# Unit of account or medium of exchange?

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## 1. The question of precedence

Joseph Aschheim and George Tavlas say that "What is money?" is a "fundamental issue in monetary economics" (2006, p. 333, hereafter A&T). Is it, really? As Jeremy Bentham saw, it is often futile to look for the meaning of single words out of context; the sentence, rather, is what carries meaning. Karl Popper rightly condemned *essentialism*, interpreted as the attempt to gain knowledge by brooding over words and what they might label.[1] Suffice to say that both the unit-of-account (numéraire, measure-of-value) and medium-of-exchange functions of 'money' characterize an efficient reckoning and payments system. It does not much matter what aspects of the system we call 'money' and what aspects something else. We should beware, though, of question-begging definitions, such as withholding the name 'money' from anything that is *not* a creature of the state (as Georg Knapp, admired by A&T, apparently does).

More substantively, A&T attribute "logical and historical precedence" (A&T 2006, p. 358) to money's function as numéraire over its function as medium of exchange. But what does it mean to compare the functions that way?[2] Is the issue which function came earlier in history or which is more indispensable or which is closer to the heart

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[1] Hart (1982, pp. 10 and 43, and 1983, pp. 26 and 272), discussing Bentham's "Essay on language" and Popper (1982, pp. 18-31).

[2] It is unnecessary to consider two further – derivative – functions sometimes listed. The "standard of deferred payments" is a unit of account applied to transac-

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of monetary theory? What is at stake? Anyway, I mostly agree with A&T on issues of substance. Rather than quibble over words, I try to provide further context for their position. Conceivably they mean – and I would agree – that a single unit of account in a currency area is more important than a single medium of exchange.

A&T say that most writers on money at the start of the twentieth century were 'metallists', believing that money's medium-of-exchange role was primary and that money had to consist of or be backed by one or more commodities, notably the precious metals. They credit three 'chartalist' writers in particular – Alexander Del Mar, Georg Knapp and J.M. Keynes – for setting the profession straight.[3]

Money's numéraire function is indeed crucial. Einzig (1966) reports on primitive cultures in which people apparently first converged on one or a few commodities as unit of account before converging on one or a few as medium of exchange (similarly, Moini 2001, pp. 284-86). Barter, though continuing, was facilitated by valuing traded goods in the numéraire commodity, as A&T say, instead of keeping track of separate exchange ratios between the two goods in each possible transaction. The numéraire also facilitated valuing unilateral transfers, including compulsory and traditional ones. Temporal precedence of the numéraire over the medium-of-exchange function is far, however, from a universal historical fact.

The very question of historical precedence implies that the two functions need not attach to the same objects or tokens. But particularly when both functions *are* linked together in the same commodity or fiat money, the "essential properties of the medium of exchange" require close attention (Yeager 1968). With such a money being rou-

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tions stretching over considerable time. As for "store of value", money must have that property, at least over brief periods, to serve as medium of exchange. Besides, money is far from the only kind of storable wealth.

[3] But do all three of those "chartalists" deserve that much credit? (The label comes from Latin *charta*, meaning paper or document and, more loosely, token or ticket.) They were far from the first to recognize that money's unit-of-account function is important, that metallism is wrong and that irredeemable paper may perform money's functions as token or ticket. What about experience in the Bank Restriction period in England and the views of Thomas Attwood and other antibullionists of the time? What about the irredeemable paper currencies, and their defenders, of Austria-Hungary and Russia in the late 19th century? What about Austria-Hungary's experience in early 1879, when the irredeemable paper gulden came to be worth *more* than the quantity of silver supposedly defining the unit?

tinely accepted in payments, its supply creates its own demand (in nominal terms, through roundabout repercussions on nominal incomes and prices, conformably with the quantity theory). People demand money to hold in cash balances for transactions and other purposes; and an excess or deficiency at prevailing prices and nominal incomes (or, equivalently, these being too low or too high in relation to the nominal quantity of money) causes price inflation or, by impeding transactions, causes recession. A unified money has no price of its own – none other than the price of 1 that any good has in terms of itself – no price that might adjust on a market of money's own – to correct any disequilibrium without widespread repercussions. Much can be said, as argued below, in favor of defining the unit of account independently of any dominant medium of exchange.

Surprisingly, A&T do not cite the account of the origin of money that Carl Menger based on documented and conjectural history and on anthropological evidence (1909/2002 and earlier publications). They take issue with it only implicitly, not explicitly. Menger famously argued that one or a few generally employed media of exchange evolved in primitive societies from commodities found convenient as intermediate goods – goods that people were glad to accept in barter exchanges, even if they did not want them for their own use, because they observed that other people also would readily accept them. Gradually one (or a few) of these intermediate goods became dominant because certain properties (formerly recited in money-and-banking textbooks) made it especially convenient and economical for the purpose. Once people almost routinely paid and received this good in exchanges and in unilateral payments, it was convenient to adopt it as the standard of value (unit of account, numéraire) also. Eventually, as Menger himself recognized, the state sharpened the definition of money as numéraire and improved the payments system by minting coins of specified amounts of gold or silver. (By debasing or revaluing the coins, the state then acquired a new means of extracting revenue from the public. The eventual emergence of and continued use of fiat paper money is readily understandable along the lines of Menger's theory and Mises's theory of 1912. Although the state can indeed have great influence over what circulates as money, it does not have unlimited power to keep its money in circulation and in use as unit of account no matter what, as episodes of extreme inflation illustrate.)

Examples of the numéraire function developing first do not discredit Menger's point that money arose privately through gradual evolution as a cultural product. Although the state may improve (or ruin) its serviceability, money is not originally or fundamentally a creature of the state – no more so than marriage or private property (Schumpeter 1970, pp. 19-22 and *passim*; 1956, p. 160). How, if not compatibly with this theory, does one understand the emergence of cigarettes as medium of exchange and numéraire in prisoner-of-war camps, as Radford (1945) describes?

Menger and Schumpeter would agree that the nature of a developed institution is not necessarily specified by its genesis or most primitive form; to suppose so is to commit the 'genetic fallacy'. Institutions do evolve, and changes in degree can cumulate into changes in kind. Today's money has involved by historically understandable steps into something well beyond those commodities found most convenient as numéraires and as intermediaries in multistage barter.

## 2. Record-keeping and clearing

Money has become a device for monitoring transactions, keeping records and accomplishing multilateral clearing. Clearing is an arrangement for offsetting a person or firm's claims on some trading partners against its obligations to others (Kuenne 1958; Schumpeter 1970, giving an example on p. 227). Clearing could conceivably be accomplished by a central agency that would receive and maintain detailed information about the values of each trading unit's purchases and sales and then accomplish the offsetting on its own books. This centralized method would be unwieldy and expensive, however, and the Big Brother aspects ominous. A more attractive method is decentralized, using currency and accounts in many competing banks to keep track of and settle claims and obligations. Coins, notes and bank accounts are memoranda or tickets, so to speak – receipt vouchers for the values of goods and services delivered and generalized claims on whatever the market will offer for sale at prices that transacting parties agree on. (A fuller description would recognize unilateral transfers, loans, financial intermediation, capital accumulation and the role in economic calculation of the unit of account denominating the tickets.)

To develop the idea of clearing is not to deny money's two traditionally emphasized roles but to spell them out in greater detail. Two noteworthy articles have insightful titles. By "Evil is the root of all money", Kiyotaki and Moore (2002) mean that absent a method of tracking and settling obligations, some people would larcenously incur obligations without settling them. Money is a means of enforcement. Not only evil intentions but also faulty memory would obstruct the tracking and settling of claims in the absence of money, a thought that justifies the title "Money is memory" (Kocherlakota 1996). (Similarly, Moini 2001 recognizes that the medium of exchange serves to record and convey information about rights arising from transactions.)

Modern money is not, then, and does not even purport to be, physical commodities or titles to them. Supposing that the medium-of-exchange function is clearly primary is "a carryover conception from the age of gold" (A&T, p. 358). In Schumpeter's words (1970, p. 165), "money is nothing but a technical aid for affecting economic transactions – a game chip without significance in itself" (nevertheless Schumpeter favored the gold standard as a "trick of genius" for providing discipline against money's overissue and depreciation, *ibid.*, p. 224).

## 3. Determinacy

A&T, following the chartalists whom they cite, stress money's aspect as symbol or name. The unit of account could indeed be an abstract unit, not defined by any medium of exchange. It could not be so abstract, however, as to be a *mere* name, not naming any thing or quantity. The level of prices in so abstract a unit would be indeterminate, drifting without restraint.

Determinacy necessarily has a quantitative aspect. It presupposes some nominal anchor, some "critical figure" (so called by Schumpeter 1970), set not by ordinary market processes but by social convention or law. It could be set either 1) by defining the unit of account as a specified quantity of some commodity (as the gold dollar was defined), with two-way convertibility maintaining the equivalence, or 2) by control of some nominal quantity measured in units of account, like the total quantity of money, whether narrowly or

broadly defined (Schumpeter 1956 and 1970, Shah and Yeager 1994). *Both* methods entail control of some quantity, however indirectly and loosely. Under the first, convertibility links the quantity of money to the *scarcity* of the monetary commodity, which, like any ordinary commodity, cannot be produced costlessly in unlimited quantities. The second method finds an example nowadays in efforts of the Federal Reserve to restrain price-level drift by manipulating the Federal funds rate. Setting it above or below what the free-market rate would otherwise be requires open-market operations that reduce or expand creation of the system's fiat base money, with ultimate repercussions on the quantity of money more broadly measured.

Both methods are compatible with the quantity theory of money, although showing so is more complicated than if the total quantity of some fiat money were set directly. Although A&T (p. 333) seem to question the idea, which they attribute to the metallists, money *does* have its value determined, like an ordinary commodity, by supply and demand. The differences concern just *how* the process works: money's supply and demand do not meet on a specific money market and do not impinge on a single price of money's own.

## 4. Separation of the two functions

A unit of account can coexist with multiple media of exchange. As A&T mention, the euro existed only as a unit of account for three years before its notes and coins went into circulation in 2002, the old national currencies meanwhile continuing as media of exchange. In the Middle Ages a variety of coins of fluctuating relative values circulated, each being appraised in some local or standard coin (Lane and Mueller 1985; Eucken 1950, pp. 159-72, Allais 1947, p. 25n.). Later, in Hamburg, the mark banco, defined by silver bullion, served as the standard for appraising a variety of media of exchange. Before the US Civil War thousands of banks issued dollar-denominated notes, but none of these defined the dollar, which was defined separately by gold and silver coins of specified weight and fineness. Even today a great variety of media circulate in the United States, notably checking accounts that routinely change ownership (shifting among thousands of depository institutions). All are denominated and sup-

posedly redeemable, directly or indirectly, in base money, if only the government's fiat dollar bill. Each bank, to maintain its credibility, must maintain parity between deposits with it and the unit-of-account dollar. None of these deposits *defines* the dollar.

An even greater separation between the bearers of unit-of-account and medium-of-exchange functions would have advantages. The medium or media would not define the unit. Consider a dollar defined by a specified weight of gold. The government issues no money, leaving the issue of notes and deposits (and coins) to competing private banks. (I do not recommend this gold-based system, but it is instructive.) To maintain customers' confidence, each bank, through direct or indirect redemption, must maintain the gold parity of its issues. If it fails to do so, its money, *not* being regarded as defining the unit of account, depreciates or is completely rejected as its customers shift to moneys of other banks. The discipline of competition works to maintain gold parity.[4]

Suppose, on the other hand, that the government does issue currency denominated in a gold unit of account. The unit of government currency (and central-bank deposits, if any) comes to be identified in the minds of the public with the gold defining it. If the government now devalues its money by reducing the gold content of this unit or by discontinuing redemption, the public and the banks continue to regard government money (no longer gold) as the unit of account and the medium of bank reserves. Innumerable historical episodes testify to this psychologically understandable fact. The government could get away with a devaluation – unlike an individual bank in the decentralized competitive system described above.

A&T rightly suggest the importance of having a single unit of account (or very few) in a currency area. That implies the importance of defining the unit suitably, but it does not imply that one function

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[4] One reader suggests that the system described here bears some resemblance to a currency board. Here, the government issues no money. In contrast, a currency board does issue high-powered (base) money; but it is fully backed by and convertible into some foreign currency, which, at one remove, then, defines the local unit of account and serves as the medium of bank reserves. Competing private banks issue most of the local circulating currency and bank deposits, which are denominated and redeemable in the currency board's base money and are backed by reserves of it (presumably only fractional reserves). None of these private issues, however, *defines* the local unit of account, which is in effect the relevant foreign currency, analogous to the gold in the system described in the text.

is somehow more important than the other. Multiple media of exchange can be workable and even advantageous.

## 5. An improved unit of account

Gold is far from the ideal commodity for defining the unit of account, even in a competitive system. A broad basket of goods and services (like one for a price index) would serve better, and the level of prices in units so defined would be nearly stable.[5] (Since modern monetary systems are structured by centuries of government domination and regulation and since any reform must start from where we are now, a governmental nudge might be required toward adoption of a specific unit-defining basket.)

This system would not be a commodity-reserve currency as familiarly proposed. Since direct redemption of money in multicommodity baskets would be too awkward for all concerned, issuers would promise *indirect* redemption. A 100-dollar banknote or deposit would be redeemed in whatever quantity of some *redemption medium* was worth 100 standard baskets at actual market prices. (The redemption medium could be gold or some other convenient commodity or even agreed securities.[6] Anyway, it would be delivered in amounts actually worth the basket denominations of the notes and deposits being redeemed.) The bulk of the redemptions would probably take place as routine interbank clearing at the banks' clearing houses; the public would not be inconvenienced. Arbitrage would tend to maintain the unit of account denominating currency and deposits at parity with the total standard basket (as may be understood

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[5] A reform of government money proposed by Allais (1947, pp. 18-21 and 581-85) would split money's two functions. The unit of account, the 'franc', would be defined to have a stable value. The 'circul', or medium-of-exchange unit, would continuously depreciate against the stable franc, discouraging holdings of circul-denominated banknotes and deposits. Its use as unit of account would be 'flatly forbidden' (*ibid.*, pp. 582-83). (Allais expected depreciation of the circulating medium to promote capital formation – in a way that we need not examine here.)

[6] Proposing a roughly similar system, Hayek (1984) suggested that competing private moneys be redeemable in commodity-value amounts of each other. Each issuer, to maintain his money's purchasing power, keep it desirable to receive and spend and hold in cash balances, and so forestall unmeetable demands for redemption, would restrain the quantity of his money in circulation.

by considering the corrective incentives that would come into play if the total price of the commodity basket should incipiently deviate up or down from 1). This process would keep the actual quantity of media of exchange practically equal to the quantity demanded at a stable price level, avoiding the pains of monetary disequilibrium. (Stock mutual funds might also serve among the media of exchange – or might do so if capital-gains taxes did not pose prohibitive inconvenience. Dollar-denominated checks could be drawn on a stock fund, just as on an ordinary bank account. The fund would cover a check by selling a dollar-equivalent number of shares from the drawer's holding.)

The foregoing paragraph summarizes what Greenfield and I (1983) have described as the "BFH system". No authority watches over and regulates any monetary aggregate (in contrast with the authority required to regulate the supply of a fiat money). The system still has a quantitative aspect, though, because the unit of account is defined by inherently scarce goods and services in which money is indirectly redeemed and because prudence requires each issuer to restrain his own issue. The system does control quantities of money, but only indirectly, while adjusting quantities to the demand for them.

A substantial subsequent literature (much of which can be found by doing a Google search for "BFH system") considers details. The main point here is that the advantages of a single unit of account and of convenient media of exchange could be preserved and enhanced by their *separation* – separation in the sense that no specific medium of exchange would define the unit of account. Such a reform could become timely in the United States if dwindling relative demand for Federal Reserve base money and the large fraction of Federal Reserve notes held abroad rather than at home should eventually make quantitative control of the total fiat money supply no longer feasible.

## 6. Lingering misconceptions – conclusion

Despite A&T's and others' (correct) view of modern money as 'tickets' or 'tokens' for record-keeping and the clearing of transactions, one sect of 'Austrian' economists still insists that all currency and check-

ing accounts be backed by 100% reserves of base money, ideally gold or silver and at worst, and regrettably, government fiat money (Hoppe, Hülsmann and Block 1998). They repeatedly call money "property", with currency and checking accounts representing mere titles to this property. Putting more titles into existence than correspond to the supposedly underlying property is downright fraudulent, just as it would be fraudulent to have more titles to cars in existence than actual cars. Word-juggling takes the place of economic analysis. Actually, as A&T would agree, the monetary tickets and memoranda employed in monitoring, record-keeping and clearing of transactions need not take the form of little disks of precious metal or fully backed warehouse receipts for such disks. Nothing in economics, morality, or law so requires.

Money evolved gradually as a cultural product; it was not originally invented and imposed by the state (although it did later come under state domination). Historical evidence does not conclusively settle whether unit of account (numéraire) or medium of exchange evolved earliest. Quite plausibly, one function came first in some times and places, the other in others. Little of analytical importance hinges on the answer. Both functions are important in economic life and in monetary theory. Who knows how to measure and compare *degrees* of importance?

Indirectly or directly, as explained above, both functions have a quantitative aspect. Convenience does recommend a single numéraire within a currency area, but a well organized payments system can readily accommodate multiple media of exchange (if, indeed, notes and deposits of different banks and claims on other types of financial institution count as separate media). Much can be said in favor of separation of functions in the sense of a numéraire defined independently of any particular medium of exchange.

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