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Analyzing the Euro-Currency Market: An Attempt to Clarify Some Basic Issues[1/]

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Introduction

The inflationary potential of credit creation in the euro-currency markets has in recent years been a subject of increasing concern to national and international monetary authorities. As a result, there have been numerous attempts, both in official and in academic circles, to measure this potential and to find means by which it can be offset or limited.[2/] Most studies of the subject use techniques developed in the analysis of domestic banking systems. In particular, much work on the euro-currency market has followed the credit multiplier approach originally developed to explain credit expansion in a closed banking system.

This approach has the attractions of familiarity and relative simplicity: this is probably why much discussion on the subject continues to use its terminology and techniques, albeit with modifications in their application. Such an analytical framework, however, when applied to the euro-currency market diverts attention from certain basic structural relationships and only perpetuates confusions about the nature of the money creation process. The most important single source of these confusions is the seemingly harmless concept of the reserve asset multiplier. This concept, when used carelessly, misleads observers in two distinct ways. First, it tends to direct attention, erroneously, to the credit-creating power of the banking system as the reason for the uniqueness of the monetary liabilities it issues. Secondly, it encourages the search for a mechanical relationship which, in the institutional set-up of the euro-currency market, simply does not exist.

It will be the purpose of this note to try and clear up these confusions in as simple a manner as possible. No new theoretical or empirical results will be presented: the intent is merely to set down a number of basic and generally

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1/ Arturo Brillembourg, Malcolm Knight and David Llewellyn offered valuable comments on an earlier draft of this paper.

2/ Manfred Willms, "Money Creation in the Euro-Currency Market," DM/75/112, contains an up-to-date list of references.

accepted propositions that sometimes get obscured in analyses that have more wide-ranging and ambitious objectives.

Credit Creation and the Nature of Money

An analytical distinction is sometimes attempted between banks, which are assumed to have the capacity to *create* credit, and other financial institutions, which are said only to *intermediate* between borrowers and lenders. This distinction between credit-creating and credit-intermediating institutions, is sometimes advanced as the reason why the activities of banks should be singled out for special attention and control. In a similar tradition of analysis, some observers of the euro-banking system have concentrated on the question of whether euro-banks create credit as being the key to explaining the growth of the market, and whether it needs to be actively controlled.1/

The distinction between the credit-creating and credit-intermediating functions of different institutions, however, is a false or at best an overdrawn one.2/ At the most superficial level, of course, it is tautologically true that if credit is understood to mean money, and money is defined as bank notes and bank deposits, banks create money and other financial institutions do not. But it could equally well be said that savings and loan institutions create savings and loan deposits and life insurance companies create life insurance policies. The act of *creation* is not qualitatively different. Each institution expands the size of its balance sheet by simultaneously acquiring assets and liabilities in a market environment in which there is competition for both assets and liabilities. The liabilities issued by each institution have certain differentiating characteristics, of course: those of banks are a means of payment; those of savings and loan institutions provide a rate of interest, those of insurance companies provide insurance protection, etc. But any institution can expand its balance sheet if there is a sufficiently profitable margin between borrowing costs and investment yields; and any institution expands thereby the volume of financial credit passing through the intermediation system.

Even if it is accepted that all kinds of financial intermediation involve credit creation, it might still be argued that the capacity of banks to create their kind of liabilities is subject to fewer constraints than is the capacity of other financial institutions. The basis of this proposition is the fact that bank liabilities are the only accepted means of exchange. This is sometimes taken to mean that bank deposits, once created, cannot be extinguished by the exercise of portfolio preference on the part of the general public (unlike other financial assets, which can always be exchanged for the means of payments).

The implied corollary of the foregoing, that banks have a freedom to expand their business which is denied to other intermediaries, and that they must

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1/ See, for example, G.L. Bell "Credit Creation through Euro-Dollars," *The Banker*, August 1964; A.K. Swoboda "The Euro-dollar Market: An Economist's Point of View," in Herbert Prochnow, (ed.) *The Eurodollar*, Chicago, Rand McNally: 1970.

2/ This is the central point of the "New View" of financial markets. See John G. Gurley and Edward S. Shaw *"Money in a Theory of Finance,"* Brookings, 1960; Tobin "Commercial Banks as Creators of 'Money,'" in Deane Carson (ed.) *Banking and Monetary Studies*, Homewood, Illinois, 1963.

therefore be restrained by specific portfolio constraints is, however, misleading. It is misleading because it concentrates on the immediate consequences of a transaction and not on the subsequent process by which equilibrium in asset portfolios is re-established. When attention is shifted to the portfolio adjustments which are needed to restore equilibrium in the balance sheets of financial institutions and their customers, it will be seen that the circumstances of banks and other financial intermediaries are quite comparable. This can be demonstrated, both at the level of an individual bank, and at the level of the banking system as a whole.

An individual bank, like any other financial institution, will choose to expand its overall balance sheet when it perceives that the return from marginal assets exceeds the cost of marginal liabilities. Admittedly, a bank can make a loan before actually borrowing funds (by writing up the credit of a customer), but this is a trivial distinction. Borrowers borrow in order to make payments, and when they do a bank faces the same need for funds as any other kind of intermediary. Looking at the matter from the point of view of a non-bank financial intermediary, it is true that funds must be attracted before lending can be undertaken. But in an efficiently functioning financial system this can easily be done by an increase in the yield offered on liabilities. So long as the margin between the return on lending and the cost of attracting deposits is sufficient to cover an intermediary's costs, it can expand its business whether it creates money or not.

The similarities between banks and other financial intermediaries have always been accepted as reasonably clear when single institutions are considered in isolation. But does what is true for an individual bank hold at the level of the banking system as a whole? Or does the fact that in a closed system a loan generates its own deposit mean that, in the absence of specific constraints, the system could expand indefinitely without tending to any stable equilibrium? The answer is clear: there is an equilibrium and the expansion of the banking system is limited by ordinary cost and demand factors, just as is the market for any other financial asset.

If the portfolios of non-financial sector are to be in equilibrium, then existing quantities of financial assets and liabilities must be willingly held at prevailing interest rates. Banks assets and liabilities are not perfect substitutes for the assets and liabilities of other financial intermediaries. They can only expand their share of total portfolios, therefore, by increasing their relative attractiveness. This imposes a constraint on the expansion of bank's business which is exactly analogous to that which applies to non-bank financial intermediaries.

When a bank makes a loan, it increases both the money stock and the gross financial assets of the private sector. It is unlikely, however, that the private sector will want to hold all its additional financial claims in the form of money unless it is given some special inducement to do so. If, therefore, all the new bank loans are to be matched by new deposits, willingly held, the pattern of interest rates must adjust so that money becomes more attractive relative to competing financial assets. If banks are prevented, by law or custom, from increasing interest rates on their own liabilities, then the relative adjustment must come about through a reduction in the rates offered on the

liabilities of other institutions. This means that these other institutions now find it easier and cheaper to attract funds. As a result it becomes profitable for them to expand their lending by offering loans to marginal borrowers who would otherwise find accommodation at banks.

This in turn curtails the lending opportunities of banks and restricts the growth in their balance sheets. The key point is that while bank deposits cannot be extinguished by a transfer of deposits to competing institutions, they can be curtailed by a transfer of lending business. There is no widow's cruse[1/] which enables bankers to create credit out of thin air but which prevents other financial intermediaries from undertaking credit creation based on their particular brand of financial instruments. Consequently, there is no analytical virtue in a distinction between the credit creating capacities of different institutions; and the discussion of whether or not euro-banks create credit is a sterile one.

The special role of money in the financial system, and in the determination of aggregate demand, derives not from the manner in which it comes into existence, but from the unique differentiating characteristics of money as an asset. Those who believe in the central determining importance of money consider these differentiating characteristics are sufficiently important that money cannot be regarded as a close substitute for any other single financial instrument. Thus a change in the quantity of money cannot be accommodated by a change in the relative price of substitute assets, but must give rise to an overall change in the price of *all* other assets, i.e., a change in the price level. Other financial markets, by contrast, are thought to have a rather narrower significance, and to affect prices and interest rates in a more restricted sphere.[2/] Following this line of reasoning, the central issue in deciding whether euro-bank liabilities should be considered as money, is whether they are regarded as substitutes for domestic money balances in asset-holders portfolios.

Multiplier Analysis and the Euro-dollar Market

Much analysis of euro currency markets has attempted to exploit the multiplier framework often used in studies of domestic banking systems. It is frequently ignored that the use of such an approach requires a banking system to exhibit the following two institutional characteristics.

(i) The existence of a more-or-less fixed ratio between bank reserves and banks deposits.

(ii) The possibility of controlling, or at least predicting, the quantity of assets used in reserves.

1/ The analogy is from Tobin, op.cit.

2/ The distinction between money and non-money is probably overdrawn however. The existence of non-bank financial intermediaries which grant loans and issue liabilities presumably allows economies to be achieved in money-holding. If for example, savings and loan institutions were closed down by ordinance, and their business absorbed into the banking system, the time deposit liabilities of banks could presumably rise without a corresponding loosening of credit conditions.

Both of these characteristics hold reasonably well in a closed banking system with prescribed reserve requirements earning zero interest. As far as the stability of the reserve ratio is concerned, legal sanctions prevent bank reserves going below the prescribed minimum, while commercial incentives are almost as effective in preventing reserves rising more than marginally above the minimum. Thus, the reserves/deposits ratio is stable and, liquidity traps apart, cannot be affected by changes in market interest rates.

To be slightly more technical, there is a discontinuity in the implicit yield on reserves. (The "yield" on reserves can be thought of as the value to a bank of avoiding the legal sanctions which result from inadequate reserves.) Below the required minimum the implicit marginal yield on reserves is extremely high; above the prescribed minimum, it is zero. Thus, movements in the yield on alternative assets will have no influence on the ratio of reserves which an individual bank wishes to hold.[1/]

Secondly, the stock of reserve assets is also predictable. Reserves are created by the central bank and, in a closed economy, can leak out only by being converted into circulating currency. Currency demand is assumed, with reasonable verisimilitude, to be relatively inelastic with respect to interest rates. Thus the stock of bank reserves is also invariant with respect to interest rates, and so, by extension, is the high-powered money multiplier. This has the corollary that whatever portfolio shifts and interest rate changes take place as the banking system adjusts towards equilibrium, do not affect the new equilibrium size of its balance sheet.

The foregoing makes it clear that it is the discontinuity, in a closed banking system, in the banks' demand for reserves that makes the multiplier analysis useful as an analytical tool and policy instrument. The existence of reserve requirements means that the yield on a marginal loan is always greater than the cost of a marginal deposit. As soon as the authorities remove the reserve constraint on the banks--either by providing more reserves, or by reducing requirements--the banks can be counted on to respond by expanding their balance sheets.

In other words, it is not the mechanical nature of credit creation by banks that makes reserve requirements essential, but rather the existence of reserve requirements that makes credit creation conform to a multiplier framework. (This is not intended to be an observation which diminishes the significance of reserve requirements; the existence of a predictable fulcrum on which open market operations can work may be a very desirable feature in improving the responsiveness of the banking system to monetary policy.)[2/]

1/ For completeness, it should be noted that some small "cushion" of excess reserves has value to a bank in facilitating portfolio management decisions. The size of this cushion may be responsive to relative interest rates, and this would tend to reduce the precision with which the reserve asset multiplier could be used to predict changes in the money stock. However, since excess reserves are normally a small proportion of the total stock, it is a permissible simplification for present purposes to regard the reserve ratio as fixed.

2/ This was indeed explicitly stated as a reason for reserve requirements in the new British arrangements for controlling the banking system introduced in 1971. See *Bank of England Quarterly Bulletin*, pp. 477-481, December 1971.

Consider, however, the case of an open banking system without reserve requirements, such as the Euro-currency market. Instead of reserves having an implicit yield that is discontinuous (very high where reserve holdings are below the prescribed minimum ratio; and zero above that ratio) the utility derived from holding reserves will be a continuous function both of the interest rate, and of the amount held. As a result, banks are able to equalize the return on a marginal unit of reserves with that on marginal units of other assets, and to equalize both with the cost of deposits.[1/] This is because there is no threshold volume of reserves which banks are required, by law or custom, to hold, and because euro-banks hold their liquidity in the form of short-term inter-bank deposits or money market assets earning a competitive rate of interest. Consequently, any change in relative interest rates on reserves and other assets will require a shift in portfolio composition (and thus in reserve ratios) if portfolio equilibrium is to be preserved.

The practical significance of shifts in reserve holding for variations in the multiplier (which is the reciprocal of the reserve ratio) is enhanced by the fact that reserves are likely to be extremely low anyway. To a large extent, euro-banks match deposits and liabilities and thus have very little need to hold liquid reserves to meet unforeseen withdrawals of funds. Furthermore, the market for deposits is sufficiently well organized that banks can usually meet their needs by buying deposits at short-notice. Finally, banks can maintain a readiness to meet a run-off reserves by maintaining stand-by facilities with correspondent banks, as well as by holding owned assets.

Not only are reserve ratios subject to substantial variation, but the stock of reserve assets available to the euro-banking system is, for all intents and purposes, almost indefinitely expandable. A reserve asset to an off-shore banking system such as the euro-currency market is a deposit in the national money market of the country of issue. So long as loans yield more than deposits euro-banks can expand their balance sheet and meet their need for reserves by placing additional deposits with the banking system of the currency of denomination. The total volume of deposits in a domestic banking system is, of course, limited, but since this stock is very large relative to the potential reserve needs of the euro-markets, an absolute shortage of reserves will not be the factor limiting the expansion of business.

The means by which portfolio equilibrium is maintained when both the stock of reserve assets and reserve ratios are subject to variation can be traced quite simply. Suppose there is an increase in the demand for euro-dollar loans by private borrowers. This will raise the marginal return to banks from their lending activities and thus create a disequilibrium in their portfolios. The higher yield on euro-dollar investments will encourage individual banks to seek additional deposits, and to switch out of reserves and into the higher yielding investments. Because the liquidity services provided by reserves may be presumed to be a diminishing function of the amount of reserves held, marginal reserves now have a higher liquidity value. At the same time, the expansion of loans may result in banks accepting loans with lower returns (either with a

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1/ The costs and returns involved must, of course, be understood to include non-pecuniary factors, such as liquidity.

lower coupon, or with a greater discount for riskiness). Both these tendencies will continue until a new equilibrium is struck.

The conclusion to be drawn from the above is that an analysis of the euro-dollar market which relies on the estimation of a deposit multiplier is likely to be unhelpful; consequently it is not surprising that the various attempts to analyze the markets in such terms have produced widely disparate results.[1/] In order to find a more fruitful analytical framework, one must go back and look more carefully at the basic economic mechanism underlying the working of the multiplier relationships.

Despite the fact that it is the contraints on banks' portfolios that make multiplier analysis possible, it should still be noted that the mechanism whereby open market operations give rise to changes in the money stock works through relative interest rates. An increase in the volume of reserves provided by the central bank causes a discrepancy between the return on marginal loans (assumed unchanged) and the return on reserves (which being excess to requirements, will fall to the zero-yielding portion of the discontinuous yield curve).

Banks will respond by lowering the implicit yield they seek on loans and investments, and expand their portfolio of these assets, gradually reducing the ratio of assets held in reserve form. This process will stop when reserves are precisely at the required ratio, when the implicit yield will be indeterminate between zero and the very high cost involved in having a deficiency. At this point, the return on reserves can be considered equal to the return on investments.[2/]

Credit multiplier analysis is therefore just a special case which is derived from general portfolio theory by assuming that asset demand and supply functions are discontinuous and thus that the demand to hold reserves is not significantly affected by changes in interest rates in the relevant range. In the case of the euro-currency market, there is no a priori reason to expect these assumptions to hold and, indeed, there is strong empirical evidence to the contrary.[3/]

The size of the market is determined not by specific portfolio constraints on banks, but rather by the supply of and demand for loanable funds. As banks' activities expand, the volume of bank loans will rise and marginal borrowers will be prepared to pay less by way of interest in order to obtain additional accommodation. Similarly on the deposit side, the higher the volume of deposits outstanding, the less willing will depositors be to add to them, and consequently, the higher the rate of interest banks will have to offer on marginal funds. In short, the simple mechanism of supply and demand equated by price can explain the expansion of the euro-dollar market perfectly well.

1/ Ranging, for example, from 0.50 to nearly 100. See Willms, op.cit.

2/ Because not all assets can be invested in interest-earning form, however, the marginal yield on investments will be higher than the marginal cost to the individual bank of attracting funds.

3/ See, for example, Malcolm Knight "Euro-dollars, Capital mobility and the Forward Exchange Market" DM/75/113.

Once one starts to think of the factors underlying micro-economic supply and demand curves for funds, a number of fallacies of the multiplier approach become evident. The fact that the implicit yield on reserves is not interrupted by a discontinuity (as in the case of domestic banking systems) means that a shift in the *demand* for reserves causes a shift in the quantity of reserves held by the banking system.

Consider an event which is usually taken as the beginning point of multiplier analysis: a euro-deposit originating outside the system. Although in some description the motivation for such a deposit is unexplained, it may be considered to reflect an upward shift in the demand curve for euro-deposits. If the euro-market was previously in equilibrium, the upward shift in the demand curve will, at unchanged interest rates, generate a disequilibrium. How do banks react to this situation? According to conventional multiplier analysis, they retain a fixed proportion of the additional funds in reserves, and lower their lending rates to whatever extent is necessary to get rid of the remainder. The loans they make give rise to deposits elsewhere in the system, and so the process continues until all the original has either leaked out or been absorbed in reserves. All that is needed to measure the resultant expansion in the euro-dollar market is an estimate of the "redeposit ratio" of the recipients of funds as they are spent.

But why should banks act in this way? As competitive agents, they will presumably balance deposits and loans at the interest rate most profitable to them. It may be that this is achieved by expanding loans to match the now-higher deposits. It may equally be that it is achieved by lowering the rate they offer on deposits, so that the previously existing quantity of loans is now sustained by lower-cost liabilities. Most likely, of course, the increase in supply of funds to the bank will result in some expansion in their balance sheet and some reduction in interest rates. The relative slopes of the supply curve of deposits, and the demand curve for loans, from the non-bank public will determine the interest rate and volume of activity at which a new equilibrium will be established.

Controlling the Euro-currency market

The fact that the size of the euro-currency market is determined by the straight forward interaction of demand and supply curves means that the specter of uncontrolled credit expansion, made possible by an infinite multiplier, is illusory. Policies aimed at control of the market need to concern themselves with the position and slope of the demand and supply curves. This is, of course, an extremely complex analytical problem, since it implies the existence of a simultaneous model of both the euro-currency markets, and the domestic markets with which they interact.[1/]

In practice, however, it is probably possible to significantly influence developments in the euro-currency market by operating in those national financial markets to which it has close ties. Since euro-deposits are closely

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1/ For an ingenious attempt to construct a simplified model along these lines, see John Hewson and Eisuke Sakakibara, "The Euro-dollar Deposit Multiplier: A Portfolio Approach," *Staff Papers*, July 1974. This paper also contains a useful theoretical critique of the fixed multiplier approach.

substitutable with deposits in the domestic banking system of the currency in question, the relevant opportunity cost for depositors in euro-markets is the interest rate in the national center. On the lending side, too, euro-bank loans may be close substitutes for loans from domestic banks. Thus the equilibrium size of euro-bank balance sheets is inevitably very closely influenced by developments in national money markets. In conditions of reasonable capital mobility, euro-market rates *cannot* depart by far from those in the domestic money markets of the currencies concerned.

In a closed economy (and in the short run), the monetary authorities can choose to control the quantity of money or its price (i.e., nominal interest rates). If they choose to control the quantity, the price adjusts to reestablish an equality between supply and demand. Through their control of the money stock, however, the authorities can exercise a pervasive influence over all financial markets. (A fall in the money supply pushes up interest rates across the board, discourages borrowing from other intermediaries, and reduces the size of their balance sheets.) Since euro-dollar assets and liabilities are clearly substitutable in most respects for comparable domestic instruments, whatever influence the authorities are able to impart to domestic financial markets by their control of the money supply, can also be imparted to the euro-currency market.

The foregoing prompts a conclusion and requires a caveat. The conclusion is that adequate control over domestic monetary expansion is a necessary and sufficient condition for adequate control over euro-currency credit expansion. "Adequate control" implies, of course, that the monetary authorities should take account of euro-markets in formulating their targets for monetary policy, and in monitoring their success. In particular, they need to consider the extent to which euro-markets permit economies to be realized in the private sector's holdings of money in the form of domestic bank deposits.

The caveat is that competitive conditions are not the same in the euro-currency market as in domestic banking systems. Reserve requirements in domestic systems act as a tax on banking intermediation, and displace business to other channels of intermediation, including the euro-currency markets. The closer the substitutability between euro-currency assets and domestic money balances, the greater the extent to which changes in the effective tax on domestic banks will be offset by expansion in the euro-currency market. A similar consideration applies to the use of other portfolio-distorting controls, such as Regulation Q-type interest ceilings. In the case of these, the extent to which the curtailment of domestic banking activity is offset by euro-market expansion is particularly uncertain.

A Final Note on Reserve Requirements

The imposition of reserve requirements in euro-currency markets would restrict the size of these markets by taxing them; in this way, the effect of the reserve requirement would be no different from that of any other tax. It would improve allocation, by removing the present distortion whereby domestic banking activity is taxed, but offshore banking is not. However, the distortion would only be removed if the reserve requirement were in the same form as the domestic one (i.e., in zero-earning deposits with the central bank of

issue), and the control were applied comprehensively. For well-known political and institutional reasons, these conditions are not likely to be met. And it should be noted that reserve requirements on offshore banks would *increase* the distortion between banks and other financial intermediaries. This kind of distortion could most easily be eliminated by a progressive reduction in the amount of special taxation applied to domestic banking systems through reserve requirements.