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## Endogenous money: Structuralist and horizontalist

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**Working Paper No. 512**

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**Endogenous Money: Structuralist and Horizontalist**

by

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The Levy Economics Institute and  
University of Missouri–Kansas City

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## **ABSTRACT**

While the mainstream long argued that the central bank could use quantitative constraints as a means to controlling the private creation of money, most economists now recognize that the central bank can only set the overnight interest rate—which has only an indirect impact on the quantity of reserves and the quantity of privately created money. Indeed, in order to hit the overnight rate target, the central bank must accommodate the demand for reserves, draining the excess or supplying reserves when the system is short. Thus, the supply of reserves is best characterized as horizontal, at the central bank’s target rate. Because reserves pay relatively low rates, or even zero rates (as in the United States), banks try to minimize their holdings. Over time, they continually innovate, as they seek to minimize costs and increase profits. This includes innovations that reduce the quantity of reserves they need to hold (either to satisfy legal requirements, or to meet the needs of check cashing and clearing), and also innovations that allow them to increase the rate of return on equity within regulatory constraints, such as those associated with Basle agreements. Such behavior has been a central concern of the structuralist approach—which argued that it is too simplistic to hypothesize simple horizontal loan-and-deposit supply curves.

**Keywords:** Monetary Theory and Policy, Horizontalist, Structuralist, Money Supply, Central Bank Targets, Central Bank Independence

**JEL Classifications:** B5, E0, E4, E5

## **I. INTRODUCTION**

Heterodox economists share an endogenous approach to money that insists that money is an essential component of the normal operation of the capitalist economy. Hence, they deny that money could be neutral, whether in the short run or in the long run. Further, money is created during the process of financing spending. The notion that the supply of money is, or could be, carefully controlled as in Friedman's famous money supply growth rate rule is also rejected. Many heterodox economists have argued that bank motivation is similar to that of other capitalist firms—to make monetary profits. Thus, the profit motive as well as profit-seeking financial innovations must play a role in creation of money by the banking system. Still, it is conceivable that banks operate within constraints, including those imposed by the monetary authorities, and that these might limit bank money creation. In addition to exogenous constraints, there could be endogenous constraints that restrain money creation arising over the course of a business cycle. For example, expectations might change in a systematic manner that affects demand and supply of loans and deposits. Central bank behavior, too, might change—with trend and with cycle. Still, there is no question that any influence of the central bank on the quantity of money is at best indirect and unpredictable—and should be of little interest to economists.

## **II. ENDOGENOUS MONEY**

In this section, I will focus on three aspects of endogenous money: the creditary approach, the state money approach, and the relation between sovereignty and policy independence. I have previously distinguished between different notions of endogeneity: theoretical, statistical, and control. (Wray 1992a; also see Desai 1989 and Cooley and LeRoy 1981) I will not repeat that discussion here, but will instead adopt the usual definition according to which at least some components of the money supply are privately created, in the process of financing spending (on goods, services, and assets). The notion of a simple deposit multiplier is rejected, and, indeed, reversed. Bank reserves are not treated as the “raw material” from which loans can be made; nor are bank deposits

an intermediate good used in the production of loans. Marc Lavoie (1984) put it best when he said that loans make deposits and deposits make reserves. That will be the working definition used for endogenous money in this paper.

Virtually all heterodox economists insist that money should be seen as credit money, which simultaneously involves four balance sheet entries. Credit money (say, a bank demand deposit) is an IOU of the issuer (the bank), offset by a loan that is held as an asset. The loan, in turn, represents an IOU of the borrower, while the credit money is held as an asset by a depositor. On this view, money is neither a commodity (such as coined gold), nor is it “fiat” (an asset without a matching liability). In the first subsection, I will briefly discuss the “creditary” nature of money. This is not (or should not be) controversial among heterodox economists. In the second subsection, I address the nature of the money issued by the state. Some heterodox economists have inconsistently accepted the orthodox characterization of the state’s money as a “fiat” money, with a nominal value established by state proclamation (or legal tender laws). It is often not recognized that even the state’s money is an IOU. In the final subsection, I examine the relation between policy independence and what can be called monetary sovereignty.

### **A. Creditary Approach**

The clearest statement of a creditary approach to money can be found in the work of A. Mitchell Innes, in two extraordinary articles published in 1913 and 1914. (Innes 1913, 1914, in Wray 2004) Rather than selling in exchange for “some intermediate commodity called the ‘medium of exchange,’” a sale is really “the exchange of a commodity for a credit.” Innes called this the “primitive law of commerce”: “The constant creation of credits and debts, and their extinction by being cancelled against one another, forms the whole mechanism of commerce...” (Innes 1913, p. 393) Innes explains:

By buying we become debtors and by selling we become creditors, and being all both buyers and sellers we are all debtors and creditors. As debtor we can compel our creditor to cancel our obligation to him by handing to him his own acknowledgment [sic] of a debt to an equivalent amount which he, in his turn, has incurred. (Innes 1913, p. 393)

The market, then, is not viewed as the place where goods are exchanged, but rather as a clearing house for debts and credits. On this view, debts and credits and clearing are the

general phenomena; trade in goods and services is subsidiary—one of the ways in which one becomes a debtor or creditor (or clears debts). Innes viewed the creditor-debtor relation as the fundamental social relation lying behind money's veil. There is no “natural” relation-free, or commodity, money that lies behind the credit money. The veil conceals creditor and debtor relations, not exchange as in the neoclassical view.

The simple circuit model shows how credit money is created by banks to allow production to proceed as firms pay wages (and working capital expenses) on the basis of short term loans. (Graziani 1990; Parguez and Seccarrecia 2000) Wage payment, in turn, shifts the credit money (in the form of deposits) to workers, who use them to purchase the consumption output of firms. Sales of intermediate and final output by firms, in turn, allows them to retire their bank loans, “refluxing” the bank money. As Innes (1913) argued, the bank creditors are obliged to accept their own debts (bank money) in loan repayment, at which point the credit money is extinguished. The circuits can become much more complex, but the fundamental circular creditary process remains. As Gardiner (2004) explains, much of the credit that allows production to proceed is internal trade credit that bypasses banks, although the modern commercial paper market uses back-up lines of credit at banks to reduce default risk. Use of credit cards for consumer purchases also economizes on bank deposits. Complex circuits plus nonbank credit means that there won't be any fixed ratio between a stock measure of bank money and a flow measure of spending. The stock of money is thus a residual, of limited interest to heterodoxy.

Still, the conceptual rules are clear. First, production begins with credit because the firm must hire the inputs before output can be sold. The credit can take many forms: trade credit granted by suppliers; a bank loan; accumulated deposit claims on a bank (perhaps from previous production, but still representing an outstanding bank loan); or even wages owed to employees. Sales of produced output allow the firm to accumulate third party IOUs used to cancel its own debt; or (rarely) the firm might deliver output to cancel debt, with both the output and the debt valued in nominal terms. Unsold output is accumulated as inventory (including intermediate goods), again nominally valued, and offsets liabilities that cannot be extinguished until the output is finally sold. When IOUs complete their journey back to their issuers, they are destroyed. Second, a debtor cannot eliminate her debt by delivering her own IOUs. Often reference is made to the normal

“debt pyramid” (Foley 1989, Bell 2001), according to which one delivers third party IOUs issued by an agent higher in the debt pyramid (a household or firm pays debts using bank liabilities; banks retire their own liabilities using central bank liabilities for clearing). Or, as Innes argued, one delivers the IOU of one’s creditor to cancel one’s own debt. Since banks play such an important role, much of the debt of the household and business sector is held by banks, and bank liabilities are used to retire this debt. Banks then clear accounts using either a private clearing facility, or the central bank’s facility; bank reserves (IOUs of the treasury or central bank) are used for net clearing.

Finally, capitalist economies are characterized as monetary production economies in which the purpose of production is to end up with “more money.” Marx’s M-C-M’ formulation is the most famous, although both Keynes and Veblen adopted very similar expositions. (Wray 2000) Money cannot be a veil that conceals the production process, because it is the purpose of production. Accounts differ on the reasons why capitalist economies are oriented around production for money values, with some Post Keynesians asserting that money contracts reduce fundamental uncertainty while some Marxists see money as the social representation of value in the abstract. Various expositions have demonstrated the conditions that are necessary to allow generation of profits in money form (Marx’s schemes of reproduction, Keynes’s fundamental equations, Kalecki’s profit equation, simple circuit models that include investment, and the accounting approach of Vallegeas). (Fan-Hung 1939; Wray 1990; Vallegeas 2004; Graziani 1990)

## **B. State Money Approach**

The State Money approach can be traced to Knapp, and was endorsed by Keynes. (Wray 1990; Knapp 1924) The approach has also been called the “chartalist” or “taxes-drive-money” approach. (Wray 1998) It emphasizes the important role played by “government” in the origins and evolution of money. More specifically, it is believed that the state imposes an obligation in the form of a generalized, social unit of account—a money—used for measuring the obligation. This does not require the pre-existence of markets, and, indeed, almost certainly predates them. Once the authorities can levy such an obligation, they can then name what can be delivered to fulfill it. They do this by denominating those things that can be delivered, in other words, by pricing them in the

monetary unit. To do this, they must first “define” or “name” the unit of account, and then place an obligation denominated in that unit on at least a segment of the population. The obligation itself takes the form of fees, fines, taxes, duties, tribute, or tithes. Today, of course, the most important obligation is the tax, hence, the role played by taxes in “driving money” is highlighted.

Note that the state can choose anything it likes to function as the “money thing” denominated in the money of account. (Knapp 1924) The state chooses the unit of account and names the thing that it accepts in payment of obligations to itself—at the nominal value it assigns to the thing. However, in practice, the state issues its own IOU—whether that is notched on sticks, etched on clay tablets, stamped on metal coins, printed on paper notes, or stored in computers as electronic charges. (There are cases in which a state has decided to accept the IOUs issued by other states at its pay offices; an obvious example is a “dollarized” currency board, but even the U.S. treasury accepted foreign coin in payment until the mid nineteenth century. Still, these are not the “normal” cases for developed capitalist economies.) These IOUs are then accepted back in payments made to the state. Note that all of this conforms to the principles laid out by Innes for credit money: the state makes payments by going into debt, and it must accept its own IOUs to extinguish the debt of its debtors. The fundamental difference is that the state imposes obligations on its subjects or citizens (depending on the form of government) in the form of tax debts. The government’s IOUs “reflux” when they are “redeemed” for tax payment. Refusal by the state to accept its own IOUs in payment at established nominal value represents a default by the state—with likely consequences for the value of the state’s IOUs in private transactions. (Some have objected that the State money approach cannot apply to democracies in which citizens—not the government—“voluntarily” impose taxes on themselves. This is, of course, a red herring—even in the most democratic of states, individuals are not free to evade tax payments, and are not free to choose the form in which they will pay their taxes. The state money approach applies equally well to representative forms of government—indeed, it almost certainly works better to the degree that the population sees tax obligations as fairly imposed. Representative democracies achieve higher tax rates, higher compliance with tax laws,



and less chance of governmental default—which contributes to a larger state sector and more stable monetary system.)

In (almost) all modern developed nations, the state accepts the currency issued by the treasury (in the U.S., coins), plus notes issued by the central bank (Federal Reserve notes in the U.S.), plus bank reserves (again, liabilities of the central bank)—that is, the monetary base or high powered money (HPM). The material from which the money thing issued by the state is produced is not important (whether it is a gold coin, a base metal coin, paper notes, or even numbers on a computer tape at the central bank). Indeed, throughout most of Europe’s history, the money-thing issued by the state was the hazelwood tally stick. Other money-things included clay tablets, leather and base metal coins, and paper certificates. Why would the population accept otherwise “worthless” sticks, clay, base metal, leather, or paper? Because the state agreed to accept the same “worthless” items in payment of obligations to the state. Contrary to orthodox thinking, then, the (nominal) value of the money-thing issued by the state was not typically determined by its intrinsic value, but rather by the nominal value set by the state at its own pay offices (at which it accepted payment of fees, fines, and taxes). (Wray 1998; Goodhart 1998)

While there might be some relatively minor exceptions, the privately-issued credit monies are denominated in the unit of account chosen by the state—the dollar, the euro, the peso. Again, as discussed above, the private debts “pyramid” the state’s HPM, with final net clearing using HPM. (Wray 1998; Bell 2001) While net clearing in HPM represents a very small proportion of daily financial transactions, the HPM balances play an important role—as we will discuss in more detail below. Finally, it should be emphasized that if there are examples of private monies that are not denominated in a state-chosen unit of account, if there are examples of commodity monies that are not debts, and if there are states that choose to accept payment in private credit monies or in government monies issued by other states, that in no way challenges the argument that the most common and important arrangement in modern capitalist countries today follows the model described by Innes and Knapp. While I do not think that critics of the credit money and state money approaches have been able to find examples of stateless, commodity money, even if they were to do so these are exceptions to the rule and of very

limited interest in a study of the modern monetary economy. (See Mehrling 2000 and Rossi 1999 for attempts to revive the stateless theory of money; see Parguez 2002 for an attempt to put the state into the circuit.)

### **C. Sovereignty and Policy Independence**

A sovereign nation like the U.S. (as well as countries like Japan and Turkey, and Argentina after it abandoned the currency board or Italy before it joined the Euro) creates a currency for domestic use. (Goodhart 1998) The government, itself (including the Treasury and the Central Bank), issues and spends high powered money as its liability. It is clear that the U.S. government does not promise to convert its HPM to any other currency, nor to gold or any other commodity, at any fixed exchange rate. The flexible exchange rate is a key to maintaining fiscal and monetary policy independence—what I like to call sovereignty, although governmental sovereignty certainly has other dimensions as well. By contrast, if a country pegs its exchange rate, it must operate to obtain foreign currency reserves to maintain the peg, which means that it must subsume domestic policy independence to the overriding necessity of accumulation of reserves. It thus surrenders monetary sovereignty and hence domestic policy independence in the name of “external balance.” This is why a floating exchange rate is a necessary component of policy independence.

But there is more to it than a flexible exchange rate. The sovereign government spends (buys goods, services, or assets, or makes transfer payments) by issuing a Treasury check, or, increasingly, by simply crediting a private bank deposit. In either case, however, credit balances (HPM) are created when the central bank credits the reserve account of the receiving bank. (Wray 1998; Bell and Wray 2002-03; see Van Lear 2002 for an attempted critique) Exactly analogously, when the government receives tax payments, it reduces the reserve balance of a member bank (and, hence the quantity of HPM). Simultaneously, the taxpayer's bank deposit is debited, and her bank's reserves at the central bank are reduced. While it is usually supposed that the operation is reversed, with a government needing to first receive tax revenue, and then spending that revenue, this sequence is quite obviously not necessary for any sovereign government. If a government spends by crediting a bank account (issuing its own IOU—HPM) and taxes

by debiting a bank account (and eliminating its IOU—HPM), then it is not as a matter of logic "spending" tax revenue. In other words, with a floating exchange rate and a domestic currency, the sovereign government's ability to make payments is not revenue-constrained precisely because it spends by emitting IOUs.

Note that the sale of its own debt by a sovereign government should not be thought of as a borrowing operation, even though it is frequently described as such. Rather, the operational effect of government bond sales (whether by the treasury in the new issue market, or by the central bank in open market operations) is to drain any excess reserves created (mostly) by treasury deficit spending. If the bond sales were not undertaken to drain excess reserves, the overnight rate would fall. Operationally, the Treasury and the Central Bank work together to ensure that the overnight interest rate target (set by monetary policy) is hit. They do this through security sales or purchases to drain or add reserves as necessary to allow the monetary authorities to hit rate targets. (Wray 1998; Bell and Wray 2002-03; Bell 2000)

When a household or non-sovereign government borrows, it issues an IOU and obtains a bank IOU that it needs in order to spend. The sovereign government, on the other hand, has no need to obtain a deposit before it spends its own currency. It can spend by crediting a private bank account. It sells a security, not to finance its expenditures but to reduce the outstanding stock of HPM, offering to substitute one of its interest-paying liabilities (the security) for a non-interest-paying liability (the HPM that is debited from bank accounts). This is really an interest rate management operation (known within the Fed as offsetting operating factors)—reducing bank reserves in order to eliminate (non-interest-earning) excess reserves that would otherwise place downward pressure on overnight interest rates. As such, bond sales are really a part of monetary policy, not a required part of fiscal policy.

The final point to be made regarding such operations by a sovereign government is that the interest rate paid on treasury securities is not subject to normal "market forces." The sovereign government only sells securities in order to drain excess reserves to hit its interest rate target. It could always choose to simply leave excess reserves in the banking system, in which case the overnight rate would fall toward zero. When the overnight rate is zero, the Treasury can always offer to sell securities that pay a few basis points above

zero and will find willing buyers because such securities offer a better return than the alternative (zero). This drives home the point that a sovereign government with a floating currency can issue securities at any rate it desires—normally a few basis points above the overnight interest rate target it has set. There may well be economic or political reasons for keeping the overnight rate above zero (which means the interest rate paid on securities will also be above zero). But it is incorrect to argue that the size of a sovereign government deficit affects the interest rate paid on securities. Not understanding this, treasuries sometimes try to “play the yield curve,” issuing longer maturities when interest rates are low on them, or reversing course and issuing short maturities when the yield curve is steep. While it is perhaps true that market forces of “supply and demand” enter into maturity spreads, if treasuries understood that the purpose of bond sales is to drain excess reserves so that the central bank can hit its overnight interest rate target, they would not issue long maturity debt at all. Indeed, paying interest on reserves is an adequate substitute for treasury debt issue—as the overnight rate cannot fall below the interest rate on reserves.

A non-sovereign government faces an entirely different situation. In the case of a "dollarized" nation, the government must obtain dollars before it can spend them. Hence, it uses taxes and issues IOUs to obtain dollars in anticipation of spending; unlike the case of a sovereign nation, this government must have "money in the bank" (dollars) before it can spend. In contrast to the sovereign nation, the non-sovereign government promises to deliver third party IOUs (that is, dollars) to service its own debt (while the U.S. and other sovereign nations promise only to deliver their own IOUs). Furthermore, the interest rate on the non-sovereign, dollarized government's liabilities is not independently set. Since it is borrowing dollars, the rate it pays is determined by two factors. First there is the base rate on dollars set by the monetary policy of the U.S. government (the issuer of the dollar). On top of that is the market's assessment of the non-sovereign government's credit worthiness. A large number of factors may go into determining this assessment. The important point, however, is that the non-sovereign government, as user (not issuer) of a currency cannot exogenously set the interest rate. Rather, market forces determine the interest rate at which it borrows. This is an important point that has been ignored by

horizontalists—who argue that the interest rate is exogenously set by policy. That is strictly true only for a country that floats its currency.

### **III. HORIZONTALIST**

Over the course of the 1970s and 1980s, Basil Moore played the major role in developing the “horizontalist” approach to money that emphasizes the nondiscretionary nature of reserves. (Moore 1988) This effectively reverses the “deposit multiplier” of the money and banking textbooks, arguing as above that “loans make deposits” and “deposits make reserves.” (See also Lavoie 1984.) The focus is on the private decisions made by banks and their customers, which determine the supply of loans and deposits, hence, the supply of credit money that “endogenously” expands to meet the needs of trade. The central bank can only “exogenously” set the short-term interest rate (federal funds rate in the U.S., repo rate in the UK) at which it supplies reserves “horizontally” on demand to banks.

The links between the horizontalist approach and the credit money approach discussed above should be obvious. The difference is really one of emphasis, with the horizontalist approach focusing more on bank and central bank decision-making and interactions, while the credit approach has been more interested in identifying the nature of credit/debt relations. The horizontalist approach also recognizes that today’s HPM is the debt of the government (treasury and central bank), although it is not clear that all followers of this approach would agree with Innes that all money—even gold coin—is debt. What has largely been neglected in the horizontalist literature is the role of the state and the impact of fiscal operations on banks and the central bank. At least in Moore’s version, the role of the state is limited to the central bank’s ability to set the overnight interest rate, which requires that it passively accommodate bank demand for reserves.

Indeed, the index to Moore’s 1988 book (Moore 1988) does not even list entries for fiscal policy, treasury, or taxes, and discussion of the connection between fiscal and monetary policy is limited to a brief argument that governments in the Third World are generally biased toward low interest rates because they are typically the largest borrower in any economy. (Moore 1988, pp. 67-68) By implication, government is seen to be in the

same position as any other economic agent, financing its spending either by running down deposit balances, or through borrowing from financial institutions. Hence, relations between the state money approach and horizontalism remain relatively unclear. It is somewhat surprising that fiscal effects on reserves are largely ignored in the endogenous money literature (except by the chartalists), because these are potentially many times larger than the quantities of reserves added or drained by central bank operations. (Bell and Wray (2002-03) represent a significant exception.) Some of those who adopt the endogenous money approach have even argued that central bank behavior should be analyzed separately from fiscal operations, as the central bank is formally independent of the treasury in many nations. (Van Lear 2002; Mehrling 2000)

In reality, however, the central bank's desire to set and hit overnight rate targets means that it cannot be independent of the treasury—in the sense that any undesired impact of fiscal operations on banking system reserves must be immediately and completely offset by central bank operations. All else equal, treasury spending leads to a credit to banking system reserves while tax payments lead to a debit, thus, treasury deficits lead to net credits. In practice, daily operations of the treasury would almost always generate either net credits or net debits even if the budget were balanced over the course of the year for the simple reason that tax payments on any given day would differ from government spending on that day. Hence, the treasury and central bank have created complex procedures that allow them to closely coordinate activities to minimize effects on reserves. These reserve effects of fiscal operations have been a central concern of the Chartalist literature. (See Wray 1998; Bell 2000; Bell and Wray 2002-03; and Parguez 2002.)

None of this really requires revision of the horizontalist approach that should be consistent with both the credit and the state money approaches. According to the state money approach, the state chooses the unit of account (the dollar, for example) in which the privately-issued credit moneys are denominated. The state also chooses which moneys it will accept in payment of taxes. In modern sovereign nations with their own domestic, floating, currencies, this is always an inconvertible, high powered, money (liabilities of the treasury and central bank). Private banks help in clearing between the government and the private sector, since most taxes are “paid” using bank accounts and

most recipients of treasury checks deposit them into private banks. In these operations, the private banks act as intermediaries making payments to the government on behalf of their depositors, and crediting depositors with government payments. The central bank and treasury then coordinate activities to offset undesired impacts on bank reserves, allowing the central bank to exogenously set and hit the overnight rate target. The high powered money accepted by the state in such countries is always a credit money, a liability of the treasury or central bank, and hence operates according to Innes' fundamental law of credit—or the law of reflux cited by the followers of the endogenous money approach. That is to say, state liabilities (HPM) are destroyed when they return to the state, mostly in tax payments or bond purchases by the non-government sector. In any case, Moore's fundamental point remains: at the end of the day, the quantity of HPM remaining in private hands (as bank reserves and as cash) is demand-determined, and is not a discretionary variable from the point of view of the central bank that is targeting an overnight interest rate.

#### **IV. STRUCTURALIST**

During the 1990s an unfortunate misunderstanding led to debate between horizontalists and a small group who came to be called structuralists. (See Goodhart 1998, Meulendyke 1988, Moore 1991, Palley 1991, Pollin 1991, and Rouseas 1986.) Drawing on earlier work by Schumpeter, Gurley and Shaw, Minsky, and Rouseas, structuralists argued that financial institutions are profit-seeking firms that innovate to avoid constraints and to take advantage of new opportunities. (See Wray 1990.) For them, the claim that banks supply loans on demand seemed to neglect supply conditions and to imply that banks are passive. Structuralists argued that banks are quite active, continually creating new financial instruments to economize on reserves (in 1957, Minsky had shown how the development of the fed funds market was in reaction to higher interest rates, as banks tried to reduce reserve holdings—see Wray 1990), evade interest rate controls (such as Regulation Q in the U.S. that prohibited interest on demand deposits—Wray 1990), or move assets off their balance sheets (“securitization” to avoid capital losses; or, now, to escape Basle capital requirements—Wray 1990; Guttman 2006). Clearly, these are

examples of *active* asset and liability management, rather than passive bank behavior. Further, more extreme statements by some horizontalists seemed to imply that the supply of loans is “infinitely elastic” at the market interest rate (determined as a mark-up over the overnight target rate). As it was difficult to conceive of any bank making an infinite quantity of loans (or a loan of infinite size), such claims appeared to have gone too far.

Let U.S. first distinguish between a horizontal supply of reserves versus a horizontal loan (and deposit) supply. In my view, the first of these is the correct way to think about the supply of reserves, however, the second is confused. Some structuralists tried to argue that the central bank can choose to use quantity constraints to restrict the supply of reserves. This then generates a response by the banking system to try to evade and avoid quantity restraints. It is now well-established, however, that central banks target overnight rates and then accommodate the demand for reserves. It is true that actual rates deviate from target, but this simply results from central bank tolerance of such deviations; when the rate finally goes above or below the central bank’s band, it intervenes. Because the demand for reserves is interest inelastic, it is not possible to allow “market forces” to determine the overnight rate—excess reserves cannot be eliminated by falling rates, nor can insufficient reserves be rectified by rising rates. For this reason, quantitative controls on reserves are not feasible. Maintenance of an orderly payments system (both private payments as well as payments made by and to the government) requires net clearing in HPM, which must be supplied on demand to ensure checks don’t bounce. Thus, while banks and other financial institutions should be viewed as profit seekers, the central bank spurs innovative behavior through its rate-setting rather than through quantitative constraints on reserves. Higher rates will indeed provide greater incentive to economize on reserves because reserves act like a tax on bank profits. Further, if the central bank raises reserve requirements, it must supply the additional reserves. While it is probably true that this will lead to changes in bank behavior so as to reduce the “tax” implied by reserve holdings, economizing on reserves will take time. Hence, it is still best to think of the supply of reserves as horizontal at any point in time, although demand will fall over time as banks find ways to economize.

The horizontal loan and deposit supply is meant to counter the notion that there is something equivalent to a resource constraint on bank lending. Assuming that the costs of



soliciting and supervising loans and deposits are reasonably constant, banks can cover their costs with a more-or-less constant mark-up for each risk class over the overnight interest rate set by the central bank. (Moore 1988 has a thorough discussion of the difference between the setting of wholesale and retail rates that need not detain U.S. here.) Whether retail loan rates and deposit rates should be considered “exogenous” in the policy control sense depends on behavior of the mark-up. If the mark-up does not vary with central bank policy, itself, and is known, then the central bank could, trivially, raise the loan rate to hit any higher rate target (for a risk class) by raising the overnight rate target. If the mark-up varies through time—perhaps due to macro or micro conditions—then exogenous “administration” of loan rates by the central bank becomes more problematic.

At least some of the structuralist criticism of Moore’s framework has been based on the argument that the mark-up depends on the state of the macroeconomy (for example, the stage of the business cycle) and also on the balance sheet positions of the lending bank and its borrower (which, again, may vary temporally). Moore does not deny that the mark-up might be variable—perhaps rising with pessimism and falling with optimism. This could be seen as a reclassification of risks—borrowers that used to receive loans on the basis of a 200 basis point (bp) mark-up now are charged 400 bp because risks have risen. Structuralists (wrongly) sought to refute a horizontal loan supply curve on the argument that over an expansion interest rates tend to rise because mark-ups rise as perceived risks grow. However, Moore’s horizontal loan supply curve is at a point in time, while theirs is a plot of interest rates over time. Moore’s horizontalism is not inconsistent with a rising mark-up over time as risks in the economy increase, thus the structuralist concern with innovation and evolution of practice can be incorporated within Moore’s framework. The point that Minsky (1963; 1975) had tried to make is that over an expansion, and under some conditions, the balance sheets of both borrowers and lenders can become “stretched” in such a way that loan rates tend to rise; this can be construed as either an upward sloping trend (structuralist) or as shifts of a series of horizontal curves due to rising risk (horizontalist).

What is more problematic is the claim made by horizontalists that the loan/deposit supply curve is perfectly elastic at the marked-up loan/deposit rate. It is true that

households and firms hold credit cards with pre-approved lines of credit up to some limit at a fairly constant cost (including fees and interest rate). However, utilization of these lines up to those limits would almost certainly impact rates and fees charged on additional borrowing. For example, variable rate mortgages in the U.S. often include terms that allow lenders to change interest rates after virtually any change in the borrower's credit status (including taking on additional debt, missing a credit card payment, or even late payment of a water bill). Firms also negotiate credit lines that typically trigger higher fees and rates as they are utilized. Commercial loans (and mortgage loans) require individual negotiation, with loan quantities and uses carefully established at the time interest rates are quoted. The firm must meet specific performance requirements to continue to draw upon the loan. Further, loan (and mortgage rates) can be partially or even mostly variable rate (depending on institutional arrangements) with higher interest rates triggered by rising debt or other impacts on financial strength. In these cases, it is difficult to see what it means to say that the supply of loans is "horizontal," except that the lender will supply credit at the negotiated rate and up to the negotiated limit—with borrowing that might take place later and beyond that limit to be subject to another rate that will be either negotiated at that time, or fixed as some mark-up over a future prevailing rate that is currently unknown.

Finally, all financial institutions actively construct portfolios as part of their risk management strategy. This means that they want a mix of loans and safer assets (principally, government bonds and high grade private paper). They also must conform to Basle (I and II) agreements. The new regulations are quite complex, but rest on three pillars: minimum capital requirements, supervisory review, and market discipline (Guttman 2006). Each of these pillars, in turn, has several components. To simplify, pillar one allows greater flexibility in establishing required capital ratios. It creates many more risk classes than were defined in 1992's Basle I Accord, and it allows larger banks to adopt "internal ratings-based approaches" and to rely on external ratings agencies to assess riskiness of assets. Calculated risk ratings are used, in turn, to establish capital requirements. The largest banks are encouraged to use their own models, pursuing what is known broadly as the "advanced approach" to assess credit risk (default probability, and losses in the event of default), market risk (risk that asset prices fall), and operational

risk (risk of losses from internal mismanagement, or from unforeseen external events). Pillar two addresses host-country supervision. Supervisors are supposed to work closely with their banks to monitor risk assessment practices; they can require extra capital beyond Basel II's minimum if they believe that domestic economic conditions warrant it. Finally, pillar three seeks to increase the force of the market to discipline banks. Riskier banks will have to pay higher interest rates on their liabilities and will face lower equity prices. Given these considerations, it is difficult to maintain that banks simply accommodate all demand for loans at an exogenously administered interest rate. Rather, banks adopt highly sophisticated strategies to determine the mix of assets as well as the pricing of risk. In such an environment, it is a gross simplification to model the supply of loans as horizontal at an exogenous interest rate.

## **V. CONCLUSION: A RECONCILIATION**

There are structural and horizontal aspects of the money supply process. In modern, developed, capitalist economies money should be conceived as *credit* money, an IOU of the issuer and an asset of the holder. It is denominated in a state money of account. It is refluxed back to its issuer, redeemed in debt payment. This recognizes that banks are simultaneously debtors as well as creditors; as debtors they are obligated to accept their own IOUs in payment by their debtors, which simultaneously extinguishes both their debit and their credit. Even the state's own money is an IOU, but it is redeemed in tax payment or other payments made to the state. The state's money is not "fiat," but rather is "driven" by the sovereign ability to impose tax liabilities on the population, liabilities that can be relieved by delivering the state's own IOU in tax payment. Private moneys "pyramid" (or "leverage") the state money, which is also used for ultimate net clearing of private accounts, as well as for making payments to the state. There is, however, no fixed leverage ratio between the quantity of private IOUs issued and the stock of state money existing. Most creation of state money occurs when the state spends, and most destruction of state money occurs through tax payment. However, the central bank also creates and destroys state money as it provides or drains banking system reserves—at the discount window and through open market operations. Treasury new issues of debt as well as

retirement of debt should be seen as part of monetary policy, designed to ensure that fiscal policy does not lead to continuous injections or leakages of banking system reserves.

While the mainstream long argued that the central bank could use quantitative constraints as a means to controlling the private creation of money, most economists now recognize that the central bank can only set the overnight interest rate—which has only an indirect impact on the quantity of reserves and the quantity of privately created money. Indeed, in order to hit the overnight rate target, the central bank must accommodate the demand for reserves—draining the excess or supplying reserves when the system is short. Thus, the supply of reserves is best characterized as horizontal, at the central bank’s target rate. Because reserves pay relatively low rates or even zero rates (as in the U.S.), banks try to minimize their holdings. Over time, they continually innovate as they seek to minimize costs and increase profits. This includes innovations that reduce the quantity of reserves they need to hold (either to satisfy legal requirements, or to meet the needs of check cashing and clearing), and also innovations that allow them to increase rate of return on equity within regulatory constraints, such as those associated with Basle agreements. Such behavior has been a central concern of the structuralist approach—which argued that it is too simplistic to hypothesize simple horizontal loan and deposit supply curves. While this paper has agreed with this conclusion, it has not accepted other structuralist arguments.

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