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A Structural Base for Macroeconomic Policy**

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**Abstract:** *Tautological structures bring clarity to arguments in macroeconomics: familiar structures relate to the circulation of money, the circular flow of real income, and the balance of international payments. Less familiar is a structure incorporating all aspects of macroeconomic policy interventions. The origins and use of the credit counterparts of broad money are examined in the context of the application of UK monetary policy in the period since 1945.*

**Key words:** International Monetary Fund,  
 macroeconomic policy, overfunding

**JEL Classification Codes:** E50, E60

**Introduction**

Familiar tautological structures provide an axiomatic base for macroeconomic theory. With conventional notation: monetary analysis is structured upon the equivalence of exchange values ( $MV \equiv PQ$ ); the analysis of international payments is structured upon the relative value of traded goods/services and debt instruments ( $0 \equiv X - M + \Delta\text{forex}$ ); and national income analysis rests upon the correspondence between income/output and an exhaustive string of mutually exclusive categories of expenditures ( $Y \equiv C + I + G + X - M$ ). Although structures *per se* are benign, they can be confused with analysis based upon those structures. Too often there is a segue from truisms to pseudo-behavioural statements; for example, the tautological derivations of the money multiplier and the bank credit multiplier (see Appendix 2) led some directly to conclude that base money control necessarily constrains bank credit.

The respective importance of different structures might be argued, but only in terms of the analysis which each facilitates. By its comprehensiveness, one truism must be viewed as ‘special’: all aspects of macroeconomic policy interventions are encapsulated within a structure known as the credit counterparts of broad money (CCM). This is the present focus, together with three objectives: (a) to give a clear presentation of the encompassing features of CCM; (b) to identify the origin of CCM; (c) to illustrate how CCM serves in raising criticisms of policy conclusions. In regard to the last of these, a half-century narrative of UK macroeconomic policy (Batini and Nelson, 2005) is used to draw specific illustrations. Key abbreviations are listed in Appendix 1.

**The sovereign and its central bank**

The division of activities between a sovereign government and a domestic central bank may obscure their interdependence. In the UK, the Debt Management Office of the Treasury is tasked with

‘minimising financing costs over the long term’ that follow from decisions regarding public sector spending and taxation. Alongside those decisions, the Monetary Policy Committee of the Bank of England reviews monetary policy on a monthly cycle in deciding upon the key short-term interest rate. Conceptual relationships show the interdependent macro-policy options that are open to the ‘authorities’

### Domestic Credit Expansion and the Credit Counterparts of Money

A familiar derivation of the CCM integrates all borrowing options for the government within a definition of broad money (M). Government borrowing requirements (GBR) are necessary to accommodate:

- (i) a fiscal deficit: with expenditure (G) exceeding tax revenue (T), new government debt takes the form of additional currency ( $\Delta C$ ) and additional bonds ( $\Delta B$ ) acquired and held as assets by banks ( $\Delta C^B + \Delta B^B$ ) and by non-banks ( $\Delta C^{NB} + \Delta B^{NB}$ );

and, in an open economy,

- (ii) the acquisition of foreign exchange reserves ( $\Delta R$ ).

These give

$$\text{GBR} \quad \equiv \quad (G - T) + \Delta R \quad \equiv \quad \Delta C^B + \Delta B^B + \Delta C^{NB} + \Delta B^{NB} \quad (1)$$

where corresponding debt instruments are domestic currency and bonds purchased by banks and by non-banks. Here, the amount of new bank credit extended to the government ( $\Delta D^{\text{ebt}(G)}$ ) is

$$\Delta D^{\text{ebt}(G)} \quad \equiv \quad (G - T) + \Delta R - \Delta C^{NB} - \Delta B^{NB} \quad \equiv \quad \Delta C^B + \Delta B^B \quad (2)$$

Within a closed economy, broad money (M) comprises non-bank holdings of currency ( $C^{NB}$ ) and bank deposits ( $D^{\text{PTS}}$ )

$$M \quad \equiv \quad C^{NB} + D^{\text{PTS}} \quad (3)$$

The value of banks deposits ( $D^{\text{PTS}}$ ) is identical to the value of bank assets ( $A^{\text{SSTS}}$ ); *i.e.*, banks necessarily hold assets of the same value as the amount of outstanding credit extended to government ( $C^B + B^B$ ) and to non-government agencies ( $D^{\text{ebt}(NG)}$ )

$$M \quad \equiv \quad C^{NB} + (C^B + B^B + D^{\text{ebt}(NG)}) \quad (4)$$

Corresponding changes in levels are indicated as:

$$\Delta M \quad \equiv \quad \Delta C^{NB} + \Delta C^B + \Delta B^B + \Delta D^{\text{ebt}(NG)} \quad (5)$$

Substitution (and thereby moving to an open economy) in (5) from (2)

$$\Delta M \quad \equiv \quad (G - T) - \Delta B^{NB} + \Delta D^{\text{ebt}(NG)} + \Delta R \quad (6)$$

gives a consolidated banking sector balance sheet (see Appendix 3). Equation (6) presents the five components of the CCM, each of which has an associated interventionist policy instrument. The respective linkages are:

- a) *monetary policy*            monetary growth ( $\Delta M$ )
- b) *fiscal policy*                budget deficit/surplus ( $G - T$ )
- c) *interest rate policy*        sale of state debt to the general public ( $\Delta B^{NB}$ )
- d) *credit controls*              commercial bank lending to the general public ( $\Delta D^{ebt(NG)}$ )
- e) *exchange rate policy*        adjustments to foreign exchange reserves ( $\Delta R$ )

Hence, the CCM present five macroeconomic categories as a structural basis for theoretical hypotheses. The encompassing structure of CCM indicates the interdependence of policy interventions.

All too often the benign nature of that facility becomes lost. For example, in pointing to the potential danger of unwittingly repeating ‘the omissions, analytical errors, and talking points’ of policymakers, the following comments are made:

those that accepted the validity of the authorities’ “credit counterparts” approach to analyzing money growth determination, and criticized policy from within that framework. As we discuss below, this framework should itself be regarded as flawed. (Batini and Nelson, 2005, p. 6)

The identity does not provide a good guide to the economic behavior that determines broad money growth. (Batini and Nelson, 2005, p. 30)

Those conclusions have no substance: the CCM identity is neither ‘flawed’ nor a guide to behaviour.

With a monopoly in the supply of ‘narrow’ or base money (C - currency), the position of a monetary authority is analogous to that of any other monopoly producer in deciding either (i) to fix a price for the product, in which case the amount supplied is determined by demand; or (ii) to fix the amount supplied, in which case the product price is determined by demand. Similarly, a monetary authority can target either the currency exchange rate (price) or monetary growth (quantity supplied). However, with ancillary choice options, possibilities are extended.

With five interrelated categories, the CCM present four degrees of freedom. This opens the possibility of targeting both the exchange rate *and* monetary growth. By analogy, where advertising enhances the perceived quality of a monopolist’s product, both the supply price and the amount supplied can be increased. Similarly, active targets for the exchange rate *and* monetary growth are feasible given other policy engagements. For example, if fiscal tightening ( $\Delta(G - T) < 0$ ) reduces the perceived exchange risk on sovereign debt, monetary growth with an appreciating exchange rate becomes possible.

The presentation of Keynesian macroeconomics predominantly takes the form of ‘fixed-price models’; *i.e.*, where an economy operates below full capacity (which is the only context in which the Keynesian income-multiplier is relevant) the assumption is that prices are unaffected by policy to boost aggregate demand. Fiscal interventions have direct impact upon the circular flow of income (IS); monetary interventions affect the terms and availability of credit (LM); and open economy ramifications are accommodated by international payments and exchange rate adjustments (BB). That

familiar IS-LM-BB model is consistent within the CCM constraint, but presentations too often imply that fiscal and monetary policy adjustments are possible as independent, rather than as inter-dependent, initiatives. Clearly, this may lead to implausible conclusions.

## Origins

The origins of the CCM structure are associated with a move to secure an international adjunct to Keynesian aggregate demand management. Where exchange rates are fixed, variations to the money supply (and, by Keynes's analysis, variations in the rate of interest) are largely dependent upon the balance of payments. This set the context for Keynes to find 'avowedly national advantages' in the mercantilist doctrine; *i.e.*, the accumulation of wealth through sustained trade surpluses. According to Keynes, mercantilists had 'perceived the existence of the problem without being able to push their analysis to the point of solving it' (Keynes, 1936, p. 350). The solution which they had missed was that of applying

the policy of an autonomous rate of interest, unimpeded by international preoccupations, and of a national investment programme directed to an optimal level of domestic development. (Keynes, 1936, p. 349)

Unlike the mercantilist zero-sum game of trade balances, Keynes asserted this option to be open to all, enabling every country to achieve the remarkable result of 'restoring economic health and strength internationally' (*ibid.*). In the UK, those precepts were to be applied in large degree as the authorities attempted the impossible: holding sterling to a fixed dollar price in the face of chronic fiscal deficits, low interest rates, and recurring trade deficits. This thread is developed further (see below: Radcliffe Report).

A desire to anchor the purchasing power of paper currencies provided the rationale (necessary, though not sufficient) for fixed exchange parities. In July 1944, delegates to the United Nations Monetary and Financial Conference agreed upon rules, procedures and institutions to regulate the international monetary system. Under the 'Bretton Woods Agreements', nation states were obliged to maintain the exchange value of their respective currencies within one percent of a fixed value in terms of the US dollar price of gold. As overseer, the primary function of the International Monetary Fund (IMF) was to ensure that trade flows did not undermine those values. The IMF took the view that: 'balance of payments problems ... were typically due to bursts of excessive domestic expansion' (Polak, 1998, pp. 401-2). In the event of chronic payments deficits, with domestic reserves running low and the value of its currency compromised, a nation state could seek credit from the IMF. For its part, the IMF needed to identify and then to impose remedial measures as the condition for making that credit available.

Although national income accounting tautologies had been developed as the basis for Keynesian precepts of aggregate demand management -

Under the stimulus of Keynes ... *An Analysis of the Sources of War Finance and an Estimate of the National Income and Expenditure for 1938 and 1940*. (1941, Cmd 6261) ... was published in time for the 1941 Budget. This was the Chancellor of the Exchequer, Sir Kingsley Wood's first budget, and it, and the accompanying budget speech was thoroughly Keynesian ... (Gilbert, 1982, p. 31)

- the IMF brought a non-Keynesian focus to bear upon the implications of that activity for currency values; that is, the IMF sought to redress what it regarded as a serious deficiency in Keynesian-oriented income and expenditure accounts. This was the omission of data relating to intersector finance and an analysis of liquidity (see Hicks, 1957).

The CCM structure, showing the inter-relationship between broad money growth ( $\Delta M$ ) and new foreign exchange reserves acquired from export surpluses ( $\Delta R$ ), invites alternative conjectures: trading surpluses *cause* domestic monetary expansion; trading deficits are *caused by* domestic monetary expansion. Thus, where domestic monetary expansion causes a trade deficit and currency outflow from nation A, it leaves nation B with a trade surplus and currency inflow. The encompassing IMF stance was that trade imbalances are correlated with monetary readjustments; and that, within any trading economy, the stock of money has its origins both at home and abroad.

Thus, ‘by netting out all other liabilities, the money supply ... is allocated to two categories of asset: net foreign assets and net domestic assets ... described as “money of foreign origin” and ... “money of domestic origin”’ (Hicks, 1957, p. 347). The latter - designated domestic credit expansion (DCE) - can be ‘further subdivided into net credits to governments and net credits to the private sector’ (*ibid.*), respectively,  $DCE^G$  and  $DCE^{NG}$ :

$$\Delta M \quad \equiv \quad DCE + \Delta R \quad (7)$$

$$\Delta M \quad \equiv \quad DCE^G + DCE^{NG} + \Delta R \quad (8)$$

which may be compared directly with the CCM tautology derived earlier:

$$\Delta M \quad \equiv \quad (G - T) - \Delta B^{NB} + \Delta D^{ebt(NG)} + \Delta R \quad (6)$$

with

$$DCE^G \quad \equiv \quad (G - T) - \Delta B^{NB}$$

$$DCE^{NG} \quad \equiv \quad \Delta D^{ebt(NG)}$$

The common component with (6) and (8)

$$\Delta R \quad \equiv \quad \Delta C^{R(NB)} + \Delta C^{R(B)} + \Delta B^{R(NB)} + \Delta B^{R(B)} \quad (9)$$

accrues as the monetary authority acquires foreign exchange ( $\Delta R$ ) from non-banks and banks, in exchange for domestic currency ( $\Delta C^{R(NB)} + \Delta C^{R(B)}$ ) and bonds ( $\Delta B^{R(NB)} + \Delta B^{R(B)}$ ). The implication is that, although DCE and the CCM for a closed economy are identical,

$$DCE \quad \equiv \quad DCE^G + DCE^{NG} \equiv \quad (G - T) - \Delta B^{NB} + \Delta D^{ebt(NG)} \quad (10)$$

in an open system the details change, because ‘money of domestic origin’ (DCE) appears in the identity in *net* terms. In gross terms, new domestic money is used to acquire ‘money of foreign origin’ ( $\Delta R$ ), not only from the passive exchange (at a fixed exchange rate) of export earnings, but also from active interventions in foreign exchange markets (in order to offset the impact of ‘excessive’ DCE,

and to maintain the exchange rate). The requirement, for a domestic monetary authority to intervene to support the exchange value of the domestic currency, is determined by the willingness of agents to hold domestic debt instruments; which, as a first approximation, might be represented as ‘a constant income velocity of money’ (see below).

Although identity (6) is a feature of modern presentations, it was in early use by De Nederlandshe Bank, as a basis for distinguishing between ‘autonomous causes’ and ‘unavoidable effects’ of inflationary processes:

This ... approach was the well-known technique of determining the *causes* of the changes in the volume of money from the combined balance sheet of the banking system. ... To give a simplified example of the type of situation with which the Netherlands was faced in 1950, let us assume that the analysis of causes in the change in the volume of money provides the following data for a certain period:

Government debt to banking system	+ 300	$[(G - T) - \Delta B^{NB}]$
Private debt to banking system	+ 400	$[\Delta D^{ebt (NG)}]$
Loss of foreign exchange	- 1000	$[\Delta R]$
Net change of money in circulation	- 300	$[\Delta M]$

Environmental conditions: a booming economy and rising prices

(Holtrop, 1957, p. 311-3; [...] added)

Set within identity (6) these illustrative details can be presented as,

$$\begin{aligned} \Delta M &\equiv (G - T) - \Delta B^{NB} + \Delta D^{ebt (NG)} + \Delta R && (6) \\ - 300 &\equiv 300 + 400 - 1000 && (6a) \end{aligned}$$

These data would be consistent with the behavioural hypothesis ‘that the increased indebtedness of the government and the private sectors to the banking system indicates inflationary conditions in both sectors’. Alternatively, if closer scrutiny shows the government to have repaid 500 units of debt to the private sector which, in turn, had ‘been spending these funds on long-term investment and on real expenditure’, those details would show as

$$- 300 \equiv - 200 + 900 - 1000 \quad (6b)$$

This alternative representation might then prompt the hypothesis that ‘the inflationary impulse has originated completely in the private sector’ (*ibid.*).

It was from ‘dissatisfaction with the results obtained ... [from this] ... analytical approach’ (*ibid.*) that De Nederlandshe Bank switched its perspective and method in 1951 to that of ‘splitting the economy into separate sectors ... [so that] ... the total amount of ascertainable net deflationary or inflationary financing is calculated’ (*ibid.*). Since, within a closed economy, the sum of all liquidity surpluses and liquidity deficits must be zero, attention was thereafter directed to the international payments surplus and to the net change in reserve holdings; that is, to the tautology of identity (8).

Clearly, De Nederlandshe Bank and the IMF were both on the same track, and in giving emphasis:

- (i) to ‘higher taxes or ... foreign loans’, to which might be added cuts in expenditure (G), as alternatives to DCE<sup>G</sup>; and
- (ii) to the ‘restriction of consumption or ... the repatriation of capital’ as alternatives to DCE<sup>NG</sup>;

there was a clear line-of-sight: ‘the balance of payments effects of credit creation by the banking system’ (Polak, 1998, p. 395). In developing their guidelines for extending credit facilities in the face of reserve losses ( $\Delta R < 0$ ), the IMF found relevance in the long-established quantity theory of money.

Taking evidence from end-of-year money stock data and national income for 44 countries (1950-54), IMF economists found justification in ‘the assumption of a constant ratio of money to income’ (Polak, 1957, p. 8). Thereby, the IMF espoused a key classical precept: that ‘of a constant income velocity of money’, for which ‘there is enough evidence of its approximate validity’ (Polak, 1998, p. 399). Those conclusions from the IMF were as closely aligned to those reached by Milton Friedman in his seminal work on the ‘neo-quantity theory of money’ (Friedman, 1956; Friedman and Schwartz, 1963; 1982)<sup>1</sup>, as they were radically different to those shaped by Keynes’s *General Theory* and recommended contemporaneously by the Radcliffe Committee (1959).

### **The Radcliffe Report**

In 1957 the UK government set up a committee of enquiry ‘into the working of the monetary and credit system’. The *Report of the Committee* (Radcliffe, 1959) saw no sound basis for active monetary policy; and, by implication, saw little relevance in the precepts of the quantity theory of money that had been embraced by the IMF. Instead, its conclusions were fully embedded within the context of Keynesianism; that is, acceptance of a robust Phillips curve relationship and cost-push inflation.

The Radcliffe conclusions set the guidelines for official policy in the UK over the next decade: money *per se* held no interest for the authorities. Two citations catch the ethos of that period:

from 1960, with small group of young hopefuls at the University of Birmingham, we started research on money in the UK ... But first we had the monumental job of preparing the historical time series on money and credit supply etc. I applied to the Bank of England for a modest research grant. The Bank refused to support such research since, it said, the quantity of money was of little consequence and there would be few people interested in such statistics. (Walters, 1989, pp. 441-2)

Many economists on the Bank staff in the 1950s and 1960s learned economics during the period of “Neanderthal Keynesian” U.K. academic thought, with their views on monetary policy shaped further in that direction by the Radcliffe Report. Consequently, senior Bank economists during this period tended not to be monetary specialists. It is perhaps significant that when in 1968 the Bank hired an economist with a monetary economics background, the event was considered unusual enough to merit a news item in the *London Times*. (Batini and Nelson, 2005, p. 21)

Events forced a review of this stance, when monetary concerns resurfaced as it became clear that the 1967 sterling devaluation had failed to redress the problem of recurring UK trade deficits. The continuing requirement for official interventions to support sterling prompted Chancellor Roy Jenkins to seek an IMF loan. As *quid pro quo* the IMF sought monetary constraint; but it was first necessary to clarify all that this entailed:



In the mid-1960s, the minister of an industrial country that suffered from frequent balance of payments difficulties advised a visiting Fund mission that the country was addressing the problem by keeping the increase its money supply to  $x\%$  (I forgot the figure) per year, and was truly surprised by the staff's comment that the policy stance adopted amounted to replacing any money that leaked out through the balance of payments so that the leakage could continue. (Polak, 1998, p. 399)

The citation indicates the extent to which unabashed Keynesianism (disconnected from 'international preoccupations') constituted a 'mission impossible': the attempt to hold sterling to a fixed US dollar price in the face of (i) fiscal deficits, (ii) low interest rates and (iii) recurring trade deficits. The DCE implications of such policy choices in terms of the (closed economy) CCM -

$$\Delta M \quad \equiv \quad (G - T) - \Delta B^{NB} + \Delta D^{ebt (NG)} \quad (10)$$

- (i) fiscal deficits  $(G - T) > 0$
- (iia) lowered interest rates  $\Delta B^{NB} < 0$
- (iib) lowered interest rates  $\Delta D^{ebt (NG)} > 0$

- reveals how Keynes's strategy is likely to be undermined by monetary expansion ( $\Delta M > 0$ ), excess demand and inflation. Certainly the impact of chronic trade deficits upon the value of a sovereign currency might be offset by selling

- (iii) foreign exchange reserves  $\Delta R < 0$

this provides only a limited palliative: exchange reserves are finite.

In the final outcome of the UK's IMF loan negotiations, conditions that were usually applied to constrain the growth of base money were directed instead to the broader components of DCE. The UK authorities had successfully argued that DCE was more appropriate to an economy with complex financial sectors. An explicit commitment to DCE was made public in 1969 by Jenkins in a Letter of Intent (to the IMF). Yet, even as inflation continued unabated, the government hung tightly to the Keynesian concept of cost-push inflation; the official view was that the driving force was a post-devaluation import prices-wages spiral.

### **The Heath-Barber boom**

Inflation, rising unemployment and worsening trade figures featured prominently during the general election campaign of 1970. With the announcement that monthly retail prices were 'up' by a record 2.1%, Conservative Party leader Edward Heath gave a promise:

to break into the wage/price spiral by acting directly to reduce prices. This can be done by reducing those taxes which bear directly on prices and costs, such as the selective employment tax, and by taking a firm grip on public sector prices and charges such as coal, steel, gas, electricity, transport charges and postal charges. This would, at a stroke, reduce the rise in prices, increase production and reduce unemployment. (Conservative Party press release, 16<sup>th</sup> June 1970)

Two days later, after a late swing in voting intentions, Edward Heath became Prime Minister. As Keynesianism continued to hold sway, non-monetary measures were introduced to combat inflation.

These included income tax cuts (intended to break the wage/price spiral), a sales tax cut, price curbs and public sector wage restraint. In March 1972 however, there was a policy sea-change.

John Knott, a junior Treasury minister, recalls the event: ‘a diktat came down from No. 10 to the Treasury saying that unemployment should be halved within a year - an absurd and dangerous notion’ (Knott, 2002, p. 147). The goal was to deliver ten percent growth over two years (twice the economy’s productive potential). With cuts in income tax and purchase tax, borrowing by the state and broad money growth soared. The latter peaked at twenty-nine percent in September 1974, with inflation rising from seven percent in 1972 to twenty-four percent in 1975.

As the authorities worked to support the value of sterling on currency markets, official reserves of foreign exchange became seriously depleted. To maintain the policy initiative, the fixed exchange rate was abandoned in June; and the value of sterling fell by fifteen percent over the next eighteen months. With government borrowing unabated, the dash for growth was abandoned. The infamous policy ‘U-turn’ of December 1973 introduced deflationary measures and a statutory incomes policy.

That the fiscal deficit spending of the Heath-Barber boom was the primary contribution to inflation in the 1970s has been countered by the view that ‘monetary policy was ... decisive’; and that

monetary policy was expansionary in its own right, well beyond any accommodation of fiscal deficits - as shown by the behaviour of real interest rates, which fell sharply from 1970, whereas a monetary expansion triggered by fiscal expansion should see real rates constant or rising. (Batini and Nelson, 2005, p. 84)

The CCM truism allows the basis whereby monetary policy might be ‘expansionary in its own right’ to be investigated; that is, with  $\Delta M > 0$  and  $(G - T) = 0$ , then

$$\Delta M \quad \equiv \quad -\Delta B^{NB} + \Delta D^{ebt (NG)} + \Delta R > 0 \quad (6c)$$

so that

$$\Delta B^{NB} < \Delta D^{ebt (NG)} + \Delta R \quad (6d)$$

This outcome might be obtained by a variety of routes. Among the more direct are:

1. a decline in bond sales to non-banks ( $\Delta B^{NB} < 0$ ), triggered by (say) a greater reluctance to purchase bonds because of rising exchange/default risk, although this is likely to be associated with  $\Delta R < 0$  (falling reserves);
2. a rise in commercial bank credit to non-government recipients ( $\Delta D^{ebt (NG)} > 0$ ) triggered by: (i) falling interest rates; (ii) autonomously rising business prospects; (iii) a greater volume of bank reserve assets ( $\Delta C^B > 0$ ) sourced from either an increase in base money ( $\Delta C > 0$ ) and/or a fall in cash in circulation ( $\Delta C^{NB} < 0$ );
3. a rise in foreign exchange reserves ( $\Delta R > 0$ ) triggered by: (i) an abandonment of attempts to support an overvalued currency; (ii) a soaring trade surplus; (iii) international credit transfers.

Notwithstanding the variety of routes by which monetary expansion is possible, those by which ‘monetary policy ... expansionary in its own right’ can occur must be identified. Plausible narratives doubtlessly exist whereby ‘a monetary expansion triggered by fiscal expansion should see real rates constant or rising’ (*ibid.*); but not of necessity. And even if the latter were so, there would be no logical requirement for monetary expansion *not* triggered by fiscal expansion to see real rates falling ‘sharply [as they did] from 1970’ (*ibid.*). Indeed, there is no limit to complex behavioural interactions that would, in their aggregate outcome, show themselves to be consistent with the CCM structure; but they would need to be stated and plausibly argued.

## Overfunding

The legacy of the Heath-Barber boom was inflation and high unemployment, which the ensuing Wilson-Callaghan Labour administrations attempted to counter with price and wage controls. Monetary reforms were applied with conviction only after the Thatcher government took office in 1979. Even then, the attempt to achieve tighter control on money was obscured by financial innovations, especially the practice of paying interest on formerly zero-interest deposits. This inhibited the capacity of the authorities to control the growth of broad money by raising short-term interest rates. In rejecting the alternative of base money control, the debt management technique of ‘overfunding’ was tried:

The intention was to withdraw liquidity from the private sector by the sale of government debt - even at times in excess of that required to meet the government’s borrowing requirement, so that it became known as *overfunding* - in order to hit the broad money target. In that way, broad money growth could be reduced. Overfunding operated between 1981 and 1985, until broad money targets themselves fell out of favour. (King, 1994, p. 271)

From identity (7), if bond sales to non-banks ( $\Delta B^{NB} > 0$ ) exceed the fiscal deficit ( $\Delta(G - T) > 0$ ) this *directly* reduces monetary growth ( $\Delta M < 0$ ); and, if those sales are facilitated by withdrawals from commercial bank deposits, bank base money falls ( $\Delta C^B < 0$ ) with the potential for diminished commercial bank lending ( $\Delta D^{ebt(NG)} < 0$ ). The latter has a second *indirect* impact upon monetary growth ( $\Delta M < 0$ ):

$$\Delta M \quad \equiv \quad (G - T) - \Delta B^{NB} + \Delta D^{ebt(NG)} \quad + \quad \Delta R \quad (6)$$

As overfunding was applied in the UK in the 1980s, there was a rise in the sale of long-term debt (predominantly of gilts and national savings) and a contraction in the stock of Treasury Bills and commercial bank liquidity. That liquidity shortage ( $\Delta C^B < 0$ ) was offset by the Bank of England becoming engaged in a series of commercial bill purchases:

Overfunding ... meant that the stock of Treasury Bills was run down to the minimum amount compatible with keeping the market in existence, and the Bank of England built up a large holding of commercial bills, those being the assets which it chose to buy in order to relieve shortages of cash in the market. This was known as the ‘bill mountain’, which reached £15.1 billion, or  $4\frac{3}{4}\%$  of GDP, at the end of March 1984; at times within financial years it exceeded £20 billion (Allen, 2012, p. 25).

The twin effects of overfunding would then have been (1) to increase sovereign debt *pro rata* the rising bill mountain and (2) to change the maturity profile of national debt (more long-term bonds, fewer short-term Treasury Bills).

The likely economic implications of overfunding can be understood only by the behavioural hypotheses structured upon the CCM. From a monetarist position, UK overfunding was ‘immensely useful as a means of curbing the growth of the monetary aggregates’ (Congdon, 1992, p. 227); and the abandonment of overfunding is alleged to have produced an ‘inflationary boom’ (Pepper and Oliver, 2001, p. 47). Certainly, there was an acceleration in UK house values, which increased by 73.7 percent over four years from January 1985. That evidence is consistent with the monetarist hypothesis that prices rise when monetary growth ( $\Delta M > 0$ ) is in excess of the demand to hold money. However, by the alternative hypothesis of fiscal monetarism, inflation occurs when the sovereign debt to income ratio  $(M + B)/MV$  signals impending default. From that perspective, overfunding *per se* (gross debt increasing *pro rata* the acquisition of commercial bills) leaves net national debt unchanged and implies no inflationary outcome. While the CCM confirm the coherence of both monetarism and fiscal monetarism, it is impotent in indicating the relative force of the respective propositions.

## **Conclusion**

No criticism of any behavioural position has been presented. Instead, a case has been made that concepts and their definitional interrelationships must be clearly stated; and that definitional structures are the root of expositional clarity in presenting behavioural propositions. One particular identity, the CCM, has served to establish a general point. An identity is an impartial guardian. Its single function is to impose internal consistency upon a narrative.

## Appendix 1: Abbreviations

$A^{SSTS}$	bank assets	
$B$	government bonds	
$B^B$		held by banks
$B^{NB}$		held by non-banks
$B^{R(B)}$		issued to acquire foreign exchange from banks
$B^{R(NB)}$		issued to acquire foreign exchange from non-banks
$C$	currency	
$C^B$		held by banks
$C^{NB}$		held by non-banks
$C^{R(B)}$		issued to acquire foreign exchange from banks
$C^{R(NB)}$		issued to acquire foreign exchange from non-banks
DCE	domestic credit	
$DCE^G$		extended to government
$DCE^{NG}$		extended to non-government
$D^{ebt}$	bank credit	
$D^{ebt(G)}$		extended to the government
$D^{ebt(NG)}$		extended to non-government agencies
$D^{PTS}$	bank liabilities	
G	government expenditure	
GBR	government borrowing	
M	broad money	
R	foreign exchange reserves	
T	tax revenue	

## Appendix 2: Bank credit and money multipliers

With definitions used earlier

$$C \equiv C^{NB} + C^B$$

$$M \equiv C^{NB} + D^{PTS}$$

$$A^{SSTS} \equiv D^{PTS}$$

Pseudo-behavioural elements are introduced with two coefficients that mask two varying relationships: (i) commercial banks' leverage upon their reserve base ( $\alpha$ ); (ii) general preferences for the use of currency in transactions ( $\beta$ ). Neither  $\alpha$  nor  $\beta$  is parametric; each represents a variable that invites behavioural propositions.

$$\alpha \equiv C^B / D^{PTS}$$

$$\beta \equiv C^{NB} / D^{PTS}$$

$$C \equiv C^{NB} + C^B$$

$$\equiv (\alpha + \beta) D^{PTS}$$

$$D^{PTS} \equiv C (\alpha + \beta)^{-1} \quad \text{where } (\alpha + \beta)^{-1} \text{ is the bank credit multiplier}$$

$$M \equiv C^{NB} + D^{PTS}$$

$$M \equiv (1 + \beta) D^{PTS}$$

$$M \equiv C (1 + \beta) (\alpha + \beta)^{-1} \quad \text{where } (1 + \beta) (\alpha + \beta)^{-1} \text{ is the money multiplier}$$

Even where institutional structures have stabilised in such a way that close statistical correlations are found between variations in base money ( $\Delta C$ ) and broad money ( $\Delta M$ ), attempts to effect control over broad money, through the exercise of control over base money, face *Nemesis* which has been explained as the 'Lucas critique' and epitomised as 'Goodhart's Law'.

**Appendix 3: CCM. Banking Sector Consolidated Balance Sheet (closed economy)**

<i>Central Bank</i>	
<i>Liabilities</i>	<i>Assets</i>
Currency ( $C^B + C^{NB}$ )	Government Bonds ( $B^{\text{central bank}}$ )
Bank Reserves	Commercial Banks' Refinancing
$C^B + C^{NB} \equiv B^{\text{central banks}}$	

<i>Commercial Banks</i>	
<i>Liabilities</i>	<i>Assets</i>
Deposits ( $D^{PTS}$ )	Currency ( $C^B$ )
Commercial Banks' Refinancing	Bank Reserves
	Government Bonds ( $B^{\text{commercial banks}}$ )
	Loans ( $D^{\text{ebt (NG)}}$ )

<i>Consolidated</i>	
<i>Liabilities</i>	<i>Assets</i>
Currency ( $C^{NB}$ )	Government Bonds ( $B^{\text{central bank}}$ )
Deposits ( $D^{PTS}$ )	Government Bonds ( $B^{\text{commercial banks}}$ )
	Loans ( $D^{\text{ebt (NG)}}$ )
$C^{NB} + D^{PTS} \equiv B^{\text{central bank}} + B^{\text{commercial banks}} + D^{\text{ebt (NG)}}$	

$$D^{PTS} \equiv B^{\text{central bank}} + B^{\text{commercial banks}} + D^{\text{ebt (NG)}} - C^{NB}$$

$$M \equiv C^{NB} + D^{PTS} \tag{3}$$

$$M \equiv B^{\text{central bank}} + B^{\text{commercial banks}} + D^{\text{ebt (NG)}}$$

with  $C^B + C^{NB} \equiv B^{\text{central bank}}$

$$M \equiv C^{NB} + (C^B + B^{\text{commercial banks}} + D^{\text{ebt (NG)}})$$

with  $B^B \equiv B^{\text{commercial banks}}$

$$M \equiv C^{NB} + (C^B + B^B + D^{\text{ebt (NG)}}) \tag{4}$$

with corresponding changes in levels indicated as:

$$\Delta M \equiv \Delta C^{NB} + \Delta C^B + \Delta B^B + \Delta D^{\text{ebt (NG)}} \tag{5}$$

Substitution (and thereby moving to an open economy) in (5) from (2)

$$\Delta M \equiv (G - T) - \Delta B^{NB} + \Delta D^{\text{ebt (NG)}} + \Delta R \tag{6}$$

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<sup>1</sup> 'A numerically constant velocity does not deserve the sneering condescension that has become the conventional stance of economists. It is an impressive first approximation that by almost any measure accounts for a good deal more than half the phase-by-phase movements in money income' (Friedman and Schwartz, 1982, p. 215)