TEACHING MONEY, PRICES, INCOME, AND THE QUANTITY THEORY OF MONEY

Han X. Vo, Winthrop University

ABSTRACT

One problem often encountered in teaching macroeconomics, particularly at the principles level, is the abstract nature of the subject matter. In teaching the quantity theory of money, many students have difficulty with understanding the theory itself and the terms in that equation. In fact, for the students to comprehend the quantity of money, they first need to have a good grasp of such elusive concepts as the quantity of money, the velocity of money, as well as the distinction between nominal income and real income.

This paper describes a classroom simulation technique designed to teach the quantity theory of money and related concepts. The focus of the simulation is to use a concrete classroom situation to help the students relate to more abstract concepts and phenomena. The author has used this simulation to teach macro principles with good results. This paper has two parts: the first part deals with a discussion of simulation method and the second part, with the historical development and policy ramifications of the quantity theory.

The paper begins with an identification of the major problems that may be encountered in teaching the quantity theory to undergraduate students. It then proceeds to describe the simulation exercise in details. Basically, the exercise involves dividing the class into a producer side and a consumer side. The class receives a fixed amount of money and a fixed quantity of good. The students also receive clarifications of the meaning of each of the terms in the equation of exchange, $MV = \sum PQ$. After allowing a short period of "free" exchange of good for money between the two sides,

the students were asked to compute the value of nominal income. To reinforce their understand of the equation of exchange, the simulation goes through a second and third round after changes in the money supply M and the quantity of goods or real income Q.

Upon completion of the simulation exercise, the instructor goes through the meaning of the quantity theory and policy implications. This second phase of the learning is designed to help the student see the functional linkages between money, prices, nominal income, and real income. The students seemed to enjoy a fresh change of venue and gain a better understanding of equation of exchange, a clearer idea about the quantity theory as a theory about money, price, and income.

INTRODUCTION

In undergraduate macroeconomic classes, at the principles level especially, teaching the quantity theory of money can sometimes be a challenging experience. From the students' perspective, the difficulties frequently arise from the first-time encounter with such elusive concepts as the supply of money, money's velocity, and the link between the quantity of money and the price level and nominal income. The challenge with teaching the quantity theory can also comes from student failure to grasp such measures as nominal GDP and real GDP. Even from the faculty's perspective, the modern quantity theory of money is not without controversy. In a nutshell, the controversy concerns the identity-vs.-equation issue, or about the role of money in stabilization policy, or the effectiveness of monetary policy. In other words, the controversy has revolved around issues regarding the nature and direction of causality between the major terms of the equation, namely, money, prices, and output. Interestingly enough, this controversy among economists also finds a parallel expression in the classroom, when the teacher may have a hard time explaining to his students the nexus of money-velocity-price-income relationships. This paper explores a complementary teaching technique aimed at addressing the pedagogical challenge stated above.

If the controversy among economists is concerned with Athe technical difficulty of sorting out the direction of causation running between money and prices," (Laidler 1991) to many undergraduate students, especially those taking principles of economics, the difficulty in understanding causality is further compounded by the abstract nature of entities such as the stock of money, velocity, and the general price level. This paper addresses the "abstract" and "causality" issues by tackling the "abstract" problem first. My experience with the classroom technique described below suggests that, once the students gained a firmer understanding of such abstract terms as the stock of money and the velocity of money, then it is easier to get into a more substantive discussion of such a matter as relationships or transmission mechanism of monetary policy.

In short, it is essential that the students overcome their fear of what they perceive as too abstract macroeconomic words or concepts. For example, once students gain a firmer comprehension of such vocabulary as velocity and quantity of money, they would be more willing to accept the "quantity theory of money"as an identity, and from this acceptance, we can then show them the "quantity theory" as a theory. Thus, before one can expect them to understand the "quantity theory" as a theory, it is helpful to convince them how a complex economy can be reduced to a simple identity VM = PQ. In my experience, I have found the exercise described below helpful in explaining the meaning of the said identity. Briefly, the strategy consists of allowing the students to participate in the Aworking" of an economy-an economy created for them right in the classroom. In other words, the simulation is meant to help the students grasp the fundamental of the circular flow of income and output. Once that objective is accomplished, the next step is to explain the linkages as different theories or schools propose. In short, the simulation exercise is built on the premise that, in teaching the quantity theory of money, the place to start is to help the students master the equation of exchange. Consequently, the exercise is primarily aimed at achieving the latter objective. This paper has two parts. The first part presents the simulation exercise; the second part deals with more substantive issues surrounding the quantity theory.

CLASSROOM SIMULATION

The Money Supply Constant

To begin the simulation, I explain to my class the purpose and strategy of the exercise. Briefly, I said, the idea is to turn the class into a simple economy. By allowing the economy to function, that is by letting the economy engage in an exchange process, one can gain a better understanding of how the quantity theory of money, or more precisely, the equation of exchange can describe the concepts and functional relationship between the stock of money, velocity, and nominal GDP. In that simulated economy, I ask my students to play the role of producers and consumers and I provide the class with given amount of cash to facilitate the exchange. After the introduction, I split my class into two equal halves. Naturally, this works nicely if the class is of an even size, but if it is not, one has to ask one student to abstain and to serve as your assistant/facilitator. For example, if my class has 30 students, I would have two groups of 15 students per group. One group, named group P, comprises of producers only, while the other group, called group C, is made up of consumers only. I then give one-dollar bill to each of the 15 students in group C. Obviously, for this economy, the "money supply" or the "quantity of money" is 15 dollars. Similarly, to each of the 15 students in the group P, I give a token commodity, say, a new pencil. The idea is that the output produced by this economy, as embodied in group P's initial possession, is 15 pencils. In other words, this is the real GDP of the simulated economy.

Now my newly created economy begins to engage in exchange-albeit under some arbitrary rules meant to facilitate the exercise (Mind you I definitely have no intention of creating a "command" economy!). One cardinal rule is budget exhaustion. That is, after the bell announcing the opening of the market, the consumer side, i.e., group C, must spend all of its income on the good sold by the producer side, i.e., group P. The second rule is that the market clearing price for the pencil is one dollar each (sometimes, this rule needs not be stated explicitly). The third rule makes this economy

a debt-free one meaning that borrowing is forbidden, so that the money supply will stay constant during the first phase of the experiment.

Once the economy completes its first round of exchange, group C, which represents the demand side of the market, should now have all of the good and no money, and conversely, group P (supply side) should now have all of the money and no good. I then ask the class to figure out national output of this economy in monetary terms, based on the Fisherian expression $\sum$ (p x Q). The students have no problem finding the answer: nominal GDP = \$1x15 = \$15. My next question to them is about nominal GDP, using the velocity approach. I give them the formula, nominal GDP = M x V, and the definition of velocity as the turnover rate of M, i.e., the number of times the money supply M is exchanged. Again, the student's answer comes readily: nominal GDP = \$15 x 1 = \$15. Eureka! MV = pQ (This formulation of the quantity theory, and its variations, MV = PT, MV = Py, is due to Irving Fisher (1911), one of the first and most ardent defender of that theory in the twentieth century).

Upon inquiry, I have learned that the first round of simulation has enabled my students to visualize in concrete terms how one measures V, M, nominal GDP, and real GDP. To reinforce their comprehension, I ask my classroom economy to engage in a second round of exchange identical to the first. However, this time, for variety's sake, I use pens instead of pencils (the class still keeps the previous quantity of pencils) and I give one pen to each of the members in group C, the side that has pencils at this point. (To avoid interruption, there is a reversal of role, so that the side that has pencils, i.e., group C, now becomes the supply side). Thus, in this second phase of the exercise, one side has 15 pencils and 15 pens and the other side has \$15. Again, the market equilibrium price of each pen is also supposed to be one dollar, and the side that holds money will now buys pens from the other side. The same ground rules apply (budget-exhaustion, no debt, and so on). When the second round of transaction is completed, I ask my class to figure out the latest nominal GDP figure, using the familiar expression $\sum$ (p x Q). The correct answer comes from my class as readily as the first time, namely, nominal GDP = (\$1x15 pencils) + (\$1x15 pens) = \$30. To test their mastering of the velocity concept, I also ask them to calculate the nominal

GDP using the velocity approach. Once again, the students have no difficulty meeting the challenge: MV = \$15 x 2 = \$30. The supply of money has changed hand twice. Thus, to my class, it appears that the equation of exchange as an identity, MV = pQ, has been established beyond a doubt.

Changing The Money Supply

I take a further step to help the student relate to the link of the quantity of money to prices. This time, I start the simulation over again by taking back all the goods and money from this economy. I then give each student in one group two dollars, and each student in the other group one pencil. I ask those who have the money to spend all their money on the good offered for sale by the other group, i.e., per budget-exhaustion assumption. With that restriction, the "equilibrium market" price jumps to two dollars for each unit of the good, namely pencils. Every class member realizes that this economy has experience one hundred percent inflation. Why? The money supply M is doubled, of course. However, what happens to nominal income? The answer is apparent: nominal GDP = $\sum$(p x Q) = \$2 x 15 = \$30. Using the alternative approach, MV = \$30 x 1 = \$30. In short, by comparison with the result of the first round of simulation where GDP = \$15, the conclusion here is that doubling the money supply doubles the price, hence higher nominal income, leaving real income Q constant. This situation is known as the neutrality of money: it is simply a veil. A change in the money supply changes the price level, while leaving the real macro variables untouched! We have taken the first step to try to understand the quantity theory. Further elaboration and explanation are needed, and some historical grounding would be an appropriate place to start.

A HISTORICAL BACKGROUND

From a historical perspective, some crude forms of the quantity theory can be traced back to the times of antiquity in China and Rome. In their writings, disciples of Confucius (551-479 BC) such as Ma-twan-lin and

Chia Yi, and of Socrates (470-399 BC) such as Xenophon had discussed the about the importance of value of money, its relation to prices, in a broad context of demand and supply of money and goods (Hegeland 1969). One of their concerns was the attempt to understand what determines the value of money and how to keep that value stable. Some authors (e.g., Marget 1942; Hechscher 1935; Kemmerer 1907) believe that the Roman lawyer Julius Paulus to be the first expositor of the quantity theory. However, there were authors who maintained that Davanzati is first economic writer who dealt with the specific issue raised by the quantity theory in its modern form (Hegeland 1969). Davanzati was once the head of the Mint House of Naples and was the author of a book published in 1588 that contains what is considered as the original statement of the quantity theory by linking the quantity of money to the value of the quantity of goods. Other classical contributors to the quantity theory include such writers as John Locke, David Hume, Richard Cantillon, David Ricardo, and John Wheatley. To these writers and early theorists, the common elements essential to the quantity theory are 1) constant proportionality between the quantity of money and price, 2) money-to-price causality, 3) neutrality of money, (4) independence of demand and supply of money, and 5) real causes and monetary causes of changes in absolute and relative price (Humphrey 1997; Patinkin 1995). Modern versions of the quantity theory are often associated with Knut Wicksell (1898, 1906) and Irving Fisher (1911). While Fisher was the first to express the quantity theory in its contemporary form, emphasizing the equiproportionality of money and prices, Wicksell focused on the real-balance effects and argued that short-run price fluctuations generate efforts by wealth-owners to take appropriate measures to stabilize their real balances. In other words, Wicksell maintains that both supply and demand of money play a role in determining the price level (Humphrey 1997, pp. 76-77)

Many economists think that Fisher, the Yale economist, is the author responsible for formulating the definitive version of the quantity theory. Fisher started out with the equation of exchange, which "...relates to all the purchases made by money in a certain community during a certain time." (Fisher 1922, p. 16). Therefore, "the equation of exchange is simply the sum

of the equations involved in all individual exchanges in a year." (Fisher 1922, p. 16). Hence, in Fisher's own words, $MV = \sum pQ$. Alternatively, if P is the weighted average of all the p's and T is the sum of all the Q's, then according Fisher, the above equation of exchange can be reformulated as $MV = PT$. This is same as the expression we use for our simulation purpose as seen above. Fisher left little doubt that the place to start the quantity theory is the equation of exchange, which he saw essentially as an identity. He summarized his exposé in three concise propositions, which he called theorems, in this way (Fisher, 1922, p. 26):

(1) If V and the Q's remain invariable while M varies in any ratio, the money side of the equation will vary in the same ratio and therefore its equal, the goods side, must vary in that same ratio also; consequently, either the p's will all vary in that ratio, or else some p's will vary more than in that ratio and others enough less to compensate and maintain the same average.

(2) If M and the Q's remain invariable while V varies in any ratio, the money side of the equation will vary in the same ratio, and therefore its equal, the goods side, must vary in that ratio also; consequently, the p's will all vary in the same ratio or else some will vary more and others enough less to compensate.

(3) If M and V remain variable, the money side and the goods side will remain invariable; consequently, if the Q's all vary in a given ratio, either the p's must all vary in the inverse ratio or else some of them will vary more and others enough less to compensate.

Succinctly, other terms being equal,

$$1)\ M \uparrow\downarrow\rightarrow P \uparrow\downarrow,\ 2)\ V \uparrow\downarrow\rightarrow P \uparrow\downarrow,\ \text{and}\ 3)\ Q \uparrow\downarrow\rightarrow P \uparrow\downarrow$$

According to Fisher, proposition (1) above "constitutes the quantity theory of money." In his words, "...the level of prices varies directly with the quantity of money in circulation provided the velocity of circulation of that money and the volume of trade...are not changed." (Fisher 1922, p. 14). One is not likely able to find a more forceful statement of the equation of exchange in the literature. Briefly, the quantity theory of money is the proposition that, with velocity constant, changes in the money supply are

reflected in a proportionate increase in nominal income. Finally, Fisher argued that the definition of money must be broadened to include demand deposits. He pointed out that even though the original formulation of the equation of exchange is correct, it is an error to leave consumer bank deposits out of the equation. So, if M' is the "total deposits subject to transfer by check and V' is the "average velocity of circulation," then a complete equation of exchange must read as $MV + M'V' = \sum pQ. = PT$

According to Hegeland (1969), Kemmerer (1907) was among the first writers to use a variation of the equation exchange for statistical work. Kemmerer's formulation was MR = NEP or P = MR/NE, where M refers to the quantity of money in circulation, R the number of time M is turned over in a period, N the quantity of the goods exchanged, E the number of times N is exchanged and P the average price of the goods. In that formulation, MR can be interpreted as the money supply and NE the good supply. Then, changes in the price can be attributed to changes in N, E, R and not just changes in M.

Milton Friedman is most closely associated with the "monetarist" school of thought. Although Friedman did not pretend to give an exact expression to the quantity theory, which he argues is a theory about demand for money rather a theory of output or price, he made a serious attempt to synthesize a rather loose oral tradition at the University of Chicago regarding monetary theory (The Chicago "school", as it is sometimes referred to, is associated with Henry Simmons, Lloyd Mints, Frank Knight, Jacob Viner, and, of course, Milton Friedman himself). To expose his ideas, however, Friedman relied on the classic equation of exchange but reformulated to make his point. Friedman started out with a demand for money equation, in which demand for money M is a function of the price level P, interest on bond rb, interest on equity re, the rate of change in prices, the ratio of non-human to human wealth w, money income Y, and a variable standing for tastes and preferences. Assuming the demand for money function is homogeneous of degree one, he then derived the equation in "the usual quantity theory form" as follows:

$$Y = v(r_b,\ r_e\ ,\ e,\ 1/P \cdot dP/dt,\ w,\ Y/P,\ u)\ .\ M$$

Thus, according to Friedman, demand for money is a function of real income and the cost of holding money. As discussed below, the above equation serves as a theoretical underpinning for the monetarist policy prescription on monetary policy.

SUBSTANTIVE ISSUES AND CONTENDING PERSPECTIVES

In the form of the equation of exchange, the quantity theory tells a very simple story. The monetary value of goods and services produced (pQ or Py) must be identically equal to the amount of money spent on them (MV) (Fisher also called the latter, "expenditure," 1991, p 24). This is evident from the results of the simulation. However, as a theory, the functional relationship between the terms is what makes the equation of exchange a theory. Consequently, theoretical and policy implications of the quantity theory need to be explored. The rest of this paper addresses two issues; one relates to the meaning of money and the other, the role of money on stability and growth.

What is Money?

As seen earlier, Fisher is one the earliest modern economist to define money to include demand deposits and checks. His emphasis is thus on the medium-of-exchange function of money.

Friedman's definition of money distinguishes between two approaches. The transaction approach stresses the medium-of-exchange function and the cash-balances approach focuses on the store-of-value function (Friedman 1971). According to the monetarist approach, money is considered as an exogenous variable over which the government has considerable control. This is the transaction approach to money. By changing credit availability through its tools of monetary policy, the government can effectively change the money supply. Changes in credit availability have a direct impact on economic activity through investment and consumption expenditures. But according to monetarists, such power is destabilizing, because it is powerful. Inability to diagnose correctly the source of macro instability and failure to

act at the proper time has tended to make discretionary monetary policy counterproductive.

Does Money Matter?

As mentioned earlier, the quantity theory of money posits that prices and the supply of money vary positively and proportionately, i.e., equiproportionality. What this means is that equiproportionaliy is present in both the equation of exchange as an identity and the equation of exchange as a quantity theory. Fisher based that conclusion on his macro studies in which he found that in the long run, changes in M does not affect V or T (or Q). He considers V stable (in the long run) and independent of the other variables in the equation. However, in transition, that is at certain time before the equation of exchange has a chance to re-establish itself, changes in M may affect V and T (Fisher 1911, pp. 158-60). Put differently, Fisher's "transition periods" are the times when the economy adjusts to prices changes induced by changes in money supply. Thus, while Fisher admits the possibility that the monetary variables can affect the real variable, he argued that temporarily the link between money and prices may be weak, but in the end, equiproportionaliy will reassert itself. Fisher was unequivocal about the neutrality of money:

> *...(except during transition periods) the volume of trade, like the velocity of circulation of money, is independent of the quantity of money. An inflation of the currency cannot increase the product of farms and factories, nor the speed of freight trains or ship. The streams of business depend on natural resources and technical conditions, not on the quantity of money.* (Italics mine).

How then do changes in money supply affect the real variables during the "transition period"? Again, Fisher's position is that the initial changes in prices provokes a chain reaction in the money and good markets, affecting velocity, interest rate, profits, and business activities. Fisher describes the cumulative process in a transitional sequence as follows. When monetary disturbance occurs, prices ("The price level is normally the one absolutely

passive element in the equation of exchange," Fisher 1911, p. 172) rise, which increases velocity, which leads to increase in profits, loans, and economic activities, i.e., the Q's. (Fisher 1911, p. 63).

In short, given his preoccupation with the purchasing power of money (the title of his classic 1911 book), as a forerunner of the contemporary monetarist school, Fisher's quantity theory can be thought of as a theory of prices, or be more precise, theory of long-run price behavior. The policy prescription that flows from the works of Fisher and other early monetarists is that the key to macro stability lies in keeping prices stable through control of the money supply.

A major difference between the early monetarists and the contemporary or later monetarists is the way changes in money supply affect prices and output. While the former sees the effect level of money supply on output through changes in the prices, velocity, interest rate, and profit, the latter describes the transmission mechanism in terms of the theory of demand for money. The monetarist theory of demand for money, as reflected in Friedman's work (Friedman 1971), posits that for wealth-holders, how much money they want to hold depends on their income, wealth, interest rates, rate of returns on financial assets, and rate of change in the prices of goods. Changes in the supply of money cause changes in prices, hence in wealth-holders' real balances, which in turn prompts them to adjustment their portfolio. To the extent that wealth-holders take action to realign their expenditures to reflect changes in their real balances, this adjustment endeavor affects real variables such as investment and consumption, which affects economic activities. In short, one may say that monetary changes affect production and output in the short run through real-balance adjustment effects. Friedman provides his statement of the quantity theory as follows:

> ...the empirical generalization that changes in the desired real balances (in the demand for money) tends to proceed slowly and gradually or to be the result of events set in train by prior changes in supply, whereas, in contrast, substantial changes in the supply of nominal balances can and frequently do occur independently of any changes in demand. The conclusion is that substantial changes in prices or nominal income are invariably the result of changes in the nominal supply of money (Friedman 1968).

Thus, the monetarist view about the quantity theory is that money does matter and that the quantity of money M influences economic activities and through which, real macro variables such as consumption, investment, and real and nominal income. In addition, like the early monetarist writers, Friedman posits that velocity is more stable than Keynes's investment multiplier. The later monetarists point to the high correlation between the money supply and nominal GDP as a proof that velocity is stable. Friedman's monetary research led him to conclude that money is a better predictor of income than investment. The research of Friedman and Schwartz and other monetarists shows that recessions have tended to follow strong deceleration in the money supply. Contrary to the Keynesian view that the spending of money is more important for economic stability and growth, the monetarist view keeping the supply of money honest, i.e., in line with changes in productivity, is the key to stabilization policy. Thus Friedman's policy prescription is to keep the growth of money supply stable and predictable.

On the other hand, Friedman warned against any tendency to equate his demand for money equation with a theory of income determination. In fact, he was quite explicit about that:

Suppose the supply of money in nominal units is regarded as fixed or more generally autonomously determined. Equation (13) [given above] then defines the condition under which this nominal stock of money will be the amount demanded. Even under these conditions, equation (13) alone is not sufficient to determine money income. In order to have a complete model for the determination of money income, it would be necessary to specify the determinants of the structure of interest rates, of real income, and the path of adjustment in the price level. (Friedman, 1956, p. 15).

The Keynesian Perspective

Kahn (1984) describes the formation of Keynes as an economist as "a struggle to escape from the stranglehold of the Quantity Theory [of Money.]". Keynes was initially attracted to the classical quantity theory because he saw it as providing a reasonable framework to tackle the problem

of short run economic instability. This situation clearly shows the influence of Knut Wicksell on Keynes'economic thought. Keynes himself was working on compiling price statistics to deal with the problem of inflation. In his early writing, Keynes went along with the Wicksellian thinking that the price level varies proportionately with the supply of money. For a long time, Keynes believes that monetary policy is an effective stabilization tool (Skidelsky 1995).

However, with the publication of his General Theory, Keynes no longer believes that in the equation of exchange, the level of output Q is an independent variable as the early monetarists had assumed. With that departure, Keynes and his followers argue that the quantity of money has a weak relation to output. Monetary is a largely ineffective stabilization policy because increases in the money supply are absorbed into cash balances, causing velocity to fall. So any variation in the money supply is offset by changes in velocity in the opposite direction, so as to leave aggregate demand unchanged. That being the case, the link between M and nominal income advocated by the monetarist would cease to exist. To Keynes, the strength of monetary policy is diluted by the existence of the liquidity trap and the fact that investment can be interest-inelastic. Keynes saw the link between the supply of money on the price level and real output to be a complex one. For example, in one of his class lectures, he argued that "ceteris paribus, the chain of causation is: increase in the volume of money -fall in the rate of interest-increase in the volume of investment
-increase in the volume of output-through diminishing returns in the short period and a rise in the wage units, a rise in prices." (Rymes 1989). (italics in the original).

Central to Keynes' theory on monetary policy is the importance of money as a store of value and his liquidity preference theory associated with that function of money. This is sharp contrast with the Wicksellian concept of money that stresses its medium-of-exchange function. The implication of Keynesian monetary analysis is clear: fiscal policy based on taxes and spending is the more effective tool to address instability problem regarding output and employment. In other words, the Keynesians believe that the

supply of money is less important than the spending of money because the latter affects aggregate demand and output directly.

CONCLUDING REMARKS

The outcome of this simulation exercise has been that the students seemed to enjoy a fresh change of venue and gain a better understanding of equation of exchange, a clearer idea about the quantity theory as a theory about money, price, and income. Although simplistic in its construct, the simulation seemed capable of making more accessible to many students some of the main ingredients of macroeconomics and the linkages between them. In addition, the students gain a deeper perspective of the various contending viewpoints and policy prescriptions. Needless to say, one can come up with variants of the design described here. As is often the case, any pedagogical device aimed at bringing the "real" world into the classroom is always a welcome learning experience for the students and faculty involved. Our experiment affirms this.

As an effective teaching tool thanks to its simplicity, or perhaps because of it, this exercise faces a number of limitations. In the first instance, the model underlying the simulation is one of comparative statics. This characteristic is clear as the instructor moves his "simulated economy" from one phase to the next. For example, as that economy doubles its output from 15 units (goods) to 30 units, the quantity of money being held constant (at $15), nominal income also doubles. Similarly, with a constant quantity of goods, when the quantity of money doubles, the price also doubles. The dynamic process of change in income, real and nominal, and changes in the price level cannot be demonstrated by the exercise. The students witness the change as an outcome and not as a process, so that what they actually see are like snapshots. Here, one hopes that the students use their imagination to visualize the successive phases of economic changes as the economy moves from one phase to the next. They have to fill in the frames between different scenes of a film script, so to speak.

REFERENCES

Fisher, I. (1911). *The Purchasing Power of Money: Its Determination and Relation to Credit, Interest, and Crises.* New and revised edition, 1922. New York: McMillan, 1922. Reprinted by Augustus M. Kelley, 1963, 1971 (1922 edition).Friedman, Milton (Ed.) (1956). *Studies in the Quantity Theory of Money*. Chicago: University of Chicago Press

Fisher, I. (1968). *Money: Quantity Theory. International Encyclopedia of the Social Sciences,* 434.

Fisher, I. 1971). A Theoretical Framework for Monetary Analysis. *NBER Occasional Paper 112*. New York: Columbia University Press.

Heckscher, E. F., (1935). *Mercantilism.* Two vols., transl. by M. Shapiro, London. Vol. II, 225

Hegeland, H. (1969). *The Quantity Theory of Money*. New York: Augustus Kelly, 83.

Humphrey, T. M. (1997). Fisher and Wicksell on the Quantity Theory. *Economic Quarterly, Federal Reserve Bank of Richmond, 83*(4), 72-73.

Kemmerer, E. (1907). *Money and Prices*, New York, 2.

Kemmerer, E. W (1907). *Money and Credit Instruments in Their Relation to General Price.* New York, 13.

Kahn, R. F. (1984). *The Making of the Keynesian Revolution.* London: 50-51.

Laidler, D. (1991). The Quantity Theory is Always and Everywhere Controversial-Why? *The Economic Record, 67*(199), 289.

Marget, A. W. (1942). *The Theory of Prices*, 2 vols. New York, vol. I, 9.

Patinkin, Don (1995). Concluding Comments on the Quantity Theory. In Mark Blaug (Ed.), *The Quantity Theory of Money from Locke to Keynes and Friedman.* Aldershot, England: Edward Elgar, 72-73.

Rymes, T. K. (1989). *Keynes's Lectures, 1932-35 : Notes of a Representative Student.* Ann Arbor: University of Michigan, 156.

Skidelsky, R. (1995). J. M. Keynes and the Quantity Theory of Money. In *The Quantity Theory of Money - From Locke to Keynes and Friedman*, Hants, England: Edward Elgar Publishing Company.

Wicksell, K. (1989). Interest and Prices. Translated by R. F. Kahn. London: Macmillan, 1936, reprinted, New York: Augustus M. Kelley, 1978.

Wicksell, K. (1906). Lectures on political Economy. Vol. 2, "Money." Translated by E. Classen. Lionel Robbins (Ed.), London: Routledge and Kegan Paul, 1935, reprinted New York: Augustus M. Kelley, 1978.