INFLATIONARY RECESSION - A DIAGRAMMATIC REPRESENTATION

by

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No existing geometric model accurately pictures (much less explains) the commonly observed coexistence of continuing inflation with growing unemployment upon the heels of a restrictive monetary policy implemented to restrain an inflation. This clearly cannot be analyzed using a Phillips curve unless one postulates that the whole curve is constantly shifting to the right for awhile and then finally shifts back to the left as the inflation abates and unemployment returns to its normal level. An elaborate theory would have to accompany such an assertion, and I believe that a much simpler explanation is at hand.

It has been shown that one way of accounting for the "stickiness" of prices in the face of falling aggregate demand, without relying on arguments based on institutional rigidities or market power, is to recognize the implications of the fact that information is an economic good.[1] The purpose of this paper is to construct a diagrammatic representation of the inflationary-recession process which uses information costs as an explanation of the observed lags.

Usually (and the present is no exception) decreases in the rate of growth of the money supply are followed, after a 2-3 quarter lag, by decreases in the rate of growth of real output. After an additional lag of three to four quarters the rate of growth of the price index starts to decline.[2] As the rate of growth of prices diminishes so does the unemployment rate. This pattern is perfectly predictable from elementary demand theory as will be shown below. In spite of this repeated pattern all macroeconomic models pretend as if the rate of inflation will diminish immediately upon the application of a restrictive monetary (or fiscal) policy. Even the most recent models such as that developed by the St. Louis Fed[3] indicate that that inflation will abate immediately even though

much of the decline in the rate of growth of total spending will be reflected in smaller rates of growth of real output in the short run. In that particular model prices and wages must fall to induce larger than normal search periods which account for the temporary fall of the rate of growth of real output beneath its long run level. In fact we know that smaller (even negative) rates of growth of real output occur before there is any decrease in the rate of growth of prices. A successful model must explain this.

The first task, however, is to make explicit how the observed sequence of events fits into the constraint set by the quantity equation of exchange. It follows from $MV = PQ$ that the sum of the percentage change of the money supply and the percentage change of income velocity equals the sum of the percentage changes in the price index and real output. I.e., $\dot{M}/M + \dot{V}/V = \dot{P}/P + \dot{Q}/Q$. A restrictive monetary policy could mean either that $\dot{M}/M$ has decreased or become negative. Assume that the former is the case. For the 2-3 quarters that it takes for the restrictive policy to affect $\dot{P}/P + \dot{Q}/Q$ (the rate of growth of total spending) it must be the case that $\dot{V}/V$ has become (more) positive. Assume for simplicity that initially $\dot{V}/V$ is zero and that this is the equilibrium value of $\dot{V}/V$. After 2-3 quarters as the rate of growth of total spending falls, $\dot{V}/V$ falls until it equals zero. At this time all of the fall in $\dot{P}/P + \dot{Q}/Q$ is in $\dot{Q}/Q$; eventually $\dot{Q}/Q$ returns to its long run value and $\dot{P}/P$ falls. Clearly the sequence of events is consistent with the constraint imposed by the quantity equation of exchange.

The interesting question is whether or not the above sequence of events can be put together into a model consistent with economic theory.

Standard demand theory says that if the demand curve for X shifts to the left, and if the price of X does not fall, less of X will be demanded. That is, there are two possible results of a downward shift of a demand curve: either price must fall or the quantity demanded will fall. Given that $MV = PQ$, if V is constant a rectangular hyperbola may be constructed in the P-Q plane and this may be interpreted as an aggregate demand curve the position of which is determined by the size of the existing money stock. If the money supply decreases this "aggregate demand" curve shifts to the left. In Figure 1 if full employment real output is Q_f, P must fall from P_1 to P_2 in order to maintain full employment in the face of a decrease in the money stock from M_1 to M_2. If for any reason P remains at P_1, Q must become Q_2 and

Figure 1
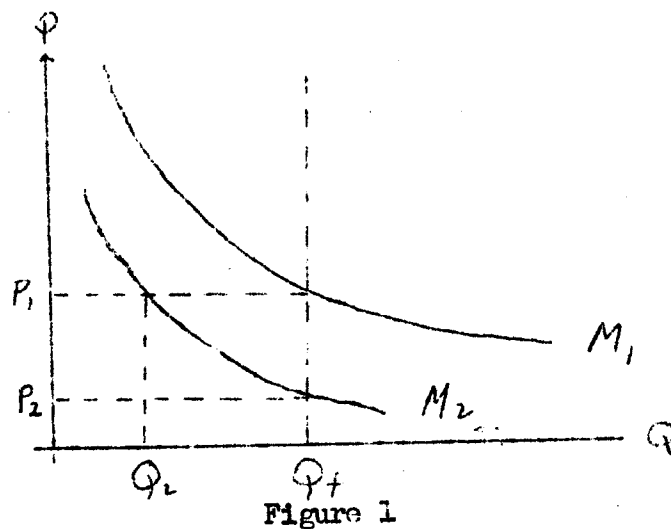
unemployment would be the result.

Unfortunately this diagram can only consider levels of the variables rather than their rates of change. An alternative diagram which employs rates of change must be constructed if the inflationary -

recession of 1970-71 is to be adequately portrayed. Assuming that the

equilibrium rate of change of velocity is zero, the relationship between

the rate of change of prices $(\dot{P}/P)$ and the rate of change of real output

$(\dot{Q}/Q)$ can be pictured as a family of straight lines of slope minus one.

The particular line of interest at a given point of time is determined

by the rate of change of the money stock $(\dot{M}/M)$ at that point of time.

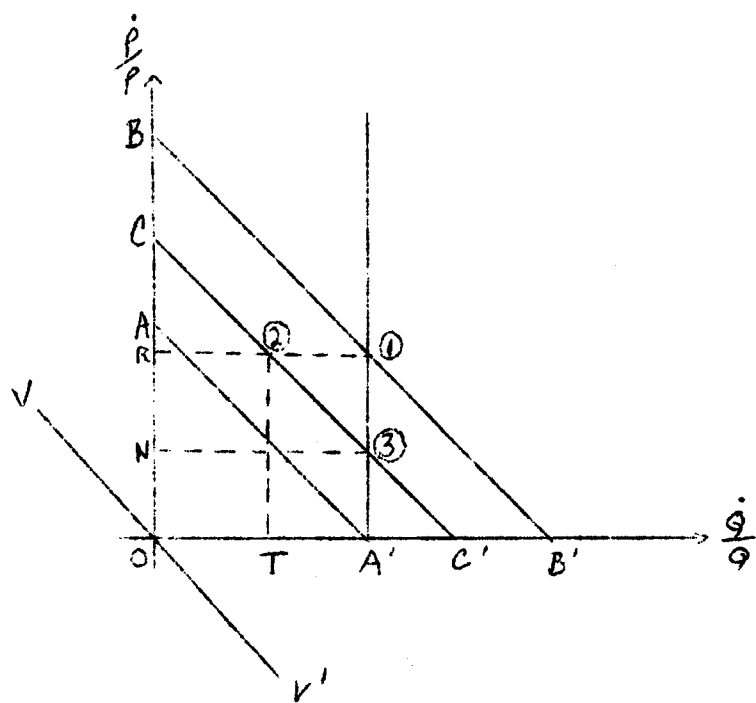Quite simply, if $\dot{V}/V$ is zero, $\dot{P}/P = \dot{M}/M - \dot{Q}/Q$.

Figure 2

In Figure 2 if the rate of growth of the money stock were zero, the

relevant line would be VV'. Suppose that the long run rate of growth of

real output, as determined by the growth of the labor force and capital

stock and the development of technology, is constant at A'. If the money

supply grew at the rate A', i.e., if the relevant line were AA', real

output could grow at its long run rate and a constant price index would be maintained. With real output growing at the rate A' unemployment would be at its natural level (say 4 percent) as set by search costs encountered in job changes.

Suppose the economy has fully adjusted to a rate of growth of the money stock equal to B': unemployment is at its natural rate, real output is growing at rate A', and the rate of inflation is R. The economy is at point 1 in the diagram on the "total spending" line labeled BB'. The monetary authorities now reduce the rate of growth of the money stock to C'. For 2-3 quarters the rate of growth of total spending is un-affected, hence velocity must increase. This would happen, for instance, if the specialists in the money market with whom the Fed's trading desk deals, continue to purchase securities at an unchanged rate even though the Fed has decreased its rate of purchase from them. These specialists will not adjust their purchase rates instantaneously because they don't know whether or not the Fed's changed purchase rate is transitory. They know that for a given policy, the Fed's purchase rate is not constant but follows some distribution. When a policy decision is made to reduce the rate of growth of the money stock the initial decrease is still in the range experienced when the old policy was in effect. It takes time for the information that the policy has changed to be communicated down the line from the Fed to the specialists, to the buyers and sellers in the money market, to banks, and finally to customers of banks, the purchasers of final goods and services.[4]

As velocity returns to its long run equilibrium value the rate of

growth of total spending decreases shifting the total spending line in

the diagram down until it settles at the position labeled CC'. Full

employment could be maintained if the rate of inflation immediately

fell to N (position 3). If the inflation rate R continued, however,

$\dot{Q}/Q$ would have to fall from A' to T and unemployment would increase

(position 2). With slower real growth full employment could only be

maintained with lower real wages. In the short run it is unlikely that

the rate of growth of money wages will fall because of the phenomenon

of search under conditions of imperfect information. With prices

continuing to rise the resistance to money wage decreases will be strong,

especially since unemployment insurance reduces the cost of search.

Given that the rate of growth of total spending has declined, why

do prices continue to rise at their previous rates? Why do sellers of

goods and services not change their pricing policies? The sales of any

individual firm are never constant from day to day or week to week.

Instead they follow a distribution. Sales are sometimes high and

sometimes low. These fluctuations are constantly experienced and usually

transitory. If the median sales rate falls due to a restrictive

monetary policy, observed sales rates may still be within the range

experienced before the restrictive policy. Only after a period of

time will the seller recognize that the distribution of his sales rates

has a lower median. Even when he recognizes this he may not believe that

the restrictive monetary policy is capable of permanently affecting his

sales, or he may believe that the unemployment which has been brought

about by the restrictive policy will be considered too expensive by the

monetary authorities and that the policy will be reversed. In addition,

especially if the existing inflation had been growing over a long period

of time before the implementation of the restrictive monetary policy,

individuals become accustomed to the pattern of rising prices and build

them into contracts specifying prices for supplies, labor, and sales.

These contracts cannot be abrogated instantly, and when they come up

for renegotiation both parties to the contract must have reversed

their expectations in order that the contracts will be for lower prices.

For all of these reasons adjustments to a restrictive monetary policy

will take place through quantity before price.

The same situation can be looked at from the point of view of the

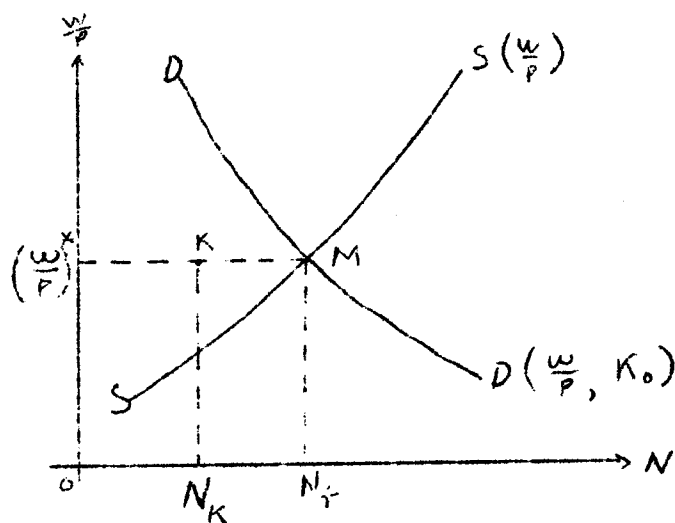labor market using the disequilibrium model developed by Patinkin.[5]

Figure 3

DD is the aggregate demand for labor derived from the principle of profit

maximization and drawn against the real wage rate; i.e., DD is a

schedule of the marginal physical product of labor which depends on the

existing capital stock, K_o. Its derivation assumes that firms can,

at prevailing (rate of change of) prices, sell each quantity of output

implicit in each value of N given that $K = K_o$. SS is the aggregate

supply of labor curve which is assumed to be rising with respect to the

real wage rate $(\frac{W}{P})$. Point M in Figure 3 corresponds to point 1 in

Figure 2. The economy is at full employment with money wages and the

price index rising at the same rate (R in Figure 2). The real wage is

constant at (W/P)*. A restrictive monetary policy is adopted, and

after velocity returns to its equilibrium value, the rate of growth

of total spending decreases. Sales rates decrease, meaning that firms'

can no longer sell the quantity implicit in each value of N at prevailing

prices (rates of change of prices). Firms are at some point such as

K off of the demand curve for labor. The demand curve was derived from

the assumption that firms could sell all they want to at the prevailing

prices. With the restrictive policy in force firms can no longer do

this. The demand curve, therefore, no longer tells us the amount of

labor demanded at each real wage. We cannot say that the demand curve

has shifted down because the capital stock has not changed. The

marginal physical product of labor curve will shift down only when K

decreases (assuming complementarity). Our new situation must be rep-

resented by a point off of the demand curve. Firms, because they

cannot sell all they want, cannot employ all they want.[6]

The unemployment that results $(N_f - N_k)$ will put downward pressure

on (the rate of change of) money wages. The excess capacity in the

product market will put downward pressure on (the rate of change of)

prices. As the long run rate of growth of real output is attained

firms will move back to the intersection of the DD and SS curves of

Figure 3. Money wages and prices will be lower (not increasing as fast) and the real wage will be unchanged.

One does not have to rely on market power arguments to understand inflationary - recession. Unions cannot get higher and higher money wages in the face of declining aggregate demand. Firms cannot simply continue to raise prices when aggregate demand falls. The fact that money wages and prices do continue to rise when the rate of growth of total spending declines creates the illusion of market power, an illusion that is dispeled by the recognition that information about what equilibrium prices are is not free.

FOOTNOTES

1. Armen Alchian, "Information Costs, Pricing, and Resource Unemployment".

    Western Economic Journal, June, 1969.

2. Federal Reserve Bank of St. Louis, Review, Jan. 1970, p. 7.

3. Federal Reserve Bank of St. Louis, Review, April, 1970.

4. I am indebted to Dan Benjamin, UCLA, for this suggestion.

5. Don Patinkin, Money, Interest, and Prices, 2nd ed. Harper & Row,

    1965, pp. 316-328.

6. Ibid., p. 322.