

Appendix A

On the Statistical Problems Calling for Solution

The issuance and redemption of money, the purchasing power of which remained constant, became possible about a hundred years ago. Once Stanley Jevons made the significance of index numbers clear, no insurmountable difficulty would have been involved in establishing an inflation-proof currency system.

It is my position that since the redemption of money cannot be properly provided for by the simple expedient of using a single commodity like gold, redemption should be based upon the use of index numbers and of statistical data which has long been available.

Three statistical problems call for solution and all three can be resolved by compiling the necessary data to make possible (1) the computation of an International Standard of Value; (2) the computation of an International Currency Price Index or international exchange rate index, and (3) the computation of an International Commodity Price Index. Without such an international standard of value the unit of redemption cannot be computed; without an international currency price index, the conversion into constants of deposits in BISC made in different national currencies is impracti-

cal; without an international commodity price index, constants cannot be properly redeemed in any of the commodities included in the unit of redemption.

The methods used in the course of the Exeter experiments in dealing with these three problems were as follows:

1. Computation of the International Standard of Value—

(a) List thirty commodities economically most important in world trade.

(b) List the world production of the thirty commodities in 1970 by standard units used in trading.

(c) Because gold and silver have been used from time immemorial for money and because most of the production of both from time immemorial has been saved and not consumed as is the case with other commodities, their economic importance cannot be established merely by their world production. In this study, world production of both is multiplied by ten to provide for this.

(d) List the average dollar price in 1970 in one specified market (possible in New York) in standard trading units.

(e) Multiply (b) the world production by (d) the average price per unit. This will be considered their economic importance. Add all these dollar totals together; consider this 100%.

(f) Divide the economic importance (e) of each commodity by the total economic importance of all thirty commodities to determine the percentage represented by each commodity, carrying the percentages to the ten-thousandths (1/10,000).

(g) Convert the number of ten-thousandths of a percent of (e) each commodity's economic importance in the basis of (one-ten-thousandth) $.0001 = \$1.00$ which should make the total for all thirty commodities \$10,000.

(h) Divide the amount in dollars (g) for each commodity by (d) its average price per standard unit to obtain the actual number of units this represents.

(i) Increase or decrease (i) the number of units to round them out, discarding fractions of a unit, to make a first trial apportionment.

(j) Multiply (i) the number of rounded out units by (d) their average price, to evaluate the first apportionment in dollars.

(k) Make a final rounding out of the number of units so that the total value in dollars of all the apportionments in units comes as close as possible to \$10,000.

(l) Multiply the number of units in the final rounding out of the number of units by (d) their average price per unit, so that the total amount in dollars of all the final apportionments in units comes as close as possible to \$10,000.

2. Computation of the International Currency Price Index—

Quotations on foreign exchange are published in all leading newspapers daily. The quotations in American newspapers like the *Journal of Commerce*, the *Wall Street Journal*, and the *New York Times* are typical and accurate enough to be used as sources upon which to base the computation of this index. As published,

however, they evaluate other currencies in current dollars. The method used in computing the index must provide for the conversion of these dollar quotations into quotations in constants. This can be done by the use of the following conversion formula:

(a) As of 1970, the base year used in my studies, both prices in dollars and the purchasing power of the dollar are assumed to be 100.00 or \$1.00 respectively. The conversion rate of dollars into constants in 1970 was fixed at \$1.00 or €5.00. Finally the redemption rate of the constant in commodities was fixed at €1.00 = 1/50,000 (one fifty-thousandth) of the quantity of each of the thirty commodities constituting the Unit of Redemption. The equations then to be used in all the computations then become \$1.00 = € 5.00 and €1.00 = \$0.20.

(b) Determine the value or purchasing power of current dollars (averaged for the month the index is to cover) in terms of the International Commodity Price Index (again averaged in the same way). If the period is to cover the period consisting of the month of June, 1973, and evaluation shows by the commodity price index that commodity prices have risen to 110.0, the current dollar exchange rate (for each currency to be included in the currency price index) must be increased by ten points. This will then give them the price of each currency in constant dollars as of 1970.

(c) Determine the average monthly current dollar rate for each currency to be included in the currency index, by averaging the daily quotations at least once weekly.

(d) For illustrative purposes, assume that this procedure (c) shows that during June, 1972, the exchange

rate of current dollars and the Argentine peso was $\$0.102 = 1$ peso. Adding ten points to the dollar price of the peso, as provided for in (b) above, then calls for the conversion of the current exchange rate as follows: $\$0.1122 = 1$ peso. Since the conversion rate of current dollars into constants during the base year was $\$1.00 = C5.00$, then the exchange rate for pesos in constants can be established as follows: $\$0.1122 \times 5 = \text{€}0.561$.

(e) Applying this formula to each of the currencies to be included in the index, could then give us the International Currency Price Index. This would provide for the measurement of these currencies in a constant unit of value instead of the fluctuation value represented by their quotations in current dollars.

3. Computation of the International Commodity Price Index—

The following five procedures will produce a monthly index:

(a) Determine the monthly averages of the prices of each of the commodities included in the International Standard of Value and Unit of Redemption (in my studies there were thirty), using price quotations published in the daily press. To ensure their international reliability, it would be best to average the quotations published in the best newspapers in various countries, newspapers like the *Wall Street Journal* in the United States and the *Financial Times* in England.

(b) Multiply the quantity of each of the commodities included in the International Standard of Value and Unit of Redemption by its monthly average price, (a).

(c) Add together the products of (b). The sum is the monthly average price of the aggregate of all of the commodities included in the Standard of Value and Unit of Redemption.

(d) Divide the sum produced by (c) for the month for which the index is being computed sum of (c) for the base year 1979. The product is the commodity price index for that month.

In the course of the studies I made, monthly averages were used; in practice daily averages could be readily produced by the use of computers.