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On some principles to fix the quantity of bank money

Tim Congdon



INSTITUTE OF
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In his 1970 Institute of Economic Affairs pamphlet on *The Counter-Revolution in Monetary Theory* Milton Friedman, who was to be awarded the Nobel prize for economics six years later, wrote,

“Inflation is always and everywhere a monetary phenomenon in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output. ... A steady rate of monetary growth at a moderate level can provide a framework under which a country can have little inflation and much growth. It will not produce perfect stability; it will not produce heaven on earth; but it can make an important contribution to a stable economic society.”

Introduction to the Institute of International Monetary Research's 5th research paper

Monetary economics has long been plagued by a controversy over the determination of the quantity of money in a modern economy, where “a modern economy” is understood to contain *both* a commercial banking system *and* a central bank. The controversy is about issues that are fundamental to the conceptualization of an economy of this sort, and it needs to be settled. The purpose of the following research paper is to end the disagreements – or, at any rate, to propose an analytical framework in which the disagreements can be discussed fruitfully and amicably.

In a modern economy most money balances take the form of bank deposits, which are the main liabilities of commercial banks. Banks' customers believe that deposits are fully convertible (at 100 cents in the dollar, 100 pence to the pound and so on) into legal-tender cash. Given that in this sense deposits are equivalent to cash, they can be used to settle debts. Although profit-seeking and privately-owned commercial banks tend to be many times larger than the central bank, the central bank occupies a position of remarkable power. Specifically, by statute it is the only issuer of legal-tender cash. The commercial banks must therefore maintain a relationship with it, so that they can always obtain enough cash to conduct settlement and other money transmission tasks for customers. (Legal-tender cash is held partly by the general public for small retail transactions, partly by shops and other companies for till money, and partly by the banking system to honour settlement instructions from depositors. The sum of all these holdings of cash is known as “the monetary base”.)

And what is the nature of the relationship between the central bank and the commercial banks? Different answers to this question are the main source of contention between the theories of the determination of the quantity of money. The first and most well-established theory is associated with the “monetarist” viewpoint once championed by Milton Friedman and the University of Chicago.¹ The historical record shows that in many past periods banks have maintained stable ratios of cash to deposit liabilities. Indeed, the quantity of money as a whole can be understood as a multiple of the total amount of cash issued by the central bank (i.e., the monetary base).² The quantity of money is then equal to the “money multiplier” (or “base multiplier”) times the monetary base, with the direction of causation seen as running from policy-makers' decisions to the quantity of base and hence to the quantity of money. In other words, the base multiplier approach to money supply determination takes it for granted that the central bank has the ability to determine the quantity of money *exogenously* by operations that fix the monetary base.

An account of the base multiplier approach often appears in textbooks not far from a well-known diagram for Keynes' liquidity preference theory of the rate of interest. In this diagram the exogenous supply of money is represented by a straight line rising vertically from the x axis, where the x axis measures the quantity of money. As a result, the monetarist position is sometimes called *verticalism*.

A competing view has been promoted by the “post-Keynesian” school, which developed in several universities (in the English-speaking world, but also in France and Italy) from the 1960s. It emphasizes that bank deposits are created within the private sector of the economy, or *endogenously*, by the extension of bank credit. Of course banks grow their businesses in pursuit of profit. One of their most profitable products is overdraft finance, where the borrower decides the size of the bank loan subject to a maximum figure. Since banks cannot control the timing of their customers' call on overdraft facilities, the size of their balance sheets is not determined exactly by banks' managements on a day-by-day – or even on a month-by-month – basis. It

instead depends largely on customers' overdraft requirements and even, to some extent, on the wider behaviour of the economy. Since banks must normally increase their cash holdings when their balance sheets expand, they value flexibility in acquiring cash from the central bank. Hence a common arrangement is that commercial banks can borrow freely, also on overdraft terms, from the central bank. It follows that the activities of commercial banks and their customers, not the central bank, determine the size of the monetary base. The central bank may be able to determine the interest rate at which it lends to the commercial banks, but it does not determine the levels of either the monetary base or the deposits (or "bank money") that constitute most of the quantity of money. These levels reflect the innate workings of the economy, not policy-makers' objectives.

In papers dating from the 1960s, and particularly in Basil Moore's 1988 book *Horizontalists and Verticalists: the Macroeconomics of Credit Money*, the availability of overdraft finance is represented – in the same money-interest space the textbooks use for Keynes' liquidity preference theory – by a straight line that runs horizontally from the y axis (i.e., parallel to the x axis). The x axis refers simultaneously to both the quantity of bank credit and the quantity of money. Unsurprisingly, the endogenous money approach is sometimes labelled *horizontalism*.

The theory of endogenous money creation is supported nowadays by most central bank economists, if with variations and caveats. Despite this widespread endorsement, the post-Keynesians are themselves split into two groups – those ("accommodationists") who abandon Keynes' liquidity preference theory of the rate of interest; and those ("structuralists") who insist that Keynes' theory lies at the heart of his macroeconomic thinking and must be retained in any plausible macro model.³ The differences between the accommodationists and the structuralists are interesting and important, but there is no room here to discuss them in detail.

Anyhow it should be clear that these differences are minor compared with those between the monetarists and the post-Keynesians. To summarize, the monetarists say that the quantity of money is – or at any rate ought to be – determined by central bank decision-takers with some precision. By contrast, the post-Keynesians deem the quantity of money to be inherently difficult to control because banks and their customers in the private sector create and destroy money for their own business reasons. Most post-Keynesians go further and say that, because the quantity of money is difficult to control, the state should not try to control it. This is a direct challenge to the monetarists' policy prescriptions, in which management of the quantity of money is vital to preventing inflation and maintaining macroeconomic stability.

The following research paper reprints chapter eight of a 2018 collection of essays in honour of the influential economist and Keynes' scholar, Victoria Chick, presented on her 80th birthday.⁴ Its purpose is eirenic, to bring peace to the warring factions. The paper provides an analytical description of the banking system in a modern economy. The description is of the equilibrium – even perhaps "the general equilibrium" – arising from the interactions between all the key participants (the central bank and the commercial banks of course, but also the non-banks, who use the banks' services). These participants are understood to pursue maximisation objectives within a Marshallian framework of demand and supply functions.

The presentation is geometric and verbal in form, and avoids algebra and mathematics. (I would welcome an algebraic formulation.) The paper uses a trick of four-quadrant diagrams which makes these diagrams ideal for describing banking systems. Banks' assets and liabilities must be identical, while two of the axes of a right-angled triangle can be made equal in length to represent the numerical equivalence of two separate categories. So one four-quadrant diagram shows the equilibrium of the commercial banking system, with assets and liabilities matched up, and another four-quadrant diagram shows the equilibrium of the central bank, again with assets and liabilities matched up. An eight-quadrant diagram is able to connect the central bank with the commercial banking system. The connection is possible because – in the real world – the

central bank is involved in the determination of the inter-bank rate, which is linked to its policy rate, while commercial banks regard the inter-bank rate as their marginal cost of funds in the supply function for credit extension. (The eight-quadrant diagram is not given in the paper here, but the extension is obvious. It will be discussed in a future research paper from the Institute of International Monetary Research.)

The paper agrees with the post-Keynesian view of money creation, that – if we ignore money creation by the extension of bank credit to the state – the crux of the matter is that,

- loans create deposits, and
- much of the short-run change in the stock of loans takes place on overdrafts.

But it rejects one feature of the post-Keynesian story, the tendency to regard the quantity of bank credit and the quantity of money as the same thing. Bank credit consists of bank loans, which are part of banks' assets, whereas the quantity of money is dominated by bank deposits, which are most of banks' liabilities. Loans and deposits are different notions. They should not be lumped together as one, as is standard practice in the horizontalist diagrams. It is easy enough to adjust the geometry – by proposing a four-quadrant diagram with separate axes for bank credit and bank deposits – to preserve the essence of the post-Keynesian thesis. Indeed, the separate representation of credit and deposits is one of the paper's innovations.⁵

The analysis in the paper does determine the quantities of both the monetary base and the quantity of money. So implicitly there is a “base multiplier”. However, it should be evident from reading the paper that the base multiplier does *not* play any significant role in the determination of the quantity of money. (I concede that it may matter in hyper-inflationary episodes, but these are exceptional.) Indeed, by accepting the post-Keynesian hypothesis that a high proportion of new deposits arise from the drawing-down of overdraft facilities, the paper questions the usefulness of the base multiplier approach to money supply determination. (I opposed monetary base control in the UK debates of the late 1970s and early 1980s, even though many economists – including Milton Friedman – thought that monetarism and the base multiplier approach to money stock determination were intellectual associates.)

In this respect the paper is a slap in the face for the monetarists.⁶ As I have long argued in public debate that the quantity of money is central to all macroeconomic analysis, my position may come as a surprise. But, in my view, it is possible to have both

- a monetarist view of the determination of national income and wealth, where we take the quantity of money as given, and
- a substantially post-Keynesian view of the processes which cause the quantity of money to be whatever value it takes in reality.

In a recent book on *Money and Government* Keynes' biographer, Lord Skidelsky, calls me a “Keynesian monetarist”.⁷ That may have seemed oxymoronic and strange to most people, since Keynesianism and monetarism are sometimes represented as antithetical. But Keynes' own economics – as distinct from that of the Keynesians – is very much about the role of money and banking in a modern economy. Further, I am not disputing that Keynes' writings (which, incidentally, most of today's so-called “Keynesians” have never read) have been a major influence on me. I don't mind being seen as mostly post-Keynesian in my account of how the quantity of money is determined, however much I disagree with the rest of post-Keynesianism.

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- ¹ See, for example, pp. 30 – 35 of Milton Friedman *A Program for Monetary Stability* (New York: Fordham University Press, 1960).
- ² The derivation of the banking system multiplier is a textbook commonplace. But see, for example, pp. 776–808 of Milton Friedman and Anna Schwartz *A Monetary History of the United States* (Princeton: Princeton University Press, 1963), for a rigorous treatment.
- ³ The accommodationists say that the banking system accommodates its customers by the granting of highly flexible overdraft facilities; the structuralists insist that the structure of the banking system must be recalled, not least because banks can finance loans not by expanding their balance sheets, but by using part of their cash reserves and other liquid assets. For an example of the literature, see Thomas Palley 'Horizontalists, verticalists, and structuralists: the theory of endogenous money reassessed', IMK Working Paper no. 121 (2013), IMK at the Hans Boeckler Foundation, Macroeconomic Policy Institute.
- ⁴ Sheila Dow, Jesper Jespersen, Geoff Tily (eds.) *The General Theory and Keynes for the 21st Century* (Cheltenham: Edward Elgar Publishing, 2018), pp. 98 – 115.
- ⁵ I believe that the geometric construction in this paper is new. But other four-quadrant constructions have been developed in the literature, going back to a 1966 paper by Karl Brunner and Allan Meltzer mentioned in footnote 16 below. My construction is similar in spirit to that proposed by the American post-Keynesian economist, Thomas Palley, in several papers. Giuseppe Fontana, professor of monetary economics at the University of Leeds, has also contributed to the literature.
- ⁶ Milton Friedman on many occasions professed his preference for a Marshallian partial-equilibrium style of analysis, with demand and supply diagrams, over a Walrasian general-equilibrium approach, with a multiplicity of equations. The essence of the Marshallian method is its emphasis on marginal differences, with continuously differentiable supply and demand functions. But – in the subject (i.e., monetary economics) that dominated his life work – Friedman retreated to a fixed-coefficients explanation of the quantity of money. Even worse, at various points in his career he supported the proposal for a 100-per-cent cash reserve banking system. In fact, a 100-per-cent-cash-reserve bank would not be a bank at all and the proposal would destroy the banking system of any economy that adopted it. In my view, the idea is also a blatant violation of private property rights, specifically, those of banks' shareholders.
- ⁷ Robert Skidelsky *Money and Government: a Challenge to Mainstream Economics* (Allen Lane: UK, USA, etc., 2018), p. 279.

On some principles to fix the quantity of bank money¹

Tim Congdon

In his 1936 *The General Theory of Employment, Interest and Money*, Keynes proposed the liquidity-preference theory of the rate of interest. He insisted on the monetary character of the theory, as opposed to the highlighting of such real variables as time-preference and capital productivity in what he termed ‘the classical theory’. In the paradigm case explored in *The General Theory*, the rate of interest was the yield on a long-dated bond, notably a long-dated government bond (or ‘gilt-edged security’ in the UK context).² Equilibrium was achieved by transactions that established equality at the margin between the expected returns on money (in terms of the reduction in future transaction costs) and a representative long bond.³ Given the emphasis on money in the liquidity-preference theory, perhaps it is not surprising that in an (unpublished) letter to *The Times* just before *The General Theory*’s appearance, Keynes remarked that ‘no question is more important than the principles on which the Bank of England and the Treasury should fix the quantity of bank money. It has not been discussed lately as much as it deserves to be’ (Keynes [1936b] 1982, p. 381).

Over 80 years later economists continue to debate exactly what these principles are. Dozens of textbooks include a diagram with the quantity of money on the x axis and the rate of interest on the y axis. As is familiar, Keynes’s equilibrium is shown in this diagram by the intersection of a demand-to-hold-money curve (sloping downwards to the right) and the quantity of money, which appears as a straight line rising vertically from the x axis. The verticality of the line reflects the monetary authorities’ presumed ability to control the quantity of money for policy purposes, where

¹ The author would like to thank Victoria Chick, Sheila Dow, Charles Goodhart and Geoff Tily for their very helpful comments. David Laidler guided him to the 1966 Brunner and Meltzer paper. The author is of course responsible for all remaining errors and infelicities.

² Keynes (1936a, p. 202). The discussion on this page of how the price of a bond changes with the rate of interest is intelligible only if the bond is long-dated, that is, it has many years (usually more than 15 years in UK parlance) until it is to be redeemed.

³ Crucially in Keynes’s analysis, the expected return included possible capital gain or loss.

the making of policy can be viewed as ‘outside’ the economy; it is said to indicate the ‘exogeneity’ of the quantity of money in this sense.

In well-known Post-Keynesian analyses the textbook approach was dubbed ‘verticalism’, with Basil Moore’s 1988 book *Horizontalists and Verticalists: The Macroeconomics of Credit Money* being the focal work. Following the lead of Nicholas Kaldor in polemics against monetarism beginning in the 1960s, Moore developed a different view of money supply determination.⁴ He argued that in modern conditions banks have an elastic supply function of bank credit that can be incorporated in the usual money-interest diagram as a straight line extending from the y axis. This line is horizontal to the x axis. The horizontality of the credit supply function is taken to denote the ready availability of overdraft finance in real-world banking.

Horizontality is therefore found in an economy where money has ceased to be a commodity; it is a feature of a world in which ‘credit money’ is manufactured by banks when they extend new credit. The quantity of money is determined in the money-interest diagram by the intersection of agents’ demand for bank credit with the horizontal line. The horizontality of the line is said to portray monetary policy-making in practice, as it focuses on the *price* of money (that is, ‘the rate of interest’), not the quantity. The quantity adjusts to the private sector’s behaviour, as individuals and companies ‘inside’ the economy take out new loans or repay old ones. The quantity of money should therefore be seen as ‘endogenous’, a variable determined by the economy’s own workings, not by policy.

THE STRAIN BETWEEN HORIZONTALISM AND KEYNES’S LIQUIDITY PREFERENCE THEORY

Victoria Chick has long been aware of the horizontalist point of view, mentioning it sympathetically in a 1985 conference paper (Chick [1986] 1992, p. 197). But, with Sheila Dow, she has protested in influential articles that Post-Keynesian ‘horizontalism’ can be taken too far, not least because it may undermine Keynes’s liquidity-preference theory. Chick and Dow (2013, p. 160) warned that the notion of ‘credit money’ can slide into semantic and conceptual mischief. They worried that ‘credit-money becomes a compound noun: credit or advances are conflated with deposits, and a particular type of money is confused with a method of generating money’. Perhaps, in a definitive geometry, monetary equilibrium ought to

⁴ Kaldor (1970) was one of the earliest contributions.

be depicted in *both* a money-interest space *and* a separate credit-interest space.

The purpose of this chapter is twofold:

- to advance a diagrammatic construct that represents the equilibrium of the banking system in a modern economy (a concept to be defined in the next two sections);
- with the help of this construct, to reconcile the verticalist and horizontalist contributions to discussions about the macroeconomic role of the banking system.

Two four-quadrant constructs are elaborated, one for the central bank's balance sheet and the other for the balance sheet of the commercial banking system. Liquidity-preference theory is retained in one quadrant and shown to be compatible with the availability of overdraft finance from banks. This may seem to be progress, but the conclusion is cautious about what has been achieved. The chapter can be seen as a response to the challenge posed by Keynes in his letter to *The Times* in February 1936 (Keynes [1936b] 1982). But one of its themes is that *The General Theory* is selective and incomplete in the components of a modern capitalist economy chosen for analysis.

SETTING THE AGENDA: BANKS' ASSETS MUST BE IN THE ANALYSIS

Keynes offered a definition of the rate of interest in his *General Theory* which used the word 'debt'. It appears in Chapter 13, under the title 'The general theory of the rate of interest'. The rate of interest is earned by one agent by holding a claim on another agent. To quote, 'the rate of interest is . . . nothing more than the inverse proportion between a sum of money and what can be obtained for parting with control of money for a debt for a stated period of time' (Keynes 1936a, pp. 166–7). Plainly, if a full equilibrium is to be described it must refer to the circumstances of the two parties to the debt. We need an account of the banking system in which two types of equilibrium condition are to be satisfied. These relate to *both* sides of banks' balance sheets. At more length, the conditions are that:

- the demand to hold banks' liabilities (which roughly speaking are money) is equal to the quantity of such liabilities; and
- the demand for bank credit on the part of borrowers is equal to the supply of such credit from banks.

The importance of conditions of the first type is explicitly recognised at the end of Chapter 7 of *The General Theory*, with the remark that national income and wealth are not at their equilibrium values unless '[t]he aggregate of the amounts of money which individuals choose to hold . . . has come to equality with the amount of money created by the banking system' (Keynes 1936a, pp. 84–5). But the reader struggles to find anywhere in *The General Theory* a comparable statement about bank credit and banks' assets.⁵

SETTING THE AGENDA: THE NEED TO DEFINE THE EQUILIBRIUM OF THE CENTRAL BANK

Keynes was of course aware that central banking and the state's involvement in monetary management had to be part of the discussion.⁶ The central bank is certainly present in *The General Theory* as a body separate from the commercial banks. However, *The General Theory* has markedly less material on the institutional idiosyncrasies of particular central banks than its predecessor, the 1930 *Treatise on Money*. The *Treatise* is realistic, and indeed general, in that from the outset it differentiates between 'State money or money proper' and 'bank money or acknowledgements of debt' (Keynes [1930a] 1971, p. 5). The supposedly more all-embracing *General Theory* loses the distinction. It refers many times to 'money' as if it were a single homogeneous category issued by a uniform and consolidated banking system. That is misleading. Nowadays legal-tender notes (always by law worth their stated nominal value) are issued exclusively by a state-backed central bank, whereas bank deposits (which may not always be repaid in full) are liabilities of a much larger and usually profit-seeking commercial banking system.

The notion of 'a modern economy' under consideration in this chapter can now be made precise. It contains two distinct types of banking organisation:

- a central bank with the monopoly right to issue legal tender;
- commercial banks that offer payment services to non-banks, but settle debts between themselves in central bank money.

⁵ *The General Theory* is unlike the *Treatise on Money* in this respect. The penultimate chapter of the second volume of the *Treatise* has a discussion over several pages of the question, 'Can the banking system control the rate of investment?', where the sensitivity of bank credit to changes in the central bank rate was a key issue (Keynes [1930b]), 1971, pp. 325–31).

⁶ Both of Keynes's first two books, *Indian Currency and Finance* (1913) and *A Tract on Currency Reform* (1923), were about the institutions of monetary policy-making.

It follows that two forms of money co-exist in a modern economy, with the implication that in a thorough analysis separate equilibrium conditions should be spelt out for each. Our agenda is thus defined. As banking institutions have matching assets and liabilities, an account of the full equilibrium of the banking system must specify equilibrium conditions for the credit extended on the assets side of the balance sheet as well as the money they create as liabilities. Further, the equilibrium conditions must be presented for the two types of banking organization, the central bank and the commercial banks, and two kinds of money, legal-tender base money and bank deposits.

The next two sections cover the equilibrium of the central bank, and the subsequent section the equilibrium of commercial banks as a group. The procedure is to exploit a well-known feature of four-quadrant diagrams, that 45-degree lines drawn through the origin link the categories on different axes. As assets and liabilities are of course equal, a four-quadrant diagram is ideal for describing the equilibrium of banking institutions. Bank credit and the quantity of money differ somewhat, but it will turn out that the differences are readily assimilated in the analytical framework. Both four-quadrant diagrams have a money-interest space *and a credit-interest space*, with the two spaces connected by a 45-degree line.

What about ‘the rate of interest’? It should be evident from the last few sentences that four ‘prices’ – as well as *four* quantities – will be set in the geometry (of supply and demand diagrams, in effect) that is about to be elaborated. All four prices could be deemed a ‘rate of interest’ or even *the* rate of interest. Arguably, it is wrong to privilege one concept above any of the other three, as Keynes did in *The General Theory*. The long bond yield may be a valid means of expressing the idea of the rate of interest, but it is not *the* generic, one-and-only rate-of-interest notion. The significance of determining a multiplicity of interest rates is another topic picked up in the conclusion.

THE EQUILIBRIUM OF THE CENTRAL BANK: OVERVIEW AND THE ASSETS SIDE OF THE BALANCE SHEET

Brief remarks on the position of the central bank in a modern economy are essential as a preliminary to the main exposition. The central bank’s note liabilities are the most familiar form of money, since every agent – all members of the general public – must hold them to complete small but essential everyday transactions. However, the central bank has no meaningful direct connections with the general public. Instead the central bank has only two

kinds of customer: the government and commercial banks.⁷ Commercial banks hold claims on the central bank, in the form of so-called ‘cash reserves’ which are fully convertible into legal-tender notes; they settle debts between themselves, which arise constantly from their customers’ payments instructions, by drawing from or adding to these cash reserve balances. They also keep legal-tender cash in their vaults and tills. In fact, emissions of notes via the banks’ infrastructure are the main source of the public’s note holdings. But in the construct which is about to be developed the public’s note holdings play no role. As is widely understood, in modern conditions the central bank is a passive supplier of cash, via the banks, for the convenience of the general public.

The sum of the central bank’s note issue and its cash reserve liabilities to commercial banks is usually known as ‘the monetary base’ or ‘high-powered money’. Members of the general public can make payments between each other across their bank accounts. But they can also make payments to (or receive them from) the government. As the government keeps its deposit with the central bank, it too must be mentioned as another of the central bank’s liabilities. The central bank therefore has four kinds of liability relevant to the payments business conducted in its liabilities:

- legal-tender notes held by the general public;
- legal-tender notes held in commercial banks’ vaults and tills;
- the commercial banks’ cash reserves with it;
- the government’s deposit.

It also has one category of liability distinct from payments settlement, namely its own capital. On the whole, this is of little or no importance to macroeconomic analysis, and is not discussed at length in the current chapter. In summary, although the central bank has five categories of liability that deserve mention in a discussion of its purposes and responsibilities, only two of these – commercial banks’ cash reserves and the government’s deposit – are to be included in our analytical framework.

What about the central bank’s assets? As a closed economy is assumed, in line with the core chapters of *The General Theory*, the central bank can have claims only on either of its two domestic customers, the government or the commercial banks. The representation of the supply function of central

⁷ The course of financial development almost universally is that, even if the central bank began as a commercial bank with merchants and manufacturers as its customers, it loses all non-bank customers over time, and restricts its business to the government and commercial banks. The pattern of specialisation needs to be explained. On the social costs and benefits of central banking, see Congdon (2009, chs 3 and 4, pp. 44–84).

bank credit now becomes a live and contentious topic. The Post-Keynesian convention is to take the central bank's assets as consisting predominantly, or even entirely, of claims on the commercial banks. In *Horizontalists and Verticalists*, Moore argued that commercial banks' demand to hold cash reserves depended on the size of their assets and that, because they offered overdraft facilities to customers, the size of their assets was to some degree out of their control.

To elaborate, suppose that banks' customers draw down overdrafts on an unexpectedly large scale. The commercial banks have larger balance sheets and may need extra cash reserves. They might try to obtain these from market sources (that is, for example, from other banks in the interbank market), but that would put upward pressure on money market rates. If the central bank is committed to a particular interest rate level, it has to supply extra cash to choke off the excess demand. In Moore's words, 'The monetary authorities' paramount function is to support the liquidity of the domestic financial system. When loans and deposits increase and required reserves rise, reserves must somehow be made available.' It follows that 'a horizontal money supply function provides a simple and plausible explanation of the monetary authorities' own behaviour' (Moore 1988, pp. 91 and 92).

So, in a diagram describing the market for central bank credit, the supply function of central bank credit to the commercial banks can be drawn as a line horizontal to the x axis (see S_1S_1 in Figure 8.1 below). Commercial banks' demand to hold cash reserves must normally be highly interest-inelastic, since it is imperative that they meet retail deposit withdrawals with cash and cover settlement obligations with other banks.⁸ Their demand for central bank credit ($D_{1c}D_{1c}$) must be highly interest-inelastic, for similar reasons. When the central bank announces a change in its lending rate (or the rate at which it will discount assets sold to it, perhaps on a repurchase or 'repo' basis), the horizontal supply schedule moves up and down in the market for central bank credit. A new official interest rate becomes effective straight away and signals policy intentions.

An obvious question is, 'how does the central bank have so much power?'. Remember that in a modern economy the state confers on a

⁸ Traditionally in the UK, the Bank of England would drain cash from the money market to ensure that the commercial banks were always close to the minimum at which they could meet settlement obligations. Since cash reserves did not pay interest, the commercial banks were relaxed about the position, but only as long as they could be sure the Bank would help them in the extreme. In such circumstances the need to hold at least some cash was compelling and highly insensitive to the interest rate. Nowadays the Bank of England pays interest on cash reserves, a practice which complicates the discussion.

Keynes's liquidity preference theory of the long bond yield and should not be confused with it.¹⁰

THE EQUILIBRIUM OF THE CENTRAL BANK: THE LIABILITIES SIDE OF THE BALANCE SHEET, AND THE TWO SIDES OF THE BALANCE SHEET BROUGHT TOGETHER

The last section focused on the assets side of the central bank balance sheet. But our agenda requires us also to discuss equilibrium on its liabilities side. As already noted, commercial banks settle between themselves in central bank money and can borrow from the central bank if they have difficulties meeting their obligations. However, the central bank may be 'closed', for whatever reason, and the quantity of the monetary base is then given.¹¹ Banks can still borrow and lend base money between each other, enabling cash-deficient banks to meet obligations. But the participants in the interbank market do not control the quantity of cash, either individually or in the aggregate. As far as they are concerned, the supply function of cash is inelastic. In a diagram for the money-interest space (where 'money' is in this context base money), the supply function can be represented by a vertical line from the x axis. A few words are needed on the notion of the 'closure' of the central bank, since it is crucial to justifying a vertical line in our geometry.

Imagine a realistic situation in which the central bank is open only for certain hours of the day ('closing its doors' at, say, 2.30 pm), but inter-bank settlement extends for a longer period (until, say, 5.30 pm). In the last few hours of the day the inter-bank rate may become disconnected from the central bank rate, with excess demand for cash perhaps driving overnight rates into the hundreds per cent.¹² The possibility challenges horizontalism's insistence that the central bank controls short-term interest rates without qualification. Further, the potential extreme volatility of one type

¹⁰ The realization that the Bank of England – then the world's leading central bank – could influence short-term interest rates came in the nineteenth century, although only gradually. See Cramp (1962, especially ch. 1, pp. 1–7).

¹¹ The notion of the closure of the central bank is necessary for the quantity of the base to be fixed. This may seem to conflict with the core premise of horizontalism, that solvent banks compliant with regulations can always borrow as much as they want from the central bank. But the notion of closure is valid. Central banks may be open on every working day, but they are not open every hour. (See the box on p. 12 of Bank of England 1997, with a section on 'End-of-day arrangements'.)

¹² This sounds alarming, but – if one bank charges another a modest 0.1 per cent for an emergency overnight facility – the implied annual rate is 44 per cent.

of short-term interest rate does need to be incorporated in a comprehensive treatment of the subject.

A diagram can now be drawn to describe equilibrium on the liabilities side of the central bank balance sheet. The central bank's capital is incidental to our analysis, but it has a role to play when the two sides of the balance sheet are brought together in the four-quadrant Figure 8.1, because it results in non-capital liabilities being smaller than assets. However, it is not an active element in the market for central bank money. For simplicity in drawing our diagram, the government's deposit is ignored for the moment. As will soon be discussed further, it can be pivotal to monetary policy and become a huge nuisance for the horizontalist argument.

The diagram has the quantity of banks' cash reserves fixed, with a line (B_1B_1) rising vertically from the x axis. The inter-bank rate is banks' marginal cost of funds and is crucial to their behaviour; it fluctuates as the demand-to-hold-base function ($D_{ib}D_{ib}$, for example) for the entire commercial banking system moves up and down. In the normal course of events the inter-bank rate (y per cent) is somewhat above the central bank rate (x per cent). We are now in a position to assemble a four-quadrant diagram to represent the markets with which the central bank is involved. Figure 8.1 combines the two sides of the balance sheet, with 45-degree lines that connect both assets and liabilities, and fixes two rates of interest of considerable real-world importance. As one aim of this chapter is to bring peace between horizontalism and verticalism, the gremlins that can arise from the government's deposit are suppressed by its exclusion from the diagram. It becomes possible to describe the balance sheet of a central bank, and to talk about the evolution of the items on the balance sheet, in accordance with the horizontalist approach. Central bank overdrafts to commercial banks can be reconciled with the determination of the inter-bank rate by a form of liquidity-preference theory.

Why would the government's deposit do so much damage to horizontalism and the larger claims for money's endogeneity, if it were brought into the picture? The trouble is the government can spend the deposit as it wishes, and so boost deposits held by non-bank private sector agents and hence the quantity of money, with wider macroeconomic ramifications.¹³ Such transactions reflect government decisions that are undoubtedly 'exogenous' as far as the private sector is concerned. Further discussion of this flaw in horizontalism is postponed to a later section.

¹³ One tactic for dealing with this criticism of endogenous money thinking is to say that the assumed economy has neither a government nor a central bank. See Lavoie (2013).

THE EQUILIBRIUM OF THE COMMERCIAL BANKS: ASSETS, LIABILITIES AND THE TWO SIDES OF THE BALANCE SHEET BROUGHT TOGETHER

The treatment of the commercial banking system can be shorter than that of the central bank. The assets side of the balance sheet comes first. Given the kind of economy being considered, commercial banks can have claims only on the private sector or the state, where the state consists of both the government and the central bank. They must have claims on the central bank, specifically cash reserves to enable them to carry out customers' payment instructions. For simplicity, assume that otherwise their assets consist entirely of loans to the private sector which are all in the form of overdrafts. (Banks charge a loan rate which is equal to the inter-bank rate plus a mark-up. The mark-up has two elements, an allowance for the banks' cost and a profit margin. The profit margin is related to banks' capital requirements.)

Further, assume that every borrower has an unused portion of the overdraft still available for drawdown, a situation which generates the most straightforward illustration of horizontalism. In the normal fashion, the non-bank private sector has a demand for commercial bank credit which slopes downwards to the left in the credit-interest space. The quantity of commercial bank credit is determined by the intersection of the nonbank private sector's demand-for-bank-credit schedule with the horizontal supply-of-bank-credit schedule.

What about the money-interest space? The quantity of bank deposits is identically equal to commercial banks' assets minus their capital. Our working assumption in the geometry is that – apart from cash, which we ignore because it can be (and usually is) a tiny part of the balance sheet – assets are entirely loans to the private sector. The quantity of bank deposits is then equal to the quantity of commercial banks' credit to the private sector minus their capital. A rather drastic assumption is now adopted, to highlight and clarify key issues in the debates. The non-bank private sector is taken to be divided between agents that have no bank borrowings and complete all their transactions with money (that is, they are money-holders and nothing else), and agents that live perpetually 'on tick' (that is, they hold no money, but pay for everything by running their overdrafts up and down). It is evident that the money-holders have a demand to hold money in the form of bank deposits, but they cannot alter the quantity of bank deposits created by the commercial banks. As far as these money-holders are concerned, the supply schedule for money is fixed and can sensibly be represented by a vertical line (M_1M_1) through the x axis. It is also evident that, if money-holders operate with the sort of money demand function

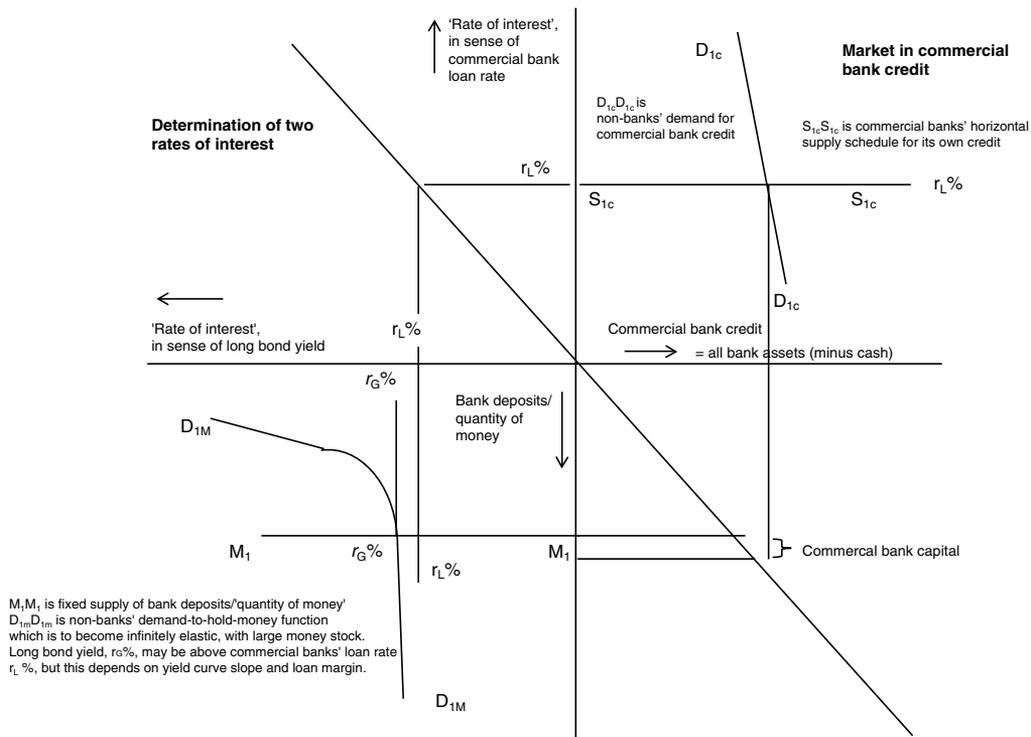


Figure 8.2 Full equilibrium of the commercial banking system

($D_{1M}D_{1M}$) hypothesised by Keynes in *The General Theory*, the final quadrant of our construction is our old friend, the liquidity-preference theory of the rate of interest.

The need to separate the credit-interest space from the money-interest space has been a motif in this chapter.¹⁴ An expansion of banks' loan assets does not always imply an identical increase in deposit liabilities. Remember that an allowance must be made for banks' capital, which represents at least a proportion of liabilities in real-world situations. As shown in Figure 8.2, for the full equilibrium of the commercial banking system, the quantity of money (that is, banks' deposit liabilities) is smaller than commercial banks' total assets. In the diagram the long bond yield is above the banks' loan rate. If the long bond yield is understood as the yield on a government security, this is likely to be true most of the time, but is certainly not inevitable.

DEBT-FREE AGENTS AND MONEY'S EXOGENEITY

Several advocates of the horizontalist position have remarked that, when agents' demand to hold money differs from the actual quantity of money in being, the disequilibrium can be removed by a transaction in bank credit. For example, if agents hold more money than they would like, they can repay a bank loan, so destroying money balances and eliminating the excess supply of money. Conversely, if they have deficient money (again relative to the desired quantity), they can use up more of the overdraft facilities, adding to the quantity of money and ending the excess demand for money. But this entirely reasonable observation about the logic of money creation is sometimes followed by an extraordinary leap in empirical generalisation. The leap is to assert that the demand to hold money is always equal to the supply, as determined by credit extension or withdrawal. To quote from Moore, 'so long as banks are price setters and quantity takers in ... deposit markets, the quantity of credit money is determined precisely by the amount the public desires to hold. It necessarily follows that the money supply is always demand-determined' (Moore 1988, p. 329).

But the supposition that agents *always* respond to disequilibrium in their money holdings *only* by increasing or reducing their bank loans rests on a daring assumption. It depends, very obviously, on every person and company having a loan facility that they can expand or contract at will. Is it necessary to point out that this is not the real world? Since

¹⁴ See also Dow (2006) for the need to distinguish between a 'credit market' and a 'money market', notably in the diagrams on pp. 47 and 49.

most loans to the private sector (mortgages, corporate term loans) have fixed repayment schedules, overdrafts are only a small part of banks' loan assets. Further, agents with some bank debt typically have money balances as well. The point is crucial. Logically, it is of course impossible for the aggregate quantity of money to be changed by transactions between agents that are entirely free from bank debt. As far as debt-free, purely money-holding agents are concerned, the quantity of money is exogenous. In a money-interest space in our geometry a straight line rising vertically from the x axis is the only legitimate way to characterise their position. But in truth most private sector agents with bank debt do not regard their loans as a variable they can change significantly and at will in the short term. These agents organise their affairs so that the overwhelming majority of receipts and payments pass to and from their bank deposits. They are likely to behave, in response to unexpected changes in their money holdings, in much the same way as agents that have no bank debt at all. The standard textbook representation of Keynes's liquidity-preference theory – including a straight line for the quantity of money, rising vertically from the x axis in the money-interest space – was and remains wholly valid.

BORROWING BY THE STATE FROM THE BANKING SYSTEM: IMPLICATIONS FOR THE EXOGENEITY/ENDOGENEITY DEBATE

Mention has already been made of the difficulties for the endogenous money school that arise from large-scale borrowing by the government from the central bank. Unless words are being used in a bizarre way, it is silly to regard hyper-inflations as consistent with endogenous money creation. When the government borrows several or many per cent of national output from the central bank and causes the monetary base to expand by 50 per cent a month or more, the key influences on macroeconomic conditions are from crazy policy-making. If banks grow their balance sheets at the same sort of rate as their cash reserves, the quantity of money and the price level are likely also to expand by 50 per cent or more a month. The non-bank public then needs more legal-tender notes to conduct its everyday transactions. Fantastic though it may seem, in the Weimar hyper-inflation one of the worst headaches for the Reichsbank's management was that it could not make the printing presses work fast enough. In his book *Das Geld*, Karl Helfferich, an influential German economist of the day, drew a perhaps surprising conclusion. He said that steps to reduce money-printing would result 'in a very short time'

in ‘the entire public, and above all the Reich’ no longer being able to ‘pay merchants, employees, or workers’ (Bresciani-Turroni [1931] 1968, p. 81). The Reichsbank could therefore defend itself, amid all the madness, by saying that its printing of notes was only to meet demand. Some wiseacres might want to propose that in analogous circumstances today the monetary base would be demand-determined, with the supply curve of money remaining horizontal in the money-interest space. If so, horizontalism has run amok.

Dozens of hyper-inflations have been recorded, but not one of them has arisen from inordinate lending – by either the central bank or the commercial banking system – to the private sector. The endogenous money approach is hopeless in understanding these episodes. History is full of wars, recessions and finance ministers indifferent to the debauching of their currencies. A neat endogeneity–exogeneity dichotomy cannot always do justice to events. As Chick has warned, ‘money is neither purely exogenous nor purely endogenous. Which is the better description depends on circumstances’ (Chick [1983] 1991, p. 236).

CONCLUSION: SOME UNRESOLVED ISSUES

The two four-quadrant diagrams in this chapter provide a general theory of the determination of the quantity of money in a modern economy, where ‘a modern economy’ has both a central bank and a commercial banking system. Notes and coin held by the public can be added to banks’ deposit liabilities to genuine non-bank private sector agents. The sum of these two items is the broadly-defined quantity of money, as that category is usually understood and certainly as understood by Keynes.¹⁵ The chapter has therefore set out some principles on which the monetary authorities of any nation might try to ‘fix’ the quantity of bank money, even if nowadays most economists may be more sceptical about their ability to do this than Keynes was in February 1936. The apparatus of thought – to recall one of his favourite phrases – is advanced as a realistic and convincing description of the equilibrium of the entire banking system in a modern economy. As far as the author is aware, it constitutes a new way of looking at this

¹⁵ Keynes was a ‘broad money man’, as explained in Congdon (2011, essay 4). In his 2007 volume on the betrayal of Keynes’s economics by the post-war textbooks, Tily has a discussion of Keynes’s views of the money creation process in the context of the UK’s financing of its Second World War military programme. The issue of relatively illiquid Treasury Deposit Receipts to the commercial banks was crucial in preventing inflation. See Tily (2007, p. 205). Keynes’s policy approach made sense only if he were interested in *all* bank deposits and indeed *all* holdings of liquid assets in the economy.

subject, although other diagrammatic representations of banking system equilibrium are to be found in the literature.¹⁶

Two kinds of warning need to be issued in conclusion. First, the diagrams have supply and demand schedules intersecting neatly and precisely, which may give the impression that the real world can be characterised by an immaculate ‘equilibrium’ at every instant in time. The truth is not so tidy. In reality ‘[t]here is a distinct time-stream of events, in sharp contrast to general equilibrium, where everything happens at once, or partial equilibrium, where everything happens in the market being analysed and nothing is allowed to happen in other markets while the economist’s back is turned’ (Chick [1983] 1991, p. 15).

Second, one aim of the chapter has been to protect the territorial integrity of Keynes’s liquidity-preference theory of the rate of interest against the incursions of the Post-Keynesian horizontalists. But does the liquidity-preference theory deserve its place in the sun? We have seen that four of the quadrants in our two diagrams determine a valid notion of ‘the rate of interest’, namely the central bank rate, the inter-bank rate, banks’ loan rate and the long bond yield. Bluntly, the liquidity-preference theory is only one way of viewing the subject of interest rate determination. Keynes did not dispute the approximate long-run similarity of the rate of increase in money and nominal national income that is crucial to a monetarist way of thinking (Keynes 1936a, p. 306). Sceptics might wonder by what precise causal link – over countless decades in numerous countries – the long bond yield takes just the right values to ensure this approximate similarity. Might they not suggest that an exclusive focus on just one asset, and one channel of impact, is implausible?

¹⁶ Three previous accounts are known to the author. The first dates back to Brunner and Meltzer ([1966] 1989, pp. 112 and 114). The word ‘endogenous’ is used, with reference to the monetary base, before it had been appropriated by the Post-Keynesian school. The second was set out in Palley (1994) and the third in Fontana (2013). (The author understands that Fontana’s work has included a four-quadrant diagram since 2004. Note that the Palley and Fontana four-quadrant diagrams are similar.) The concerns of these three contributions are different from those of the current chapter. None of them differentiates between the equilibrium of the central bank and the commercial banks in the same fashion as here, although Fontana uses essentially the same diagram for what he terms ‘the reserve market’, ‘the credit market’ and ‘the financial market’. All three of these other contributions preserve a fixed multiplier between the monetary base and the quantity of money. (Indeed, Brunner and Meltzer were interested in the split of the base between banks’ cash reserves and the general public’s note holdings.) The two four-quadrant diagrams in the current chapter can be brought together in an eight-quadrant construction, which does determine both the monetary base and the quantity of money. In that sense the ‘money base multiplier’ makes an appearance, although the author pays little attention to it. Except in the extreme circumstances of hyperinflations, he does not regard the base money multiplier as a useful analytical tool. He also does not see the general public’s note holdings as of major analytical interest in a modern and fairly stable economy.

This chapter has tried to rescue liquidity-preference theory from the horizontalist criticisms, although also questioning the undue emphasis that it has received in the textbooks. Keynes's *General Theory* was a great and revolutionary work, but it seemed to have forgotten important passages in the *Treatise on Money* about how money enters the economy via the banking system. Equally, the endogenous money school does not have all the answers. It may have performed a valuable service in forcing Keynes's admirers to develop new arguments in defence of liquidity-preference theorising and stimulating a major reinterpretation of his ideas. But horizontalism does not excuse the government and the central bank from managing the currency in order to deliver price stability, as argued by Keynes in his 1923 *Tract on Monetary Reform*. Moreover, hyperinflation cannot be analysed and explained within an endogenous money framework, a failure so fundamental that the horizontalists need surely to resume and sustain a dialogue with the verticalists (and perhaps even with the monetarists).¹⁷ All being well, the apparatus of thought developed in this chapter – with the two separate, but linked four-quadrant geometric representations of the different parts of the banking system – will facilitate this dialogue in future.

¹⁷ The author of this chapter is usually (and correctly) regarded as a 'monetarist', in terms of doctrinal affiliation, because he believes the behaviour of the quantity of money has a fundamental bearing on macroeconomic outcomes. But his monetarism owes much to Keynes's own work and indeed to Post-Keynesian writings, as explained – for example – in essay 13 in Congdon (2011). In his view the New Classical School that has evolved from Chicago-School monetarism is an intellectual cul-de-sac.

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Changes in the price level – through either inflation or deflation – have diverging effects on different people and companies. They can result in arbitrary shifts in income and wealth distribution, and cause social upheaval. As the great economist, John Maynard Keynes, said in his famous 1923 *Tract on Monetary Reform*

‘...a change in the value of money...is important to society only in so far as its incidence is unequal. Such changes have produced in the past, and are producing now, the vastest social consequences, because, when the value of money changes, it does not change equally for all persons or for all purposes...Each process, inflation and deflation alike, has inflicted great injuries.’

Professor Tim Congdon CBE

Tim Congdon is an economist and businessman, who has for over 40 years been a strong and widely-respected advocate of sound money and free markets (“Thatcherite monetarism”) in the UK’s public policy debates. He is currently chairman of the Institute of International Monetary Research, which he founded in 2014. The Institute is based at the University of Buckingham, where he is a professor of economics. His most influential position was as a member of the Treasury Panel of Independent Forecasters (the so-called ‘wise men’, or ‘wise persons’ after a lady joined them) between 1992 and 1997, which advised the Chancellor of the Exchequer on economic policy in a successful period for the UK economy. In June 2017 a collection of papers *Money in the Great Recession*, edited by Professor Congdon, was published by Edward Elgar Publishing Ltd.

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