

A Critical Note on the Quantity Theory of Money

Quantity Theorists assert that "money matters" and mean by this that changes in the quantity of money (1) have substantial and important effects on key economic variables like real income or the price level. Unfortunately, the Quantity Theory discussion of the impact of changes in the quantity of money on income, prices, etc., suffers from unrigorous examination of basic propositions. In this paper, I attempt to show that failure to examine the processes whereby the quantity of money can be changed has led to serious error in the case of the Quantity Theory.

In the classical Quantity Theory of Money, the quantity of money demanded is exclusively a function of real income and the price level; in the neo-Quantity Theory, the quantity of money demanded is said to depend, in principle, upon interest rates as well, but the role of interest rates is denied on empirical grounds (2). Denial of an interest-elastic demand function for money is equivalent, of course, to an assumption that the proportion (k) of money income (yP where y is real income and P is the price level) held as money balances, or its reciprocal, the income velocity of money (v), is fixed. We can, then, write the demand function for money in both the classical and contemporary Quantity Theory as $M^d = kyP$ or, equivalently, $M^d = (1/v)yP$.

(1) Throughout this paper, by "quantity of money" or "money balances" is meant what is usually called the "nominal quantity of money", that is, the stock of dollars (or pounds) held by the public, not adjusted by an index of prices, income, or whatever.

(2) The findings of the neo-Quantity theorists on the interest-elasticity of the demand for money are reported in, for example: MILTON FRIEDMAN, "The Demand for Money: Some Theoretical and Empirical Results", *Journal of Political Economy*, August, 1959, p. 345, 349; and RICHARD T. SELDEN, "Monetary Velocity in the United States", in Milton Friedman, ed., *Studies in the Quantity Theory of Money*, Chicago, University of Chicago Press, 1956, pp. 179-257.

Although the Quantity Theory begins as nothing more than an identity in the classical case (3) or as a theory of the demand for money in the contemporary case (4), it is soon transformed into a theory of the price level or money income. In the classical case, it is asserted that a change in the quantity of money causes changes in the price level (5); in the neo-Quantity Theory, the possibility that changes in the quantity of money may affect real income as well is admitted (6).

Central to both the classical and contemporary versions of the Quantity Theory is the "hot potato" analogy. The quantity of money is said to be determined by the central bank or, more generally, exogenously, and must be held by someone (7). As a result of an increase in the quantity of money engineered by the central bank, individuals may find their money balances excessive relative to their money income and try to rid themselves of the excessive money balances by spending them but, for the community as a whole, this is impossible. As a result of spending to reduce excessive money balances, prices and/or real income rise until the quantity of money corresponds to that proportion of their money income the public wants to hold in the form of money (8). Thus runs the Quantity Theory argument.

(3) See: IRVING FISHER, *The Purchasing Power of Money*, Reprints of Economic Classics, New York, Augustus M. Kelley, 1963, pp. 8-26.

(4) MILTON FRIEDMAN, "The Quantity Theory of Money - A Restatement", in *Studies in the Quantity Theory of Money*, p. 4.

(5) Fisher writes: "... one of the normal effects of an increase in the quantity of money is an exactly proportional increase in the general level of prices", *op. cit.*, p. 157.

(6) MILTON FRIEDMAN, "The Quantity Theory of Money - A Restatement", *op. cit.*, p. 15.

(7) For example, Milton Friedman writes: "The nominal stock of money is determined in the first instance by the monetary authority and cannot be altered by the non-bank holders of money". See: "The Demand for Money: Some Theoretical and Empirical Results", *op. cit.*, p. 330. Elsewhere, Friedman states: "Broadly speaking, the public as a whole cannot by itself affect the total number of dollars available to be held — this is determined primarily by the monetary institutions". See: "The Supply of Money and the Price Level", in Deane Carson, ed., *Money and Finance*, New York, John Wiley, 1966, p. 148.

(8) Friedman's description of the role of money in the economy employs the hot potato analogy. See: "Statement on Monetary Theory and Policy", in W.L. Smith, R.L. Teigen, eds., *Readings in Money, National Income and Stabilization Policy*, Homewood, Richard Irwin, 1965, pp. 82-3. In another place, Friedman and Schwartz use a subtler version of the hot potato analogy in conjunction with what appears to be an interest-elastic, speculative demand for money: MILTON FRIEDMAN, ANNA J. SCHWARTZ, "Money and Business Cycles", *Review of Economics and Statistics*, (supplement), February, 1963, pp. 32-64, especially p. 60.

Two objections to this analysis can be raised: first, it is not true that the community is unable to reduce the quantity of money in existence; and second, it is not possible for the quantity of money to be excessive, if the term "excessive" is interpreted correctly.

In the modern economy, the largest part of the money stock consists of bank deposits against which the banks hold, to a large extent, the obligations of individuals and firms. If these individuals and firms find their money balances excessive, they can reduce them by the simple process of repaying bank loans. By this process, the quantity of money can in fact be reduced (9). It might be objected that new loans and bank deposits will offset retired loans and deposits but this would imply that the quantity of money was at once both excessive and deficient (10).

While it is untrue that the community is unable to reduce the quantity of money should it be considered excessive, a more fundamental objection to the Quantity Theory analysis is that it is impossible for the quantity of money held by the public to be excessive.

It is one of the first principles of price theory that neither suppliers nor demanders can unilaterally determine the actual quantity of a commodity traded or sold in a market; the actual quantity traded or sold is determined by the interaction of the plans of buyers (demanders) and sellers (suppliers). In the light of this, then, what is implied by a statement that the public holds an excessive amount of a particular commodity? Such a statement in fact means that the public holds more of a commodity than it wants at prevailing levels of the determinants of the demand for that commodity. Yet this implies, contrary to price theory, that suppliers are able to increase unilaterally the quantity of a commodity held by the public (demanders) without reference to the demand for that commodity. We must conclude, therefore, that it

(9) Fisher dismisses this possibility on the grounds that it would disturb the "normal" ratio of currency to bank deposits: *op. cit.*, p. 154.

(10) A portion of current money balances might be rendered excessive by some institutional or technical innovation, such as a reduction of the average payment period, which reduces the quantity of money required to carry out planned transactions. Under a fractional reserve banking system, the usual result of a reduction in the quantity of money through repayment of loans (which can occur with no change in the ratio of currency to bank deposits) will be excess reserves. If the banks react to excess reserves by lowering the interest rate, then the Wicksellian Quantity Theory model, examined below, applies, as do our conclusions regarding that model. If the banks do not lower the interest rate but, instead, hold excess reserves, the quantity of money is reduced and the matter is ended.

is not possible for the public to hold an excessive quantity of a particular commodity (11).

By the same reasoning, the Quantity Theory proposition that the community may find its money balances excessive embodies a contradiction for it implies that the suppliers of money can unilaterally increase the quantity of money in existence without reference to the demand for money. An acceptable explanation of the effects of changes in the quantity of money on income, prices, etc., cannot, therefore, be based on the effects of excessive money balances upon spending decisions (12).

If excessive money balances cannot form the basis for an analysis of the determination of income and prices, by what process, then, can changes in the quantity of money be viewed as affecting income, prices, etc.? The answer lies in an examination of the processes whereby the suppliers of money can induce the public to alter the quantity of money it wants to hold. Such an examination reveals that the ability of the suppliers of money to change the quantity of money depends upon the interest-elasticity of investment and/or consumption, or upon the interest-elasticity of the demand for money.

Given the Quantity Theory demand function for money, the suppliers of money can alter the quantity of money only if they are able to affect real income, prices, or both. While neither commercial nor central banks possess the power to alter prices or real income directly, through their ability to affect the rate of interest they are

(11) This argument does not mean that it is not possible for suppliers to offer for sale quantities of a commodity in excess of amounts demanded at prevailing levels of the determinants of the demand for the commodity. Should this happen, we expect price adjustments to remove an excess supply. It must be stressed, however, that buyers do not hold or purchase the "excessive" quantity of the commodity prior to a price reduction; they are induced to increase their purchases through a decline in price, that is, through a change in one of the determinants of the demand for the commodity.

(12) It may be objected that, because they consider it currently advantageous, individuals may sell commodities in return for money balances which they do not intend to hold but, rather, intend to spend later.

Because these money balances are greater than current transaction needs, they must be considered excessive; attempts to be rid of the excess balances will then yield the usual Quantity Theory results.

Unfortunately, this argument fails to recognize that when individuals sell commodities, they receive *income* in the form of money. Admittedly, their money balances are increased (unless they receive income-in-kind) but it is increase in income which leads them to increase spending, not being in possession of excessive money balances which they try to get rid of like a "hot potato".

able, under certain conditions, to alter anticipated income or expenditures and, thereby, the demand for money. More precisely, the banking system or central bank may induce the community to alter its demand for money under Quantity Theory assumptions if investment or consumption are sensitive to changes in the rate of interest. In the version of the Quantity Theory usually associated with Wicksell (13), the banking system is able to initiate an expansion of the quantity of money through a reduction of the money rate of interest. A lowering of the money rate causes investors and households to revise their spending plans upwards: investors view the acquisition of capital goods as more profitable than before and households wish to spend a larger proportion of their incomes for consumption. To finance these revised spending plans, both groups sell securities to the banks in return for money balances. Subsequent spending for investment and consumption raises prices and/or real income. Prices and/or real income rise until the real and market interest rates are equal; in equilibrium, yP rises by $(1/k)$ times the increase in the quantity of money (14).

The proportional rise in yP in the Wicksellian model is, of course, a traditional Quantity Theory result, but with an important difference. In the classical and contemporary versions of the Quantity Theory, individuals' efforts to rid themselves of excessive money balances cause yP to rise until money balances are no longer excessive relative to money income. In the Wicksellian model, there is no role whatsoever for unilateral increases in the quantity of money nor for excessive money balances. Rather, the suppliers of money are able to effect an increase in the quantity of money because they are able to alter the public's spending plans. In other words, they are able to alter one of the determinants of the demand for money. It is by this process, that is, by affecting the determinants of the demand for money, and by no other process, that the quantity of money can be increased in the Quantity Theory, or any other, model.

If neither investment nor consumption are sensitive to changes in the rate of interest, there exists no vehicle whereby the quantity

(13) KNUT WICKSELL, *Lectures on Political Economy*, London, Routledge, 1935, Vol. II, pp. 159-208.

(14) Classical Quantity Theorists of course assumed full employment so that changes in real income were not considered. Such changes are included here for the sake of greater generality only.

of money can be increased except by a rise in government spending, that is, by fiscal policy (15). In this case, too, the "hot potato" analogy is invalid. For example, consider a rise in transfer payments. Assume that the government sells securities to the central bank in return for banknotes which it mails to transfer recipients. At this point, the quantity of money has risen by the amount of the transfer. According to the Quantity Theory, individuals, finding their cash balances excessive, will rush to spend them, thereby raising yP . What the Quantity Theorist implies is that the recipients of the banknotes do not regard them as income although, presumably, the same notes in a pay envelope would be regarded as income. If they are regarded as income, they will be spent, with each original and subsequent spender retaining a fraction (k) of his new receipts in the form of money. By this process, money income will rise by $(1/k)$ so that, in equilibrium, the community will hold the original increase in the quantity of money. In this case, it is the flow of income to individuals which increases the quantity of money and it is *normal* spending of income, not efforts to be rid of excessive money balances, which raises yP and renders the community willing to hold the enlarged quantity of money. Furthermore, the central bank brings about an increase in the quantity of money only to the extent that it provides the government with the money with which to make the transfer payments.

In both the Wicksellian and transfer payment cases, then, the authorities are able to bring about an increase in the quantity of money because they are able to affect yP , directly in the latter case, and indirectly in the former. It is possible, however, for the suppliers of money, more particularly the central bank, to induce the public to alter its money balances in the absence of a change in yP when the rate of interest enters the demand function for money.

Inclusion of the rate of interest in the demand function for money allows us to view the central bank as initiating changes in the quantity of money through open-market operations in government securities. Open-market operations simultaneously change the

(15) Fisher writes that the three most important means whereby the quantity of money can be increased are raising the denomination of existing dollars, debasing the currency by cutting each existing dollar into two or more parts, or duplicating every dollar in existence. Each of these techniques, however, is simply a means of giving away money, something central banks never do. In fact, these techniques constitute transfer payments. See: *The Purchasing Power of Money*, pp. 29-32.

quantity of money and the interest rate. For example, an open-market purchase of securities simultaneously increases the public's money balances and bank reserves and lowers the rate of interest. The power of the central bank to influence securities prices through its activities in the securities markets coupled with an interest-elastic demand function for money means that the central bank can induce the public to alter the quantity of money it holds without reference to consumption or investment decisions. The fact that, with an interest-elastic demand function for money, the central bank can change the quantity of money in existence does not, of course, mean necessarily that it can alter income, prices, or employment. The effect of changes in the quantity of money and the interest rate upon income, prices, or employment depends upon, among other things, the interest-elasticity of investment and consumption.

The theme of this paper has been that the suppliers of money are able to change the quantity of money only on condition that they are able to affect the determinants of the demand for money and that the public never holds more money than it wants to hold. Consequently, any analysis of the impact of changes in the quantity of money on income, prices, etc., predicated on the assumption that the monetary authority can arbitrarily create "excessive" money balances is fundamentally in error.

Quantity theorists have a revealed preference for monetary control of economic instability while Keynesians emphasize fiscal policy. Yet, if the preceding analysis is correct, the changes in the quantity of money fundamental to monetary policy may be difficult to accomplish under Quantity Theory assumptions but more easily accomplished under Keynesian assumptions.

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