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SOME SUGGESTIONS FOR COMPLICATING THE THEORY OF MONEY

Kevin D. Hoover

> It is very funny about money. The thing that differentiates man from the animals is money. All animals have the same emotions and the same ways as men. Anybody who has lots of animals around knows that. But the thing no animal can do is count, and the thing no animal can know is money.
>
> Men can count, and they do, and that is what makes them have money.
> Gertrude Stein, 'All About Money'

HICKS'S PROGRAMME

The title of this chapter intentionally echoes the title of John Hicks's (1935) famous paper 'A Suggestion for Simplifying the Theory of Money'. Like that paper it is intended to be a prolegomenon to an as yet unwritten monetary theory. However, the monetary theory it foreshadows is to be constructed differently.

For centuries the central problems of monetary theory have been to articulate the relationship between money and prices and between money and real quantities. The oldest monetary theory, the quantity theory of money, starts from the well-established empirical generalization that (for some definitions of money at least) there is a rough proportionality between changes in the quantity of money and changes in the price level. The quantity theory attributes that correlation to the causal efficacy of money over prices. If changes in the stock of money cause proportional changes in all prices, then money is 'a veil' without real effects. One irony of the modern quantity theory is that its adherents usually believe that control of the money supply is essential, even though money is a veil. This is usually justified by distinguishing between long-run neutrality and short-run non-neutrality, but inevitably some hand-waving is involved.

Going back at least to Hume (1742a, 1742b), quantity theorists recognized that prices cannot adjust instantaneously to increases in the stock of money. To the degree that they do not, real quantities must be affected. But the argument that money affects prices and output is more elliptical than is usually

appreciated. Indeed, in the hands of Milton Friedman, the most prominent modern advocate of the quantity theory, it presents a genuine puzzle. According to Friedman (1956), the essence of the quantity theory is the stability of the demand function for money. At first blush, this seems an odd formulation, because the demand function is usually written to indicate the amount of money that economic agents would choose to hold conditional on prices, interest rates and income. The implicit causal direction is thus from these various factors to money. Yet the quantity theory asserts just the opposite causality – money determines prices and income. Friedman presumes that the supply of money is exogenously determined and that agents consult their demand functions; if they find excess supply, they try to rebalance their portfolios by purchasing goods or financial or real assets, putting pressure on prices and rates of return.

This seems plausible, but is in fact puzzling. A 1 per cent increase in the stock of, say, M1 is a very tiny percentage increase in total social wealth. Friedman's (1957) own permanent-income hypothesis holds that only the yield from additions to wealth should go toward consumption, so the pressure on prices would appear to be infinitesimally small. Friedman (Friedman and Schwartz 1982: 29–31) would concede that the first-round effect is indeed small, but that the process continues as money flows from agent to agent, each trying to rebalance his portfolio. That the 1 per cent increase in M1 must ultimately increase prices by 1 per cent is then not a conclusion drawn from any detailed description of the mechanism through which prices rise. Instead, it comes from the assumption that changes in the stock of money do not increase real output in the long run, and that money supply must ultimately equal money demand. Not only does this appear to be question-begging, but it places an almost metaphysical faith in the tendency of an economy to converge to market-by-market static equilibrium.

This account of the transmission mechanism explains why the question of how to define money has loomed so large and proved so slippery. For Friedman's account to be plausible money must be the transactions medium, the asset that agents typically acquire as a byproduct of spending on real goods and services.[1] Historically, however, the assets that play this role keep changing – from coins, to banknotes, to cheques against bank accounts, to cheques against money-market mutual funds – so the quantity theory must be constantly reoriented to new primary causal agents. In Hume's day the claim was that changes in the amount of precious metals caused changes in prices and income. In Friedman's youth, changes in notes, coins and cheque deposits were claimed to be the causal agents. With every financial innovation there is a proposal to reorient the quantity theory. The definition of money also affects the very facts that the quantity theory is meant to explain: the proportionality of money and prices depends on the judicious definition of money. Indeed, Friedman (Friedman and Schwartz 1963: 649–50, *passim*; 1970) explicitly advocates defining money as

the financial asset most closely correlated with nominal GNP. Once again, questions are begged.

Hicks wrote his essay on money twenty years before Friedman's restatement of the quantity theory. The main points of this essay are easily summarized.

First, Hicks castigates monetary theory for not analysing money using the same microeconomic tools (value theory) that economists use for other problems. Instead, quantity equations are tacked on to models of barter. But Hicks notes that since people choose to hold money, money must have marginal utility, and should be subject to the same theoretical analysis as the holding of real assets or the consumption of real goods.

Second, Hicks notes that the central puzzle of monetary theory is that people hold money despite the fact that other assets have higher rates of return. He writes (1935: 66):

> This, as I see it, is really the central issue in the theory of money. Either we have to give an explanation of the fact that people do hold money when rates of interest are positive, or we have to evade the difficulty somehow. It is the great traditional evasions, which have led to Velocities of Circulation, Natural Rates of Interest, *et id genus omne*.

Third, to explain the puzzle of rate-of-return dominance Hicks appeals to frictions that money helps to overcome, such as risk and transactions costs.

Hicks's programme for monetary theory follows immediately from his critical position. A successful monetary theory had to be based on the analysis of individual choice; in more recent language, he advocates establishing microfoundations for monetary theory. A successful monetary theory also needs to be a general equilibrium theory – one that accounts for why individuals hold money and how their choices help to determine prices and/or real allocations for the whole economy. Furthermore, a successful monetary theory will recognize that asset choice is about the future and therefore will take expectations seriously. Finally, a successful monetary theory must recognize that money is a stock, which both influences and is influenced by real flows; it will therefore treat the stock/flow distinction carefully. This programme for monetary theory is remarkably fresh. We recognize the central concerns of contemporary monetary theorists in the issues that he outlines.

GENERAL EQUILIBRIUM MICROFOUNDATIONS

Despite this freshness, I want to argue that the programme that Hicks advocated for monetary theory has been a failure – a heroic failure, but a failure none the less. To heterodox economists, declaring the general equilibrium programme for monetary theory a failure may seem uncontroversial; declaring the attempt heroic might appear to concede too much.

The general equilibrium approach requires some justification and defence. Mark Blaug (1990: 228) observes that general equilibrium theory changed

from the 1930s, when models were viewed as potential analytical tools for empirical economies, to the 1980s, when they were regarded as ideal, non-empirical models used to demonstrate principles. Frank Hahn (1984: 45–6, 135–7) argues that general equilibrium models are useful not because they model Adam Smith's invisible hand, but because they show just how stringent the conditions are under which Smith's results can be proven; they thereby adumbrate the features of the actual economy that prevent it from operating like a general equilibrium model.

While Blaug is deeply suspicious of this argument, I think there is good reason to accept the general point with respect to monetary theory. Monetary theory would advance enormously if we could provide an idealized model of the behaviour of money in an economy-wide context. The failure of money to find a suitable place in general equilibrium models is a clear indication of the wide lacuna in our understanding of the operation of money. If we cannot capture its operation in an idealized context, what hope have we of capturing it in more realistic contexts?

The difficulty of embedding money in a general equilibrium model concerns how to connect holding money to the real choices of individual agents. Patinkin (1956) attempts to connect the monetary and the real by assuming that real money balances (M/p) give consumers utility because they provide services by permitting uncoordinated fluctuations in expenditure and receipt flows. Once money enters into consumer decision-making in this way, Patinkin argues, the ordinary mechanisms of the Walrasian model establish of the price of money ($1/p$) along with all other prices.

It turns out that Patinkin's model works only in highly restricted circumstances. If utility functions are restricted in such a way that there are no distribution effects, then relative prices are fixed by the conditions of barter equilibrium and any arbitrary price can stand in for the general price level p, since every price is a scalar multiple of every other. Hahn (1965) showed that, absent such restrictions, if there is an equilibrium in which money has a well-defined value, then there is necessarily another equilibrium in which its value is zero (i.e. there is a barter equilibrium), and also that a monetary equilibrium may not exist at all. That for every monetary equilibrium there is a barter equilibrium is a consequence of Patinkin's failure to assign any *essential* role to money: no economic possibilities are foreclosed in the absence of money. That monetary equilibrium may not exist at all is a consequence of the peculiar feature that the real value of money (i.e. its characteristic that is analogous to the *quantity* of any other good) depends on the prices of other goods. As prices are adjusted to find the market-clearing price vector, the quantity of money, unlike the quantities of any other goods, changes and may change in ways that drive the system further into disequilibrium.

In response to these difficulties Hahn (1973) argues that the mechanism of monetary exchange must be more fully specified so that it becomes evident how money expands the opportunity set of the economy. Hahn is surely right here,

but there are other lessons to be learned from Patinkin. The Walrasian model solves two economic problems – it establishes relative prices, and it assures that the economic system is consistent and feasible at those prices. Expositions of the Walrasian model typically focus on the first problem. They sometimes even glory in demonstrating that a decentralized economy is feasible and that each agent need only consult prices (and not the actions of other agents) in order to give the 'correct' quantity response. This 'invisible hand' result is, however, parasitic on the highly centralized information processing of the Walrasian auctioneer (or the mathematical equivalent, the mapping rule of prices into prices to which a fixed-point theorem is applied to prove the existence of equilibrium). The Walrasian model works only because there is, implicitly at least, somebody in the model whose business it is to know everyone else's business.

Money is redundant in a true Walrasian economy. The most important function of money in reality is as a means of accounting for relative values and settling imbalances that arise in trading at those relative values. Such functions are unnecessary in a Walrasian world because the auctioneer knows enough to set relative prices in such a way that imbalances never arise. A programme to create a successful monetary theory is, therefore, unlikely to find the Walrasian model a happy starting point.

THE MAIN ALTERNATIVE MONETARY MECHANISMS

As a result, monetary theorists have, by and large, attempted to explain frictions and describe the mechanisms through which money overcomes them. But they have attempted to maintain the Walrasian framework, and this has created problems for these alternative approaches. Let us now look at four of the principal mechanisms in the current literature.

The overlapping-generations model

While most monetary theories concentrate on the role of money as a means of conducting transactions, the overlapping-generations model stresses the fact that money is a store of value, a means of moving wealth from one period to another.[2] The central idea of the overlapping-generations model is that individuals want to shift resources from earlier parts of their lives to later parts, but they cannot do so directly since resources do not store well (e.g. strawberries spoil). A solution is to trade for real resources in the future with people who want real resources today. Unfortunately, if the young want to give up resources in their youth and the old want to consume more than they have, such trades would be infeasible – for the old will die before the young can be repaid. Money overcomes this friction. The young sell to the old, carry the money into their own old age, and buy from a new generation of young people.

The overlapping-generations model, however, fails to solve the central problems of monetary modelling. Its principal difficulty is that it does not explain the fact, noted by Hicks, that money is held despite its low rate of return. Simple versions of the model rely on there being no means of shifting resources forward in time except money. If there were time-using productive processes (the analogy would be wheat growing rather than strawberries spoiling), they would provide a better means of shifting resources through time. Since money is held *only* for its ability to store value, no one would choose to hold money when better stores of value were available.

Many attempts have been made to explain rate-of-return dominance in an overlapping-generations framework. None has been successful. If real returns are stochastic, risk-averse agents will sometimes hold money as a way of reducing risk even though real returns on assets are positive on average (Wallace 1981). While this is true, the range of stochastic yields is far too narrow to explain commonly observed differences of five or ten percentage points between the yields of money and other assets. Intermediation costs could explain a premium (interest foregone) on money (Bryant and Wallace 1979). But actual intermediation costs in the real world (think of the service fees on money-market mutual funds) are simply too small to account for observed differential yields. If certain people (the relatively poor) cannot hold assets because of legal restrictions on intermediation (e.g. banks are forbidden to issue one-dollar bearer bonds at interest) then money might be dominated in rate of return but still held by the poor (Wallace 1983). Again, this is true in principle, but does violence to the facts. A wide range of interest-bearing assets can be purchased by the poor in small denominations. Furthermore, the rich as well as the poor hold money. The puzzle about why people hold money remains.

The cash-in-advance model

Cash-in-advance models focus on the role of money as a means of exchange.[3] As Clower (1967: 5) puts it: 'money buys goods, and goods buy money, but goods do not buy goods'. In the cash-in-advance model, people may have real resources, but they cannot barter them for other goods. Instead they must sell them for money. Only with money can people purchase goods.

Clearly, a comprehensive cash-in-advance requirement is too strict; some goods are in fact bartered directly. Lucas (1984) and others have investigated models in which there are both cash goods, which are subject to the constraint, and credit goods which are not.

But the principal difficulty with the cash-in-advance model is that it is not a good description of the economy. While it is true that one must have coins in hand to use vending machines, the largest transactions by value are made on credit, with settlement coming some time later. As credit-card use advances, this point becomes more obvious. What is less obvious is that the cash-in-advance constraint has never been pervasive. For hundreds of years many, and

perhaps most, transactions have been carried out on credit – personal accounts with grocers or tailors, trade credit and wages paid in arrears. Money seems central to the economic system, yet it does not seem essential to possess money in advance of purchase.

Liquidity-cost models

Another way to model money is to assume that the possession of money reduces the real cost of obtaining consumption or production goods. Holding money is consumption foregone, but failing to hold money raises the costs of obtaining consumption goods. The demand for money is determined by balancing these opposing costs.

The principal objection to this approach is that it is question-begging. The nature and size of the liquidity costs, and the exact mechanism through which money is supposed to reduce them, are never clearly specified.

Liquidity-cost models have been used to justify the model of money in the utility function, in spite of Hahn's criticisms of Patinkin for using this technique. Feenstra (1986) demonstrates that for any particular specification of liquidity costs there is a model with money in the utility function that delivers the same equilibrium. Suppose that agents optimize a utility function $U(C_t, C_{t+1}, C_{t+2}, \ldots)$, where C is real consumption and the subscripts indicate current and future periods, subject to a budget constraint in which money enters as a liquidity cost measured in terms of reduced consumption. Feenstra demonstrates that the problem can be recast as one in which agents optimize a different utility function $U^*(M_t, X_t, X_{t+1}, X_{t+2} \ldots)$, where M is real money balances and X is consumption plus liquidity costs. The solution to each optimization problem generates exactly the same paths for consumption and money holdings. This result follows from the duality relationship between direct and indirect utility functions. It would appear, then, that if the liquidity-cost model could be justified, so could the money-in-the-utility-function model. Feenstra's result, however, is only valid, as he himself observes, for an economy with a single commodity. In such an economy there are no relative prices to induce the distribution effects that threaten the existence of equilibrium.

Beyond that, even in the restricted range of its validity, Feenstra's result says that for a particular utility function, U, and a particular specification of liquidity costs, there exists a particular isomorphic utility function, U^*. This function, U^*, however, is unlikely to belong to the class of utility functions commonly used in monetary models. Indeed, the form of U^* is dictated by the form of U and of the liquidity-cost function, and is likely in practice to be quite peculiar. Thus, Feenstra's result is highly limited: even if we were happy to model only a single-good economy, and even if we were happy with the specification of liquidity costs – assumptions unlikely to be fulfilled – there is no general support in Feenstra's analysis for choosing some particularly

tractable utility function that includes money and using it as the basis for monetary analysis.

Search models

Search models are perhaps the most radical attempt to view money as a response to particular frictions.[4] Their central notion is that people have goods to trade and limited preferences over which goods to consume, so the process of finding suitable trading partners can be arduous. With direct barter, agents must find another agent who both has a good they want and who wants the good they have (Jevons's famed 'double coincidence of wants'). If agents believe that some undesired goods may be used to purchase desired goods, indirect barter is possible: I trade oranges for cigarettes, even though I do not smoke, because I believe that I can trade cigarettes for coffee at a later stage. If any commodity comes to be universally regarded as the preferred intermediary in trades, then that good is essentially money. Most work in search models has concentrated on detailing the conditions under which particular goods take on the role of money and on the efficiency improvements from monetization.

Search models may give some insights into how particular objects historically became money, but they do not help to understand a developed monetary system. The problem here stems from the fact that the friction that money overcomes is ignorance of where to find the goods that we wish to purchase. Money is valuable because the average time involved in locating preferred consumption goods is lower in a monetary economy than in a barter economy. But is this really a problem? I do not need to search randomly for groceries; I go to the same grocer each week. If I want a bolt I go to the hardware store; if I want aspirin I go to the pharmacy. Even when I do not know immediately where to find a good, my search is directed through informational resources such as the *Yellow Pages* or the advice of my neighbour. Holding intermediate goods is not a relevant part of finding my preferred consumption good, although there is undoubtedly a monetary aspect to the transactions involved in securing it.

In search models people can trade only when they find someone to trade with. Money improves consumption possibilities because it increases the probability of finding a willing trader. The average time to find two trades (what I have got for money and money for what I want) is lower (and therefore the consumption loss is lower) than the time to find one trade without money. The search metaphor is one of undirected trade and random mixing. The point about knowing where to find the grocer is that in any developed economy trade is directed, not random, and the fundamental friction is not search (finding the appropriate trade), but the difficulty of arranging the trade in a suitable way: valuing it appropriately (one function of a unit of account), and keeping it fair and honest. The issue is not just that I know where the grocer is, but that I know where the university (my employer) is, and that the grocer

knows where the university (that his child attends) is. Search is not the issue; coordination is.

A NEW PROGRAMME FOR MONETARY THEORY

Search models are on the right track in that they reject the Walrasian model as a basis for monetary theory. They go wrong because they are mesmerized by the task of isolating why some particular good (gold, silver, fiat paper) becomes the preferred intermediary in transactions, and because they wrongly characterize the informational constraint that we face. Like some attempts to understand money in a Walrasian framework, search models overemphasize the role of money in transactions as an intermediary good. Money is in part a response to information failures; however, the principal failure is not ignorance of where to find goods but the ignorance of what goods we will in fact buy or sell. This latter information failure is the one stressed by Patinkin. And this friction can be overcome by any number of credit arrangements, not just through holding a specialized money good. In any developed economy, the credit system is essential. Money is an essential part of the credit system. But the important thing about money in a credit system is neither its quantity nor the number or value of the transactions in which it mediates.

Rather, the principal modern function of money is the one traditionally regarded as the weak sister of the famous triad (means of exchange, store of value, unit of account). Money is most importantly a unit of account, and the efficiencies of a monetary economy arise not from the services of the particular asset called 'money', but instead from the whole complex of transactions and financial services that use the monetary unit as their principal means of keeping score: 'Men can count, and they do, and that is what makes them have money.'

I have argued in detail elsewhere (Hoover 1988a, 1988b) that a financial system involving nominal paper assets can function only if these are convertible through *direct* or *indirect* chains to a real asset. For these purposes, fiat currency or central bank reserves can be thought of as real assets in the sense that they provide no entitlements to further conversion (unlike, say, a cheque which is an entitlement to receive cash or central bank reserves) and that they are the stipulated means of meeting certain obligations (e.g. payment of taxes or settlement of reserve positions). In practice, most financial assets are ultimately convertible into a narrow class of real assets. This class could be thought of as defining 'money', although that is a narrower definition than common usage. In practice such narrow money is the typical unit of account, although accounts could be specified in units other than the natural units of this class provided that they were related to goods in the class in well-defined ways (e.g. in gold guineas, coins that no longer exist but whose value is defined to be £1.05, or SDRs, which are defined as weighted averages of the values of national moneys).

Stressing the centrality of an accounting system using a unit that is the

ultimate good of conversion (or settlement) diminishes the importance of money as a store of value or a means of payment. Narrowly defined money is a very small player in the whole system of credit and finance. When I obtain goods without surrendering a real equivalent, accounts must be kept of what I owe. Some manner of discharging my debt must be, implicitly at least, agreed upon. Narrow money is not important because it is intermediary in most of my transactions: indeed it does not even settle most of my debts, since I mostly pay my bills by cheque, reducing my own demand deposits and raising my creditors' demand deposits with banks transferring but a small proportion of their total clearings of all such exchanges in the form of central bank reserves. Rather, narrow money is important because it defines the unit in which my debts are recorded, and because it provides the ultimate anchor for the convertibility of assets with which I typically discharge my debt.

It is this pervasive engagement with the financial system at every level that explains the peculiar robustness of money. Who has not heard stories of Germans in 1923 paying for bread with wheelbarrows full of money? The story is usually told to illustrate how depreciated the Reichsmark had become during the hyperinflation. I think that it illustrates a much more astonishing point: despite its vast depreciation, despite its high negative real rate of return, despite the vastly increased shoe-leather costs (after all, a wheelbarrow load of paper is heavy) and despite the substitution possibilities into foreign currency or physical assets, the Reichsmark continued to be used.

My first proposal for an alternative monetary theory then is to place the emphasis on the accounting and settlement functions of money. Since these functions have no role in a Walrasian system, it follows immediately that we must seek a non-Walrasian model. We obviously have to give up the auctioneer as a guarantor of the feasibility of trading. Without an auctioneer, the model lacks a price-setting mechanism. The alternative model must therefore supply the gap. The natural alternative is a model of price-setting agents.

My second proposal is to extrapolate from current trends in transactions technology (e.g. credit cards, electronic fund transfers or debit cards), and make the extreme idealizing assumption that no narrow money is needed in advance of purchase. All purchase is on credit, but from time to time uncleared balances have to be settled either at the level of the individual, or at the level of banks or other financial intermediaries, with narrow money. This is to replace the cash-in-advance constraint with a *cash-in-arrears* constraint.

My third proposal is to take the fact that money is dominated in rate of return as a primitive fact about the economy. Monetary theory after Hicks has attempted to explain why that could be an equilibrium result – either by finding some service that makes up the rate-of-return deficit or by introducing some constraint that forces money to be held as the corner solution to an optimization problem. Either way, the goal is to explain why money is held voluntarily. In keeping with the idealized assumption of the cash-in-arrears constraint, I suggest a further idealization. Let us suppose that money is not

held voluntarily. Money holdings arise in the process of settlement, and people dispose of their money by purchasing better-yielding financial assets as fast as possible. Clearly all the money in existence must be held by someone, but they need not hold it as part of an optimal portfolio.[5] In taking this view we give up the ideal of static equilibrium. There may, none the less, be something akin to equilibrium in our model, what von Mises (1963: 224–50) has called the 'evenly rotating economy' – an economy in motion, not at rest, but whose rotation is recurring and routine.

One great appeal of the Walrasian model is that it yields nice analytic results. My suggestions force us to give up these results. One might nevertheless answer the main questions of monetary theory in a computer simulation that is founded on the three proposals that I have sketched. Such a model would involve a large number of heterogeneous agents – producers and consumers or producer-consumers. These agents would set prices for the goods that they produce and choose goods for purchase on the basis of the prices advertised in the market. Their behaviour could be forward-looking and consistent with a sort of practical rational expectations. This means that, while we do not endow agents with omniscience about the price-setting structure, we could nevertheless make them efficient learners who do not persist in remediable mistakes.

Demands, supplies or both would be stochastic. This would introduce randomness into purchases and sales. Agents would formulate plans at the beginning of a period for consumption or production in a way not inconsistent with dynamic optimization (e.g. the life-cycle model of consumption), but would find at the end of the period that some expected sales had failed to materialize or that some consumption plans had been frustrated. Agents would then find themselves willy-nilly to be creditors or debtors to other particular agents. (It might be useful to model a separate banking sector, so that the settlement of net imbalances became the specialized task of the banks.)

Transactions are conducted with a higher frequency than settlements: we spend money every day, but pay our bills monthly. Therefore, after a certain number of periods, agents must settle net outstanding balances. Money is needed for this. Agents without money would have to borrow it. Agents who carried money over unwillingly (because it is dominated in rate of return) from earlier settlement periods would use it to settle their own debts and would purchase financial assets with any extra money.

Two different financial markets are presupposed in this story. One, which corresponds to our bond market, is the market for savings. Agents should not be assumed to attempt the impractical Walrasian feat of generating a good-by-good consumption plan for all future periods. Instead, they would choose real savings (and purchase the counterpart financial assets) as part of their general period-by-period consumption decision. This is more Keynesian in spirit: the decision to save is the decision to abstain from current consumption, not the decision to consume some definite thing in the future. The second market is the market for the settlement asset itself. This corresponds to the US Federal funds

market, where one bank lends another central bank reserves in order to meet reserve requirements or settlement needs. To obtain sufficient realism it may be necessary to introduce a third financial market – a stock market, where returns are linked to the real yields of productive physical assets.

While such a simulation model would be highly stylized, it is a reasonable portrayal of the future exchange system in developed countries. Moreover, in the context of such a model one could address the classic questions of monetary economics. Does expansion of the narrow-money asset generate proportional inflation? Do changes in the money stock have real effects in the short or long run? Are supply shocks inflationary? Are monetary policies that aim to fix nominal interest rates unstable? Would this model provide different answers than those that try to remain with the Walrasian framework? We cannot know the answer to these questions without actually constructing the model. But as I noted at the beginning of this chapter, this is a prolegomenon to a monetary theory, not a monetary theory itself.[6]

NOTES

1 That Friedman and Schwartz (1963: 649–50, *passim*) characterize money as 'a temporary abode of purchasing power' rather than as a means of exchange does not affect the point here at all.

2 The classic paper on the overlapping-generations model is Samuelson (1958). Wallace (1980) has been the most persistent advocate of using overlapping-generations models to provide a foundation for monetary theory.

3 The *locus classicus* of the cash-in-advance constraint is Clower (1967). Also, see Kohn (1981).

4 The prototypical search model of money is Diamond (1984). Kiyotaki and Wright (1989, 1991, 1993) have been major proponents of this approach.

5 This is the basis of the 'buffer-stock' approach to aggregate money demand; see Laidler (1982).

6 The author thanks Clinton Greene and Steven Pressman for comments on an earlier draft of this chapter.

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