

BIS ECONOMIC PAPERS
N° 2 - April 1980

**US MONETARY AGGREGATES,
INCOME VELOCITY
AND THE EURO-DOLLAR MARKET**

by Warren D. McClam

BANK FOR INTERNATIONAL SETTLEMENTS
Monetary and Economic Department
BASLE

Table of Contents

1. Introduction	5
2. Components of income velocity	9
3. Changes in velocity components: Some statistical comparisons	11
4. Interrelationships between changes in the money stock, total credit and income velocity	13
5. The money stock, interest rates and credit velocity	19
6. The income velocity of credit and the Euro-dollar markets . . .	26
7. US credit markets and the Euro-dollar market	30
8. The United States as international lender of last resort	36
9. Euro-currency market growth: Some general observations . . .	38
10. Concluding remarks	41

US MONETARY AGGREGATES, INCOME VELOCITY AND THE EURO-DOLLAR MARKET

1. *Introduction*

The basic premise of monetarist doctrine is the proposition, lent support by extensive empirical research, that the income velocity of money behaves in an essentially stable way. That is, technically expressed as a “money demand function”, the demand for money has been found in a number of countries to be closely, and principally, related to changes in interest rates and the level of income. Broadly speaking, rising interest rates, at short and/or long term, tend to reduce money demand by inducing a shift towards alternative financial assets, while rising income leads to an increase in the demand for cash balances for transactions purposes. In the monetarist view, control over the money stock is therefore seen as the most effective way, making allowance for variable and sometimes lengthy lags, of controlling final demand and, in particular, the price level. Moreover, the monetary authorities in various countries, though rather more sceptical of the stability of money demand, have used estimates of money demand functions, together with projections of actual and desired levels of final demand, in formulating policies with respect to money growth.

In the inflationary environment of the 1970s the monetarist approach to economic stabilisation would appear to have found increasingly wide support. Yet its basic theoretical premise – the stable demand-for-money function – has seemed at times, in different countries, to rest on shifting sands. Previous demand-for-money relationships have

tended to break down as a result of rapid institutional and technological change and the growing sophistication of both bank and non-bank market participants in cushioning themselves against the impact of monetary control provisions or circumventing such measures. Problems have arisen not only in the choice of appropriate operating and intermediate target variables but also with regard to the technical control instruments themselves. At the same time, new questions have been posed concerning the appropriate definition and identification of monetary aggregates for purposes of monetary control.

This broad set of issues also has an important international dimension. It is widely accepted that claims held in the Euro-currency market, to the extent that they are not already counted in national money supplies, may serve as a substitute for domestic liquid balances. It is asserted, in particular, that a certain proportion of Euro-currency assets should, to all intents and purposes, be viewed as the equivalent of domestic liquidity. The failure to treat it as such statistically (and to exercise some control over it) may mean that income velocity measured in terms of the domestic aggregates can at times increase faster than would otherwise be the case. One clear expression of this view has been given by Governor Wallich of the Federal Reserve Board, who has estimated that the monetary-type volume of Euro-dollar claims which should be added to the US monetary aggregates amounts to about \$50 billion and is growing at the rate of about 25 per cent. a year. He concludes that

“... if monetary authorities focus exclusively on the growth of domestic aggregates, ignoring the effects of the more rapid growth of liabilities to non-banks that is occurring in the Euro-currency market, they may facilitate more expansionary and more inflationary conditions than they intend, or may be aware of. Indeed, there is a risk that, over time, as the Euro-currency market expands relative to domestic markets, control over the aggregate volume of money may increasingly slip from the hands of central banks.” *

* Statement by Henry C. Wallich before the Sub-committee on Domestic Monetary Policy and the Sub-committee on International Trade, Investment and Monetary Policy of the Committee on Banking, Finance and Urban Affairs, US House of Representatives, 12th July 1979.

These broad issues, domestic and international, pose analytical problems of kinds which cannot easily be taken into account in the usual demand-for-money analysis. On the international side, there is no easy answer to the question whether individual countries should include some portion of Euro-currency claims in their national money supplies and, if so, to what extent.* Moreover, on the domestic side it would appear that factors relating to competition and equity have, independently of interest rates as such, significantly influenced the changing pattern of financial intermediation. This would seem to be true both of changes in the regulatory framework and of the development of new financial instruments and payments practices. In some countries, particularly the United States, the banks' recourse to "liabilities management", with a view to minimising the cost and increasing the availability of funds, is a special case in point.

For these reasons, I have found it helpful, as an alternative to the conventional demand-for-money approach, to use a broader, if less rigorous, income-velocity framework – one which can be more directly related to changing patterns of financial intermediation. The paper draws primarily on the experience of the United States, for which comprehensive data on sectoral flows of funds are available. Among other things, it examines some of the links between the Euro-dollar market and US domestic monetary conditions.

In terms of its theoretical foundations, the analysis in this paper leans towards those views which place emphasis on the demand for credit as distinct from the demand for money. Basically, it sides with the Gurley/Shaw "new view" of financial markets, which stresses the need for a *financial* policy designed to influence credit creation over financial markets as a whole instead of a *monetary* policy focusing on the control of specific banking-sector monetary

* The Federal Reserve Board has included certain Euro-dollar claims in the course of a recent extensive redefinition of the monetary aggregates. Federal Reserve press release, 7th February 1980. See footnote on page 30.

liabilities.* On the banking-sector level, the approach is consonant with the "European" (and IMF) view of money creation, which underlines the relative exogeneity of changes on the assets side of the banks' balance sheet: credit to the private sector, credit to the public sector and net foreign assets. A closely related view, of course, is the "monetary approach to the balance of payments", which highlights the rôle of external flows in equating money-supply creation, as it derives from domestic credit expansion, to the actual demand for money.

The evidence presented in this paper suggests that since the 1960s, in contrast to earlier years, changes in the income velocity of M_1 in the United States can be ascribed largely to variations in the growth of total domestic credit-market debt in relation to the money stock. In behavioural terms it would appear historically that the income velocity of total credit, i.e. the relationship between financial wealth and income, has become increasingly stable. From the early 1960s onwards the ratio of total credit-market debt to gross national product fluctuated fairly narrowly around a zero trend, even declining slightly during later years when the Euro-dollar market was growing very rapidly. With regard to the domestic expenditure effects of the Euro-dollar market, this behaviour suggests one of two things. On the one hand, viewed independently of US credit-market developments, it could mean that any marginal influence that increased non-bank

* Cf. John C. Gurley and E. S. Shaw, "Financial aspects of economic development", *The American Economic Review*, Vol. XLV, No. 4 (September 1955), pp. 515-538.

In a recent book examining the significance of differentiated sectoral financial behaviour, Dorrance analyses the differences between liability adjustment and asset adjustment. In this context he calls attention *inter alia* to Sir John Hicks' distinction between an "overdraft" (or net borrowing) sector and an "auto" (or net lending) sector and Cagan's distinction between the credit effect and the portfolio effect. See Graeme Dorrance, *National monetary and financial analysis* (The Macmillan Press, London, 1978), pp. 31-41.

See also Richard Coghlan, "A new view of money", *Lloyd's Bank Review*, No. 129 (July 1978), pp. 13-27. Coghlan outlines a model in which "... the money supply changes in response to movements in bank credit (broadly defined) and, when combined with a stable demand function, has direct effect on output and prices". He emphasises that, while the process of asset adjustment to changes in the money supply is similar to that in the monetarist explanation, "... this is not a monetarist model; the quantity of money is not determined in response to an exogenously determined monetary base" (p. 27).

holdings of Euro-dollar claims have been up to now at the domestic level deflationary rather than inflationary. On the other hand, viewed in conjunction with US credit-market developments, it could mean that US monetary conditions have given sufficient encouragement to domestic credit creation and net expenditure abroad to outweigh any domestic expenditure effects deriving from the growth of non-bank Euro-dollar activity.

2. Components of income velocity

Let us start with the proposition that changes in the income velocity of narrowly defined money ($\% \Delta M_1$) can be meaningfully broken down into two parts as follows.

$$\% \Delta \frac{\text{GNP}}{M_1} = \% \Delta \frac{\text{TCMD}}{M_1} + \% \Delta \frac{\text{GNP}}{\text{TCMD}}$$

where TCMD = total credit-market debt, as defined in the US flow-of-funds accounts published by the Federal Reserve Board.*

Thus, on this assumption, the income velocity of money may change for either one or both of two reasons. On the one hand, a change in the term TCMD/M_1 , which may for convenience be called the “credit velocity of money” even though it is a stock/stock ratio, would imply a change in the income velocity of money related to an acceleration or slowing-down in the growth of total net credit in relation to that in the narrow money stock. On the other hand, a change in GNP/TCMD , the “income velocity of total credit”, would signify a velocity change deriving from an acceleration

* Includes total net credit-market *debt* owed by non-financial sectors, including the government and foreign sectors. This total, which excludes equities, is equal to total credit-market *claims* on non-financial sectors, including the official dollar assets of monetary authorities abroad. The figures are stock data and include not only credits intermediated by financial institutions but also those representing direct claims on non-financial sectors. As now constituted, the TCMD series includes no US non-bank liabilities to offshore markets and only a small amount of claims against these markets. In formulating the velocity concepts above, I have chosen to emphasise the credit side, and thus credit demand as distinct from financial asset demand, but both assets and liabilities behaviour should be borne in mind.

or slowing-down of spending unrelated to the composition of credit-market debt (or otherwise unaccounted for by the recorded credit-market statistics).

As formulated above, the equation is no more than a statistical identity without causal implications. However, I hope to show, if only in an elementary way, that it helps to throw some light on behaviouristic determinants of money demand and supply. Although the issue of causality is not extensively dealt with in this paper, it will be argued that until the 1970s the components of velocity varied systematically over the business cycle in a manner that is not adequately "explained" by the behaviour of interest rates. Accordingly, a focus on the composition of credit-market debt/claims can provide insights about the income velocity of money that are not fully captured by the conventional demand-for-money function.

Compared with a demand-for-money approach, the analysis starts with changes in the composition of credit-market debt/claims rather than with interest rate elasticities as an explanation of changes in the demand for money. However, insofar as the $TCMD/M_1$ term of the above identity varies closely in line with the income velocity of money, there would be some presumption of a causal link via the level and structure of interest rates, such as one would expect to find in a complex, fully articulated demand-for-money function if it were possible to specify one. It is, of course, possible to imagine changes in the $TCMD/M_1$ relationship that would imply no change in the income velocity of M_1 – for example, equal and one-way changes in saving and investment intermediated by the financial markets. It seems more likely, however, that ex ante changes in saving and investment will not be equal, especially on a short-term year-to-year basis,* but will rather be unequal and therefore associated with changes in interest rates, and hence in the income velocity of M_1 .

The significance of the second term, the income velocity of credit ($GNP/TCMD$), also needs clarification. Though its denominator is

* One indication to this effect is that the balance of payments on current account (i.e. the difference, approximately, between gross national saving and gross domestic investment) tends to vary significantly from year to year.

total credit-market debt, the velocity component it reflects is, paradoxically, that element which is *unrelated* to the composition of credit flows. It represents, as it were, mainly a measure of velocity in the “pure” meaning of the term, i.e. as a reflection of “hoarding” and “dishoarding” in the classical sense of storing up or running down cash balances in proportion to money income.¹ Indeed, if one imagines a monetary system in which the only asset is M_1 , velocity changes would be only of this nature. Moreover, although the income velocity of total credit has been very stable in the United States for many years now, this has not always been the case. In fact, during the inter-war period, the Second World War and up to the early 1950s it was quite unstable. The evolution from instability to relative stability is, in itself, an interesting development which will be explained in more detail below.

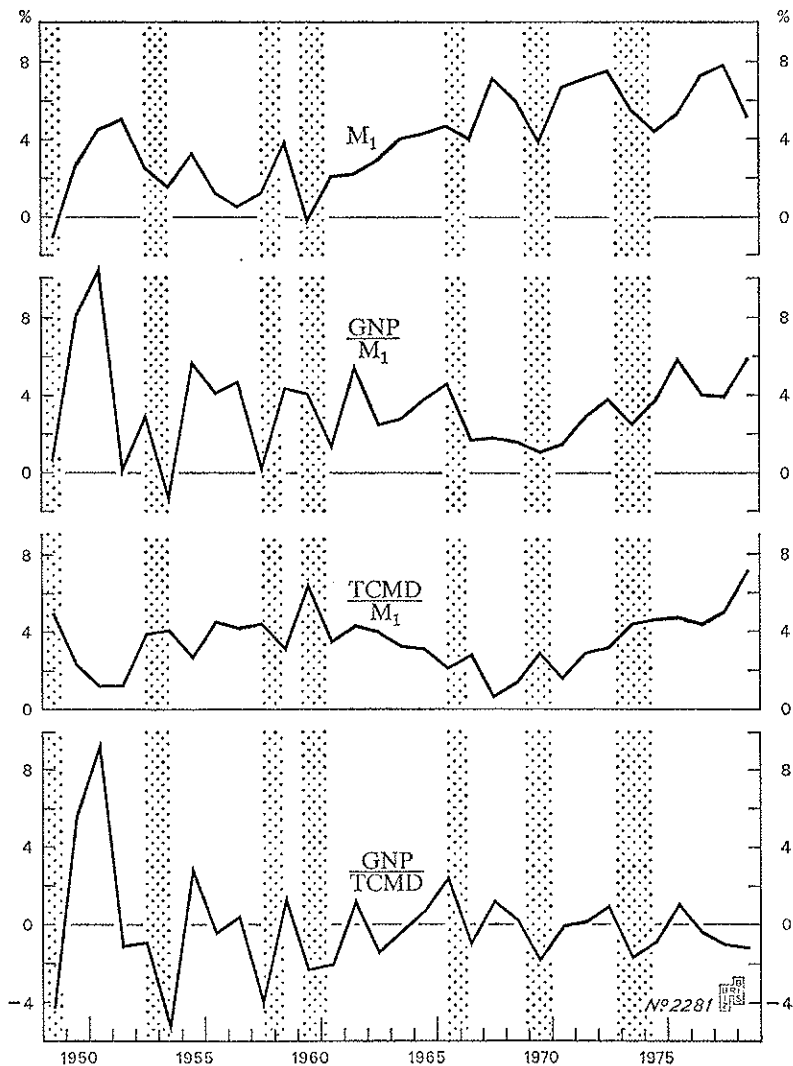
3. *Changes in velocity components: Some statistical comparisons*

In the graph on the following page, the upper two panels show, first, annual percentage changes in M_1 and, secondly, the corresponding percentage annual changes in the income velocity of M_1 (GNP/M_1).² The lower two panels comprise, first, the changes in the credit velocity of money ($TCMD/M_1$) and, secondly, the income velocity of total credit, which in terms of percentage changes add up to give the total change in velocity.

¹ D. H. Robertson defined hoarding as “... that process of turning money aside from active use which contracts the stream of money demand...” or as “the act of an economic agent within a given period to increase the proportion between his money stock and his money income”. He adds, “For some reason I have never been able to understand, this word makes some writers very angry, and they would like to banish it from the economic vocabulary.” See his *Money* (Pitman, London, 1948 edition), p. 212. Another student of velocity, Howard S. Ellis, once remarked: “The original connotation of hoards was undoubtedly money withdrawn from circulation, but some sort of false sophistication in monetary theory allowed this common-sense meaning to disappear.” See “Some fundamentals in the theory of velocity”, *Quarterly Journal of Economics*, Vol. LII (1938), p. 460.

² In this paper annual financial data are, unless otherwise indicated, based on averages of year-end data for the current and preceding years.

United States:
Changes in M_1 and its income velocity components



Note: Shaded areas are recession phases.

It will be observed that the first velocity term ($TCMD/M_1$) is strongly positive on a trend basis, in much the same way as the income velocity of M_1 itself, and, furthermore, that changes in the trend moved broadly in line with those in GNP/M_1 . On the other hand, the income velocity of total credit, though quite variable earlier in the period, became less volatile from about 1960 onwards. After a time it settled down to a period of relatively narrow fluctuation around a zero trend.

As time went on, changes in the income velocity of money became increasingly associated with changes in the credit velocity of money and less with the income velocity of total credit. This can be illustrated by means of simple regressions of each of these terms on percentage changes in the income velocity of money. On this basis, the \bar{R}^2 of the regression of $GNP/TCMD$ on the income velocity of money was 0.827 for the years 1949–68 but dropped to -0.041 for the years 1969–79. At the same time, the \bar{R}^2 of the regression of $TCMD/M_1$ on the income velocity of money increased from 0.002 in the first period to 0.619 in the second. Seen in historical perspective, these changes may reflect a growing emphasis in liquidity management by non-banks on liability adjustment as distinct from asset adjustment. Changes in income velocity (or in the demand for money) may thus have become associated with an increasingly exogenous behaviour in the demand for credit, reflected in greater variability in the credit velocity of money. On the other hand, the “non-credit” element of velocity ($GNP/TCMD$), which may better reflect underlying attitudes with respect to asset adjustment, has settled down to narrow fluctuations around a stable trend.

4. Interrelationships between changes in the money stock, total credit and income velocity

As indicated earlier, there are contrasting views about the factors underlying changes in the money stock and their behavioural significance. According to the monetarist view, the nominal money stock is basically supply-determined, reflecting the exogenous behaviour of

the monetary authorities. In an alternative view, changes in the money stock are better explained, over certain periods at least, as being the short-term “disequilibrium” counterpart of exogenous changes in the demand for credit. Whether one or the other of these views is the more correct would seem to depend on the particular phase of the business cycle.

In this context, is it possible, by means of a further breakdown of velocity components, to shed any light on these interrelationships? For this purpose it is useful to split the “credit velocity of money” ($TCMD/M_1$) into two elements, one being the ratio of total bank credit¹ to M_1 (TBC/M_1) and the other being the ratio of total credit-market debt to total commercial-bank credit ($TCMD/TBC$), both credit aggregates being defined as in the US flow-of-funds statistics.

On this basis the original identity shown earlier becomes:

$$\% \Delta \frac{GNP}{M_1} = \% \Delta \frac{TBC}{M_1} + \% \Delta \frac{TCMD}{TBC} + \% \Delta \frac{GNP}{TCMD}$$

As shown in the following table, a fairly systematic lag emerges between each of the velocity components and changes in M_1 for the period 1951–71, but it breaks down, except for the non-credit component $GNP/TCMD$, for the longer period 1951–78. In other words, the lags which were observable in the earlier period appear to have changed substantially in the 1970s.²

The lags, which have been identified in terms of simple regressions between changes in the rates of change of money and the velocity components, are different for each of the velocity measures over the period 1951–71. It is interesting to note that one velocity component – TBC/M_1 – actually leads the acceleration or deceleration of M_1 by one year. In the case of the non-credit component – $GNP/TCMD$ –

¹ Credit-market claims (both loans and investments) held by the commercial banks and the monetary authorities.

² It is appropriate to stress again that the above equation is not a behavioural equation in the usual sense, although it does serve to focus attention on several relevant behavioural relationships and on the rôle of financial intermediation. Moreover, whether viewed in terms of a monetarist or a Keynesian behavioural model, the systematic lags referred to above lend themselves to interpretation in terms of an “IS/LM” framework and may also give clues to the sources of economic disturbances.

United States:
Lags between money stock and velocity components.¹

Velocity component	Time period	Simple regressions ² of rates of change in velocity component on rates of change in M_1 at:		
		t-1	t	t+1
		\bar{R}^2		
$\frac{TBC}{M_1}$	1951-71	0.542	0.178	-0.051
	1951-78	0.106	0.093	-0.013
$\frac{TCMD}{TBC}$	1951-71	0.190	0.206	0.333
	1951-78	0.020	0.160	0.035
$\frac{GNP}{TCMD}$	1951-71	-0.012	0.178	-0.030
	1951-78	-0.020	0.150	-0.006

¹ The money and credit aggregates used are averages of year-end data for the current and preceding years. ² In terms of second differences. The time subscripts in the column headings refer to the velocity components.

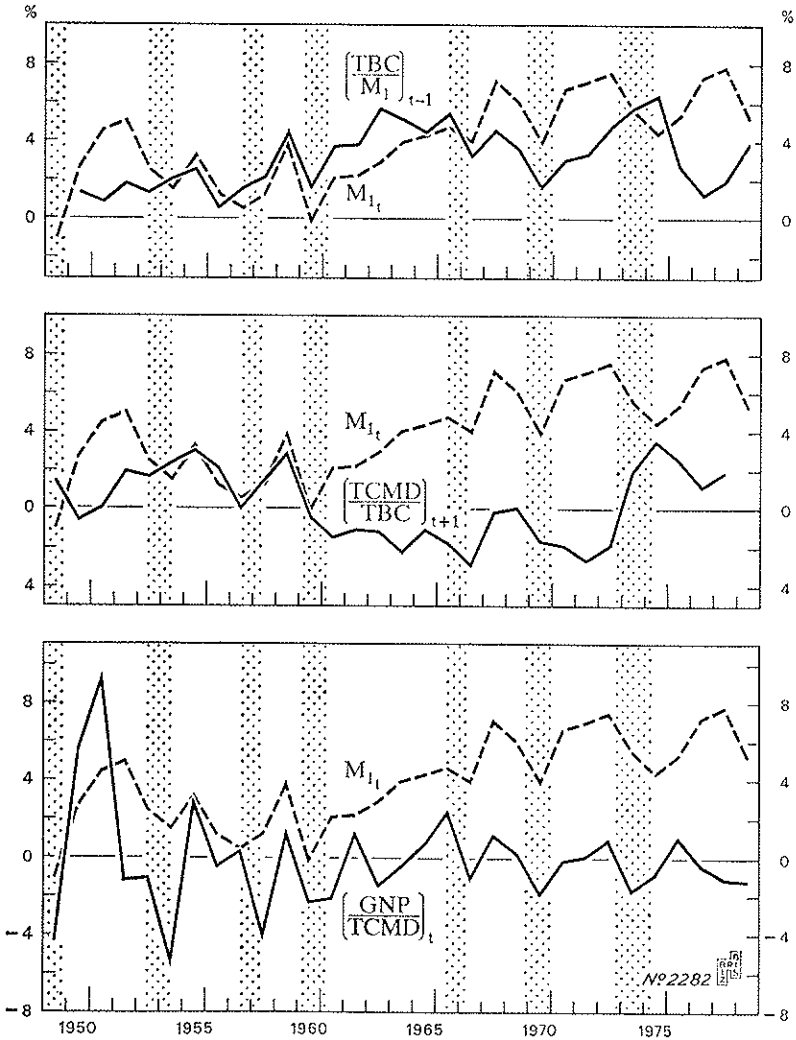
there is no lag, but rather coincident behaviour, while for TCMD/TBC the lag is one year behind any change in M_1 .

The closeness of the lag relationships up to 1971, and their significant alteration thereafter, may be seen in the graphs on page 16.

What interpretations can be put on the lags so identified for the years 1951-71? They should be seen, I would suggest, in the light of the *cyclical* pattern of monetary ease and restraint common to the institutional circumstances of the period. The graph on page 18 shows the rates of change of M_1 , income velocity and the three velocity components in relation to the shaded recession phases over the period in question. It is also revealing to examine them in terms of Sir John Hicks' brief account of the classical cycle as depicted by Thornton, J. S. Mill and later, as the monetary theory of the cycle, by Hawtrey.

“The boom starts by businessmen becoming more optimistic and ... keeping less money idle. So the velocity of circulation rises and prices rise. The rise in prices engenders expectations of further rises; this further

United States:
Lags between money stock and velocity components



Note: Shaded areas are recession phases.

increases 'optimism' and further increases the velocity of circulation. But businessmen do not have the money to do all they want to do; so they borrow from the banks, who share their optimism, and are therefore very ready to give them the credit which they require. Thus there is an increase in bank credit, which we would nowadays reckon to be an increase in the supply of money." *

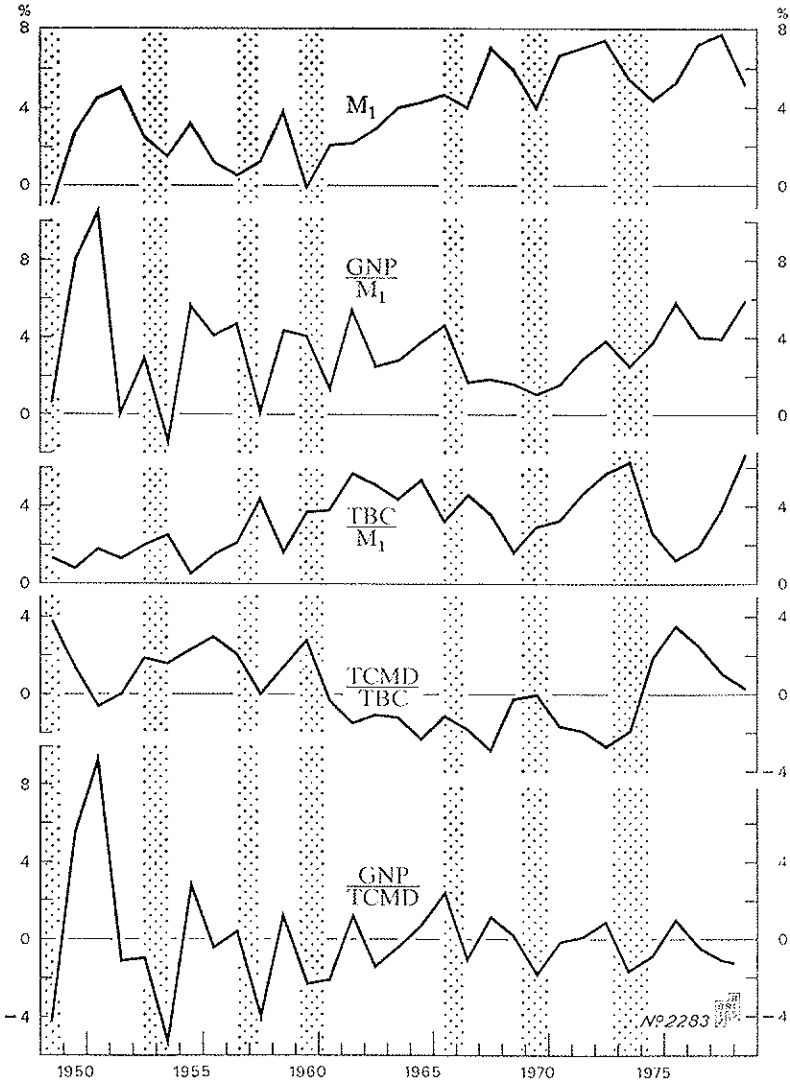
First, with regard to the leading component TBC/M_1 , it will be noted that the ratio accelerated significantly during each recession up to that of 1970-71. Compensatory budget deficit financing, reduced need for transactions balances and relatively high rates of growth in time and savings deposits help to explain this pattern during recessions.

Secondly, with respect to the recovery phase, one observes an acceleration of M_1 growth coincident with a speeding-up of the non-credit component of velocity $GNP/TCMD$. This pattern closely resembles the monetary response mechanism described by classical monetary theory. In other words, in this phase of the cycle the classical theory postulates a *positive*, demand-determined relationship between changes in the money stock (together with its counterpart changes in the private demand for credit) and changes in velocity. However, the kinds of velocity changes involved are mainly those which have been referred to as hoarding and dishoarding (i.e. decreases or increases in $GNP/TCMD$), unrelated to changes in relative credit-market flows. In this sense they would probably reflect changes in confidence and precautionary attitudes and would presumably nowadays be explained as simultaneous shifts in the "IS" and "LM" functions with largely neutral implications for interest rates. This phenomenon is not captured by conventional demand-for-money functions (see Section 5 below).

Thirdly, the ratio $TCMD/TBC$ usually tends to increase in the culminating phase of the cycle, in this case lagging behind a prior acceleration in the money supply (M_1). The behaviour of this ratio reflects the growth of non-bank credit in relation to that of the commercial banks, and the lag in question is consistent with experience. Thus, in

* Sir John Hicks, "Real and monetary factors in economic fluctuations", in *The 'new inflation' and monetary policy*, edited by Mario Monti (The Macmillan Press, 1976), p. 5.

United States:
Changes in M_1 and its income velocity components



Note: Shaded areas are recession phases.

the advanced phase of the cycle, with the money supply becoming more supply-determined and with bank credit becoming tighter, the demand for credit may be shifted more to non-bank credit channels.

Since the early 1970s the lags described above have substantially altered: in particular, TBC/M_1 no longer leads changes in M_1 , having first become coincident with them and then begun to lag behind, and $TCMD/TBC$ has changed from being positively correlated with changes in M_1 on a one-year lag basis to being negatively correlated with such changes.

The developments occurred during a period in which a number of institutional, technological and regulatory changes may have basically altered the interrelationships between money growth, credit expansion and income velocity. However, it was also a period in which monetary targeting became the operational focus of policy and in which the first oil crisis and ensuing deep recession had a strong impact on financial flows. Thus there was a change not only in monetary lags but in the way these may have been influenced by movements in the level and structure of interest rates. In the next section, therefore, it may be instructive to examine the behaviour of the velocity components against the background of interest rate variations over the period.

5. The money stock, interest rates and credit velocity

US financial developments in the 1970s have been turbulent and complex. In this section I make no pretence of explaining adequately the changes in monetary lags that appear to have occurred in this period. Rather, the aim is to call attention to what seem to be some of the relevant tendencies and considerations.

A first observation is that money-supply policy itself appears to have changed in a fundamental way from the early 1970s onwards, by which time the aggregates were already being targeted on a de facto basis. From 1970 to 1973, spanning the breakdown of Bretton Woods and the move to generalised floating, the banks' prime lending rate remained far below the yield on AAA industrial bonds (see page 21)

and M_1 grew at a rapid rate, as did TBC/M_1 , for that matter.¹ Indeed, in contrast with earlier periods, M_1 and TBC/M_1 continued to grow well after the prime rate had recorded a sizable increase, as between 1972 and 1973.² Similarly, a decline in the growth rate of M_1 and TBC/M_1 occurred only when the prime rate was above the yield on bonds. It would therefore appear that the wide fluctuations in short-term rates in relation to long-term ones were associated with an alteration in the behaviour of money and TBC/M_1 . In earlier periods those variables moved more closely in line with the peaks and troughs of short-term rates.

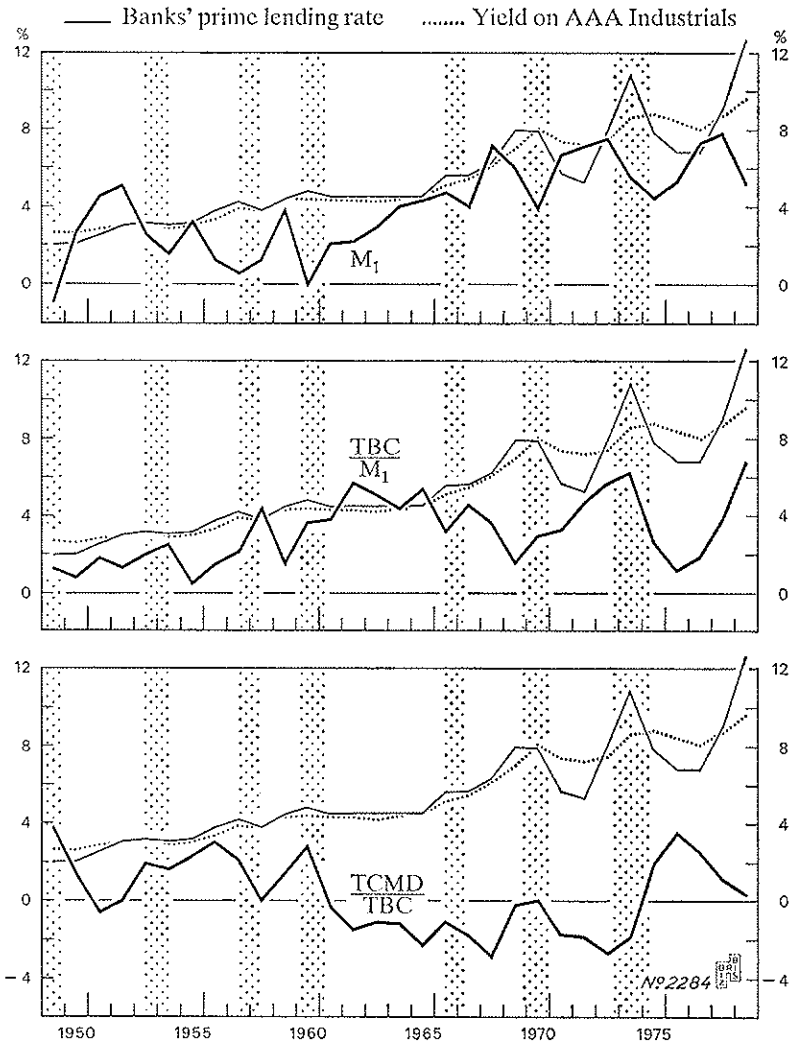
Secondly, one might have expected the ratio $TCMD/TBC$ to decline after 1974 as the prime rate fell below the long-term rate. Instead, it accelerated in 1975 and 1976, perhaps owing partly to the expectation of a decline in long-term interest rates in the aftermath of the oil crisis and deep recession.

If the ratio $TCMD/TBC$ remains constant, it means that non-bank credit is growing at the same rate as bank credit. If the ratio is changing, some substitution processes may be at work, in one direction or the other, between bank flows and those via the non-bank credit markets. In these processes one would expect interest rate differentials to come increasingly into play. Moreover, one need not expect a simple positive relationship between interest rates and shifting credit-market flows, since the expectation of capital gains may lead to shifts to longer-term interest-bearing assets as interest rates are falling.

¹ This result should be attributed not to aggregates targeting per se but rather to the continuing practice of keeping money-market rates stable within a narrow range over the short run, presumably a reflection of political resistance to higher interest rates. Cf. Henry C. Wallich and Peter M. Keir, "The role of operating guides in US monetary policy: A historical review", *Federal Reserve Bulletin*, Vol. 65, No. 9 (September 1979), p. 685. An added complication was the fact that during the 1970-72 recession the rates of actual and expected inflation were unusually high compared with earlier recessions, thus making it considerably more difficult to achieve the same comparative level of real interest rates.

² One explanation could be that the wide fluctuations of short-term interest rates in relation to long-term ones reflect, inter alia, expectations of whether the prime rate is likely to rise or fall. Thus, should observed excessive growth of M_1 lead to expectations that the prime rate would be pushed up by a tightening of policy, the demand for bank credit might accelerate as long as the prime rate seemed relatively low.

United States:
The money stock, interest rates and credit velocity



Note: Shaded areas are recession phases.

As is well known, the Federal Reserve System experienced considerable difficulties with its demand-for-money estimates during much of this period. From late 1974 to early 1977 the earlier functional relationships substantially over-predicted money demand (and may even have contributed to the pace at which interest rates were brought down over this period as a result of the policy reactions they engendered). Apparently this mystery has never been satisfactorily resolved. Could the answer run somewhat along the following lines? The 1973 boom, the oil shock and the initial 1974 policy responses produced a traumatic precautionary reaction in terms of saving and investment propensities, i.e. a marked leftwards shift of the IS curve. In itself, this reaction did not necessarily imply an increase in liquidity preference in the narrow sense; it could have reflected an effort to improve the overall financial asset/debt positions of balance sheets at the expense of spending on real goods. As far as liquidity preference is concerned, financial investors, who in this context evidently came to expect a decline in long-term bond yields, shifted out of cash and short-term assets into the capital market, as is reflected in the sharp rise in the TCMD/TBC ratio above the trend line after 1974. Borrowers, particularly the corporate sector, entered a phase of short-term debt consolidation after having greatly increased their recourse to external funds in the years 1972–73. They made large repayments of short-term debt, which extended to a cutback in the bank loan counterpart of M_1 and hence involved a destruction of existing cash balances.

The third observation to be made is that institutional and technological changes, together with the development of new credit-market instruments, have no doubt contributed to an alteration in monetary lags over recent years. As indicated earlier, the credit velocity of money (TCMD/ M_1) has been defined as consisting of two components. The first of these, TBC/ M_1 , may fluctuate widely, partly because of changes in the relative importance of time and savings deposits at commercial banks, but partly also because of variations in the recourse to funding by way of “managed liabilities”. Since the mid-1960s, but particularly since the removal of Regulation Q on large certificates of deposit in the early 1970s, managed liabilities have become an important source

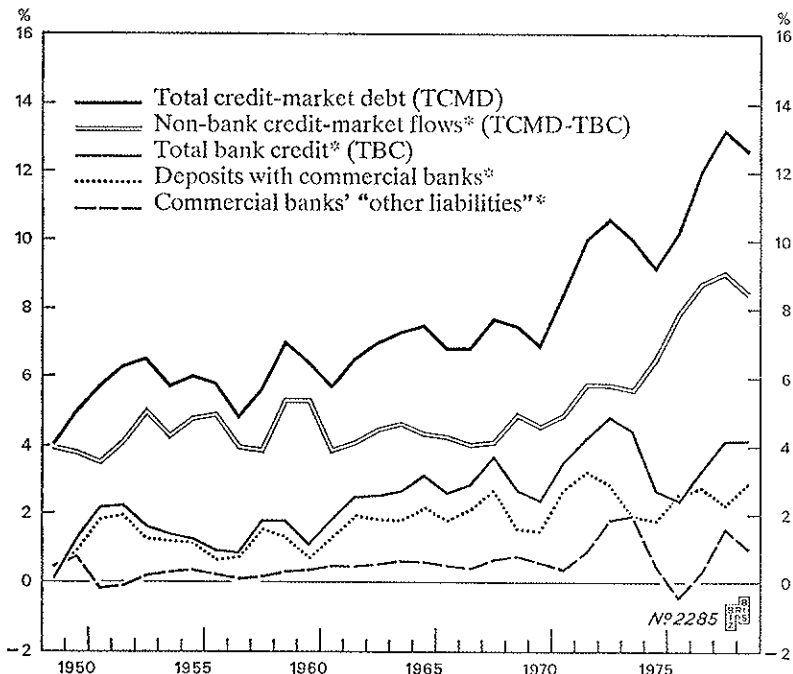
of marginal funding for the commercial banks. In addition to large certificates of deposit, managed liabilities consist of Federal funds purchased from non-member banks, security RPs (repurchase agreements) and funding via the Euro-currency market.*

Financial innovations have also significantly influenced the behaviour of the ratio TCMD/TBC over recent years. As far as new instruments are concerned, the development of the commercial-paper market and the rapid increase in money-market mutual funds are notable examples. In the institutional/technological field, the use of savings deposits for transactional purposes has proliferated in the guise of NOW accounts, telephone transfers and automatic transfer facilities. In the mortgage markets, lending institutions have benefited from the introduction of new short-term certificates bearing interest at rates linked to those on Treasury bills, and they have had increasing recourse to the issue of variable interest mortgages. Federal mortgage lending institutions have also acted aggressively in the provision of funds so as to cushion the housing market from financial-market tightness.

It is widely accepted that one of the principal reasons for domestic disintermediation (in the sense of a relative growth in financial flows outside the banks, i.e. of TCMD/TBC) is the high cost of US reserve requirements. However, as is shown on page 21, this ratio tended to decline during most of the 1960s and early 1970s, and the increases after 1974 can be attributed partly to the improved ability of the mortgage market to attract funds. The main impact of reserve requirements seems to have been in encouraging member banks to rely more heavily on "managed liabilities" exempt from or less burdened by such requirements. These tendencies began with the so-called "banking revolution of the 1960s". Other effects have been the exodus of banks from the Federal Reserve System and the enhanced competitiveness of banks in their operations via the Euro-currency markets. In these ways banks have been able to sustain their market shares vis-à-vis non-bank credit markets (see graph on page 24).

* There were particularly sharp increases in TBC/M_1 in the years 1972-73 and again in 1977-79, in both cases after monetary restraint had caused the growth of M_1 to slow down.

United States:
Contributions of bank and non-bank credit flows to the
growth rates of total US credit-market debt



* Percentage-point "contributions" = absolute annual changes divided by total credit-market debt outstanding at end of preceding year.

Over the past year or so measures have been taken to curb the growth of the banks' "managed liabilities". First, in January 1979 a supplementary reserve requirement of 2 per cent. (in addition to the existing requirement ranging from 1 to 6 per cent. according to maturity) was imposed on all time deposits of \$100,000 or more with retroactive effect from 2nd November 1978. The objective was to moderate the rapid expansion of bank credit while at the same time encouraging banks to borrow abroad so as to lend indirect support

to the dollar. In early October 1979 a second supplementary requirement was announced with effect from 26th September. It consisted of a requirement of 8 per cent. on the *growth* of all "managed liabilities" above a base amount, including large time deposits of less than one year, Euro-dollar borrowings, repurchase agreements against US Government and Federal agency securities and Federal-funds borrowings from a non-member institution. Thus, as far as large time deposits were concerned, this added burden came on top of an already existing requirement of up to as much as 8 per cent. Hence there still remained a marginal incentive in favour of other types of "managed liabilities" (including Euro-dollar borrowing), while the incentive for member banks to leave the Federal Reserve System was strengthened owing to the high cost of reserve requirements. It was hoped, however, that the measures would prove temporary.

Viewed broadly, it should be noted that the cutting edge of US monetary policy has been evolving since the 1960s towards one based largely on "price" effects, via interest rates, and away from reliance on disintermediation and credit-rationing effects. In the main this has been a deliberate objective of policy, based on equity considerations aimed at spreading the impact of monetary restraint more evenly.* While the changes in question have benefited the housing market in

* Recently, following a further serious intensification of inflationary forces and expectations, the US monetary authorities abandoned for the time being their efforts to control money and credit by interest rates alone. On 14th March 1980, as part of a more general government stabilisation package, the Federal Reserve Board announced a voluntary special credit restraint programme applying to all domestic commercial banks, business credit extended by finance companies and credit to US residents by the US agencies and branches of foreign banks. It was laid down that the growth of bank loans (plus investments) should not exceed the range of 6 to 9 per cent. The commercial-paper market, closely linked to bank credit lines, was to be monitored.

In addition, the marginal reserve requirement on the managed liabilities of large banks was raised from 8 to 10 per cent., and special deposit requirements were established as follows: 15 per cent. for increases in certain types of consumer credit, 10 per cent. for increases in the managed liabilities of large non-member banks and 15 per cent. for increases in the total assets of the money-market mutual funds.

Although the discount rate was kept at 13 per cent., a special surcharge of 3 per cent. was to be applied to discount borrowings by large banks when above a certain frequency.

particular, they have also affected competition among financial institutions and encouraged the practice of accepting “managed liabilities”. The upshot has been that, in order to ensure a given degree of monetary restraint, interest rates would now have to be higher than in the conditions existing previously. Expressed in another way, the credit velocity of money is now higher than it used to be.

6. *The income velocity of credit and the Euro-dollar markets*

As shown earlier, the annual percentage changes in GNP/TCMD fluctuated around a virtually zero trend line during the entire period. At the same time, the variance of this term declined from 9.85 in the period 1949–71 to 1.01 in the years 1972–78.

In view of the stable relationship between total credit and the gross national product, Henry Kaufman has suggested that total credit, or rather a narrower but more quickly available “total credit proxy”, would be superior to the monetary aggregates as an intermediate monetary target.¹ Richard Davis has rejected this view, stating that, when measured in terms of first differences, this relationship demonstrates no marked superiority over a money aggregate (M_1 or M_2), is less readily available and, seen from the standpoint of the Federal Reserve System, is inferior in terms of controllability.² However, the debate on this issue will no doubt continue. On the basis of annual data, it appears that the stability of the GNP/TCMD relationship has increased over time and became superior to that of GNP/ M_1 in the 1970s.³ Moreover, on the issue of controllability, it would pre-

¹ Henry Kaufman, Statement before the Committee on the Budget of the US House of Representatives, Washington, D.C., 6th February 1978.

² Richard G. Davis, “Broad credit measures as targets for monetary policy”, Federal Reserve Bank of New York *Quarterly Review*, summer 1979, pp. 13–22.

³ Davis’ measure of total credit, unlike that used in this paper, excludes funds raised by the government and foreign sectors. Even so, his regressions of the growth rate of gross national product on total credit, using current quarterly data, rise from an \bar{r}^2 of 0.23 for the years 1961 to 1977 to one of 0.39 for the shorter, more recent period from the third quarter of 1969 to the fourth quarter of 1977. In the same periods the \bar{r}^2 with respect to M_1 were 0.30 and 0.23 respectively.

sumably be possible to adjust money-stock policy, even if with a short lag, to take better account of the flows occurring in the credit markets as a whole. There is no obvious reason why the monetary authorities could not give some weight to TCMD as an exogenous variable for control purposes.

Viewed from another angle, the term GNP/TCMD is, by definition, that component of income velocity which is unrelated to the composition of recorded credit-market debt. Its fluctuations may, in fact, be viewed as representing direct substitutions between cash balances and goods unconnected with shifts in the composition of financial assets. To this extent one may describe it as reflecting a process of hoarding or dishoarding in the classical sense. Though it has generally fluctuated in a pro-cyclical manner, and hence has coincidentally moved in the same direction as interest rates, its narrow range of fluctuation around a zero trend suggests that its movements are primarily associated with phases of the business cycle and not with interest rates per se. As pointed out earlier, its movements may thus generally be interpreted as reflecting simultaneous shifts in the "IS" and "LM" functions in response, say, to changes in business and consumer confidence and thus to changes, in the Keynesian sense, in the precautionary (or contingency) motive for holding cash balances.* In this sense it may reflect shifts in expectations of the kind that have posed such difficulties for builders of econometric models.

In this paper one purpose in calling attention to the income velocity of total credit is to relate it to Governor Wallich's hypothesis concerning the Euro-dollar market. According to this hypothesis the rapid growth of Euro-dollars in the hands of non-banks has to some extent

(continued from previous page)

Using changes in average annual data and the broader concept of total credit (TCMD), I obtained an \bar{R}^2 of 0.635 for the period 1955 to 1979 and one of 0.749 for the short, later period 1969 to 1979. The corresponding \bar{R}^2 for gross national product and M_1 were 0.636 and 0.372 respectively.

As far as asset adjustment is concerned, these results would suggest that the demand for total financial assets has become more stable since the 1960s.

* For example, a decline in the demand for money (a shift in the LM curve to the right) would be accompanied by an increased propensity to spend (a shift in the IS curve to the right), with counterbalancing interest rate implications.

been a substitute for domestic dollars. These dollar claims are said to be associated with domestic spending just as are the domestic aggregates, and the fact that they are not counted in these aggregates means that the income velocity of money is higher than it would otherwise be.

If Governor Wallich's hypothesis were valid, one would expect to see an increase in the trend of the income velocity of total credit, especially during the 1970s when the Euro-dollar market was growing rapidly. This is the velocity component which would reflect elements not captured in the measured credit flows accounted for in the credit velocity of money. This is not to deny that there are strong credit links between the US financial markets and the Euro-dollar market. Indeed, there are, and more will be said about this in the next section. However, as Governor Wallich's hypothesis is formulated, and assuming the growth of the Euro-dollar market to be largely independent of US credit-market conditions, there is nothing in the behaviour of the income velocity of total credit that would seem to reflect an unrecorded influence on domestic spending coming from the stock of dollar claims held by non-banks in the Euro-currency market. Changes in this velocity component have been quite stable since the early 1960s, following narrowly around a practically zero trend. Over the ten-year period 1962-71 the cumulative change in this component of velocity was on balance about 1 per cent., i.e. scarcely 0.1 per cent. on an annual average basis. Over the next eight years, this component contributed to an actual decline in M_1 velocity of about 0.3 per cent. a year. It would not appear, therefore, that the Euro-dollar market has contributed in any direct way to the increases in M_1 velocity that have occurred since 1972.

It might be objected that, by concentrating on GNP/TCMD, one fails to deal adequately with the US case. Would not an expansion in US non-bank residents' holdings of Euro-dollars be reflected in a rise in the component TBC/M_1 , insofar as it represented an economising on US M_1 holdings? It could, of course, contribute to a lower M_1 figure, although the Euro-dollar holdings that are strictly comparable with M_1 are small. Moreover, insofar as these deposits are loaned back to US banks, which then increase their loans to the US non-bank

public, TBC/M_1 and the income velocity of money would rise. From a conceptual point of view, however, inflows of funds from the Euro-currency market to US domestic banks are presumably not the major focus of US concern, since they are recorded, monitored and amenable to policy action. Thus, any increase in non-bank Euro-dollar claims which have *unrecorded* influences on spending in the United States would presumably be captured in full by the term $GNP/TCMD$.* The fact that they seem to have had no such effects suggests that they are held for reasons of liquidity, investment or financing outside the United States or have neutral aggregate demand effects on the US economy. It cannot be denied, however, that such balances *could* be used for net spending in the United States.

Another, more serious, objection is that the relative stability of $GNP/TCMD$ may simply reflect the working-out of two counterbalancing external tendencies. That is to say, the growth of non-bank borrowing (domestic plus foreign) in the US credit markets to support spending abroad may have approximately offset the Wallich effect deriving from non-bank deposits in or borrowing from the Euro-dollar market to support spending in the United States. This objection has considerable plausibility; given the reserve rôle of the dollar, one consequence of such borrowing in US markets might be to increase M_1 while reducing the income velocity of money, at the same time as the Wallich effect would be working to increase velocity. In this event, however, one would have to conclude that the US credit markets have been approximately as expansive as the Euro-dollar market itself – a conclusion that is consistent with the findings of the next section and touches on the fundamental question of the extent to which the two markets can be considered to grow independently of each other.

* As already indicated (see footnote on page 9) no data on direct borrowing by US non-banks from the Euro-markets have as yet been incorporated into the US flow-of-funds series $TCMD$. Other evidence and opinions suggest that the amount of such borrowing has not been very significant, though it could become more important in the future. It consists mainly of funds taken up in the Euro-markets by the foreign subsidiaries of US non-bank firms and on-lent to their parent companies.

7. US credit markets and the Euro-dollar market

In terms of the transmission process, Governor Wallich's hypothesis seems to imply a direct link between stocks of US dollar claims in the Euro-markets and spending in the United States. However, given that the non-credit element of income velocity (GNP/TCMD) declined slightly during most of the 1970s on a trend basis, the validity of the hypothesis remains open to question. On the surface it would appear that, insofar as the Euro-dollar market itself is not simply financing a rapidly growing volume of counterbalancing flows of trade and payments, the accumulation of dollars by non-banks has been motivated by investment or liquidity considerations rather than by spending in the United States. On the other hand, it is possible that the Wallich effect has been concealed by the countervailing effects of over-expansive US credit-market conditions, in which case the burden of proof would lie with US monetary policy. As matters stand, therefore, the US case for including any *sizable* portion of Euro-claims in the domestic money-supply aggregates, and for controlling the broader aggregate, seems a questionable one.* If the relationships between the Euro-dollar market and US monetary conditions are to be illuminated, one must examine the links in both directions.

In putting the matter this way, the question arises, of course, of the extent to which the growth of the Euro-dollar market is a phenomenon largely independent of developments in the United States. The US authorities have frequently insisted, with justification, that the link between the US current-account position and the growth of the Euro-dollar market is not a very close one. This largely reflects the widespread international use of the dollar as a vehicle currency and as a medium for settling payments imbalances. Hence changes in the growth of world trade and payments, and the degree of pay-

* This issue has now been clarified by the Federal Reserve Board's announcement of new definitions for the monetary aggregates. The new M_2 includes overnight Euro-dollars held by US non-bank residents at Caribbean branches of member banks (\$3.2 billion as of November 1979). Other overnight Euro-dollars and longer-term Euro-dollars of US non-bank residents (\$34.5 billion as of November 1979) are included in the newly adopted broad measure of liquid assets, "L".

ments disequilibrium outside the United States, can independently affect the expansion of the Euro-dollar market.

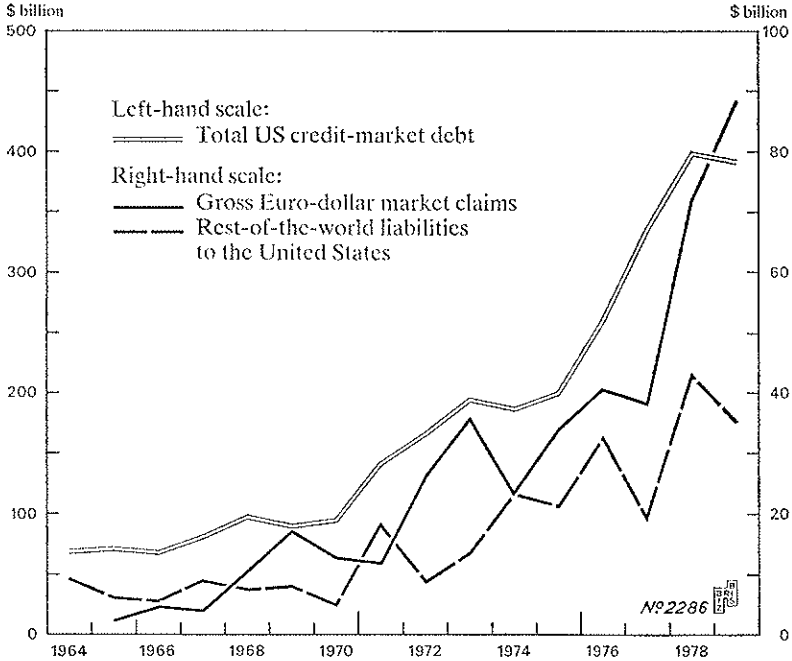
At the same time, as is well known, domestic regulatory arrangements impart a structural bias in favour of the growth of the Euro-currency markets. In the case of the United States, the historical background is quite familiar. In trend terms, Euro-dollar growth has been attributable in large measure to the competitive disadvantages imposed on domestic banks by Regulation Q, reserve requirements, FDIC insurance charges and the prohibition of paying interest on demand deposits. In countries where monetary control depends partly on such regulatory features, as distinct from general market techniques for influencing interest rates, the application of monetary restraint may intensify the tendency for borrowers and lenders to shift business to the Euro-currency market.

In the context of this paper, however, the principal question is whether the relative tightness or ease of overall US credit-market conditions, as evidenced by the banks' prime lending rate and the rate of expansion of total credit-market debt, directly influence the growth of the Euro-dollar market. The graph on page 32, which records the annual growth of total US credit-market debt and total Euro-dollar market claims *in absolute dollar terms*, suggests that there is a fairly close link. It will be seen that the growth in the gross size of the Euro-dollar market appears to have been positively correlated with that of total US credit-market debt.* In the broad sense, disregarding market imperfections and differences in market participants, the domestic and international dollar credit markets might therefore be regarded virtually as a single market, a view that is also confirmed by the very close link between Euro-dollar and US domestic money-market interest rates.

Expressed in marginal *absolute* terms, the acceleration and deceleration of the growth of the Euro-dollar market in the 1970s thus generally

* Of course, starting in the 1960s from a comparatively low base, the Euro-dollar market has in percentage terms grown appreciably faster than the US credit markets. Although in this situation the statistical comparisons, whether in absolute or percentage terms, can be misleading, the graph conveys a fair impression in directional terms of the comparative growth paths of the two markets.

The growth of US total credit-market debt and
the Euro-dollar market
Annual changes based on end-of-year data



paralleled fairly closely that of the US credit markets.* One may object, of course, that both these variables responded to much the same exogenous influences over most of this period, in particular after the oil crisis of 1973/74. To some extent, this is no doubt true. But,

* In the US view, the proportion of Euro-dollars outstanding that is relevant to spending in the United States may be held by non-bank non-residents as well as US residents. Taken alone, however, the identified dollar deposits held outside the United States by US residents are relatively small. According to figures supplied to me by Helmut Mayer, total holdings at the end of 1978 amounted to \$21.6 billion, but by September 1979 the overall total had risen to \$34.5 billion. Taking the larger total, and disregarding questions of the degree of "money-ness", its proportion to total credit-market debt/assets is no more than about 1 per cent. and to M_1 about 8 per cent. On the basis of rather sketchy maturity data it appears

to that extent, the growth of the Euro-dollar market should seem no more a mystery than the growth of the US credit markets.

The stress laid earlier in this paper on the exogeneity of credit demand on the domestic market also carries over to the Euro-dollar market. A number of analysts view the Euro-market as being essentially demand-determined, in the sense that the *stock* of Euro-dollar claims has on the whole tended to adapt itself to the demand for dollar credit directed to the Euro-banks. For this reason, and given the closeness of interest rates in the two markets, it makes sense to say that both markets respond in much the same way to changes in US credit-market conditions as a whole, apart from the disintermediation effects caused by domestic regulatory biases.

On the credit side, as on the assets side, the two markets are close substitutes for each other and related via arbitraging effects. What have been the main sources of these substitutable credit demands? One of these is reflected in the annual changes in rest-of-the-world liabilities to the United States, as shown in the graph. Interestingly, the rate of change of these liabilities tended, up to 1976 at least, to vary inversely with that of the Euro-dollar market itself, suggesting relative shifts in demand from one credit market to the other. Probably more important, but virtually impossible to trace, are changes in credit demand on the part of US business firms and banks, domiciled both at home and abroad. Moreover, shifts in demand may occur not merely between different segments of the dollar market but also in and out of other countries and currencies.

(continued from previous page)

that roughly half of non-banks' Euro-currency deposits have a maturity of less than one month.

Of the September 1979 total, more than half reflected US domestic bank transactions booked through the Caribbean and not strictly comparable with conventional Euro-currency business. The figures do not include US residents' deposits at affiliates of non-US banks in the Caribbean and elsewhere outside the BIS reporting network, but these are probably quite small.

See also the US Federal Trade Commission's *Quarterly Financial Report* (Second quarter, 1979), which puts total deposits held by US non-financial corporations outside the United States at \$8.3 billion. These balances rose sharply in late 1978 and early 1979 following the imposition of the supplementary reserve requirement of 2 per cent. on large time deposits.

As a factor influencing exchange rates, comparative credit-market conditions in different domestic markets are of interest from mainly two points of view. First, in some countries domestic lending rates, particularly the banks' prime lending rates, appear to adjust much less quickly to Euro-currency market conditions than domestic deposit rates, thus maintaining arbitrage possibilities on the borrowing side for extended periods. Secondly, when currency speculation sets in, the borrowing of potentially weak currencies may be the quickest, most effective way to establish the desired speculative and hedging positions. For example, in 1971, in late 1972 and in 1973 and again in 1977-78 total credit-market debt shot up at times coincident with external pressure on the dollar – and without provoking any significant defensive reactions in terms of higher US interest rates.

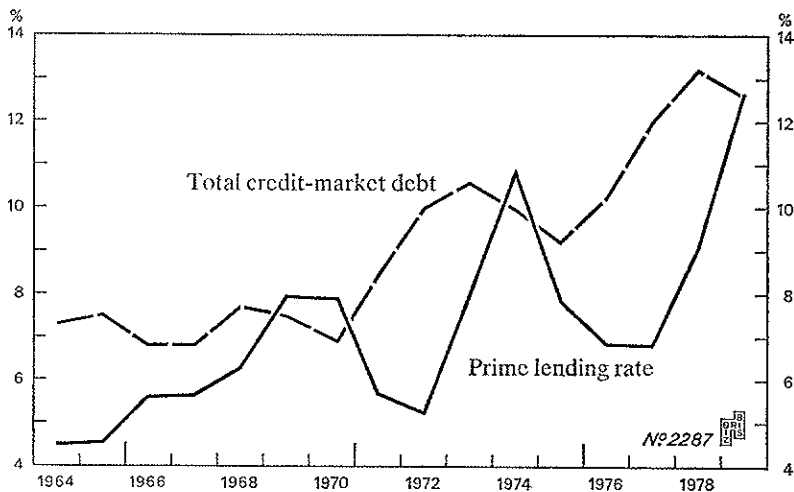
If it is true that the demand for Euro-dollar credit is closely dependent upon US domestic credit-market conditions, it follows that the US monetary authorities can also influence the growth of the Euro-dollar market by affecting the demand for domestic credit. Governor Wallich has himself underlined the importance of this link:

“Nor are the Euro-markets ‘out of control’, as has sometimes been alleged. They are controlled, in a monetary sense, by the interest rate prevailing in the Euro-market for each currency, the level of which may encourage or discourage borrowing. That interest rate, in turn, is tied to the interest rate in the home country, through arbitrage, provided that there is freedom of capital movements between the Euro-market and the home market.” *

How responsive is the growth of total US credit-market claims to changing monetary conditions? The following graph, which relates the percentage annual growth in total credit-market debt to variations in the banks' prime lending rate, suggests that monetary restraint may have a substantial effect on total credit – and hence, indirectly, on the growth of the Euro-dollar market.

* Lecture given at a meeting sponsored by the Landeszentralbank in Berlin, 18th June 1979.

United States: The prime lending rate and the annual growth rate of total credit-market debt



However, according to Governor Wallich, the application of monetary restraint would work itself out in an undesirably discriminatory way. Some domestic borrowers would experience the full impact of monetary restraint while others, generally the large international firms and banks, could shift their borrowing to the Euro-dollar market. This is a long-familiar concern even on the US domestic scene, since some borrowers have been better able than others to cushion themselves against credit tightness. In this context, however, one must remember that Euro-dollar interest rates tend to adjust very closely in line with domestic rates. From the credit-market standpoint, and disregarding any growth trend differentials or disintermediation effects stemming from domestic regulatory biases, borrowing conditions in the Euro-market follow closely those on the US domestic market. Hence, just as in the US domestic market, credit restraint under highly efficient market conditions can normally be viewed as a matter of the level and structure of interest rates rather than of credit-rationing effects and other market imperfections.

8. The United States as international lender of last resort

The discussions among the central-bank representatives meeting in Basle have done much to clarify certain aspects of the functions implied in acting as "international lender of last resort". As far as prudential responsibilities are concerned, the consensus with regard to supervisory functions is that

"... parents should have ultimate responsibility for subsidiaries, and that central banks should be responsible for supervising the lending of banks of their own nationality, wherever the lending is conducted. We are currently developing ways in which this principle can be extended, for the purposes of prudential supervision, by means of consolidated accounts for each bank on a worldwide basis."¹

As to responsibility for actual bailing-out operations, the central banks meeting in Basle have as a matter of policy remained deliberately vague. What they have said on this subject was contained in the statement issued in early September 1974 following the Herstatt revelations:

"They recognised that it would not be practical to lay down in advance detailed rules and procedures for the provision of temporary liquidity. But they were satisfied that means are available for that purpose and will be used if and when necessary."²

However, the present discussion is concerned not with individual central-bank responsibilities in a liquidity crisis but with the lender-of-last-resort function as discharged in terms of a market prerequisite, i.e. the maintenance of a large, open market in which liquidity is always available at a price. Indeed, many monetarists consider this condition both necessary and sufficient to satisfy the need for lender-of-last-resort facilities, though most observers would also see a rôle under certain circumstances for active central-bank participation. At any rate, it is well known that the growth of the Euro-currency markets has been based on the use of the US dollar as an ultimate funding

¹ Governor Gordon Richardson of the Bank of England, speech given at the Annual Banquet of the Overseas Bankers' Club, 5th February 1979.

² Issued by the Bank for International Settlements, 10th September 1974.

currency. From the market standpoint, therefore, the availability of credit from the US financial markets serves an important lender-of-last-resort function, whatever the particular rôle that central banks might choose to play.

A proper assessment of the lender-of-last-resort function also requires that we take account of the implications of chronic inflation. Failure to do so would mean running the risk of completely misreading the nature of financial crisis under present-day conditions. Historically, crises have occurred in the context of cyclical excesses followed by financial panic, leading to the need for central-bank intervention to provide large-scale liquidity support at a penalty rate. However, under conditions of chronic inflation and periodic exchange rate depreciation, validated by a continuing process of monetary accommodation, the nature of the lender-of-last-resort function undergoes a kind of metamorphosis. It becomes more a matter of the "here and now" – implying a need to invoke a "quasi-penalty rate" so as to avoid injecting excessive liquidity into the system and thereby prolonging and possibly intensifying inflation and exchange-market unrest.*

While this line of argument may be over-simplified and debatable, it does serve to make a point with respect to US monetary policy in recent years. Viewed in these terms, and given the pre-October 1979 operational techniques used by the Federal Open Market Committee, the relevant penalty rate became in effect the top of the narrow range fixed from month to month for the Federal funds rate. Once this range was set, the financial system, including the Euro-dollar market, was automatically provided with all dollars currently on demand. As is well known, the rate was not adjusted sufficiently to achieve existing monetary targets, even assuming the latter to have been correctly chosen. The Volcker measures of 6th October 1979, which involved a shift in operating techniques from money-market to bank reserve management, may well mark a new departure in which the

* In the context of its new voluntary credit restraint programme of 14th March 1980, the Federal Reserve Board introduced a surcharge of 3 per cent. on large banks' discount borrowing so as to discourage frequent use of the discount window and to encourage banks to adjust their loans and investments more promptly to changing market conditions.

rôle of interest rates, and of the discount window as well, will be more in keeping with both domestic and international needs. This was further confirmed by the far-reaching voluntary credit restraint and other measures announced by the Federal Reserve Board in March 1980. These measures, though partly of a short-term emergency nature, would seem to reflect some shift of policy emphasis from the monetary aggregates to the behaviour of credit markets as a whole.

9. Euro-currency market growth: Some general observations

A number of different proposals whereby the central banks might bring the Euro-currency markets under better control are currently being discussed. In this context one major problem concerns the ways in which monetary regulatory devices, particularly reserve requirements, have encouraged a continuing structural shift in favour of the Euro-currency markets. While this paper does not purport to deal with these proposals as such, it concludes that US monetary policy has a major rôle to play in influencing the rate of growth of the Euro-dollar market and indirectly other segments of the market as well. Since in absolute terms the growth of the Euro-dollar market has been shown to parallel fairly closely that of the US credit markets, there is a strong presumption that the former has been fairly closely dependent on the latter. At the same time, there is supporting evidence to show that both the domestic and external demand for dollar credits are quite sensitive to US interest rates. Moreover, with the possible exception of late 1971 and early 1973, when major dollar devaluations occurred, it would not appear that there have been any extended periods when domestic and external interest rate considerations would have been strongly divergent. The change in US operating techniques announced in the monetary package of 6th October 1979, together with the voluntary credit restraint programme and other measures introduced in March 1980, have helped the authorities to get a better grip on both domestic and external credit markets.

However, it does not follow that the need to restrain the growth of the Euro-currency market may somehow be taken for granted, or that such a need, if it arises, implies that principal reliance should be placed on US monetary action. This may or may not be the case, depending on the circumstances. The factors governing the growth of the Euro-markets are highly complex and changeable, and the question of how they can most effectively be influenced has to be answered in the light of the specific situation. At the present time, for example, OPEC oil surpluses are expected to increase substantially, and the Euro-banks will again be called upon to help recycle surplus earnings to oil-consuming countries.

Even on the assumption of an appropriately tight US monetary policy, the Euro-currency market may thus be expected to grow independently at a comparatively fast and variable rate. Therefore, given that the sheer speed of its growth has been a matter of concern, it is important to come to a better understanding of the nature and magnitude of the factors underlying it. In this context it would perhaps be helpful if attention were focused less on the size of the market as such than on its relation to developments in the real world economy.

It is possible, of course, for the growth of international trade and payments to be financed from domestic credit-market sources. It is equally plausible, however, that especially close links have developed between the Euro-markets and international financing requirements. World imports, for example, rose in absolute terms from just under \$300 billion in 1970 to \$1,230 billion in 1978, while the Euro-currency market increased on a net basis from about \$65 billion to some \$540 billion. In absolute terms, therefore, the growth of the Euro-currency market was not glaringly excessive.

Viewed from a somewhat different angle, one may also relate the relatively rapid growth of the Euro-markets to the increasing degree of interdependence of national economies. In this respect external sectors have increased substantially in size in relation to the gross national product. From the financing standpoint, one may view the Euro-markets as performing an essentially "wholesale" function, engaged in a two-way financing of trade and payments. To this extent

these markets may grow in relative importance without necessarily altering to any significant degree the relation between domestic money and credit aggregates and the gross national product. The table below gives an indication, though in current-account terms only, of the increased relative size of the external sector in the Group of Ten economies since the return to convertibility in 1958.

Exports plus imports of goods and services as a proportion of gross national product.

Country	1958	1978
	ratio	
Belgium . . . . .	.612	.937
Canada . . . . .	.364	.515
France . . . . .	.258	.392
Germany . . . . .	.417	.514
Italy . . . . .	.243	.484
Japan . . . . .	.214	.216
Netherlands . . . . .	.923	.950
Sweden . . . . .	.449	.570
Switzerland . . . . .	.546	.655
United Kingdom . . . . .	.401	.579
United States . . . . .	.091	.180

Another important factor is that the market's accelerated growth from 1973 onwards appears to have been closely related to a sharp widening in the aggregated current-account imbalances for the world as a whole. This largely reflects the emergence of the OPEC oil surpluses and the differentiated adjustments to them. As a proxy measure, the gross current-account imbalances of the OECD countries averaged \$21 billion in the years 1970-73 and \$63 billion in the years 1974-78, while the corresponding figures for the average net growth of the Euro-market were \$29 and 67 billion respectively.

10. *Concluding remarks*

A principal aim of this paper has been to suggest an income-velocity/flow-of-funds framework for examining the expenditure implications of changes in the pattern of financial intermediation, taking account of both domestic and external financial markets. With attention focused primarily on the experience of the United States, the analysis points *inter alia* to the following conclusions:

(1) In contrast to the experience of earlier years, the variability of the income velocity of money in the 1960s and 1970s, and particularly in the latter, appears to have been attributable in large part to changes in the composition of total credit-market debt/claims. The variability of this velocity component, described in this paper as the “credit velocity of money”, has caused difficulties for monetary policy and has raised questions about the definitions of monetary aggregates and the choice of intermediate target variables.

(2) Over the same period the ratio of gross national product to total credit-market debt/claims became more stable, fluctuating fairly narrowly around a zero trend. This measure, termed the income velocity of total credit, reflects the residual, or non-credit, element of the income velocity of money. Its behaviour suggests that the portfolio demand for financial assets, viewed independently of the variability of the demand for credit, is relatively stable.

(3) In the light of (1) and (2), it would appear that the monetary authorities should give more consideration to total credit-market debt/claims as an intermediate target. Although on grounds of controllability this aggregate would be less satisfactory as a target than narrower aggregates, there is no reason, apart from data lags, why its behaviour could not be taken into account when narrower targets are formulated. With the Volcker measures of 6th October 1979, the authorities took a major step to control the banks’ managed liabilities and, with the switch to bank-reserves targeting, to influence dollar

credit markets more generally. Subsequently, in March 1980, these initiatives were reinforced by a broad programme of voluntary credit restraint and other restrictive monetary measures. Though the new programme is partly of an emergency nature designed to get quick results, its emphasis would appear to reflect growing policy concern about the behaviour of credit markets as a whole.

(4) As the velocity component under (1) takes virtually no account of non-bank Euro-dollar credit/assets, any influence of the Euro-dollar market on domestic spending should be picked up by (2), i.e. by the income velocity of total credit. The fact that this velocity component has fluctuated fairly narrowly around a virtually zero trend over many years thus brings into question the hypothesis that Euro-dollar holdings have been indirectly responsible for an increase in the income velocity of money. However, one must reserve judgement on this question, because the stability of this component is open to several interpretations:

- (a) that the growth of non-bank Euro-dollar holdings has up to now been motivated mainly by liquidity and investment considerations;
- (b) that, as far as transactions balances are concerned, non-bank holdings of Euro-dollars have been used to finance largely counterbalancing external debit and credit transactions, mainly at the "wholesale" level;
- (c) that, insofar as Euro-dollar holdings have actually served to increase the income velocity of money, the expansiveness of US monetary policy may have exerted offsetting influences in the opposite direction;
- (d) that the magnitude of non-bank Euro-dollar holdings is still too small to have had a perceptible influence on spending in the United States.

(5) The fact that, in terms of their marginal absolute rates of growth, total US credit-market debt/claims have increased in parallel with the gross size of the Euro-dollar market suggests that the two

markets are more closely related than is usually supposed. The similarity of interest rate behaviour in the two markets, and the absence of exchange controls, reinforces this view. Given that the growth of total US credit-market debt is responsive to interest rates, it would appear that the US monetary authorities have the means of exercising a substantial degree of control over dollar credits in both markets.

(6) It remains true that, in the Euro-dollar and other Euro-currency markets, regulatory burdens impinging on domestic financial intermediation contribute to a gradual structural shift in favour of offshore transactions. How this problem of regulatory biases should be dealt with remains an open question. One view is that a global system of uniform reserve requirements on non-bank Euro-currency assets should be introduced. A contrasting view is that monetary authorities should seek, by mitigating the cost burden of domestic regulations, to reduce the incentive for banking business to be shifted to offshore channels.

(7) In the light of (6), it would be going too far to say that the US authorities could adequately control the growth of the Euro-dollar market by controlling the growth of total US credit-market debt/claims, though they might well come close to doing so. It is right, therefore, that they should continue to watch Euro-dollar developments closely, to seek a better understanding of the ever-changing factors underlying the market's growth and to study different options for exercising more influence over the market should the circumstances warrant.

