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No economy is an island, entire of itself

The bell tolls for lower European interest rates

**Accelerating
monetary growth
in the UK,**

Monetary growth in the UK has accelerated in 1995, with the broad measure of money, M4, up by 8.7% in the year to October, compared with a rise of 4.1% in the previous year. With inflation staying moderate and likely to fall sharply in early 1996, the growth of real money has also accelerated and may accelerate further. As real money is a reasonably good leading indicator of economic activity, the message is that the current slowdown will not become a recession. Indeed, if recent monetary trends continue early next year, late 1996 should enjoy some upturn in the growth of demand and output.

**but investment is
weak**

But to suggest this is not to claim that the behaviour of real money is the only influence on economic activity. First, if investment plans are being cut, a decline in capital expenditure may for a few quarters offset the monetary boost. (Technically, a shift of the IS curve to the left offsets a shift of the LM curve to the right.) The best guide to investment intentions comes from orders, data on business and consumer confidence, and various industrial surveys. For the UK most such items of information currently paint a pessimistic picture. Construction orders in the three months to September amounted to £5.1b. (constant 1990 prices, seasonally adjusted), more than 10% less than the average quarterly level in 1993 and 1994. Car registrations, housing starts and sales of consumer durables have all been disappointing in recent months. As some industries are over-stocked, it is logical that the latest surveys from the Confederation of British Industry and the Chartered Institute of Purchasing & Supply point to growth remaining weak over the next few months.

**and monetary
growth is
decelerating in the
rest of Europe**

Secondly, and perhaps more fundamentally at present, the business environment is deteriorating sharply in Britain's European neighbours. Whereas real money has accelerated in the UK, it has decelerated in Germany and Italy, and stayed quite low in France. (In Germany M3 was a mere 1.0% higher in October than a year earlier; In Italy, where M2 growth was 8.5%, 5.9% and 8.2% in 1991, 1992 and 1993 respectively, it was only 0.4% in the year to September 1995.) Leading indicator indices for France and Italy prepared by Lombard Street Research, Gerrard & National's research subsidiary, are sliding, while the index for Germany is collapsing. (Similar indices prepared by the OECD are also going down, if not quite so abruptly.) The UK cannot insulate itself from the adverse effects of the Continental downturn on its exports, and so on the growth of demand and output more generally. A weak pound might mitigate the damage, but the Treasury and the Bank are nervous that sterling depreciation could run out of control. Lower interest rates are now essential in our neighbours and ought to facilitate a rate cut (or cuts) here.

Summary of paper on

"The role of central banking in economic development"

Purpose of the paper

The role of central banks in economic development has been controversial. This paper, based on a lecture given earlier this year by Professor Congdon, tries to answer the question, "does central banking promote economic development?".

Main points

- * **Central banking has emerged only in the last 150 years. Critics (notably monetarists such as Professor Milton Friedman) have argued that it hinders economic progress.**
- * **Foolish central banking, in which the central bank usurps the resource-allocation and risk-assessment work that ought to be done by commercial banks, is indeed harmful to economic development.**
- * **But wise central banking, which allows banks to economise on their cash reserves and gives them access to rediscount facilities, increases commercial banks' efficiency.**
- * **The increased efficiency of the commercial banks is evidenced by narrower loan margins and increased availability of overdraft facilities. These are helpful to non-banks in general, but particularly so to traders in securities and commodities who have volatile and unpredictable balance sheets.**
- * **The emergence of central banks in the modern sense, with note liabilities ("cash") free from default risk and the task of protecting depositors from bank failures, improves the liquidity of bank deposits. Deposits come increasingly to be seen as equivalent to cash.**
- * **This boost to liquidity expands the range of investments (the "efficient set") that a society can consider, as fund managers balance expected mean returns against the liquidity of their portfolios. The equilibrium capital stock and output per head are therefore increased by central banking.**

This paper is based on the first Gilman Rutihinda Memorial Lecture, given at the Institute of Finance Management, Dar-es-Salaam, Tanzania, on 20th June, 1995 by Professor Tim Congdon, with financial support from British Airways.

The role of central banking in economic development

The first Gilman Rutihinda Memorial Lecture, given in Dar-es-Salaam, 1995

Development economists increasingly agree on important role for the financial system

In the last 20 years specialists in development economics have become increasingly persuaded that the financial system matters. More precisely, the share of the financial sector in the economy seems to increase with rising output per head. Goldsmith has proposed the idea of a "financial inter-relations ratio", defined as the ratio of financial assets to tangible assets. In his view, the "existence of clearly different paths of financial development is doubtful. The evidence now available is more in favour of the hypothesis that there exists only one major path of financial development, a path marked by certain regularities in the course of the financial inter-relations ratio, in the share of financial institutions in total financial assets and in the position of the banking system".(1) As part of this wider recognition of the financial sector's role, more attention has been paid to the contribution that banks can make to economic development. A large literature has been built up since the seminal publications of McKinnon and Shaw.(2) There is widespread agreement that a "repressed" banking system, subject to extensive controls on its pricing and balance-sheet structures, is likely to impede efficient resource allocation, to reduce investment and to restrict growth. The consequent argument for the liberalisation of financial systems has been endorsed by the World Bank and many development economists.

but position of central banks is more uncertain

But what about central banks? Seen in historical terms, central banks are a relatively recent innovation. As entities with functions and characteristics clearly distinct from commercial banks, they did not exist - or, to be exact, were not recognised to be "central banks" in the modern meaning of the term - before the middle of the 19th century. One of Bagehot's achievements in his classic work on *Lombard Street* (1873) was to urge that in matters of public policy the Bank of England could not be regarded as just another privately-owned bank. It was a different kind of organisation, in his words, "the holders of our ultimate bank reserve", the one and only lender of last resort.(3) In the decades leading up to the First World War other industrial countries followed Britain's example by forming their own central banks. The creation of the US Federal Reserve System in 1913 was perhaps the most outstanding of these developments.

and they have some very fundamental critics

As the 20th century has on the whole seen faster economic growth than earlier centuries, there is at least a possibility that the emergence of central banking has been benign. Like the growth of the financial system as a whole, central banking may have had a positive effect on productivity and living standards. But that view is far from unanimous among economists. In the USA particularly, the Federal Reserve has been subject to considerable criticism from monetary economists. In his *Monetary History of the United States* Friedman and Schwartz doubted whether the Federal Reserve had reduced the instability of the American economy, an understandable comment in view of the severity of the Great Depression in the early 1930s only 20 years after the Federal Reserve's

inception. In a yet more forthright vein Timberlake in his recent book *Monetary Policy in the United States: an Intellectual and Institutional History* has commented, "Federal Reserve policies over the decades have been largely a series of politically-inspired, government-serving actions that have taxed the private economy."⁽⁴⁾ These criticisms are fundamental. Friedman, Schwartz and Timberlake are not attacking certain aspects of the American central bank's operations with its existence taken for granted. They are instead questioning whether the central bank ought to exist at all. If Friedman, Schwartz and Timberlake were right, a highly sceptical assessment of the role of central banking in economic development might seem in order.

This lecture will argue that central banking makes a highly positive contribution to economic development,

The argument of this lecture will be that the growth of a distinct central banking function is part of a process of specialisation in the financial system which is highly beneficial for economic development. The verdict on the contribution that central banks can make to economic progress will therefore be positive and even enthusiastic. However, the precise nature of this contribution needs to be pinned down. One theme - which may not have been previously examined in the literature will be that a central bank confers extra security to commercial banks and that this then improves non-banks' "liquidity". An attempt will be made to define "liquidity", to analyse how it enters portfolio choice and to show how the provision of extra liquidity (in the sense to be defined) may lead to higher investment.

but central banking can help only if it is "wise", not "foolish"

But at the outset a distinction needs to be drawn between wise and foolish central banking. A wise central bank concentrates on the task of providing liquidity (and related services) to its customer, the commercial banking system. Its support for economic development is therefore somewhat indirect and consists in mostly passive promotion of an efficient financial system. A foolish central bank, by contrast, usurps the role of commercial banks and tries to involve itself directly in economic development by actively lending to non-banks. The lecture starts with a critique of foolish central banking.

I. Wise and foolish central banking

The phrase "resource mobilisation" is one of the most plausible and mischievous in development economics. It implies that somewhere in an under-developed economy are idle or even ignored resources, which require only the enlightened intervention of some outside agency for them to be put to good use. The state itself is the obvious agency in question, and straightaway politicians and civil servants are taking decisions which properly belong to the business sector.

The state - and its agencies, including the central bank - may try to become involved in "resource mobilisation"

Unless the economy is already in state hands and subject to centralised planning, the government can assume command of resources by three means. The first is by taxation. Although the most honest, this is also the most obvious and unpopular. The second is by deliberate nationalisation, with the previous owners of the assets compensated by government debt. If the debt is to be honoured by the genuine transfer of goods and services to the previous owners, this has the disadvantage - from the government's and taxpayers' standpoint - of additional debt servicing costs in future. If the debt is not to be so honoured, nationalisation

may be barely distinguishable from theft. In such an environment all private property rights become insecure, investors require much above-normal rates of return to allow for the extra political risk and private-sector capital formation is impeded. Finally, the government can borrow from the banking system, either the commercial banks or the central bank.

Government borrowing from commercial banks may be stimulatory,

The results of government borrowing from the commercial banks may sometimes be entirely favourable. The first effect is to increase both the assets and the deposit liabilities of the commercial banks. Since cheques can be written against deposits, which are therefore "money", the quantity of money rises. Where the level of output is beneath trend, where - in other words - there is "a margin of unused resources", the monetary injection may be beneficial. If the monetary injection has been correctly judged, the resources are put to use and the level of output returns to trend, without adverse inflationary consequences.

as also may be the case, even more powerfully, with government borrowing from the central bank

Much the same story can be told about government borrowing from the central bank, but with an important difference. As before, the first effect is to increase both sides of a balance sheet, on this occasion the central bank's. But the liabilities of the central bank are different from those of the commercial banks. They consist of the note issue in the hands of the non-bank public and claims on the central bank held by the commercial banks. These claims in turn are of two kinds, the notes that the banks keep in their vaults to meet deposit withdrawals, and the balances they hold at the central bank to meet their obligations to other banks (principally at the cheque clearing) and to top up their "vault cash" when it runs short. As notes cannot pay interest, and as a central bank does not normally offer interest on banks' balances with it, the central bank's liabilities are an unattractive asset compared with interest-bearing bank deposits. In most countries they are inevitably much smaller than the liabilities of the commercial banking system as a whole. The commercial banks' liabilities (the money supply) are a multiple of the central bank's liabilities (the monetary base). It follows that a given amount of government borrowing is more stimulatory if the borrowing is done from the central bank instead of from the commercial banks. The amount of government borrowing that can be safely done, without eliminating the margin of slack, is less with central bank finance than with commercial bank finance. There may nevertheless still be cases where government borrowing from the central bank can bring "unused resources" to life, where - in other words - deficit financing can play a helpful role in "resource mobilisation".

But such "monetary stimulation" is nearly always misguided

The main plot of these stories - these fairy tales, as some might call them - is well-known. But in the real world, in the typical developing country of the late 20th century, central bank financing of so-called "resource mobilisation" rarely ends with the line "they all lived happily ever after". First of all, some doubts must be raised about the long-run consequences for resource allocation. The unused resources might have in any case found satisfactory employment without the involvement of the government or the banking system. The activation of the resources might have taken longer without their intervention, but - if conducted in the private sector subject to market constraints - both the

private and social rate of return might ultimately have proved higher. Secondly, there is the risk that the government has misjudged the availability of resources, and that its decision to borrow from the central bank leads to excessive money creation and inflation.

Inflation used to be advocated as a "method of development"

Surprising though it may seem nowadays, the literature of development economics includes some quite frank advocacy of inflation. In 1960 Bruton proposed that, "a case could be made for making inflation an instrument of [development] policy, rather than the control of inflation an object of policy".(5) A standard collection of essays on development issues published in 1964 referred to "the method of development by inflation" and noted "the usual points advanced in favor of inflation", which may be listed as follows

inflation permits the employment of underemployed workers; monetary or credit expansion is necessary to allow the 'development authorities' to bid resources away from consumption; in the early stages of inflation, the 'money illusion' may induce factors of production to work more intensively; the period of inflation may be short since it will increase investment which, in turn, will expand total output, and a large portion of the increment in output may then be saved and taxed to offset the rise in investment; and none of the alternative methods of financing a rise in investment is any less free of hardships.(6)

Inflation intended to achieve switch from consumption to investment in a fully-employed economy

There is in fact only one argument here, which can be readily summarised. Consider an under-developed country that - in contrast to our previous discussion - does not have a margin of spare resources. What, then, can "resource mobilisation" mean? The answer is a shift of already-employed resources away from consumption to investment, where investment adds to the capital stock and so creates more output in future. As before, the resource shift could be accomplished by taxation or expropriation, but both methods have obvious drawbacks. Superficially, borrowing from the banking system - indeed, borrowing on such a scale as deliberately to stimulate inflation - has clear advantages. Unlike expropriation, it channels resources into development without posing a direct challenge to private property rights; and, unlike taxation, it does not undermine the political popularity of a government committed to economic development. In this analysis the money creation due to borrowing from the banking system, and the subsequent inflation, are instrumental in effecting the resource shift. Indeed, it serves a vital and apparently constructive role. It reduces the real value of people's money holdings and incomes, so that resources are released to the state for capital projects. The implied deception, the so-called "money illusion", is crucial in curbing consumption so that more room can be made for investment.

On the theoretical level this argument is unconvincing in many ways. In practice its results are almost certain to be disastrous. For a start, it begs the question of how long people are prepared to be deceived by inflation. If they are not so deceived and instead see the connection between monetary financing of budget

But this is likely to backfire, because of lower equilibrium ratio of money to national product

deficits and inflation, the scope for a resource shift towards investment declines. Because people know that inflation will reduce their real incomes, they anticipate it by larger upward adjustments to nominal incomes. Because people expect that the value of money will fall, they reduce the amount of money they are prepared to hold in relation to their incomes and wealth. In addition, they may hold foreign currency instead of local currency. The reduction in the ratio of money to national product implies an equivalent reduction in the ratio of bank intermediation to national product and so limits the government's ability to extract real resources by monetary financing of the budget deficit.

and reduced quality of investment

Further, although a policy of deliberate inflation might sometimes boost the *quantity* of investment, the result is likely to be an accompanying deterioration in the *quality* of investment. As claims on government and the public sector rise as a proportion of the banking system's assets, there must be offsetting fall in the importance of claims on the private sector. The private sector, subject to market disciplines, necessarily has less access to resources. Inflation also complicates financial planning, particularly the planning of decisions to save, borrow and invest. Much depends on how interest rates respond to higher inflation. The rise in inflation may be matched by a rise in interest rates, in which case the initial servicing costs of loans increase with adverse consequences for corporate cash flow and long-term investments. Conversely, if interest rates remain the same, the real return on bank deposits and other interest-bearing financial assets is lowered, and - because people are not prepared to hold such assets to the same extent as before - the ability of the financial system to channel resources from savers to private-sector investments is undermined.

Inflation, caused by foolish central banking, retards financial development and economic progress more generally

In short, inflation retards the growth of the financial system or may even cause it to contract. Instead of the financial system expanding relative to the economy as a whole, as in Goldsmith's "one major path of financial development", it diminishes in size relative to other branches of economic activity. In any society specialist skills are required to evaluate the merits of alternative investments, and in particular to rank them in order of profitability so that only investments with a rate of return above the rate of interest are chosen. These specialist skills are found in such organizations as banks, fund management companies, stockbrokerages, venture capital funds and so on. They are acquired only with experience and the passage of time. Moreover, they can be exercised only within a clearly defined background framework of law, accountancy, corporate finance practice and financial regulation, and that framework in turn needs time and continuous practical testing if it is to develop properly. Further, the success of any financial system depends on the clear delineation of property rights so that success in selecting investments is rewarded and failure penalised.

The specialist skills in question cannot readily develop in a state-owned organization such as a central bank. As the central bank is a state-owned entity, it cannot go bust. If it makes misguided loans to non-banks which are then unable to repay them, the extent of the misdirection of credit can be concealed for a long period by the simple addition of interest to old loans and the indefinite

postponement of repayment. Even if common sense does finally require the loss to be recognised, any deficiency in the central bank's capital can be covered by a few accountancy tricks on the government's part, without any obvious resource cost being incurred. After all the bulk of central bank's liabilities (i.e., the note issue) is legal tender, so that the central bank can make a loan to government which is then injected back into the central bank as capital.

High "reserves" at central bank undermine banking efficiency

The mischief is all the greater if the central bank extends cheap credit to non-banks and finances it by requiring the commercial banks to leave low-interest (or entirely non-interest-bearing) reserves with it. This either reduces the profitability of the commercial banking system or necessitates wider margins on its loans. Indeed, the divergence between the cost of cheap loans from the central bank and rather expensive credit from the commercial banks is a manifest price distortion. This sort of distortion - which is common in developing countries - is virtually certain to lead to resource misallocation. Even worse it may cause resentment, with a partisan political tinge, on the part of the commercial banks and their customers as they see the more favourable treatment extended by the central bank to its customers.

Forced development with central bank credit is mistaken, because people never wish to hold large amounts of zero-yielding notes

To summarize, an attempt to force development by expanding central bank credit is an altogether misguided venture. Because the note issue does not pay interest, the ratio of the central bank's liabilities to national income that is acceptable to the community (the "equilibrium ratio of the monetary base to national income") is necessarily limited. Even if monetary policy were conducted sensibly to avoid inflation, a high ratio of financial intermediation to national income could never emerge on the basis on the central bank's balance sheet alone. A financial system that is large-scale in relation to the whole economy must be a financial system where the overwhelming preponderance of assets are held by commercial banks and other financial institutions, and not by the central bank.

But - if policy-makers are misled by the legal-tender status of bank notes into believing that they can extract resources by inflation - the damage is even worse. Because of the uncertainties about the real value of financial assets in future, people become averse to the holding of such assets and the financial system contracts. If central bank credit is a disproportionate share of total credit, the amount of credit extended by other institutions is correspondingly reduced. In consequence, savings and investment are low as a share of national product, the level of the capital stock per head is restricted and the marginal productivity of labour is lower than it would have been with a larger capital stock. Incomes per head are modest compared with nations benefiting from more advanced financial systems and larger capital stocks.

A general law - that the central bank's role in financial intermediation

Indeed, it may not be too brave to propose a general law. The higher is the ratio of central bank credit to total credit extended by the banking system and to national income, the lower is income per head. Part of the process of "financial deepening" (to adopt Shaw's term) and so of economic development as a whole is a decline in the size of the central bank's balance sheet relative to other

declines, as income rises - proposed

financial institutions. Rapid growth of central bank credit is unlikely to promote "resource mobilisation", but instead to cause inflation and to prevent the development of an efficient market-oriented financial system.

II. How central banking helps the commercial banks

So much for foolish central banking. In the rest of the lecture the assumption will be that central banking is wise, in the sense that the conduct of monetary policy keeps the value of money reasonably stable and that the central bank confines itself to its main tasks, namely to be banker to the banking system and to conduct the government's financial transactions. How can central banking, restricted in this way, contribute to economic development?

If central banks decline in relative importance with economic progress, how can they contribute to that progress?

Straightaway there is a paradox. The discussion of central banking so far concluded with a proposed "general law" that the central bank declined in size relative to the rest of the financial system as incomes per head increased. Superficially, the implication must be that the importance of the central bank to economic growth is less as societies become more developed. However, this implication may be quite wrong, for reasons which were first explained by Edgeworth in 1888.(7)

Management of banks' cash reserves vital to their profitability

The business of banking is consistently to earn a higher rate of interest on assets than is paid away on liabilities and to expand the balance sheet as much as possible. More specifically, the greater is the gap between the average interest rate a bank charges on its assets and that which it pays on its liabilities, and the higher is the ratio of assets to capital, the higher is the return to a bank's shareholders. The difference between a bank and other financial organisations is that it attracts deposits not merely by paying an interest rate, but also by offering transactions services. Specifically, it accepts cash deposits from its customers, agrees to repay the deposits after the due period of notice (if any) and makes transfers between different customers' accounts, as they instruct. In order to be able to offer such services, it has to have some legal-tender currency or "cash" of its own (i.e., the notes or "vault cash" and bankers' balances already mentioned). If it fails to repay depositors with notes, it is in breach of its undertakings and has to close its doors. Plainly, the higher is the ratio of cash to its liabilities, the more confident it can be about repaying deposits in full. But - because notes and bankers' balances do not pay interest - the higher the ratio of cash to liabilities (and of course to assets), the lower is the shareholders' rate of return.

Edgeworth showed in classic 1888 paper that law of large numbers helps in economising cash balances

Edgeworth's insight - in his classic paper on 'The mathematical theory of banking' - was that "the law of large numbers" could be applied banking. If depositor's withdrawals are stochastic, and depositors' actions are independent of each other, the amount of cash reserves that a bank must hold is subject to the laws of probability. A bank can from its own records readily calculate the standard deviation of deposit withdrawals over time. Cash reserves can be varied so that they are a multiple of this standard deviation and associated with every particular multiple is a particular probability of running out of cash. Banks' managements can operate with a high or low multiple, depending on the amount of risk that they are prepared to run. It turns out that - because of

the law of large numbers - there are important economies of scale in cash management. For a given probability of running out of cash, cash reserves need to increase not in proportion to the number of independently-acting depositors, but as the square root of that number, so that "cash holdings need only be doubled as the number of such depositors increases fourfold".(8) This principle gives a large bank a formidable advantage relative to a small bank and may be part of the reason for the rather concentrated nature of clearing banking in most countries.

and so also does a central clearing mechanism

But Edgeworth sets out the case not only for large banks, but also for a central clearing mechanism. It is possible to imagine a situation in which a few large banks each maintain similar cash ratios and form a clearing-house, at which they settle debts between themselves by drawing on balances they maintain there. The clearing-house's assets consist only of notes (issued, for example, by government) and its liabilities only of bankers' balances. To understand the clearing-house's behaviour, Edgeworth's paper considers an amusing analogy with London clubland. The manager of every club has the problem that the number of diners is unpredictable from day to day. Now suppose "that the managers of several clubs, finding it inconvenient to keep a large reserve of provisions on their premises, request the manager of a large central club to keep provisions for them". This central club "undertakes to supply on demand any evening dinners up to a certain number". If R had been the reserve of each club before the central club had been set up, if n is the number of clubs and they are equal in size, what is the size of the reserve that must be maintained by the central club to fulfil the contract?

Centralisation of cash reserves also economises on reserve requirement

The answer might appear to be $R \times n$. But it is not. It is much lower, for two reasons. First, "an excessive demand upon one club is apt to be partially compensated by a diminished demand upon some other club", because the maximum number of diners is of course limited. This "compensatory action of mutual hospitality" enables R to be lower, say, at R_2 instead of R_1 before. Secondly, even aside from this advantage, the level of the central club's reserve provisions can be reduced because of the law of large numbers. So the reserve that the central club must maintain is the square root of $R_2 \times n$, whereas if all the clubs had continued to act independently their combined reserve would have been $R_1 \times n$. Of course, the managers of clubland and the managers of clearing banks are in much the same position. So "if n banks become co-ordinated by keeping their reserve in one prime bank, the reserve which is now required to meet their liabilities tends to be less than n times the previous average reserve".(9)

Edgeworth's point explains why commercial banks would agree to form a central clearing mechanism and it has already gone quite a long way to providing a rationale for a central bank. The rationale is obvious. It is simply a matter of profit maximisation. The reduction in the cash reserve requirement enables the banks to increase the ratio of interest-bearing assets to total assets. But a central clearing house is still not a central bank. In actual historical experience banks have typically left reserves with the safest bank, usually the

banker to the government, and these balances have been used to settle net debit positions in cheque clearing houses.

Central bank has further advantage - compared with centralised reserve - that it can also lend

The benefits from the centralisation of the reserves still accrue, but there is a further advantage. Whereas the size of a clearing house's balance sheet depends on its members' decisions to leave balances with it, a central bank can grow its balance sheet by simultaneously expanding both its assets and its note liabilities. (This property stems of course from the legal-tender status of its notes and their consequent acceptability in as a medium of exchange.) Whereas a clearing house cannot lend to its customers, a central bank most certainly can. A central bank is not merely a home for bank's liquidity; it is also, at least potentially, a lender of last resort.

Lender-of-last-resort facilities allow still greater economisation of cash reserves

As commercial banks started to leave deposits with embryonic or fully-fledged central banks in various countries, an implicit contract began to emerge. Just as the central bank took cheap deposits from the commercial banks when they had cash surpluses, so the central bank would purchase assets from them or even lend to them when they were short of cash. So a tacit understanding to lend cash, particularly in emergencies, accompanied the acceptance of deposits from the banks. This helped the banks in two further ways. First, the availability of central bank rediscount and lender-of-last-resort facilities allowed them to reduce their cash reserves even more and again to boost the ratio of interest-bearing assets to total assets. Secondly, as the central bank could lend and adjust the size of its balance sheet (and so the amount of cash in the economy) at management's discretion, the commercial banks felt emboldened to incur obligations to lend whatever amount their customers required, subject to some maximum, at their customers' convenience. In other words, they offered overdraft facilities. (The Royal Bank of Scotland is usually credited with the innovation of extending overdraft facilities. It is interesting that the innovation occurred only a few decades after the establishment of the Bank of England - where the RBS kept its reserve and that it happened in Scotland, where banking regulation was much lighter than in England.) (10)

and encourage overdraft facilities

III. How central banking helps the economy as a whole

Benefits to whole economy extensions of benefits to banking system

So far the subject has been discussed very much from the standpoint of the commercial banks. It has explored the benefits that accrue to them from the existence of a distinct central banking function. But what about the banks' customers? What, if anything, do they gain from the emergence of central banks? Three arguments will now be developed to show that the development of central banking confers benefits throughout the economy and not just merely in the banking system. Two of these arguments are extensions of the ideas already proposed. The third will be separate and more ambitious, and will try to establish a connection between, on the one hand, the work performed by the banking system and the central bank, and, on the other, the "liquidity" of non-banks and the size of a nation's capital stock.

First, Edgeworth's account of the mathematics of reserve management showed how the existence of a central reserve organisation allows banks to reduce the ratio of cash, the non-interest-bearing asset, to total assets and so to increase

i. Reduction in ratio of non-interest-bearing cash to total assets leads to lower loan margins for banks' customers

their profits per unit of assets. If the ratio of capital to assets is the same as before, this economisation on the use of cash increases the rate of return on capital. But - as Alfred Marshall taught long ago - competition and the reallocation of capital from unprofitable to highly profitable activities equalises the rate of return on capital to a "normal" level, which is roughly the same in all industries. The innovation of central banking may enable entrepreneurs in banking to earn above-normal profits for a time, but the boost is only temporary. Eventually they have to pass on the benefit to their customers in a narrower gap between the interest paid on deposits and charged on loans. This compression of banks' margins is one of the advantages that non-banks receive from the development of central banking.

ii. Availability of overdraft facilities reduces non-banks' interest charges

Secondly, the availability of overdraft finance is also a boon to banks' customers. This can be demonstrated most simply by discussing the financial situation of a trader in financial securities, whose balance sheet is volatile from period to period. (The same thesis would apply if he were a trader in commodities, semi-finished products or whatever.) His business is to buy and sell securities as an agent for his customers, who are the long-term holders. But the securities pass through his accounts on a short-term basis and for a few days he is the beneficial owner. Because he is only an agent, his balance sheet can safely be a multiple of his capital which may be denoted by K . K is fully used up in the infrastructure of the business and does not finance his holding of securities. He therefore has to finance his securities holdings by a bank loan and pay an interest rate, i , which is charged as a proportion of the value of loan in each period. The question is "what is the most profitable way for the trader to conduct his business and, in particular, his banking relationship?"

and is of most help to agents with volatile balance sheets (brokers, dealers, traders)

One of his key problems is that he cannot predict the maximum size of his customers' orders. Obviously, he wants to meet his customers' requirements and to carry out the largest possible value of transactions, but he is subject to the constraint that he must not take on too much risk by over-exposing his capital. Say that his maximum balance sheet size is $x \times K$ and that he expects to reach this maximum in only one trading period out of, say, m trading periods. The average size of his balance sheet is only half the maximum. Failure to meet customers' requirements at the peak period is damaging to his goodwill and must be avoided. Because of uncertainty, neither he nor his customers can predict which of the m periods will see the peak order level.

Denote the maximum bank loan at the peak by L . Then this is equal to $(x - 1) \times K$, because the business's own capital is tied up in infrastructure. But the average loan size during the m trading periods is much smaller at $(1/2 x - 1) \times K$. The trader could finance his business by a term loan, a fixed sum borrowed from the bank over the m periods, in which case his interest cost would be $i.m.(x - 1).K$. Alternatively, if it were available, he could arrange an overdraft facility with his bank, in which case the interest cost would be $i.m.(1/2 x - 1).K$. The overdraft facility is evidently much cheaper, with a saving in interest costs of $1/2 x.i.m.K$. over the m trading periods. It would be straightforward to examine other cases with different assumptions, but the main

point is obvious. The overdraft enables the trader to economise on interest costs because his average bank borrowing equals his average securities holdings, whereas with a term loan it is equal to his maximum securities holding.

Savings in traders' interest charges are passed on - because of competition - to ultimate producers and consumers,

The savings in interest cost made possible by the introduction of overdraft facilities are - in the real world - shared between the banking system, traders (in securities, commodities, currencies and so on) and the traders' customers. Banks can charge commitment fees for offering overdraft facilities, which bites into the interest saving. But competition will limit the commitment fee to the actual cost of offering such facilities instead of term loans. In an economy with an efficient central bank which readily accommodates fluctuations in banks' balance-sheet size, that cost ought to be trifling. (Here lies a large part of the justification for central bank efforts to curb volatility in inter-bank and money market rates.) Traders may in the first instance earn super-normal profits as they benefit from the reduction in interest costs associated with overdrafts. But in due course competition forces them also to pass on part of the cost saving to their customers by cutting the spreads between their bid and offer prices.

as in the City of London and other financial centres

In short, the development of the central bank enables commercial banks to offer flexible overdraft facilities to their customers. When these customers have volatile balance sheets, the resulting reduction in interest costs is of wider benefit, and cuts the cost of trading in all kinds of securities and commodities. This argument may be part of the explanation for the concentration of commodity and financial markets in the City of London in the late 19th century, a concentration which occurred just as the Bank of England was discovering and specialising on its central banking role. It is interesting that the formation of the Federal Reserve just before the First World War was also followed, over the next 15 years, by rapid growth in such trading activities in the USA. Liquid markets in commodities and raw materials, where traders can deal in large amounts and charge only narrow spreads, are plainly valuable to industrial companies. Even though central banks deal exclusively with banks, their activities help agents throughout the economy and not merely in the financial sector.

iii. Central banking increases non-banks' liquidity, a concept best understood by a digression into portfolio choice

The third argument on wider benefits conferred by central banking requires a digression into portfolio choice. One familiar textbook account of portfolio choice differentiates between the expected mean return on an asset and the expected variance of that return, with the variance serving as an easily-interpreted measure of risk. A range of investments can be hypothesized, with different mean returns and variances. An investment with an identical variance to another but a lower mean return can be rejected from the "efficient set" of investments, as can an investment with an identical mean but a higher variance. The investor's choice from the resulting efficient set depends on his risk preferences, which can be modelled in various ways.

Cf. mean-variance analysis

Mean-variance analysis suggests at least one means by which financial markets can boost a society's productivity. It is evidently worthwhile for society if investments with a high mean return are chosen instead of those with a low

mean return. Risk, as measured by the variance, may matter to the individual investor, but society would be better-off if decisions were taken solely with the objective of maximising returns. Financial markets have the great advantage that they enable investors to allocate funds to a large number of securities. This process of diversification has the crucial property that it reduces the variance of the entire portfolio without affecting the mean return. As a result the portfolio decisions of all the individual investors, taken in the aggregate, can move closer to the social optimum than if investors had been unable to diversify their risks.(11)

But portfolio managers are concerned with several attributes of an investment, and not merely with its mean and variance. For example, they are also interested in their ability to buy and sell an asset at a price close to its middle market price. If an asset cannot be bought or sold except at a wide penalty to the middle price, it is "illiquid". This illiquidity is a particular nuisance if the portfolio manager has a planning horizon which extends over many periods and he wants to have the flexibility to shift the investments around in the future, as opportunities arise. (In the typical textbook discussion mean-variance analysis is timeless. Implicitly it applies only to a single period.)(12)

A new measure of "liquidity", in terms of price spreads

A measure of liquidity in this sense is easy to propose. Imagine a market for an asset of any kind, with traders who intermediate between ultimate buyers and sellers. As the traders have to make a living, their selling price (P_a) is higher than their buying price (P_b). Their "spread", S , can be expressed in relation to the middle price, as follows

$$\frac{P_a - P_b}{(P_a + P_b) / 2.}$$

An asset is more liquid than another if it has a lower spread in the recognised market-place. (This very simple concept is plainly different from the asset's variance. Risk and liquidity are altogether distinct concepts.)(13)

and its variation according to the size of trade and length of transaction time

Liquidity could have several further dimensions. Thus, a liquid asset is one where the spread does not change much however large the buying and selling orders placed for it. (Let w be the size of the orders. Then, in any one period, S is a function of w , $S = S[w]$, where the first derivative, S_w , is positive. An asset is more liquid than another if the value of this first derivative is lower.) There is also a possibility that, for a relatively illiquid asset, the spread narrows as a result of search and discovery over several periods. (Let t be the number of periods in which transactions are undertaken. Then, S is a function of t , $S = S[t]$, where the first derivative, S_t , is negative. An asset is more liquid than another if the value of this first derivative is less negative.) The liquidity attributes of an asset can then be described by the function, $L = L(S, S_w, S_t)$.

Now consider the liquidity of cash, the high-powered money issued by the central bank. In modern circumstances, where legal tender laws are universally

Cash is most liquid asset in any economy in force, its value is given by the nominal value stated on notes or coins. In other words, the "spread" is zero. Moreover, the nominal value of cash in any market does not change no matter how large the amount of cash tendered (i.e., S_w is zero) and also no matter the number of periods in which transactions are undertaken (i.e., S_t is also zero). Cash is the most liquid asset imaginable.

Bank deposits are less liquid than cash But what about bank deposits? In contemporary definitions of the money stock cash and bank deposits are conflated, as if they were perfect substitutes. For most practical purposes it does little harm to regard them as perfect substitutes, although - as a matter of fact - they are quite different assets. (Time deposits are more difficult to access than sight deposits, because of the notice period. Further, even sight deposits are inferior to notes and coin because cheques - unlike notes and coin - can legally be refused in payment.) But, as an historical matter, bank deposits were certainly not regarded as being "as good as" notes and coin. Until the last 100 or so years depositors knew that a bank might not be able to repay them the full value of the money left with it, because the bank might "go bust". They were willing to make the deposits only because of the better interest return, security (i.e., in the sense of avoiding theft) and convenience (such as ease of transfer geographically) offered. In most countries there is still a risk that banks can go bust, although small depositors are often protected by deposit insurance. (In aspiration, the value of bank money is the same whether it is being withdrawn or deposited, i.e., P_a and P_b are equal. But, while that may be true today, it is not certain that P_a and P_b will be equal at all future dates. Indeed, when banks "have to shut their doors", P_a is temporarily zero and the "spread" is infinite.)

But central banking brings cash and deposits closer to full equivalence The vital achievement of central banks in this context is that, by the provision of rediscount, lender-of-last-resort and supervisory services to commercial banks, they have greatly reduced the likelihood of banks going bust. The provision of such services became conceivable only when central banks emerged as an institutional category clearly distinct from commercial banks. Because of the effectiveness of the new central banking services, the likelihood of banks failing to repay deposits in full is less in the late 20th century than it was in the 18th or 19th centuries. As a result, bank deposits have increasingly come to be seen as equivalent to notes or, in other words, as sharing the liquidity attributes of the most liquid asset imaginable. (This may seem an odd comment in view of the enormous losses suffered by depositors in the USA during the early 1930s, almost 20 years after the formation of the Federal Reserve. The losses were far greater than in any comparable episode in the 19th century. But Friedman and Schwartz are surely right to identify the Federal Reserve's blunders as the cause of the catastrophe. It should be emphasized that Britain, with a much older central bank, suffered no bank failures in the 1930s. Moreover, the incidence of bank failures and deposit losses in the USA has been far less in the late 20th century than before the Fed's creation.)

- except for the disaster of the Great Crash

Mean-liquidity analysis cf. mean-variance analysis How is all this relevant to portfolio choice? The answer is that a portfolio manager has to balance not just the mean and variance of investments. He has also to consider their mean and liquidity, in the sense defined earlier in the

proposed "liquidity function". Just as it is possible to hypothesize an efficient set of investments described in terms of their mean and variance, so an analogous efficient set can be hypothesized with investments described in terms of their mean and liquidity.(14) Portfolio managers choose a particular point on the efficient set, depending on their liquidity (as well as their risk) preferences. (Hicks suggested in *A Market Theory of Money* that investors could be differentiated according to their liquidity preferences, with some being "fluid" and others "solid".)(15) Further, just as a case can be made that financial markets facilitate greater portfolio diversification and enable society to make a better choice between risk and return, so a case can be made that the development of central banking extends the efficient set of investments and helps agents to undertake a greater amount of investment while leaving the liquidity of their portfolios unchanged.

An efficient set of investments can be defined in terms of mean and liquidity

Before the development of central banking, the efficient set of investments for a nation's investors, taken in the aggregate, had capital assets with various expected mean returns and liquidity. These assets included cash with the highest liquidity and zero nominal return, bank deposits *with markedly less liquidity and a small positive return*, securities less liquid than deposits but a higher return, and so on. The quantity of deposits that non-bank agents were prepared to hold was, say, some multiple *a* of the amount of cash in the economy. The value of the multiple depended partly on the return offered on bank deposits relative to other assets. Bank deposits and other financial assets were, directly or indirectly, claims on physical capital. (In the case of bank deposits, this was indirect, since the deposits were matched by loans, which were extended only at a further remove to productive companies with physical capital.) The return on the bank deposits and other financial assets depended ultimately on the return provided by the physical capital, which was determined by technology, the availability of other factors of production and other considerations.

Central banking expands this efficient set

Now consider how the development of the central bank improves the situation. The efficient set is changed, because it now includes cash with the highest liquidity and zero nominal return, bank deposits *with virtually identical liquidity to cash and a small positive return*, other securities and so on. For any given return on bank deposits, the quantity of deposits that non-bank agents are prepared to hold is a multiple *b* of the amount of cash, where *b* is higher than *a*. Because the stock of deposits willingly held is higher than before, banks can expand their loan assets in real terms and the society's equilibrium stock of physical capital is increased. In practice, the return on bank deposits may fall somewhat so that non-banks are indifferent between the old situation (higher return on deposits offset by lower liquidity) and the new situation (lower return offset by increased liquidity), and the society accepts a lower marginal productivity of capital, a higher capital/labour ratio and higher marginal productivity of labour. The higher marginal productivity of labour ought in turn to be associated with higher living standards.

and so increases society's equilibrium capital stock and output per head

Cf. McKinnon, Shaw and financial deepening

The precise size of the benefit conferred on a society by central banking by this means is difficult to conjecture in general terms. Evidently it depends on the relative size of the two multiples of cash, *a* (pre-central banking) and *b* (post-central banking). Earlier it was suggested, as a general law, that the central bank's balance sheet contracts (in relation to national product) as incomes per head increase. On the other hand, the literature of financial development is agreed that the banking system's balance sheet expands relative to national product as incomes per head increase. Indeed, it was integral to McKinnon's thesis in *Money and Capital in Economic Development* that the rise in real money balances, both in absolute terms and in relation to national product, during periods of above-average economic growth was instrumental to the process. In his view, extra loans (and, at a further remove, physical capital) on the assets side of the banking system's balance sheet matched the higher money balances on the liabilities side. The argument here is consistent with the idea that "financial deepening" involves a decline in the size of the central bank's balance sheet relative to other financial institutions, including the commercial banks.

IV. Summary

Lecture implicitly a strong critique of "free banking"

This lecture is intended to demonstrate that central banking has a positive role to play in economic development. By showing that central banks can improve the efficiency of the banking system and non-banks alike, it provides a critique of "free banking" and related rather dreamy notions of "de-nationalising money". The historical record is that central banks evolved gradually and spontaneously, in response to a well-defined functional need on the part of the commercial banks. This lecture has tried to identify and describe these functional needs more precisely. It has suggested that - in a number of very practical ways - the introduction and growth of central banks can be of great economic benefit both to individual agents and to society at large.

Central bank powers can of course be abused,

Of course, central banking has to be conducted competently. Some developing countries suffer from a grotesque confusion in which the central bank's main task is seen as lending support to state economic planning and sectoral credit allocation. Others abuse the special attribute of the central bank's note liabilities - that they are costless to produce but have a positive value because of the legal tender laws - to appropriate resources for the public sector. (Even worse this appropriation of resources may be not for the benefit of society as a whole, but rather for such good causes as the personal fortunes of the current ruling elite.) Such activities - "foolish central banking" - are not really central banking at all. The analysis of the benefits from central banking in this lecture has assumed that the central banking is "wise" in character. More exactly, central banks restrict themselves to serving the needs of their customers (the commercial banks) and to keeping the value of their liabilities stable (i.e., maintaining price stability).

The main points can be summarised. The innovation of centralising the banking system's cash reserve allows banks to reduce the ratio of their non-interest-bearing cash to total assets, with the eventual consequence that margins on loans to non-banks can be narrower than before. Like the

but - if used intelligently - they increase banks' profits and efficiency,

commercial banks, the bank acting as the central reserve can issue liabilities (i.e., notes, bankers' balances) against itself and acquire claims on other agents, by for example lending to commercial banks. As this ability to lend develops over time into a recognised lender-of-last-resort function, the central reserve bank becomes "a central bank", a different type of institution from commercial banks. When commercial banks know that the central bank can thereby support them in emergencies, they are willing to extend overdraft facilities to non-banks. Overdraft facilities lower the interest costs of traders with limited capital and volatile balance sheets, and competition between traders then narrows dealing costs in the markets for securities, commodities and semi-finished products.

and add liquidity to the economy at negligible resource cost

Finally, but perhaps most fundamentally, the lender-of-last-resort role expands into more general supervisory work and the central bank encourages the expectation that deposits will always be repaid in full. Bank deposits therefore become virtually as liquid as the central bank's own liabilities (i.e., cash). Because the economy is endowed with extra liquidity by this institutional innovation, non-bank agents are willing to hold a larger capital stock, and labour's marginal productivity and living standards are increased. A remarkable aspect of the process is that - in a fiat-money economy where the value of money rests solely on the legal tender laws - the gain has a negligible resource cost (i.e., the cost of printing notes and the central bank's own management expenses). The origin of this gain - which may be very substantial - can be understood only if the discussion of portfolio choice is extended beyond the familiar mean-variance analysis into more unfamiliar territory where agents are balancing the mean return on various assets against their relative liquidity.

Paradox that gains from central banking are greater, the smaller is central bank's balance sheet relative to rest of banking system

The description of the growth of central banking in this lecture began with the banks' assumed wish to reduce their costs by centralising and minimising their cash reserves. It follows that the imposition of mandatory cash reserve ratios which are above banks' own functional needs is the negation of central banking. Ideally, banks should be free to decide on the size of their own cash holdings, subject of course to always meeting their clearing and deposit repayment obligations. A central bank which instead tries to capture a large chunk of the commercial banks' balance sheet by enforcing a high non-interest-bearing cash ratio lowers their profitability. The banks have to compensate by widening margins on their genuine loan business. Because the central bank improperly encroaches on their legitimate area of business, their efficiency is weakened, and they are unable to make such a large and positive contribution to economic development. Paradoxically, a central bank serves the process of economic development more powerfully, the smaller is its own balance sheet compared with that of the banking system as a whole.

Notes

- (1) Raymond W. Goldsmith *Financial Structure and Development* (New Haven and London: Yale University Press, 1969), p. 40.
- (2) Ronald I. McKinnon *Money and Capital in Economic Development* (Washington, DC: Brookings Institution, 1973) and Edward S. Shaw *Financial Deepening in Economic Development* (New York: Oxford University Press, 1973).
- (3) Norman St. John-Steuart *The Collected Works of Walter Bagehot*, vol.9 (London: The Economist, 1978), *Lombard Street* (originally published 1873), p. 135.
- (4) Richard H. Timberlake *Monetary Policy in the United States* (Chicago and London: University of Chicago Press, 1993), p. xxi.
- (5) H. J. Bruton *Inflation in a Growing Economy* (Annual Lectures by Visiting Professor of Monetary Economics, 1960 - 61, University of Bombay, Bombay). Paratheses added on p. 184 of Gerald M. Meier *Leading Issues in Development Economics* (New York: Oxford University Press, 1964), p. 170.
- (6) Meier *Leading Issues in Development Economics*, p. 170.
- (7) Francis Y. Edgeworth 'The mathematical theory of banking' (read before the British Association, September 1886), *Journal of the Royal Statistical Society*, LI (1888), pp. 113 - 27, reprinted in Mervyn K. Lewis (ed.) *Financial Intermediaries* (Aldershot, UK, and Brookfield, Vermont: Edward Elgar Publishing, 1995), pp. 3 - 17.
- (8) Lewis (ed.) *Financial Intermediaries*, p. xvi.
- (9) Edgeworth 'Mathematical theory' in Lewis (ed.) *Financial Intermediaries*, pp. 14 - 16.
- (10) The benefits of the rapid growth of banking to the Scottish economy in the mid-18th century was emphasized by Adam Smith in *The Wealth of Nations*.
- (11) This argument is well-known from Arrow's 1965 Yrjö Jahnsson lectures. By means of "the market in common stocks", the businessman can "own a diversified portfolio of common stocks" and "derive the benefits of the reduced aggregate risk through pooling; thus, the stock market permits a reduction in the social amount of risk bearing". K. J. Arrow *Collected Papers of K. J. Arrow: The Economics of Information*, vol. 4 (Oxford: Basil Blackwell, 1984), p.79.
- (12) For example, see T. E. Copeland and J. F. Weston *Financial Theory and Corporate Policy* (Reading, Massachusetts: Addison-Wesley Publishing Company, 1980), p.120 and the subsequent analysis.

(13) Tobin's well-known proposal that liquidity preference can be explained as behaviour towards risk does not exhaust the subject. (J. Tobin 'Liquidity preference as behaviour towards risk' *Review of Economic Studies*, no. 67), 1958, pp.65-86.) In fact, Tobin claimed only that "the theory of risk-avoiding behaviour has been shown to provide *a* basis for liquidity preference" (lecturer's italics), not *the* basis.

(14) Copeland and Weston *Financial Theory*, p.142, where "the efficient set" is described as "the set of mean-variance choices from the investment opportunity set where for a given variance ... no other investment opportunity offers a higher mean return". By analogy, the efficient set in mean-liquidity analysis is that set of choices where for a given liquidity - as defined by any or all of S , S_w and S_t - no asset offers a higher mean return.

(15) Hicks made the distinction between "fluid" and "solid" investors in his final book, *A Market Theory of Money*, developing ideas originally expressed in his 1974 lectures on *The Crisis in Keynesian Economics*. It would be possible in principle to measure degrees of liquidity-aversion, just as it is possible to measure risk-aversion.