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# Financial Intermediation, Monetary Policy, and Equilibrium Business Cycles

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*Wide disagreement exists over the exact role that money plays in the economy and why money seems to matter. There is a related disagreement concerning the role played by financial intermediaries. This paper provides a discussion of alternative views of the role played by financial intermediaries in determining the impact of monetary policy. The emphasis is on the macroeconomic impact of intermediaries and the discussion is limited to equilibrium models of the business cycle.*

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Policymakers charged with responsibility for monetary policy take it as self evident that their policy actions have an impact on the real economy in the short-run. Professional economics journals, on the other hand, are filled with models of equilibrium business cycles that imply systematic monetary policies have no real effects. While most economists would agree that monetary actions can—and do—have real effects on the macro-economy, they disagree on the exact role that money plays in the economy and why money seems to matter.

Business cycle theories in the Keynesian tradition assume that monetary disturbances affect real output because wages and prices adjust slowly in the face of economic shocks. Changes in the nominal quantity of money generate changes in the real quantity of money—the nominal quantity adjusted for the level of prices—since prices are sticky. Fluctuations in the real supply of money then affect interest rates and aggregate spending.

In sharp contrast, equilibrium business cycle theories assume wages and prices adjust continually to ensure that markets are in equilibrium. In most equilibrium models, the real effects of monetary fluctuations are typically either nonexistent or arise only when individuals have incorrect information about the current stock of money.

Economists also disagree on the role played by financial intermediaries. Some economists incline to the view that financial intermediaries are a “veil” in the sense that they re-package financial assets but do not affect real savings or investment behavior. Others emphasize that financial intermediaries can have real effects on economic resource allocation. This divergence of opinion is significant for the bearing it has on the debate about the role of monetary policy. An understanding of the roles of both money and financial intermediaries is necessary for evaluating and designing both macroeconomic monetary policy and bank regulatory policy.

In this article, we discuss how the behavior of financial intermediaries—and that of banks, in particular—may have an influence on real economic activity and how, through its impact on banks, monetary policy influences economic activity.<sup>1</sup> The objective of this article is not to present a complete survey of recent developments in the economics of financial intermediaries. Rather, the article focuses on developments that promise to advance our

understanding of the roles played by both financial intermediaries and monetary policy. The emphasis is almost exclusively on the macroeconomic impact of intermediaries, and the discussion is limited to equilibrium models of the business cycle.<sup>2</sup> Specifically, this article examines some of the channels through which systematic monetary policy will have real effects even when prices adjust quickly.

Sections I and II examine the role played by the liability side of the banking sector's balance sheet. Bank deposits are an important component of the medium of exchange, and variations in the quantity of bank deposits may affect economic activity. Section I discusses one recent approach in the economics literature that allows some role for major

disruptions in the banking sector to affect the economy, but in which monetary policy itself has no effect on real activity. Section II discusses other recent work that examines more closely the determinants of the demand for bank deposits and concludes that monetary policy actions may have real effects via their impact on bank liabilities.

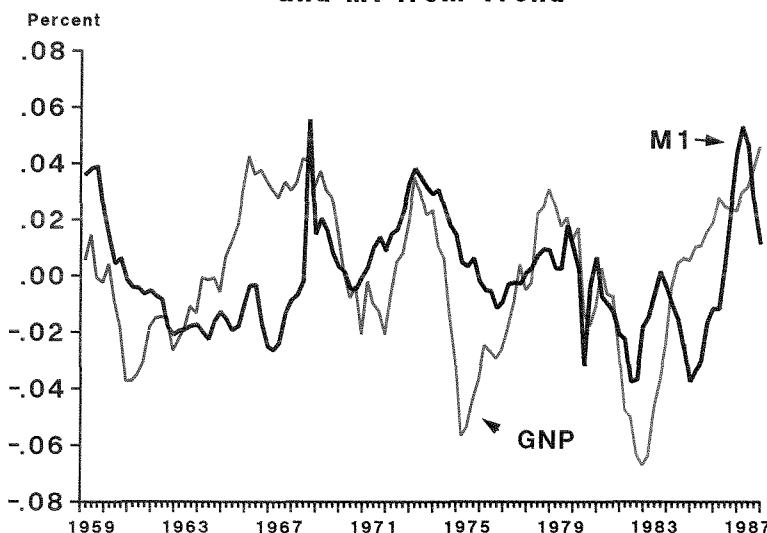
Section III turns to the asset side of the banking sector's balance sheet. Recent work that attempts to account for the economic role played by financial intermediaries is reviewed. One conclusion from this work is that variations in the supply of intermediated credit can affect the level of economic activity. The effect of monetary policy on the supply of bank-intermediated credit is then discussed. Conclusions are summarized in Section IV.

### I. Transactions Services in Real Business Cycle Models

Charts 1 and 2 show that fluctuations in the money supply and fluctuations in the general level of real economic activity exhibit a high degree of association. In Chart 1, deviations of real GNP and M1 around trend are plotted using quarterly data for the period 1960.1 to 1987.4. Chart 2 plots the growth rates of M1 and real GNP. It is easy to see why monetary disturbances have played a major role in theories of the business cycle. Disagreements arise over whether this close association should be interpreted as evidence that monetary fluctuations have helped to cause business cycles, or whether *both* output and money supply movements are caused by nonmonetary economic disturbances.

The economics profession recently has seen the development of a body of work that employs stochastic growth models of competitive economies as a stylistic framework within which to study business cycles. For example, Kydland and Prescott (1982) and Long and Plosser (1983) studied business cycles as induced responses to real productivity shocks in models of economies that exclude any role for money. Because they ignore monetary factors as possible sources of cycles, these "real business cycle models" contrast strongly with models that focus on monetary disturbances as the major cause of cyclical fluctuations (for example, Lucas, 1975).

**Chart 1**  
Deviations of Real GNP  
and M1 from Trend



In an important paper, King and Plosser (1984) introduce money into a real business cycle model. In their model, the sources of business cycles are entirely non-monetary. Money does not cause cycles. But their model does predict a positive correlation between real output and monetary aggregates, like M1, that incorporate both outside money (the liabilities of the central bank) and inside money (the liabilities of the banking sector).

King and Plosser focus on the financial sector as a producer of transaction services that are used by firms and consumers in the process of production and the purchase of goods and services. Variations in the total output of goods and services generate positively correlated movements in the demand for transactions services. These changes in demand then induce similar movements in the actual supply of transaction services, leading to a positive correlation between measures of transaction services and real output during the course of a business cycle.

To account for the observed co-movements of real output and the stock of deposits at banks, it is necessary to provide some link between deposits and the quantity of transactions services produced by the financial industry. An economic rationale for such a tie is not straightforward, as Fama (1980) points out. King and Plosser skirt this issue by assuming that transaction services are linked directly to the stock of deposits held by the banking sector. Thus, by construction, the positive co-movement of output and transaction services translates into a positive co-movement between output and bank deposits. Inside money and out-

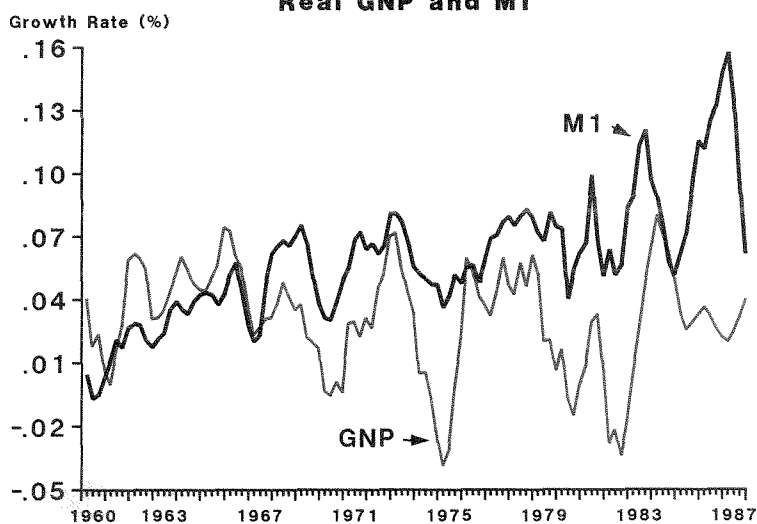
put move together even though monetary factors have no causal role in generating business cycles.

This reverse causality argument—output causes money and money does not cause output—is not new. See, for example, Tobin (1971). But King and Plosser extend the argument by showing that their model implies measures of inside money, such as real bank deposits, should be more highly correlated with measures of real economic activity than are measures of outside money, and they present some evidence that such is the case in the U.S.

In the King and Plosser model, both individuals and banks care only about the real value of their asset holdings and the real value of the transaction services produced by the payments system. There is no money illusion; individuals do not care about nominal values. Consequently, changes in the nominal quantity of outside money simply result in proportional variations in the aggregate price level, leaving all real variables unaffected. Monetary policy, which varies the path of outside money, has importance only for the price level. Thus, a change in the stock of outside money does not affect the real value of bank assets or liabilities.

The neutrality of money holds in their model even if the variations in the path of outside money induce changes in the expected rate of inflation. An increase in the money supply that is viewed as only temporary, for example, would raise the current price level relative to future prices and generate expectations of future deflation. Such changes will cause nominal interest rates to adjust, but in the model

**Chart 2**  
**Growth Rates of**  
**Real GNP and M1**



of King and Plosser these nominal rate adjustments leave all real rates of return on interest bearing instruments unchanged. Since outside money is non-interest bearing, a rise in the expected rate of inflation reduces its real return. The resulting fall in the demand for outside money would be eliminated by an immediate rise in the price level, thereby reducing the real supply of outside money.<sup>3</sup>

Unfortunately, the empirical evidence that King and Plosser present to support their model is weak. For example, correlations between outside money, inside money, and real economic activity are very dependent on the way monetary policy has been conducted. Outside money has never been used as a policy target by the Federal Reserve, but instead has been allowed to fluctuate in a manner consistent with the Fed's interest rate or monetary aggregate targets. Thus, the relative strength of the correlation of outside money with measures of real activity does not necessarily provide much information on King and Plosser's hypothesis. In fact, King and Plosser actually demonstrate that the exact relationship between the monetary base, the stock of currency, the stock of inside money, and the price level will depend on the presence or absence of reserve requirements and the particular aggregate targeted by the central bank.

Moreover, King and Plosser choose to ignore one channel in their model by which monetary variables could have effects on real economic activity. Because transaction serv-

ices—the banking sector's output—are used as inputs into the production of other goods and services, a real shock to the banking sector can have real effects on production in other sectors. Thus, a major disruption of the payments system, such as occurred during the episode of massive bank failures in the early 1930s, would contribute to a fall in real output by lowering the quantity of an important input into production.<sup>4</sup> Bernanke's 1983 study of the impact of intermediation during the Great Depression provides some empirical evidence relevant to this issue. Bernanke showed that measures of the liabilities of failing banks enter significantly in real output equations estimated over the 1920s and 1930s, even when measures of the money supply also are included.<sup>5</sup>

If the transaction services provided by bank deposits are an important determinant of the general level of economic activity, then more mild fluctuations in the stock of bank deposits than those accompanying major bank failures also may produce general economic fluctuations. Substitution between bank deposits and other financial assets might then affect economic activity. King and Plosser ignore this channel from monetary variables to real variables on the grounds that it is likely to be unimportant empirically. Whether, in fact, such an effect is small enough to neglect will depend on the nonbank sector's demand for liquid assets.

## II. Bank Liabilities and the Medium of Exchange

Until recently, economists studying the microeconomic foundations of the demand for transaction services concentrated on the demand for outside money (the liabilities of the central bank). In some of the earlier literature, such as the Baumol and Tobin transactions costs models, there was an explicit recognition that interest bearing assets were an alternative to non-interest bearing money as a store of value so that the interest yield on those assets represented the opportunity cost of using money to fund transactions. However, the models did not attempt to explain why non-interest bearing money was used to effect transactions, and in that sense, left the microeconomic foundations of the demand for money partly unexplained.

In any event, changes in expected inflation induced by monetary policy will lead market interest rates to adjust and cause substitution between interest bearing bank deposits (inside money) and non-interest bearing outside money. Consequently, the real impact of monetary disturbances may depend on the properties of bank liabilities as medium of exchange substitutes for outside money. This suggests that the liability side of the banking sector's bal-

ance sheet may be important in determining the impact of monetary policy.

In recent years, the overlapping generations model of Samuelson (1958) has been the most popular way of explaining the role of money in intermediating transactions. This model suggests that money is needed to facilitate spatially or temporally-separated transactions since any one generation is unable to arrange trades with all successive generations without the use of some "money-like" asset.<sup>6</sup> A difficulty with these models is that they leave unexplained the use of non-interest bearing outside money to finance transactions when interest bearing inside money also is available.

Bryant and Wallace (1984) appeal to legal restrictions on private intermediation to explain the co-existence of currency and interest bearing default-free bonds. Interest bearing default-free bonds are unsuitable for financing many transactions because of the bonds' large denominations. Legal restrictions prevent intermediaries from creating a better medium of exchange by issuing default-free small denomination claims to such bonds.

Bryant and Wallace use their model to examine the interactions between such legal restrictions and monetary policy. In effect, the legal restrictions and the use of both currency and bonds to fund transactions permit the government to levy a non-linear inflation tax. The real equilibrium their model achieves is not independent of either monetary policy or the institutional factors explaining the demand for currency and intermediary liabilities. However, these effects depend solely upon the nature of the legal restrictions on intermediary behavior and may not be intrinsic to all economies in which financial intermediaries issue inside money.

Another strand of the recent literature on the demand for monetary assets has focused on the cash-in-advance constraint model of liquidity. Drawing on a suggestion of Clower (1967), Lucas (1980) developed a formal model of the transaction services provided by money by assuming money balances were required to finance purchases of consumption goods. Goods could be exchanged for money and money for goods, but goods could not be exchanged for goods. Also, purchases were limited by the cash in hand at the time of purchase and could not be paid for by a subsequent exchange of interest bearing assets. In Lucas and Stokey (1983), the model was further elaborated to allow for two categories of goods. Some goods could only be purchased with cash, while other goods could be paid for with a subsequent exchange of interest bearing assets. In Lucas (1984), consumers can hold interest bearing state-contingent “securities” in addition to money. While the securities bear interest, they can be exchanged only at infrequent intervals and therefore are not very useful for financing consumption.

These ideas are developed further in Svensson (1985) and Hartley (1988). In Hartley’s model, consumers can use either cash or interest-bearing “deposits” to purchase some goods, while other goods can only be purchased with cash. Consumers also can hold interest-bearing state-contingent securities. Cash and deposits are more liquid than securities in that only the former can be used at any time to effect purchases. Cash is more liquid than deposits because it can effect a wider range of purchases. While the liquidity return is highest for cash and absent for securities, the explicit interest payments are highest on securities and absent for cash. This inverse relationship between liquidity and interest yield suggests that changes in the nominal interest payments on deposits or securities will affect the demand for all three assets. As a result, monetary policy, by changing the anticipated rate of growth of base money, will have real effects by altering the demands for the different categories of financial assets.

Englund and Svensson (1986) examine banking in a

general equilibrium model related to the Lucas, Svensson, and Hartley models. They show that changes in the credit multiplier, or “banking sector shocks,” will have real effects, but one-time changes in the level of base money will affect only prices. In the macroeconomic model examined in Hartley and Walsh (1986), one-time changes in the level of the base money supply also are neutral, whereas temporary changes in the level of the base, or changes in its rate of growth, will have real effects by inducing substitution between holdings of inside and outside money.

Economists typically rule out the real effects of inflation-induced portfolio substitution (Tobin effects) on the grounds that they are likely to be unimportant empirically. For example, this is the position taken by King and Plosser. This is a reasonable assumption concerning direct substitution between money and capital on the part of the economy’s wealth holders. However, the real effects of monetary shocks in Hartley and Walsh are driven by substitution among monetary assets such as currency and bank deposits. The elasticity of substitution among different monetary assets is likely to be large, even if the elasticity of substitution between portfolio holdings of capital and liquid assets as a whole is essentially zero.

While the microeconomic models that allow roles for both outside and inside money as mediums of exchange are far from complete, they all suggest that monetary policy could have significant aggregate real effects in equilibrium models of the business cycle. In general, these effects arise by altering the relative demands for different liquid assets. As consumers substitute between different liquid assets as mediums of exchange, interest rates are affected and the flow of “savings” to finance investment may be altered. Thus, even in equilibrium models of the business cycle—models in which prices freely move in response to perceived monetary disturbances—the role of bank liabilities in the payments system, and their substitutability for outside money plays a role in determining the impact of monetary policy on the real economy.

This discussion has focused on the liability side of the banking sector’s balance sheet and on banks as producers of transaction services. Banks, however, also provide portfolio management services. Consumers hold deposits in order to gain access to the payments system and the transaction services banks provide, and these deposits represent claims against the assets held by the bank. Thus, it makes sense to consider the asset side of the banking sector’s balance sheet and banks’ role as suppliers of credit as a key channel of the impact of monetary policy. To understand this potential channel for monetary policy actions, it is necessary to understand the role of banks as suppliers of credit.

### III. Increasing Returns, Financial Intermediaries, and Credit

Variations in the demand for currency and bank deposits may affect the total volume of bank liabilities and, as a result, lead to variations in the volume of bank lending. An increased demand for currency, for example, may produce a decline in bank lending. But while banks are distinguished by the transaction accounts they offer, banks are not the only intermediaries that supply credit, and the impact on the total supply of credit due to a reduction in bank lending will depend on how easily borrowers can replace bank loans with credit from nonbank sources. Changes in the volume of bank loans will have the greatest impact on economic activity when there is something "special" about bank credit.

This section begins with a discussion of an environment in which bank credit has no special characteristics that distinguish it from other sources of credit and in which financial intermediaries are unimportant for the determination of real economic activity. Then, some recent work that focuses on the role played by intermediaries is discussed. This work suggests there may be something special about bank credit. If this is the case, monetary policy is likely to affect economic activity through its impact on bank lending.

Suppose, as in the real business cycle model of King and Plosser, that banks face constant returns to scale as providers of portfolio management services. In this case, banks will care only about the management fees they earn, and not about the composition of the portfolio of assets they hold. Banks "simply cater to the tastes and opportunities of suppliers of securities and demanders of deposits. Thus, the real activity that takes place, the way it is financed, and the prices of securities and goods are not controlled either by individual banks or by the banking sector." (Fama 1980, p.48)

The size of the intermediation industry can undergo proportional expansions and/or contractions without having any effect on the relative prices of different assets. Asset prices and the financing of real economic activity are determined by the behavior of the economy's savers. They ultimately hold the economy's assets, whether they do so directly or indirectly by holding the liabilities of the financial intermediaries. When returns to scale are constant, shifts in the public's demand for the liabilities of intermediaries have no real effects; a reduced demand for these liabilities shrinks the assets held by intermediaries, but the affected assets can instead simply be held directly in the public's portfolio.

Reserve requirements present a potential problem in this framework. Reserve requirements force institutions subject

to such regulations to hold some of their assets in the form of non-interest bearing assets or, in some countries, in the form of low interest rate government securities. Reserve requirements impose a tax on the banking sector, and drive a wedge between the return on banks' portfolio of assets and the return paid to depositors. With constant returns to scale, the demand for the portfolio management services of intermediaries subject to a reserve requirement would fall to zero. Individuals would prefer to hold assets directly rather than use the portfolio services of the intermediary. Banks would not be able to pass this reserve requirement tax on to the consumers of their portfolio management services.

King and Plosser argue that such a reserve requirement tax will lead to higher deposit service fees—that is, fees for access to the payments system will rise. As a result, the demand for bank deposits will fall, and the banking sector will contract. However, in the model of King and Plosser, variations in the size of the banking sector have no effect on the real allocation of credit or the financing of real economic activity. Either financial intermediaries not subject to reserve requirements will expand to offset the shrinkage of the banking sector or individuals will hold the liabilities of the economy's ultimate borrowers directly.

Fama (1985) recently has argued, however, that the reserve tax seems to be borne by bank borrowers, not by bank depositors. This implies that there is something "special" about bank loans [see also James (1988)]. Borrowers are willing to pay more to obtain a loan from a bank than from a nonbank source of credit. But this uniqueness of bank loans seems at odds with the view that intermediation is simply a veil behind which real activity is conducted, or that variations in bank-intermediated credit can be offset by the actions of nonbank intermediaries.

If bank credit is special, monetary policy actions that affect the size of the banking sector will have an impact on real economic activity. Thus, an increase in reserve requirements, for example, would shrink bank credit and force firms to switch to less attractive sources of funds. This would raise the net cost of funds in the economy and lead to a fall in aggregate investment activity.

To understand fully the role of banks in determining the effectiveness of monetary policy, it is necessary to examine more closely why bank loans might be special. In King and Plosser's model, asset choices of banks play no real economic role. A very different view of financial intermediaries emerges from another body of recent research which includes papers by Boyd and Prescott (1986), Bernanke (1983), Bernanke and Gertler (1986), Stiglitz and

Weiss (1981), and Williamson (1986a, 1986b). These papers all attempt to provide economic explanations for the endogenous development of such institutions as financial intermediaries (both bank and nonbank).

Two characteristics of economic transactions are sufficient to generate the presence of intermediaries: asymmetric information and increasing returns to scale. The exact manner in which these two characteristics interact has been modelled differently by different authors. For example, Williamson (1986b) develops a model in which entrepreneurs have access to a technology that requires a fixed investment and yields a random real return, the expected value of which is known by both borrowers and lenders. The actual realization of the random return is known (*ex post*) to the entrepreneur, but other individuals can obtain information on the realized return only by incurring a fixed cost to monitor each project. The presence of fixed monitoring costs makes it costly for individual investors to attempt to diversify by lending to many different borrowers. Moreover, the projects are assumed to be sufficiently large relative to individual wealth that entrepreneurs must gain access to the savings of several individuals in order to carry out their investment projects.

This rudimentary framework is sufficient to generate a role for intermediaries. Since the project's actual return is known only by the entrepreneur, in the absence of monitoring, the entrepreneur always has an incentive to report a low return to his creditors and abscond with the profits. To prevent this behavior, each of the individual investors who finances a project must incur the monitoring cost. A large intermediary, on the other hand, can finance a large number of projects and incur the fixed cost of monitoring only once for each project. The intermediary is able to exploit the increasing returns to scale implicit in the fixed-cost monitoring technology. In addition, the intermediary's ability to fund a large number of projects permits diversification of nonsystematic risks. If there is no systematic risk, a large intermediary can offer a certain return to its depositors.<sup>7</sup>

Information asymmetries also give rise to debt contracts between lenders and entrepreneurs. In Williamson's model, the optimal contract can be shown to involve a fixed payment to the lender if the project return exceeds some critical value  $R^*$ . If the actual return is less than  $R^*$ , the lender receives the entire return. In other words, the borrower pays a fixed rate of interest on the loan if the return exceeds  $R^*$ ; otherwise the entrepreneur declares bankruptcy and the intermediary recovers the entrepreneur's assets, which will be worth less than  $R^*$ . This contract minimizes monitoring costs since the entrepreneur

has no incentive to lie if the actual return is greater than  $R^*$ .

The introduction of financial intermediaries in the presence of asymmetric information and monitoring costs leads to increasing returns to scale from intermediation. In contrast to the view of intermediation as a constant-return-to-scale industry, increasing returns imply that the level of intermediation has an impact on real activity, the way that activity is financed, and the prices of securities and goods. This is particularly apparent if the equilibrium involves credit rationing (Williamson, 1986a).

Although these models help to explain why intermediation matters, they do not explain why *banks* might be special and therefore, why monetary policy might have real effects. One reason is that banks are both lenders and providers of transaction services. Banks have informational advantages that result in lower monitoring costs because they simultaneously lend to and maintain the transaction accounts of firms. The firm's transactions account provides the bank with low cost information about the firm. A nonbank intermediary lacking this source of information faces higher monitoring costs. In this case, banks are able to supply credit more efficiently than can other intermediaries. Consequently, if monetary policy affects the size of the banking sector, it also will affect the level of real economic activity.

While the economic role of intermediaries seems more fully developed in the asymmetric information literature, the real business cycle research has, somewhat paradoxically, provided a much more detailed analysis of the impact of monetary policy.<sup>8</sup> One attempt to bridge this gap is developed in Hartley and Walsh (1986), which supplements a conventional *ad hoc* macroeconomic model with a banking sector that makes loans to finance real investment spending. This framework permits the study of the macro implications of intermediation when intermediation matters. They show that monetary policy has real effects when changes in expected inflation induce substitution between bank liabilities and non-interest bearing outside money. Equal changes in all nominal interest rates (in order to restore expected real rates) alter the relative demands for non-interest bearing outside money and interest bearing inside money. Both the market for bank deposits and the market for outside money are affected, and adjustments in the price level cannot restore equilibrium to both markets simultaneously. As a result, real interest rates must adjust. Movements in the rate on bank deposits then lead to changes in the supply of bank loans and bank loan rates that affect the level of real economic activity. Unlike the case considered by King and Plosser in which returns to



scale in intermediation are constant, changes in the quantity of bank credit are not fully offset by changes in credit supplied by nonbank intermediaries or by changes in direct lending by individuals.

Additional channels through which monetary policy can affect real activity arise when bank liabilities are subject to reserve requirements. By reducing the nonbank sector's demand for outside money, an increase in expected inflation increases the supply of reserves available to the banking sector. Since reserves can be viewed as an input in the intermediation process under a fractional reserve system, an increase in expected inflation allows the banking sector to expand the supply of loans. This reduces the equilibrium loan rate and leads to a rise in real investment.

Shocks to the banking sector have effects on the level of real economic activity, then, because they affect the supply of loans. In Williamson's model of intermediation, for example, disturbances work through the asset side of the banking sector's balance sheet. In contrast, disturbances to banks in King and Plosser's model can have real effects only if they influence the provision of transaction services. Real effects arise, not because of variations on the asset side of banks' balance sheets, but because of variations on the liability side due to the role of bank deposits as a means of payment.

Several recent attempts have been made to determine

whether it is bank credit (the asset side) or money (bank liabilities) that matters for real economic activity. Bernanke (1983) found that for the 1920s and 1930s money had effects on real output even after controlling for credit. Empirical evidence from post-war data is reported by King (1986) and Bernanke (1986). King finds little support for the role of credit as the transmission mechanism for monetary policy. In vector autoregressions (VARs) that include real GNP, demand deposits, and various measures of bank loans, demand deposits generally account for a much higher fraction of the variance of GNP forecasts errors than do any of the loan variables. Since King's measure of money—demand deposits—is a measure of inside money, these results seem most consistent with the real business cycle view.

Bernanke (1986) obtained somewhat different results when he used a structural model to identify underlying money and credit shocks in a VAR that included, in addition to M1 and a measure of credit, real GNP, real defense spending, and the monetary base. Based on a decomposition of the output forecast error variance, credit shocks appeared to be much more important than shocks to the monetary base (outside money). M1 and credit shocks were of roughly equal importance. These results make it clear that few generally agreed upon empirical regularities exist in this area.

#### IV. Conclusions

Recent research in monetary economics that has focused on the role of information asymmetries and the costs of monitoring provide an improved understanding of the role of financial intermediaries. This research highlights three characteristics of intermediaries that seem of special importance from the perspective of understanding the role played by monetary policy in equilibrium models of business cycles. First, when intermediation is modeled as a constant-returns-to-scale activity (as in the real business cycle model of King and Plosser), the asset side of the banking sector's balance sheet is irrelevant for real economic activity. Variations in bank-intermediated credit are offset by other intermediaries or by direct portfolio adjustments on the part of individuals.

Second, the characteristics of bank liabilities as a means of payment play a role in determining the impact of monetary policy. Monetary policy can induce individuals to substitute between bank deposits and outside money. These portfolio shifts will affect relative rates of return and real economic activity. The importance of the portfolio adjustments caused by changes in the relative yields of bank deposits and outside money will depend on the

transaction properties of currency and bank deposits, and the characteristics of the payments system.

Third, if bank loans are special, perhaps due to the information efficiencies attributed to the banking sector's role as a provider of both credit and transaction services, then variations in the banking sector's aggregate lending will have an impact on real economic activity. Monetary policy will influence the real economy through its influence on the supply of bank loans. Variations in the path of outside money that induce changes in expected inflation will result in nominal interest rate adjustments, but such adjustments generally will affect real rates and will thereby affect the supply of bank loans.

If financial intermediaries essentially form a veil behind which real activity takes place, the resolution of many of the issues faced by economic policymakers is quite simple. If real activity, and the way it is financed, is independent of the actions of financial intermediaries as Fama (1980) and King and Plosser (1984) assume, then there would appear to be no justification on monetary policy grounds for any special regulation of the banking sector.<sup>9</sup> The appropriate conduct of monetary policy in such an environment also is

straightforward. Since variations in the monetary base have no effect on real variables, the monetary authority need concern itself only with achieving price stability.

However, if bank loans or deposits are in some sense special, then the optimal design of policy becomes a more complicated task. From both sides of the banking sector's balance sheet there seem to be good theoretical reasons to

believe monetary policy disturbances will not be neutral, even in equilibrium models of the business cycle. Policy analysis requires a better understanding of the role of both bank lending and bank provision of the medium of exchange. Without such an understanding, we are unable to evaluate alternative policy proposals.

## ENDNOTES

1. By "banks," we mean financial intermediaries whose liabilities provide transaction services.
2. For a more general summary of the real effects of monetary policy, see Blanchard (1987).
3. This superneutrality result does not strictly hold in a model like King and Plosser's which incorporates an endogenous labor supply decision unless the labor supply decision also depends only on ex-ante real interest rates. However, King and Plosser ignore this potential effect as empirically unimportant.
4. For a model of bank runs, see Diamond and Dybvig (1983).
5. As will be discussed in Section III, Bernanke's evidence also is consistent with the view that it is bank lending that is the key channel through which banking

disturbances affect real economic activity.

6. Assets used to carry out intergenerational trades need not, however, bear much resemblance to money. For some examples from nonmonetary economies, see Walsh (1983).
7. Since the large intermediary can earn a certain rate of return through diversification, the type of asymmetric information problem between bank and depositors analyzed by Leland and Pyle (1977) does not arise.
8. A recent paper by Williamson (1987) attempts to incorporate his earlier work on intermediaries into a real business cycle model.
9. For a discussion of banks and regulatory policy, see Furlong and Keeley (1988).

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