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Money in Market Clearing

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ABSTRACT

Market clearing is the central issue in macroeconomics. Two centuries of debate on Say's Law indicates that the issue is not yet settled. This essay proposes that double coincidence is a necessary condition for market clearing, in addition to the equality of demand and supply at equilibrium prices. However, the literature does not recognize necessity of double coincidence. Jevons (1875) gave shape to the conventional wisdom on double coincidence. The idea is that it is peculiar to barter, and that money overcomes this inconvenience. This is a fallacy. It prevents the development of a theory of money as a necessary medium of indirect exchange. It hides the role of money in market clearing. By recognizing double coincidence as a necessary condition for any trade, and the role of money in market clearing, economics can become a much stronger and practically more useful science. Monetary reform can correct the perverse circulation of money and prevent involuntary unemployment, undue instability, and excess debt.

Keywords: Market clearing, neutrality of money, double coincidence, unemployment, instability, debt.
JEL Classifications: B41, C67, C68, D46, D51, D71, D74, E41, E52, J64,

INTRODUCTION

Market clearing throughout the economy (multi-market equilibrium) is the toughest analytical concept in economics. The idea that when demand is equal to supply together gives market equilibrium produced the first but incomplete scientific discourse in the hands of Adam Smith. The earliest formulation of the idea of Say's Law about economy wide market clearing has been debated for two centuries, essentially because it fails to conceptualize market clearing. Neoclassical revolution of the 1870's took economic off-track to individual optimization and made the discussion of market wide clearing next to impossible. Walrasian general equilibrium model of the economy, despite much refinement in the hands of Arrow and Debreu, fails to conceptualize the issues of market clearing. This model has no intermediation, no entrepreneurship or transaction cost, no money, and essentially fails to understand market-wide phenomena. The reaction was the creation of macroeconomics by Keynes. But it was unable to produce compelling theorems and actually added to confusion. Today, more than forty different groups of

economists are disagreeing with each other (see www.paecon.net), all essentially because nobody has so far provided a tractable method of studying market clearing, a condition defined by the absence of either excess supply (involving unemployment) or excess demand (involving poverty and stagnation).

Market clearing requires that the buyer must pay the seller. The payment must meet two necessary conditions. First, the value of the payment must be equal to the value of the good. This is a more general condition than the equality of demand and supply at equilibrium prices. It may be called equivalence. The second condition is that the buyer must deliver a payment of a definite kind, whether it is a real good or money, which the seller accepts. It is a necessary condition for any trade, direct or indirect, immediate or intertemporal, regardless of whether money is used or not. This second necessary condition may be called double coincidence.

Sadly, the literature does not recognize the necessity of double coincidence. So it fails to see the role of money as a device to create an artificial double coincidence to meet this necessity under indirect trade and thereby serve as an artificial means of payment in market clearing. It is a puzzle why formal models do not recognize the role of money as a means of payment. Serving as a means of payment is the essential function of money. If it does not serve as a means of payment, it cannot be money. Yet all formal models treat money as either a numeraire (measure of value) or as a bond (store of value), but never purely as a means of payment that performs the transfer of value under indirect trade.

Why has conventional wisdom overlooked transfer of value as the essential function of money, and instead has been obsessed with non-essential functions such as store of value or measure of value? A remark from Bertrand Russell may shed some light on this paradox. He said:

(1): "……the point of philosophy is to start with something so simple as not to seem worth stating, and to end with something so paradoxical that no one will believe it." Russell (1902).

Apparently, the obvious fact that the buyer pays the seller was deemed 'not worth stating.' The penalty of not stating the obvious has been tragic. The expenditure of much energy to build monetary theory and macroeconomics did not produce compelling theorems about money, as it was without a proper articulation of the role of money in market clearing. The key issues are still being debated, and whether the market (especially for labor) clears is not yet known with any confidence. The most heated debate in economics is about neutrality of money, and this debate cannot be resolved unless one recognizes transfer of value as the necessary function of money.

If money is shown formally as a means of payment, then the inevitable conclusion is that money is necessary to clear the market under indirect exchange. In a formal model with a means of payment, price theory, income theory, and monetary theory become inseparable parts of the same theory of payment. In that case, macro and

microeconomics become inseparable, and the prevailing micro and macroeconomics become obsolete. One surprising conclusion is that the gravest economic miseries of humanity, namely needless poverty, undue instability, and excess debt arise from a perversion in the circulation of money that impedes market clearing. Reforming the monetary system can solve these problems.

JEVONS ON DOUBLE COINCIDENCE

Jevons (1875) may very well be the architect of the conventional wisdom on double coincidence. Paradoxically, his book "Money and the Mechanism of Exchange" is not much discussed in the literature on the history of thought, apparently because of the nature of success. According to Russell (1902), the successful teacher makes himself redundant by making his teaching a part of commonsense. Jevonian ideas have become commonsense.

Jevons provides a pretty exhaustive study of money, covering its functions, its history, and the issues of currency, coinage, and banking. The book begins with barter and lists what are termed inconveniences of barter. The next step shows that the use of money avoids these inconveniences. This effectively stops any further examination of double coincidence.

Jevons is an excellent logician and that makes his arguments compelling. Where he falls off the track, it is hard for his followers to get back on track. Let us see two aspects of his analysis of double coincidence to see how he went off the track. The first is its inconvenience as opposed to its improbability. The second is its presumed absence in monetized transaction.

INCONVENIENCE VERSUS IMPROBABILITY OF DOUBLE COINCIDENCE

The idea that barter is inconvenient compared to money is old. It is found in earlier writings of Smith (1776/1976), Say (1803), Mill (1909), and Walker (1866).

(2): "But when the division of labor first began to take place, this power of exchanging must frequently have been very much clogged and embarrassed in its operations. One man, we shall suppose, has more of a certain commodity than he himself has occasion for, while another has less. The former consequently would be glad to dispose of, and the latter to purchase, a part of this superfluity. But if this latter should chance to have nothing that the former stands in need of, no exchange can be made between them." Smith (1776/1976).

(3): ".... What infinite confusion and difficulty must arise.....were everyone obliged to exchange his own products specifically for those he may want; and were the whole of this process carried on by a barter in kind. The hungry cutler must offer the baker his

knives for bread; perhaps, the baker has knives enough, but wants a coat; he is willing to purchase one of the tailor with his bread; the tailor wants not bread, but butcher's meat; and so on to infinity." Say (1803).

(4): "The inconveniences of barter are so great, that without some more commodious means of effecting exchanges, the division of employments could hardly have been carried to any considerable extent." Mill (1909).

Jevons makes the statement clearer than earlier authors to articulate double coincidence:

(5): "The first difficulty in barter is to find two persons whose disposable possessions mutually suit each other's wants. There may be many people wanting, and many possessing those things wanted; but to allow of an act of barter, there must be a double coincidence, which will rarely happen." Jevons (1875).

(6): "We have seen that three inconveniences attach to the practice of simple barter, namely, the improbability, of coincidence between persons wanting and persons possessing; the complexity of exchanges, which are not made in terms of one single substance; and the need of some means of dividing and distributing valuable articles. Money remedies these inconveniences, and thereby performs two distinct functions of high importance, acting as— (1) A medium of exchange. (2) A common measure of value." Jevons (1875).

It is clear to Jevons that there is an 'improbability of double coincidence between persons wanting and persons possessing'. This apparently is the first inconvenience of barter. Who knows what might happen if this short-lived logician lived long enough to revise his writings. Improbability is not really inconvenience; but one may fall prey to heritage of using imprecise words. Jevons knows quite clearly that when barter is possible, which of course occurs rarely, it is gainful and not inconvenient at all.

(7): "Exchange has been called the barter of the superfluous for the necessary, and this definition will be correct if we state it as the barter of the comparatively superfluous for the comparatively necessary". Jevons (1875).

If exchange is the 'the barter of the comparatively superfluous for the comparatively necessary', then double coincidence must mean that in an exchange, the seller of the first good regards it as comparatively superfluous, that is, lower in utility compared to the payment (second good). In short, it is gainful. Menger holds the same view.

(8): "..... if command of a certain amount of A's goods were transferred to B and if command of a certain amount of B's goods were transferred to A, the needs of both economizing individuals could be better satisfied than would be the case in the absence of this reciprocal transfer" (Menger, 1981).

The logical question must be asked: If exchange is gainful as it barters 'the comparatively superfluous for the comparatively necessary', why is it regarded as inconvenient? We must conclude that barter is improbable, but not inconvenient. Double coincidence in kind is rare, but if it occurs, it is conveniently gainful. The danger is that one may not see the fundamental distinction between barter and indirect exchange in hence may not recognize (1) that under indirect exchange, the absence of double coincidence in kind is compensated by the presence of multiple coincidence in kind, and (2) that if multiple coincidence exists, it is possible to use money as a device to create artificial double coincidence.

As we study the literature, it becomes clear that the authors are confusing commodity money with barter. For example, in the simplest case of indirect exchange, there are three real goods. No two of them have double coincidence and yet all three of them together have triple coincidence in the specific sense that each good has both an offer and an acceptance in its kind.

Thus supposing that a farmer first sells his food against a piece of cloth, and then sells the cloth to buy medicine. It may appear as two-stage barter, but it is not barter. The cloth here is used as commodity money. Money is something that is bought without an intention to consume and sold without having produced it. It is bought just to serve as an intermediate payment. The critical point is that at each stage, there must be double coincidence. Thus at the first stage, there is double coincidence between food and cloth, and at the second stage, there is double coincidence between cloth and medicine.

In a more advanced economy with fiat money, the farmer sells food for money and then sells money for medicine, replacing commodity money (cloth) with fiat money. But it is still the case that at the first stage, there is double coincidence between food and money, and at the second stage, there is double coincidence between money and medicine. It should be obvious that the job of money is to transfer claims and obligations on real goods in an indirect exchange. If the farmer delivers food to the weaver, he has a claim on the real output of the weaver, but he wants to transfer this claim to obtain medicine from the aptekar. He gives the cloth to the aptekar to get the medicine. Money is necessary to achieve this transfer.

In the absence of the distinction between direct and indirect exchange, one confuses commodity money with barter and reaches the fallacious impression that double coincidence is not necessary when money is used.

(9): "The earliest form of exchange must have consisted in giving what was not wanted directly for that which was wanted. This simple traffic we call barter or truck, the French troc, and distinguish it from sale and purchase in which one of the articles exchanged is intended to be held only for a short time, until it is parted with in a second act of exchange. The object which thus temporarily intervenes in sale and purchase is money. At first sight it might seem that the use of money only doubles the trouble, by making two exchanges necessary where one was sufficient; but a slight analysis of the

difficulties inherent in simple barter shows that the balance of trouble lies quite in the opposite direction. " Jevons (1875).

The use of the term 'inconvenience' instead of 'improbability' makes it hard, and perhaps even impossible to recognize that double coincidence must be present when money is used, although this time, it is first between a real good and money, and then between money and another real good. We could generalize Jevons by putting the word money and changing 'rarely' into 'usually' in his passage as follows: (Changes are in bold):

(5* generalized by the present author): There may be many people wanting money, and many possessing money; but to allow of an act of barter between a real good and money, there must be a double coincidence, which will usually happen.

DOUBLE COINCIDENCE IN MONETIZED TRANSACTIONS

Once one thinks of how money overcomes the alleged inconvenience of barter, it requires a difficult and perhaps impossible mental gymnastic to switch to the idea that double coincidence must be present even when money is used. One apparently feels no need to show how money itself changes hands, presumably because it is obvious. The literature is obsessed with the issue of why people will accept (fiat) money, but quite forgetful of the issue of why they will offer it. Perhaps it is presumed that people of course do not consume money, but spend it. Indeed, they take it if and only if they believe that they can spend it. But this is incompatible with the idea of money as a store of value, although most formal models of money are models of a store of value. If Money is a store of value, why spend it?

The Keynesian revolution and the rise of macroeconomics would be wholly unnecessary if the issue of spending money (i.e., supply of money) was properly formalized earlier. Having regarded double coincidence as an inconvenience instead of as a necessity, the train of thought wanders off into an intractable territory because at this point, the connection between money and exchange is forgotten. Even though everybody knows that money circulates, somehow nobody feels a need to consider the circuit in which it circulates. The essential function of money as a medium of exchange is dismissed as not worth stating. The distraction leads to three lines of enquiry, all away from the essential function of money and all adding to confusion.

First, the issue of how money might have arisen endogenously from an earlier state of barter leads to the (fallacious) Austrian theory of spontaneously originating money. The second issue is the function of money as a numeraire or measure of value or unit of account, leading to the (fallacious) quantity theory of money, monetarism, and Lucasian superneutrality of money. The third is the issue of money as a store of value, leading to the (highly problematic) Keynesian theory of money and subsequent developments. These are all off the track digressions that indeed contradict the role of money as a means of payment. All three issues are still being debated.

REDISCOVERING THE OBVIOUS

Let us go back to the basic issue of money's essential function as a medium of exchange to see how the three sets of issues mentioned above are resolved. In this section, we consider some basic elements for formalizing the issues. After that, we successively consider the evolution of money, its role as a measure of value, and as a store of value.

Let us begin with the most obvious fact of exchange- the buyer pays the seller. From that, we consider four mutually exclusive situations requiring four mutually exclusive types of payments, money being one of the four. This taxonomy is of critical importance, because money has been confused with all of them. Once we have categorized the four exchange scenarios, we can identify the issues pertinent to money as a means of payment.

We may formally define an exchange as a set of real goods that pay for each other. The most basic case involves just two real goods in a direct exchange or barter. Since each traded good has two different agents associated with it, the first being the producer/seller and the second being the consumer/buyer, let us use the letter x to denote a real good, its first subscript denote the producer and the second subscript denote the consumer. Between the agents j and k, the direct exchange is

$\mathbf{x}=(x_{jk}, x_{kj})$

A special form of direct exchange is an intertemporal barter between a current good and a future good. Suppose a superscript denotes the period (0 for current, 1 for future). Then the intertemporal exchange between (j, k) is denoted by

$\mathbf{x}=(x^0_{jk}, x^1_{kj})$.

However, to balance payments in each period, the borrower produces a bond f^0 to give to the lender as current payment, which is redeemed in the future period. Thus the bond splits the intertemporal barter into two exchanges (where f1 is f0at the time of redemption):

$$\mathbf{x}^0=(x^0_{jk}, f^0)$$

$\mathbf{x}^1=(f^1, x^1_{kj})$

The bond is a store of value, and most models of money are models of bond. There is a possible root of confusion between money and bond, because the use of money also splits the exchange between two real goods. Suppose that j sells the real good to a customer k, and buys a real good from a supplier i. Then the two real goods are $\mathbf{x}=(x^0_{jk}, x^0_{ij})$. It is split into $\mathbf{x}^0_k=(x^0_{jk}, m^0_{kj})$ and $x^0_i=(m^0_{ji}, x^0_{ij})$ where m is money and x is good. All goods and money belong to the current period unlike the bond. Money involves a transport (transfer) of value, and not storage of value. There is no need to add a time superscript. Agent j faces $\mathbf{x}=(x_{jk}, x_{ij}) = [\mathbf{x}_k = (x_{jk}, m_{kj}) + \mathbf{x}_i = (m_{ji}, x_{ij})]$.

A degenerate form of exchange occurs when the buyer is identical to the seller j=k. In that case, exchange degenerates into subsistence involving just one good that pays for

itself. It is interesting the much of prevailing microeconomics is true only for this degenerate case. If genuine payment is introduced, much of prevailing microeconomic theory breaks down.

Let us now consider indirect exchange. Walker (1866) wrote:

"For example, the farmer may wish to exchange wheat for a hat; but the hatter is already supplied: what, then, will the hatter accept? A table. The farmer must then go to the cabinet-maker, and offer his wheat for a table. But the cabinetmaker is supplied with wheat. He would, however, accept a pair of boots. The farmer applies to the boot-maker, who happens to wish for wheat and accepts the offer. With the boots the farmer gets the table, and with the table gets the hat which he desired. In such a state of things, this was the only process by which exchanges could be effected; circuitous, and expensive in time and labor, as it was. We might have supposed a far more difficult case; but this is sufficient to illustrate the inconvenience of barter, or the direct exchange of commodities. But there is still another difficulty, of scarcely less magnitude. When articles to be exchanged became numerous, it would be found a very intricate matter to establish satisfactorily the relative value of each" (Walker, 1866).

Walker wants 'to illustrate the inconvenience of barter'. He does not care to distinguish between direct exchange, in which money is neither necessary nor possible, and indirect exchange in which money is both necessary and possible, provided there is a complete circuit of payments.

Walker misses the highly significant implications of his example, nine of which are listed below. There is no sign that this example inspired later generations to study the implications. The next known example of a complete indirect exchange appears in Wicksell (1901/1977), but no implications of indirect exchange are discussed. That is, there is no useful model of indirect exchange known to this author. Mises (1949) devotes a whole chapter to indirect exchange, but without giving any formal clue to the need for a complete circuit. Marx (1977) considers an incomplete circuit. But nobody explains precisely what makes money necessary.

DISTINCTION BETWEEN DIRECT AND INDIRECT EXCHANGE

To distinguish indirect exchange from direct exchange, the first thing to note is that in an indirect exchange, the first individual sells the real good to the second individual (customer) and buys the intended real good from the third individual (supplier). Double coincidence can now be seen as the condition under which the second individual is both the customer and the supplier.

Let us show Walker's example with a graphical circuit. There are four real goods for each of which demand is equal to supply. Walker's discussion explicitly shows the direction of movement of the goods. The opposite direction of movement of money is not implied, but may be added without contradiction.

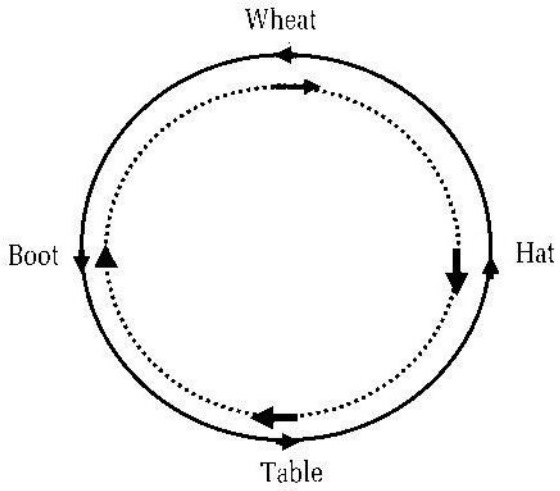


Figure-1: Walker's Payment Circuit

In the graph above, wheat pays for boot, boot pays for table, table pays for hat, and hat pays for wheat. The outer circle shows the direction of movement of goods. Money flows in the opposite direction of the goods, as shown in the inner circle.

Let us consider the matter from the viewpoint of the farmer. We look at the upper part of the graph. The farmer's customer is the cobbler and the supplier is the hatter. When money is used, as shown by the solid inner arrows, the farmer receives money from the cobbler and pays the hatter with money, while he gives the wheat to the cobbler and gets the hat from the hatter. If barter were possible, he would get the hat and pay with the wheat, and would neither receive money nor give it.

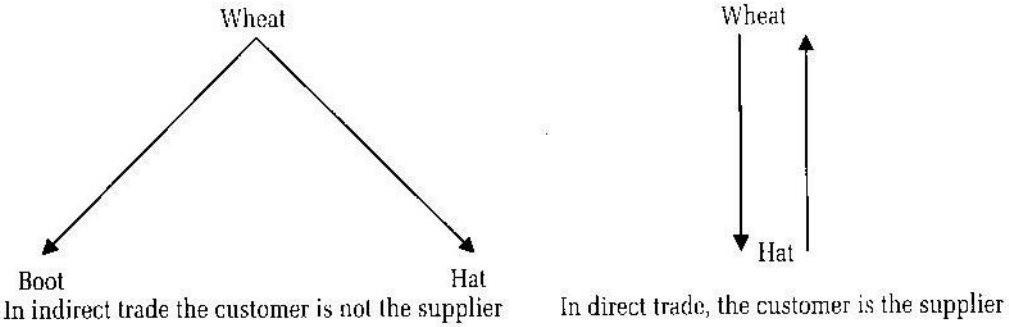


Figure-2: The Customer and the Supplier

The key distinction is that in direct exchange, the customer is also the supplier, but in indirect exchange, the customer is not the supplier. The problem is to find out why the hatter would accept money against a real good, namely, what would he get for his hat in real terms? Again, where does the cobbler get the money from or what happens to his boots? These questions about demand and supply of money at the micro level have not been answered by the literature. We must find the answers.

COMPLETENESS OF THE PAYMENT CIRCUIT

The critical next step is to consider the circulation of money. We have so far presumed that the farmer gets the money from his customer- the cobbler. But the cobbler himself had to sell his good to get the money. In Walker's example, the cobbler's boots would be sold to the carpenter. But the carpenter had to get the money from his customer- the hatter. And where would the hatter get his money from? His customer is the farmer, who, as we have just seen, does not have the money unless he gets it from the cobbler. The literature is unaware of this problem, and hence it cannot deal with market clearing.

The quotation from Say suggests that he did not think much about completing the circuit. In his example, the cutler wants bread, but the baker wants a coat, the tailor wants meat and so on ad infinitum. This is an exaggeration to magnify the inconvenience of barter, and not an analysis of indirect exchange and the use of money. The idea of 'exchange ad infinitum' is certainly false.

Marx (1977) took the issue of money seriously. He uses the term circuit to a single agent's action of selling a commodity C, getting and spending money M, and buying a commodity C. As far as one individual is concerned, the sequence C-M-C (commodity-money-commodity) and its obverse M-C-M (money-commodity-money) may look like a circuit. But it is not a complete circuit. These incomplete circuits cannot tell us about the customer's source of money and the supplier's destination of expense.

Why is it important to learn about the complete circuit? Unless the circuit is complete, no trade can take place and no money can circulate. Suppose that the cobbler is absent in Walker's example. In that case, wheat lacks demand and the boot lacks supply. The farmer cannot sell (to the missing customer) and consequently cannot buy. The carpenter cannot buy (from the missing supplier) and hence has no reason to sell. Though the hat has demand and supply, and the hatter has both a customer and a supplier, he is also disabled because his customer has no money and his supplier has no reason to sell. Only when the cobbler joins the gang do we have demand and supply for every good.

Supposing that demands and supplies exist for every good, it is still necessary that money must be used as the means of payment. Thus supposing once again that the cobbler has no money, so he cannot give it to the farmer, who in turn cannot give it to the hatter, who in turn cannot give it to the carpenter, who in turn cannot give it to the

cobbler. But if the cobbler has money, then the 'cannot' becomes 'can' in the above example: Thus supposing that the cobbler has money, so he can give it to the farmer, who in turn can give it to the hatter, who in turn can give it to the carpenter, who in turn can give it to the cobbler. It is critical that the money must return to its point of origin. It is just like an electrical circuit: unless it is complete, the electron cannot flow.

IMPOSSIBILITY OF BARTER AND NECESSITY OF MONEY

It must come as a shock that just when demand is equal to supply for every good under indirect trade, no trade can occur unless money is used. The trouble in indirect exchange is that the customer of the real good (the cobbler) has an obligation to deliver his own real good, not to his supplier (the farmer) but to somebody else (the carpenter) on behalf of his supplier (the farmer). Likewise, the supplier of the real good (the hatter) has a right to receive a real good in payment, but not from the customer, but from somebody else (the carpenter) on behalf of the customer (the farmer). In the example, the carpenter receives the boots on behalf of the farmer, and delivers the table, again on behalf of the farmer, even though it is not at all transparent if we look only at the incomplete Figure-2.

The key is that there is a transfer problem: the obligation of the customer to deliver a real good is transferred to the supplier, and the claim of the supplier is transferred to the customer. Money is the instrument to achieve this transfer. Without the use of money, this transfer is not possible. In Figure-3, the customer's real good (the boot) goes to the supplier of the hat through a chain of transfer. Any break in the chain will stop the transfer and hence no trade will occur.

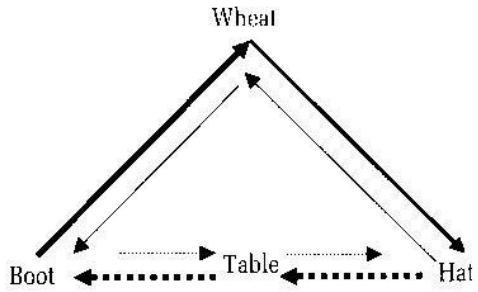


Figure-3: The Transfer of Claims and Obligations

Despite the presence of demand and supply for each good, no barter is possible because there is no double coincidence. Money creates an artificial double coincidence to solve the problem. The farmer does not really want to consume money, and his demand for it is artificial. He buys money pretending to prefer money to his real good. Next, he is not the producer of the money, and yet he creates an artificial supply. He

sells money to his supplier. This is true for any money- be it commodity money or fiat money. In Walker's thinking, the farmer would use the boot and the table as commodity money in succession. But if fiat money was available at a lower transaction cost, the farmer would use fiat money, taking it rather than the boot from the cobbler, and giving the money rather than the table to the hatter.

The necessity of money as a means of payment should settle the issue of neutrality of money. If money is a necessary means of payment, it cannot fail to affect the output that must be traded against it. The key is that the lack of money cannot be overcome by resorting to barter, because barter is impossible. Money is not a more convenient alternative to barter: these are mutually exclusive means of payment. If barter is possible, money is impossible; and if money is possible, barter is impossible. This should conclusively disprove the claim of neutrality of money and make classical and new classical macroeconomics obsolete.

INTERDEPENDENCE OF DEMAND

The payment circuit makes it graphically clear that the demand for each good depends on the demands for every other good in the circuit. Thus the demand for the wheat depends on the demand for the boots, which in turn depends on the demand for the table, which in turn depends on the demand for the hat, which depends on the demand for wheat. In barter, the demand for the first good is dependent on the demand for the second good.

The interdependence of demand is fatal to the most sophisticated piece of prevailing microeconomic theory. The Walras-Arrow-Debreu general equilibrium model postulates a set of independent demand functions. But if the demand functions are dependent, no solution is possible with a simultaneous equations system. This is a major blow to prevailing microeconomics in general and theory of value in particular.

TRANSMISSION MECHANISM

The payment circuit shows that there is a mechanism to transmit the instability. If the farmer fails to get money for wheat, he fails to demand the hat, and the hatter fails to demand the table, and the carpenter fails to demand the boots. If there are n goods in the circuit, then the failure of the 'effective' demand for one good disables the 'effective' demands for all other goods. There is a multiplier effect, and this effect is the core of the theory of business cycle.

Let us imagine what might have happened if J B Say did not really suppose that the cutler's supply of knives was not met with demand for knives, especially as he has been credited with the loose statement that supply creates its own demand. Suppose that in Say's example, the cutler wanted the bread, the baker wanted the coat, the tailor wanted the meat, but the butcher wanted the knives. In other words, suppose he took Walker's

example. Then it would be impossible for him to say that supply creates its own demand, because he would then be compelled to recognize the need for money and the multiplier effect of not using money on the demands. He would have come to the conclusion that the presence of demand and supply is only half of market clearing. The other half is the use of money under indirect exchange. But he did not think in this way. For two centuries, Say's Law missed the issue.

The Keynesian revolution would be unnecessary if the payment circuit was recognized earlier. Then it would be known that involuntary unemployment is inevitable unless money transfers the claims and obligations on real output, namely, to clear the market. The length of the circuit would also easily measure the magnitude of the multiplier effect.

In retrospect, the lack of the formal payment circuit meant that half of market clearing was hidden from view. Let us now use the two distinct terms 'ability to buy' and 'ability to pay' so that we can reinterpret Keynes. When a prospective buyer has some real good ready to deliver, and whose market value is equal to the value of intended purchase, the agent has the ability to buy. The farmer has enough wheat to buy the hat. However, the ability to pay is a different thing. It exists when the buyer has the right kind of payment as required by the seller. The hat's supplier does not accept wheat in payment for the hat, but requires the table, and the farmer must somehow manage to deliver a table to the hatter. Unless he can get money, he cannot achieve the transfer of his obligation to deliver a table to the hatter. The term effective demand is not a good one, but the intent is to say that demand is not made effective until money is used. We may say that the buyer must have both the ability to buy and the ability to pay. The ability to buy must be converted into ability to pay by getting money for the good. Money converts the ability to buy into ability to pay.

In the Keynesian argument, there is something wrong with the price either of labor (in money illusion) or of capital (in liquidity trap) so that equilibrium is not reached. The distinction between ability to pay (correct price) and the ability to buy (correct means of payment) shows that there is nothing wrong with price behind unemployment. When cash does not move, goods do not move, and hence jobs are lost. It has nothing to do with the real or nominal price at all.

MULTIPLE COINCIDENCE

For a sharper presentation, we should clearly distinguish between the quantity and the kind of payment. Let us reserve the terms demand and supply to refer to the quantities while the terms 'acceptance' and 'offer' refer to the kinds. Then associated with the presence of demand and supply of every good in a circuit, we need to add the condition that each one of the several good has both offer and acceptance. This condition may be called multiple coincidence.

Let us clarify the terms offer, acceptance, and coincidence. These refer to the kind

of the good, not the quantity. The seller of a good accepts a payment while the buyer offers a payment. Just as the consumer maximizes utility by choosing the quantity, the seller maximizes utility by choosing the kind of payment. If there are several kinds of goods all available in payment for the seller's good, he chooses the one with the highest utility. Similarly, just as the seller minimizes cost by choosing the quantity of output, the buyer minimizes his sacrifice by choosing the kind of payment. Thus if the buyer has several kinds of goods each of which is equally acceptable in payment to the seller, he chooses the one with the lowest utility to him.

When one good has both offer and acceptance, the condition is called single coincidence. If the offer of the first good against the acceptance of the second good is matched by a reciprocal acceptance of the first good against the offer of the second good, there is double coincidence. When each of several goods has single coincidence, and it is possible to arrange them in a payment circuit, then there is multiple coincidence. Indirect exchange requires multiple coincidence. If and only if there is multiple coincide, it is possible to create artificial double coincidence. Money cannot repair the lack of offer or acceptance. It creates artificial double coincidence only if each good has both offer and acceptance.

CREATION OF ARTIFICIAL DOUBLE COINCIDENCE

Money creates an artificial double coincidence to achieve a transfer of real goods. In Walker's example, the farmer creates double coincidence artificially by first buying the boot with the wheat, and then selling the boot to buy the table, and then selling the table to buy the hat. The purchase of something without an intention to consume it is an artificial demand, just as the sale of something without being its producer is an artificial supply. The farmer neither produces nor consumes the boot, and yet he buys and sells it. He does this to achieve a transfer of goods.

The use of commodity money is generally mistaken for barter. We should note that an outsider may not perceive that the farmer is really not bartering his wheat for the boots, but he is trying to get the hat for the wheat. He is using the commodity to transfer the claims on real output, in this case, literally. However, using commodity money imposes high transaction cost. If a cheaper method is found, such as fiat money, the farmer would resort to using the fiat money.

Ultimately, double coincidence simply means that the buyer pays the seller. But of course the payment must be both of the right quantity and of the right kind. The use of money is designed to deliver the right kind of payment through a transfer of claims on real output. The market of indirectly traded goods cannot clear unless this is done. The phenomenon of business cycle cannot be understood until the market-clearing role of money is recognized clearly.

SEIGNIORIAL ENTREPRENEURSHIP

The creation of money requires seigniorial entrepreneurship. Walker's farmer does not intend to consume the boot, yet he buys it. If he were to consume the boot, he would suffer loss of utility. This act is therefore not optimizing behavior. The act of buying something without an intention to consume is an entrepreneurial one. It bears risk of loss, and also carries the prospect of pure gains. The farmer bears the risk in the hope that he can gain utility by getting the desired hat.

This entrepreneurship of course requires the ability to manage payment by conducting a transfer of claims and obligations. Echoing Menger, we may say that "if the individual (a) recognizes the situation, and (b) has the power actually to perform the transfer of the goods' then he can turn a commodity into money or better yet, create fiat money out of thin air. The entrepreneurial element in the creation of money is fundamental to a theory of money. Menger contradicts his own subjectivism to fashion a theory of marketability of real goods rather than recognize that the seigniorial entrepreneur turns any commodity into money by buying it without intention to consume and by selling it without producing.

EXCESS DEBT

A surprising revelation is that just when each individual has budget balance in real terms and hence has no need to borrow, one of the agents must borrow money in the first instance. This money debt is an excess debt. It is unavoidable, because a real good must be converted into money before its owner can lay claim on the desired good in its exchange. We see that outsiders must issue fiat money, and only as credit. If ordinary producers and consumers could create money endogenously, there would be no occasion for excess debt or business cycle.

This has enormous practical significance to deal with the real problem of debt of developing nations and of ordinary people. The circulation system must be reformed to match the supply of money to the need for money, and to reduce burden of seigniorage fee (commonly misnamed interest rate). There is a need to reconsider the idea of money as a bond. If an ordinary person sells something to get money, and then buys something with money, is he either a lender or a borrower? And is he storing money or a good? How is money a store of value in this picture?

THE EVOLUTION OF MONEY

Unless one recognizes how money creates artificial double coincidence by serving as a device to transfer claims on real output, one cannot hope to study the emergence of money from a state of its non-existence. One must see the essential job of managing the transfer of claims and the entrepreneurship involved in performing this managerial action.

As we see it, the emergence of money is illustrated by Walker's example of the enterprising farmer. It is important to stress that the farmer is not behaving as an optimizer when he undertakes to convert the boot and then the table into commodity money. An optimizer does not buy what he does not consume, and he does not sell what he does not produce. An entrepreneur buys what he does not consume, and sells what he does not produce. Their motives and constraints are different. Without this distinction, creation of money cannot be understood.

The literature on the emergence of money overlooked the essential role of money as a device to transfer claims on real output. The notions of marketability and endogenous money expose two major flaws in the prevailing literature on the genesis of money. Both of these notions overlook the seigneur's role in the creation and issue of money as a tool.

MARKETABILITY

The concept of marketability is a quest for the concept of acceptance. It is a matter of kind. All traded goods must have demand and supply, and it is not likely to help if we think of some goods as having an extra demand not for consumption but for the purpose of serving as a medium of exchange. That begs the question: why would some good have additional demand as a medium while other goods would not? The problem is vexed by the history of use of a wild variety of real goods as commodity money.

If one saw a payment circuit, one would see that any good could serve as commodity money depending on who the entrepreneur is. One paradoxical quality of the commodity money is that it must neither be produced nor be consumed by the agent who intends to use it as money. In Walker's example, the cobbler could use the table and the hat as commodity money; but he could use neither the wheat (he consumes) nor the boot (he produces) as money. The farmer cannot use wheat or hat as money, but he can use the boot or the table.

The concept of marketability completely ignores the very creators of the market who started indirect trade. Without traders, there would be little trade. So long as barter alone is possible, there is no real market. Neighbors may engage in barter, but it is likely to remain a very rare occurrence. Lending and borrowing would be a lot more frequent.

The emergence of organized trade must be supposed to begin with the emergence of organized traders, and this occurs only for indirect exchange. This is a very different story than the idea of spontaneous emergence of money without any organized effort to promote particular goods as commodity-money. The spontaneous emergence story sounds as if individuals went door-to-door in search of finding marketable goods. How did marketplaces, fairs, shops and organized trade begin in that case? But if we suppose that some people took it upon themselves to become merchants and thereby created the new institution of the market, it becomes simpler to tell. Merchants have great need to select means of payment to minimize the transaction cost of doing business, and high stakes in developing a convenient medium of exchange. If we pursue this line of inquiry,

we are likely to tell a more coherent and historically more accurate story of the evolution of money as a device to clear the payments.

ENDOGENOUS MONEY

The idea of endogenous money risks missing the issue of medium of exchange altogether and ending up with a bond (store of value). Ordinary people can certainly save, and they certainly want to build up stores of value. But a store of value as such cannot become money, first because a store is not spent, and secondly because the debtor's liability cannot be transferred.

The fundamental problem of money is the problem of managing the transfer of claims on real output. This management cannot be done without managers. An external senior is able to provide the management, but ordinary producers and consumers cannot. Thus suppose that the producer of a generally acceptable good is able to buy anything with it. Then he is doing barter with ease, a rather uncommon experience of course, but it is still barter. The buyers consume the good and there is no question of it circulating. Again, a consumer just consumes the good and it just cannot remain money, it cannot even remain a good: it simply vanishes.

How can money arise then? It must be issued by an outsider, and only as a loan. In Walker's example, the farmer may be said to lend his wheat. He gives it to the cobbler for boots, then converts the boot into a table, and at last buys the hat with the table. The time that lapses between his delivery of wheat and his receipt of the hat is the time he waits, as if he is lending his wheat. If he refuses to lend wheat in this sense, he cannot create money. To initiate the transfer, somebody must take the first step of giving away something without immediate receipt of the desired good. But that has nothing to do with storing value.

One possible way for a merchant to start commodity money is now easy to see. Suppose that the farmer has a huge superfluity of wheat, which he cannot possibly consume. Let us suppose that he wants to use this as his capital to run a business. What business is there? He could lend wheat, and agree to take anything the debtors could give him in repayment. Suppose we change Walker's story by taking it back a few thousand years. The farmer lends wheat to the cobbler, the carpenter, the smith, the potter, the hatter, the tailor, and other assorted producers. And he receives all kinds of goods in repayment, because it is always easier for a debtor to redeem his debt in his own produce than in the produce of somebody else.

Let us imagine that the cobbler is not exactly good at producing wheat, and hence tries to pay back his debt in boots. The farmer does not need either the boot or the wheat, but he accepts the boot. In course of time, the smith asks him if he would part with the boots for some iron products, say nails. The farmer is now a merchant, and does not consume any of the goods he buys. But he agrees to take nails in exchange for the boots, and puts the nails on sale. It is not hard to see that by using wheat as a

capital, he is able to collect an assortment of all kinds of goods, and he wants to consume none of them. So he effectively buys and sells everything.

Anything that is bought to be sold again is commodity money. The farmer has a wide variety of commodity money. But he has the largest stock in wheat, and it is best for him to turn wheat into the common means of payment for anything he has. At the least, he may measure value in wheat. Now suppose that the hatter does not need wheat, but needs the table. He comes to the farmer-merchant. The farmer agrees to buy the hat, and offers to pay in wheat, with the promise that he will take back the wheat for any good the hatter may wish to buy. Eventually, the hatter buys the table with wheat. General acceptability has nothing to do with the wheat becoming the common medium of exchange. The readiness of the lender to accept it in settlement of debt is the first requisite and the readiness of the merchant to accept it in payment for anything is the foremost requisite of it. And the early merchant could hardly begin a career as a merchant without being a lender in the first place. The first and the foremost could mean the same thing: accept payment or repayment in some chosen commodity.

The issue of lending is relevant. The presence of a lender is a necessary background to assure the availability of the good that is to become money. Wheat would not become money just because people would spontaneously suppose that everybody would more or less readily accept wheat in exchange for any kind of good. Why? Wheat is also likely to be produced by almost everybody. It would become money if the prominent lenders, acting as a single lender in the extreme case, agreed to accept wheat in settlement of debt. In contrast, precious metals are not generally available, and would hardly be generally acceptable to ordinary people. Ordinary people were very unlikely to use gold and silver as ornaments, unless we forget that they did not even wear much cloth a few thousand years ago. In short, metals could not become money just because everybody took them. The hand of the merchant must be seen behind its use as money.

Lending and borrowing is more likely than not to precede indirect trading. It is of course an empirical issue and fresh research is needed to find out the role of merchants in the creation of money vis-à-vis the occurrence of spontaneous emergence. If we remember that until about half a millennium ago, the vast majority of people were peasants who strived to produce everything they needed except artisanal goods, medicaments and minerals they just could not produce, the picture of the atomistic individuals spontaneously choosing one good over another would seem less likely. Land was owned socially and administered by various forms of feudal politics.

The rise of commerce did not probably occur because of the prior atomistic ownership of land as the principal factor of production, but the causation might go the other way. The rise of commerce may have atomized agriculture by breaking down the power base of the feudal aristocracy. In part, that is because the richer landlords would be lenders who ended up with repayments in every sort of products and set up merchandising operations to dispose of the various receipts.

Though the state did not create money, its choice of the product to be accepted in

payment of tax certainly favored one over another commodity to become more widely used. If the king took silver, so did his subjects. Deliberate promotion of one good over another as money is possible.

For the modern age, there is no question that fiat paper money is not endogenous. It is exogenously supplied by the banking sector acting as a single body. This dramatically changes the story of how money is supplied. The quantity theory of money apparently thinks of money as a numeraire that people can assign without any trouble. Friedman's vision of helicopter money suggests that somehow people can simply increase their cash balances simultaneously in the same proportion (Friedman, 1969). The Lucasian vision of rational agents (Lucas, 1972) also appears to include the ability of the agents to change the stock of money at will. But if we allow that money is supplied by an external supplier, and according to considerations of lending risk based on some assessment of borrower trustworthiness and project feasibility, the story becomes very different. In that case, cash balances do not suddenly change for everybody, but money travels in a payment circuit so that's some people have more cash earlier than others. The external supplier is able to manipulate the cash constraint and the ordinary people can do nothing about the constraints. If we consider the sequence of flow of cash in a circuit, and the effect it has on the demands, supplies, and prices as it circulates, the study of market clearing becomes dramatically different. Business cycle theory, monetary theory, and macroeconomics cannot remain the same if the concept of payment circuit is used.

Money is endogenous also in the Keynesian theory (Keynes, 1936). Here, ordinary savers are supposed to save money. The extremely complicated explanation of how the flow of money is impeded by liquidity traps could be avoided if we supposed that external suppliers of money may change the money supply abruptly according to their animal spirits.

MONEY AS A NUMERAIRE

When double coincidence is overlooked, one does not have a formal model to see money as a medium of exchange. Then the digression is to think of money as a unit of account or numeraire. Of course prices in a monetized economy are quoted in money. Theory of money ought to be a part of theory of payment because money is a means of settling payments, but it becomes a part of theory of price. The quantity theory of money is not really a theory of money at all, but it is a theory of price. It is concerned with explaining the general price level.

Had there been a formal model of payment, one would have defined price as the quantity of payment. Now, if the payment is in money and its supply increases without any increase in the supply of real goods, then the price counted in money of course goes up by definition. The crux of the problem is to find out how money supply could have increased or decreased without a change in the supply of real output, but the quantity

theory tradition did not consider the supply of money as a means of payment at all. Supply without a supplier has no useful meaning.

MONEY AS A STORE OF VALUE

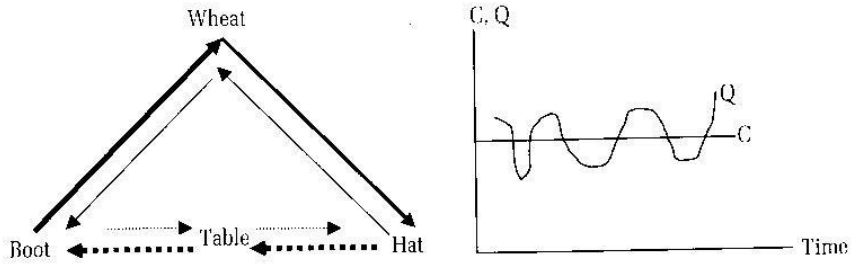
Let us quote Jevons on the use of money as a store of value.

(10): "It is worthy of inquiry whether money does not also serve a fourth distinct purpose—that of embodying value in a convenient form for conveyance to distant places. Money, when acting as a medium of exchange, circulates backwards and forwards near the same spot, and may sometimes return to the same hands again and again. It subdivides and distributes property, and lubricates the action of exchange. But at times a person needs to condense his property into the smallest compass, so that he may hoard it away for a time, or carry it with him on a long journey, or transmit it to a friend in a distant country. Something which is very valuable, although of little bulk and weight, and which will be recognized as very valuable in every part of the world, is necessary for this purpose. The current money of a country is perhaps more likely to fulfill these conditions than anything else, although diamonds and other precious stones, and articles of exceptional beauty and rarity, might occasionally be employed." Jevons (1875).

It is interesting to note that Jevons applies his logical sharpness to see that serving as a store of value is an incidental function of money, not its essential or first function as a medium of exchange. Suppose that money does not serve as a means of payment. Can it then serve as a store of value? The answer is obviously negative. But most models of money are models of a store of value, and not of a medium of exchange at all. Even Baumol's model of transaction demand for money ends up with storing cash balances as stores of value (Baumol, 1952). The key question of why money is used in transactions in the first place is not discussed.

Let us distinguish between money and bonds as mutually exclusive means of payment. First, in an indirect exchange, there is a problem of transferring current claims on current output, and it has nothing to do with lending or borrowing as such. If the farmer pays the hatter with money, he is neither a lender nor a borrower. He gives money as a device to enable the hatter to get the table in exchange for the hat indirectly.

But intertemporal exchange is a completely different thing. Let us imagine that the farmer and the hatter trust each other. They both try to keep a steady flow of consumption over time, but their production is unsteady. At some points, the farmer has more wheat than he can use and is glad to lend the excess to the hatter. At other times, the farmer has a smaller supply of wheat than he needs, and the hatter procures wheat from somewhere and settles his debt to the farmer. The essence is that lending and borrowing is a method of balancing the flow of production (Q) with the flow of consumption (C). Time lapse is the essence here. But time lapse is not the issue in indirect exchange.



Money for Transfer of value in one period Bond for store of value over many periods

Figure-4: Money versus Bond

The distinction between bond and money is crucial for making progress in monetary theory, business cycle theory, and macroeconomics. The first distinction is that a bond cannot become a medium of exchange, but a medium of exchange can become a bond. The problem is that a bond is essentially a barter, which excludes the use of a medium of exchange. This is because the debtor cannot transfer his liability to somebody else. One who pays with the bond is a debtor in the current period and has no real output to deliver, and hence cannot persuade somebody else to deliver the compensation to the creditor on his behalf. But one who pays with money has a real output to deliver in the current period, and can persuade his customer to compensate his supplier on behalf of him. If the farmer pays the hatter with money, he is neither a lender nor a borrower. The money enables the hatter to obtain the table delivered on behalf of the farmer. This is not possible if the farmer issued a bond, having no wheat to deliver to the cobbler. In short, the bond could not circulate as a means of payment. However, if a medium of exchange is hoarded, it can be used later.

The theoretical issue for business cycle is to identify the source of the propagation of the instability. The bond has no transmission mechanism associated with it, but money has. Let us suppose that the lender fails to lend, so that his borrower fails to borrow. This of course keeps one lender and one borrower unable to fulfill their lending and borrowing plans, but it cannot affect anybody else. But money necessarily carries a transmission mechanism with it just because it is a device to transfer claims on output. Let us use Walker's example with a Keynesian twist to see the transmission problem.

We suppose that Mr. Bagehot of Lombard Street is a lender of gold coins. Each period, he lends one coin to the trusted nobleman Mr. Farmer, who buys a hat, and the hatter buys the table, and the carpenter buys the boots, and the cobbler buys the wheat, and then Mr. Farmer returns the coin to Mr. Bagehot, with a suitable interest in a sack of wheat. However, Mr. Bagehot has seen some of his debtors fail recently, and is not

optimistic about the future. He refuses to lend the coin this time. No haggle on interest is enough to persuade him. Despite all demands and supplies of real goods remaining as intact as before, all trades stop. It has nothing to do with saving and investing or the distinction between consumer good and capital good. The same story holds if Mr. Farmer refuses to borrow, because he does not care about buying the hat this period. The disappearance of the demand for one good takes away the demand for all other goods in the circuit through the interdependence of demands. It does not matter if the hat is a consumer good or a capital good. In short, the propagation of instability is possible only under indirect exchange as money carries the transmission mechanism. Instability cannot spread under barter or in intertemporal lending and borrowing.

CONCLUDING COMMENTS

If we recognize that the buyer actually pays the seller, then we must agree that there is double coincidence. If the seller wants money rather than the particular kind of good the buyer is able to deliver, this is because the money is a device to enable the seller to get the kind of good he wants. Unless money is used, indirect trade cannot take place.

The recognition of the role of money as a necessary instrument of market clearing under indirect exchange must change economic theory fundamentally. We will mention a few of the changes in the theoretical outlook.

UNIFIED ECONOMICS

To find why and how money is both earned and spent, we must to look at the sales and purchases at once for each household. This is most easily done with the input–output table. But this also unifies micro and macroeconomics inseparably. If we describe the entire set of exchanges of real goods of all n different kinds by an input-output table, then price theory and monetary theory become essentially the same theory of payment in which the relations between the quantities of traded goods appear as prices while the relation between the kinds of goods appear as means of payment. Economic theory itself becomes a theory of trade, and there is just no need for a separate theory of international trade or of international finance.

INVOLUNTARY UNEMPLOYMENT AND NEEDLESS POVERTY

The recognition of double coincidence as a necessary condition of trade in addition to the equality of demand and supply at equilibrium prices offers a simple theory of involuntary unemployment. Under indirect exchange money is necessary to permit market clearing. Even when demand and supply is equal for every good in the payment circuit, no indirect trade can occur unless money is used. Indirect trade covers perhaps no less than 95% of all trade.

Involuntary unemployment or real business cycle is impossible under subsistence or barter, namely, when real goods suffice to serve as means of payment. If the employer can pay the worker with the employer's own output, which is really the output of the workers, there is no reason for unemployment to occur. But if the employer cannot pay the worker with real output, because the worker wants to consume other kinds of goods that the employer is unable to deliver, then unemployment is inevitable unless the employer has money to enable the workers to get what they want. Presence of demand and supply of labor at the correct wage is not enough to ensure employment; the workers must also be paid in money. Keynesian confusion about workers demanding money wage rather than real wage must be avoided.

Poverty is the result of involuntary unemployment. Let us distinguish poverty from dependence, and inequality. If a person has no productive ability, he is dependent on the mercy of others, especially the family, but he is not poor. If one wants to do work that nobody wants to pay him to do, that person lacks a marketable skill and is not unemployed, but unemployable. If he has lower productive ability compared to others, he is of course not as rich as the others; but that is not poverty, but inevitable inequality. These cases of lack of ability and low productivity are structural factors that must be remedied structurally by training the worker or equipping him, or in case of dependence, supporting him with family or social support.

True poverty is relative to the potential income. It occurs if one has the productive ability but he cannot use it. This happens if he is unable to get and use money to complete the transactions; he is involuntarily unemployed despite the presence of demand and supply of labor. The inability to get money may occur owing to the perversion in circulation of money, as discussed below.

LONG AND SHORT CIRCULATION

The thick volumes on banking and multiple credit creation have ignored the sordid fact that very large numbers of people are unable to get the proper amount of money and at the proper time. Even in a world awash with fiat money, and plagued by inflation, unemployment is the result of lack of necessary money. To see this, we must consider the circulation of money. A distinction between short and long circulation will reveal the source of tragedy. A short circulation system, unknown in practice except in case of commodity money, is the situation where one unit of money is used only once. In contrast, a long circulation regime uses the same money many times. Long circulation spreads instability, short circulation does not.

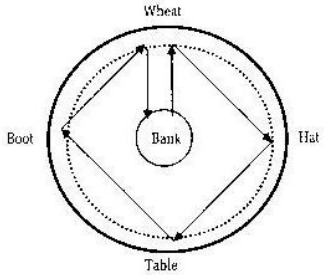
To see the fundamental difference, let us take the Walker circuit. Suppose that the farmer borrows a unit of fiat money (of the same value as the wheat, the hat, and the boots), and uses it to buy the hat. He of course receives money from the cobbler in payment for the wheat, and as soon as he gets the money from the cobbler, he repays the banker. It is long circulation if the money goes from the bank to the farmer to the hatter

to the carpenter to the cobbler to the farmer to the bank. It will be short circulation if the money goes from the bank to the farmer to the hatter to the bank. Excluding the bank, it is used just in one transaction, to pay for the hat, and for nothing else.

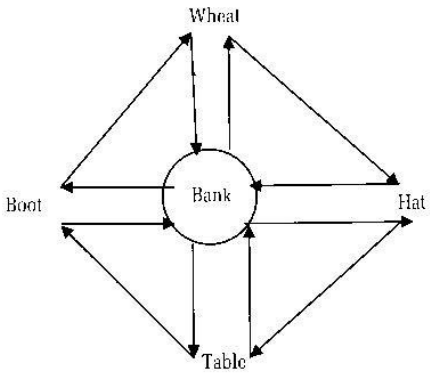
Short circulation would work if and only if the banker issued one unit of money to every agent in the circuit, and instructed them to use it just once. Requiring that the money be written as a single-use check enforces that, and the recipient must send the check to the banker. The total supply of money would be exactly the same whether the circulation is short or long. Under long circulation, 1 unit of money will be used n times, but under short circulation, n units of money would be used 1 time each.

Let us see how that short circulation destroys the transmission mechanism to immunize the economy from unemployment and instability. In Figure-5 below, the dashed inner circle shows long circulation. The farmer receives a unit of money from the outside banker (shown in the center). This money goes to the hatter, the carpenter, the cobbler, and then comes back to the farmer, when he returns it to the banker. In contrast, there are 4 short circuits shown by the four inner triangles. In the first circuit, the farmer receives one unit of money from the bank, and gives it to the hatter, who returns it to the bank. The second circuit has the hatter borrowing one unit and giving it to the carpenter, who returns it to the bank. The third circuit has the carpenter borrowing one unit, and giving it to the cobbler, who returns it to the bank. Lastly, the cobbler gets one unit of money from the bank, gives it to the farmer, who then gives it back to the bank. That is, the short circuit is a system of writing checks that are used just once among buyers and sellers of real goods.

Short circulation immunizes the economy from the transmission mechanism. If every producer gets fiat money directly from the bank, then the failure of one man to spend money would not affect anybody else's demand. This is because his supplier would not be dependent on him for the money to buy his desired good, but would get money from the bank directly. His supplier of course will be unable to sell the product, and hence remain indebted to the bank. But others would not be affected. Under the long circulation regime, if the farmer fails to give the money to the hatter, the hatter fails to buy the table, and the carpenter fails to buy the boots, and the cobbler fails to buy the wheat. Under the short circulation, the carpenter, the cobbler and the farmer would be able to sell their goods, and only the hatter will sit with unsold goods while the farmer will sit with unspent money.



Long Circulation: One unit of money from farmer-hatter-carpenter-cobbler-farmer-bank.



Short circulation: Four units of money from 1: Bank-farmer-hatter-bank, 2: Bank-hatter-carpenter-bank, 3: bank-carpenter-cobbler-bank; 4: bank-cobbler-farmer-bank.

Figure-5: Long and Short Circulation of Money

The biggest trouble with the existing long circulation regime is that the issuers of money lend to 1 of n producers, and refuse to lend money to the other (n-1) producers. They regard money as capital, and apply conditions appropriate to lending real capital. But money is not real capital at all: it is fiat, and it ought to be fiat. The denial of money-loan is the true reason behind the poverty of the great masses. This denial is not justified.

It is worth stating why a short circulation system does not require a test of creditworthiness. The system must ban bearer cash. Now, if there is no bearer cash, a borrower cannot possibly run away with the checkbook. If he has any real good to sell, the proceeds must be surrendered to the bank, and he cannot fail to repay the loan. If he fails to sell real goods, the bank has good reason to take possession of the unsold goods and try to sell them, and put the borrower through appropriate changes so that he learns to produce things that can be sold. Incidentally, short circulation will reduce many petty crimes such as theft of cash, mugging for cash, counterfeiting, money laundering, et cetera.

The experience of micro-credit should be reassessed as a peculiar manner of making money available to people who are ordinarily denied by the banks. Empirical studies on payment circuits can measure the effect of money on output and employment. How much money is needed? The obvious answer is that the amount of money must be exactly equal to the value of the indirectly traded output. The literature has no model to measure the need of money. Economists are not sure what money is,

and hence they use M1, M2, M3 and M4 as alternative measures of how much money there is, without any mention of how much money is needed. But it is easy to measure the need for money exactly. Walker's example involves the following matrix in which every real good has both demand and supply, and yet no barter is possible. Unless money is used, all the output and employment must be aborted. The cell where the zero is bold is the place where 1 unit of money must be used to pay for the real good shown with 1 unit of value. Thus if the farmer wants to buy $1 of hat, he must sell $1 of money to the hatter. The hatter must sell money to the carpenter, who must sell money to cobbler, who must sell money to farmer.

	Wheat	Hat	Table	Boot
Wheat	0	**0**	0	1
Hat	1	0	**0**	0
Table	0	1	0	**0**
Boot	**0**	0	1	0

We believe that a serious rethinking of economic theory of money is required to help us learn how to overcome the problems of poverty and instability (Vij, 2003). Gani (2003) offers an exposition of a possible reconstruction of economics with money as a medium of exchange.

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