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7 The Theory and Measurement of the Nominal Output of Banks, Sectoral Rates of Savings, and Wealth in the National Accounts

Thomas K. Rymes

7.1 Introduction

Debate about the treatment of interest and “the banking imputation” in the national accounts, long smoldering, has recently been rekindled (see Haig 1986; Ruggles and Ruggles 1982; Ruggles 1983; Sunga 1967, 1984; Rymes 1985, 1986; and Mamalakis 1987). The debate is important for two reasons. First, the satisfactory integration of money and banking and general equilibrium theory has not yet been achieved (cf. Gale 1983). If money, or, more precisely, the services of money, were a private good, then one would argue that such services would be privately produced and that modern general equilibrium theory would satisfactorily incorporate money into value theory. A growing literature argues that central banks are fifth wheels and that monopoly fiat money exists solely as a device for governments to levy “distorting” taxes. Keynesian monetary theory argues that central banks produce a public good, stability, and that its value enters into the determination of all relative values in a Keynesian momentary general equilibrium. What appears in neoclassical general equilibrium as a set of “distorted” values representing the unfortunate existence of inefficient central banks, in the Keynesian framework is a demonstration that neoclassical general equilibrium value theory cannot be carried over to a monetary economy.

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This theoretical debate is of absolutely vital importance for the second aspect reviewed in this paper: the measurement of the nominal output of banking and rates of saving and wealth at the sectoral and aggregate levels in a monetary economy.

The basic problem that this paper addresses then is what effects on measures of output, rates of saving, and wealth derived from the national accounts are generated by different theoretical approaches associated with the measurement of banking. What measures, derived from monetary theory, can be proposed, and how will such proposals affect measured output, rates of saving, and wealth?

7.2 A Simple National Accounting Illustration of the Banking Problem

A representative statement of revenues and expenses of Canadian banks is shown in table 7.1.

In the national accounts, interest receipts and payments are regarded as part of the distribution of the net returns to capital originating in various activities. If one takes the labour costs and profits before taxes in table 7.1, adds to them interest payments by banks (on the argument that such payments, along with dividends, represent the distribution of the net returns to capital arising in banking), and deducts interest receipts (on the argument that such receipts represent the distribution to banks of the net returns in activities other than banking), one has

Labor costs	2,400
+ Profits before taxes	<u>1,250</u>
	3,650
+ Interest payments	<u>6,920</u>
	10,570
– Interest receipts	<u>10,725</u>
= Net domestic product	– 155

Table 7.1 Representative Revenues and Expenses, Canadian Banks (millions of Canadian dollars)

Expenses		Revenues	
Interest payments	6,920	Interest receipts	10,725
Intermediate inputs	1,000	Service charges	845
Labor costs	2,400		
Profits before taxes	1,250		
Taxes	435		
Dividends	<u>227</u>		
	11,570		<u>11,570</u>

Source: Figures are based on data in Revell (1980).

That is, the net (of depreciation) value added or net domestic product originating in banking is negative.

If one estimates net value added or net domestic product originating in the banking activity directly by means of deducting intermediate inputs from gross outputs (where only the service charges are treated as the gross outputs), then the same result occurs. This anomalous result leads national accountants to adopt the so-called banking imputation, which amounts to the assertion that banks do not fully charge depositors and lenders for the services they render and are compensated by paying less interest on deposits than they earn on loans—that is, the banks are delivering an underpriced service, and depositors are loaning their money to the banks in an offsetting underpriced way. It is as if there were a barter arrangement outside the price system between banks and their customers. Then, in line with “usual” national accounting practices, imputations are made.¹

In Canada (Statistics Canada 1975; 3:201), the imputed value of the service rendered by the banks is in effect the difference between interest flows, and this is added to the gross output of the banks. We then have

Labor costs	2,400
+ Profit before taxes	<u>1,250</u>
	3,650
+ Interest payments	6,920
+ Imputed interest payments	3,805
– Interest receipts	<u>10,725</u>
= Net domestic product	3,650
or Gross output	845
+ Imputed gross output (interest receipts 10,725 – interest payments 6,920)	<u>3,805</u>
= Total gross output	4,650
Less: Intermediate inputs	<u>1,000</u>
= Net domestic product	3,650

Part of the imputed gross output of the banks, that deemed to be purchased by households, is part of consumer expenditures. An equal amount is added to consumer income, in the form of imputed interest receipts. The absolute savings of the household sector is left unchanged. However, since both consumption expenditures and household investment income are increased by the same amounts, then the measured rate of saving is reduced by the imputation. In current practice (which this paper questions), as is shown in table 7.2, the effect for Canada is miniscule.

With respect to the savings of the business sector, which are the undistributed corporate profits and net income of unincorporated

Table 7.2 Incomplete Effects of Interest Imputation on Personal Rate of Saving, Canada, 1975–85 (millions of Canadian dollars)

Year	Personal Disposable Income	Personal Expenditures on Goods and Services	Rate of Saving	Interest Imputation	Rate of Saving (Adjusted)
1975	113.3	97.6	.139	1.3	.141
1976	128.2	111.5	.131	1.5	.132
1977	141.4	123.6	.126	1.6	.128
1978	159.5	137.4	.138	1.8	.140
1979	179.9	153.4	.147	1.9	.149
1980	203.7	172.4	.153	2.0	.155
1981	237.7	196.2	.175	2.4	.176
1982	262.8	212.5	.191	2.6	.193
1983	275.8	232.5	.157	3.4	.159
1984	299.9	251.4	.162	3.4	.164
1985	323.4	274.7	.151	3.7	.153

Source: GNP Division, Statistics Canada. The rate of saving (adjusted) is computed by subtracting imputed interest receipts from disposable income and imputed expenditures on banking services from expenditure on goods and services.

enterprises, there is no effect. The imputation does not affect the undistributed corporate profits of the banks. In Canada, though the imputed gross output produced by banks, beyond that which is treated as the purchases of households, should be deducted, as an intermediate input, from the gross output of nonbanks to obtain their value added, the remaining imputed interest flows from the banks to the nonbanks would leave nonbank corporate profits and the net income of nonbank unincorporated enterprises unchanged. In fact, in Canada the nonconsumer flows of imputed gross outputs and interest distributions are routed through a “dummy” banking industry so that measures of value added and gross domestic product originating in the nonbanking sectors in the Canadian national accounts are too high. Total gross domestic expenditures and products are affected, then, only with respect to the imputations that pertain to households’ use of the services of banks.² If some of the imputed services of the banks are treated as part of government expenditures or as part of private capital formation, total gross domestic expenditures and product and rates of saving would be additionally affected.

To the extent that nonresidents would be deemed to be net purchasers of the services of domestic banks, then aggregate domestic product and expenditures would be further increased by the imputations that would be added to exports. Of course, if Canadians were deemed to be purchasers of banking services produced abroad, then, for households, the imputed expenditures would be added to consumption ex-

penditures and imports, whereas the imputed interest receipts by Canadians would appear as part of exports. It remains the case, however, that the imputations for banking services do not affect the balance of payments on current account or the measures of absolute savings of the rest-of-the-world sector in the national accounts. In fact, in Canada, no imputed expenditures by nonresidents on the output of Canadian banks or imputed expenditures by residents on the output of non-Canadian banks are recorded. Imputed international banking services would, in general, affect merchandise trade balances. Since trade in banking services is an important topic in policy discussions about freedom from nontariff barriers to trade, and since, as I shall argue below, the output of banking services cannot be measured independently of monetary policy, the better measurement of international trade in banking services is a matter of some priority.³

The measurement of banking output, obtained by the usual application of the economic theory of the firm producing goods and nonfinancial services and the corresponding national accounting conventions, yields then meaningless results. The various treatments—(1) the standard national accounting imputations, (2) the “spreads” convention (Mintz 1979), and (3) the Ruggles-Sunga treatment of interest receipts and payments as “rentals” received and paid for the use of money and therefore as gross outputs and intermediate inputs of the various activities and not therefore as the distribution of the net returns to capital—while all having different effects on the measurement of the outputs and inputs of banks, and while not affecting measures of absolute savings, do affect measured rates of saving.

The important question is, however, which of the various measures has theoretical support. Is, in fact, the current treatment of banks leading to meaningless results? Are the various palliatives such as the banking imputation really improvements? Do the measures of output, the rate of saving, and wealth that result have theoretical significance and defense?

With respect to stocks, in the national accounts balance sheets, the stock of fiat money, because it is an asset of the private sector and a liability of the public sector, does not appear as a component of overall national wealth.⁴

For the private sector, fiat money in the form of nonprivate circulating currency and reserves of the banking sector with the central bank are considered as part of monetary wealth. (Without this component of wealth, the famous Pigou-Kalecki-Patinkin “real balance effect” would apparently not appear as an ultimate determinant of the overall price level in macroeconomic theory.) Bank deposits (and any private circulating currency) would not be treated as wealth since such assets would be liabilities of the private banks. Yet this distinction between

inside and outside money has never been satisfactory (cf. Johnson 1969; and Lucas 1986). Indeed, in a world in which fiat money is created essentially through deposits of the government with the Monetary Authorities that are switched to private banks for reserve creation, the distinction between inside and outside money breaks down. The value of the buildings, computers, and so forth in private and central banks is part of reproducible wealth. Moreover, actual stocks of reproducible wealth will reflect the efficacy with which banking operations are privately and collectively provided. Is it not double-counting to add the capitalized value of the promise of stability in monetary arrangements brought about by central banks, inspectors-general of banks, deposit insurance corporations being effected through private banks, and hence the rest of the economy?

Resolution of these problems awaits a satisfactory general equilibrium theory of banking, to which I now turn. Such a theory must at least explain why private banks do not pay the same rates of interest on deposits as they earn on loans and levy explicit service charges short of the costs of such services provided.

The theory or theories must, that is, explain or predict the national accounting banking problem and the need for the imputation. I present two very simple theories. One I call the neoclassical theory, the other Keynesian. With these two theories in hand, I return to the measurement problems outlined in this introduction.

7.3 On the Neoclassical Theory of the Efficiency of Banking⁵

7.3.1 Introduction

The regulation of banking by Monetary Authorities or central banks leads to Paretian inefficiency. Optimum money supply policies result in banking services being efficiently priced. The regulation by the Authorities determines the relations between interest rates on loans and deposits of banks and between the service charges levied for banking services and the cost of those services (cf. Merrick and Saunders 1985).

7.3.2 An Outline of the Model

The optimum neoclassical monetary growth model is used to portray inefficient pricing by banks. A representative agent, who maximizes intertemporal utility, uses the services of labor not supplied to the representative competitive bank, the services of commodity capital not held by the bank, and the service of the bank as metered by the service of real bank deposits to produce the one commodity output. The output is consumed or is added to the stock of capital or is exchanged for an

increase in deposits with the bank, where it appears as an addition to bank capital. All agents taken together have their "real" bank deposits change as the price level changes. Therefore, the flow of bank services or bank output for all banks taken together, given the nominal stock of bank deposits, is a function of the overall price level (Johnson 1972). The services of bank deposits, and therefore the services of banks, are of two kinds. A transaction service is provided such that, for given amounts of nonbank capital and labor, a larger flow of this service of banks will result in a larger final output. A portfolio or store of value service is also performed by banks and bank deposits. Banks pay interest on bank deposits, and, the higher the rate of interest, the greater will be the demand for real bank deposits. For the services provided, in particular, the transaction service, banks levy a service charge, and, the lower the service charge, the greater will be the demand for real bank deposits as agents attempt to obtain more of the transactions services provided by the banks.

All nominal high-powered or fiat money created by the Authorities is randomly distributed among the banks in the form of deposits with the Authorities so that, as an important and restrictive simplification, there is no circulating currency (cf. Friedman and Schwartz 1986; and Selgin 1988).

Banks produce bank services by using labor supplied by the agents, capital obtained from the agents as they substitute real bank deposits for capital, and the services of real high-powered, fiat money or reserves. The services of the reserves stand for the services of the Authorities and can be obtained only through such deposits.

7.3.3 The Competitive Bank

In a deterministic version of the argument, a competitive bank producing primarily transaction services⁶ is said to maximize

$$\begin{aligned}\Pi_B = & [\delta_M - (i - p)]M/P + RL/P + (i_H - p - \delta_H)H/P \\ & - WL_B - \delta K_B + \lambda_1 [M/P - (L/P + K_B + H/P)] \\ & + \lambda_2 [M/P - M/P(K_B, L_B, H/P)] + x,\end{aligned}$$

w.r.t. L/P , M/P , K_B , L_B , H/P , where Π_B = the commodity value of profits; M/P = the commodity value of homogeneous bank deposits; L/P = the commodity value of homogeneous bank loans; H/P = the commodity value of homogeneous bank deposits (reserves or high-powered money) held by the bank with the Authorities; L_B = the flow of labor used by the bank; K_B = the stock of capital used by the bank; δ_M = the service charge paid by depositors, expressed as a rate on deposits, for the services rendered by the bank; i = the nominal rate of interest paid on bank deposits; p = the expected equal to the actual

rate of inflation in the money price of the commodity; R = the competitive net rate of return to capital earned on loans; i_H = the nominal rate of interest paid by the Authorities on the bank deposits or reserves with them; δ_H = the service charge paid by the bank, expressed as a rate on deposits or reserves, for the service rendered by the Authorities; W = the commodity rental on labor; δ = the rate of depreciation on the commodity stock of capital; $M/P = L/P + K_B + H/P$ is the balance sheet constraint; $M/P = M/P(K_B, L_B, H/P)$ is the production function; P = the overall price level; and x = the lump-sum changes in high-powered money created by the Authorities.

Competitive banks primarily provide a transaction service obtained by using and holding over any period an average volume of bank deposits. The transactions service of banks is indexed by the services of bank deposits, and these flow services are indexed by the stock of "real" bank deposits. Service charges are, in reality, complex, consisting of a variety of fixed charges and varying charges per debit and credit entries on depositors' accounts.⁷ I simplify by expressing the service charge as a rate.

The technology of banking service requires the services of capital and labor and the services of the Authorities, obtained by the banks by holding deposits in turn with the Authorities. Again, the transaction service of the Authorities is indexed by the services of high-powered money, and, again, the flow of services of high-powered money is indexed by the stock of "real" deposits of the banks with the Au-

Table 7.3 **Explicit Service Charges Paid to Banks, Canada, 1985**

Composite service plans (e.g., Scotia Club)	3.9
Service charges on personal deposits	12.9
Nonpersonal deposit charges	19.2
Night depositories	.3
Guaranties on letters of credit fees	4.5
Funds transfer service fees	2.6
Acceptance fees	5.0
Credit card discounts and fees	19.2
Service charges on mortgages	1.5
Standby loan fees	2.9
Other loan fees	6.3
Safety deposit boxes	2.8
Canada Savings Bonds commissions	3.4
Security investment services fees	1.5
Safekeeping	1.4
Computer service revenue	2.6
Contractual management fees	2.5
Other miscellaneous services	7.4
Total	100.0

Source: GNP Division, Statistics Canada.

thorities just as the services of capital are indexed in neoclassical analysis by their stocks (Fischer 1974). The transaction services rendered by the Authorities could be clearing arrangements or deposit insurance arrangements (cf. Goodhart 1987, 1988) that lead banks to hold reserves with them.

A single bank competes for reserves by attempting to acquire deposits (or borrowing from agents) with the increased deposits taking the form of additional reserves and/or capital stocks. It is assumed that the banking service technology exhibits constant returns to scale. The single bank takes as given the price level, service charges, and all interest rates and knows confidently the steady-state inflation rate. From first-order conditions for profit maximization, we have

$$\begin{aligned}\frac{W}{\delta_M - (i - p) + R} &= \frac{\partial_{M/P}}{\partial_{L_B}} (K_B, L_B, H/P), \\ \frac{R + \delta}{\delta_M - (i - p) + R} &= \frac{\partial_{M/P}}{\partial_{K_B}} (K_B, L_B, H/P), \\ \frac{R - (i_H - p - \delta_H)}{\delta_M - (i - p) + R} &= \frac{\partial_{M/P}}{\partial_{H/P}} (K_B, L_B, H/P),\end{aligned}$$

which reveal that only if bank deposits earn the competitive rate of return, that is, if $i - p = R$, will the transaction service rental of bank labor and capital be metered by their respective marginal products and only if the Authorities pay the competitive rate of return on reserves, that is, if $i_H - p = R$, will the price of the transactions service provided by the Authorities be metered by the value of the marginal products of such services. We will then have

$$\begin{aligned}\frac{W}{\delta_M} &= \frac{\partial_{M/P}}{\partial_{L_B}} (K_B, L_B, H/P), \\ \frac{R + \delta}{\delta_M} &= \frac{\partial_{M/P}}{\partial_{K_B}} (K_B, L_B, H/P), \\ \frac{\delta_H}{\delta_M} &= \frac{\partial_{M/P}}{\partial_{H/P}} (K_B, L_B, H/P).\end{aligned}$$

The latter conditions are those required for Paretian efficiency in the provision of banking transactions services.

The zero-profit condition entails

$$\begin{aligned}[\delta_M - (i - p) + R]M/P &= (R + \delta)K_B + WL_B \\ &\quad + [R - (i_H - p) + \delta_H]H/P\end{aligned}$$

so that, if $R = i - p = i_H - p$, then

$$\delta_M M/P = (R + \delta)K_B + WL_B + \delta_H H/P,$$

or the price of the banking service will equal the marginal cost of providing that service. The link between the Authorities not paying competitive rates on reserves, differences between loan and deposit rates, and service charges not equaling the marginal cost of the provision of banking services is what this paper seeks to establish.

With δ set by technology and δ_H , i_H , and p set by the Authorities, the unknowns to determine are R , δ_M , W , i , and P —the net rate of return to capital, the service charge on bank deposits, the wage rate, the interest rate on bank deposits, and the overall price level.

In the foregoing, the price level is one of the things given to the competitive bank. However, at the market level of analysis, the services of bank deposits and bank reserves and therefore the services of banks and the Authorities cannot be determined independently of the price level. The determination of the price level is the sine qua non of the neoclassical quantity theory of money. In much of the banking literature, the codetermination of the level of output for all banks and the general price level is not investigated because such analysis is generally concerned with single competitive banks (see, e.g., Baltensperger 1980; Elyasiani 1982; Klein 1971; Santomero 1984; Spellman 1982; Tobin 1984; and Hancock 1985). Consideration of the price level, as I shall show, is also vital for the national accounting banking imputation.

From the first-order conditions for capital and real reserves, for any labor input, there will exist portfolio balance relations for different amounts of bank capital and real reserves that ensure that the value of the gross marginal physical product of bank capital equals the competitive gross rate of return or rental on capital and that the value of the gross marginal physical product of real reserves equals the competitive net rate of return or rental on capital plus the service charge, if any, levied by the Authority minus the real rate of interest paid by the Authorities on real reserves. These relations, which were set out in similar form by Keynes (1936, chap. 17), are

$$[\delta_M - (i - p) + R](\partial_{M/P}/\partial_{K_B})(K_B, L_B, H/P) = R + \delta,$$

$$[\delta_M - (i - p) + R](\partial_{M/P}/\partial_{H/P})(K_B, L_B, H/P) = R - (i_H - p) + \delta_H,$$

and are illustrated in figure 7.1. Figure 7.1 has the following interpretations. If $R = i - p = i_H - p$, then, from the bank capital relation, there are combinations of real reserves or the services of the Authorities used by banks and the services of capital such that the value of the gross marginal product of capital in banking equals the competitive gross rate of return or rental on capital. Those combinations are shown by the curve denoted K_B^* . Similarly, there are combinations of real reserves and real bank capital such that the value of the gross marginal

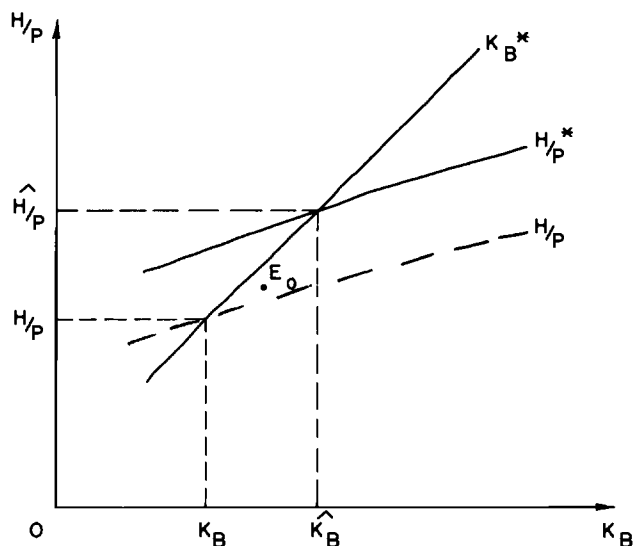


Fig. 7.1 Capital and real reserves for banks

product of the services of Authorities in banking equals the service charge levied by the Authorities. Those combinations are shown by the curve denoted H/P^* .⁸ There is one combination of bank capital and real reserves such that portfolio equilibrium would hold, namely, banks would be content to hold capital and real reserve stocks. \hat{K}_B and \hat{H}/P . If the Authorities then set $i_H - p < R$, then the banks would seek to hold fewer reserves. If the banks were able to generate lower real reserves, then real capital stocks would be earning less than the going rate of return, and both capital and real reserves would be reduced to K_B and H/P , where again portfolio equilibrium would be attained. Since nominal reserves are determined by the Authorities, real reserves cannot be altered unless the price level is changed, and, of course, competitive banks by themselves and together cannot determine the price level.

If the interest rate on deposits was lower, and so, proportionally, was the service charge on bank deposits, then the portfolio balance relations would be unaffected. If the reduction in the service charge was less in proportion than the interest rate on bank deposits, then both curves K_B^* and H/P would shift and intersect at a point such as E_0 in figure 7.1. To show that the change in the interest rates on deposits and the service charge is connected with the change in policy by the Authorities, it is necessary to consider the behavior of the representative agent.

7.3.4 Nonbanks

The representative agent maximizes

$$W = \int_0^{\infty} U(C_t) e^{-\rho t} dt,$$

where $U(C_t)$ is the instantaneous utility function with the usual properties, $U' > 0$, $U'' < 0$, and ρ is a constant rate of time preference, subject to

$$C[K(t), \tilde{L}(t), M/P(t)] + (i - p - \delta_M)M/P(t) + WL_B(t) - \dot{K}(t) - \dot{M}/P(t) = C(t),$$

where $C(t)$ is consumption; $\dot{K}(t)$ and $\dot{M}/P(t)$ are investments in commodity capital and real bank deposits; $C[K(t), \tilde{L}(t), M/P(t)]$ is the gross output of the flow of consumption goods as a function of the services of the stock of capital, labor, and the services of the stock of real bank deposits (with again the services of bank deposits indexing the transaction services of banks); $i - p - \delta_M$ is the nominal rate of interest on bank deposits less the confidently expected steady-state rate of inflation less the service charge (as a rate); and $WL_B(t)$ are the wages paid by the banks. The technology $C[K(t), \tilde{L}(t), M/P(t)]$ entails that the production of consumption, now assumed subject to constant returns to scale, is positively related to real bank deposits or the services of banks in the sense that a lower use of the transactions services of banks would necessitate more labor and capital to produce the same level of consumption. In this paper, I ignore bank loans and assume for simplicity that agents demand bank deposits services, will give up capital to the banks for such deposits, and will supply labor to the banks.

The optimum solution entails

$$\begin{aligned} \partial_C / \partial_{\tilde{L}} (K, \tilde{L}, M/P) &= W, \\ \partial_C / \partial_K (K, \tilde{L}, M/P) - (\delta + \rho) + \eta_c / c &= 0, \\ \partial_C / \partial_{M/P} (K, \tilde{L}, M/P) + i - p - (\delta_M + \rho) + \eta_c / c &= 0, \end{aligned}$$

where η is the elasticity of the marginal utility of consumption with respect to consumption. In the steady state,

$$\begin{aligned} \partial_C / \partial_K (K, L, M/P) - \delta &= \rho = R_K, \\ \partial_C / \partial_{M/P} (K, L, M/P) - \delta_M + i - p &= \rho = R_M. \end{aligned}$$

With normalization on labor, a second portfolio balance diagram is provided in figure 7.2. There are, for $\dot{C} = 0$, combinations of K and M/P such that \dot{K} is also zero. Similarly, again for $\dot{C} = 0$, there are

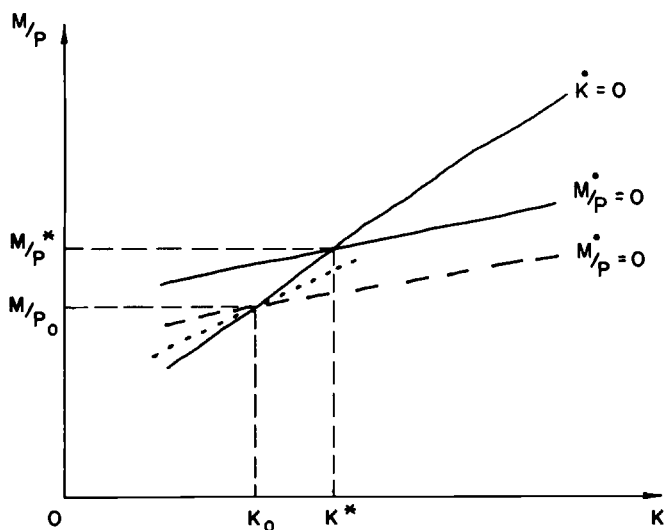


Fig. 7.2 Capital and real deposits for nonbanks

different combinations of K and M/P such that $\dot{M/P}$ is zero. A steady-state combination $(K^*, M/P^*)$ of real nonbank capital and real bank deposits is such that the net marginal rates of transformation between present and permanent consumption through either capital or bank deposits equals ρ , the steady-state rate of return. The steady-state combination depends on $i - \delta_M - \rho$, the net of the service charge real rate of interest earned on bank deposits. If $i - \rho$ is equal to ρ , then

$$\partial_C / \partial_{M/P}(K^*, M/P^*) - \delta_M = 0,$$

that is, the amount of K^* and M/P^* would be such that the gross marginal rate of transformation between present and permanent consumption through bank deposits would be equal to the service charge equal to the marginal social cost of producing such services.

The efficient steady-state equilibrium in which the Monetary Authorities pursue the optimal money supply policy, such that $i_H - \rho = \rho$, that is, the Authorities pay the steady-state competitive real net rate of return on reserves, entails that $i - \rho = \rho$, that is, the real interest rate on bank deposits will also equal the competitive real net rate of return. Thus, all service charges, expressed as rates, would equal the values of the marginal physical products of the services of real reserves and bank deposits. For bank deposits, then, in steady state we would have

$$\rho = \partial_C / \partial_{M/P}(K^*, M/P^*) + i^* - p - \delta_M^*,$$

such that $\rho = i^* - p$ entails $\partial_C / \partial_{M/P}(K^*, M/P^*) = \delta_M^*$.

Could the same equilibrium exist if $i < i^*$ and $\delta_M < \delta_M^*$ but $i - \delta_M = i^* - \delta_M^*$? The answer is no. A reduction in δ_M entails a reduction in the price of bank services relative to P , the overall price level, so that real effects must follow. A lower overall price level entails real effects such that the contemplated equilibria other than $\rho = i^* - p$ would not exist.

7.4 The Model (and Stability)

If the Authority sets $i_H - p$ less than ρ , the banks' demand for real reserves will be less, and they will attempt to supply fewer real deposits, which results in lower interest rates being paid on bank deposits. Agents in turn would want to hold fewer bank deposits or demand fewer services because of the lower interest rate, which would result in lower service charges. Agents wishing to hold fewer bank deposits are, however, simultaneously wishing to hold more stocks of goods (as are banks), and the price of goods in general will be higher so that the relative price of banking services in terms of the numeraire commodity must be lower. The higher price level is associated with lower amounts of real deposits and reserves.⁹ The real deposits and reserves are associated with higher gross marginal rates of transformation between present and permanent consumption through reserves and bank deposits to offset the difference between $i_H - p - \delta_H$ and between $i - p - \delta_M$ and ρ . The lower real reserves and deposits in turn are associated with lower amounts of real capital.

The argument is partially illustrated in figure 7.2. One starts with optimum monetary arrangements and the observed allocations M/P^* and K^* . The Authority then sets $i_H - p < i_H^* - p$. Banks therefore have a negative excess demand for reserves at the existing price level. In competing less for reserves, the banks attempt to supply fewer bank deposits and so generate lower interest rates on bank deposits. The lower interest rates on bank deposits will be associated with agents demanding fewer bank deposits and bank services.

Two effects follow: If service charges could be lower *pari passu* with interest rates on bank deposits (a possible partial equilibrium result), then the negative excess demand for bank deposits would be eliminated, but the negative excess demand for reserves would remain. The reduction in the service charges will be less, however, because as part of a generalized increase in the excess demand for goods the price of all consumption in general, including bank services, will rise, offsetting to some extent the fall in the nominal price of the services of banks

but not preventing a decline in the relative service price of banks. The result is a dashed $M/P = 0$ locus in figure 7.2 and a dotted temporary equilibrium locus that indicates that at the higher overall price level, which equalizes rates of return on capital and real bank deposits,¹⁰ the temporary equilibrium rates of return to capital and real bank deposits would be below ρ , agents will save less, and a new steady-state equilibrium, M/\dot{P}_0 , K_0 , would exist. By the simplifications on the balance sheet $M/P = K_B + H/P$, it follows that in the banking sector there will be a new steady-state equilibrium H/P_0 , K_0 , such that the volume of the transaction services of banks would be lower.

The inefficient steady state entails that real interest rates on bank deposits are less than ρ with

$$\frac{\partial_C}{\partial_{M/P}}(K_0, M/P_0) - \delta_M = \rho - (i - p) > 0,$$

$$\frac{\partial_{M/P}}{\partial_{H/P}}(K_{B0}, H/P_0) - \delta_H = \rho - (i_H - p) > 0.$$

The Authorities, by setting $i_H - p$ less than ρ , behave as a monopolist constrained by pecuniary behavior to maximize (say) the inflation tax, and the community experiences the associated welfare losses. That behavior by the Authorities shows up not only in the “distortion” of relative interest rates and relative prices but in a “distortion” of the price level (the once-over change in the level of prices is the key to the argument) as compared to that state that results from the optimum money supply policy. It is these “distortions” that lead to the standard observations that interest rates on bank deposits are less than those on bank loans and that the service charges banks levy do not cover the cost of the services provided. Again, the argument depends on the supposed ability of the Authorities to effect changes in $i_H - \delta_H - p$ independently of x , the lump-sum tax transfer mechanism, an ability this paper assumes. This is a requirement for the supernonneutrality results to hold (see Dornbusch and Frenkel 1973).

To recapitulate, then, the levying of a tax by the authorities, that is, their failure to pursue the Friedman-Lucas optimal money supply policy of paying the competitive real rate of return on reserves results in banks earning a higher rate on their loans than they pay on their deposits and in the value of the transactions services provided by the banks being greater than the service charges collected. These are, however, precisely the conditions that give rise to the problem of measuring nominal banking output and that lead national accountants to embrace the banking imputation “resolution” of the problem.

It will be noted that only one “distortion” has been introduced—the failure of the Authorities to pay the competitive real rate of return

on reserves. Generalizations and extensions would appear possible. Additional "distortions" would be imposed if the Authorities compelled the banks to hold (binding) legal and varied cash reserve ratios or to set some ceiling to the interest rates banks could pay on deposits or could earn on loans¹¹—to name just two examples.

Technical objections to the neoclassical general equilibrium theory of efficient banking (cf. Harkness 1978; Sargent and Wallace 1985; Bewley 1985; Milbourne 1987), while of concern (cf. Rymes 1972), are not as important as the obvious fact that it leaves no room for a theory of central banking. In the neoclassical theory, the failure of central banks or Monetary Authorities to pay competitive interest rates on fiat money results in a "distorting" tax. The Authorities must be constrained (Brennan and Buchanan 1980) to follow optimum money supply policies and must not behave in a discretionary fashion because such behavior may not be effective in affecting real nonmonetary variables such as the volume of unemployment and can lead only to departures, such as inflation or a reduction in $i_H - p$, from efficient monetary arrangements. A central bank, constrained to pay competitive interest rates on reserves and to replicate other competitive conditions, is not a central bank. As Wills (1982, 258) argues: "A system with a mandatory cash base on which the marginal cost of funds is paid is equivalent to an unregulated system." In our simple case, the reserve base is not mandatory, but, even in the case in which the interest rate on reserves is set below the competitive rate, banks will still hold such reserves if such holdings permit them to access the provision of (say) deposit insurance by the Authorities, such insurance potentially obviating the phenomenon of bank runs (see Diamond and Dybvig 1983). The "tax" still applies since a service charge would be and is levied by the Authorities for the service provided.

However, if the reserves did earn the competitive rate of return, it would be possible for the reserves to be privately produced and held and for the Monetary Authorities to provide the insurance service other than through the reserves of the competitive banks. Similarly, the banks could hold their reserves privately, and the Monetary Authorities could provide interbank clearing or transaction services without the need for the banks to hold reserves with the Authorities. Such insurance and clearing services could be provided privately, in which case the rationale for Monetary Authorities or central banks has completely vanished. The services of competitive banks would be efficiently priced, the service charges would cover the costs of the banking services, or the transactions services of bank deposits and the set of prices associated with the transition-production technology would be observed to be but a part of standard monetary general equilibrium analysis (Fama 1980, 1983; Greenfield and Yeager 1983; Hall 1982; King 1983; Yeager

1985). The special problems associated with the measurement of banking output would have disappeared.

All this results from the nonexistence of a satisfactory theory of central banking in the foregoing analysis. I now turn to that crucial problem.

7.5 The Model (and Instability): An Introduction to the Keynesian Theory of Banking

In the analysis so far, global stability in a rational expectations perfect foresight sense has been assumed. Had global instability been assumed, nothing could have been said. What about the rational expectations saddlepoint instability argument? In figure 7.3, I illustrate the problem. In figure 7.3, suppose there exists an optimal steady state, $(K^*, M^*/P)$. Suppose the equilibrium is "disturbed" by a change in the capital stock. If lower, it would appear that, in a temporary equilibrium, as agents tried to go from bank deposits into goods, the rise in the price of goods would so reduce M/P that further decumulation and a further rise in prices would occur. The economy would be off into infinite capital shallowing and ever-higher price levels. If the capital stock were greater, it would appear, for temporary equilibrium to hold, that the price of goods would fall, resulting in further accumulation, and the economy would be off into infinite capital deepening and ever-lower price levels.

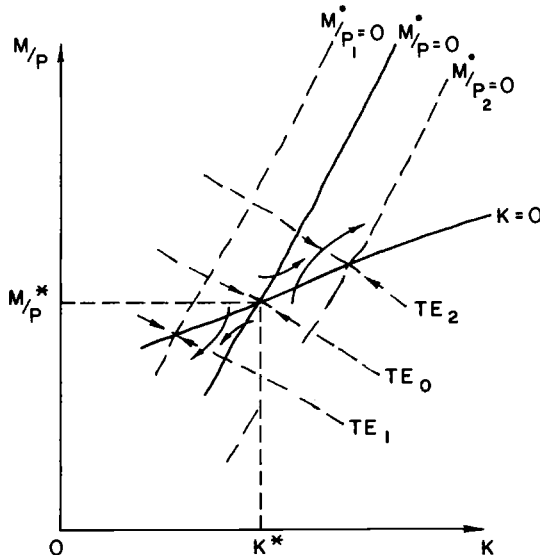


Fig. 7.3

Capital and real deposits for nonbanks: saddlepoint stability

Agents would know, however, that the Authorities would engage in monetary reform to prevent such inefficient outcomes. In the first case, agents would be compensated for the reduction in the real value of their bank deposits; the extent of such expected compensation would be such that agents would seek to hold greater, not less, real cash balances; the initial price level would be lower, not higher; and the temporary equilibrium would be on the stable arm of the saddlepoint equilibrium, labelled TE_0 in figure 7.3. In the second case, the value of bank deposits would be reduced by the monetary reform. Agents, knowing this, would seek to hold fewer real deposits, and the price level would be higher rather than lower, putting the economy in temporary equilibrium again on the stable arm of the saddlepoint equilibrium TE_0 (Sargent and Wallace 1973; Begg 1982; and Sheffrin 1983, 1981).

The unique stable perfect foresight path is not connected with any rules the Authority would follow but is in fact a product of the supposed discretionary power of the Authority to provide the stability.

The saddlepoint instability may arise because of myopic expectations—all agents, for example, may not know exactly what the steady-state rate of inflation must be and are sufficiently misguided to adapt their inflation expectations to the different rates of inflation that would exist along any sequence of temporary equilibria. The saddlepoint equilibria can also arise from the specification of the basic transformation schedules $C(K, \bar{L}, M/P)$ and $M/P(K_B, L_B, H/P)$ so that second-order conditions may not be secure. In figure 7.3, the relative slopes of the portfolio balance relations have been altered to reflect this possibility of a transactions technology that is consistent with instability.

Suppose that the Authority, endeavoring to increase efficiency, raises the real rate paid on reserves and that the real rate of interest net of the service charge on bank deposits increases. Then, as illustrated in figure 7.3, the $\bar{M}/P = 0$ locus is shifted upward to $\bar{M}/P_1 = 0$ because the net rate of return on real bank deposits, with $i - p - \delta_M$ higher, would remain at p only if real bank deposits were much higher, ensuring that the gross marginal rate of transformation respecting consumption through bank deposits was lower. With no further action by the Authorities, the system would be unstable, off on a programme of infinite capital and real bank deposit accumulation. Action by the Authorities known by the agents to be required for monetary stability entails that the holding of real bank deposits will be penalized. The relevant unique perfect foresight stable path is along the temporary equilibrium locus TE_1 . Conversely, if the Authorities caused the banks to pay lower interest rates on deposits, then agents, trying to move out of deposits, would cause prices to rise at an accelerating rate, and the economy as in figure 7.3 would be off into infinite capital shallowing and ever-higher

price levels. Again, agents who perceive such a possibility will be expecting monetary reform such that the terminal value of their bank deposits will be greater than under the unstable scenario. The relevant temporary equilibrium locus becomes TE_2 . The extent to which reform must occur is such that in the first instance agents would seek to hold less real money and the price level would adjust instantaneously upward. The reason for this is that overall, taking into account the higher rate of interest on deposits and the reduction in the terminal value of the deposits, money is not as attractive to hold. In short, the Authorities have made the holding of money less, not more, attractive. Similarly, in the second instance, the expected increase in the real value of bank deposits more than offsets the lower interest rates, and overall money is more attractive to hold. Again, the Authorities have in fact made the holding of money more, not less, attractive.

An interesting problem emerges. The possibility of a unique perfect foresight path to a steady-state equilibrium depends on the maintenance of stability by the Authorities. The efficiency of monetary arrangements depends not on the maintenance of a competitive real rate of interest on reserves but on the preservation of stability by the Authorities—assuming instability in the saddlepoint sense. What is then meant by the efficiency gains from an optimal money supply rule such as paying competitive real rates on the reserves of the banks? This question is particularly relevant when cognizance is taken of the point that attempted maintenance of optimum rules by the Authorities may contribute to rather than reduce the instability of the economic system. Discretionary behavior by the Authorities, when fully taken into account by private agents, is stabilizing, whereas conduct of policy by rules is disstabilizing.

Under the assumptions of neoclassical monetary growth theory, if global stability is assumed, the failure of the Authorities to follow the rule of paying competitive real interest rates on reserves involves welfare losses. If saddlepoint instability is assumed, no rule will ensure efficiency. In fact, the announcement by the Authorities of a rule will necessitate at some time the announcement of a change in the rule—what some call “time inconsistency” in rules (Calvo 1978)—to enhance the efficiency of the economic system.

More important, if stability is assumed, it is hard to see any role for Monetary Authorities. Optimum money supply policies entail the complete deregulation of the banking activity. Optimum rules and laissez-faire banking are one and the same thing. Once the optimum rules are followed, interest rates on reserves and on deposits equal the competitive real net rate of transformation between present and permanent consumption streams, all services performed by the Authorities and by the banks are efficiently priced, and M would be at the level of the

marginal real resource cost of the services of banks. The central bank has no role to play. The problem with banks in the national accounts would, at least on this analysis, not exist.

These conclusions are radically altered if saddlepoint instability in the rational expectations sense is assumed in which the unique sequence of temporary equilibria to steady-state equilibria is a function of the rationally expected discretionary action of the Authorities. Depending on the specification of the service of bank deposits and reserves in production relations, the rule $i_M - p = \rho$ can lead to instability and is corrected into a unique sequence of temporary equilibria if and only if the Authorities change the rule at some time. Then optimum money supply policy rules cannot be followed.

The consequence of Monetary Authorities that act in a discretionary way is that the rules set out for efficiency in the case in which stability was assumed cannot apply. Banks will not earn the going net rate of return on their reserves, interest rates on deposits will not be the same as those earned on loans, and the service charges levied by the banks will not cover the cost of such services. In a world in which the Monetary Authorities play the essential role of ensuring monetary stability, then the sets of interest rates and service charges will generate precisely those characteristics that give rise to the banking problem outlined in the introduction to this paper.

Reserves and, indirectly, bank deposits would earn nonpecuniary liquidity premia (not part of the return on money balances in the neo-classical case) because the real value of the services of money and hence the real value of the money stocks themselves are associated with the provision of the public good, stability, by the Authorities. It is not the service of money that is a public good (cf. Weldon 1971; Laidler 1977) but the service of stability by the Authorities.

7.6 The Problem of Measuring Nominal Private and Central Bank Output

What is the significance of the theoretical discussion for the measurement problems that are also the topic of this paper? Consider the neoclassical argument first. It was observed, under the optimum monetary policy argument, that for bank deposits

$$R = \frac{\partial C}{\partial M/P} (K^*, \bar{L}, M/P^*) + i - p - \delta_M$$

so that, where $i_M - p = R$, then

$$\frac{\partial C}{\partial M/P} (K^*, \bar{L}, M/P^*) - \delta_M = 0,$$

or

$$\delta_M = \frac{\partial C}{\partial M/P} (K^*, \bar{L}, M/P^*),$$

that is, the rental price of the services of bank deposits or the price of the output of banks equals the value of the marginal product of such services. The banking imputation would not be needed, and the measurement problem associated with banks would not exist.

For nonoptimum monetary policy, however, we have

$$R - (i - p) + \delta_M = \frac{\partial C}{\partial M/P} (K, \bar{L}, M/P).$$

The theoretical argument says that the nonoptimum value of the marginal product of banking services will be equal to the difference between the competitive net real rate of return and the real interest rate paid on bank deposits (or $R + p - i$, the difference between the competitive net nominal rate of return less the nominal rate of interest paid on bank deposits) plus the service charge rate associated with banking services.

This would appear to be precisely that which results from the application of the banking imputation procedure. If we assume that bank loans earn the competitive rate of return, then the imputed real gross output for banks will be, where M/P is the real value of bank deposits equal to loans,

$$[R - (i - p) + \delta_M]M/P,$$

or the imputed nominal gross output for banks will be

$$[R + p - i + \delta_M]M,$$

which is precisely what national accountants do.

The “real” gross output of the banks,

$$[R - (i - p) + \delta_M]M/P,$$

which results from this imputation, reflects, however, the policy of the Authorities. Given M , the greater the “distortion” tax levied by the Authorities, then, by the preceding argument, the higher will be the price level P (so that on this ground the lower will be the real gross output of the banks) and the lower will be $i - p$ (offset by some possible lesser fall in δ_M because of the rise in the overall price level)—so that on this latter ground the higher will be the real gross output of the banks.

The implication of the analysis is that the measure of output of banks, obtained from the banking imputations, is not independent of the policy of the Monetary Authorities. If other nonbanking industries had their

purchases of bank services so measured and treated as intermediate inputs, then such real intermediate inputs in all other nonbanking industries would also reflect the policy of the Authorities.¹²

The imputation based on the neoclassical argument suffers, however, from a grave drawback. Corrections are made for interest rates on deposits and service charges on deposits on the grounds of being too "low," but no account is taken in the imputation procedure for the overall price level being too "high." At the given level of nominal deposits, then, the argument is that "real" bank deposits are too low. Hence, were the imputation applied according to the neoclassical theory, the real value of bank deposits would have to be increased so that the imputed gross output in banks would have to be greater. This argument is based on the revision of interest rates and prices that are the components of the imputation and that would be reflected in the revision of prices in the temporary equilibrium accompanying the adoption of efficient policies by the Authorities. It is not the revisions in interest rates and prices that will be associated with the full equilibrium adjustments in the economy. If correct, though, it means that the present banking imputation results in an underestimate of banking output and value added. It is conjectured that the effects of such revised imputations on measured rates of saving would be significant.

There are further implications associated with the neoclassical analysis. One of the inputs into the production of the bank's transaction service is the services of the reserves or the services of the central bank. The neoclassical analysis implies that an imputed measure of the gross output of the central bank can also be derived.

Consider again the optimum money supply argument. We would have

$$\delta_M \frac{\partial M/P}{\partial H/P} (K_{B^*}, L_B, H/P^*) - \delta_H = 0,$$

or

$$\delta_H = \delta_M \frac{\partial M/P}{\partial H/P} (K_{B^*}, L_B, H/P^*),$$

or the rental price on reserves would equal the real value of the marginal product of real reserves or the service of the Authorities. Otherwise, we would have

$$R - (i_H - p) + \delta_H = [\delta_M - (i - p) + R] \frac{\partial M/P}{\partial H/P} (K_B, L_B, H/P)$$

so that, even if no interest was paid on reserves and no service charge was levied for the services rendered by the Authorities, the nominal interest rate, $R + p$, would be a measure of the price of gross output of the Authorities.

In general, the imputed real gross output of central banks would be

$$[R - (i_H - p) + \delta_H]H/P,$$

or the nominal gross output would be

$$[R + p - i_H + \delta_H]H.$$

Since the burden of the neoclassical argument is that a central bank or Monetary Authority can be treated as if it were a private bank—particularly so if the optimum monetary policy were pursued and Authorities charged for any services rendered—then it follows that the banking imputation can be applied to central banks or Monetary Authorities as well. The banking imputation applied to Monetary Authorities, just as when it is applied to private banks, would result in measures of “real” gross output that would imperfectly reflect the policy being carried out by such Authorities.¹³

In the Keynesian case, if the banking imputations were employed, then the price of the gross output of the banks would meter not just the value of the marginal physical product of the transaction service of banks but also the liquidity premium attached to bank deposits for a service not produced by the banks, except indirectly through their holding of reserves, the liquidity premium being a measure of the confidence with which the Authorities are expected to perform their function of preserving monetary stability. The “failure” of the Authorities to pay full interest on reserves (i.e., $R > i_H - p$) in the Keynesian case would not represent the imposition of a “distorting” tax but would reflect the “price” banks would pay for the provision of monetary stability by the Authorities obtained through the holding of reserves. Similarly, the “failure” of the banks to pay full interest on deposits (i.e., $R > [i - p]$) in the Keynesian case again would not represent the indirect imposition of a “distorting” tax by the Authorities but would reflect the “price” nonbank agents would “pay” for the provision of monetary stability by the Authorities, obtained indirectly through the holding of bank deposits, since they, in turn, access that provision directly through the holding of reserves.

In the case of the Keynesian theory of central banking and the resulting liquidity premia on “money,” application of the national accounting banking imputation confounds the measure of the rental price on banking services with the liquidity premia that results from the provision of the public good, monetary stability, by the Monetary Authorities.

From the theoretical viewpoint, the Keynesian analysis entails liquidity premia being imbedded in all relative prices since in modern monetary economies all activities employ, directly and indirectly, as intermediate inputs, the services of private banks, which incorporate

indirectly the provision of monetary stability by the Monetary Authorities. There is no way to “price” the provision of monetary stability by the Authorities, but the various liquidity premia are imbedded in the structure of relative prices with no operational way of separating, say in the case of the rental price of banking service, $\partial C/\partial_{M/P}(K, L, M/P)$, the value of the marginal product of banking services from the liquidity premium on bank deposits.

In general, therefore, the output of banks—in particular, the transaction services of banks—cannot be defined or measured independently of the conception and measurement of the output of the Monetary Authorities, which given the nature of the output cannot be measured in the *ex post* manner applicable to the national accounts.

7.7 Relation to Measures of Rates of Saving and Wealth

The limited application of the banking imputation results in a lower rate of saving for the personal sector, though, as is shown in table 7.2, the effects are negligible.

Governments can as well be treated as (collectivities of) households. Governments hold deposits with private banks and central banks. (In fact, these government accounts, particularly switches between them, are part of the day-to-day operations of directionary monetary policy and are the mechanism by which increases in fiat money are brought into existence.) Government deposits with private banks are the means by which governments tap the transactions services provided by banks, and, since they are in this respect identical to households, the banking imputation would result in an increase in imputed government expenditures and imputed investment income. One could similarly argue that government deposits with the central bank are devices by which the government accesses the transactions services being provided by the central bank, and an imputation could be made for those deposits as well. Again, government expenditures and income would be further equally increased. Each level of imputation would reduce the rate of saving of the government sector.

The results then of the banking imputation is that the rate of saving of both households and governments is decreased.¹⁴ There remains the fundamental objection to the application of the imputation procedure, even assuming the applicability of the neoclassical general equilibrium theory of banking, namely, that for each and every variant of nonoptimum money supply policies there will be a different price level. It is understood that different nominal money supplies entail, by the underlying quantity theory of money, different proportionate price levels. Beyond that—and this is the major point—if one assumes that each variant left nominal stocks of money unchanged, it would still be the

case that the price levels would differ. The greater the departure from optimality, the higher would be the overall price level.

To summarize, the greater the departure of money supply policies from optimum, the greater, other things being equal, will be the banking imputation. The greater the banking imputation, the lower would be "after imputation" rate of saving of households and governments.

By the very nature of the problem, the attempted measurement of banking output must recognize that such output can be ascertained only within the confines of a general equilibrium framework of banking and monetary analyses. The neoclassical theory set out provides such a framework. That theory immediately suggests that, while the standard imputation recognizes that interest rates and service charges on deposits are too low, it should be additionally recognized that the "overall" price level is too "high." If the banking imputation took into account that, the more extensive were the difference in rates on loans and deposits, the more the price would be too "high," then the imputed gross output of banks would be much higher than results from the present limited imputation, and measured rates of saving for the personal (and government) sector would be even less. Such a result would be in accord with the foregoing neoclassical theory, which predicts that, the more efficient the money supply policy conducted by the Monetary Authorities, the greater would be the rate of saving, at the temporary (and steady-state) level of analysis. Thus, the augmented banking imputation would be fully supported by neoclassical general equilibrium banking and monetary theory.

The Keynesian theory recommends, however, against the banking imputation. The immeasurable liquidity premium on private bank deposits, a component of the service of bank deposits, arises because banks specialize in, or are required to hold, the holding of bank deposits with the central bank. The private banks then have direct access to the services connected with provision of monetary stability by the Authorities, and nonbank agents have, through their bank deposits, indirect access to such services. Since these services are public in nature and cannot be produced privately, no price can be found for them. The Keynesian framework rejects the argument that one can impute a measure of the gross output of central banks, that is, a measure of the value of the marginal product of real deposits with the central bank, held either by private banks or government, since the crucial output of the central bank, the preservation of monetary stability, is not measurable (Acheson 1986).

The crucial distinction between the Keynesian general banking and monetary general equilibrium and neoclassical theories can be seen by asking what treatment would be suggested if, for example, all banks were nationalized and became *de jure*, instead of *de facto*, agents of

the central bank. The rejection by the Keynesian argument of the imputation means that government expenditures in the extended government sector would merely be redefined to include the expenditures on labor and materials undertaken by the bank (cf. Haig 1986). Estimates of the rate of saving in the personal and government sectors would not be affected by the banking imputations since such imputations would not be made.

It was shown earlier that wealth measurement encountered the problem of the distinction between inside and outside money. My discussion of the banking imputation problem permits some advance as well in that discussion.

If the "money" in the neoclassical framework were outside, then the wealth of the private sector would be

$$H/P^* + K_B^* + K^* = M/P^* + K^*,$$

where the efficient monetary policy is pursued, and

$$H/P + K_B + K = M/P + K,$$

where it is not, with all components of such national wealth being lower the further away from optimality the monetary policy would be. No double-counting would be involved since, in the optimum policy case, the present value of the services being rendered by the Authorities (e.g., deposit insurance or clearing arrangements) would be equal to the value of the deposit claims against the Authorities. The capital stock held by the banks would be part of the overall capital stock, $K_B + K$, with K being the stock of capital in all nonbank activities.

It was pointed out that the nominal addition to reserves, rather than being injected into the economy via the lump-sum transfers, x , could be brought about by the switching of government deposits with the central bank to the private banks. It will be remembered that circulating currency is being ignored. In this case, there would be no outside money—that is, for the banks, real reserves as assets would always be offset by real government deposits as liabilities. The components of a national wealth statement by sector, ignoring irrelevant items, would be

Government	
Deposits with private banks	Government "bonds" held by the
Deposits with the central bank	central bank
Central Bank	
Government "bonds"	Deposits of the government
	Deposits of the private banks
Private Banks	
Deposits with the central bank	Deposits of the government
Bank capital	Deposits of the nonbank agents

Nonbanks

Deposits with private banks

Net worth

Nonbank capital

so that, with the deposits of the private banks with the central bank equal to the deposits of the government with the banks, the net worth of the private sector consists only of nonbank and bank capital.

This accounting treatment of the inside money case neglects, of course, the fact that government deposits with the private banks are not a liability that would affect bank behavior in the same sense as the existence of private deposits does. (Canadian bankers have, e.g., argued that they should not be required to hold reserves behind government deposits.) Recognition that the government deposits-reserves mechanism is part of the mechanism by which the Monetary Authorities seek to preserve monetary stability enhances the validity of the Keynesian argument to the effect that, even in the case of “outside” money, that money is not part of national wealth. Rather, it is the expectation of monetary stability that constitutes the monetary component of wealth. It will be captured in the value of nonbank and capital, $K_B + K$, and to add H/P to obtain a measure of private national wealth would involve double-counting.¹⁵

7.8 Extensions and Conclusion

7.8.1 Extensions

Two extensions to the argument would appear necessary. First, the argument has assumed one homogeneous bank deposit. If Monetary Authorities impose different reserve requirements on different deposits in recognition that banks produce nonhomogeneous banking services with different deposits also being associated implicitly with different transactions and portfolio services, the foregoing analysis would predict different interest rates and service charges (e.g., savings nonchequable deposits would pay higher real rates and have lower service charges since such deposits would perform a greater flow of portfolio services and relatively limited transactions services such as currency withdrawals). A much richer theoretical model than I have presented would be necessary to illustrate and predict such arguments. Also, many other dimensions of banking, such as monitoring and verification costs (cf. Chant 1987) and a more intricate transactions technology, would have to be explored. The essential connection between banking services and the Monetary Authorities must, however, be maintained. It would appear, from the Keynesian viewpoint, that it is the discretionary behavior of the Authorities that provides much of the rationale for the existence of fiat money. Second, there are other financial

intermediaries, other than banks per se, that provide differentiated banking services in the sense that some of them may have more indirect access to the services of the Monetary Authorities of a more indirect nature than the banks. In table 7.4, the distribution of deposit interest paid to persons by deposit-taking intermediaries shows that banks are becoming perhaps relatively less important in the provision of transactions services. A needed extension of the preceding theoretical argument is to include transactions services provided by country banks such as trust companies and by those intermediaries that, in the limit, would not be classed as banks.

While providing but one measure of the changing importance of banks in Canada, it must be remembered that the data in table 7.4 are drawn from a decade in which some would say there was a major increase in competition in Canadian banking with a sharp increase in numbers of banks following Royal Assent to the Bank Act in 1980 and important changes in central bank policy with the addition and subsequent disowning of gradual monetarism and monetary targeting from 1975 to 1982.

7.8.2 Conclusion

Two extremely simple general equilibrium theories of banking have been examined with arguments that Monetary Authorities are seen as taxing the community by not following efficient monetary policies in the Friedman-Lucas sense or providing the services, by themselves and indirectly through private agents such as banks, of the public good monetary stability. Both arguments, as developed, predict that banking

Table 7.4 **Distribution of Deposit Interest to Persons, Canada, 1975–85:**
Major Deposit-Taking Intermediaries

Year	Banks	Quebec Savings Banks	Trust Companies	Mortgage Loan Companies	Credit Unions
1975	.554	.016	.236	.049	.145
1976	.551	.014	.239	.043	.152
1977	.489	.015	.276	.046	.175
1978	.486	.013	.251	.073	.176
1979	.533	.013	.235	.057	.162
1980	.546	.012	.220	.054	.168
1981	.592	.010	.199	.057	.142
1982	.543	.010	.214	.085	.147
1983	.434	.013	.269	.125	.160
1984	.450	.012	.255	.132	.151
1985	.405	.015	.273	.145	.163

Source: GNP Division, Statistics Canada.

statistics lead to the apparent need for the banking imputation. In this connection, the significance of these two arguments for measures of banking output, rates of saving, and wealth are examined. The neoclassical argument lends partial support to the current imputation procedures but reveals that such procedures suffer from an important defect, which leads to the result that banking output is understated and rates of savings in the personal and government sectors are overstated—and potentially substantially overstated. The less and less efficient is the monetary policy, the greater and greater are these measurement effects. The neoclassical argument tends to include fiat money as a component of private wealth, though, the more and more it is recognized that the fiat money is created by the inside money route, the more and more the neoclassical argument approaches that provided by the Keynesian theory of private and central banking. That theory provides no support for the imputation and arguments associated with it and would, in comparison with the neoclassical argument, result in higher rates of saving of the personal and government sectors. The Keynesian theory concludes as well that it is the policy of the promotion of monetary stability that contributes to wealth, that to add outside money to private national wealth would be to engage in double-counting since the real components of wealth, reproducible capital in the banking and nonbanking sectors, already include the wealth-creating effects of the promotion of monetary stability.

Notes

1. In this case, the imputations are radically different from those customarily made in national accounting. In the case of other imputations, (1) a set of equivalent or nearly equivalent market prices is available that permits the “pricing” of services such as farm production consumed on farms and the rents earned on owner-occupied houses (Rymes 1979), and (2) the case for the imputations is that changes in the distribution of resources between market and nonmarket institutional forms would, unless the imputations were made, result in undue variations in measured output. The banking problem is unique. The uniqueness is that (1) there is apparently not a set of equivalent or nearly equivalent prices that permits the pricing of banking output since there is no apparent market counterpart and (2) the invariance argument fails as well.

A sophisticated version of the invariance argument is that the barter-type arrangements between banks and depositors said to be implicit in the fact that banks underprice services they are rendering to depositors and depositors underprice services they are rendering to banks arise because of the payment of taxes on interest receipts. A household depositor will pay less in taxes if his deposit interest receipts are smaller and so will provide service to the banks at less than market prices to minimize taxes. The bank will compensate the depositor by reducing the service charges on bank deposits or what it is charging

for its service to depositors. The version fails to take account of the different interest rates—service charges on different bank deposits—and the fact that the nonuse of the price system induced by income taxes would not hold for transactions between banking and other industries.

2. In the Canadian input-output accounts, the imputed intermediate output of the banks is, in fact, treated as part of the intermediate inputs of the nonbank industries.

3. The Ruggles-Sunga treatment of interest flows has fundamental ramifications for the national accounts that are not discussed here. Their treatment of interest on the national debt would result, however, again in a reduction in the overall national rate of saving.

4. For the Canadian economy, standard measures of national wealth will include net claims on the rest of the world so that net holdings of fiat monies of other companies do appear as part of Canadian wealth.

5. I have presented overviews of these arguments in my other work on the imputation problem (Rymes 1985, 1986). A full statement of the theoretical framework is necessary to assess the wider measurement problems considered in this paper. Earlier versions of this section of the paper have been presented to the Departments of Economics at Monash University, the Australian National University, Carleton University, McGill University, the University of Strathclyde, Manchester University, the Churchill College Seminar in Economic Theory, and the 1986 meeting of the Canadian Economics Association. I am grateful to Courtney Wright, Ian Harper, Ted Seiper, John Pitchford, Nicholas Rowe, Steve Ferris, Randy Geehan, Jack Weldon, James Pickett, Ian Steedman, Partha Dasgupta, Jack Revell, John Chant, Jack Galbraith, Keith Acheson, and Leslie Milton for critical and helpful comments.

6. In an appendix to this paper supplied on request, the case of a competitive bank providing both transactions and explicit portfolio services is set out.

7. In Fischer's (1983) analysis, while the banks cannot produce their services without acquiring the services of real reserves obtained by holding deposits with the Monetary Authorities, individual agents can obtain the services of banks without holding bank deposits. In my formulation, the crucial transaction service supplied by a bank can be obtained only by holding and using a certain volume, on the average, of bank deposits. I do not deal with services such as safety deposit box rentals, the making up of pay packets, etc. as some of these, e.g., travel services, may have nothing to do with the banking service. Table 7.3 lists the various explicit service charges paid to banks in Canada in 1985, along with their relative importance.

8. The respective slopes of K_B^* and H/P^* in fig. 7.1 are based on the second-order conditions for the bank's maximization problem.

9. If the overall price level is defined to include the nominal price of the services of banks, then, of course, an index number problem is involved in what is meant by "real" bank deposits and reserves. I ignore this complication in this paper.

10. Agents seek to hold fewer bank deposits and more stocks of commodities. There is a temporary equilibrium higher-price level such that, since real bank deposits are lower, the net rate of return on bank deposits rises because of the increase in the gross marginal physical product of real bank deposits and the net rate of return to capital falls until such rates are equalized. Since the net rate on capital has fallen, it is now below the efficient steady-state rate.

11. The latter is a type of "distortion" not practiced in Canada since the 1967 revision of the Bank Act (see Freedman 1983). That the failure of the Authorities to pay interest on reserves is a tax on transactions intermediated

by banks is also argued by Wills (1982), though Wills pays no attention to the general equilibrium effects on service charges and the overall price level.

12. In any given year, the nominal gross output of the banks would be

$$[R - (i - p) + \delta_M]M$$

so that changes in the nominal gross output would reflect changes in R , i , p , δ_M , and M . A Laspeyres index of the "real" gross output of the banks would be

$$\frac{R_0 - (i_0 - p_0) + \delta_{M0}}{R_0 - (i_0 - p_0) + \delta_{M0}} \cdot \frac{M_1/P_1}{M_0/P_0}$$

and a Paasche index would be

$$\frac{R_1 - (i_1 - p_1) + \delta_{M1}}{R_1 - (i_1 - p_1) + \delta_{M1}} \cdot \frac{M_1/P_1}{M_0/P_0},$$

where the expressions are in general vectors and the indexes are aggregators. For examples of some of the other problems involved in measuring the "real" output of banks, see Gorman (1969) and Geehan and Allen (1978).

13. A reallocation of value added from private banks to the central bank would be involved. For instance, if actual service charges were insurance premiums received by Monetary Authorities, such as the Canada Deposit Insurance Corporation (CDIC), all that would be involved, if the CDIC were treated as a government business enterprise in the Canadian system of national accounts, would be a particular distribution of value added within the finance industry. Similarly, with respect to the imputed service charges on reserves, they would be part of the gross output of the central bank, deemed to be a government business enterprise, and part of the intermediate inputs of the private banks.

In Canada, an imputation for central banking output is made by splitting the expenditures on labor and other inputs by the central bank between the personal and government sectors and adding the personal component to imputed expenditures in the personal sector. The theoretical argument for this Canadian treatment is not clear.

14. In Canada, only expenditures and interest income from private financial intermediaries are imputed to the government sector (no imputed expenditures on the Bank of Canada's output is made). In the years 1981–85, the ratio of government to personal expenditures for these imputations is about 7 percent. The effects on the rate of saving for the government sector are quite insignificant, given the incomplete nature of the imputations.

15. It is argued (cf. Patinkin 1972) that outside money is the value of the government's monopoly right to issue currency. Such arguments beg the question of the need for the Authorities in the first place.

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Comment Anna J. Schwartz

The focus of the paper is on the theoretical justification for bank imputation. Two contrasting general equilibrium theories of banking are presented, each of which predicts the apparent need for banking imputation. One theory lends partial support to the current imputation procedures; the other provides no support. In this connection, the significance of the two theories for measures of banking output, rates of saving, and wealth is examined.

Neither of Professor Rymes's models seems to me to have anything to do with the need for bank imputation. My first question is how he

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explains the need for bank imputation in Canada before 1935. Canada had no central bank until that year, so there is no basis either for a so-called neoclassical model in which the central bank does not pay the competitive rate of return on bank reserves or for a so-called Keynesian model in which the monetary authorities are providing monetary stability. Commercial banks in Canada had no required reserves before 1935 but maintained prudential reserves of about 10 percent of their deposits that became the required reserve ratio under the Bank of Canada.

Income is imputed to the banking industry, not because the authorities fail to pay interest on reserves, and not because of the monetary policy followed by the authorities, but for the same reason that food produced and consumed on farms is added to the national income, namely, that in both cases the aim is to include income in kind in the national income and not simply income associated with monetary payments.

In the case of banking, there are two questions. First, is there income in kind, that is, are barter transactions being engaged in that would bias the income account if not allowed for? Second, why are those barter transactions carried out? It is easier to answer the second of these questions than the first. In U.S. commercial banking, at least since the Banking Act of 1933, barter transactions have occurred because of the prohibition of payment of interest on demand deposits. This is a major incentive to engage in barter transactions, as is also the incentive to avoid taxation on interest paid. Even if interest were permitted to be paid on demand deposit accounts, individuals could benefit by accepting a lower interest rate on deposits in return for services rendered without charge because that would reduce the income reported on their income tax returns and hence reduce the tax they have to pay.

In Canada, there was no prohibition on the payment of interest on demand deposits, so this reason for the emergence of barter would not exist. However, the tax reason would certainly be present. It seems to be in operation currently where interest is permitted to be paid on household demand deposits, but how much is paid depends on the volume of services rendered free of charge.

So far as the failure to pay interest on reserves is concerned, that is currently viewed as tax. As a tax, it affects the allocation of resources but gives no particular reason for the imputation of income. A tax on tobacco, for example, is not viewed as a reason for the imputation of income to the tobacco industry. However, as in the case of banking, it might lead to a strong incentive to engage in barter, in which case there might be noncash items of income that should be included. The tax implicit in the nonpayment of interest on reserves has the same

effect as any other tax of raising the relative price of the item taxed and reducing the quantity, but again that is no reason to impute any items of income any more so than we do in other areas where taxes are imposed.

With respect to the models, since they have nothing to do with the imputation of income to financial enterprises, have they any interest in their own right? There is nothing particularly interesting or novel about the so-called neoclassical model. I do not understand Rymes's argument that it is a shortcoming of the neoclassical model that it leaves no room for a central bank. If, as he notes, reserves can be held privately by banks, insurance and clearing services can be provided privately, with the result that competitive bank services would be efficiently priced, service charges would cover banking costs, and problems of measuring bank output would vanish, why is that a shortcoming? If this were the outcome, why is a central bank essential?

Turning to the Keynesian general equilibrium model of banking that Rymes has fashioned, what is the basis for his assumption that there is saddlepoint instability in the economy that monetary authorities offset? According to the model, agents *know* that authorities will engage in monetary reform to prevent inefficient outcomes. Suppose we grant these assumptions. Rymes's argument that banking imputation is not needed in this case is unsustainable. If the wedge between what banks earn on loans and what they pay on deposits measures the price that banks and agents willingly pay for monetary stability services that the authorities provide, imputation is surely required to measure the monetary value of these services. Rymes's answer is that the wedge is immeasurable because the services are public in nature, not producible privately. Are not many government services not producible privately yet measurable by the cost the government incurs in providing those services? All sorts of arbitrary rules have had to be used to distinguish between those government activities that are to be regarded as intermediate goods and those that are to be regarded as providing final services. The cost of rendering these services is included in the national income except insofar as they are regarded as intermediate goods, in which case they are implicitly included in the sales prices of the final products for which these services are regarded as intermediate goods.

Now drop the assumptions that agents know that monetary authorities will provide the service of monetary stability and know instead that what the authorities will provide is likely to be monetary instability. Consider the two examples of monetary authority actions that Rymes himself has suggested will be destabilizing but he contends the authorities will then take actions to undo, if and when they result in any damage. We have recently had a demonstration of agents moving out

of deposits in the face of accelerating price levels. Agents who purchased money-market funds, instead of keeping deposits, paid a cost that was imbedded in the market rate of return. Imputation would provide for deducting that cost as an expense. U.S. firms that now rely on sweeping and overnight repos to have their demand deposits recorded as zero on a daily basis incur a cost in engaging in this activity to avoid those deposits that pay no interest. In the Keynesian model that Rymes proposes, once one does not take for granted, as he does, that authorities will invariably provide monetary stability, the case for imputation is restored.

Finally, I do not accept Rymes's argument against treating outside money as wealth in the private-sector accounts. He argues that bank reserve assets cancel when matched with government deposits as commercial bank liabilities and that such shifts of government deposits from the central bank to commercial banks are the principal way in which inside money is created. His facts are wrong. Reserves are a much larger magnitude than government deposits at commercial banks, and, in this country, transfers of government deposits from central banks to commercial banks are dwarfed by open-market purchases and sales by the Federal Reserve in accounting for inside money creation. But, even if Rymes were right about the magnitudes of reserves and government deposits, he tells us nothing about currency held by the public—the much larger component of the monetary base than reserves. What offset is there for currency that would make their inclusion in private sector wealth unacceptable?

Rymes's paper suggests that research is needed to investigate the motives that have led to the use of barter in financial transactions and their importance, how these motives are likely to be affected by the deregulation of banks, and how the volume of income imputed to financial intermediaries in this country after 1933 compared to that before that time.

Reply Thomas K. Rymes

Though I have profited from Dr. Schwartz's comments, she does not understand the basic points of my paper. Before dealing with her comments, I reiterate one of its main neoclassical contentions.

Though he is absolutely not responsible for anything said in this reply, the author is indebted to Ehsan Choudhri for very helpful discussions on his paper, Dr. Schwartz's comments, and his reply.

Employing the usual neoclassical assumption of global stability, I investigate the consequence of the failure of the Monetary Authorities, in a world of near-costless fiat money¹ and in the context of an otherwise costless price system (cf. McManus 1975), to pursue the Friedman-Lucas optimum money supply policy. In my model, in which the fiat money is only reserves voluntarily held by competitive banks, the failure takes the form, as is well known, of the nonpayment of the competitive real net rate of return on such reserves. (It is understood that this encompasses the usual inflation tax argument.) The model is the optimal neoclassical monetary growth model with the banking sector introduced in the manner (though necessarily emended) of Fischer (1983). With profit-maximizing firms and wealth-maximizing individuals, the results of the failure that are of interest for this paper are that the rate of interest paid on deposits will be less than the competitive net real rate of return and that the service charges paid for the service rendered by the banks will be less than the value of the marginal product of the transaction service provided by the banks through bank deposits so that the service charges will not cover the costs of such services.

The latter is exactly the measure of the Paretian inefficiency introduced into the economy by the failure of the Monetary Authorities to follow the Friedman-Lucas rule. (In a model in which the banks are ignored, this inefficient equilibrium is commonly described by the condition that the value of the marginal physical product or utility of the services of real money balances [cf. Friedman 1969] will exceed the social marginal costs of providing such services.) The two conditions are exactly the conditions that give rise to the apparent necessity for the banking imputation in the national accounts.

Should the Authorities follow the Friedman-Lucas rule, however, the banks, more anxious to acquire reserves, will bid up interest rates on deposits, individuals will bid up service charges because the bank deposits that are the source of the services are more attractive to hold and to use, and, in accordance with the theoretical framework being employed, the overall price level, which must include the price of the service provided by the banks, will be lower. The result will be that the rate of interest on deposits will equal the going rate of return and that the service charges will meter the value of the marginal physical product of bank deposits and the marginal costs of providing such services. Not only will the full efficiency associated with the Friedman-Lucas rule be captured, but there would also apparently be no need for the banking imputation.

It is important to note that the only source of inefficiency in my model is the failure of the Authorities to pay the going rate of return on reserves. Should the Authorities require banks to hold reserves in excess of those voluntarily held (e.g., there could be binding legal cash

reserves ratios), the tax levied on reserves by the failure to pay the going rate of return will be increased, and I conjecture that the observed differences in interest rates and between service charges and the costs of transaction services will also be increased.²

The discussion so far permits me to deal with some of Schwartz's points. By Monetary Authorities, I do not necessarily mean central banks per se. Indeed, Monetary Authorities can take on a variety of institutional forms. The pre-1935 period in Canada to which she refers as offering evidence against my hypothesis is characterized, through the operations of the Finance Act, by Canada's chartered banks holding *some* non-interest-bearing reserves (see Bordo and Redish 1987); however, the Canadian monetary system for most of that time would not be characterized as having a near-costless fiat standard. If income taxes are offered as another explanation of banking data that seem to call for the banking imputation, then, since Schwartz offers the earlier period in Canada as evidence inconsistent with my hypothesis, a difficulty for her exists in that Canada did not have an income tax until 1917. For many years after that, I would not want to argue that income taxes on interest income were such as to generate the barter-type arrangements she claims lie behind the banking statistics. There are other objections to her assertions. How are the taxes on interest income supposed to result in a reduction in the accompanying service charges for those deposits held by businesses; that is, why should businesses enter into such barter-type arrangements with the banks? Why are interest rates higher in general on those deposits with lower reserve requirements, an observation that seems more consistent with extensions of my basic model, as noted in my paper, than Schwartz's observations about income taxes. I am quite willing to admit, however, and subject to the qualifications noted, that income taxes may play some role, but I should continue to argue that a principal reason for the problem is the pursuit of inefficient policies in the Friedman-Lucas sense by the Monetary Authorities. I quite agree with Schwartz that an additional reason is the prohibition of interest payments on deposits, but such prohibition I regard as part of inefficient regulation and supervision by the Monetary Authorities.³ Indeed, arguments to the effect that Monetary Authorities should be constrained constitutionally to behave according to the Friedman-Lucas rule are, in my view, the ultimate ones for the deregulation of financial intermediation and a particular manifestation of the argument that free banking, that is, private banking without inefficient regulation by the Monetary Authorities, will result in "unbundling" and the Pareto-efficient pricing of the services banks render.

Contrary, then, to Schwartz's assertion that the optimal neoclassical monetary growth model has nothing to do with the banking statistics

problem, I maintain that it is central. She admits that there is a tax, that the existence of such a tax may lead to barter, and that, because of the barter, imputations should be made. Yet she then turns around and argues that, since it is a tax like any other tax, there are no reasons to impute any more than we do where other taxes lead people and firms to engage in tax-minimizing activities. The inefficient monetary supply rule "tax" is, I should argue, so essentially different in its general equilibrium effects on the general level of prices that it must be treated differently and is treated differently if the argument about the general equilibrium effects on the competitive banking system is correct and if the banking imputation is done.⁴ I therefore reject her assertion that the neoclassical monetary growth model with the banking system modeled explicitly with the Monetary Authorities failing to follow the Friedman-Lucas rule has "nothing to do with the imputation of income to financial enterprises." Rather, I would have thought that it is rewarding to have a theory that predicts, other things being equal, that the interest rate and service charges data for a competitive banking system give rise to the seeming need for the banking imputation and the resulting effects on the rates of saving and the conceptions of monetary wealth as measured in national accounting dealt with in my paper. Schwartz may be right that there are other reasons why such data require the imputations, but her assertions and casual evidence in no way lead to nonconfirmation of my argument. I confess to enormous simplicity in the theoretical structure presented, but the simple general equilibrium model of banking I advance is at least one of the usual ways of attempting to understand a problem in economics.

I return now to my argument. It is the essence of the assumption of stability in the neoclassical optimum monetary supply model that the Monetary Authorities must be constrained to follow the Friedman-Lucas money supply policy rule. If they do, then the resulting outcome will, it is argued, match that set out in my paper and in Schwartz's comments, namely, that, among other things, competitive bank services would be efficiently priced and no banking imputation would be necessary. Monetary Authorities constrained to follow a rule, however, do not engage in discretionary policy. Indeed, should the Authorities do so, the argument is that that would return us to the situation associated with the inefficiencies of Authorities *not* following the Friedman-Lucas rule. I failed to make clear that the neoclassical theory has no room for a Pareto-improving discretionary Monetary Authorities.⁵

I assumed stability in examining the neoclassical case. I also argue that a Keynesian central banking theory entails the need for discretionary monetary policy. I provide a potential rationale for that policy and collective Monetary Authorities by assuming saddlepoint instability. The discretionary policy modeled entails the abandonment of the efficient rule and, I conjecture, the reemergence of banking data ne-

cessitating imputation. The imputation would be an attempt, in effect, to value the service of monetary stability provided by the Authorities. I know of no way this can be done. If I do not misunderstand Schwartz, she seems to be arguing that that service is properly valued by including in national income the value of the wages and salaries and intermediate inputs used by the authority, and she seems to be saying I am arguing against his procedure. I am not, but the procedure she sets out is not an imputation for the service of monetary stability any more than the value of wages and salaries and intermediate inputs used by the Supreme Court of Canada is a measure of the value of the public goods provided by the Court.

It is the essence of the saddlepoint instability case that it provides a rationale for the existence of discretionary monetary policy. I do not believe I took for granted that the Authorities would always be successful. What the rational expectations model does in this case is provide for the possibility of discretionary policy. Schwartz has been critical of Monetary Authorities who have failed to provide the services of monetary stability (cf. Friedman and Schwartz 1963, esp. chap. 7), but it is quite unsatisfactory to admit the possibility of saddlepoint instability and argue also that Monetary Authorities will always fail in the conduct of discretionary policy. It is equally unsatisfactory to assume stability and to argue that Monetary Authorities will be tempted to act in a discretionary and destabilizing fashion. If one sees no role for Monetary Authorities, one will want, I suppose, to constrain them by constitutional rules for stable money (cf. Dorn and Schwartz 1987). If one admits, however, the possibility of a role for Monetary Authorities, then one must state clearly what it is. I do point out, then, that rules may not be sufficient to ensure stable money and that discretion may be necessary, and I specify the consequences for banking data, the measurement of banking output, and the other empirical concerns of my paper. I do not know what theory of central banks, save perhaps that they are mischievous, Schwartz has.

With the aid of the analysis in my paper, consider the scenario set out by Schwartz. The Monetary Authorities have failed to contain unstable inflation. The inefficiencies associated with the inflation tax would then be experienced, that is, the fall in real wealth as exhibited in my figure 7.3, because the Authorities fail to engage in the discretionary policy that ensures stable temporary equilibria. My argument in this case would be that the banking data would appear as those requiring the imputation. I leave it to the reader to imagine what the imputation, recommended by Schwartz in this case, could possibly mean.

Two final points. I specifically stated in my paper that I was ignoring circulating currency. I have already stated why. If the Monetary Authorities have prohibited banks from issuing private currencies and have

instead replaced private note issue with non-interest-bearing Authority currency, thereby enhancing the inefficiency of the money supply rule, I do not understand Schwartz's argument that this should be regarded as an addition to wealth. The point about wealth measures I was trying to make is very simple. If the government purchases goods with money, then the additions to the money supply are indeed costly. It is not then the near-costless fiat money case I am considering. If the government replaces bonds with money, then the Ricardian equivalence theorems would raise questions about the money supply being part of net wealth. The mechanism for the creation of money, the switching of government accounts, was introduced merely to illustrate the idea that, in the case of potential instability, monetary wealth surely consists in the confidence of the community in the ability of the Authorities to maintain a stable monetary environment (cf. Klein 1978) and not in any "outsiderness" of money. That some arbitrarily defined concept of outside money should determine what is the wealth of the community in the context in which it depends on the discretionary conduct of policy seems simply beside the point.

A general theory of imputation in the national accounts and the effects that they have on the meaning of the measures of output, rates of saving, and wealth has yet to be written. Most theories would appear to have something to do with the costliness of the use of price systems and then are undertaken apparently only when otherwise anomalous results would "significantly" appear.

I have, in that context, set out a very simple but abstract argument based on the barest bones, as I understand it, of the general equilibrium theory of private and central banking that is beginning to emerge. My argument might be wrong, and much I have no doubt missed. I regard Schwartz's comments as helping me to sharpen the argument, but I wish she had directed her comments to the central theoretical concern of my paper.

Notes

1. Friedman and Schwartz (1986) note that the emergence of currencies based on a pure fiat standard is a key development in the world monetary system. It is that world with which I am essentially concerned. By near costless, I mean that I ignore the cost of production of fiat money but take costs of running the reserves system as being positive.

2. In my paper, I did not consider circulating currency such as banknotes. Why? There is nothing in the theoretical framework permitting me to ascertain whether banknotes should be issued by the Authorities as monopoly issue or whether competitive banks, though holding reserves in the form of deposits

with the Authorities, would issue bank notes on which, as history would seem to suggest has happened (cf. Goodhart 1988, chap. 4), interest might be paid. It would appear, though, that the sole issue by the Authorities of non-interest-bearing circulating currency notes is yet another way of requiring the banks (and individuals) to hold non-interest-bearing monies and constitutes yet another tax on reserves and another departure from the Friedman-Lucas rule, thereby exacerbating the effects I discuss.

3. As Schwartz notes, in Canada there is no prohibition of the payment on interest on deposits (cf. Freedman 1983). Up to the decennial revision of the banking legislation in Canada in 1967, however, chartered banks were prohibited from charging interest rates above 6 percent on consumer loans. When that regulation began to bind, the banks resorted to the same sort of subterfuges that the banks in the United States have done to undercut the limitation on interest rates on deposits (cf. Klein 1974).

4. For an argument about the essential difference in the "inflation tax," see Lucas (1986, 123), who argues, "Liquidity is not 'another good' nor, indeed, a 'good' at all. It is the *means* to a subset of goods that an income tax has already taxed once."

5. The theory of central banking contained in Goodhart (1988) purports to show that, because of free-rider and moral hazard problems associated with costly information in the provision of banking, a nonprofit Monetary Authority will "evolve" to meet the needs of competitive banks; that is, the Authority will be a way in which the private banks agree to constrain their opportunistic behavior so as to capture all the feasible gains from trade in banking. Goodhart argues that this Monetary Authority will be a government body. So far as I can see, no logical reason, arising out of the transactions cost theory of institutional form, is provided as to why that Authority could not be one contained within the private sector. That is, there is nothing in Goodhart's argument that would obviate (say) the Canadian Bankers' Association from taking on the role of the Monetary Authority. The essence of Goodhart's Monetary Authority is, however, that it engages in no discretionary monetary policy.

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