# THE ANATOMY OF MONETARY THEORY

by

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> It is· obvious even to the most ordinary intelligence,
> that a commodity should be given up by its owner in
> exchange for another more useful to him.  But that
> every economic unit in a nation should be, ready to
> exchange his goods for little  metal disks apparently
> useless as such, or for documents representing the
> latter, is a procedure so opposed to the ordinary course
> of things [as to seem] downright 'mysterious'.
>
> Karl Menger, "On the Origin of Money" [1]

Modern discussions of monetary theory have fairly well demolished
its traditional foundations without so far putting anything definite
in their place.  To be sure, some progress towards reconstruction has
been made.   In particular, contributions by Hicks(1967), Hahn(1971),
Brunner and Meltzer (1971), Hirshleifer (1973) and a host of other writers
have shown that set-up costs of engaging in trade must play a central
role in any acceptable formal theory of monetary exchange.  Other
contributions by Clower (1969), Perlman(1971),Fried(1973),Ostroy and Starr(1974)
and Howitt (1974) have suggested that individual holdings of commodity
inventories must also be taken into account.  Finally, many writers
have argued that certain physical characteristics of commodities are
vital.  Thus some of the ingredients for a reconstruction of the
foundations are not seriously in doubt.  What remains to be settled
is the manner in which these and possibly other ingredients might
best be combined.

This problem is not likely to be resolved in the near future; at best, we might hope for an early professional concensus about the way in which the problem should be approached. My purpose in this paper is to contribute to the formation of such a concensus by exploring rather carefully the roles that transactions costs and other purportedly crucial complications might play in the evolution of monetary exchange arrangements within a simple spot-exchange economy that is initially imagined to be as devoid of explicit empirical features as any standard Arrow-Debreu model.

## I.

Our first order of business is to state explicitly just what aspects of experience we should want to have "explained" by any theory that claims to provide even a minimally adequate description of a monetary economy. This may be accomplished most conveniently by setting out an agenda of requirements that any such theory should satisfy. On the basis of earlier literature, everyday observation and my own considered professional judgment, I should regard four requirements as mandatory:

1. The theory should imply that trade is an ongoing process in time rather than a once-for-all affair that ends in the permanent elimination of incentives for further trade.

2. The theory should imply that, on average over any finite time interval, each individual holds positive stocks of all goods that are regularly traded.

3. The theory should imply that the bulk of all trades occur not through essentially random pairing of individuals who happen to share a double coincidence of wants, but rather through systematic pairing of specialist with nonspecialist traders in a relatively small number of organized, continuously operating markets.

4. The theory should imply that at least one and at most a
   few distinctive "money" commodities are transferred (or
   promised for future delivery) by one party to another in
   virtually all exchange transactions.

The rationale of each of these conditions will become clear as we

proceed.

## II.

Directing inquiry now to our central theme—the logical anatomy

of monetary theory—let us start by imagining a Patinkinesque community

of self-interested individuals each of whom receives "like manna from

heaven" a predetermined quantity per unit time of one or more durable

goods that may be consumed directly, traded for other commodities,

or held for future consumption or trade.  Suppose also that each

individual is a natural source of labor services that can be consumed

directly (as "leisure" or as inputs in household "production") or

contracted for sale to other individuals.   Given these assumptions,

received theory informs us that potential gains from trade will

exist if different individuals have different preferences or endow-

ments.  Let us assume that this proviso is satisfied.   Then, depending

on the magnitude and distribution of potential gains, trades will

almost certainly occur.   What we can validly say about the volume

and pattern of trading activity will then depend on just what

story we choose to tell about the manner in which individual trading

plans are conceived and executed.[3]

At this stage, of course, we have almost unlimited room for

maneuver.  Our basic model includes certain necessary elements of an

acceptable theory of monetary exchange, namely, objects to be traded,

agents to trade these objects, and incentives for agents to interact

so that actual trades occur. But it lacks all elements that might
be or have been adduced by various writers as necessary conditions
for monetary exchange. Our next task, therefore, is to add further
content to our model.

### III.

Let us proceed by asking, first, What additional assumptions should
be included in our argument to ensure satisfaction of the first
of the requirements listed earlier, i.e., the requirement that
trading activity should occur as an ongoing process in calendar time?

At first glance, the answer to this question might seem to be,
"None at all," since our basic model is explicitly formulated as
a stock-flow system in which potential gains from trade are sustained
over time by the continuous receipt of fresh commodity endowments
by individual traders. As Radner, Hahn and others have shown[4], however,
even outwardly "essential" sequence models may turn out to be logically
equivalent to "nonessential" sequence models of Arrow-Debreu type in
which trading contracts are concluded at just one instant in calendar
time. The source of this equivalence is significant; it lies in the
twin assumptions that traders are inhumanly prescient and that trading
contracts and arrangements for future delivery of commodities can
be negotiated at zero cost. If either or both of these restrictions are
dropped, the first of our requirements can be easily satisfied by
almost any stock-flow model.[5]

Let us drop both restrictions; more precisely, let us suppose
that individuals view future endowment flows as probable rather than
certain, and also that individuals can negotiate trades only by engaging

in extensive search and bargaining activities.    Then our model will
satisfy our first requirement.  Will it also satisfy the second; i.e.,
can we assert that each individual will hold positive average stocks
of all goods that are regularly traded?

Again, the answer would appear at first thought to be in the
affirmative.   For it is easy to show that if search, bargaining and
other trade-related activities  impose set-up costs on individuals in
the form of foregone leisure or consumption or both, then individuals
will engage in trade, if at all, only at discrete points rather than
continuously in time; hence, each individual will hold, at one
moment of time or another, positive stocks of all traded goods.[6]  What
we have to show, however, is not that holdings of stocks will occasionally
be positive, but rather that average holdings over any finite time
interval will be positive.

To avoid tacitly assuming what we seek to prove, let us suppose
that we have to deal with an individual who wants to trade a good
$X$ for another good $Y$, but discovers to his horror that no other
individual is willing to trade $X$ or $Y$ for anything but a third
good, say, $Z$.  In this case the individual will either not trade at
all, or he will first sell $X$ for $Z$ and then use $Z$ to purchase $Y$.
Unless units of $Z$ are less costly to store than units of either
$X$ or $Y$, however, the individual will (if rational) combine every
sale of $X$ for $Z$ with a nearly simultaneous purchase of $Y$ with
$Z$, which implies that average holdings of units of $Z$ will be
arbitrarily close to zero.  Thus storage costs as well as set-up costs

apparently must be invoked to ensure that our model satisfies the
second requirement listed earlier.    Actually, this is too strong.
If search and bargaining costs are substantial relative to potential
gains from trade, then indirect trades will be infrequent or non-existent,
in which case storage costs will irrelevant.    But there is also
another possibility.     If individuals regard future endowment flows
as merely probable rather than   certain, we should expect many or
even most traders to hold precautionary balances of some goods as
a hedge against possible real-income reductions, and such balances
would consist predominantly of goods with relatively low costs of
storage.    If such holdings are widespread and are concentrated in
a few goods that are held by virtually all individuals, then it may
well cost less time and effort for an individual to trade  X for
one of these goods, and then go on to purchase Y, than to trade X for
Y directly.    In this situation, therefore, our argument goes through
as stated initially: i.e., storage as well as transactions costs
must be invoked  to ensure satisfaction of our second requirement.


## IV.

The third requirement in our agenda--that the bulk of all trades
should occur in organized markets--appears not to have been noticed
in earlier work or, as seems more likely, has simply been taken for
granted.[7]   However that may be, the oversight is crucial; for as we
shall see later, the existence of organized markets appears to be
almost a precondition for monetary exchange.    But our immediate task is
just to explain how, on our present assumptions, organized markets
might evolve in response to the working of natural economic forces.

If potential gains from trade were large and widely distributed across individuals and commodities, trading activity might be substantial even in a community without organized markets; but if search and bargaining costs were at all significant, vast areas of potential gain would never be explored.  In the latter case, as Stigler has observed[8], there would exist "powerful inducements"--namely, widespread profit opportunities--for some individuals to localize trade by establishing "ready markets" for commonly traded goods in which other individuals could routinely execute certain designated pairwise trades at dates and in quantities of their own choosing.

Powerful inducements notwithstanding, we should not expect many individuals to act as specialist traders.  To establish a ready market and attract enough customers to earn a profit that would make the activity worthwhile, an individual would have to :

   (i)    accumulate inventories of a wide variety of commonly traded goods;

  (ii)    offer to trade at rates of exchange more attractive than average rates which individuals could normally expect to obtain on short notice by trading with other nonspecialists;

 (iii)    maintain a spread between "buy" and "sell" rates that would encourage volume trading and discourage competition by other specialists yet yield a real income sufficient to offset operating costs;

  (iv)    earn a rate of return on average holdings of trade inventories at least equal to his rate of time discount.

Casual introspection suggests that these conditions would dissuade any but the most thrifty, foresighted, diligent, energetic, sagacious and enterprising individuals[9] from setting up shop as trade specialists. But specialist traders could never be common in any case; for if they

tended in that direction, competition among them would reduce trading spreads to the point where only those specialists with relatively low rates of time discount would choose to survive.

I need not emphasize the social benefits that flow from the existence of organized markets. The trouble and effort that would otherwise be incurred in the conduct of the most ordinary business of life has been a favorite theme of writers on money since the time of Aristotle.[10] What does merit emphasis is that these benefits do not depend logically on the use of special "money" commodities as media of exchange. The literature of monetary economics--again from Aristotle on--is replete with instances in which writers have inadvertently used the word "money" as if it were synonymous with the phrase "organized markets."[11] Historically, of course, "money" and "markets" have generally coexisted, but that connection is one of fact rather than logic. Confused understanding of this point is, I conjecture, a major reason why monetary theory has for so long remained one of the least settled branches of formal economic analysis. As we have just seen, it is easy to explain how organized markets arise from the working of natural economic forces; there is no mystery here, except perhaps Adam Smith's "instinct to truck and barter". What is not easy to explain is how the organization of such markets tends always to take a highly specialized form that permits us objectively to assert that certain objects (or "documents representing the latter") play a distinctive role as "money". That, of course, is the task set for us by the fourth and final item on our agenda.

## V.

Given the individualist behavior assumptions of standard theory, we have no option but to suppose that monetary exchange will emerge, if at all, only if that way of organizing trading activity is clearly advantageous either to specialist traders or to nonspecialist traders and is disadvantageous to neither.

Can it be shown that a typical specialist will have reason to require that customers give or receive units of a few designated "money" commodities in exchange for all other goods? The answer appears to be in the negative; for although it is known that economies of scale may be achieved by concentrating inventories in relatively high-volume lines of activity,[12] it can be shown that the elimination of one commodity from a specialist trader's list of "tradeable goods" will necessarily reduce trading volume in one or more other commodities that remain on the list--which works in the wrong direction. Indeed, granted that inventory holdings are a potential source of scale economies, and ignoring such considerations as costs of travel and transport and diseconomies in the operation of large-scale markets, the logic of our analysis leads us to conclude that the only permanently viable form of market organization would be one in which a single specialist trader--presumably one with a very low rate of time discount and a very keen eye for profit--provided the only ready market in the entire community. This form of organization would also be socially optimal in the usual efficiency sense since, with all trading activity concentrated in a single market, potential economies of scale in inventory holdings could be exploited to the fullest possible extent.

This line of argument does not demonstrate that a monetary form of market organization would be disadvantageous to specialist traders. However, it strongly suggests that no specialist trader would find it worthwhile to initiate moves in that direction. What about nonspecialist traders? Have they any incentive voluntarily to restrict their dealings to a relatively small subset of the set of all pairwise trades that specialist traders in the aggregate would be able and willing to handle?

Again, the answer appears to be in the negative. For why should any individual who wishes to trade, say, X for Y, proceed instead first to trade X for another commodity Z, and then to trade Z for Y, particularly if it is always possible to trade X directly for Y with less time and effort? On closer inspection, however, this argument is seen to beg the question, for it rests on the tacit assumption that an individual who wishes to trade one good for another also wants to acquire the second good immediately. To appreciate why this might not always (or even usually) be so, suppose that an individual's only endowment flow consists of units of a good X, and that all units of this good are sooner or later used to finance purchases of a variety of other goods--Y,Z,A,B,...,etc. Then, as has been shown in recent work on the demand for trade inventories and the timing of exchange transactions[13], the individual will--except in very special cases--minimize total trade-related costs by purchasing many or even most consumption goods at dates that differ significantly from those at which he sells units of X. To be sure, units of at least one consumption good must necessarily be acquired every time units of X

are sold. But suppose that X is typically traded in large-size

lots in exchange for just one other good—any good will do. Then

units of this other good can later be used to purchase yet other

commodities in various lot sizes and at various dates to conform

with cost and other considerations that underlie the individual's

choice of transaction dates for different goods. So we conclude

that individuals will quite generally choose to carry out two

transactions to go from X to Y , even though only one transaction

is ever strictly necessary.[14]

The last result resolves our central problem; for now we have

only to recall our earlier discussion of conditions in which certain

commodities would be held and used for transactions purposes to

arrive at an obvious and compelling reason why nonspecialist traders

might voluntarily restrict themselves to selected pairwise trades,

namely, storage costs. If there exists some commodity that is already

a common object of exchange and which has distinctly lower storage

costs than all or most other commodities, a rational individual will

choose to acquire or dispose of units of this good in virtually all

exchange transactions. Moreover, since different individuals are

unlikely to differ much in their perception of the relative costs

of storing different commodities, it follows that nonspecialist

traders as a group will choose to conclude most transactions with

one or a few goods which will thus come to play a distinctive role as

"common media of exchange" and "temporary abodes of purchasing power."[15]

If one of these goods is not just inexpensive to store but is also

easy to identify, handle, partition, count, hide and transport (Did

someone shout "Gold"?), then that good will almost surely
dominate all others as a means of payment in spot transactions.
But in that case, and perhaps even under weaker conditions, specialist
traders will have no incentive to maintain direct pairwise trading
of every variety of commodity. Ready markets that deal exclusively
with selected commodity lines (groceries, hardware, clothing, meats,
black puddings, etc.) will be at least as viable as more general
markets, among other reasons because inventory economies of scale
can be exploited fully in such markets with relatively small stocks
of trade capital. But there is no need to carry the story further; we
have already established a satisfactory rationale for the existence
and ubiquity of monetary exchange.

## VI.

My conclusion can be brief. The preceding analysis indicates
that just two main factors, namely, costs of negotiating exchange
transactions and certain physical characteristics of commodities,
have to be taken into account to establish <u>necessary</u> conditions for
monetary exchange to emerge in an otherwise strictly Arrow-Debreu
economy. <u>Sufficient</u> conditions cannot be stated, except in very
general terms, because these depend in an essential way on the precise
character of individual preferences, on the size and distribution of
endowment flows, on the magnitude of search and bargaining costs, and
on the technology of market management. Thus our results are not in
any sense final or complete; at best they might be said to clarify
just how much still remains to be done if we are to make theoretical
sense of money.

## FOOTNOTES

* I am indebted to numerous colleagues for helpful personal discussions about central ideas in this paper, but especially to Joel Fried and Peter Howitt of the University of Western Ontario, and to Robert Jones and John Riley of UCLA. As will become clear in the sequel, all of my thinking in this area has been strongly influenced by recent work of Professor Hicks, particularly his Theory of Economic History (1969) and Critical Essays in Monetary Theory (1967). My debt to other writers, both at UCLA and elsewhere, is not too inadequately acknowledged, I hope, by citations in the text.

1. Menger(1892), p. 239. I owe this reference to Robert Jones, whose Brown University dissertation supplies one possible solution to Menger's "paradox"(for a published version of the argument, see Jones,1976).

2. For extensive discussion and references see Ulph and Ulph (1975).

3. This theme is most elegantly elaborated in papers by Veendorp (1970), Ostroy (1973), Feldman(1973),Madden(1975) and Jones(1976).

4. Cf. Radner (1968); Hahn (1973), pp. 230-34; Ulph and Ulph(1975),pp.365-7.

5. Strictly speaking, pure stock models fail this test; but such models are seldom used except to discuss special aspects of the logistics of exchange, for which purpose they are invaluable (cf. Ostroy,1973).

6. See Hirshleifer (1973),pp. 138-41, for an especially clear exposition.

7. This is reflected in the common use of the word "money" to refer to a complex of indeas that would be more accurately rendered by using the term "organized markets." For more on this, see below, fn. 11.

8. Stigler (1961), pp. 218-9.

9. This list is lifted, of course, from various places in Marshall's Principles.

10. See Monroe (1927), p. 17, for Aristotle's contribution, and McCulloch (1975), pp. 1-2, for a particularly lucid modern version of the same story.

11. This usually occurs as soon as a writer has (with little difficulty) pointed out the costs of simple barter and passed on to consider other cases, for the only other cases that ever seem to come to mind are those that involve fully monetized market exchange. For an explicit account of other conceivable cases, see Clower and Leijonhufvud(1975),pp.184-5.

12. See Arrow, Karlin and Scarf (1958), pp. 7-8.

13. See Grossman and Policano (1975) for discussion and references; also Clower and Howitt (1976).

14. An obvious exception would occur if "time taken to go to market" greatly outweighed all other trade-related costs, since in this case an individual would "bunch" sales of endowment goods with purchases of goods for consumption, thereby minimizing the number of trips to market. History provides a possible example of this in dealings of the general merchant of pioneer times with trapper and farmer customers. See also Jonung (1976), for some fascinating comments on Swedish experience.

15. If costs of search and bargaining were relatively unimportant, organized markets would not be viable; but the preceding argument would still provide a rationale for individuals to hold and use certain kinds of goods as temporary abodes of purchasing power. Such behavior would probably not be common, however, because the insignificance of transactions costs would encourage frequent sales of small-size lots of endowment goods in direct exchange for goods to be consumed, which would make storage costs a minor factor in the choice of trading dates. An external observer of such an economy would be unlikely, therefore, to see any pattern in the pairing of traded commodities. These patterns become blindingly obvious only in economies where most trades occur in organized markets.

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