Eurodollars: A Paper Pyramid? *

1. - The idea that, within certain limits, banks can create credit has been attributed by many to James Pennington, on the basis of a note sent in 1829 to Thomas Tooke who then published it.[1] Nonetheless it now appears that the originator of this concept was Thornton, who first proposed it in a paper written in 1802.[2] The Italian School commonly holds that Francesco Fuoco, an early-nineteenth-century Neapolitan economist, was the first to convincingly demonstrate the principle wherein "capital multiplies itself" through credit:[3] whether this is true or not, there is no doubt that this brilliant mind had already perfectly understood the essence of the argument.

The principle, further refined along fundamental lines during the Twenties and the Thirties,[4] was fully accepted by Keynes, who with clearsighted analyses pointed out its many implications for political economy.

The thesis that banks can multiply credit and, through this, deposits, causes a certain amount of perplexity to those who work in the banks themselves; from their point of view on a company level, it seems obvious that *first* the saver puts funds aside, *then* he deposits them with a bank, and that *finally* the bank lends them to the entrepreneur.

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* I should like to give my sincere thanks to Dr. Paolo Savona, of the Bank's Research Department, for his help in drafting this document.

1 T. Tooke, "Paper Communicated by Mr. Pennington", Appendix to: *A Letter to Lord Grenville on the Effects Ascribed to the Resumption of Cash Payments on the Value of the Currency*, John Murray, London, 1829.

2 H. Thornton, *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain*, J. Hatchard and F. & C. Rivington, London, 1802.

3 F. Fuoco, *La Magia del Credito Svelata Istituzione Fondamentale di Pubblica Utilità da Giuseppe de Welz* (The Magic of Credit Revealed as a Fundamental Institution of Public Utility by Giuseppe de Welz), Stamperia Francese, Napoli, 1824.

4 W. F. Crick, "The Genesis of Bank Deposits", *Economica*, June 1927, pp. 191-202. J. F. Meade, "The Amount of Money and the Banking System", *The Economic Journal*, March 1934, pp. 77-83.

I should add that even Luigi Einaudi hesitated to reject this interpretation of monetary facts. But since the era in which he wrote, the instruments of analysis have become much more sophisticated, and nowadays no economist who specializes in monetary matters would question that *first* the banking system as a whole grants a line of credit to a customer, *then* the customer draws checks on his line of credit and the checks' recipients have them credited on their own accounts in the same banking system; *as a result* bank deposits are created.

According then to this line of thinking, a study of credit-creation mechanisms must begin by singling out that category of financial instruments on which the banking system as a whole relies when granting credit lines, i.e. those assets which can be used as reserve (free or compulsory) instruments by the banks. These assets which are the basis of the process of credit multiplication are usually denominated "reserve funds", or "credit base", or, even more frequently, "monetary base", using the term commonly employed by the Chicago School. Let me add that the use of one of its terms does not necessarily imply acceptance of the theories of that school.

Generally speaking, the monetary base is considered to be money in circulation (legal tender) and the financial assets that can be deposited at central banks as compulsory reserves, or that are freely convertible into cash at the monetary-base-creating institutions.

These basic financial instruments can also be examined in terms of their sources: the foreign sector (namely balance of payments surpluses or deficits), the Treasury (government budget deficit financed through the creation of monetary base), the banking system (borrowing from the central bank) and other minor sectors, whose financing brings about newly created monetary base instruments.

Next it is necessary to examine the distribution of the monetary base among its holders: that is individuals (families and businesses) and non-bank financial intermediaries on the one hand, and the banking system on the other.

Finally, we must look at the following relationships: among the monetary base, the quantity of credit or money and the level of interest rates; and between these variables and the total of other financial and real flows.

In order to understand these relationships one must first analyze the functions that determine the quota of monetary base held outside

the banking system and at the same time that part which is used in the process of bank-credit multiplication.

Then one has also to know the relationships (numerical value and time lags) existing between bank reserves and potential credit supply, and, through the analysis of credit demand, the links between the same bank reserves, the effective amount of credit and deposits, and the level of interest rates.

The process of credit creation and control within a single country can thus be summarized as follows: the monetary authorities decide the amount of the monetary base to be created. Individuals, in turn, decide, mainly in relation to income and its distribution, as well as to changes in interest rates — variables in turn affected by the amount of monetary base and its channels of creation — how much of the monetary base they need to keep on hand as means of payment; what they do not hold becomes re-available to the banks. These, on the other hand, have to deposit (as compulsory reserves with the central bank) a ratio of the monetary base acquired through their customers' deposits; they keep a smaller fraction for themselves as voluntary cash reserves. Thus that part of the base remaining, provided there exists a sufficient demand, is made available to their customers in various forms of credit. A lack or sluggishness of demand for credit would cause the amount voluntarily kept by banks as their liquidity to rise at the expense of other earning assets and bring about a fall in interest rates.

The stream lent out flows back, either wholly or in part, to one or more banks in the system. These automatically repeat the triple ritual (depositing a quota with the central bank, keeping a second for themselves and granting the rest as credit). The monetary base in use remains the same, but its amount available to customers is reduced at every round by the building up of voluntary and compulsory reserves; thus the outcome of the process is a volume of credit equal to a multiple of the base initially created by the monetary authorities.

From what has been said up to now, it becomes clear that, if the central bank did not require the setting aside of a given ratio of bank deposits in the form of compulsory reserves, the only limit to the expansion of credit, besides demand, would be found in voluntary cash reserves. If these were no longer found necessary, the growth of means of payment could go on infinitely, with possible inflationary effects, provided the demand existed and the monetary

base were not gradually absorbed by the public. Hence the setting up of liquidity ratios (as in the United Kingdom) or of compulsory reserves (as in Italy) is one of the main instruments commonly used to control the money supply.

On a more technical level, one can also say that the monetary authorities control the last unit of monetary base to be created and decide the compulsory reserve ratio (exogenous or instrumental variables), and only indirectly control the amount of credit and means of payment (endogenous variables) available to the economy; in fact the latter, as shown above, depends upon factors ruling how the outstanding monetary base is distributed between individuals and banks, and on the extent of use these same banks make out of it.

To fill out this brief sketch, it should be added that movements of funds between banks — inasmuch as they do not involve the deposit of compulsory reserves — have no effect at all on the volume of credit and means of payment in a system.

Thus, to use Francesco Fuoco's words, this is "the magic of credit revealed as a fundamental institution of public utility".

2. - The point I should like to make here is that in our day and age this "magic art" is performed on an international scale. It has fostered a great amount of liquidity held by banks, enterprises and individuals all residing outside the U.S., that forms what is known as the Eurodollar market. Generally speaking this market works in a way similar to the model described above, with the additional complication that not only do individuals deposit the monetary base for the development of credit, but so do U.S. commercial banks and many national central banks. Furthermore, there is no system of restraints set up by monetary authorities on the operation of this market, which is thus theoretically capable of expanding itself without any limits except discretionary fractional reserves.

Whether the Eurodollar, besides being a form of "magic" is also "a fundamental institution of public utility", is a question which has been raised in many quarters.

The experts are not in agreement over the most appropriate ways of measuring the size of this market and its growth potential, factors which need to be known in order to ascertain whether the suspicions and fears it has evoked are well-founded.

Nonetheless there is a unanimous agreement that it is a mechanism which transmits and amplifies inflationary pressures

operating inside the U.S. It has also been argued that, by facilitating the transfer of funds from one market to another, the Eurodollar can hinder domestic monetary policies outside the U.S. This means that it can reduce the effectiveness (and speediness) of monetary interventions to re-establish equilibrium in the balance of payments or to control domestic credit expansion. Furthermore, it is claimed that the Eurodollar market is used to finance speculative attacks against national currencies, and lastly that it contributes to the ever widening use of the dollar as the currency of intervention on foreign exchange markets and as a vehicle currency in world trade.

To examine these charges, let us follow the same logical itinerary used above to trace the behavior of domestic money markets and find the sources creating the international liquidity base, or international monetary base, and see what use the international money market makes of this base.

For the sake of simplicity, the considerations that follow pertain to European banks; nonetheless they have their logical extension over the entire arc of the international banking system.

Our first consideration is the U.S. balance of payments, where one must be careful to make a distinction between current account payments and receipts, and long- and short-term capital movements including direct investments. The balance of goods and services over the last 25 years has almost consistently shown a surplus. But in the case of capital movements the story is quite a different one: the negative balance of these, in addition to unilateral transfers made by the U.S. as aid to the rest of the world, has almost always more than offset the surplus registered on goods and services. As a result the U.S. has got into considerable short-term debt; obviously the rest of the world has found itself in the corresponding position of holding short-term claims on these liabilities — mostly in the form of deposits and money market paper held by official organizations (mainly central banks), commercial banks and individuals. Any variations in the quantity of these holdings alter the liquidity conditions of the rest of the world; a similar effect is produced when these holdings are transferred from central to commercial banks or to individuals and viceversa. Therefore the liquidity of the rest of the world is affected by the behavior of the U.S. balance of payments, whether it is expressed "on official settlements basis" or "on liquidity basis".

Compare the behavior of these flows in their components in Table 1, and for some items in Chart 1 . The first total figure (item 3) reflects only transactions with both the United States and non-U.S. residents made by official organizations that determine a change in the official dollar reserves of the rest of the world; whereas the second (item 4) gives a total picture of the variations in the different liquid assets held by all public and private non-residents vis-à-vis the United States. The balance "on liquidity basis" can therefore be seen, besides the "other liquidity" of Table 1, as a source of the monetary base in international markets, while the other balance can be regarded as showing the extent of the absorption by foreign monetary authorities both of the newly created base and of the monetary base already outstanding.

TABLE 1

U.S. BALANCE OF PAYMENTS (1964-1970)

(millions of dollars)

Items	1964	1965	1966	1967	1968	1969	First three quarters	
							1969	1970
1. Balance on goods and services	9,920	8,749	6,302	6,117	3,296	2,709	1,246	2,710
2. Unilateral transfers	−4,037	−4,386	−3,810	−3,874	−3,632	−3,594	−2,719	−2,707
3. Balance on official settlements basis	−1,564	−1,289	266	−3,418	1,641	2,700	2,186	−6,500
4. Balance on liquidity basis	−2,800	−1,335	−1,357	−3,544	171	−7,012	−7,432	−3,311
4.1 Base-liquidity	*−1,929*	*− 63*	*−1,915*	*−3,121*	*− 271*	*−6,346*	*−6,857*	*−2,583*
held by:								
4.1.1 Official organizations	− 757	120	405	−1,517	2,712	275	48	−5,426
4.1.2 Commercial banks	−1,032	153	−2,203	−1,195	−2,742	−7,137	−7,353	2,684
4.1.3 Individuals	− 140	− 336	− 117	− 409	− 241	516	448	159
4.2 Other liquidity	*− 700*	*− 50*	*1,126*	*− 371*	*− 438*	*−1,853*	*−1,608*	*709*
4.3 U.S. official reserve assets	*− 171*	*−1,222*	*− 568*	*− 52*	*880*	*1,187*	*1,033*	*−1,437*

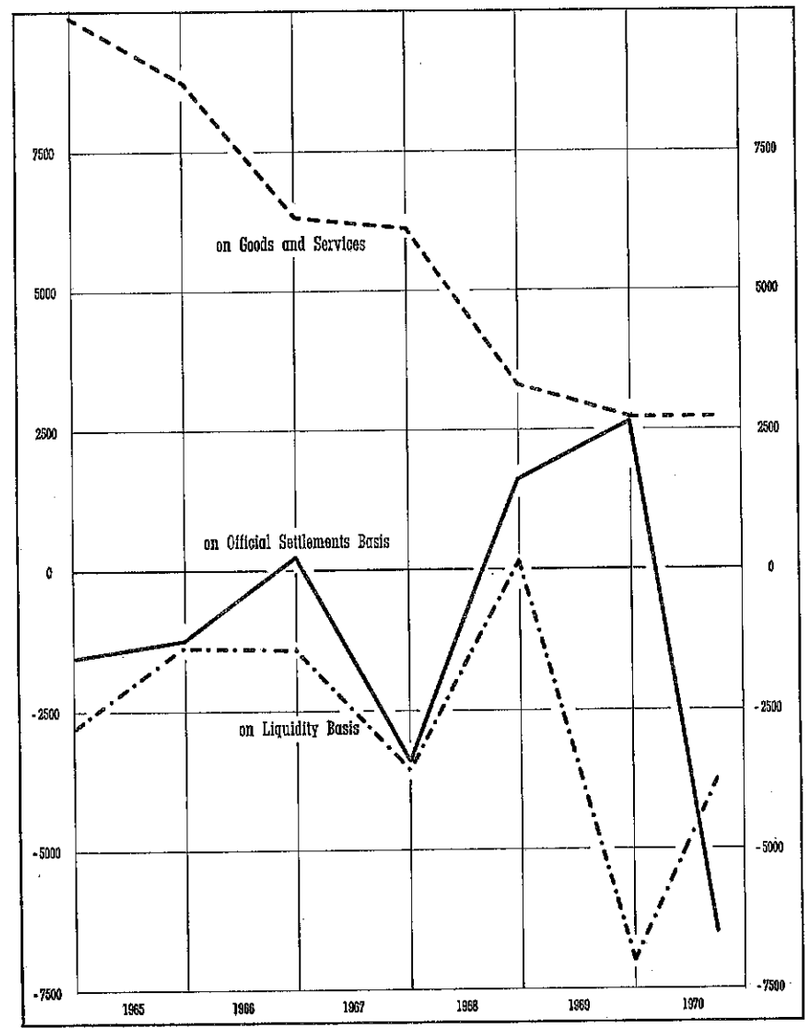
SOURCE: U.S. Department of Commerce, *Survey of Current Business*, No. 6, 1969 and No. 12, 1970.

NOTE: The minus sign (−) indicates an increase in U.S. liabilities.

CHART 1

U.S. BALANCE OF PAYMENTS DISEQUILIBRIA

(millions of dollars)



The reason these claims are held in the first place stems from the fact that the dollar is a currency of intervention in foreign exchange markets and thus bought and sold by domestic official bodies in unlimited quantities at an official exchange rate which cannot fluctuate more than one per cent to each side of parity.

This international system for exchange rates generates growth of the monetary base in two directions.

When central banks purchase dollars, they automatically create an equal amount of local currency; this has a multiplicative impact on the volume of domestic credit which in turn depends upon the multiplier coefficients of the various banking systems. When, on the other hand, commercial banks do not convert their dollar holdings into local currency, the impact on credit may still be quite similar to that induced in the former case, as long as the bank is sure that it can always convert its dollar holdings into national currency or that no matter what happens, it will have no difficulty in finding a purchaser.

The first fact falls under the category of analyses on the domestic markets; the second will be dealt with here.

Let us then take a look at the operations which bring about variations in the amount of dollars held by commercial banks and what limitations they have in converting them. A distinction must be made here between dealings with non-bank customers and with official bodies and those among the banks themselves for dollar-denominated transactions.

Eurodeposits[5] may be fed through transactions made by non-banks owning dollars received in settlement for goods exported to the U.S., or for any financial asset sold to a U.S. resident. In the first case, the payment of dollars corresponds to a current deficit in the U.S. balance of payments, in the second, to a deficit on capital account. In both these instances, the liabilities of the U.S. banks remain unchanged, but are transferred from residents to non-residents. But at the same time the dollar assets of the European banks increase and accordingly so does their power to expand credit. The extent to which they do so, as was shown above, depends

5 This term is commonly used for deposits denominated in dollars held in banks outside the U.S. and, by analogy, those in other reserve currencies, which are held in countries other than the one that the currency — in which the deposits are denominated — originated in.

on how the system as a whole makes use of the dollars: if it sells them to the central bank then the effect will be the same as if bank reserves in national currency were increased by an equal amount, but if it holds onto them, credit expands only within discretional limits.

The European banks may also register increases in dollar receipts and as a result in liquidity base when they receive deposits previously held in U.S. banks from individuals outside the U.S. At the same time, both Eurodeposits and "Euroreserves" increase when European residents use a central bank to convert domestic currencies into dollars and deposit them with a bank outside the U.S.

The same effect is induced when central banks deposit part of their dollar holdings previously held in U.S. commercial banks with Eurobanks.[6]

Finally, the reserves of the Eurobanks can be bolstered by the U.S. banks. It is usually stated that U.S. banks get "Eurofunds" from European banks (including the overseas branches of U.S. banks). This concept must be interpreted in the sense that the latter basically act as intermediaries for the former. They do so in order to enable U.S. banks to remunerate sight deposits and pay a rate of interest higher than that set by Regulation Q on time deposits. Furthermore, before measures were adopted in July 1969, compulsory reserves against Eurodollar liabilities were not required for U.S. banks, so that from this angle too, there were advantages to be gained by U.S. banks through the intermediation of their own overseas branches. In addition to the advantages listed above, moreover, one cannot rule out the existence of genuine debit and credit relations stemming from the further convenience of operating on international markets.

For all of these operations it should be pointed out that, to the extent in which the Eurofunds lent to U.S. banks can be re-withdrawn by Eurobanks should the need arise, they act as reserves of liquidity for the Eurobanking system. But, if Eurobanks accept sight deposits and convert them into time deposits within the U.S. banking system this conversion is equivalent to investing their liquid assets and thereby reduces Eurocredit potential, unless of

6 This denomination is used for all banks operating on the Eurodollar or, more widely, on the Eurocurrencies markets. Because of its origins and of its main center of activity, the term, in principle, also applies to banks operating outside of Europe.

course the technical form merely masks an agreement for quick convertibility of the deposit into cash or other monetary assets accepted by their clientele (i.e. checks). In the second case the Eurobanks will presumably include a part of these "time" deposits in calculation of their monetary base assets, and can thus also use them for starting a process of multiplication of international means of payment.

The dollars held by Eurobanks can be lent to non-banks; if the latter use them in making payments to U.S. residents, the multiplying mechanism comes to a halt, provided the U.S. banks do not start it up again, in the manner shown above. If, on the other hand, the Eurodollars are granted as credit to other non-bank residents outside the U.S. who in turn redeposit them in banks belonging to the Eurosystem, the volume of Eurodeposits increases without a corresponding increase in the head offices' balances.

Finally, in contrast to what happens on the domestic level, on the Eurodollar market the web of interbank accounts can also set in motion the credit multiplier.

In fact, country A's banks, which have deposited a part of their dollar holding with country B's banks can consider these deposits as a part of their own liquid assets if they judge that the debtor banks will, if necessary, be able to repurchase the dollars, should the need arise by resorting to official reserves or to the U.S. market. Thus the banking system of country A can expand its credits to non-bank clientele within the bounds in which, using its own judgement, it considers it advisable to maintain liquid assets. As an intuitive parallel, one could say that the U.S. money market is to Eurodeposits held by head offices as official dollar reserves are to interbank Eurodeposits expressed in that currency.

In short, the impact of the U.S. balance of payments deficit — defined both "on official settlements" and "on liquidity" — on domestic monetary base creation in countries outside the U.S. is two-pronged at least: in one instance the deficit causes a change in official reserves and in the size of the domestic monetary base; in the other, provided the banks are allowed to hold their dollar funds, it directly feeds the credit base and makes possible the widening of the international money supply through the mechanisms indicated above.

However, credit multiplication is more greatly affected in one case than in the other. The expansion of credit in domestic currency

is subject to the restraint of compulsory reserves and to the control exercised by domestic monetary authorities on the volume of monetary base instruments. On the other hand, the expansion of dollar-denominated base does not seem to be subject to any restraints except the amount of discretional liquid reserves which each bank holds. If, however, the liquidity base in dollars is accessible to an "almost unlimited" extent even this restraint ceases to have any braking impact on the growth of international means of payments.

Hence it is rather important to know not only how much the international money market is being fed through disequilibria in the U.S. balance of payments, but also how much base-liquidity is owned by individuals and the central banks as potential suppliers of reserves to the Eurobanks, as well as the extent to which the international banking system multiplies the base-liquidity that it has acquired.

Tables 2 and 3 show in terms of flows (from 1964 on) and outstanding amounts (at the end of September 1970) figures useful in this type of analysis within the framework of the widest definition of the international monetary system where the dollar plays an important but not exclusive role.

As far as concerns present analysis one should stress the unevenness of newly created base liquidity flows (a good indicator of the lack of controls in the sector) and also the rate at which the volume of dollars injected into the international market is quickening. Another interesting point is the reversal in 1969-70 of the propensity on the part of non-residents to keep monetary balances in the U.S. as the Euromarket built up. Finally one should note the vigorous growth of Eurobank reserves in the years 1968-69 mainly at the expense of official reserves and through the system of deposit mechanisms described above.

From these figures one can see that the amount of short term U.S. liabilities in the hands of non-residents has reached proportions justifying fears expressed at the beginning of this study that in a short amount of time the credit Eurobanks might create on this base could in fact reach inflationary dimensions, or at least become an important disturbing factor in the activity of domestic money markets. However, in spite of the theoretical possibilities open to Eurobanks, the multiplication of international means of payment has occurred with moderation and at the moment does not appear

TABLE 2

INTERNATIONAL BASE-LIQUIDITY
(changes in millions of dollars)

ITEMS	1964	1965	1966	1967	1968	1969	first three quarters		Outstanding amount at the end of Sept. 1970
							1969	1970	
Sources									
1.1 Gold for monetary use	1,469	1,590	— 143	570	— 302	81	20	— 355	38,347
1.2 I.M.F. ordinary and special drawing rights	215	1,221	954	— 583	740	238	241	*3,144	*9,870
1.3 FED New York — IMF available stand-bys	— 858	17	2,113	1,456	4,804	1,337	1,962	— 42	11,157
1.4 U.S. "liquid" liabilities	1,929	63	1,915	3,121	271	6,346	6,857	2,583	37,157
1.5 U.K. "liquid" liabilities	— 25	— 106	— 154	— 675	— 667	87	— 160	845	6,461
Total	2,730	2,785	4,685	3,889	4,846	8,089	8,920	6,175	102,992
Uses									
2.1 Official reserves	746	1,372	1,864	420	2,110	1,590	2,533	8,600	79,549
2.1.1 "Liquid" claims on the U.S.	*757*	*— 120*	*— 405*	*1,517*	*—2,712*	*—275*	*— 48*	*5,426*	*17,489*
2.1.2 "Liquid" claims on the U.K.	*— 213*	*— 274*	*31*	*— 361*	*— 420*	*209*	*358*	*427*	*2,686*
2.1.3 Other "liquid" assets	*202*	*1,766*	*2,238*	*— 736*	*5,242*	*1,656*	*2,223*	*2,747*	*59,374*
2.2 Individuals	952	1,566	618	2,274	— 6	— 638	— 966	259	7,277
2.2.1 Gold for monetary use	*624*	*1,062*	*686*	*2,179*	—	—	—	—	—
2.2.2 "Liquid" claims on the U.S.	*140*	*336*	*117*	*409*	*241*	*— 516*	*— 448*	*— 159*	*3,502*
2.2.3 "Liquid" claims on the U.K.	*188*	*168*	*— 185*	*— 314*	*— 247*	*— 122*	*— 518*	*418*	*3,775*
2.3 Commercial banks	1,032	— 153	2,203	1,195	2,742	7,137	7,353	—2,684	16,166
2.3.1 "Liquid" claims on the U.S.	*1,032*	*— 153*	*2,203*	*1,195*	*2,742*	*7,137*	*7,353*	*—2,684*	*16,166*

SOURCE: M. FRATIANNI - P. SAVONA, *Proposta per la ridefinizione del problema della liquidità internazionale* (A Suggestion for a New Approach to International Liquidity Problems), mimeograph 1970.

* Of which 3,183 of SDR.

TABLE 3

EURODOLLAR MARKET
(end of period data)

Items	1964	1965	1966	1967	1968	1969	June 1970
	(outstanding amounts in billions of dollars)						
1. Size, gross of interbank deposits	9.0	11.6	16.1	19.9	30.4	46.0	*50.0
2. Size, net of interbank deposits	9.0	11.5	14.5	17.5	25.0	37.5	41.5
3. Eurobank claims on the U.S.	1.8	2.1	4.4	5.2	9.5	16.5	16.4
	(unit ratios)						
4. $\frac{\text{Net size}}{\text{Eurobank claims on the U.S.}}$ [2:3]	5.0	5.5	3.3	3.4	2.6	2.3	2.5
	(percentage)						
5. 3-months Eurodollar rate	4.7	5.5	6.8	6.4	7.3	11.3	9.5

SOURCE: Bank for International Settlements.

* Estimates based on 1968-69 behavior of the spread between the gross and net size of the market.

to total more than three times the international monetary base held by the banks (fig. 2).

Using more sophisticated analytical methods it appears that this money multiplier could even climb to a ratio of seven times liquid reserves held by Eurobanks if (as is now taking place) there were a weakening in the needs (or the simple holdings) of dollars held by U.S. banks.

In any case it is clear that as of June 1970 the size of the phenomenon had not yet reached alarming proportions. Nonetheless, inherently it can reach such levels and in recent months with no statistics yet available, it may have already done so in some countries.

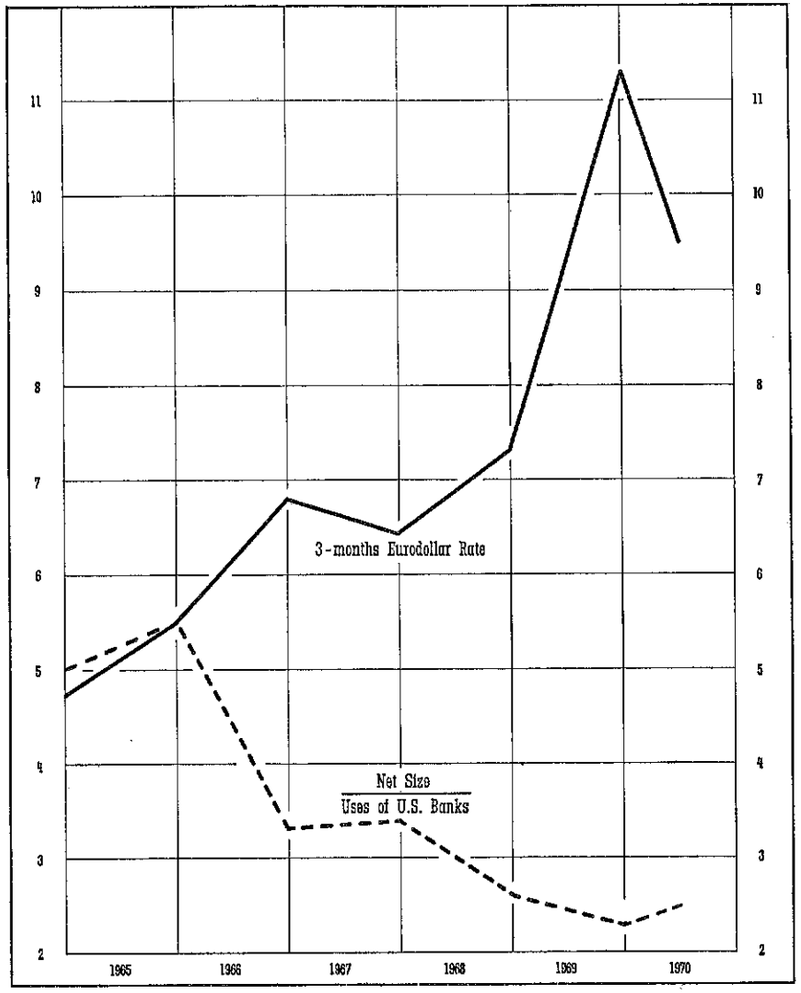
It appears clear then that in the future an effective control over the process of money creation must be extended to cover funds created by the Eurodollar and, to be more general, the Eurocurrency market.

Since this problem is one facet of a wider discussion which involves the adequacy of the present international monetary system, possible solutions seem to be:

(a) a reduction in dollar availability to international markets through an increase in the current account surplus of the U.S.

CHART 2

EURODOLLAR RATE, EURODOLLAR DEPOSITS (NET OF INTERBANK ACCOUNTS) AND THEIR USE BY U.S. BANKS



balance of payments. This target could be attained by modifying parities of the U.S. dollar on the one hand and the currencies of the rest of the world on the other; this change in effect, could be achieved:

— by making gold more expensive in terms of dollars, while keeping its price unchanged (or raising it to a lesser extent) in terms of the rest of the world's currencies;

— by leaving the price of the U.S. dollar unchanged and lowering the price of gold in terms of the currencies of the rest of the world;

— by freeing the U.S. dollar from its gold link, and at the same time abandoning the present system of fixed exchange rates where dollars can be converted into other currencies in unlimited quantities, on the basis of fixed parities.

— as an alternative solution to this last one, by widening the band in which rates may fluctuate around parity;

(b) a reduction, in dollar availability to international capital markets through the introduction of controls on long- and short-term capital movements in the U.S., in the rest of the world, or in both. These controls should aim at curbing the availability of dollar-denominated liquid assets both in the banking and in the non-bank sectors; this control might lead to the creation of a two-tier dollar market: an "official" one for current account transactions and a second "private" one for capital transactions;

(c) reabsorption of the dollars that have flowed into the international market through open market operations — such as that recently carried out by Eximbank — conducted either by U.S. or official international organizations, or in a concerted action of the world community;

(d) setting up compulsory reserve ratios on dollar operations carried out by domestic commercial banks in the various countries; obviously a measure of this type would not solve the problem of direct borrowing by individuals outside the banking system.

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Naples