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Treasurer's Department

In Search of a Monetary Anchor: A "New" Monetary Standard

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Abstract

This paper explores recent versions of older ideas for stabilizing the value of money based on an independently defined unit of account. The gold standard was such a system, but suffered from gold's fluctuating relative value and the costly need to redeem money for gold. This paper explores monetary standards with relatively constant real values in which the supply of money is market determined by its redeemability for assets equal in value to its valuation basket (rather than for the basket itself). An SDR valuation basket with a constant real value might be widely adopted as a monetary standard.

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1/ The author is an Advisor with the Treasurer's Department of the International Monetary Fund. The paper has benefitted from the comments of Milton Friedman, Sir Joseph Gold, Timothy Lane, Sir Alan Walters, and Leland Yeager. The views expressed here are the author's and not necessarily those of the staff or Executive Directors of the International Monetary Fund.

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Summary

This paper explores recent versions of some older ideas for stabilizing the value of money. These recent versions stress the desirability of a monetary standard with a relatively constant real value.

The value of money is measured by what it can be exchanged for. Until fairly recently, money's value was generally explicitly linked to the value of a specific commodity, such as gold or silver, by making money redeemable for a specific amount of the commodity. As a result, stating prices in terms of money was equivalent to stating them in terms of gold, silver, copper, or whatever commodity or combination of commodities defined the standard (i.e., the ultimate unit of account). Single commodity standards, however, transmitted changes in the relative price of the single commodity to the general value of money. They did not establish money with constant real value. However, standards of value based on baskets of many commodities, which have better prospects of having stable real values, were thought to be impractical and too costly to operate because of the need to warehouse all the commodities in the valuation basket. In recent years, therefore, most countries have replaced redeemable money with fiat money whose value is determined by supply and demand.

Two recent advances in our understanding of monetary systems have generated new interest in commodity standards as the anchor of the monetary system. The first is the realization that a viable commodity standard does not require the redemption of money for the specific commodities defining the ultimate unit of account. This greatly simplifies and reduces the cost of operating such a system. The second is the realization that the market regulation of the supply of redeemable money works for bank-issued money as well as government-issued money. This removes a major justification for a state monopoly in supplying money and, by reducing the government's incentive to suspend it, strengthens the prospects that redeemability will be adhered to.

This paper reviews these ideas and discusses a practical strategy for establishing stable money by giving the International Monetary Fund's SDR a constant real value.

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We have standardized every other unit in commerce except the most important and universal unit of all, the unit of purchasing power. What business man would consent for a moment to make a contract in terms of yards of cloth or tons of coal, and leave the size of the yard or the ton to chance? 1/

I. Introduction

Alternative monetary standards and mechanisms for determining the quantity and value of money have interested economists for centuries. This paper explores some fairly recent versions of some older ideas for stabilizing the value of money. These recent versions stress the desirability of a monetary standard with a relatively constant real value.

The value of money is measured by what it can be exchanged for. Until fairly recently, money's value was generally explicitly linked to the value of a specific commodity, such as gold or silver, by making money redeemable for a specific amount of the commodity. As a result, stating prices in terms of money was equivalent to stating them in terms of gold, silver, copper, or whatever commodity or combination of commodities defined the standard (i.e. the ultimate unit of account). Single commodity standards, however, transmitted changes in the relative price of the single commodity to the general value of money. They did not establish money with constant real value. However, standards of value based on baskets of many commodities, which have better prospects of having stable real values, were thought to be impractical and too costly to operate because of the need to warehouse all of the commodities in the valuation basket. In recent years, therefore, most countries have replaced redeemable money with fiat money whose value is determined by supply and demand.

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1/ Irving Fisher, page 501-2.

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II. Price Standards and Quantity Standards

1. The Unit of Account

Money exists primarily because it is able to reduce the costs of trading. So does a generally accepted unit of account. Monetary arrangements have evolved, and continue to evolve, so as to reduce transaction costs (and risks) of trade, thereby extending the scope for specialization and growth. The role of the unit of account in lowering the cost of trading is easily overlooked. The coordination of economic activity ("pricing, contracting, accounting, and cost/benefit calculations" 1/) would be more constrained by the lack of a unit of account than by the absence of money.

Historically the unit of account has invariably been an amount of money. In part, this reflects the evolution of the means of payment from frequently traded commodities with convenient properties, to forms cheaper to produce and use that were convertible into (redeemable for) such commodities. It also reflects the lower transaction costs of pricing and contracting in units of money. Pricing goods and services in units of money is clearly a convenience of such importance that economic agents even use money of rather unstable value as their numeraire rather than shift to something else. 2/ Therefore, any monetary system will need to be concerned with how the value of money is determined.

Since the demise of the *gold standard*, the world's major currencies have had their values determined by their quantity. A *quality standard* is one in which a country's unit of account is defined as one unit of its currency. The value of the unit is therefore the inverse of the price level in terms of that currency. Under a quantity standard, therefore, the value of a country's unit of account is determined by the market value of its money resulting from the quantity supplied and demanded. This has invariably resulted in a standard of economic value that has been more variable than standards of measurement in other areas, for example, weights and measures.

1/ Yeager (1989) p.370.

2/ The strength of this "inconvenience" is revealed by the fact that historically the value of money has had to behave very badly indeed before other units (e.g. cigarettes or U.S. dollars) were adopted for pricing purposes. See Friedman and Schwartz and Friedman (1986).

A *price standard* (or commodity standard), by contrast, defines the unit of account as an amount of something other than the medium of exchange, such as gold or a "basket" of commodities. The value of the unit is the market value, in terms of the medium of exchange, of the stipulated amount of the commodity or basket of commodities. The value of the unit of account and of money may be equal but are not synonymous. The essence of a price standard is that a unit of account defined independently of the medium of exchange has a value independent of the quantity of (or demand for) the medium of exchange.

The seeming ease with which a price standard can define a more stable unit of account than most of us have ever experienced, must confront the reality that people generally prefer to state prices in terms of money even when its value is less stable than other possible units. The transaction cost advantages of doing this are so great that a divorce between the unit of account and the medium of exchange would not generally be acceptable if it meant that prices could not be quoted in monetary units. Therefore, when money is not the ultimate unit of account, a mechanism is needed to keep the value of money equal to that of the unit of account. This has been achieved by the promise to *redeem* money for the unit of account on demand.

Excessive growth in the quantity of money will lower its value relative to that of the unit of account. This difference between the money price of the unit of account in the market and its fixed money price promised by the redemption obligation, creates a profit opportunity. Arbitrage will lead to a redemption of the excess supply of money for the unit of account. The public's preferences control the quantity of money in light of its independently determined value. In short, with a quantity standard, the central bank determines the nominal quantity of money the public holds and the public determines its value (i.e. the price level). With a price standard, the government determines the value of the unit of account and the public determines the nominal amount of money denominated in that unit that it will hold.

2. The Gold Standard

The best known price standards were based on gold or silver. ^{1/} A gold standard required agreement on the amount of gold constituting one unit of money and the willingness of all issuers of money (notes and/or deposits) to redeem their issues for that agreed amount. Though prices were quoted in monetary units, the unit of account was an amount of

^{1/} For an interesting discussion of bimetallic standards see Friedman 1989.

gold, not, ultimately, an amount of money. 1/ The redeemability of money for gold gave substance to the divorce of the unit of account from money by allowing arbitrage rather than definition to keep the value of a unit of money equal to the amount of gold defining the unit of account (this point is discussed more fully below). The requirement to redeem money for a fixed amount of gold applied to all entities that issued money, whether private banks or government banks.

Gold standards had several shortcomings: They required inventories (reserves) of gold sufficient to honor potential redemptions, which was costly. Gold's inelastic supply meant that a more rapidly growing demand for money "backed" by gold could be met only through "deflation," i.e. by an increase in the price of gold relative to goods and services (though not relative to money). Gold's value, hence money's value, was also sensitive to periodic gold discoveries or improvements in mining or refining technologies, which affected its supply and hence its relative price. Changes in non-monetary demand for gold could have the same effect.

Despite their shortcomings gold standards had some very attractive features. The supply of gold was endogenously (rather than politically) determined by the cost and other factors of its production in relation to its price. The requirement to redeem bank money or government money for a fixed amount of gold limited the creation of money to the amount the public was willing to hold at the prevailing price of gold. These features resulted in money's value avoiding the extreme fluctuations that have been experienced with fiat money.

As already noted, a fixed money price of gold did not guarantee a constant real value for money because gold's relative price could change. This shortcoming could be reduced by adopting a unit of account based on a basket of many goods rather than just one. This was traditionally thought to be impractical, however, because of the transaction costs involved in redeeming bank money for a basket of many goods. A more recent insight is that the self regulating character of a commodity standard does not require redemption for the commodity itself. As noted above and discussed in more detail in the next section, the supply of money is limited to its demand by arbitrage, not by the quantity of gold reserves. 2/ All that is required for the arbitrage mechanism to work is that bank money be redeemable for a marketable asset having a current market value equivalent to that of

1/ These very general statements skirt over more complex legal issues of contract law. Many of these issues have been discussed over the years by Sir Joseph Gold in his surveys of legal developments in SDRs, currencies and gold.

2/ See George A. Selgin's very important book for an extensive discussion of this point.

the unit of account basket. 1/ In fact, a highly elastic supply of the reserve asset would be a virtue.

III. The New Price Standards

To have the virtues of a price standard without its shortcomings, several writers have proposed the adoption of commodity standards based on relatively large baskets of goods, in which competitively supplied money would be redeemable for acceptable assets equal in value to the commodity basket rather than for the basket itself. 2/ This would eliminate the real resource cost of holding physical reserves of the basket commodities, a major shortcoming of traditional commodity standards. The commodity basket, which would define the unit of account, would be chosen so as to have as constant a real value as possible.

For the system to work, market forces must maintain the nominal quantity of money equal to the nominal quantity demanded given the independently determined price level. This is assured, as it was for the gold standard, by the requirement that money be redeemable for an asset equal in value to the unit of account. Arbitrage ensures that the supply of money will be appropriate for the independently defined value declared for it.

1. Fisher's Tabular Standard and More Recent Examples

Irving Fisher proposed a constant real value price standard over three quarters of a century ago. The plan, as he described it involved "a combination of the tabular standard [indexing] with the principles of the gold-exchange standard." 3/ While Fisher described several slightly different versions of this scheme, in essence the plan is a convertible paper currency, the paper to be redeemable on demand, -- not in any required weight or coin of gold, but in a required purchasing power thereof. Under such a plan, the paper money would be redeemed by as much gold as would have the required purchasing power. Thus, the amount of gold obtainable for a paper dollar would vary inversely with its purchasing power per ounce as compared with commodities, the total purchasing power of the dollar being always the same. The fact that a paper dollar would always be redeemable in terms of purchasing power would theoretically keep the level of prices invariable. The supply of money in circulation would regulate itself automatically. 4/

1/ This point is made by Stanley Fischer.

2/ For example: Black, Fama, Hall, and Greenfield and Yeager.

3/ Fisher, page 337.

4/ op.cit. page 331.

At an address to the American Economic Association in Boston, December, 1912, Fisher summarized his scheme as follows:

Briefly stated, the plan is to introduce the multiple standard, in which the unit is a "composite ton" or "composite package" of many staple commodities, not of course by using such a package in any physical way but by employing instead its gold bullion equivalent. In essence it would simply vary the weight of gold in the dollar or rather behind the dollar. The aim is to compensate for losses in the purchasing power of each grain of gold by adding the necessary number of grains of gold to the dollar.... With the development of index numbers,... we now have at hand all the materials for scientifically standardizing the dollar and for realizing the long-coveted ideal of a "multiple standard" of value. In this way it is within the power of society, when it chooses, to create a standard monetary yardstick, a stable dollar. 1/

Fisher's multiple or tabular standard was never adopted in the form he envisaged. However, independently defined units of account have been used in a variety of ways. Pegging an exchange rate and the general indexing of prices and monetary contracts are familiar examples of divorcing the unit of account from the medium of exchange. So are the International Monetary Fund's SDR (Special Drawing Rights) and the European Community's ECU (European Currency Unit), each of which have values based on a fixed basket of currencies. In fact, those countries that peg the exchange rates of their currencies to the SDR or other currency baskets have adopted a loose form of Fisher's multiple standard.

In addition to these more traditional examples, modern finance is providing an increasing number of interesting uses of independently defined units of account. One example is the use of mutual fund investments denominated in shares to make payments denominated in a currency. This is an example of *share banking*, which has very different risks than traditional *par value banking*.

Par value banking refers to the traditional practice of recording bank deposits in units of the medium of exchange and transferring or redeeming them at par, i.e. for the same number of units of the medium of exchange. Because the value of a bank's assets generally vary in terms of the medium of exchange (except, of course, for "reserves," which are the medium of exchange) the value of its assets (abstracting from its capital) will not always equal that of its liabilities.

This risk does not exist for share banking where deposits are recorded in units or shares of a portfolio of assets. In this case, the value of a bank's assets always equals its liabilities. However,

1/ op.cit. pages 494 and 502.

the value of its assets and hence its liabilities can vary in terms of the medium of exchange. This potentially makes share bank deposits less attractive as a means of payment since payments are required in specific amounts of the medium of exchange. This problem has been overcome for money market mutual funds by allowing depositors to transfer amounts denominated in the medium of exchange, as is done with par banking checks. When cleared, the amount of the check is converted into its equivalent value in units (shares) of the mutual fund and deducted from the depositors holdings in the fund.

Another example is provided by the ECU denominated bank credits, bonds, demand and time deposits created by commercial banks. In addition to these and other ECU denominated assets, a large number of ECU denominated payments are made daily despite the absence of any central bank or official agency supplying ECU denominated reserve assets that could be used to settle ECU transfers between banks. To the extent that these payments do not net out between banks in the daily clearing administered by the BIS on behalf of the ECU Clearing Association, ECU denominated loans are extended or an equivalent value of assets are transferred. There is nothing mysterious or difficult to understand about this process. If one person pays another an amount of ECU through their respective banks, the payor's bank will either transfer the appropriate amounts of the twelve European currencies in the ECU valuation basket 1/ or the equivalent value of any one of them (or the U.S. dollar). All of these approaches are in fact used. 2/ The transfer of the agreed settlement asset (national currencies) uses established payment channels.

The private and unrestricted creation of a wide range of financial instruments denominated in ECU (including credit cards, checking accounts and travelers checks) is also a concrete example of the stability of an all inside money system. No central bank or other official agency supplies ECU to the banking system. It has no "outside," high powered reserve asset. 3/ Banks freely supply whatever quantity of ECU the public wants.

2. A Central Bank Money Price Standard

The past generation of fiat (quantity standard) money makes it difficult for many of us to understand any more how the value of money can be kept equal to the value of an independently defined unit of account. Historical experience with the gold standard may not be fully convincing because it (ultimately) involved redemption of money for the

1/ The number of currencies went from ten to twelve on September 21, 1989.

2/ See Coats, et al.

3/ The "official" ECU used among EC central banks does not constitute such an asset as it is not and can not be held by commercial banks.

standard itself (i.e. for gold). Current experience with the ECU, while not always involving redemption for its currency basket, may not be fully convincing because it floats on the backs of existing national currencies and therefore could not (as presently defined) be a world wide foundation of value capable of replacing all national currencies. Skeptics will want a more detailed analysis of the proposed mechanism.

Consider an economy with paper money supplied solely by a monopoly central bank. These "outside" central bank currency notes may be used as reserves (base money) for a competitive banking system that supplies "inside" deposit money, or may be the only money with no private banks. The unit of account, a Valun (from "value unit" 1/), is defined as specific amounts of a large number of goods and services (e.g. the CPI basket). Each unit of money is also called one Valun and is exchangeable at the central bank for one Valun's worth of some other asset, such as treasury bills, that has a well defined, market determined value in terms of Valuns. One Valun is not the same thing as a one Valun central bank note i.e. money, but in equilibrium they must have the same value.

Taking the real demand for money (m^d) as given by the full employment level of income and the full employment rate of interest, and the price level (P) as given by the independently defined unit of account, implies that there is a given demand for nominal money balances to which the nominal supply (M) must adjust:

$$P \cdot m^d = M.$$

The left hand side of the equation is totally predetermined so that all adjustments take place in the right hand side variable. 2/

What is the mechanism for adjusting the quantity of money to its predetermined nominal demand? Suppose that the central bank overissues paper notes. Prices of goods and services quoted in units of money (i.e. Valun bank notes) will rise. The money prices of the items making up one Valun's valuation basket would add up to more than one Valun. This creates an arbitrage incentive to convert (redeem) currency for assets equal in value to the independently defined unit. 3/

The mechanism can be brought out more clearly by describing its operational aspects. Let the central bank maintain reserves of

1/ Following Yeager (1989)

2/ With a quantity standard, P would adjust in the equation to an exogenously given M.

3/ This key insight, described in more detail in subsequent paragraphs, is critical to the argument. I suspect that it was the failure to understand this mechanism that led to White's claim (subsequently withdrawn) that the Greenfield/Yeager scheme is circular and non-operational. See White 1984 and 1986 and Greenfield and Yeager 1986.

treasury bills for redemption purposes. 1/ For simplicity assume that initially, i.e. before the overissue of currency, one treasury bill had a market value of one Valun. 2/ An overissue of α percent will raise the money price of all goods and services, including treasury bills, by percent. 3/ One treasury bill, with its market price of $1 + \alpha$ units of money, will still buy just one valuation basket, which also is worth $1 + \alpha$ units of money. A one Valun central bank currency note, therefore, can be redeemed for one treasury bill. Because the Treasury bill has a monetary value of $1 + \alpha$ in the market, redeeming one bank note and reselling the Treasury bill received in exchange results in a risk free gain of α . 4/ This arbitrage gain will reverse the overissue of notes, which will be redeemed as long as their nominal value (one Valun) remains below the market value of the valuation basket ($1 + \alpha$ Valuns).

The properties of such systems are well established and understood in the context of the small open economy with fixed exchange rates and freely mobil capital. Such economies can not independently determine their money supplies, the demand for which is given by real factors affecting the real demand for money and the independently determined price level. The world price level and fixed exchange rate together

1/ Assume that a one Valun currency note states "Redeemable for an amount of treasury bills with a current market value equal to that of the basket of goods and services defined as one Valun." This is not a traditional commodity standard because the redemption asset and the good or goods defining the unit of account are not the same. It would not serve the intended purposes of the scheme to simply redefine the unit of account as one treasury bill because its price relative to the basket or to individual goods in the basket can change. The avoidance of such relative price changes is, of course, the only reason for preferring a more complicated basket to a single good for defining the unit of account.

2/ All goods (including treasury bills) have prices in terms of Valuns (the valuation basket) and Valun notes (money). In this example, for the sake of simplicity, the Valun prices of all goods are constant but their money prices depend on the supply of money. As explained next, the price of a one Valun note is equal to one Valun only in monetary equilibrium.

3/ When the conditions for monetary neutrality hold, e.g. absence of wealth effects.

4/ In determining the number of treasury bills the one Valun note can be redeemed for, the central bank takes the current monetary value of a treasury bill and divides (deflates) it by the current monetary value of the one Valun valuation basket. If, for example, the basket was the CPI basket, the monetary value of the treasury bill would be deflated by the CPI index to determine its basket (real) value.

fix the domestic price level in much the same way that the independently defined unit of account does in the above example. 1/

Nonetheless, a number of readers have stumbled at this point. How can the redemption of bank notes for treasury bills eliminate the price pressure in terms of bank notes? 2/ It does so by reducing the quantity of money without changing the quantity of treasury bills, which simply move from bank portfolios to individual portfolios as the assets (and liabilities) of banks contract. 3/ In the above example, a one valun bank note would purchase fewer treasury bills in the open market than could be obtained by redeeming it with the central bank. Exploiting this arbitrage opportunity will reverse any over issue of bank notes and will make over issue unprofitable for the central bank. As a first approximation, nothing in the process would change the relative price (and hence the valun unit of account price) of treasury bills (or any other redemption asset).

3. An All Private Money Price Standard

The core of the mechanism has now been described. An independently defined unit of account can be established with existing, central bank controlled monetary systems, as long as central banks are prepared to "play by the rules" by passively adjusting the supply of central bank money to the public's demands. The scheme can be enhanced and its stability strengthened, however, by replacing the central bank with competitive private banks that are free to issue convertible currency

1/ The implications of redeeming money for the unit of account or for some other asset equal in value to the unit of account has its counterpart in the exchange rate literature as well. It is analytically analogous to the issues relating to the relative effectiveness of sterilized or unsterilized foreign exchange market intervention. As long as the value of money in general is the objective of policy (rather than its value in terms of the unit of account itself), the supply of money relative to everything else is all that matters. Redeeming money for the unit of account will therefore be no more effective than redeeming it for anything else.

2/ There can be no question of "price pressure" in terms of Valuns (i.e. the independently defined unit of account), whose value is precisely that of the amounts of commodities in the one Valun basket.

3/ It is worth repeating at this point that money could be redeemed for any existing asset as long as the amount of the asset has the same value as the one Valun unit of account. Redemption for government base money created for that purpose would have a wholly different implication as we know from the present fiat (quantity standard) money system.

notes. 1/ The role of the state in this version of the scheme is limited to defining the official unit of account, and requiring the convertibility of bank notes by their issuers. Such notes must be redeemable in accordance with the convertibility rules explained in the preceding section.

Arbitrage will again limit the quantity of bank notes issued to the quantity demanded. In addition to this mechanism, each note issuing bank has the amount of its own note issue limited to the public's demand for its particular notes by the phenomenon of adverse clearing. 2/ This works in essentially the same way bank deposit clearings currently limit the amount of bank deposits to the public's demand for them.

A bank that lends, for example, by issuing bank notes (deposits), will find that most of those notes (deposits) are spent by the borrower, falling into the hands of other banks. These notes (checks) are presented through the clearinghouse to the issuing bank for collection, i.e. for conversion into the agreed settlement asset (e.g. treasury bills). In the mean time, the issuing bank will have received payments in notes (checks) of other banks, which it also presents through the clearinghouse for collection. If the bank's note issue (deposits) leads to an excess of redemptions of its notes (checks) over its redemptions of other banks' notes (checks), it experiences an adverse clearing that reverses its excess issue and lowers its reserves of the settlement asset (e.g. treasury bills).

Many economists have thought that because the marginal cost of producing additional bank notes (or bank deposits) is close to zero, the free, competitive supply of money would drive its value to approximately zero. This overlooks the implications of the legally or competitively imposed requirement to redeem any issue of money not

1/ Just as the market has dealt with the risk of payment by check, it would need to cope with the risk of multiple currencies issued by private banks. Payment with checks drawn on thousands of (unknown) banks are acceptable, in part, because payments are not legally final until the checks have been cleared - i.e. until the transfers of assets between the paying and receiving banks have been completed. It seems likely that bank notes of only (possibly a small number of) major well known banks would circulate much outside the immediate region of the issuing bank's offices. This would depend, in part, on the extent of branching. However, attempting to second guess the evolution of market arrangements for dealing with these or other risks is itself a very risky business.

2/ Selgin, Timberlake.

wanted by the public. 1/ The competitive creators of money are nothing like the counterfeiter, who issues money and absconds with the difference between the face value of money and the cost of producing it. Honest producers of money accept an obligation to redeem it for something else of agreed value. 2/ As a result, they are only able to increase the supply of money to the extent wanted by the public.

The mechanism of adverse clearing, and its limitation on the amount of its liabilities a bank can circulate, is well known with regard to checkable deposits and was experienced historically for bank notes during the free banking eras in the United States and Scotland. 3/ The constraint of adverse clearing limits the amount of currency issued by individual banks relative to other banks. Arbitrage and the redemption requirement ensure that all banks simultaneously can not overissue.

It is doubtful that even this limited role of government is really necessary for the stability and viability of free note issue and an independently defined unit of account. The government's requirement that banks redeem their deposits and notes as a condition for the right to issue them, while reassuring, hardly seems necessary. While it is an important condition, it is hard to imagine that competition would not impose it voluntarily. Even the mandatory use of the government defined unit of account is probably unnecessary. The very factors that make a standardized, widely used unit so attractive would surely lead to the rapid voluntary adoption of any satisfactory unit established by the government. In the most liberal of societies the role of the government in the monetary sphere would be simply to define the unit of account as they currently define other standards of measurement. 4/

1/ In a public debate with Hayek in St. Andrews, Scotland in Sept. 1976, I argued, like many before me, that money was one of the few economic goods that could not be competitively supplied (obviously bank money can be competitively supplied, if constrained by a limited supply of government controlled reserve money). My mistaken view at that time in part reflected my failure to fully appreciate the implications of the "money" back (redemption) guarantee in terms of a unit of account defined independently of the medium of exchange. See the excellent discussion in Selgin.

2/ Economic agents are not likely to accept privately produced money that does not carry a redemption guarantee. Counterfeit money therefore makes such a pledge as well, though the issuer has no intention of honoring it. Counterfeiting is therefore correctly categorized as fraud.

3/ Selgin, White

4/ The government might also wish to impose prudential conditions for the right to operate banks and hence to produce money. This might include minimum capital requirements, accounting and reporting standards, and external audits. Contract and the criminal law would, of course, also need to apply.

IV. A Proposed Strategy

Money with constant real value is clearly desirable. 1/ It has been argued above that money with constant real value is also feasible. 2/ The question immediately arises why countries haven't adopted such a system? In the absence of constant real value money, why haven't individuals adopted constant real value units of account more widely? If such a standard were adopted, could it be made more secure than previous price standards, all of which have been abandoned (not, however, without many years of good service)? This section briefly addresses these questions in reverse order as a prelude to the paper's central proposal.

One of the most challenging objectives of any monetary arrangement is to insure adherence to the rules of the game, whatever they are. Governments are notoriously difficult to discipline. In the end the governments that set the rules can change them. As long as governments retain control over the supply of money this danger will exist for any standard adopted. The most that can be hoped for is strong public support for the rules, which makes it politically unattractive to change them. Such support is most likely if the rules are well understood, viewed as fair, produce generally desirable results and involve the government (with its necessarily political nature) as little as possible.

1/ This point is not defended here, but the reasons would include: a) More efficient resource allocation because of the improved quality of price signals; b) Increased and more efficient investment as a result of reduced risk of long-term contracting; c) Reduction or elimination of monetary business cycles as a result of elastic adjustment of money supply to (changes in) demand. The widespread use of such money (i.e. truly fixed exchange rates) would extend those benefits from national economies to the world economy.

2/ The notion of constant real value, however, is somewhat ambiguous. A unit of account can be defined unambiguously as so much gold of a specified purity, or as a basket of specific amounts of commodities of particular qualities, but not as a basket of all goods and services, or even of all commodities, present and future. The economic world is characterized by ever changing relative values between an ever changing collection of goods and services. This does not mean that the value of a carefully chosen basket of representative commodities might not closely mirror the value **on average** of all goods and services. Nevertheless, it must be understood that an abstract unit of account cannot go beyond aggregating in some fashion the values of a discreet and specific set of things whose values concern us and cannot be defined so as to guarantee its real value in terms of an ever changing list of all goods and services.

The price standard proposed by Greenfield and Yeager is meant to satisfy the above criteria for an enduring, stable monetary system and to overcome the short comings of past mono or bimetallic standards. The essential elements of their proposal are: a unit of account based on a large basket of goods and services, the competitive supply of money (bank deposits and notes etc.) redeemable for assets equal in value to the unit of account, and no government money (which could potentially create an inconsistency between the money supply and the value of the unit of account).

The resource cost of their proposed price standard is low because no physical reserves would be used and because goods and services, obligations, and the means of payment all would be denominated in the same abstract unit of account. The absence of government created or controlled base money would make it more difficult for the government to succumb to short-run temptations to over-issue base money. A unit with constant real value, which favors neither debtors or creditors, should be able to command wide spread public support. It would be free of the periodic inflations and deflations caused by past metallic standards, which were important sources of public discontent and political pressure to modify or abandon such standards. Public support should also be strengthened by the greater responsiveness of the supply of money to its demand that would result from the competitive supply of redeemable money. This would reduce or eliminate a major source of economic disequilibrium common to quantity standards.

The Greenfield/Yeager price standard has some advantages over other price standards as well. Simply indexing nominal values, for example, which provides no mechanism for regulating the supply of money, is more costly than directly maintaining constant nominal as well as real values on average and suffers from lags in adjusting for monetary inflation. Fixed exchange rates maintain real values no better than does the foreign currency to which the exchange rate is pegged.

The fact remains that very few transactors have adopted units of account with a constant real value. The reason, I believe, is the fact stressed above that the convenience of using a single common unit of account is so great that even a relatively bad one is better than using an uncommon unit. 1/ This, in my view, is also the weakness in the suggestion made by Hayek over a decade ago to allow competition in supplying money as a way of putting market pressure on domestic monetary arrangements and policies. 2/ His approach requires only that countries allow their citizens to hold, use and contract in monies and

1/ A rubber ruler is better than thousands of individual rulers with fixed units of different length, as long as every ones rubber rulers are stretched the same amount at each moment.

2/ See Hayek (1978)

units of account other than their official national money and that such contracts be enforceable in the relevant courts. 1/ Hayek's argument was that any national money whose behavior was considerably inferior to that of other monies would tend to be displaced by them, even in domestic use.

Hayek did not clearly distinguish the unit of account from the medium of exchange aspects of his proposal. In fact he seems to have implicitly assumed that money would be the unit of account. However, the implications of and prospects for competing media of payment are quite different than those for competing units of account. Most economies have had considerable experience with the competitive supply of money. For example, U. S. dollar denominated means of payment include: Federal Reserve notes, coins, personal and cashiers checks drawn on thousands of different banks, debit and credit cards, travelers checks, money orders, transferable shares in dozens of mutual funds, and electronic authorizations to transfer bank account ownership (i.e. wire transfers). No serious transaction costs seem to result from the simultaneous use of many monies as long as they are all denominated in the same unit of account.

Diversity of units of account is more difficult. Much of the purpose of a unit of account is lost if it is not widely used. While the world has learned at considerable cost, to live with competing units of account internationally (primarily in the form of national currencies), they are rarely in simultaneous use within a given geographical area. The saving in transaction costs of a single standardized unit of account are so large that the behavior of its value must become quite unsatisfactory before it would be voluntarily abandoned. The mere existence of a unit superior to existing units, which could be created by anyone, would not generally be enough for its adoption. The use of the U. S. dollar (or other units) for pricing and/or payment purposes in some Southern Cone countries with very high inflation is the exception that proves the rule.

In addition, very few countries have adopted units of account other than their own money, and none has adopted one with a constant real value. Any country could replace its current monetary arrangements with the price standard described above, but no country is likely to unless its monetary system is in serious trouble. Countries in the throws of monetary crisis are more likely to turn to already established alternative units than to establish new units of their own. In short, a price standard with a constant real value will not generally be adopted spontaneously, and only well established alternative units will be considered.

1/ See Gold

One way out of this monetary "Catch 22" would be to prepare the International Monetary Fund's SDR for the role of an established, constant real value unit waiting in the wings to be adopted by countries (or individuals) with unstable monetary systems. Its value is already independently defined on the basis of collective agreement, and it is already used to denominate a number of international obligations and financial instruments. 1/

1. The SDR

The SDR was created in the late 1960 by collective agreement of the member countries of the International Monetary Fund (currently 152 countries) and generally replaced the several gold units that had been used in international treaties and agreements. 2/ The SDR is also used by the IMF to denominate all of its financial activities (e.g. loans to its members).

In addition to its official international standing, the attractiveness of the SDR as a unit of account and hence the willingness of institutions and other economic agents to use it for denominating obligations depends on the behavior of its value in terms of real goods and services. 3/ The present definition of the SDR's value as a basket of the five major currencies has a number of attractions. As the inflation rates of the five currencies in the SDR valuation basket have generally been lower than the inflation rates of many other currencies, the SDR's real value has been relatively stable. This definition has also made it easy for commercial banks to create private SDRs on demand without exchange risk to themselves by covering their SDR-denominated liabilities with assets reflecting the composition of currencies in the SDR valuation basket. However, the SDR's purchasing power has been far from constant and remains as uncertain as are the inflation rates of its component currencies. In fact, its adoption as a unit of account has been quite limited as has the demand for SDR-denominated instruments.

1/ Examples of institutions or agreements that use the SDR are the Arab Monetary Fund, the Universal Postal Union, the International Telecommunications Union, and the International Center for Settlement of Investment Disputes.

2/ Historically, the IMF's members created a reserve asset to supplement existing reserve assets, not to introduce a new unit of account. The SDR's value was defined to be the same amount of gold as defined one U.S. dollar at that time (1970). Its valuation was first based on a basket of currencies in 1974, following the wide spread floating of the major reserve currencies.

3/ This criteria is less important for the units denominating financial instruments because changes in the "real" value of such units (i.e., inflation in terms of such units) tend to be reflected (hence compensated for) in the interest rates paid on such instruments.

If the SDR had a more stable real value, I believe that it would be far more widely adopted internationally for denominating obligations. An SDR with a constant real value would provide the world with a unit of account very different from any other of international standing and would potentially have dramatic consequence for interest in and use of the unit. 1/ Providing a more stable contracting unit internationally would also tend to enlarge the extent of world trade and improve the efficiency of international resource allocation. More to the point of this paper, an SDR with a constant real value would be an established unit that could be adopted easily by individuals and countries. This might be of particular interest initially to individuals or countries whose monetary systems had failed to function satisfactorily. It might also exert competitive pressure on domestic monetary systems (al la Hayek) to maintain more stable monetary values.

The United Nations Commission on International Trade Law in its search for "a universal unit of constant value which would serve as a point of reference in international conventions for expressing amounts in monetary terms," concluded that the most desired approach was to combine the use of the SDR with an index that would preserve over time the purchasing power of the resulting unit. 2/ For this purpose several Fund staff members proposed adjusting the amounts of currency in the SDR's valuation basket in order to offset the effect of changes in the consumer (or some other broad-based) price indices of the five economies whose currencies are in the SDR's valuation basket. 3/ An increase in one or more of the price indexes (i.e. inflation) would result in an increase in the amount of that currency in the valuation basket by enough to preserve the command over goods and services that it contributes to the SDR. 4/ The resulting real SDR would have a larger currency value if its component currencies were inflating than would the current nominal SDR.

Another approach would be to base the SDR's value on a representative basket of goods. In principle, this basket should be representative of the expenditures of the average (world) economic unit. As a practical matter, the basket would probably include a relatively small number of internationally traded goods whose price behavior was as

1/ As Fund quotas are also denominated in SDRs, this would have the further advantage of maintaining the real value of the size of the Fund even when inflation erodes the values of the SDR basket currencies.

2/ General Assembly document A/CN9/200, May 11, 1981.

3/ Effros, Robert C., "Unit of Account for International Conventions is Considered by U.N. Commission on Trade Law," IMF Survey (Washington), Vol. 11, No. 3 (February 8, 1982), p. 40.

4/ Each currency component would simply be multiplied by its price index.

representative as possible of the larger hypothetical basket and for which market prices were easily obtained. 1/

Any of these approaches could be adopted by the Fund's membership under its existing Articles of Agreement. The method of valuation of the SDR is determined by a 70 percent majority of the Fund's voting power. However, an 85 percent majority of the total voting power is required for a change in the principle of valuation or a fundamental change in the application of the principle in effect. A decision on the valuation of the SDR would require the consent both of countries that hold SDRs and have other assets denominated in SDRs, such as reserve tranche positions and loans to the Fund, and of countries that have obligations denominated in SDRs, such as outstanding credits from the Fund. It is therefore most unlikely that there would be a change affecting the valuation of the SDR that would be harmful to either creditors or debtors since countries standing to lose from such changes are in a position to block them. More to the point, it is very unlikely that having adopted a real SDR, the Fund's membership would be persuaded to abandon it or fundamentally modify it in response to the narrower interests of a few (or even a large number of) countries.

2. Technical Difficulties

Actually establishing an SDR with more constant real value would require resolving a number of technical difficulties. When setting contractual values in terms of the SDR, monthly adjustments in a nominal SDR for changes in real values is probably adequate (i.e. the real currency basket approach discussed by the United Nations). However, financial instruments denominated in the SDR, such as the official SDR (the reserve asset allocated by the IMF), must be valued more frequently if these instruments are to trade freely.

The official SDR generally must be used at the Fund's official value in terms of currency and these are set daily. As the price indexes needed for adjusting the currency amounts in the SDR's "real currency basket" are only available monthly and with a lag, some further steps would be required to determine the real SDR equivalent to a nominal SDR amount on a day to day basis. To avoid discrete jumps at the end of each month, the day to day index of real to nominal SDRs,

1/ One candidate is gold. However, in the IMF Staff Survey article by Robert C. Effros cited above it is reported that "over the last decade the market price of gold appears to have been more volatile than the prices of most commodities." In addition, the inclusion of gold in the valuation basket might raise questions about the restriction in the IMF's Articles of Agreement (Article V. Section 12) against fixing the price of gold in the gold market. It is obvious, however, that fixing the gold content of money does not fix the relative price of gold in the gold markets.

i.e., the SDR price index, might be projected on the basis of a moving average of the "SDR rate of inflation" derived from the most recently available two or three months price data.

Of more serious concerns, this approach does not permit market determination of the supply of money as a result of a circularity. The unit of account must be amounts of real things or money itself. It cannot be an amount of money other than one unit of money without the redemption obligation leading to instability (see, however, the next section on the official SDR). An adjustment in the amounts of the five reserve currencies in the SDR in order to preserve its real value (assuming that before the adjustment the market value of SDR denominated money and the SDR currency basket were equal) would create a difference between the market value of SDR money and the value of the currency basket. 1/ This creates an arbitrage gain from redeeming SDRs rather than spending them in the market. The instability reflects the fact that redemption does not diminish the arbitrage profit until the next adjustment in the basket. Within the day (assuming daily adjustments in the basket 2/) there would be an incentive to redeem the entire money stock.

The commodity basket approach would avoid this instability but would require the use of commodities for which there are active international markets with daily (actually continuous) price quotations. The ideal approach may be a basket of a very few commodities (see Hall) whose amounts are adjusted (in a smooth way) by a monthly CPI as proposed by Fisher.

An official SDR with a constant real value would also call for a lower interest rate than would be determined, as at present, from interest rates on financial instruments with fixed nominal values. As interest rates tend to reflect expected rates of inflation, the present method of fixing the SDR's interest rate might be modified by deducting from the nominal SDR interest rate the rate of change in the price indexes used to adjust the valuation basket. The resulting "real interest rate" could then be further adjusted as needed to maintain a balance between the supply and demand for official SDRs as reflected by the level of the Fund's SDR holdings. Considerable work would obviously be required to sort out these technical matters.

1/ Some readers will find it easier to think of an SDR currency basket consisting (initially) of one U.S. dollar. If market prices in dollar money rise so that preserving the real value of the valuation basket requires increasing its contents to \$1.10, there will be an arbitrage gain from redeeming a dollar rather than spending it directly in the market.

2/ Actually, daily adjustments that reflect actual market prices (as opposed to a fixed extrapolation of monthly changes in the CPI) are not feasible.

3. The Role of the Official SDR

A potential concern about the use of the SDR as a constant real value unit of account is whether allocations of official SDRs would interfere with the market's ability to supply the quantity of private SDRs demanded and thereby jeopardize the viability of an independent unit of account.

Within the official circle of holders, SDRs are used as reserves and to directly settle obligations to other official holds. Allocations of SDRs augment official reserves at lower cost than is otherwise possible. However, allocations of an asset of independently determined value (i.e. controlling both the quantity in circulation and their price and interest rate) poses the potential dilemma of forcing members to hold and accept unwanted SDRs at their official price and yield, if allocations exceed the increases desired. ^{1/} The use of SDRs by one country is a receipt by another. Without some market clearing mechanism there will generally be a net aggregate desire to use or to receive SDRs. To deal with this problem, uses of the SDR are controlled by comprehensive rules. In recent years, however, all uses (including receipts in exchange for currency) have been voluntary suggesting that the SDR is not in oversupply.

As noted above, it is inconvenient to price goods and services in a unit other than the one denominating the assets with which their sale is settled. Market preferences, therefore, will force all competitively supplied monies to be denominated in the unit of account. The independence of the unit of account from the medium of exchange (which is none the less denominated in the unit of account) is threatened only if the suppliers of money are able to force the public to accept their money. If the government, for example, issues currency denominated in units of account, this currency runs the risk of supplanting the independently define unit of account and becoming the unit of account itself. There is no danger that this will result from allocations of official SDRs because they can only be held by IMF members and official international entities authorized to do so by the IMF. They can not be held by banks. Consequently allocations of official SDRs cannot force the public to hold more SDRs than it desires.

V. Conclusion

Defining the unit of account so as to make its real value as constant as possible has very important implications for efficiency and for the behavior of the monetary system. Much of the disruptive power

^{1/} While this wouldn't be true on average, since allocations must be approved by 85 percent (weighted) of the IMF's members, it could be true for some individual recipients.

of monetary shocks reflects the need for money's value to adjust to its "exogenously" determined supply and the effect of that adjustment on values and expectations throughout the economy when money is the unit of account. The value of the unit of account should not be the slave of monetary policy.

Nonetheless, there is considerable advantage to quoting prices in units of money and, hence, in denominating money in the independently defined unit of account. This is possible as long as the supply of money adjusts to the nominal quantity demanded at the independently determined price level. If all money is redeemable for assets equal in value to the unit of account, arbitrage will insure that the supply of money equals its demand. This proposition is well known from the gold standard experience.

The nature of a unit of account requires its wide acceptance and use. It is therefore unlikely that even a superior unit will be accepted spontaneously in the current environment. The adoption and spread of a unit with constant real value will require its initial deliberate adoption by a major economy or an established international organization such as the IMF.

Defining the value of the SDR so as to preserve its real value to the maximum extent possible could achieve this objective, but would be worth while even if it didn't. Such an adjustment in the SDR's valuation would make a useful contribution to international trade, contracting and payments. If the SDR could also be used for denominating domestic obligations, and if SDR denominated assets could be used to pay them, the SDR could bring the benefits of more certain and more stable monetary value to all who wanted them. In addition, it could become an important competitive force for more stable domestic monetary policies and arrangements in countries that chose not to adopt it. Countries adopting (or pegging their currencies to) the SDR would constitute a "zero inflation club."

This role could be played by any unit of account with relatively constant real value that was of sufficient standing and importance to serve as a widely used standard. An equally, or perhaps even more, promising candidate is the ECU. The members of the European Community might find it easier to tie (i.e. peg) their respective currencies (the British ECU, the French ECU, etc.) to a real ECU than to the current currency basket. The resulting surrender of monetary control to the monetary union would be no greater than with any other firmly fixed exchange rate system. It seems more likely, however, that members could more easily find and sustain political support to fix the real value of their currencies than to fix them to the value of some other currency (or basket of currencies). The by-product would be a European currency as uniform as the currency notes of the twelve Federal Reserve Districts of the U.S. Federal Reserve System.

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