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Banking and Interest Rates in a World Without Money: The Effects of Uncontrolled Banking

It is possible to imagine a world in which commercial banks and other financial institutions are free to offer checking accounts (and savings accounts) on any terms they might want to set, and in which there are no reserve requirements. Banks could pay interest on demand deposits, and might not choose to distinguish between demand deposits and time deposits. Since there would be no reserve requirements, there would be no reason for Federal Reserve open market operations.

In such a world, it would not be possible to give any reasonable definition of the quantity of money. The payments mechanism in such a world would be very efficient, but money in the usual sense would not exist. Thus neither the quantity theory of money nor the liquidity preference theory of money would be applicable.

Vickrey was one of the first writers to imagine such a world. He says (1955, p 113):

> In passing it may be noted that the essentially institutional nature of monetary theory, including much of the basic notions of the quantity theory and of the liquidity-preference theory, is brought out by considering how far either of these theories would be applicable to a situation in which all transactions are executed by check or some similar instrument, in which banks cover their operating expenses entirely from service charges and

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pay interest on average balances at rates reflecting the return on their investments, and in which overdrafts are honored fairly freely, possibly at graduated interest rates. It seems likely that for application to such circumstances the theories would have to be rather radically modified, if indeed they did not become entirely inapplicable.

Vickrey does not explore the concept any further in this article, but he has a somewhat longer discussion in a later book (1964, pp. 108–10). There he emphasizes the fact that current monetary theory depends heavily on a rather restricted form of financial institution. He says that other institutional arrangements would make current monetary theory almost completely invalid.

Tobin comes close to saying the same thing several times. In "Commercial Banks as Creators of 'Money'," (1967) he emphasizes the similarity between commercial banks and other financial intermediaries, and thus between the liabilities of commercial banks and the liabilities of other financial intermediaries. He says that the differences would tend to vanish in an unregulated, competitive financial world; and that even in today's world, the volume of liabilities of any financial institution is determined more by depositor preferences than by government and central bank actions. However, Tobin and Brainard say (1967) that the presence of uncontrolled banking reduces, but does not eliminate, the effectiveness of monetary control through changes in the volume of government debt.

Tobin (1968) points out some advantages, at least in a long-run sense, of allowing interest on demand deposits, or allowing interest-bearing assets to serve as means of payment. He says (1968, p. 846):

> Freeing means of payment from the legal limitations of zero interest would make it theoretically possible to have an efficient growth equilibrium without deflation – efficient in the sense that the real rate of interest is high enough to avoid overcapitalization and in the sense that real resources are not diverted into economizing means of payment.

Tobin comes closest to seeing the implications of uncontrolled banking in (1969, p. 26):

> If the interest rate on money, as well as the rates on all other financial assets, were flexible and endogenous, then they would all simply adjust to the marginal efficiency of capital. There would be no room for discrepancies between market and natural rates of return on capital, between market valuation and reproduction cost. There would be no room for monetary policy to affect aggregate demand. The real economy would call the tune for the financial sector, with no feedback in the other direction. As previously observed, something like this occurs in the long run, where the influence of monetary policy is not on aggregate demand but on the relative supplies of monetary and real assets, to which all rates of return must adjust.

Gurley and Shaw (1960, pp. 253–6) observe that with laissez-faire banking, the price level is not determinate, and suffers from "aimless drift."

Patinkin (1965, p. 303) also says that the price level is indeterminate when banks are not controlled:

> Indeed, what we have here is the indeterminacy of Wicksell's "pure credit" economy in which all transactions are carried out by checks, while banks hold no reserves. The economic interpretation of this indeterminacy is straightforward: In order for the absolute price level to be determined by market-equilibrating forces, changes in it must impinge on *real* behavior in *some* market, i.e., must create excess demands in some market.

Johnson (1969) and Friedman and Schwartz (1969), on the other hand, claim that uncontrolled banking will lead to an uncontrolled increase in prices. Friedman and Schwartz say (1969, p. 5):

> In the hypothetical world in which there are no costs of setting up a bank and running a bank, and in which deposits transferable by check provide precisely the same services as dominant money, there would be no limit to this process short of a price level of infinity in terms of dominant money.

An even more extreme position is taken by Pesek and Saving (1967), and by Pesek (1968). They say that making money a "free good" (by paying full interest on demand deposits) will make it a worthless good, and will cause a return to barter.

I maintain that the views expressed by Vickrey, Tobin, Gurley and Shaw, and Patinkin are the correct ones. In a world without controls on banking, the real sector will be independent of the financial sector, and the price level will be indeterminate. Traditional monetary theories will be inapplicable; in fact, it will not be possible to define the quantity of money in meaningful terms. Finally, I claim that this world would have several advantages, and few obvious disadvantages, over our present economic and monetary system.

A World Without Money

Let us imagine, then, a world in which money does not exist.

The major financial institutions in this world are banks. There are several competing major banks with branches in every state, as well as banks that are more limited geographically. Payments in this world are made by check. Because of economies of scale in check clearing, there may be only one major clearing corporation, which is operated either by the banks as a group or by the government. We might even imagine that checks have been replaced by an electronic payments mechanism; the discussion below would not be affected by this assumption.

Each bank is allowed to accept deposits under any conditions that it chooses to specify, and to pay any rate of interest on these deposits. In particular, the bank can allow transfers of credit by check between two interest-bearing accounts. Demand deposits will pay interest, and depositors are likely to be charged the full cost of transferring credit from one account to another. Almost all deposits will be in the form of demand deposits.

The banks will make loans to individuals, businesses, and governments. They will probably establish a schedule of interest charges for each borrower, and will then allow him to write checks on his account that increase the amount of his loan whenever he needs the money. The interest rate paid by a borrower will depend on such things as the amount he has borrowed, his wealth, his current income and his future income prospects. It will also depend on the extent to which he provides the bank with collateral for his loan. The banks will also probably set a maximum amount that they will lend to any individual, but this maximum is mainly to keep the borrower from running up a very large debt and then declaring bankruptcy. An individual who intends to repay his loans would not approach the maximum except in very unusual circumstances. Repayment will be

flexible; so long as the bank is in touch with the borrower and is satisfied of his ability to repay, he will not need to make payments of principal or interest in any particular month or year. Interest will simply be charged against his account periodically and will serve to increase the amount of his loan.

There will be an active market in inter-bank funds. A bank that has more deposits than loans will deposit its excess funds with other banks that have more loans than deposits. There will be no special reason for an individual bank to have non-bank deposits equal to non-bank loans, since it can adjust any imbalance through transactions with other banks.

Banks will compete in setting schedules of interest rates on loans and in setting transactions charges. The interest rate on deposits will be a standard wholesale money rate. Individuals, corporations, governments, and other banks will all receive the same interest rate on deposits.

Banks will make money on the administration of loans and on the handling of transactions. Their profits on loans will come from the difference between the rates they charge and the wholesale interest rate, minus their expenses. Their profits on transactions will come from the difference between their transactions charges and their costs in handling transactions.

A bank will be happy to bid a customer with positive balances away from another bank, even if it simply redeposits the customer's money with the original bank, because it gets that customer's transactions business (and possibly other business as well). A bank will be happy to bid a customer with negative balances away from another bank, even if it gets the deposits it needs to balance the new loan from the original bank, because it gets both the customer's loan business and the customer's transactions business.

An individual, business, or government will simply have an account at a bank; there will be no need to distinguish between accounts with positive balances (deposits) and accounts with negative balances (loans). An individual may write a check that converts his deposit into a loan, or he may receive a salary payment that converts his loan into a deposit. So long as his loan does not come to exceed the maximum permitted by the bank, there is no need to make special note of these transactions. If his average balance in the latest period is positive, his account will be credited with interest; if his average balance is negative, interest will be charged to his account. Thus there will be no reason for an individual to have both a loan and a deposit at the bank. Since he is allowed to write checks on either a positive

or a negative account, and since the interest he pays on his negative account will be greater than the interest he receives on his positive account, he will be better off if he combines the two into a single account.

A business or government account will be handled in the same way as an individual account. The bank will establish a schedule of rates and a maximum loan size, and the account will be allowed to fluctuate freely so long as it does not become a loan larger than the maximum. The business or government can write checks against its account regardless of whether the account has a positive or negative balance.

For the federal government, the interest rate charged on loans will probably be independent of the size of the loan, since there is virtually no risk of default. And there will be no need for an individual bank to set a maximum loan size, since it will probably be happy to loan the government as much as it wants to borrow. The federal government will have very large negative balances at the banks, and will use these bank loans as a substitute for issuing bonds and notes. The total borrowing of the federal government will be limited by Congress, just as it is today. It will be determined by the relation between government outlays and income from taxes and other sources. Massive government spending that is not balanced by taxation would cause the financial system to break down, just as it would cause the existing financial system to break down.

Depositors will be protected in several ways. First of all, every bank will be required to have capital equal to a certain fraction of its loans, and any unusual losses on its loans will come out of that capital. Second, the major banks will be so large that their loan portfolios will be protected by vast diversification. A default on a single loan or on a single group of loans will not be dangerous because it will be such a small fraction of the bank's total portfolio. Finally, the government may provide deposit insurance to protect against catastrophic losses that affect a large fraction of the loans in all banks' portfolios.

Since the banks will not be restricted in making loans to businesses, they will be able to supply the bulk of the loans that businesses need, both short-term and long-term. There will be no reason for businesses to borrow directly by issuing debt securities on the open market; the banks can presumably offer loans at the same interest rate that the market would demand, and the cost of obtaining a bank loan is likely to be less than the cost of a public issue of debt securities. Businesses will obtain part of their capital from bank loans, and the rest from securities, especially common stock. There will be no fixed rule about how much of its capital a business obtains from bank loans; some

businesses will have large loans, while others will have none at all. At any time a business can issue common stock to retire some of its loans, or expand its loans to retire some of its common stock.

For the moment, let us suppose that all payments in this simpler world are handled by check or credit card, and that currency is not used. In this world, money does not exist.

An individual has no currency. He has a bank account, but there is no distinction between demand deposits and time deposits. His bank account, if it is positive, represents all of his riskless savings. If it is negative, his bank account represents his borrowing. His bank account together with his holdings of securities and marketable real assets represent his total savings.

There is nothing in this simpler world that can meaningfully be called a quantity of money. Some might say that the total value of all positive bank accounts is the quantity of money. But this makes a completely arbitrary distinction between positive and negative bank accounts. And it means that the quantity of money will change every time an individual transfers credit from his negative bank account to another individual's positive bank account. Others might say that the net value of all bank accounts, both positive and negative, is the quantity of money. But the net value of all the accounts in a bank is simply the capital of that bank. It is equal to the assets of the bank (its loans) minus the liabilities of the bank (its deposits). Thus, the net value of all bank accounts is equal to the aggregate value of all bank securities. We would hardly want to call this the quantity of money.

Still others might say that the value of all potential additional loans in all accounts is the quantity of money. They would say the quantity of money in a positive account is the balance in the account plus the maximum amount the bank would allow the customer to borrow, and the quantity of money in a negative account is the difference between the maximum amount that can be borrowed and the actual amount borrowed. But the maximum size of the loan that is set for a bank customer is arbitrary, and is intended to keep him from intentionally spending himself into bankruptcy. It is not intended to limit the amount of debt he incurs that he will be able to repay. Virtually no individuals will borrow to the maximum, because they will want to have income and borrowing power available for future consumption. So the quantity of money defined in this way will generally have no economic meaning.

There are cases in which this definition of the quantity of money will have economic meaning, however. Suppose, for example, that

the maximum loan amount for any individual is set equal to the estimated total value of his wealth, including real assets, financial assets, and the present value of his future income. Then this last definition of the quantity of money will simply be equal to the total wealth of the community. Similarly, if the maximum loan amount is set at a standard percentage of the total value of his human and non-human wealth, this last definition of the quantity of money will be equal to a standard percentage of the total wealth of the community. So although the definition has economic meaning, it is not reasonable to call it the quantity of money.

There are no government bonds, because the government simply borrows from the banks in the same way that individuals and businesses borrow. There is no qualitative difference between government loans and other loans, so there is no reason to treat them differently. Thus, there is no way to include government bonds as part of the quantity of money or the quantity of near money.

Since there is no quantity of money to control, there is no need for a Federal Reserve Board to control it. The banks are not restricted in the amount they can loan by reserve requirements, so there is no need to change their reserve positions through open market operations, or to make changes in the rules relating reserves to total bank assets. The banks may be subject to capital requirements, however. They may be required to have capital equal to some minimum percentage of their loans. But this is not a restriction on the total volume of loans that banks can make, because they can always issue new common stock to raise any additional amounts of capital they may need.

Since there is no quantity of money, it is clear that the quantity of money cannot affect the economy of this world in any way. The quantity of money cannot affect national income, employment, or the rate of inflation, because it does not exist.

We can take one step in the direction of a more complex world by introducing currency. The federal government will print the currency, and will issue it to banks as requested. When a bank receives currency from the government it will credit the government's account by the amount of currency received. The bank will then give the currency to individuals as requested. When a bank gives currency to an individual who has an account with the bank, it will simply reduce his balance by the amount given. When a bank gives currency to an individual in exchange for a check on another bank, it will reduce the balance of the other bank (or increase its balance with the other bank). Thus the amount of currency held by individuals and businesses will be determined by how much it is needed for small payments. So long as the interest rate on bank accounts is positive, an individual will want to hold down the amount of currency that he carries, because currency earns no interest. The amount of currency held by individuals and business will be determined by the volume of small payments, and by the cost and inconvenience of making payment by check or credit card.

The amount of currency held by banks will be determined by the patterns of withdrawals and deposits of currency by individuals and businesses during the day, and by the cost of making transactions with the government. The government will issue currency or retire currency at any time. Thus the amount of currency outstanding at any time will be determined by the needs of individuals and businesses. There will be no need for any federal agency to fix the amount of currency outstanding.

Currency alone can hardly pass for the whole of money. The quantity of currency, in this world, will not be controlled by the central bank, and will not influence the economy. So even when currency is added to our model, the quantity of money can have no effect on output, employment, or prices, because the quantity of money does not exist.

Evolution of the Means of Payment

In this section I want to start with a very simple economy and build up to the whole world without money described above. While there is no money in that world, there is a highly developed means of payment. In the paragraphs that follow I will use the word "money" as short for "means of payment," without meaning to imply that a quantity of money exists in any of these worlds.

Private Business and Commodity Money

In the simplest of all possible worlds there are no financial markets at all. Businesses are owned by individuals and may not be bought or sold. Transactions are made through barter, which is very costly, or through the use of some standard commodities that are compact, portable, and don't deteriorate rapidly. A means of payment that

requires transfer of physical commodities is costly because the transfer process is cumbersome, and is extra costly because the commodities, that have value in other uses, must be diverted from these uses to be used as means of payment. Transactions are expensive, and real resources must be tied up for use in making payments.

Common Stock and Portfolio Money

As soon as we introduce any financial market at all, we can eliminate the inefficiencies of barter and commodity money. For example, suppose we introduce common stock. We will allow an individual to sell shares in any businesses he owns, and these shares will trade continuously on the stock market. Shares of common stock may now be used as a means of payment. While it may be possible to use the shares of any company that is traded in the stock market as means of payment, it may be practical to use a standard portfolio of stocks as the means of payment.

Goods may be priced in terms of a unit of account that does not fluctuate in value very much, and the means of payment may be priced in terms of the same unit of account. Thus the dollar price of a share of the standard portfolio will fluctuate from day to day, and even from hour to hour, while the dollar price of a commodity may be relatively stable. This means, of course, that the price of a commodity in terms of shares of the standard portfolio will be constantly fluctuating. This is a slight inconvenience, since it means that every business must be aware of the current dollar price of the standard portfolio, to know how many shares to take in payment for any item. Otherwise, this system would have no disadvantage as a means of payment. Currency could be issued representing shares and fractions of a share of the standard portfolio. The only problem would be the necessity of computing a price, in shares of the standard portfolio, at the time of sale. This price would simply be the dollar price of the item divided by the current dollar price of a share in the standard portfolio.

Borrowing, Lending, and Note Money

While shares in a portfolio of common stocks would be quite satisfactory as a means of payment, they would be less satisfactory as

the only intangible form of wealth. We would want to introduce borrowing and lending to provide a larger set of alternative forms of wealth, and at the same time we get a new form of means of payment that eliminates the disadvantage of a portfolio of common stocks. A principal reason for introducing borrowing and lending is for the transfer of risk. Some individuals, instead of holding their wealth in common stocks that fluctuate in value, would rather lend part of their wealth to other individuals at a fixed interest rate. Other individuals would want to borrow to increase their holdings of common stocks, if the borrowing rate were reasonable. In effect, the individuals who lend are paying the individuals who borrow to take over some of their risk. The expected return on equity of a lender will be lower than the expected return on equity of a borrower.

Another reason for introducing borrowing and lending is to allow some individuals to spend more than they are earning by borrowing against their future income, and to allow other individuals to spend less than they are earning, and lend the difference.

Business borrowing and lending adds nothing new; it is equivalent to borrowing and lending by the owners of the business. Whatever the reason for the borrowing and lending, we can assume that the borrower writes a personal note and gives it to the lender in exchange for certain assets. The initial lender may be simply the person from whom the borrower wants to buy. The notes that are created by borrowing and lending may now be used as means of payment. They are better as means of payment than shares in a portfolio of common stocks because they do not fluctuate very much in value (assuming that they are short-term notes). On the other hand, notes have the disadvantage that the holder of a personal note can never be sure that it will be redeemed by the writer at maturity. There may be a significant risk of default, and a significant cost of collection of a personal note. (A note would be redeemed at maturity either in notes of other issuers or in common stock of equivalent value.)

Administration of Loans and Guaranteed Money

To get around the problem of default on personal notes, we can introduce "banks" that serve to administer loans and guarantee personal notes. These banks will neither make loans nor accept deposits. They will simply supervise each borrower, and will guarantee that if he doesn't pay off his notes, they will. In return the bank would

charge a fee to cover administrative costs and the probability that a borrower will default on his notes. Thus the notes would bear interest at a lower rate than the rate paid by the borrower; the difference would be income to the supervising bank.

Banks would compete by offering low fees to issuers of notes, and by having a reputation for soundness among holders of notes that they have guaranteed. The government might help ensure a bank's solvency by requiring it to have capital equal to a certain percentage of the notes it has guaranteed. Otherwise, there would be no necessity for government regulation of banks.

Payments would be made using guaranteed notes. These notes would be a convenient, low-cost means of payment that would not fluctuate in value appreciably. But they would still have a few disadvantages. The value of a note would change from day to day due to the accrual of interest. The variety of different notes would be a disadvantage, and some notes might be more acceptable than others. The opportunity for theft might be great if individuals carried notes in large denominations from place to place, unless the notes were registered. But registration might be costly.

Checking Accounts and Bank Money

To solve these problems, we allow the banks to participate in the payments mechanism in a unique way. Instead of remaining outstanding, individual notes will be used only temporarily in making payments, and will then be extinguished. Individuals will have bank accounts that will have positive balances for lenders and negative balances for borrowers. Banks will credit interest to accounts with positive balances and will debit interest to accounts with negative balances. The individual will write a note whenever he or she wants to make a payment. This note will be either in the form of a check or in the form of a credit card purchase receipt. The note will serve to credit the balance of the seller and to debit his balance. It will also credit the balance of the seller's bank with his bank. This system will be a convenient, safe, low-cost means of payment.

In none of these five worlds was there any clearly defined quantity of money. The world of private business and commodity money came closest to having a money supply, but even there, a commodity used as means of payment also has other uses, and it may not be clear when it is to be counted as part of the money supply, and when it is to be counted as involved in one of its other uses. Once we introduce

financial markets, however, and intangible means of payment, the idea of a "quantity of money" loses its meaning.

In none of these five worlds was there any role for a central bank. And the only effect that the financial sector had on the real sector was that as we go to successively more efficient means of payment, we reduce the cost of making payments and release real resources for other uses. In none of these worlds was there any mechanism that would cause uncontrolled inflation in the absence of a central bank.

Evolution of Central Bank Control

In this section I want to build up the forms of central bank control over the banking system that are used in the United States. It is clear that each of these forms of control has some effect on the banking system; but it is not clear that any of them has any significant effect on the economy as a whole.

Maximum Interest Rates on Deposits

In the world without money described above, deposits earn interest at the wholesale money rate and banks earn a profit on their transactions charges. Competition will force a bank either to pay the wholesale rate on deposits or to compensate for a lower rate by reducing transactions charges. The wholesale rate will be more common, however, because a bank offering a lower rate and lower transactions charges will tend to attract depositors that keep small balances and have many transactions. Such a bank would tend to lose money on its deposit business.

If the central bank is allowed to establish maximum interest rates on deposits, then various distortions will be introduced. A maximum interest rate on deposits is a rather odd notion in this world, because a deposit is simply an account with a positive balance. What sense does it make to have a maximum interest rate on deposits (positive balances) but no maximum interest rate on loans (negative balances)?

If the maximum interest rate is below the natural level of the wholesale money rate, then an imbalance between supply and demand will be created. At that rate, many loans will seem profitable, but few deposits will come in. The economy will tend to revert to the use of individual and business notes for borrowing and lending, rather than the more efficient use of bank accounts. Because of this

imbalance between demand for loans and supply of deposits, banks will try to evade the maximum rates by offering services instead of money interest on deposits. They will offer lower transactions charges, financial assistance to businesses, trust department services, and lower rates on loans. This is rather inefficient, of course, and cannot completely eliminate the effects of maximum interest rates, but it seems to eliminate much of the impact of maximum interest rates in the United States, at least in normal times.

What would happen, though, if the maximum rates were effective on most sources of bank deposits? No bank would be able to attract additional funds from these sources by offering higher rates. So the supply of these funds would be strictly limited. To keep loan demand down to a level equal to the supply of funds, the wholesale money rate for banks would increase until the volume of profitable loans was equal to the volume of available deposits. And this is the rate that banks would offer to any sources of funds not subject to the maximum. The spread between the interest rate paid on most deposits and the wholesale money rate would represent an extra source of profit to the banks. So they might not object strenuously to the central bank's setting maximum interest rates on deposits.

It is sometimes claimed that if banks are not allowed to pay interest on deposits, and if there are no reserve requirements, they will create deposits to buy any asset with a positive expected return, thus bidding up the prices of all assets and causing massive inflation. It is claimed that once a bank creates a deposit, it can never be extinguished, so people will use it to try to buy things and will add to the inflationary pressure.

This argument makes no sense at all. First of all, banks cannot generally own real assets (except bank buildings and equipment) or common stocks. So they cannot simply bid up the prices of these assets. What banks can do is offer to make loans at low interest rates. In our world of positive and negative accounts, this would not work, because it would cause the demand for loans to exceed the supply of deposits. Recall that a borrower in this world simply writes a check that adds to his negative balance whenever he needs to make a payment. Making a loan does not involve the simultaneous creation of a negative balance and a positive balance.

Even in a world where checks can be written only on bank accounts with positive balances, banks cannot offer loans at low interest rates. When a bank creates a deposit larger than the individual wants to hold, he can always use it to pay off some of his loan. Or he can lend

it to someone else who will pay off his bank loan. Bank deposits can always be extinguished; they can be used to pay off bank loans. If there are more deposits than people want to hold, the banks will discover that their deposits are being used to pay off their loans, and the volume of both will decline. Thus the banking system can be in equilibrium in a world with zero interest on deposits only if the interest rates on bank loans are high.

An individual bank offering lower interest rates on loans than other banks will be able to get loan customers away from the other banks. But to get money to lend to these customers, the bank will have to pay the wholesale interest rate, which will be high. Thus the bank will lose money by making these loans, and would not be tempted to do so.

Reserve Requirements

The central bank may require that each bank hold deposits at the central bank equal to some fraction of the individual bank's deposits or loans. It may do this even when it does not try to influence the total volume of bank deposits by controlling the volume of deposits with the central bank. If the central bank pays the wholesale money rate on the deposits of other banks with it, then this requirement will have no effect on the banking system. But if the central bank pays a lower rate than the wholesale money rate, this requirement will represent a tax on bank deposits. This tax will mean that banks will pay less than the wholesale rate on their deposits, too. It will cause the economy to revert somewhat to the use of personal and business notes for borrowing and lending.

Limited Reserves

If the central bank establishes reserve requirements in the form of deposits that each bank must carry with the central bank, and sets a rate of interest on these deposits, there will be a natural level of reserves. The higher the reserve requirements and the lower the rate of interest paid on reserves, the larger the tax on deposits, and the more the economy will revert to the use of personal and business notes for borrowing and lending. If, in addition, the central bank sets a maximum limit to the volume of reserves that is lower than the natural level of reserves, it will cause reserves to be worth more to banks than their face value. There is no way for the central bank

to set a minimum limit on the volume of reserves other than by changing reserve requirements and the interest rate paid on reserves.

With the quantity of reserves limited to a level below its natural level, reserves take on a value greater than their nominal value. A bank with $1 million on deposit with the central bank might be able to sell its deposit to another bank for $1.5 million. This would increase the effective reserve requirements and reduce the effective rate of interest on reserves so that banks will be satisfied with the amount of reserves allowed by the central bank at the "black market" price. The central bank would have to be careful about accepting new deposits in this situation, since any deposit it accepts results in a windfall gain to the bank making the deposit, equal to the difference between the nominal value of the deposit and the market value of the deposit. The central bank would have to set up a system of rationing for accepting new deposits or for retiring existing deposits. Thus, this would be a very cumbersome system. Since limiting reserves has the same effect on the banking system as increasing reserve requirements or reducing the rate of interest on reserves, but requires rationing of changes in reserves, it is hard to see why this system would be used.

Currency Reserves

If a central bank deposits and currency were both allowed as reserves, if the central bank allowed a bank to increase its deposits with the central bank by depositing currency, and if the central bank limited the quantity of reserves below the natural level, then a very strange situation would be set up. Currency would be worth as much to a bank as deposits with the central bank; in particular, currency would be worth more than its face value to a bank. This means that banks would offer individuals more than face value for currency. An individual making a deposit of currency would have his account credited with the market value of the currency rather than with the face value of the currency. A two-price system would thus be established for all payments: one price for payment by check (the higher price) and one price for payment by currency (the lower price).

This would hardly be a desirable state of affairs. So if currency is to be equivalent to deposits with the central bank for use as reserves, the central bank must refrain from limiting the total supply of reserves to a level below its natural level. The central bank can control reserve requirements and the interest rate paid on reserves,

but cannot, unless it wants either rationing or a two-price system, control the supply of reserves.

Since our present banking system allows the use of currency as reserves, and since we do not observe that banks are willing to pay more than face value for currency (in crediting a bank account), it seems likely that the Federal Reserve Board does not set the maximum quantity of reserves below its natural level. In other words, open market operations must be ineffective. If they were effective in controlling the quantity of reserves, then we would observe a two-price system. The only other possibility is that there is a profit opportunity that banks have not been exploiting, in paying more than face value for currency and central bank deposits.

All of these forms of central bank control tend to keep the total volume of banking below its optimal level. They all cause the economy to revert, in part, to the use of personal and business notes for borrowing and lending. Thus they make the financial system less efficient than it would otherwise be. Other than this, these forms of central bank control have no effect on the economy or on the price level.

Monopoly Banking

Even in a world with just one bank, there would be no money supply and the bank would have no significant influence on the real economy or on prices. The bank would not be forced by competition with other banks to offer high interest rates on deposits, but it would be influenced by other financial markets. If it offered very low rates on deposits, it might find that its deposits declined so much that it was more profitable to offer a higher rate and get more deposits. In any case, it is true that such a bank would charge more for transactions, would set higher interest rates on loans and might set lower interest rates on deposits, than a bank in competition with other banks.

It would not, however, be able to cause inflation by bidding up asset prices or by creating deposits that cannot be extinguished. First of all, it would not be allowed to own real assets or common stocks. And second, even if it were allowed to own such assets, it could not create deposits that could not be extinguished. A bank deposit can always be extinguished by being applied to reduction of a bank loan.

The Myth of Aggregate Demand

Those who believe that a central bank can influence the real sector of the economy often say that it does so by affecting aggregate demand for goods and services. In general their argument is that the central bank can make loans easier to get or cheaper, which will expand aggregate demand, and that it can make loans harder to get or more expensive, which will contract aggregate demand. High aggregate demand is supposed to lead to low unemployment but rapid inflation; while low aggregate demand is supposed to lead to high unemployment but stable prices. Sometimes this argument centers on loans that businesses use to buy investment goods, and sometimes it centers on loans that individuals use to buy consumption goods.

What this argument overlooks is the fact that banks must have deposits for all their loans. When a bank allows one person to borrow, it must attract an additional deposit equal to the amount borrowed. When one individual decides to spend more, some other individual must decide to spend less. Borrowing must equal lending; an increase in one must be balanced by an increase in the other. Thus an added demand for consumption goods by one individual must be balanced by a reduced demand for consumption goods by another individual. So aggregate demand is not affected.

Even when the central bank is able to affect the desired balance between consumption and investment, this does not mean that it is thereby able to affect aggregate demand. An increase in desired saving that is balanced by a decrease in desired consumption will leave aggregate demand unchanged. The central bank can increase borrowing only if it increases lending, and it can restrain borrowing only if it restrains lending. Restraining borrowing and lending will cause inefficiencies and misallocation of resources, but it is not clear that it will have any effect on aggregate demand.

The Quantity Theory of Money

In a world where transactions take place by the transfer of loans and deposits, the quantity theory has no place. As I have emphasized above, there is no reasonable definition of the quantity of money in such a world.

The quantity theory has a certain amount of plausibility in a world where the only means of payment is a commodity such as gold. If the supply of gold increases because new gold is found, then it seems fairly reasonable that the prices of other goods would rise relative to the price of gold. The quantity theory also has some plausibility in a world where the government creates currency in massive amounts and spends it for goods and services, as a substitute for direct taxation. However, there is a tendency in such a world for currency to lose its ability to serve as a means of payment. If this happens, then the quantity theory will no longer apply.

As soon as we get to a world where payments are made by transferring deposits and notes, the quantity theory becomes impossible even to formulate. Those who believe in the quantity theory are forced to argue in terms of a world with commodity money or a world where the government hands out massive amounts of currency or bonds, and then transfer their conclusions to an entirely different kind of world.

The Liquidity Preference Theory

In a world where transactions take place by the transfer of loans, deposits, and notes, the liquidity preference theory is just as inappropriate as the quantity theory. This is true whether we have competitive banking or monopoly banking, and whether banks are regulated by a central bank or are completely unregulated.

The general argument is similar to that of the quantity theory. When people have too much "money," they spend it, or they bid up the prices of financial assets, causing interest rates to fall, and stimulating business investment. When people have too little "money," they reduce their spending or sell financial assets, causing interest rates to rise and restraining business investment. Thus too much money increases aggregate demand, and too little money reduces aggregate demand.

But why should people do this? If they have too much money, in either currency or deposits, they can simply pay off their loans. If they have no loans, they can lend their deposits to someone who does, and charge him a little less interest than the bank would charge; he will then use the proceeds to pay off his loans with the bank.

An individual can adjust his portfolio of financial assets by trading with other individuals and by dealing with his bank. If he wants more currency, the bank will give it to him; if he wants less, the bank will take it back. If he wants more demand deposits, the bank will give

him a loan (at some interest rate), and if he wants less, the bank will reduce his loans. If the bank will not do these things, other individuals or businesses will.

So transactions that affect portfolio composition are purely financial; they have no impact on the real sector or on the price level.

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2

Active and Passive Monetary Policy in a Neoclassical Model

Introduction

Modern macroeconomic theories are customarily classified as either neoclassical or Keynesian. Neoclassical theories are those that assume that most markets are in equilibrium most of the time; in particular, they generally assume that the labor market is always in equilibrium. Keynesian theories are those that assume that many markets are in disequilibrium much of time; in addition to the labor market, they generally assume that financial markets and markets for capital goods are often in disequilibrium. In this chapter, we will be interested in the extent to which a theory assumes that markets are in equilibrium, rather than in the intellectual tradition of the theory, so we will classify theories as "equilibrium theories" or "disequilibrium theories." We will be interested in dynamic theories, which describe the development of prices, stocks, and flows of goods and services over time, rather than in static theories, which describe the impact of events such as a one-time change in tastes, technology, or government policy.

Let us define an equilibrium theory as one in which all markets are in continual equilibrium; in which there are never excess demands or excess supplies of any assets, goods, or services; and in which expectations of future prices and quantities are formed in a rational manner. This last condition is often violated; many theories, for example, assume that individuals maintain expectations of the rates

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