to forecast accurately. In total,

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1/ Refers to shortfalls (not purchases) that fell within those two years.

Table V.2. Incidence of Overcompensation and Undercompensation by Year, 1975-84

(In millions of SDRs unless specified)

Year in Which Shortfall Year Ends	No. of Cases (1)	Ex Ante Shortfalls (2)	Ex Ante Purchases (3)	Ex Post Shortfalls (4)	Ex Post Simulated purchases (5)	Ex Ante - Ex Post 1/ Shortfalls (6)	Ex Ante - Ex Post 1/ Purchases (7)	Overcompensation No. of cases (8)	Overcompensation Amount (9)	Under or Exact Compensation No. of cases (10)	Under or Exact Compensation Amount (11)
1975	18	2,553	678	2,736	617	-182	61	4	79	14	18
1976	26	2,256	1,247	2,483	978	-227	269	10	305	16	36
1977	7	437	231	690	329	-252	-99	1	--	6	-90
1978	21	1,344	694	2,398	651	-1,054	43	10	93	11	-50
1979	19	1,050	718	1,995	662	-944	55	8	98	11	-43
1980	14	1,108	741	769	348	339	393	8	398	6	-5
1981	18	2,334	1,148	466	304	1,868	844	17	844	1	--
1982	31	5,052	3,604	4,719	2,351	333	1,253	23	1,295	8	-42
1983	10	2,478	1,264	3,218	1,090	-740	174	3	200	7	-26
1984	4	695	519	350	59	345	460	3	460	1	--
Total	168	19,309	10,845	19,822	7,391	-513	3,454	87	3,772	81	-318

1/ Even though aggregate ex post shortfalls are in some years larger than ex ante shortfalls, this does not necessarily result in net purchases ex post being larger than ex ante purchases, because of quota limits. The following hypothetical example shows two countries with the initial purchase by each equal to 50 percent of quota (figures are in percent of quota).

Country	Purchase	Available Access	Ex Ante - Ex Post Shortfall	Ex Ante - Ex Post Purchase
A	50	33	-200	-33
B	50	33	+100	+50
Net			-100	+17

For Country A, the shortfall is underestimated by 200, implying that the purchase was undercompensated by 33 (i.e., up to quota limit of 83 percent); for Country B, the shortfall is overestimated by 100, and the purchase overcompensated by 50. On a net basis, the two shortfalls were underestimated by 100, but the purchase was overestimated by 17.

Table V.3. Overcompensation: A Breakdown by Price and Volume Components, 1/ 1981-84

Country (1)	End of Short-fall Year (2)	Ex Ante Shortfall		Ex Post Shortfall		Ex Ante Minus Ex Post Shortfall			Overcompensation of Purchases 2/		
		Total value (3)	Unit value (4)	Total value (5)	Unit value (6)	Total value (7)=(3)-(5)	Total value due to unit value 3/ (8)	Implicit volume (9)=(7)-(8)	Total value (10)	Unit value (11)= (10).(8) / (7)	Volume (12)= (10).(9) / (7)
		--------------------(In percent of shortfall year)-----------------							(In millions of SDRs)		
1981											
1. Costa Rica II	3/81	3.9	-4.5	2.2	-4.4	1.8	-0.1	1.9	13.5	-0.8	14.3
2. Guatemala	6/81	8.4	3.3	-5.8	-1.1	14.2	4.3	9.8	76.5	23.2	53.3
3. Haiti	9/81	13.4	10.0	8.2	7.1	5.2	2.8	2.4	6.6	3.6	3.0
4. Honduras I	6/81	3.9	1.9	-3.7	1.1	7.6	0.8	6.8	23.3	2.5	20.8
5. Liberia II	12/81	4.4	4.1	-4.2	-0.5	8.7	4.6	4.1	7.0	3.7	3.3
6. Malaysia II	6/81	6.3	-2.2	-0.5	-12.8	6.9	10.8	-4.0	189.8	297.1	-107.3
7. Papua New Guinea II	6/81	9.9	3.0	-0.3	-4.8	10.2	8.1	2.1	45.0	35.7	9.3
8. Peru III	12/81	11.9	2.5	3.5	-7.9	8.5	10.7	-2.3	129.3	162.8	-33.5
9. Thailand III	3/81	6.4	-3.3	-0.4	-12.4	6.8	9.1	-2.3	186.0	248.9	-62.9
10. Zambia IV	6/81	30.2	12.8	5.6	-2.1	24.6	15.8	8.8	11.5	7.4	4.1
								Subtotal	688.5	784.1	-95.6
1982											
1. Bolivia II	12/82	5.0	1.7	-2.6	-1.2	7.6	2.9	4.7	17.9	6.8	11.1
2. Bangladesh II	3/82	6.8	14.0	6.0	10.0	0.8	3.7	-2.9	4.5	20.8	-16.3
3. Chile II	9/82	8.6	10.8	1.5	-5.0	7.1	15.1	-8.0	244.4	519.8	-275.4
4. El Salvador II	3/82	29.3	6.9	8.1	4.5	21.2	2.8	18.4	15.2	2.0	13.2
5. Hungary	6/82	1.0	-1.2	-1.2	-5.1	2.2	3.8	-1.7	72.0	124.4	-52.4
6. Jamaica VI	3/82	1.8	-3.8	-8.2	-5.9	10.1	2.0	8.1	19.4	3.8	15.6
7. Pakistan III	6/82	8.1	-1.1	5.0	-6.2	3.0	5.2	-2.2	67.9	117.7	-49.8
8. Philippines IV	9/82	5.7	5.4	1.7	-0.6	4.0	6.0	-2.0	109.8	164.7	-54.9
9. Sierra Leone III	6/82	19.1	2.8	10.5	10.0	8.6	-7.9	16.5	9.3	-8.5	17.8
10. Zambia V	6/82	10.6	10.3	-2.6	-5.7	13.1	15.9	-2.8	34.0	41.0	-7.0
11. Burma I	9/82	7.0	5.3	-5.3	19.9	12.3	-14.2	26.5	25.6	-29.6	55.2
12. Fiji II	3/82	8.2	4.3	-2.6	-12.8	10.8	16.7	-5.9	13.5	20.9	-7.4
13. Guyana IV	6/82	5.4	-2.5	-6.5	-15.9	11.9	14.2	-2.3	5.9	7.0	-1.1
14. Argentina II	9/82	9.6	4.0	3.7	4.5	5.9	-0.5	6.4	262.9	-22.3	285.2
15. Panama II	12/82	17.2	0.1	-4.5	4.0	21.7	-3.9	25.6	58.9	-10.6	69.5
16. Uruguay II	9/82	5.0	3.9	2.4	-1.7	2.6	5.4	-2.9	22.8	47.4	-24.6
17. Liberia III	6/82	7.5	4.6	-0.9	-1.0	8.4	5.7	2.7	27.7	18.8	8.9
								Subtotal	1,011.7	1,024.1	-12.4
1983											
1. Jamaica III	12/82	10.0	9.5	-0.2	-7.9	10.2	16.7	-6.5	72.6	118.9	-46.3
2. Burma II	3/82	14.7	7.3	3.9	-3.7	10.8	11.1	-0.3	28.4	29.2	-0.8
								Subtotal	101.0	148.1	-47.1
1984											
1. Argentina III	5/84	3.5	-1.5	-5.7	-6.9	9.2	5.4	3.8	275.0	161.4	113.6
2. Thailand IV	12/84	2.8	-5.8	-9.8	-17.5	12.6	11.7	0.9	185.0	171.8	13.2
								Subtotal	460.0	333.2	126.8
								Total	2,261.2	2,289.5	-28.3

1/ For 31 countries for which the existence of international price forecasts allows for an analysis of price and volume forecasting errors.
2/ Defined as ex ante minus ex post purchases.
3/ Derived by holding volume constant and computing the error in value due to unit value.

there were 14 cases where ex ante estimates indicated that unit values
had contributed to the shortfall, while the ex post outturn revealed
that the unit value contribution had in fact been in excess and 4 cases
where the ex post unit value shortfall was lower than that estimated
ex ante. In 8 of the remaining cases, while the ex ante contribution of
unit value was estimated to be in excess, ex post data revealed that the
excess was larger than originally estimated. In only 4 cases was the
unit value shortfall shown to have been underestimated.

Most of the countries with overcompensated purchases that occurred in
1981-82, however, would have experienced substantial shortfalls in later
periods. An exercise was conducted for the purpose of assessing the impact
on simulated purchases of moving the shortfall years forward a quarter at
a time by up to two years until the shortfall reached its maximum and pur-
chases were simulated on the basis of the shortfall profiles (Table V.4). 1/
The analysis was limited by the availability of quarterly data to 56 cases,
with total ex ante overcompensation amounting to SDR 3.2 billion. There
were 4 cases where no shortfall occurred within the two-year period;
overcompensation in respect of these 4 cases amounted to SDR 0.3 billion.
Of the 52 other cases, there were 37 instances where a subsequent shortfall
within the two-year period would have resulted in purchases equivalent to
the original amount purchased and in which, therefore, the overcompensation
of SDR 1.8 billion would have been eliminated. In the remaining 15 cases,
maximum shortfalls within the two-year period would have resulted in a
reduction in overcompensation of SDR 0.5 billion. In total, therefore, a
more appropriate timing of the shortfall in these 52 cases would have
resulted in a reduction in overcompensation from SDR 2.8 billion to
SDR 0.5 million.

2.   Adjustment for overcompensation 2/

Establishing whether a CF purchase overcompensated the shortfall
giving rise to it requires that actual data for the two post-shortfall
years, which are projected at the time of the CF purchase, be available on
a basis comparable to the other years of the trend period. Typically, once
a country makes a CF purchase it no longer has to provide the requisite
data in the form and with the timeliness required at the time of purchase,
unless the member makes a further request for a CF purchase. Apart from
the latter situation, overcompensation could be established only after a
considerable lapse of time--at least two and frequently three years or more
after the purchase--unless procedures were instituted to require members to

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1/ The fact that a subsequent shortfall was established does not imply
that the member could have qualified for a purchase because of the need to
satisfy criteria other than the existence of a shortfall.

2/ This discussion examines only the correction of overcompensation in
cases where there is an overlap between the shortfall year supporting a
purchase and the projection period of an earlier purchase. As indicated in
Part III.2 of the main paper (EBS/87/165, 7/28/87), procedures also might
be developed for the avoidance of overcompensation whenever a request for a
purchase occurs while a previous purchase is still outstanding.

submit data on the same basis as the original request as a matter of course for the period covered by projections. In the absence of such procedures, and unless the member provides the needed data in the context of a subsequent request, overcompensation could be established only close to the time that the member will commence discharging its repurchase obligation.

Table V.4. CF Cases with Overcompensation: Incidence
of Subsequent Shortfalls, 1975-84

(In millions of SDRs unless specified)

Year	56 Cases with Overcompensation 1/			Simulated Purchases at Time of Subsequent Shortfall 2/		
	Number of cases	Ex ante purchase	Amount of over- compensation	Number of cases	Amount of purchase	Revised over- compensation
1975	2	184	74	2	184	0
1976	6	476	263	6	476	0
1977	1	56	--	1	56	0
1978	4	167	90	4	167	0
1979	4	87	47	4	87	0
1980	3	312	207	3	290	22
1981	14	1,009	812	14	823	186
1982	17	1,693	1,011	15	1,314	255
1983	3	360	200	2	259	28
1984	2	460	460	1	275	--
Total	56	4,805	3,164	52	3,931	492

1/ Quarterly data are available for 56 out of the 87 overcompensated cases.

2/ Subsequent shortfall defined as either the maximum shortfall or the shortfall resulting in a purchase equal to the ex ante purchase.

Existing procedures provide for the avoidance of overcompensation arising from CF purchases that relate to overlapping shortfall years. 1/ No such procedure exists in situations in which the shortfall year supporting a CF purchase overlaps with the projection period of an earlier CF purchase based on projections that turned out to be optimistic. Allowing the member to make a second purchase on the basis of a shortfall that occurs during the projection period on which the first purchase was based, without an adjustment to remove the element of overcompensation that resulted from these projections, would seem to run counter to the intent of the CFF. The problem can be illustrated by the following hypothetical example.

	1980	1981	1982	1983	1984	1985	1986
First purchase							
Actual exports	125	150	100				
Projected exports				125	150		
Shortfall							
Ex ante = purchase			28.6				
Ex post			11.9				
Second purchase							
Actual exports			100	125	75		
Projected exports						100	127
Shortfall/purchase					28.6		

The shortfall for 1982 supporting the first purchase (28.6) was associated with a projected recovery in exports for 1983 (to 125) and 1984 (to 150). Two years later, actual exports for 1983 turned out to be as projected, but exports for 1984, at 75, were half the level projected for the first purchase. The low outturn for 1984, results in a shortfall which is then used to support a further purchase (28.6). Under present procedures, the second purchase is made without reference to the fact that compensation was being provided twice with respect to developments in the same year (1984): (1) by projecting a recovery for 1984, and (2) when the recovery did not materialize by using the low outturn for 1984 as the basis for a further CF purchase. Because of the lower than projected outturn for 1984 the shortfall for 1982 would have been reduced from the 28.6 percent estimated at the time of the first purchase to

1/ Also referred to as double compensation, which results from two purchases being related to overlapping shortfall years. Double compensation is avoided by deducting from the second shortfall an amount equivalent to the first purchase, prorated by the number of months of the first shortfall year that overlaps with the second shortfall year.

11.9 based on actual data available at the time of the second purchase,
implying that the first purchase overcompensated the shortfall by 16.7.
This type of overcompensation could be corrected by deducting from the
second shortfall the amount of the earlier overcompensation. In the
example, the second purchase would be limited to 11.9 (= 28.6-16.7). 1/
In principle a symmetrical adjustment could be made in the event the
initial purchase involved undercompensation, but such instances may be
expected to be rare. 2/

The extent of the problem of this type of overcompensation is illus-
trated in Table V.5. Of the sample of 168 purchases made since 1976,
61 cases involved projection periods of initial purchases that overlapped
with the shortfall years of subsequent purchases, and of these 61 cases
there were 24 cases where the first purchases involved overcompensation.
The SDR 0.8 billion in overcompensation for the 24 cases represent roughly
one quarter of the aggregate amount of overcompensation (SDR 3.4 billion)
for the entire sample.

As shown in row 2.3 of Table V.5, an adjustment of the entitlement
for the second purchase on account of any element of overcompensation
that may have been determined for the first purchase would have resulted
in a reduction of aggregate shortfalls for the second purchases from
SDR 1,867 million to SDR 1,102 million. As a result, the aggregate
amount of the second purchases would have been correspondingly reduced
by SDR 330 million to SDR 732 million. Because of quota limits, the
reduction of shortfalls would not have affected 9 purchases (2.3.1) and
lowered 10 other purchases by SDR 103 million in amounts that would have
been smaller than the corresponding amount of overcompensation (2.3.2). 3/
Five purchases would have been reduced by the full amount of over-
compensation for a total of SDR 228 million (2.3.3). In brief, the amount
of SDR 330 million in overcompensation eliminated by this procedure would
have contributed to a 10 percent reduction in total overcompensation
in the entire sample.

1/ Where only a part of the shortfall year for the second purchase
overlaps with the projection period of the first purchase, the amount by
which the second shortfall is adjusted could be calculated by prorating
the amount of overcompensation in the first purchase by the number of
overlapping months.

2/ This is because the second shortfall requires low exports in the
shortfall year, whereas undercompensation of the first shortfall requires
higher than projected exports in the post-shortfall period of the first
purchase, within which the shortfall year of the second purchase may lie.

3/ Two purchases in this category amounting to SDR 18 million would
have been eliminated.

Table V.5. Adjustment of Overcompensation on Account of Projection Errors—Simulation of Cases
Where Shortfall Year of a Purchase Overlaps Projected Period of an Earlier Purchase

(In millions of SDRs)

	Number of Cases (1)	Ex Ante Shortfall (2)	Ex Ante Drawing (3)	Ex Post Shortfall (4)	Ex Post Drawing (5)	Ex Ante − Ex Post Shortfall (6)=(2)−(4)	Ex Ante − Ex Post Drawing (7)=(3)−(5)
1. All drawings	168	19,309	10,845	19,822	7,391	−513	3,454
1.1 Cases with no overlap	107	12,663	7,168	12,700	4,469	−37	2,699
1.2 Cases with overlap 1/	61	6,646	3,677	7,122	2,922	−476	755
1.2.1 Correct or under-compensated	37	4,335	2,133	6,419	2,219	−2,084	−86
1.2.2 Overcompensated	24	2,311	1,544	703	703	1,608	841
2. Overlapping cases involving overcompensation	48	4,178	2,606	1,729	1,065	2,450	1,541
2.1 First purchase overcompensated	24	2,311	1,544	831 2/	757 2/	1,481	787
2.2 Second purchase	24	1,867	1,062	898	308	969	754
2.3 Adjustment of second purchase	24	1,867	1,062	1,102 3/	732 3/	765	330
2.3.1 Purchase not affected	9	621	247	418	247	202	--
2.3.2 Purchase reduced by less than amount of overcompensation	10	826	395	491	293	336	103
2.3.3 Purchase reduced by full amount of overcompensation	5	420	420	193	193	228	228

1/ Overlap refers to instances where the shortfall year of a purchase overlaps with the post-shortfall period of an earlier purchase.

2/ Ex post calculations same as 1, except that ex post data for first purchase are derived from data provided in connection with subsequent purchase; in 1., International Financial Statistics data were used uniformly.

3/ Refers to adjustment of second purchase to account for overcompensation in first purchase. Entitlement is determined by deducting the amount of overcompensation in first purchase from the shortfall for second purchase and applying quota limits.

The Cereal Decision

In the review of the cereal decision (Decision No. 6860-(81/81)) conducted by the Executive Board in May 1987 (EBM/87/73, 5/13/87), a number of Directors requested that some proposals for the modification of the decision be examined by the staff. The proposals are:

a.   The deletion of the requirement that, for a period of three years after the request for a purchase under the cereal decision, any subsequent requests for a compensatory financing purchase must also be made under that decision (the 3-year rule). This proposal would maintain the integrated nature of the compensation whereby the compensable excesses in cereal import costs are determined by netting out excesses in earnings from merchandise exports.

b.   The establishment of a separate facility for compensating excesses in cereal import costs, whereby the compensable amount of a purchase would be determined on the basis of variations in cereal import costs alone.

c.   The provision of concessional interest and repurchase terms to low income developing countries with respect to purchases under the cereal decision.

This annex examines proposals (a) and (b); proposal (c) is encompassed by the proposal to provide CF assistance to the low income countries on concessional terms, which is examined in Part IV.1 of the text and Annex VII below.

1.   Deletion of the 3-year rule

Directors supporting the deletion of paragraph 2 of Decision No. 6860-(81/81) have suggested that the 3-year rule might be a major reason for the low use of the cereal decision in the six years of its operation. The rule was included out of concern over the size of the claims that may be made on Fund resources through a system that allowed countries to opt "in" and "out" of the cereal decision. But in practice, the aggregate amount of purchases under the decision has been modest and the level of use has been considerably below levels projected at the time of its approval in May 1981. 1/

The bulk of purchases under the cereal decision took place in the initial years of the facility and no purchases have been made since December 1985. The major factor contributing to the lack of use of the cereal decision in recent years has been the growth of global food out-

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1/ Total purchases in respect of cereal imports during the first six years of operation of the decision amounted to SDR 505 million, or an average of SDR 84 million per year. This compares with annual purchases of SDR 180 million projected at the time of Board approval in mid-1981 (see SM/81/52, Sup. 1, 4/17/81).

put, especially in the food deficit countries. Also, large stocks of cereals in industrial countries have contributed to relatively low prices for cereals and have made large amounts of food aid available to food deficit countries. Nonetheless, to the extent that the 3-year rule may be a factor inhibiting the use of the cereal decision in some instances, it must be related to a perceived risk that a member assumes in opting to use the cereal decision.

The risk is a consequence of the integrated nature of calculating entitlements under the decision (that is, by reference to the sum of cereal import excess and an export shortfall). It is conceivable that a member's purchase entitlements over a number of years might be greater had it not exercised the option, and instead made its requests under the CFF in respect of export shortfalls alone. This is because the member may be constrained in the use of unutilized access to the CFF in any purchases it may wish to make to compensate export shortfalls during the following three years; any export shortfall, in this period, may be offset, either wholly or in part, by a cereal import shortfall. A member that exercises the cereal option, however, would assume such a risk only if its initial purchase brought the total of outstanding purchases under the CFF to less than the 83 percent quota limit for export shortfalls. A member whose initial purchase under the decision brings total CF purchases to more than 83 percent of quota 1/ cannot be said to have assumed any risk since in the three years that it is bound by the option it could not have obtained larger access in relation to export shortfalls alone. 2/ For this reason, in over one half of the actual purchases under the cereal decision, there was no potential risk associated with the exercise of the option.

In practice, only one country, Malawi, experienced lower access to the CFF than it would have, had it not used the cereals option. Malawi made three purchases under the cereal decision, and only the first was made with respect to an excess in cereal import costs. The second and third purchases were made under the cereal decision because of the 3-year rule. The total of the three purchases made under the cereal decision amounted to SDR 27.5 million (adjusted for an early repurchase) 3/ compared with SDR 28.0 million which could have been purchased if the cereals option had not been exercised. In the absence of the 3-year rule, Malawi could have made the first purchase under the cereal decision and subsequent purchases under the decision relating only to export shortfalls; in this event total compensation would have been SDR 29.5 million (after taking account of the early repurchase).

1/ The quota limit for a purchase which includes a cereal excess and an export shortfall is 105 percent, subject to a separate limit of 83 percent of quota on each component.

2/ Assuming that the purchase remains outstanding during the first three years after the purchase.

3/ The early drawing by Malawi resulted in an overcompenstion of SDR 10.5 million which was reversed months later.

Three other Fund members--Bangladesh, Kenya, and Jordan--assumed a
risk of potentially reduced access when making their purchases under the
cereal decision. Bangladesh made both an initial purchase and a subse-
quent purchase in the lower CF tranche; outstanding purchases were raised
to 47 percent of quota by the first purchase, and to 50 percent of quota
by the second purchase. Purchases under the cereal decision by Kenya and
Jordan brought their outstanding purchases to 64 percent and 78 percent
of quota, respectively; neither country made further purchases within the
3-year period.

This experience suggests that the risk of reduced access to the CFF
associated with the exercise of the option to use the cereal decision
and to become subject to the 3-year rule has not been a major deterrent
to the use of the cereal decision. A simulation of purchases under the
cereal decision with the deletion of the 3-year rule and with the
retention of the joint quota limit (text Table 6, line 3.1) results in
an increase in purchases of only SDR 2 million (all of which is accounted
for by Malawi as explained above). There may have been, however, an
unknown number of countries which did not pursue requests for compensa-
tion for excesses in cereal import costs under the cereal decision because
of these considerations.

If the 3-year rule were to be deleted from the cereal decision,
members would opt for the use of this decision only when they have
excesses in cereal import costs that are either added to export short-
falls or at least not entirely offset by export excesses. By comparison
with a completely separate scheme in which purchases would be based on
cereal import data alone, purchases would still be based on the cereal
excess calculated after netting out any excess in merchandise exports.
At all other times when members experience export shortfalls, they would
make their requests in relation to exports alone under the compensatory
financing decision (Decision No. 6224-(79/135)). Under this decision,
purchases are based on export data alone; export shortfalls would not be
offset by cereal import shortfalls.

2. A separate cereal facility

The extent to which CF purchases and cereal purchases under com-
pletely separate schemes would be different from those under the present
integrated scheme depends partly on the degree to which compensation was
reduced because of integration and on the quota limits assumed. Those
members which experienced export shortfalls would have purchased under
the compensatory financing decision (Decision No. 6224-(79/135)), and
those which experienced cereal import excesses would have purchased under
a separate cereal decision. As a benchmark, in a simulation based on the
13 actual purchases, it is assumed that quota limits on cereal purchases
were the same as the actual quota limits relating to export shortfalls
(that is, 100 percent of quota through end-1983 and 83 percent thereafter)
and that there was no joint limit. It should be noted that this analysis
does not take into account further requests that may have been generated
by a separate scheme.

The results of this simulation, which are reported in Table VI.1, are as follows:

(1)   Nine purchases under the compensatory financing facility for export shortfalls would have been made for a total of SDR 637 million, or SDR 27 million more than the aggregate of export components of purchases actually made under the cereal decision.

(2)   Ten purchases relating to cereal excesses under a separate cereal facility would have amounted to SDR 753 million, or SDR 248 million more than the aggregate of cereal components made under the cereal decision.

(3)   Under a separate cereal facility aggregate purchases relating to cereal excesses and to export shortfalls by the countries that made use of the cereal decision would have exceeded actual purchases related to these two components under the cereal decision by SDR 275 million or 25 percent.

Even with a separate facility for the compensation of excesses in cereal import costs, consideration might be given to the question of the desirability of maintaining a limit on total purchases under the two compensatory financing facilities at a level below the sum of their separate access limits (that is, 83 percent of quota plus 83 percent of quota, or 168 percent of quota). A simulation using the joint limit on the two separate facilities of 105 percent of quota, as in effect under the present cereal decision (text Table 6, line 4.1), results in an increase in purchases above those under the present cereal decision of around SDR 100 million (9 percent).

Consideration might also be given to reducing the limit on out- standing purchases under a separate cereal facility without applying a joint limit on the two facilities. A simulation using an extreme case of compensation for excesses in cereal import costs limited to only 33 percent of quota under a separate cereal facility (text Table 6, line 4.2) results in a decrease in compensation for cereal excesses of nearly SDR 60 million (12 percent). While the creation of two separate facilities would result in an increase of 4 percent (SDR 27 million) in the compensation of export shortfalls, the overall compensation under the two facilities would have declined by 3 percent assuming an access limit of 33 percent of quota on the cereal facility.

Table VI.1. Comparison of Simulated Purchases Under a Separate Cereal Facility With
Actual Purchases Under Cereal Decision, 1981-87

(In millions of SDRs)

Country	Year of Purchase	Cereal Excesses			Export Shortfall		
		Amount	Actual compensation under cereal decision	Simulated dompensation under separate facility 1/	Amount	Actual compensation under cereal decision	Simulated compensation under separate facility 2/
Malawi 3/	1981	18.7	12.0	18.7	-6.7	--	--
Korea	1982	570.2	106.2	255.7	-464.0	--	--
Morocco 3/	1982	123.4	123.4	123.4	113.0	113.0	113.0
Kenya 3/	1982	31.6	31.6	31.6	34.2	28.8	34.2
Bangladesh 3/	1982	33.6	33.6	33.6	37.6	37.6	37.6
Malawi	1983	-4.1	--	--	16.3	12.2	12.9
Korea	1984	-69.0	--	--	626.1	279.7	284.1
Malawi	1984	-2.2	--	--	16.0	13.8	15.1
Ghana	1984	9.0	9.0	9.0	102.6	49.2	49.2
Jordan	1985	23.0	23.0	23.0	34.4	34.4	34.4
Bangladesh 4/	1985	139.7	55.0	121.3	-31.5	--	--
Morocco	1985	73.4	73.4	73.4	56.9	41.7	56.9
Kenya	1985	63.1	37.9	63.1	-25.2	--	--
Total		1,085.7 5/	505.1	752.8	1,037.1 6/	610.4	637.4

1/ Subject to limit of 83 percent of quota (as with export facility) from 1984 and limit of 100 percent of quota to end-1983.

2/ Subject to limit of 83 percent of quota from 1984 and limit of 100 percent of quota to end-1983.

3/ Early drawings, with amounts as estimated at time of purchase. Malawi was subsequently required to make an early repurchase of SDR 10.5 million.

4/ Outstanding purchases were limited to 50 percent of quota because of a request for a purchase in the lower CF tranche. Same limit applied to simulated purchase under separate cereal facility.

5/ Not including "excesses" in export earnings.

6/ Not including "shortfalls" in cereal imports.

Costs Associated with Concessional Arrangements

Tables VII.1-VII.4 of this Annex provide detailed calculations of the costs associated with concessional arrangements involved in the simulations outlined in Part IV.1 of this paper. A table (Table VII.5) is also provided on the purchases under the CFF by SAF countries (not including China and India) over the period 1976-87.

At the current rate of 6 percent, a country making a hypothetical drawing of SDR 100 million at present, in addition to making repurchases of SDR 50 million in both the fourth and fifth years, would pay as charges a total of SDR 24.8 million over the five years in which all or part of the CF purchase is outstanding (Table VII.1).

At the current rate of 6 percent, and assuming the special account set up to handle the concessional arrangement to pay 3 percent, the country that has purchased SDR 100 million would pay over five years a total of SDR 12.4 million, with the remaining SDR 12.4 million being paid by the special account (Tables VII.1 and VII.2).

Under repayment Scheme A the country makes its repayments in equal installments over the sixth to tenth years amounting to SDR 20 million per annum (as repayments to the special account); and under repayment Scheme B, the country makes its repayments in equal installments over the fourth to tenth years amounting to SDR 14.3 million per annum (the first two years as repayments to the IMF and the last five years as repayments to the special account). Under Scheme A the special account would have to make repayments on behalf of the country in years four and five of SDR 50 million per annum; under Scheme B the repayment would be SDR 35.7 million per annum. It is assumed in both cases the country pays a rate of charge on outstanding balances with the special account equivalent to the subsidized rate paid on outstanding balances with the Fund. The sum of net payments by the country over the ten years in which it has balances outstanding with either the Fund or the special account would amount to about 23 percent of the initial purchase under the payment deferral arrangement (Scheme A) and about 20 percent under the payment extension arrangement (Scheme B). The difference is accounted for by the larger principal required, and hence higher pay-ments for charges, on the deferral arrangement. These sums are marginally lower than the total payment for charges under the current arrangement (about 25 percent spread over five years compared with the ten years under the concessional arrangement). The sum of net payments by the special account is less than 2 percent of the initial purchase under the repayment extension scheme and less than 5 percent under the extension scheme; the difference resulting from a difference under the two schemes is the sum of charges paid by countries to the special account.

More relevant to the assessment of the operations of a special account is an analysis of transactions involving a series of annual purchases. Assuming a series of annual purchases of SDR 100 million,

net payments by the special account would rise to a maximum in the fifth
year of SDR 109.8 million under Scheme A and to SDR 81.9 million under
Scheme B (Tables VII.1 and VII.3).

Table VII.4 provides a simulation of CF drawings by SAF countries
(not including China and India) over the period 1976-86 (Table VII.5).
It is assumed that finance for the special account would have been
acquired at prevailing commercial rates (specifically, an assumption of
LIBOR plus one percentage point is used). Under assumptions in line with
those used in the calculations in Tables VII.1-VII.3, the annual financial
requirement to cover the cost of the operations of the special account,
including the subsidy on the payments for the rate of charge, would have
been at a maximum in 1984. In 1984 SDR 113 million would have been
required under the arrangement to defer the repayment period (Scheme A)
and SDR 99 million under the arrangement to extend to repayment period
(Scheme B). The amounts required would have been lower in 1985 and 1986
on account of (1) a reduction in the commercial rate on finance for the
deferral or extension of the repayment period and (2) a reduction in the
outlays for the subsidy on IMF charges because of lower purchases under
the CFF. The average annual requirements for 1984-86 under the arrange-
ment to defer the repayment period would have been SDR 102 million and
under the arrangement to extend the repayment period SDR 88 million.

Table VII.1. Comparison of Payments to Cover Principal and Periodic Charges Under the Current
Arrangement and Under Alternative Concessional Schemes for the CFF

(In millions of SDRs)

| | Year | | | | | | | | | | Total |
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	
Hypothetical purchase of SDR 100 million 1/											
Net payments by IMF	94.0	-6.0	-6.0	-54.9	-51.9						-24.8
Net payments by country											
Current arrangement	-94.0	6.0	6.0	54.9	51.9						24.8
Concessional Scheme A	-97.0	3.0	3.0	3.1	3.0	22.8	22.2	21.6	21.0	20.4	23.1
Concessional Scheme B	-97.0	3.0	3.0	17.2	16.7	16.4	15.9	15.4	15.0	14.5	20.1
Net payments by special account											
Concessional Scheme A	3.0	3.0	3.0	51.8	48.9	-22.8	-22.2	-21.6	-21.0	-20.4	1.7
Concessional Scheme B	3.0	3.0	3.0	37.7	35.2	-16.4	-15.9	-15.4	-15.0	-14.5	4.7
Hypothetical purchases of SDR 100 million per annum 2/											
Net payments by IMF	94.0	88.0	82.0	27.1	-24.8	-24.8	-24.8	-24.8	-24.8	-24.8	... 3/
Net payments by countries											
Current arrangement	-94.0	-88.0	-82.0	-27.1	24.8	24.8	24.8	24.8	24.8	24.8	... 3/
Concessional Scheme A	-97.0	-94.0	-91.0	-87.9	-85.0	-62.2	-40.0	-18.4	2.5	22.9	... 3/
Concessional Scheme B	-97.0	-94.0	-91.0	-73.8	-57.1	-40.8	-25.0	-9.6	5.4	19.9	... 3/
Net payments by special account											
Concessional Scheme A	3.0	6.0	9.0	60.8	109.8	87.0	64.8	43.2	22.4	1.9	... 3/
Concessional Scheme B	3.0	6.0	9.0	46.7	81.9	65.6	49.8	34.4	19.4	4.9	... 3/

1/ Details provided in Annex Table VII.2.
2/ Details provided in Annex Table VII.3.
3/ No totals given because values in 10th year repeated in subsequent years.

Table VII.2. Comparison of Transactions Relating to Principal and Periodic Charges on
Hypothetical Purchase of SDR 100 million Under the Current Arrangement
and Under Alternative Concessional Schemes for the CFF

(In millions of SDRs)

| | Year | | | | | | | | | | |
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Total
1. Current arrangement											
Transaction by country											
Principal											
Drawings from IMF	100.0	--	--	--	--						100.0
Payments to IMF	--	--	--	50.0	50.0						100.0
IMF charges (6% per year)	6.0	6.0	6.0	4.9	1.9						24.8
Net payments	-94.0	6.0	6.0	54.9	51.9						24.8
2. Consessional Scheme A											
a. Transactions by country											
Principal											
Drawings from IMF	100.0	--	--	--	--	--	--	--	--	--	100.0
Payments to special account	--	--	--	--	--	20.0	20.0	20.0	20.0	20.0	100.0
Charges											
Paid to IMF (3% per year)	3.0	3.0	3.0	2.5	0.9	--	--	--	--	--	12.4
Paid to special account (3% per year)	--	--	--	0.6	2.1	2.8	2.2	1.6	1.0	0.4	10.7
Net payments	-97.0	3.0	3.0	3.1	3.0	22.8	22.2	21.6	21.0	20.4	23.1
b. Transactions by special account											
Principal											
Payments to IMF	--	--	--	50.0	50.0	--	--	--	--	--	100.0
Receipts from country	--	--	--	--	--	20.0	20.0	20.0	20.0	20.0	100.0
Charges											
Paid to IMF (3% per year)	3.0	3.0	3.0	2.4	1.0	--	--	--	--	--	12.4
Received from country (3% per year)	--	--	--	0.6	2.1	2.8	2.2	1.6	1.0	0.4	10.7
Net payments	3.0	3.0	3.0	51.8	48.9	-22.8	-22.2	-21.6	-21.0	-20.4	1.7
3. Concessional Scheme B											
a. Transaction by country											
Principal											
Drawings from IMF	100.0	--	--	--	--	--	--	--	--	--	100.0
Payments to IMF	--	--	--	14.3	14.3	--	--	--	--	--	28.6
Payments to special account	--	--	--	--	--	14.3	14.3	14.3	14.3	14.2	71.4
Charges											
Paid to IMF (3% per year)	3.0	3.0	3.0	2.5	0.9	--	--	--	--	--	12.4
Paid to special account (3% per year)	--	--	--	0.4	1.5	2.1	1.6	1.1	0.7	0.3	7.7
Net Payments	-97.00	3.0	3.0	17.2	16.7	16.4	15.9	15.4	15.0	14.5	20.1
b. Transactions by special account											
Principal											
Payments to IMF	--	--	--	35.7	35.7	--	--	--	--	--	71.4
Receipts from country	--	--	--	--	--	14.3	14.3	14.3	14.3	14.2	71.4
Charges											
Paid to IMF (3% per year)	3.0	3.0	3.0	2.4	1.0	--	--	--	--	--	12.4
Received from country (3% per year)	--	--	--	0.4	1.5	2.1	1.6	1.1	0.7	0.3	7.7
Net Payments	3.0	3.0	3.0	37.7	35.2	-16.4	-15.9	-15.4	-15.0	-14.5	4.7

Table VII.3. Financial Requirements of Special Account (SA) to Cover Concessional Scheme for the
CFF Assuming Annual Purchases SDR 100 million

(In millions of SDRs)

					Year					
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th 1/
1. Transactions by countries under current arrangement										
Principal										
Drawings from IMF 2/	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Payments to IMF	--	--	--	50.0	100.0	100.0	100.0	100.0	100.0	100.0
IMF charges										
Average outstanding	100.0	200.0	300.0	381.3	412.5	412.5	412.5	412.5	412.5	412.5
Charges (6% per year)	6.0	12.0	18.0	22.9	24.8	24.8	24.8	24.8	24.8	24.8
Net payments	-94.0	-88.0	-82.0	-27.1	24.8	24.8	24.8	24.8	24.8	24.8
2. Transactions under concessional Scheme A										
a. Transactions by countries										
Principal										
Drawings from IMF	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Payments to SA	--	--	--	--	--	20.0	40.0	60.0	80.0	100.0
Charges										
Average outstanding (IMF)	100.0	200.0	300.0	381.3	412.5	412.5	412.5	412.5	412.5	412.5
Charges (3% per year)	3.0	6.0	9.0	11.5	12.4	12.4	12.4	12.4	12.4	12.4
Average outstanding (SA)	--	--	--	18.8	87.5	180.0	252.5	305.0	337.5	350.0
Charges (3% per year)	--	--	--	0.6	2.6	5.4	7.6	9.2	10.1	10.5
Net payments	-97.0	-94.0	-91.0	-87.9	-85.0	-62.2	-40.0	-18.4	2.5	22.9
b. Transactions by SA										
Principal										
Payments to IMF	--	--	--	50.0	100.0	100.0	100.0	100.0	100.0	100.0
Repayments from countries	--	--	--	--	--	20.0	40.0	60.0	80.0	100.0
Charges										
Paid to IMF (3% per year)	3.0	6.0	9.0	11.4	12.4	12.4	12.4	12.4	12.4	12.4
Received from countries	--	--	--	0.6	2.6	5.4	7.6	9.2	10.1	10.5
Net payments	3.0	6.0	9.0	60.8	109.8	87.0	64.8	43.2	22.4	1.9
3. Financing of SA under concessional Scheme A										
a. Average finance required to deter maturation	--	--	--	18.8	87.5	180.0	252.5	305.0	337.5	350.0
(i) Cost at 9% per year	--	--	--	1.7	7.9	16.2	22.7	27.5	30.2	31.5
(ii) Received from countries (3% per year)	--	--	--	0.6	2.6	5.4	7.6	9.2	10.1	10.5
(iii) Net cost	--	--	--	1.1	5.3	10.8	15.1	18.3	20.1	21.0
b. Annual payment for subsidy on IMF charges	3.0	6.0	9.0	11.4	12.4	12.4	12.4	12.4	12.4	12.4
c. Total annual requirement	3.0	6.0	9.0	12.5	17.7	23.2	27.5	30.7	32.5	33.4
4. Transactions under concessional Scheme B										
a. Transactions by countries										
Principal										
Drawing from IMF 2/	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Payments to IMF	--	--	--	14.3	28.6	28.6	28.6	28.6	28.6	28.6
Payments to SA	--	--	--	--	--	14.3	28.6	42.9	57.2	71.4
Charges										
Average outstanding (IMF)	100.0	200.0	300.0	381.3	412.5	412.5	412.5	412.5	412.5	412.5
Charges (3% per year)	3.0	6.0	9.0	11.5	12.4	12.4	12.4	12.4	12.4	12.4
Average outstanding (SA)	--	--	--	13.4	62.5	128.5	180.3	217.7	240.8	250.0
Charges (3% per year)	--	--	--	0.4	1.9	3.9	5.4	6.5	7.2	7.5
Net payments	-97.0	-94.0	-91.0	-73.8	-57.1	-40.8	-25.0	- 9.6	5.4	19.9
b. Transactions by SA										
Principal										
Payments to IMF	--	--	--	35.7	71.4	71.4	71.4	71.4	71.4	71.4
Repayments from countries	--	--	--	--	--	14.3	28.6	42.9	57.2	71.4
Charges										
Paid to IMF (3% per year)	3.0	6.0	9.0	11.4	12.4	12.4	12.4	12.4	12.4	12.4
Received from countries	--	--	--	0.4	1.9	3.9	5.4	6.5	7.2	7.5
Net payments	3.0	6.0	9.0	46.7	81.9	65.6	49.8	34.4	19.4	4.9
5. Financing of SA under concessional Scheme B										
a. Average finance required to extend maturation	--	--	--	13.4	62.5	128.5	180.3	217.7	240.8	249.7
(i) Cost at 9% per year	--	--	--	1.2	5.6	11.6	16.2	19.6	21.7	22.5
(ii) Received from countries (3% per year)	--	--	--	0.4	1.9	3.9	5.4	6.5	7.2	7.5
(iii) Net cost	--	--	--	0.8	3.7	7.7	10.8	13.1	14.5	15.0
b. Annual payment for subsidy on IMF charges	3.0	6.0	9.0	11.4	12.4	12.4	12.4	12.4	12.4	12.4
c. Total annual requirement	3.0	6.0	9.0	12.2	16.1	20.1	23.2	25.5	26.9	27.4

1/ Values in 10th year repeated in subsequent years.
2/ Assuming for simplification that all purchases made on first day of each year.

Table VII.4. Simulation of Financial Requirements of Special Account (SA) to Cover Concessional CF Arrangements
for Purchases by SAF Countries (Not Including China and India), 1976-86

(In millions of SDRs)

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
1. Transaction by countries											
under current arrangement											
Principal											
Drawings from IMF	367	109	130	219	130	322	642	469	86	132	189
Outstanding	367	476	597	783	725	811	1,292	1,531	1,442	1,341	1,130
Payments to IMF	-	-	9	33	188	236	161	230	175	233	400
IMF charges											
Average outstanding	184	422	537	690	754	768	1,052	1,412	1,487	1,392	1,236
Rate (percent)	(5.0)	(5.3)	(5.4)	(5.4)	(5.4)	(6.0)	(6.5)	(6.6)	(6.9)	(7.0)	(6.3
Charges	9	22	29	37	41	46	68	93	102	97	78
Net payments	-358	-87	-92	-149	99	-40	-413	-146	191	198	289
2. Transaction under											
concessional Scheme A											
Transaction by countries											
Principal											
Drawings from IMF	367	109	130	219	130	322	642	469	86	132	189
Payments to SA					2	8	46	93	125	170	198
Charges											
Average outstanding (IMF)	184	422	537	690	754	768	1,052	1,412	1,487	1,392	1,236
Rate (percent)	(2.0)	(2.3)	(2.4)	(2.4)	(2.4)	(3.0)	(3.5)	(3.6)	(3.9)	(4.0)	(3.3)
Charges	4	10	13	16	18	23	37	51	57	56	41
Average outstanding (SA)	0	0	3	21	112	315	507	667	852	1,024	1,298
Rate (percent)	(2.0)	(2.3)	(2.4)	(2.4)	(2.4)	(3.0)	(3.5)	(3.6)	(3.9)	(4.0)	(3.3)
Charges	0	0	0	0	1	9	18	24	33	41	43
Net payments	-363	-99	-117	-202	-108	-282	-542	-301	130	134	93
Transactions by SA											
Principal											
Payments to IMF	0	0	9	33	188	236	161	230	175	233	400
Repayments from countries	0	0	0	0	2	8	46	93	125	170	198
Charges											
Paid to IMF (3% per year)	6	13	16	21	23	23	32	42	45	42	37
Received from countries	0	0	0	1	3	9	18	24	33	41	43
Net payments	6	13	25	53	206	241	129	155	61	64	195
3. Financing of SA under											
concessional Scheme A											
To defer maturation											
Average finance required	0	0	3	21	112	315	507	667	852	1,024	1,298
Variable rate (LIBOR + 1)	(6.0)	(7.0)	(9.8)	(13.1)	(15.2)	(17.9)	(14.3)	(10.7)	(11.9)	(9.4)	(7.9)
Cost at variable rate	0	0	0	3	17	56	73	71	101	96	103
Received from countries	0	0	0	1	3	9	18	24	33	41	43
Net cost	0	0	0	2	14	47	55	47	68	55	59
Annual payment for subsidy											
on IMF charges	6	13	16	21	23	23	32	42	45	42	37
Total annual requirements	6	13	16	23	37	70	86	90	113	97	96
4. Transaction under											
concessional Scheme B											
Transactions by countries											
Principal											
Drawings from IMF	367	109	130	219	130	322	642	469	86	132	189
Payments to IMF	0	0	3	9	54	67	46	66	50	67	114
Payments to SA	0	0	0	0	1	6	33	67	90	121	141
Charges											
Average outstanding (IMF)	184	422	537	690	754	768	1,052	1,412	1,487	1,392	1,236
Rate (percent)	(2.0)	(2.3)	(2.4)	(2.4)	(2.4)	(3.0)	(3.5)	(3.6)	(3.9)	(4.0)	(3.3)
Charges	4	10	13	16	18	23	37	51	57	56	41
Average outstanding (SA)	0	0	2	15	80	224	356	444	519	558	640
Rate (percent)	(2.0)	(2.3)	(2.4)	(2.4)	(2.4)	(3.0)	(3.5)	(3.6)	(3.9)	(4.0)	(3.3)
Charges	0	0	0	0	2	7	12	16	20	22	21
Net payments	-363	-99	-115	-193	-55	-219	-514	-270	131	134	129
Transactions by SA											
Principal											
Payments to IMF	0	0	6	24	134	169	115	164	125	166	285
Repayments from countries	0	0	0	0	1	6	33	67	90	121	141
Charges											
Paid to IMF (3% per year)	6	13	16	21	23	23	32	42	45	42	37
Received from countries	0	0	0	0	2	7	12	16	20	22	21
Net payments	6	13	22	44	154	179	101	124	60	65	160
5. Financing of SA under											
concessional Scheme B											
To extend maturation											
Average finance required	0	0	2	15	80	224	356	444	519	558	640
Variable rate (LIBOR + 1)	(6.6)	(7.0)	(9.8)	(13.1)	(15.2)	(17.9)	(14.3)	(10.7)	(11.9)	(9.4)	(7.9)
Cost at variable rate	0	0	0	2	12	40	51	48	62	52	51
Received from countries	0	0	0	0	2	7	12	16	20	22	21
Net cost	0	0	0	2	10	33	39	32	42	30	29
Annual payment for subsidy											
on IMF charges	4	10	13	16	18	23	37	51	57	56	41
Total annual requirements	4	10	13	18	28	56	75	82	99	85	70

Table VII.5. CF Drawings by SAF Countries (Not including China and India), 1976-87

(In millions of SDRs)

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987 Jan.-May	Total
Afghanistan	--	--	--	--	--	--	--	--	--	--	--	--	--
Bangladesh	39.1	--	--	--	--	--	60.0+71.2	--	--	54.9	--	88.9	314
Benin	--	--	--	--	--	--	--	--	--	--	--	--	--
Bhutan	--	--	--	--	--	--	--	--	--	--	--	--	--
Bolivia	--	--	15.0	--	--	--	--	17.9	--	--	64.1	--	97
Burkina Faso	--	--	--	--	--	--	--	--	--	--	--	--	--
Burma	--	--	--	--	--	--	25.6	29.2	--	--	--	--	55
Burundi	--	--	--	9.5	--	--	--	--	--	--	--	--	10
Cape Verde	--	--	--	--	--	--	--	--	--	--	--	--	--
Cent. Afr. Rep.	5.1	--	--	--	--	9.0	--	--	--	--	--	--	14
Chad	6.5	--	--	--	--	7.1	--	--	--	7.0	--	--	21
Comoros	--	--	--	--	--	--	--	--	--	--	--	--	--
Djibouti	--	--	--	--	--	--	--	--	--	--	--	--	--
Dominica	--	--	--	1.0	--	2.0	--	--	--	--	--	--	3
Equat. Guinea	--	--	--	--	6.4	4.7	--	--	--	--	--	--	11
Ethiopia	--	--	--	18.0+18.0	--	18.0	--	--	--	--	35.3	--	89
Gambia, The	--	--	4.5	--	--	9.0	--	--	--	--	4.7	--	22
Ghana	--	--	--	--	--	--	--	120.5	58.2	--	--	--	179
Grenada	--	--	--	--	--	2.1	--	--	--	--	--	--	2
Guinea	--	--	--	--	--	--	--	--	--	--	--	--	--
Guinea-Bissau	--	--	--	--	--	1.9	--	--	--	--	--	--	3
Guyana	10.0	--	8.8	1.1	6.3	--	5.9	--	--	--	--	--	31
Haiti	--	--	--	--	--	17.0	--	--	--	--	--	--	17
Kampuchea	--	--	--	--	--	--	--	--	--	--	--	--	--
Kenya	24.0	--	--	69.0	--	--	60.4	--	--	37.9	--	--	191
Lao P.D.R.	3.3	--	--	--	--	--	--	--	--	--	--	--	3
Lesotho	--	--	--	--	--	--	--	--	--	--	--	--	--
Liberia	--	--	--	20.5	--	--	7.0+27.7	--	--	--	--	--	55
Madagascar	--	--	--	--	29.2	--	21.8	--	14.4	--	16.1	--	82
Malawi	--	--	--	9.5+9.5	--	12.0	--	12.2	3.8	--	--	--	57
Maldives	--	--	--	--	--	--	--	--	--	--	--	--	--
Mali	--	--	--	--	5.1	--	--	--	--	--	--	--	5
Mauritania	6.5	--	--	--	10.5	--	--	--	--	--	--	--	17
Mozambique	--	--	--	--	--	--	--	--	--	--	--	--	--
Nepal	--	--	9.5	--	10.5	--	--	--	--	--	--	--	20
Niger	--	--	--	--	--	--	--	12.0	--	--	--	--	12
Pakistan	90.5	27.0	--	--	--	--	180.2	--	--	--	--	--	298
Rwanda	--	--	--	--	--	--	--	--	--	--	--	--	--
St. Kitts	--	--	--	--	--	--	--	--	--	--	--	--	--
St. Lucia	--	--	--	--	--	2.7	--	--	--	--	--	--	3
St. Vincent	--	--	--	--	--	1.3	--	--	--	--	--	--	1
Sao Tome & Principe	--	--	--	--	--	--	--	--	--	--	--	--	--
Senegal	--	--	21.0	--	--	42.0	--	--	--	--	--	--	63
Sierra Leone	7.0+5.5	--	--	--	--	--	--	20.7	--	--	--	--	33
Solomon Island	--	--	--	1.1	--	--	1.6	--	--	--	--	--	3
Somalia	--	--	--	--	--	--	--	--	--	32.6	--	--	33
Sri Lanka	15.8	--	--	--	--	25.3	39.2	--	--	--	--	--	80
Sudan	26.7	--	21.3	36.0	21.8	45.7	--	39.1	--	--	--	--	191
Tanzania	21.0	--	--	20.3	15.0	15.9	--	--	--	--	--	--	72
Togo	7.5	--	--	--	--	--	--	--	--	--	--	--	8
Uganda	20.0	--	--	5.0	25.0	45.0	--	--	--	--	--	--	95
Vanuatu	--	--	--	--	--	--	--	--	--	--	--	--	--
Viet Nam	--	31.0	--	--	--	--	--	--	--	--	--	--	31
Western Samoa	0.5	0.5	1.3	--	--	2.0	--	1.1	--	--	--	--	5
Yemen Arab Rep.	--	--	--	--	--	--	--	--	--	--	--	--	--
Yemen, P.D.R.	2.5	--	--	--	--	--	--	--	--	--	--	--	3
Zaire	56.5	28.3	--	--	--	--	106.9	114.5	--	--	--	45.3	352
Zambia	19.0	19.0	48.8	--	--	59.3	34.0	97.2	--	--	68.8	--	346
Total CFF by SAF countries	367	106	130	219	130	322	642	464	76	132	189	134	2,911
Total CFF	2,308	241	578	572	980	1,243	2,628	2,839	816	929	568	1,027	14,729
% by SAF countries	16	44	22	38	13	25	24	16	9	14	33	13	20
Number of SAF country case	19	5	8	13	9	19	13	10	3	4	5	2	110
Total CFF cases	48	14	15	23	15	29	28	24	8	13	8	5	230