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ARTIFICIAL CURRENCY UNITS: THE FORMATION OF FUNCTIONAL CURRENCY AREAS

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DEPARTMENT OF ECONOMICS

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Artificial Currency Units: The Formation of Functional Currency Areas

A basic tenet of monetary economics is that the moneyness of an economic object is a matter of degree. The dividing line between money and nonmoney is inevitably arbitrary, because money fulfills not one but three functions, which are met in different degrees by different objects. Consequently, depending on the weights attached to the three functions, diverse orderings can be made of the degrees of moneyness of particular economic objects. The functions of money (1) as a unit of account, (2) as a medium of exchange, and (3) as a store of value combine to impart to an object the quality of generalized purchasing power. How and when an economic object assumes this quality in actuality involves a transformation process that cannot be delineated once and for all, because it constitutes a complex component of the course of economic development, both national and international. As a result, there is a wide diversity of cases of the transformation of particular economic objects into money.

Amid the turmoil and upheaval of the current international monetary system, a series of eventful developments are under way involving the emergence of new artificial (or composite) currency units. The number of such units is growing constantly as a reflection of mounting discontent with the practice of using one or another national currency as the major unit of account in international transactions, either official or private. Because the values of such key national currencies as the U.S. dollar and the British pound have been highly unstable since the emergence of floating exchange rates, there have been growing efforts to create substitute, so-called "artificial," currency units for use in international accounting and international settlements. Some of the efforts have been official, others unofficial.

This essay focuses upon the artificial currency units (ACUs) that have come into commercial and official use in recent years. A prominent example of such an ACU is the Special Drawing Right (SDR) of the International Monetary Fund, but other ACUs have been assuming a vital role in international finance, even though they have been less publicized or hardly recognized. Our objective is the dual one of reviewing the noteworthy ACUs and analyzing their economic significance.

Accordingly, our task is divided into three parts. First, we explore the conceptual underpinnings of the ACU phenomenon in light of the history

of its recent emergence and dissemination. Next, we consider the essential properties of the various ACUs in their wide diversity. Finally, we explore the implications of the ACU concept for the theory of optimum currency areas.

Conceptual Underpinnings

It has been observed that the introduction of a unit of account in terms of which to compare the values of different goods and services was as important for economies as was the invention of the wheel for technology. The ACUs that constitute the focus of our study have arisen in response to the challenge of devising a common international unit of account among diverse national currencies. Both for rational economic calculation and for the transmission of economic information, the emergence of ACUs illustrates the international monetary application of the adage, necessity is the mother of invention.

At its present stage of development, an ACU's main function is as a numeraire, or unit of account, in international transactions. As such, an ACU is simply a yardstick to measure the value of a transaction, with the aim of keeping that value as stable as possible. Therefore, most ACUs are not full-fledged money, being used neither as a medium of exchange nor a means of payment. Even though the value of a payment obligation is expressed in an ACU, the actual payment is generally made in one of the national currencies. It should be noted, however, that there is nothing inherent in the concept of an ACU to limit its role to that of a numeraire. The main arguments of this essay are developed with an eye to the potential, as well as the likelihood, of ACUs playing an increasingly important role as full-fledged international money. In an ACU, the two functions of money as a unit of account and a medium of exchange are separated in current usage, and in most instances only the former function is fulfilled. Such separation is by no means unknown in monetary history: from the reign of Charlemagne until the French Revolution, the unit of account and the means of payments were separated (Guggenheim, 1973, p. 93). For the time being, therefore, we define an ACU as an international quasi-money serving as a numeraire in international transactions.

The concept of an ACU is not new. As long ago as the late Middle Ages, when every kingdom, principality, and small town had its own currency, such ACUs as the Mark-Banco of Hamburg and the Florin-Banco of the Amsterdam Wissel-Bank were generally used to settle accounts in international trade (Collin, 1964, p. 27). By the end of the nineteenth century, however, the old types of ACUs had practically

disappeared, because the gold standard made possible both monetary stability and smooth settlements in international trade.

As a result of recurring instability among national currencies after World War I began, some international institutions and treaties started to include provisions for ACUs. For example, from its inception in 1930 the Bank for International Settlements has expressed its financial statements in an ACU that has a gold weight of 0.29032 gram of fine gold per unit, which corresponded to the gold content of one Swiss franc before its devaluation in 1936. The European Payments Union, which commenced operation on July 1, 1950, adopted an ACU called the European Unit of Account (EUA) that had a gold weight of 0.88867 gram of fine gold per unit. This gold value was the same as that of one U.S. dollar prior to the increase in the official price of gold from $35 to $38 per fine ounce, effective May 8, 1972. The European Monetary Agreement, which replaced the European Payments Union on December 27, 1958, also used the EUA as its basic unit of account until the Agreement came to an end on December 31, 1972.

In general, we can divide ACUs into two types. The first comprises ACUs created by official institutions primarily for official international transactions. The second comprises ACUs introduced at the initiative of private banking enterprises for commercial and financial transactions. There has, however, been active cross-fertilization of ideas between private and official institutions in establishing ACUs. When an official institution creates an official ACU, it may borrow the idea from a private ACU, as in the case of the IMF's "new" SDR, which is patterned after the currency-basket, or currency-cocktail, concept of the Eurco (a private ACU). On the other hand, private banking institutions may simply start to use an official ACU for private transactions after making a few modifications. For example, in 1961 the Kredietbank in Luxembourg introduced the European Economic Community's EUA (an official ACU) as the unit of denomination for private bond issues in the international capital market. Nevertheless, it is helpful as an expository device to divide ACUs into official and private units according to their principal uses.

While the ACUs used prior to the nineteenth century were mostly private ACUs employed for international trade settlements, the first ACUs of this century were created by official international institutions for use in their official transactions. In the late 1950s and early 1960s, however, the wide use of official ACUs in international public agreements led some private bankers and scholars to inquire whether such a device could usefully be applied to private international contracts. For example, Triffin wrote in 1957:

> A first step in this direction [toward monetary integration in Europe] might be to legalize the use of exchange guarantees in terms of the EPU unit, in the writing of private as well as public contracts. This could aid greatly in the revival of capital markets, now paralyzed by exchange fears and risks (p. 291).

As noted above, the first private ACU was inaugurated in 1961 when, with the help of a bank syndicate led by the Kredietbank, a large Portuguese oil company, SACOR, floated a bond issue denominated in an ACU called the EUA, which was a modified form of the official EUA being used by the European Monetary Agreement. The SACOR issue, in a principal amount equivalent to $5 million, was offered simultaneously in several major European countries and was a huge success, being oversubscribed more than five times (Kredietbank, 1969). Other borrowers quickly followed suit, and in the next ten years about thirty EUA bond issues were floated in the international capital market, for a total volume of about $340 million.

No additional ACUs were introduced during the 1960s. Thereafter, however, a host of official and private ACUs were created, some of them as a reflection of unsettled international monetary conditions such as dollar inconvertibility and the floating of major currencies. The list includes the SDR (1970), ECU (1970), Eurco (1973), B-Unit (1974), Arcru (1974), AMU (1974), and IFU (1975). The division of these ACUs into official and private ACUs has more than taxonomic interest. While private ACUs have thus far been employed only as units of account, official ACUs have sometimes also been used to some extent as media of exchange.

For example, an IMF member country participating in the SDR system is able to use SDRs not only to acquire national currencies from other members but also to pay certain charges it has incurred to the IMF (IMF Articles of Agreement, Art. XXV, Sec. 7). In this case, the payment is accomplished through a transfer from the paying country's SDR account to that of the IMF. This transaction is no different in principle from private transactions by check effecting demand-deposit transfers from a debtor's account to a creditor's. To the extent that an obligation is discharged directly through the interaccount transfer of SDRs, the SDR is used not only as a unit of account but also as a medium of exchange. Thus, the SDR is international legal tender as far as those IMF transactions are concerned.

However, no similar occasions have so far arisen for private ACUs to be used as a medium of exchange. Private ACUs are used primarily to denominate bond issues. Actual payments for bonds by purchasers, as

well as service payments by borrowers (interest and principal), are all carried out in a major national currency. The role of a private ACU is thus confined to that of a unit of account whose sole function is to determine payment obligations in terms of a national currency, while keeping the face value of the bond as stable as possible. It would be feasible, however, for a private ACU to serve also as a medium of exchange if a banking institution accepted demand deposits denominated in the ACU from private parties and cleared transactions through book-entry transfers.

In monetary theory, it is axiomatic that the role of money as a widely accepted means of payment is a matter of social convention. This social convention can be established in a variety of ways: (1) a governmental authority can enforce the acceptance of a certain object as payment, rendering it legal tender in fulfillment of debt obligations; (2) the convertibility of an object into something else whose status as money is already established can be guaranteed by law or contract; (3) the members of a group can pledge themselves to accept a certain object as a medium of exchange among themselves; and (4) an important member of a group can unilaterally accept a certain object in final settlement of payments due it, the importance of the member being evinced by the fact that other members of the group follow suit. The essential difference between national currencies and ACUs is that the former developed in a domestic context as essentially *national* means of payment, while the latter have been created exclusively in the context of international transactions, initially as units of account but with the potential of being developed to a limited extent into *international* means of payment.

On the international level, enforcing the acceptance of a certain object as a means of payment requires formal agreement among governments to establish an international reserve currency. The introduction of the SDR illustrates the use of this route. Although the SDR was introduced before the breakdown of the Bretton Woods system, its development has been given major impetus by the continuing post–Bretton Woods search for a stable unit of account to replace the dollar. Other ACUs may combine to varying degrees the other three ways listed above of establishing the social convention for a widely accepted means of payment. In the absence of an international legislature with the power to confer legal-tender status, establishment of the social convention leading to the emergence of a new international currency is not an instantaneous event but, rather, a time-consuming social-adjustment process.

The development of an ACU as a means of payment in international transactions may ensue from the creation of bank deposits denominated

in that ACU. To take the SDR for illustration, suppose that investors seek to keep some of their liquid financial assets denominated in SDRs in order to reduce the exposure to foreign-exchange risk inherent in a national currency. Just as the desire of the Soviet authorities to keep their dollar deposits outside the United States led to development of the Eurodollar market in the late 1950s, a desire of investors wary of exchange risks to keep their liquid assets in SDRs may ultimately lead to the development of an SDR money market. International banks may soon be willing to accept deposits denominated in SDRs because a potential demand for SDR funds already exists, as manifested by recent SDR bond issues by the Swiss Aluminum Company, the Swedish Investment Bank, and Électricité de France. The process, indeed, is already under way. In July 1975 the Bank Keyser Ullmann in Geneva (a subsidiary of Keyser Ullmann of London) announced that it would henceforth accept demand and time deposits denominated in SDRs. These SDR deposits are to be convertible at any time into any currency at the SDR exchange rate applicable on that day. Similarly, in August 1975 the Chase Manhattan Bank in New York instituted a range of banking facilities in SDRs, including loans, deposits, and futures trading. As this process spreads and as more international transactions are denominated in SDRs, banks may begin to allow direct transfers between SDR accounts, internally and then between banks. In consequence, the SDR may be transformed from mere numeraire (international quasi-money) into an outright means of payment (full-fledged international money).

In order to evaluate the evolving role of ACUs and their economic implications, it is necessary to consider first the mechanics of the various ACUs—how they have developed and their essential properties. Accordingly, we next analyze the distinctive features of various ACUs. Table 1 summarizes the essential characteristics of existing ACUs.

Official ACUs

There are at least three official ACUs: the European Economic Community's European Unit of Account (EUA), the IMF's Special Drawing Right (SDR), and the Asian Monetary Unit (AMU) of the Asian Clearing Union. Each has been undergoing change since its inception. In the following sections, we take up these official ACUs in the order of their appearance.

EUA: Old and New

As noted above, the European Unit of Account was inaugurated in 1950 by the European Payments Union for use as its official accounting unit. It has remained in use in the European Monetary Agreement, as

TABLE 1

SUMMARY CLASSIFICATION OF ARTIFICIAL CURRENCY UNITS

Type of ACU	*Year of Creation*	*Value Tied To:*	*No. of Currencies in Basket*
Official:			
EUA:			
Old	1950	Gold	—
New	1975	Currency basket	9
SDR:			
Old	1970	Gold	—
New	1974	Currency basket	16
AMU	1974	Currency basket	16
Private:			
EUA:			
Old	1961	Gold	—
New	1972	Gold	—
ECU or EMU	1970	Immutably fixed exchange rates	—
Eurco	1973	Currency basket	9
Arcru	1974	Current exchange rates	8 out of 12
B-Unit	1974	Currency basket	5
IFU	1975	Currency basket	10

NOTES TO TABLE 1:

EUA: European Unit of Account.
SDR: Special Drawing Rights.
AMU: Asian Monetary Unit.
ECU: European Currency Unit.
EMU: European Monetary Unit.
Eurco: European Composite Unit.
Arcru: Arab Currency-Related Unit.
B-Unit: Barclays Unit.
IFU: International Financial Unit.

well as in the European Economic Community, the European Coal and Steel Community, and the European Investment Bank. The value of one official EUA was originally fixed at a gold weight of 0.88867 gram (the same as in the gold-linked SDR). However, the link of the official EUA value to a fixed gold content proved impractical after the partial abandonment of the Bretton Woods system. Major currencies have been floating against each other in recent years, and their market exchange rates have diverged widely from their par values. In consequence, the market value of the gold-linked EUA could not be realistically expressed in terms of major currencies by way of the official gold definitions of the respective currencies, because the *official* gold content (expressed by the par value) of a floating currency may be far different from the *actual market* value of the currency and, more important in this context, far different from the

market price of gold in that currency. For example, the official gold content of one U.S. dollar was fixed at 0.736662 gram per dollar in October 1973, or $42.22 per fine ounce of gold. At this official price for gold, one official EUA would equal $1.21. Based on a market price for gold of $170 per ounce, however, one official EUA would be worth about $4.86, or about four times the dollar value based on the official price of gold. Such an anomaly came to apply more or less to European currencies as well, making it highly impractical to link the official EUA to gold. As an interim response to this difficulty, the gold parity of the official EUA was abandoned, and an average representative rate for floating currencies was used until a new official EUA was created in March 1975.

The link with gold is completely severed in the new EUA, which is patterned instead after the SDR or the Eurco, employing the currency-basket concept. The new official EUA consists of fixed fractions of nine EC currencies, as follows:

$$1\ \text{EUA} = \text{DM}\ 0.828 + \text{F}\ 1.15 + £\ 0.0885 + \text{Lit}\ 109 + \text{f}\ 0.286 + \text{BF}\ 3.66 + \text{DKr}\ 0.217 + £\text{Ir}\ 0.00759 + \text{Lux F}\ 0.14.^{1}$$

Because all the component currencies are those of EC member countries, the value of the new official EUA can reflect the EC economies more closely than would the SDR. In fact, this consideration was the main reason why the European Communities decided to use a new, improved EUA rather than the new SDR, even though new versions of both ACUs are based on the same currency-basket concept. The only difference between the new official EUA and the new SDR lies in the different currency compositions and the different relative weights of the component currencies. The currency basket of the new official EUA is composed of nine EC currencies, while that of the new SDR is composed of the currencies of sixteen IMF member countries which had shares in world exports of goods and services averaging more than 1 per cent in 1968-72. The relative weights of the component currencies in the new official EUA were based on the gross national products and world-trade shares of Community members, while the relative weights of the component currencies included in the new SDR are broadly proportionate to the countries' exports, with some ad hoc allowance for each currency's relative importance in the world economy.

For both the SDR and the official EUA, however, the current relative weights of the component currencies in the respective currency baskets differ from the weights of the base date, owing to the subsequent appreciation or depreciation of each component currency. The base date of the

[1] See the Table of Currency Symbols on page 29.

new official EUA is June 28, 1974, even though the new EUA was formally adopted on March 18, 1975. This choice of base date was dictated by the decision to retain a link with the new SDR, whose base date is also June 28, 1974, as will be explained in the following section.

SDR: Old and New

The SDR came into existence formally on January 1, 1970. Originally, one SDR had a fixed gold content of 0.88867 gram of fine gold, whose value was equal to one U.S. dollar before May 1972, when the dollar was devalued officially to 0.81851 gram of fine gold. Since the value of the SDR was linked to a fixed gold content, devaluations or revaluations of currencies could not affect it. Therefore, when a currency was devalued against all other currencies, one SDR commanded more units of that currency than it did before the devaluation. In order to set the value of the SDR in terms of currencies, the IMF first fixed the value of the SDR in terms of the U.S. dollar in October 1973, at the par value of the dollar (for example, from October 1973, SDR 1 = $1.20635). Correspondingly, the IMF derived exchange rates for the SDR against nondollar currencies from the market rates for these currencies against the dollar. We may call this original SDR the *old* SDR.

The widespread floating of major currencies in February 1973 caused the value of the old SDR to fluctuate wildly in terms of these currencies, even though the value of the SDR in terms of the U.S. dollar was fixed at the dollar's par value. The problem became more acute in mid-1973 as the U.S. dollar further weakened against the currencies of major European countries, causing the value of their SDR holdings to decline markedly in terms of their own currencies. Consequently, there was growing opposition to linking the value of the SDR to only one currency, the U.S. dollar. It was felt that the SDR value should be linked instead to a "basket" of major currencies in order to assure the relative stability of the SDR: such stability was thought essential in establishing the SDR as the main reserve asset in a reformed international monetary system.

Effective July 1, 1974, therefore, the IMF changed the method of valuing the SDR. The *new* SDR is now valued entirely by the market exchange rates of sixteen component currencies included in the so-called "standard basket." The new SDR contains a fixed amount of each of the sixteen currencies, as follows:

$$
\begin{aligned}
1\ \text{SDR} = {} & \$\ 0.40 + \text{DM}\ 0.38 + £\ 0.045 + \text{F}\ 0.44 + ¥\ 26 \\
& + \text{Can\$}\ 0.071 + \text{Lit}\ 47 + \text{f}\ 0.14 + \text{BF}\ 1.6 + \text{SKr}\ 0.13 \\
& + \$\text{A}\ 0.012 + \text{DKr}\ 0.11 + \text{NKr}\ 0.099 + \text{Pta}\ 1.1 \\
& + \text{S}\ 0.22 + \text{R}\ 0.0082.
\end{aligned}
$$

As noted earlier, relative weights for the component currencies were based on the respective countries' shares in world exports of goods and services in 1968-72, modified slightly to recognize nontrade aspects of the countries' importance in the world economy. The currency fractions in the SDR standard basket were derived from the relative weights of component currencies based upon the market exchange rates on the base date of June 28, 1974. In order to preserve continuity of valuation for IMF operations and transactions, it was decided to ensure that the sum of the above currency fractions, valued at the market exchange rates on the base date, would yield the same value for the SDR in terms of the U.S. dollar as did the *old* SDR, that is, SDR 1 = $1.20635. Since July 1, 1974, however, the value of the new SDR in terms of the U.S. dollar and other currencies has fluctuated from day to day as market exchange rates have changed. Using the daily market exchange rates of the component currencies against the U.S. dollar, the IMF calculates every day the rate for the new SDR in terms of the U.S. dollar by summing up the dollar value of the currency fractions. It then derives rates for the SDR in terms of other currencies by converting the dollar value of the SDR into other currencies at that day's market exchange rates.

During the first twelve months of its existence, the new SDR appreciated about 3 per cent in terms of the U.S. dollar. Thus the SDR appreciated vis-à-vis the dollar much less than, say, the German mark or the Swiss franc. This outcome demonstrates the relative stability of the SDR resulting from the fact that it is based on a number of currencies instead of one or two. The current formula for valuing the SDR is subject to periodic review by the IMF. Conceivably, either the number of component currencies could be altered or their weights could be changed by introducing a new set of currency fractions. These changes would take place if some countries were to experience a substantially reduced trade volume or if their relative economic importance were to decline for other reasons.

Yet, legally, the gold content of the new SDR remains the same as that of the old SDR. In conformity with Article XXI, Section 2, of the Articles of Agreement of the IMF, the gold value of one SDR is 0.888671 gram of fine gold. With this gold weight, the current *market* value of the SDR in U.S. dollars would be about $4 per SDR on the basis of $130 per ounce of fine gold. In contrast, the *official* dollar value of the SDR, in terms of the standard-basket concept, is about $1.17 per SDR, only a small fraction of its gold-equivalent market value. This divergence between the gold value of the SDR and the standard-basket value of the SDR is the result of the two-tier gold-valuation system implicitly imbedded in the