ESSAYS IN INTERNATIONAL FINANCE
No. 180, December 1990

THE SDR SYSTEM AND THE ISSUE OF RESOURCE TRANSFERS

WARREN L. COATS, JR.
REINHARD W. FURSTENBERG
AND
PETER ISARD

INTERNATIONAL FINANCE SECTION
DEPARTMENT OF ECONOMICS
PRINCETON UNIVERSITY
PRINCETON, NEW JERSEY

ESSAYS IN INTERNATIONAL FINANCE

ESSAYS IN INTERNATIONAL FINANCE are published by the International Finance Section of the Department of Economics of Princeton University. The Section sponsors this series of publications, but the opinions expressed are those of the authors. The Section welcomes the submission of manuscripts for publication in this and its other series. See the Notice to Contributors at the back of this Essay.

The authors of this Essay are Warren L. Coats, Jr., Reinhard W. Furstenberg, and Peter Isard. Warren Coats is an advisor in the Treasurer's Department of the International Monetary Fund and was previously chief of the department's division of Special Drawing Rights. He has published widely on monetary matters and SDRs and is the author of *Special Drawing Rights: Operations and Role in Development Finance* (1990) and coauthor of the World Bank's *World Development Report 1989* (1989). In addition to fourteen years with the IMF, Dr. Coats has been a member of the economics department at the University of Virginia and a visiting economist at the Federal Reserve Board.

Reinhard Furstenberg is a vice president in the Economic Research Department of J. P. Morgan in Frankfurt, Germany. His research and writing are concerned primarily with monetary causes of real-exchange-rate changes and issues in money and capital markets. Prior to his appointment in Frankfurt, Dr. Furstenberg served with the Treasurer's Department of the IMF and at the Kiel Institute of International Economics.

Peter Isard is an advisor in the Research Department of the IMF and has also served with the International Finance Division of the Federal Reserve Board, at the Bank for International Settlements, and at several universities. He has published articles on a wide range of policy-related issues, including exchange-rate determination and the conduct and effectiveness of monetary policy. This is his second publication with the International Finance Section.

PETER B. KENEN, *Director*
International Finance Section

ESSAYS IN INTERNATIONAL FINANCE
No. 180, December 1990

THE SDR SYSTEM AND THE ISSUE OF RESOURCE TRANSFERS

WARREN L. COATS, JR.
REINHARD W. FURSTENBERG
AND
PETER ISARD

INTERNATIONAL FINANCE SECTION
DEPARTMENT OF ECONOMICS
PRINCETON UNIVERSITY
PRINCETON, NEW JERSEY

Library of Congress Cataloging-in-Publication Data

Coats, Warren L.
The SDR system and the issue of resource transfers / Warren L. Coats, Jr., Reinhard W. Furstenberg, and Peter Isard.
p. cm.—(Essays in international finance. ISSN 0071-142X ; no. 180)
Includes bibliographical references.
ISBN 0-88165-087-0 (pbk.) : $6.50
1. Special drawing rights. I. Furstenberg, Reinhard W. II. Isard, Peter. III. Title. IV. Series.
HG136.P7 no. 180
[HG3898]
332.4′5—dc20 90-28340
CIP

Printed in the United States of America by Princeton University Press at Princeton, New Jersey

International Standard Serial Number: 0071-142X
International Standard Book Number: 0-88165-087-0
Library of Congress Catalog Card Number: 90-28340

CONTENTS

LIST OF TABLES

LIST OF FIGURES

THE SDR SYSTEM AND THE ISSUE OF RESOURCE TRANSFERS

1 Introduction

More than twenty years have passed since the Board of Governors of the International Monetary Fund approved the outline of a plan to create the Special Drawing Right (SDR). A dozen years have passed since the Second Amendment to the Fund's Articles incorporated an agreement to make the SDR "the principal reserve asset in the international monetary system."[1] Yet, during that time, SDRs have been allocated in only two three-year periods, from 1970 to 1972 and from 1979 to 1981. At the end of 1989, the existing stock of SDRs (including the Fund's holdings) represented only about 3.5 percent of the nongold reserves of the Fund's member countries, down from more than 9 percent in 1972 following the first series of annual allocations.

Opposition to SDR allocation has arisen partly from the fact that some countries have made net use of their allocations on a prolonged basis and have been perceived as having thereby gained resources at the expense of other countries. One of the main purposes of this essay is to address the validity of this notion by considering the pattern of holding and use of SDRs and by developing an appropriate framework to analyze the implications of that pattern for resource transfers.

The core of the essay is divided into two sections followed by a conclusion. Section 2 surveys the ways in which the SDR system has been used and the pattern of SDR holdings that has emerged. Section 3 analyzes the implications of these developments, distinguishing between several different concepts of resource transfers and examining whether permanent or temporary resource transfers take place as a result of the allocation and use of SDRs. Section 4 provides concluding remarks.

The authors are grateful for comments from Rudolf R. Rhomberg, an anonymous referee, and a number of colleagues at the International Monetary Fund. The analysis and opinions in this Essay do not necessarily reflect the views of the IMF or other members of its staff.

[1] See de Vries (1976) on the evolution of the SDR; de Vries (1985) on the Second Amendment; and Coats (1990) on more recent developments in the uses and characteristics of the SDR.

2 The Use of the SDR System

The Fund's Articles of Agreement establish three categories of SDR holders: (1) member countries of the Fund that elect to be "participants" in the SDR scheme, (2) the Fund itself through its General Resources Account (GRA), and (3) other official entities prescribed by the Fund. Currently, all member countries of the Fund are participants, and the Fund has prescribed sixteen other official entities as holders.

SDRs may be used to settle financial obligations among the various eligible holders. They may also be exchanged for currencies (spot or forward), lent, given away, or swapped. The ability of participants to use the SDR at its full official value is assured by a "designation mechanism" spelled out in the Fund's Articles of Agreement. Through this mechanism, members with a balance-of-payments need to use reserves are able to sell their SDRs to other members designated by the Fund as having gross-reserve and balance-of-payments positions strong enough to provide freely usable currencies in exchange for SDRs.

Table 1 indicates how the various uses of SDRs have expanded or contracted over the years. Transfers of SDRs among participants and prescribed holders, but not involving the Fund's GRA, increased from about a third of all transfers in the period from 1970 to 1980 to roughly half of all transfers in recent years (Table 1, lines 1 and 16). This development mainly reflected a rapid expansion of voluntary spot exchanges of SDRs for other monetary assets in so-called "transactions by agreement" (line 3). It should be noted that, although transactions by agreement do not directly involve the GRA, many of them have been motivated by members' needs to obtain SDRs to meet their obligations to the Fund.

Transfers of SDRs to and from the Fund's GRA (lines 6 and 11) have primarily reflected loan transactions and quota payments. All Fund loans are denominated in SDRs, although disbursements and repayments may be in a variety of currencies as well as in SDRs. Members are required, however, to pay all "charges" to the GRA in SDRs. These charges include interest payments on loans and various service charges.

Other transfers of SDRs from the GRA include their use to repay borrowings by the Fund (line 13) and to remunerate members on their net-creditor positions with the Fund (line 14). The volumes of such transactions reflect in part the preferences of the recipients, who have the option of receiving either SDRs or other currencies.

TABLE 1

TRANSFERS OF SDRs

(*in billions of SDRs*)

	Annual Average 1970-80	1983	1987	1988	1989
1. Among participants and prescribed holders	1.19	6.33	8.01	9.14	8.20
2. Transactions with designation [a]	0.55	2.07	1.10	—	—
3. Transactions by agreement [b]	0.58	2.66	5.58	7.79	6.23
4. Operations [c]	—	1.23	1.03	1.03	1.51
5. Net interest on SDRs [d]	0.06	0.37	0.30	0.32	0.46
6. From participants to the GRA	1.40	8.82	4.53	4.35	4.31
7. Repurchases [e]	0.46	0.41	2.34	2.49	2.29
8. Charges [f]	0.38	1.88	2.08	1.80	1.93
9. Quota payments	0.53	6.03	—	—	—
10. Other [g]	0.03	0.50	0.11	0.06	0.09
11. From the GRA to participants and prescribed holders	0.85	5.51	5.26	4.79	4.13
12. Purchases	0.58	2.98	1.66	0.80	0.73
13. Servicing of Fund borrowings [h]	0.03	1.02	2.03	2.79	1.91
14. Remuneration [i]	0.07	1.25	0.96	0.85	1.12
15. Other [j]	0.22	0.26	0.61	0.35	0.37
16. Total transfers	3.44	20.66	17.80	18.28	16.64

[a] Spot exchanges for other monetary assets using the designation mechanism.

[b] Spot exchanges for other monetary assets excluding transactions with designation.

[c] Transactions other than spot exchanges (e.g., swap arrangements, forward operations, loan payments), excluding transfers to or from the GRA.

[d] Net interest transfers from participants with SDR holdings less than cumulative allocations to participants with SDR holdings greater than cumulative allocations.

[e] IMF loans to its members are technically purchases (see no. 12) by members of SDRs or freely usable currencies. Repayments are therefore called repurchases.

[f] Interest on loans (i.e., purchases) from the Fund.

[g] Primarily interest receipts on the GRA's holdings of SDRs.

[h] Interest plus principal repayments.

[i] Interest on participants' reserve positions in the Fund.

[j] Acquisitions of SDRs to pay charges and, from 1970 to 1980, to make quota payments and meet the reconstitution requirement.

SDRs have also been used periodically to pay for quota subscriptions and quota increases (line 9). Under the Seventh General Review of Quotas, participants were required to use SDRs to pay 25 percent of

their quota increases. Under the Eighth General Review, they could choose to pay this percentage in either SDRs or a currency specified by the Fund. This option was extended under the Ninth General Review to cover subscription payments for the quota increases expected to become effective by the end of 1991.

In assessing the welfare implications of the SDR system, two developments are particularly noteworthy. The first is that a number of countries have now entered into two-way voluntary arrangements whereby they stand ready to buy or sell SDRs up to certain limits in transactions with other Fund members. The second is that no participant in the system has had to resort to the designation mechanism for selling SDRs since August 1987 (line 2). These developments suggest that the existing stock of SDRs is distributed more or less in the amounts countries desire to hold.

Data on SDR holdings reveal a wide dispersion among several groups of countries, both in relation to cumulative allocations (Figure 1) and as a proportion of total non-gold reserves (Figure 2).[2] At the end of 1989, the level of SDR holdings relative to cumulative allocations was, on average, approximately 120 percent for the industrial countries, 215 percent for the net-creditor developing countries, and 25 percent for the net-debtor developing countries. Holdings of SDRs also amounted, on average, to about 4.5 percent of non-gold reserves for the industrial countries at the end of 1989 and to approximately 1.5 percent of non-gold reserves for both the net-creditor and net-debtor developing countries.

The net-debtor developing countries as a group have been persistent net users of SDRs since the beginning of 1970, when the first allocations were made. The ratio of their SDR holdings to cumulative allocations remained fairly constant throughout most of the seventies, rising moderately in 1978–79, partly in response to the resumption of allocations in January 1979. In 1980, all country groups reduced their SDR holdings relative to cumulative allocations in connection with the payment of subscriptions resulting from the Seventh General Review of Quotas. The SDR holdings of the net-debtor developing countries were drawn down even further during 1982–83, reflecting a relatively heavy use of reserves following the emergence of the debt crisis and the rising need for these debtor countries to make payments to the Fund.

The subscription payments resulting from the Eighth General Re-

[2] See International Monetary Fund (1989, pp. 67-70) for definitions of country groups.

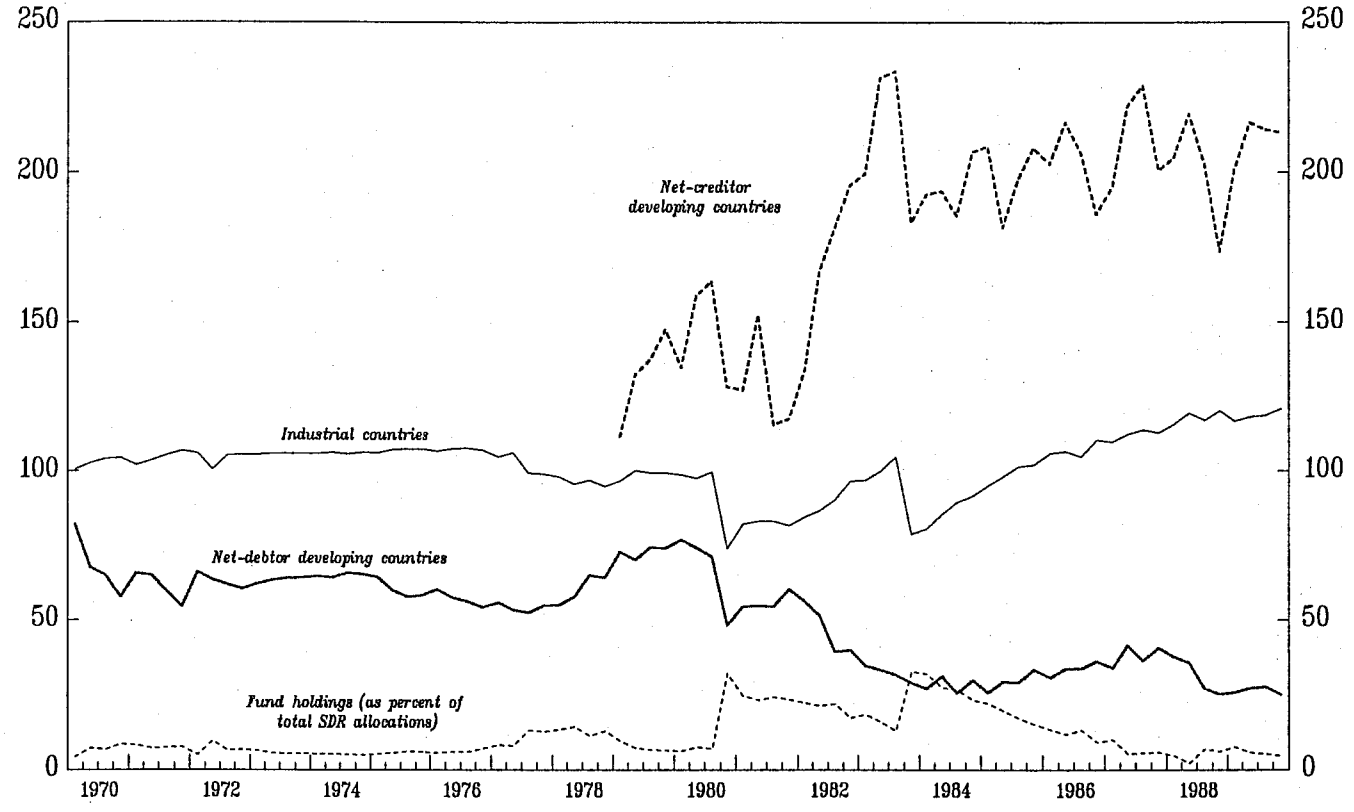

FIGURE 1

SDR HOLDINGS AS PERCENT OF CUMULATIVE ALLOCATIONS

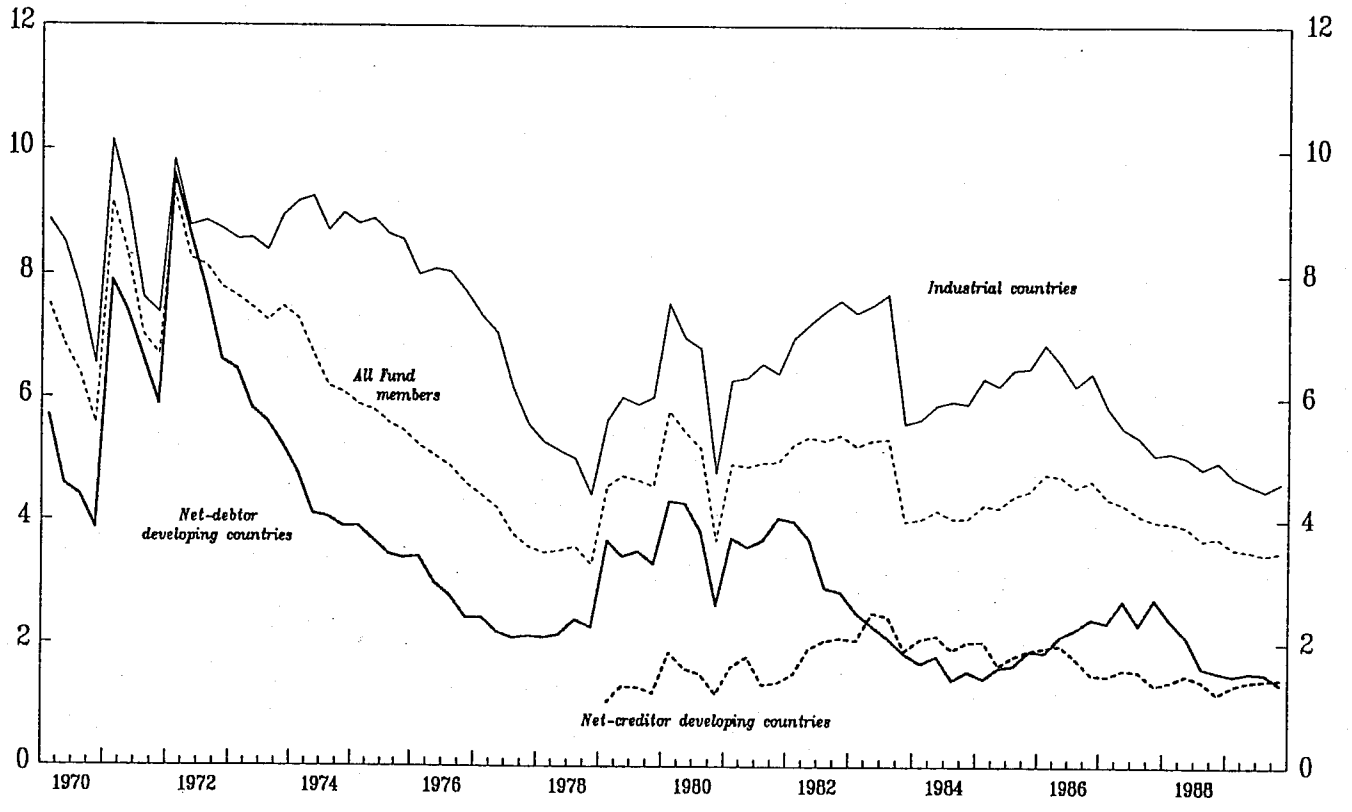

FIGURE 2

SDR HOLDINGS AS PERCENT OF NON-GOLD RESERVES

view of Quotas brought about another drop in the SDR holdings of the industrial and net-creditor developing countries at the end of 1983, but a comparable decline was not observed for the net-debtor developing countries, most of which made separate transactions to acquire the necessary SDRs.[3] From 1984 to 1987, the SDR holdings of the net-debtor developing countries rose modestly as proportions of net cumulative allocations and non-gold reserves, despite further substantial increases in payments of SDRs to the Fund. This trend was reversed, however, in 1988–89.

It may be noted that the use of SDRs to pay for quota increases has not been a driving factor in the decline of SDR holdings as a share of the non-gold reserves of the net-debtor developing countries. The sum of SDR holdings plus reserve positions in the Fund has also declined as a share of their non-gold reserves. Since 1983, moreover, the SDRs received by the Fund in quota payments have deliberately been returned to circulation through net outflows from the GRA (Figure 1); the SDR holdings of the GRA, which amounted to 0.9 billion at the end of 1989, have been kept within the range of SDR 0.75 to 1.25 billion since the middle of 1987.

The extent to which countries have made prolonged net use of SDRs can be described in terms of their ratios of average net use to average net cumulative allocations over five-year periods, the period of time suggested by the reconstitution requirement in the Fund's Articles of Agreement. Prior to 1979, the average of a participant's total daily holdings of SDRs over any period of twenty successive calendar quarters was not permitted to fall below 30 percent of the average of its cumulative allocations of SDRs for the same period. Thus, average net use of SDRs was not permitted to exceed 70 percent of average cumulative allocations. In 1979, the minimum-holdings requirement was reduced to 15 percent, and, in 1981, the reconstitution requirement was abrogated.

Since the abrogation of the reconstitution requirement, there has been a sharp increase in the percentage of participants whose average daily net use of SDRs has exceeded the previous 70-percent threshold (see Table 2). During the five years ending on December 31, 1989,

[3] Under an arrangement set up by the Fund and a group of members with large SDR holdings, countries with insufficient SDRs or foreign-exchange holdings were able to borrow SDRs to pay the reserve-asset portions of their quota subscriptions, to simultaneously purchase the reserve-tranche positions created by their payments, and to use the proceeds to repay their SDR borrowings.

60 percent of all participants made average net use of more than 70 percent of their cumulative allocations. These included 15 percent of the industrial countries, 81 percent of the net-debtor developing countries with recent debt-servicing problems, and 56 percent of the net-debtor developing countries without such problems. During the same period, all of the net-creditor developing countries and half of the industrial countries had average holdings in excess of their cumulative allocations.

Table 2 shows the distribution of countries by the extent of their average net use of SDRs over moving five-year periods; Table 3 shows the distribution of countries by the extent of their SDR holdings during selected years. As the figures in Table 3 indicate, more than 70 percent of the net-debtor developing countries had SDR holdings that were less than 20 percent of their net cumulative allocations during 1989. All of the net-creditor developing countries and over half of the industrial countries had SDR holdings in excess of their cumulative allocations during 1989; indeed, two of the seven net-creditor developing countries had holdings that exceeded three times their cumulative allocations.

3 The Issue of Resource Transfers

Concepts of Resource Transfers

The increase in the prolonged net use of SDRs since the abrogation of the reconstitution requirement has raised concerns that the SDR system gives rise to permanent transfers of resources. An analysis of this issue must distinguish between permanent and temporary transfers and must take into account both the real and financial resources that may be transferred.

Transfers occur whenever real resources (goods and services) or financial resources (financial assets of any kind) change hands. A net transfer of real resources takes place when a transfer of goods and services is not accompanied by a reverse flow of real resources of the same value, as, for example, when goods are exchanged for financial assets. The implications of these exchanges depend on whether the financial resources received entitle the holder to obtain either immediately or in the future real resources having a present value equal to the resources initially transferred. When they do, such transfers of real resources can be considered to be temporary. Only when a transfer of real resources is not accompanied by equivalent quid pro quos is it considered to be permanent.

The term "temporary transfer of real resources" has often been used

TABLE 2

DISTRIBUTIONS OF PARTICIPATING COUNTRIES BY AVERAGE NET USE OF CUMULATIVE ALLOCATIONS

(*percent of countries within group*)

	1974-78	1978-82	1980-84	1982-86	1984-88	1985-89
All participating countries						
70 to 100% net use	2	37	48	62	61	60
40 to 70	54	19	16	9	12	12
0 to 40	27	23	18	10	8	8
Excess net holdings	17	20	18	18	19	20
Industrial countries						
70 to 100% net use	0	20	20	20	15	15
40 to 70	32	5	10	10	15	15
0 to 40	16	35	30	35	25	20
Excess net holdings	53	40	40	35	45	50
Net-creditor developing countries						
70 to 100% net use	0	0	0	0	0	0
40 to 70	0	0	0	0	0	0
0 to 40	100	50	25	0	0	0
Excess net holdings	0	50	75	100	100	100
Net-debtor developing countries with debt-servicing problems						
70 to 100% net use	3	58	72	86	84	81
40 to 70	64	17	12	7	9	10
0 to 40	23	14	10	1	1	1
Excess net holdings	10	10	6	6	6	7
Net-debtor developing countries without debt-servicing problems						
70 to 100% net use	0	21	33	53	53	56
40 to 70	54	33	28	16	21	16
0 to 40	36	26	23	14	12	14
Excess net holdings	11	21	16	16	14	14
Memorandum item:						
IMF holdings of SDRs (% of cumulative allocations) [a]	12.9	17.2	23.2	9.1	6.1	4.6

NOTE: Participants with net cumulative allocations of zero during any period are excluded for that period. Entries between two ranges are included in the lower range. Column sums are rounded, so may not equal 100.

[a] End-of-period data.

TABLE 3

DISTRIBUTIONS OF PARTICIPATING COUNTRIES BY SDR HOLDINGS

(*percent of countries within group*)

	Ratios of Holdings to Cumulative Allocations						Average Ratios of Holdings to Allocations [a]
	0.0	0.0-0.2	0.2-0.5	0.5-1.0	1.0-3.0	More than 3.0	
Industrial countries							
1984	—	24	19	33	24	—	92
1986	—	24	—	29	48	—	111
1988	—	14	5	29	52	—	120
1989	—	19	5	24	52	—	121
Net-creditor developing countries							
1984	—	—	—	—	100	—	207
1986	—	—	—	—	86	14	186
1988	—	—	—	—	71	29	174
1989	—	—	—	—	71	29	214
Net-debtor developing countries							
1984	3	71	8	10	8	1	30
1986	6	63	13	6	9	3	36
1988	10	57	13	9	8	4	25
1989	8	63	13	5	6	4	25

NOTE: Distributions are based on average of end-of-month ratios for each year. Countries for which ratios fall between two ranges are recorded in the lower range.

[a] End-of-year ratios of SDR holdings to cumulative allocations for all countries in each group.

to refer to the consequences of the temporary use of reserves to finance a balance-of-payments deficit that is later reversed, but that is not our meaning here. We refer to a transfer of goods and services financed with reserves as "temporary" if the resources flowing in both directions are of equal value, regardless of whether or not the flow of reserves is ever reversed.

Most prominent among the resource transfers classed as permanent are those recorded in the balance of payments under "official unilateral (or unrequited) transfers." These largely represent grants by one

government to another. Other transactions, however, such as loans at concessional interest rates, will also permanently transfer resources from one country to another to the extent of the concessional element included in the transactions.

Conveying resources by lending (money or other claims on goods) gives rise to reverse transfers in the form of a stream of interest payments and repayment of principal. To determine whether the transfer of resources effected by a loan will be completely reversed, the value of the loan (i.e., of the resources obtained) must be compared with the present discounted value of the future payments of interest and amortization to which the loan contract gives rise, that is, the present value of the resources returned. When there is no risk that the borrower will fail to comply fully with the terms of the loan contract, any difference between the size of the loan and the present discounted value of the future payments on it can be treated as a grant component of the loan and, to that extent, a permanent transfer of resources from the lender to the borrower.

In the presence of credit risk, a distinction arises between the concept of a permanent resource transfer in an *ex ante* sense, which is defined in terms of whether transactions involve quid pro quos that are regarded as equivalent *ex ante*, and the resource transfers that may be realized *ex post*. When there is a risk that a borrower may not comply fully with the terms of a loan contract, the lender will require compensation for the risk and so will enter only into a contract in which the present value of the specified repayments stream, discounted at the market interest rate on "riskless" or minimum-risk assets, exceeds the amount of the loan.[4] Thus, if the borrower complies fully with the terms of the contract (which the lender does not regard as certain at the time the contract is written), a permanent transfer of resources will take place from the borrower to the lender after the fact. This prospect is required, however, to compensate the lender for the possibility that failure of the borrower to comply fully with the terms of the contract can result in a permanent transfer of resources from the lender to the

[4] In the absence of default risk, lending will take place on a scale that equilibrates the marginal rates of time preference of lenders and borrowers, and the appropriate discount rate for any time horizon will be unambiguous. In the presence of risk, lenders will require specific risk premiums to hold claims against specific borrowers, and the market will produce a range of interest rates for each maturity. To deal with this situation, we follow the convention of discounting the future at a rate that reflects the marginal time preferences of lenders, which can be associated with the interest rate on a "risk-free" (or minimum-risk) asset.

borrower. In a competitive environment, the issuance of a loan, or the sale of a loan on a secondary market, involves a transfer of resources for which an equivalent quid pro quo is received and thus does not involve a permanent resource transfer from an *ex ante* perspective. Even though it is likely that a permanent transfer of resources will have taken place between the borrower and the holder of the claim *ex post*, the size and direction of that transfer are uncertain *ex ante*.

Permanent Resource Transfers within the SDR System

To analyze the extent to which permanent resource transfers may arise within the SDR system, it is useful to characterize the allocation of an SDR as equivalent to the receipt of an asset through a permanent loan. Each country participating in the SDR scheme pays the SDR rate of charge on the entire amount of its cumulative allocation (the loan) and receives the SDR interest rate from the Fund on its holdings of SDRs (the asset). Although the SDR system distinguishes between the SDR rate of charge and the SDR rate of interest, the Articles of Agreement require that the two rates be set at the same level. Thus, the net stream of payments associated with allocated SDRs is zero until the SDRs are used.

Before focusing further on the SDR system, it may be instructive to consider the different channels through which resource transfers may take place when assets are loaned. Consider the loan of a marketable asset, for example, a U.S. Treasury bond with a face value of $1 million redeemable in 100 years and paying a competitive rate of interest. Assume that the interest rate charged on the loan is also competitive (the bond rate plus a competitive margin) and that the loan must be repaid in one year. (The loan could be viewed as "permanent" if the borrower were given an option to roll it over indefinitely, but this possibility is not important to the example.) The interest rate on the loan is applied to the $1 million face value of the bond, which the borrower can sell on the secondary market for $1 million in currency to deposit for one year or use in any other way desired. Because the interest rates on the asset and the loan are competitive, there is no grant element in the package.

Concessional terms can enter the package through the interest rate on the loan. The borrower will obviously gain if the interest rate on the loan (the allocation) is set below the competitive level. If the interest rate on the bond remains at its competitive level, however, the borrower will obtain no additional gain from the use of the asset (the secondary-market transaction, in this example).

Concessional terms can also enter the package through the yield on the bond. The borrower will gain from the loan, even if its interest rate is at a competitive level, if the contract contains provisions requiring a third party to purchase the bond, at the option of the borrower, for more than its price in the secondary market. More generally, the borrower will gain if the package gives him an opportunity to earn more than a competitive rate of return on the asset by selling (using) it and subsequently repurchasing (reconstituting) an equivalent asset to repay the loan.

These examples point to the possible sources of permanent resource transfer within the SDR system. We shall argue below that the net use of SDRs involves a permanent resource transfer only when the SDR interest rate is not competitive with the yields on other reserve assets after allowing for expected exchange-rate changes.[5] The allocation of SDRs, however, may provide assets on terms that involve permanent resource transfers even when the SDR interest rate is competitive.

Prior to May 1981, the SDR carried an interest rate that was clearly below the level of competitive market rates. Since the abrogation of the reconstitution requirement, however, the SDR interest rate has been set to match a "combined market interest rate."[6] At present, then, there appears to be no reason to consider the SDR interest rate to be significantly uncompetitive, and this would suggest in turn that the net use of SDRs no longer involves permanent resource transfers of substantial magnitudes. Indeed, as stated in Section 2, all transactions involving SDRs have taken place on a voluntary basis since August 1987, without resort to the designation mechanism.

[5] The SDR interest rate will be competitive if the marginal holder is indifferent between substituting one SDR for one SDR's worth of any other reserve asset in its reserve portfolio. As a practical matter, this would require an interest rate equal to the market rate on other reserve assets plus whatever premium or discount holders require to compensate for differences in the riskiness and other characteristics of the reserve assets. As the competitive level of the SDR interest rate will thus depend on all of the other characteristics of the SDR, improving those characteristics will reduce the competitive interest rate. If the SDR is relatively less attractive because it has fewer uses than other reserve assets, the competitive SDR interest rate will tend to be higher than interest rates on other reserve assets.

[6] Beginning in January 1991, the "combined market interest rate," which is periodically redefined, is to be calculated as a weighted average of the yields on three-month treasury bills in the United States, the United Kingdom, and France, three-month interbank deposits in the Federal Republic of Germany, and three-month certificates of deposit in Japan.

If the net use of SDRs does not produce permanent resource transfers, any permanent transfers within the SDR system must arise from differences between the charge paid on cumulative SDR allocations and the costs of obtaining reserves in other ways. These differences are significant for many countries, so the allocation of SDRs can be said to provide resource gains for countries that can otherwise add to their reserves only at a cost higher than the SDR rate of charge. Such resource gains are associated with the SDR allocation itself, whether or not net use is made of the allocated SDRs. These resource gains, however, do not necessarily involve permanent resource transfers from other countries.

Table 4 illustrates this point with a numerical example in which the SDR has a competitive interest rate and is riskless. The table distinguishes between three types of countries. Country A, a prime borrower, is not required to pay a risk premium to borrow in private capital markets. Country B must pay an "average" risk premium to borrow in those markets, and Country C must pay an "above-average" premium. In this example, the SDR interest rate is equal to the interest rate on risk-free reserve assets at an assumed level of 8 percent (Table 4, lines 1 and 4), and the expected yield on the riskless SDR is also 8 percent (line 5), so the expected gain from net use of SDRs is zero (line 8). Nevertheless, countries that must pay risk premiums to borrow in private capital markets can gain from an SDR allocation. In particular, Countries B and C face market borrowing rates (line 2) that exceed the expected yield on reserve assets by 2 and 4 percentage points, respectively. Because of these risk premiums for borrowing, the costs of carrying borrowed reserves (line 3) are higher than the zero cost of carrying allocated SDRs (line 6) and thus represent the expected gain from allocation (line 7).

It is important to note in this example that the resource gains of countries with relatively high borrowing costs are not at the expense of other participants in the SDR system. All countries other than the prime borrowers (country A) enjoy a resource gain as a result of the lower cost of adding to reserves through SDR allocation, and an allocation provides reserves to prime borrowers at the same cost as borrowing. Thus, no country suffers losses as a result of the allocation it receives. In addition, insofar as the SDR is competitive with other reserve assets, any resource transfers associated with the use of SDRs are accompanied by equivalent quid pro quos. Accordingly, to the extent it is valid to assume the SDR interest rate is competitive and that there is no risk in holding the SDR, it can be inferred that perma-

TABLE 4

THE SDR AS BOTH COMPETITIVE AND RISKLESS

(*in percentages*)

	Countries		
	A	B	C
1. Risk-free interest rate	8	8	8
2. Market borrowing rate	8	10	12
3. Net cost of borrowed reserves (2 - 1)	0	2	4
4. SDR interest rate (charge)	8	8	8
5. Expected yield on SDR	8	8	8
6. Expected net cost of allocation (4 - 5)	0	0	0
7. Expected gain from allocation (3 - 6)	0	2	4
8. Expected gain from net use (1 - 5)	0	0	0
9. Total potential expected gain (7 + 8)	0	2	4

nent transfers of resources do not take place within the SDR system itself. This conclusion focuses attention on the issue of whether the SDR is, in reality, both competitive and riskless. We shall discuss this further in the subsection on the nature and implications of risk.

The possibility that SDR allocation can provide resource gains to some countries, even if it does not lead to permanent resource transfers within the SDR system, raises the question of the source of these gains. This issue will be addressed in the subsection on permanent resource transfers outside the SDR system.

Before turning to these issues, it is useful to modify the preceding example to allow for the possibility that holding SDRs is risky.[7] This possibility is examined in two stages. Table 5 assumes that the SDR entails some risk, but that its interest rate is competitive; Table 6 assumes that the SDR entails some risk, but that its interest rate is not competitive. In both cases, the risk premium on the SDR, the difference between the SDR interest rate (Tables 5 and 6, lines 4) and the expected yield on the SDR (lines 5), is taken to be 0.5 percent. In Table 5, the competitiveness of the SDR is reflected in the fact that the expected yield on the SDR equals the interest rate on risk-free reserve assets, so that the expected gain from the net use of SDRs

[7] The risks of holding SDRs, which are ultimately the liabilities of the IMF and hence of all of its members rather than any particular member, are quite distinct from the risks of allocating SDRs (or lending) to individual countries.

(line 8) is zero. This is not the case in Table 6. In both cases, the expected net cost of carrying allocated SDRs (Tables 5 and 6, lines 6) is higher than in Table 4, which reduces the expected gain from SDR allocation for countries B and C and results in an expected loss for country A (Tables 5 and 6, lines 7). This reflects the assumptions that the expected yield on SDRs is less than the SDR interest rate, that the SDR rate of charge must equal the SDR interest rate, and that the *expected* SDR rate of charge is equal to the *actual* SDR rate of charge. For the case in which the SDR is competitive, the expected loss for country A cannot be offset by making net use of SDRs, so it necessarily results in a permanent resource transfer from prime borrowers to those countries regarded as posing average or relatively high risks for private creditors.

TABLE 5

THE SDR AS COMPETITIVE BUT NOT RISKLESS

(*in percentages*)

	Countries		
	A	B	C
1. Risk-free interest rate	8	8	8
2. Market borrowing rate	8	10	12
3. Net cost of borrowed reserves (2 - 1)	0	2	4
4. SDR interest rate (charge)	8.5	8.5	8.5
5. Expected yield on SDR	8	8	8
6. Expected net cost of allocation (4 - 5)	0.5	0.5	0.5
7. Expected gain from allocation (3 - 6)	-0.5	1.5	3.5
8. Expected gain from net use (1 - 5)	0	0	0
9. Total potential expected gain (7 + 8)	-0.5	1.5	3.5

These permanent transfers reflect the fact that prime borrowers must pay more to obtain reserves through SDR allocation than by borrowing to obtain reserve assets with the same expected yield, because the charge on cumulative allocations, if set uniformly for all countries and at a rate that makes the SDR competitive, includes a risk premium the most creditworthy countries can avoid. Although the interest rate earned on SDR holdings is the same as the rate of charge on cumulative allocations, the rate of charge will exceed the expected (risk-free) return on SDR holdings for all countries if the SDR interest rate contains a risk premium, and it will also exceed the cost that relatively low-risk countries must pay to borrow in private

TABLE 6

THE SDR AS NEITHER COMPETITIVE NOR RISKLESS

(*in percentages*)

	Countries		
	A	B	C
1. Risk-free interest rate	8	8	8
2. Market borrowing rate	8	10	12
3. Net cost of borrowed reserves (2 - 1)	0	2	4
4. SDR interest rate (charge)	4	4	4
5. Expected yield on SDR	3.5	3.5	3.5
6. Expected net cost of allocation (4 - 5)	0.5	0.5	0.5
7. Expected gain from allocation (3 - 6)	-0.5	1.5	3.5
8. Expected gain from net use (1 - 5)	4.5	4.5	4.5
9. Total potential expected gain (7 + 8)	4	6	8

credit markets.

Note also that, when the SDR interest rate is competitive, the permanent resource transfers resulting from allocation are not affected by the extent to which countries make net use of their SDRs (Table 5, lines 7-9). When the SDR interest rate is below the competitive level, however, those countries making net use of their SDRs can increase their expected gains (or reduce their expected losses) from the SDR system (Table 6, lines 7-9).

Temporary Resource Transfers within the SDR System

The previous analysis has established that, whether or not it is risky to hold SDRs, a competitive interest rate can prevent the use of SDRs from giving rise to permanent resource transfers within the SDR system. This conclusion notwithstanding, there remains concern that the prolonged net use of SDRs may be contrary to the purpose for which they were created and are allocated—that is, to meet the "long-term global need" for reserves. This concern deserves consideration, for it has played a central role in official deliberations regarding the resumption of SDR allocations.

The prolonged net use of SDRs does not necessarily imply that SDRs have been used to acquire real resources even temporarily. A country might, for example, use SDRs to obtain other reserve assets, a use indicating that the SDR is relatively unattractive at the margin for satisfying the perceived reserve needs or reserve-management strategy

of that particular country.[8] This use of SDRs will change the composition but not the level of the country's reserves.

A country might also repay debt with SDRs. Indeed, as discussed in Section 2, the predominant use of SDRs has been to pay interest and repay principal to the Fund. When seen in combination with an allocation, the use of allocated SDRs to service or reduce debt leaves the member's reserves at the pre-allocation level and does not significantly affect the current flow of goods and services between countries.[9]

The extent to which SDR allocations may be used to augment reserves, to reduce debt, or to finance purchases of goods and services will depend on the way in which an SDR allocation affects the amounts of reserves countries choose to hold and the way in which the size of the allocation relates to the size of the additional reserves countries wish to accumulate.

The optimal level of reserves for a country to hold reflects a balance between the marginal benefit it attaches to having additional reserves and the marginal cost of obtaining them (See Black, 1985, and Lizondo and Mathieson, 1987, on the demand for reserves). For any given level of reserves, an increase in the scale of a country's international transactions tends to increase the marginal benefit of adding to reserves. This is so because an increase in the scale of international transactions increases the amount of reserves required to meet a given percentage decline in export earnings relative to import costs. Countries consistently tend over time to increase their reserve holdings in broad proportion to the scale of their international transactions.[10] In addition, the long-run relation between the level of reserve holdings and the scale of international transactions depends importantly on the marginal net cost of obtaining reserves, that is, on the difference between the yield on reserve assets and the cost of obtaining them.

Countries face various costs of acquiring reserves through borrowing,

[8] Survey evidence suggests that the SDR's safety and stability tend to make it more attractive than other reserve assets, whereas its liquidity and usability tend to make it less attractive.

[9] To the extent that repaying debt reduces debt-service payments (i.e., that the charge on allocations is less than borrowing costs), there will be a modest effect on the flow of goods and services between countries.

[10] It may be noted, however, that cyclical or transitory factors can nevertheless lead to significant fluctuations over time in the level of a country's reserves relative to the scale of its international transactions, reflecting, in some cases, the effects of sharp adjustments in commodity prices and, in others, the consequences of active intervention to influence exchange rates.

reflecting the differences in the credit risks that lenders associate with them. The perceived risks are so high for some countries that lending to them is discontinued. Every country, however, has the opportunity to increase its reserve holdings over time by taking measures to reduce consumption or investment, or to increase production, in order to augment its net export earnings.

If countries with access to international capital markets have carefully evaluated the opportunity costs of borrowing, they will be indifferent at the margin between acquiring reserves through borrowing and earning reserves through balance-of-payments adjustment. The cost of borrowing for these countries will thus measure the marginal cost of adding to reserves in either way. For countries without access to international capital markets, the marginal cost of acquiring reserves will be the value of the consumption or investment that must be forgone to increase net exports.

The fact that countries with access to international credit markets are essentially indifferent between obtaining reserves through borrowing or obtaining them through net exports suggests that all countries collectively can simultaneously attain their optimal reserve levels even though they cannot all add to reserves through net exports. If all countries attempt at once to expand their reserves, the equilibrium outcome will be one in which countries without access to credit markets acquire reserves through net exports while other countries accommodate these net exports and obtain additional reserves for themselves by borrowing.

For most countries other than those able to borrow at prime rates, the marginal cost of acquiring reserves either by borrowing or by forgoing current absorption will exceed the rate of charge on the SDR. The marginal cost of acquiring reserves by borrowing or through net exports should, of course, reflect the marginal benefit of holding reserves. The rate of charge on the SDR, however, reflects the interest yield on prime-quality reserve assets. The difference between the cost of borrowing and the yields on prime-quality reserve assets reflects the risk premium that the country must pay to borrow, which must also equal the nonpecuniary benefit that the borrowing country associates with holding the reserves. By providing reserves at a cost less than that at which they can be acquired through borrowing or current-account adjustment, SDR allocation can reduce the *average* cost of obtaining reserves. As long as reserve holdings substantially exceed cumulative allocations, however, allocation on a modest scale will not significantly affect the cost of changing a country's reserve holdings *at the margin*,

for it will not significantly alter the marginal cost of borrowing or of current-account adjustment. Accordingly, SDR allocation on a modest scale should not have an important effect on the level of reserves that a country demands at any given time, or on the level it is actually observed to hold *ex post*.[11]

To the extent that SDR allocation does not exceed the total amount of reserves countries want to accumulate, it is properly analyzed as an alternative to other methods of reserve accumulation.[12] In these circumstances, SDR allocation will reduce the net exports of real resources that would otherwise be necessary to accumulate the desired amount of reserves. For countries with access to capital markets, allocation will also tend to reduce borrowing. This, of course, is precisely what SDR allocation is intended to do, so long as it does not exceed the amount by which countries choose to increase their reserve holdings over time.

By contrast, if some countries are allocated SDRs in excess of the amount of reserves they want to accumulate, the excess will tend to be used to reduce borrowing and/or the net export of goods and services they would otherwise seek in order to generate reserves.[13] In short, allocations that exceed the growth in reserve demand finance net purchases of goods and services as well as lower the cost of satisfying the long-run demand for reserves.[14] The resulting transfers of real

[11] It may be noted, however, that an allocation could result in some reduction in foreign-debt-service obligations and could also strengthen the quality of reserve holdings by replacing borrowed reserves with owned reserves. These factors could lead to an improvement of a country's credit standing and hence to a reduction in the marginal cost of borrowing, which would tend to increase the country's demand for reserves. In addition, to the extent SDR allocation reduces foreign borrowing, it might tend to reduce "world" interest rates and thus to increase the country's demand for reserves. The text abstracts from these secondary effects.

[12] This is true even if some countries make net use of their SDRs on a sustained basis, provided the total reserve holdings they choose to accumulate exceed the SDR allocations they receive.

[13] As noted above, not all countries can reduce net exports simultaneously. If all countries were to find themselves with excess reserves at once and were to attempt to spend them on goods and services, the result would be a rise in either world production or prices, as well as a shift of financial assets from official reserve holders to the private sector. If this entailed a reduction in net exports for some countries, it would necessarily entail an offsetting increase in net exports for others.

[14] The issue of whether, and in what circumstances, an allocation finances the acquisition of real resources is intimately linked with the issue of its impact on a member's balance-of-payments adjustment efforts. In considering the design of domestic policies for achieving balance-of-payments objectives, it is useful to distinguish: (a) policy

resources will not be permanent, however, if they are accompanied by equivalent quid pro quos.

Although it may be important to know whether an SDR allocation augments reserves or finances flows of real goods and services in order to judge whether the SDR is meeting the purpose for which it is intended, it should be noted that the scale of cumulative SDR allocations has fallen far short of the total amounts of reserves that countries have chosen to accumulate to date.

The Nature and Implications of Risk

Two questions concerning risk were identified in the subsection on permanent resource transfers within the SDR system. Is it risky to hold SDRs? And, if not, can it be inferred that the resource gains SDR allocation provides result from permanent resource transfers outside the SDR system, given that most countries must pay risk premiums to borrow on private capital markets?

The risks of holding SDRs can be viewed as (1) the chance that interest receipts on SDR holdings might be delayed or ultimately reduced by the failure of some participants to meet their obligations to the SDR system and (2) the possibility that the usability or value of SDRs might be impaired, including the chance that a loss will be sustained if the SDR system is ever liquidated.

Two considerations suggest that these risks are not significant: (1) Members of the IMF have generally placed a high value on their relations with the Fund and have endeavored to meet their obligations to the SDR system even in the face of extreme difficulty in meeting other payments. They have, in practice, subordinated their market debt to their obligations to the SDR system. (2) The Fund is required to pay interest to each holder of SDRs, whether or not sufficient amounts of SDRs are received in payment of charges. This requirement implies that any risk in holding SDRs is not related in a simple way to the risk of lending to countries that have made or are likely to make net use of their SDRs. The chance that interest receipts on SDR holdings might

---

settings consistent with a viable (sustainable) balance of payments and (b) temporary deviations from those policy settings designed to achieve an adjustment of reserve holdings to desired levels. The amounts of SDR allocations (or cancellations) should be chosen to encourage policy settings consistent with long-run viability and to diminish the extent to which deviations from those policy settings are dictated by the need to adjust reserve holdings. The success with which SDR allocations achieve these objectives depends in part on how closely the allocations match the growth over time of the reserve demands of various countries.

be delayed or not paid is eliminated or substantially reduced by the provision that the Fund must make full payment of interest when due, even if SDRs must be created for that purpose.[15]

The possibility that SDRs might at times not be usable (e.g., exchangeable for currency) at their full official value is more complicated to analyze. To the extent that the designation mechanism must be relied on to ensure the SDR's usability, the risks are that the acceptance obligations of countries with strong balance-of-payments and reserve positions might not be large enough to absorb all of the SDRs holders wish to exchange or that these countries might become unwilling to honor their obligations fully. The latter risk reflects more the behavior of creditor countries than of debtor countries.

Although these considerations suggest that the nature of any risk within the SDR system is complex, they do not deny the fact that its ultimate source is the prospect that net users of SDRs may not fulfill their obligations to the system. If that prospect is regarded as significant, one can infer from our previous analysis that the SDR system, which pays a market rate of interest on SDR holdings, does give rise to permanent resource transfers. Such transfers can in theory be avoided, at least in an *ex ante* sense, by modifying the system to apply various rates of charge to recipients of SDR allocations in accordance with the various degrees of risk they pose for the SDR system, thereby financing a uniform premium to the SDR rate of interest paid on all holdings. In practice, however, it would be difficult to assess the degrees of risk posed by various countries and to reassess these risks continuously over time. In any event, the Fund's Articles do not permit such a modification of the system.

If the risk in holding SDRs is not significant, and to the extent that the SDR rate of interest is broadly competitive with interest rates on other reserve assets, our analysis suggests that the allocation and use of SDRs does not generate significant permanent resource transfers within the SDR system. Our analysis also emphasizes, however, that the allocation of SDRs can provide significant resource gains for those countries that must pay high risk premiums to borrow in private capital markets. This fact raises another issue.

Even if resource gains from allocations do not represent transfers

[15] As of December 31, 1989, unpaid charges on cumulative SDR allocations amounted to SDR 44 million (compared with cumulative allocations amounting to SDR 21.4 billion). The payment of this amount of interest to SDR holders was accomplished, therefore, by creating 44 million SDRs.

from other countries within the SDR system, it is important to understand the extent to which they (1) represent a savings to the global economy as a whole, (2) may be offset by higher costs of borrowing outside the SDR system, or (3) may give rise to permanent resource transfers outside the SDR system.[16]

Permanent Resource Transfers outside the SDR System

The starting point for developing such an understanding is to recognize that resource gains arise from SDR allocation because borrowing costs in private credit markets include interest premiums or other charges to compensate lenders for credit risk, whereas no explicit risk premium is built into the charge on cumulative SDR allocations under the current method of setting the SDR interest rate. Our analysis depends, therefore, on the extent to which the total risk in private international credit markets is simply redistributed, and the extent to which it is diminished, when SDR allocation reduces the amounts that countries borrow to accumulate reserves.

As noted earlier, SDR allocation tends to redistribute the risks in international credit markets insofar as countries subordinate their market debt to their obligations to the SDR system. Consequently, if an allocation of SDRs leads to a reduction in market borrowing without increasing the willingness or ability of countries to service their total debt, risk premiums on the reduced volume of market debt will tend to rise commensurately.[17] If private credit markets price risk appropriately, there will be no permanent resource transfers (in an *ex ante* sense) outside the SDR system. Any resource gains associated with the SDR allocations received by a specific country will be partly or completely offset by increases in the risk premiums that country must pay to borrow in international capital markets, or by reductions in its access to those markets. The offset will be less than complete, and the country will receive a net benefit from SDR allocation only to the extent that the SDR allocation reduces the total risk in the system.

It is beyond the scope of this essay to analyze how much and

[16] "Permanent resource transfers" refer to gains by some at the expense of others. Resource gains need not represent transfers in a positive sum game.

[17] If, on the other hand, SDR allocation results in higher levels of reserves, so that market borrowing is not reduced, risk premiums on the unchanged value of the market debt will not need to rise. As argued earlier, however, allocation will not generally increase reserve holdings over the level at which they would have been without allocation.

through what channels SDR allocation may reduce the total risk in the global economic system or may otherwise provide real resource savings for countries collectively. That analysis will need to focus on the extent to which the SDR system can provide gains from reserve pooling that private capital markets cannot achieve and the extent to which reserve assets obtained through allocation are more secure than those financed by borrowing that must be periodically rolled over. In addition, such an analysis should consider the potential for real resource savings that might result from improvements in the functioning of the international monetary system. An increased proportion of owned reserves to borrowed reserves and the avoidance of excessive balance-of-payments adjustment for purposes of accumulating reserves could help to stabilize the flow of international payments and trade and could potentially save substantial real resources through higher average levels of employment and economic activity, as well as through improved resource allocation.

4 Concluding Remarks

Many countries have maintained holdings of SDRs at levels considerably lower than their cumulative allocations. Such prolonged net use of SDRs raises the question of whether the SDR system has generated permanent resource transfers. This essay has presented an analytic framework for evaluating the resource transfers that take place within the SDR system and has distinguished between permanent resource transfers that may result from the prolonged net use of SDRs and those that may arise from the allocation of SDRs.

The implications of an exchange of one type of resource for another depend on whether the present discounted values of the two types are equal. Permanent resource transfers are defined as occurring when exchanges do not involve equivalent quid pro quos. Typically, the occurrence of permanent resource transfers is associated with grants or loans at concessional interest rates.

We have argued that the net use of SDRs does not involve permanent resource transfers unless the SDR interest rate is uncompetitive with yields on other reserve assets, that is, unless the SDR interest rate differs from yields on other reserve assets by amounts that do not compensate for differences in the characteristics of the assets. Moreover, insofar as the SDR interest rate is competitive, the allocation of SDRs gives rise to permanent resource transfers only if holding SDRs is perceived as risky. In that case, the SDR interest rate and rate of

charge will include a risk premium and will therefore exceed the cost at which prime borrowers can obtain reserves on private credit markets.

These conclusions must be reconciled with the fact that, for many countries, SDR allocation provides resources at terms more favorable than the costs of borrowing or earning reserves. But, insofar as the SDR interest rate is competitive and holding SDRs is not risky, the resource gain or savings for a country from its own individual allocation of SDRs does not impose losses on other countries. Instead, it represents either a welfare gain for the international economy as a whole or a resource savings offset by losses arising from changes in the terms under which the country can obtain funds outside the SDR system. The extent to which the SDR system can provide welfare gains for the international economy as a whole requires further analysis.

References

Black, Stanley W., "International Money and International Monetary Arrangements," in Ronald W. Jones and Peter B. Kenen, eds., *Handbook of International Economics*, Vol. 2, Amsterdam, North-Holland, 1985, pp. 1153-1193.

Coats, Warren L., Jr., *Special Drawing Rights: Operations and Role in Development Finance*, New Delhi, Allied Publishers, 1990.

de Vries, Margaret Garritsen, *The International Monetary Fund, 1966-1971*, Washington, International Monetary Fund, 1976.

———, *The International Monetary Fund, 1972-1978*, Washington, International Monetary Fund, 1985.

International Monetary Fund, *World Economic Outlook*, Washington, International Monetary Fund, October 1989.

Lizondo, José Saúl, and Donald J. Mathieson, "The Stability of the Demand for International Reserves," *Journal of International Money and Finance*, 6 (September 1987), pp. 251-282.

The World Bank, *World Development Report 1989*, New York, Oxford University Press for The World Bank, 1989.

PUBLICATIONS OF THE INTERNATIONAL FINANCE SECTION

Notice to Contributors

The International Finance Section publishes papers in four series: ESSAYS IN INTERNATIONAL FINANCE, PRINCETON STUDIES IN INTERNATIONAL FINANCE, SPECIAL PAPERS IN INTERNATIONAL ECONOMICS, AND REPRINTS IN INTERNATIONAL FINANCE. ESSAYS, STUDIES, AND SPECIAL PAPERS contain new work not published elsewhere. REPRINTS reproduce journal articles previously published by Princeton faculty members associated with the Section. The Section welcomes the submission of manuscripts for publication under the following guidelines:

ESSAYS are meant to disseminate new views about international financial matters and should be accessible to well-informed nonspecialists as well as to professional economists. Technical terms, tables, and charts should be used sparingly; mathematics should be avoided.

STUDIES are devoted to new research on international finance, with preference given to empirical work. They should be comparable in originality and technical proficiency to papers published in leading economic journals. They should be of medium length, longer than a journal article but shorter than a book.

SPECIAL PAPERS are surveys of research on particular topics and should be suitable for use in undergraduate courses. They may be concerned with international trade as well as international finance. They should also be of medium length.

Manuscripts should be submitted in triplicate, typed single sided and double spaced throughout on 8½ by 11 white bond paper. Publication can be expedited if manuscripts are computer keyboarded in WordPerfect 5.1 or a compatible program. Additional instructions and a style guide are available from the Section.

How to Obtain Publications

The Section's publications are distributed free of charge to college, university, and public libraries and to nongovernmental, nonprofit research institutions. Eligible institutions may ask to be placed on the Section's permanent mailing list.

Individuals and institutions not qualifying for free distribution may receive all publications for the calendar year for a subscription fee of $30.00. Late subscribers will receive all back issues for the year during which they subscribe. Subscribers should notify the Section promptly of any change in address, giving the old address as well as the new.

Publications may be ordered individually, with payment made in advance. ESSAYS and REPRINTS cost $6.50 each; STUDIES and SPECIAL PAPERS cost $9.00. An additional $1.25 should be sent for postage and handling within the United States, Canada, and Mexico; $1.50 should be added for surface delivery outside the region.

All payments must be made in U.S. dollars. Subscription fees and charges for single issues will be waived for organizations and individuals in countries where foreign-exchange regulations prohibit dollar payments.

Please address all correspondence, submissions, and orders to:

International Finance Section
Department of Economics, Fisher Hall
Princeton University
Princeton, New Jersey 08544-1021

List of Recent Publications

A complete list of publications may be obtained from the International Finance Section.

ESSAYS IN INTERNATIONAL FINANCE

152. G. K. Helleiner, *The IMF and Africa in the 1980s*. (July 1983)
153. Rachel McCulloch, *Unexpected Real Consequences of Floating Exchange Rates*. (August 1983)
154. Robert M. Dunn, Jr., *The Many Disappointments of Flexible Exchange Rates*. (December 1983)
155. Stephen Marris, *Managing the World Economy: Will We Ever Learn?* (October 1984)
156. Sebastian Edwards, *The Order of Liberalization of the External Sector in Developing Countries*. (December 1984)
157. Wilfred J. Ethier and Richard C. Marston, eds., with Kindleberger, Guttentag and Herring, Wallich, Henderson, and Hinshaw, *International Financial Markets and Capital Movements: A Symposium in Honor of Arthur I. Bloomfield*. (September 1985)
158. Charles E. Dumas, *The Effects of Government Deficits: A Comparative Analysis of Crowding Out*. (October 1985)
159. Jeffrey A. Frankel, *Six Possible Meanings of "Overvaluation": The 1981-85 Dollar*. (December 1985)
160. Stanley W. Black, *Learning from Adversity: Policy Responses to Two Oil Shocks*. (December 1985)
161. Alexis Rieffel, *The Role of the Paris Club in Managing Debt Problems*. (December 1985)
162. Stephen E. Haynes, Michael M. Hutchison, and Raymond F. Mikesell, *Japanese Financial Policies and the U.S. Trade Deficit*. (April 1986)
163. Arminio Fraga, *German Reparations and Brazilian Debt: A Comparative Study*. (July 1986)
164. Jack M. Guttentag and Richard J. Herring, *Disaster Myopia in International Banking*. (September 1986)
165. Rudiger Dornbusch, *Inflation, Exchange Rates, and Stabilization*. (October 1986)
166. John Spraos, *IMF Conditionality: Ineffectual, Inefficient, Mistargeted*. (December 1986)

*Publications marked by an asterisk are out of print. They are available on demand in xerographic paperback or library-bound copies from University Microfilms International, Box 1467, Ann Arbor, Michigan 48106, USA, or 30-32 Mortimer St., London, WIN 7RA, England. Microfilm of all Essays by year is available from University Microfilms. Photocopied sheets of out-of-print titles are available from the Section at $9.00 per Essay and $11.00 per Study or Special Paper, plus $1.25 for domestic ($1.50 for overseas) postage and handling.

167. Rainer Stefano Masera, *An Increasing Role for the ECU: A Character in Search of a Script*. (June 1987)
168. Paul Mosley, *Conditionality as Bargaining Process: Structural-Adjustment Lending, 1980-86*. (October 1987)
169. Paul Volcker, Ralph Bryant, Leonhard Gleske, Gottfried Haberler, Alexandre Lamfalussy, Shijuro Ogata, Jesús Silva-Herzog, Ross Starr, James Tobin, and Robert Triffin, *International Monetary Cooperation: Essays in Honor of Henry C. Wallich*. (December 1987)
170. Shafiqul Islam, *The Dollar and the Policy-Performance-Confidence Mix*. (July 1988)
171. James M. Boughton, *The Monetary Approach to Exchange Rates: What Now Remains?* (October 1988)
172. Jack M. Guttentag and Richard M. Herring, *Accounting for Losses On Sovereign Debt: Implications for New Lending*. (May 1989)
173. Benjamin J. Cohen, *Developing-Country Debt: A Middle Way*. (May 1989)
174. Jeffrey D. Sachs, *New Approaches to the Latin American Debt Crisis*. (July 1989)
175. C. David Finch, *The IMF: The Record and the Prospect*. (September 1989)
176. Graham Bird, *Loan-loss Provisions and Third-World Debt*. (November 1989)
177. Ronald Findlay, *The "Triangular Trade" and the Atlantic Economy of the Eighteenth Century: A Simple General-Equilibrium Model*. (March 1990)
178. Alberto Giovannini, *The Transition to European Monetary Union*. (November 1990)
179. Michael L. Mussa, *Exchange Rates in Theory and in Reality*. (December 1990)
180. Warren L. Coats, Jr., Reinhard W. Furstenberg, and Peter Isard, *The SDR System and the Issue of Resource Transfers*. (December 1990)

PRINCETON STUDIES IN INTERNATIONAL FINANCE

52. Irving B. Kravis and Robert E. Lipsey, *Toward an Explanation of National Price Levels*. (November 1983)
53. Avraham Ben-Basset, *Reserve-Currency Diversification and the Substitution Account*. (March 1984)
*54. Jeffrey Sachs, *Theoretical Issues in International Borrowing*. (July 1984)
55. Marsha R. Shelburn, *Rules for Regulating Intervention under a Managed Float*. (December 1984)
56. Paul De Grauwe, Marc Janssens and Hilde Leliaert, *Real-Exchange-Rate Variability from 1920 to 1926 and 1973 to 1982*. (September 1985)
57. Stephen S. Golub, *The Current-Account Balance and the Dollar: 1977-78 and 1983-84*. (October 1986)
58. John T. Cuddington, *Capital Flight: Estimates, Issues, and Explanations*. (December 1986)
59. Vincent P. Crawford, *International Lending, Long-Term Credit Relationships, and Dynamic Contract Theory*. (March 1987)
60. Thorvaldur Gylfason, *Credit Policy and Economic Activity in Developing Countries with IMF Stabilization Programs*. (August 1987)

61. Stephen A. Schuker, *American "Reparations" to Germany, 1919-33: Implications for the Third-World Debt Crisis*. (July 1988)
62. Steven B. Kamin, *Devaluation, External Balance, and Macroeconomic Performance: A Look at the Numbers*. (August 1988)
63. Jacob A. Frenkel and Assaf Razin, *Spending, Taxes, and Deficits: International-Intertemporal Approach*. (December 1988)
64. Jeffrey A. Frankel, *Obstacles to International Macroeconomic Policy Coordination*. (December 1988)
65. Peter Hooper and Catherine L. Mann, *The Emergence and Persistence of the U.S. External Imbalance, 1980-87*. (October 1989)
66. Helmut Reisen, *Public Debt, External Competitiveness, and Fiscal Discipline in Developing Countries*. (November 1989)
67. Victor Argy, Warwick McKibbin, and Eric Siegloff, *Exchange-Rate Regimes for a Small Economy in a Multi-Country World*. (December 1989)
68. Mark Gersovitz and Christina H. Paxson, *The Economies of Africa and the Prices of Their Exports*. (October 1990)
69. Felipe Larraín and Andrés Velasco, *Can Swaps Solve the Debt Crisis? Lessons from the Chilean Experience*. (November 1990)

SPECIAL PAPERS IN INTERNATIONAL ECONOMICS

15. Gene M. Grossman and J. David Richardson, *Strategic Trade Policy: A Survey of Issues and Early Analysis*. (April 1985)
16. Elhanan Helpman, *Monopolistic Competition in Trade Theory*. (June 1990)

REPRINTS IN INTERNATIONAL FINANCE

24. Peter B. Kenen, *Forward Rates, Interest Rates, and Expectations under Alternative Exchange Rate Regimes*; reprinted from *Economic Record* 61, 1985. (June 1986)
25. Jorge Braga de Macedo, *Trade and Financial Interdependence under Flexible Exchange Rates: The Pacific Area*; reprinted from *Pacific Growth and Financial Interdependence*, 1986. (June 1986)
26. Peter B. Kenen, *The Use of IMF Credit*; reprinted from *Pulling Together: The International Monetary Fund in a Multipolar World*, 1989. (December 1989)

The work of the International Finance Section is supported in part by the income of the Walker Foundation, established in memory of James Theodore Walker, Class of 1927. The offices of the Section, in Fisher Hall, were provided by a generous grant from Merrill Lynch & Company.

ISBN 0-88165-087-0