A Review of Monetarism

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Abstract. This paper is focused on a review of causality relationship between money, income, price and exchange rate. It reviews both the theoretical as well as empirical literature relevant to monetarism. The view insists on quantity theory of money, rational expectations, expectations and the neutrality of money, unanticipated money growth and unemployment, monetary policy game basic model, central bank behavior and credibility, sticky-price monetary model and vicious circle view of the international monetary system.
Keywords. Monetarism, Money, Income, Price, Exchange rates.
JEL. B20, B22.

1. Introduction

Economists agree that significant changes in the growth rate of the money supply influence economic activity. How these changes are transmitted to the economy and the time of this transmission, however, remain arguable points. Monetarist theory has its origin in the quantity theory of money (Friedman, 1987) which is represented by the equation: $MV = PY$ where M stands for the total money supply, V stands for the velocity of circulation of money, P stands for the general price level and Y stands for the real national income (or full employment output). The monetarists argue that V is predictable. While recognizing that the value of V might change over time, they argue that its long-term trend is fairly stable. They further argue that Y tends to follow a long-term naturally determined trend so that the economy always adjusts towards a full employment position. Following on from these arguments, the monetarists, who view the economy as inherently stable, conclude that an increase the money supply will have no effect on real output and employment in the long-run but will raise the price level. Within the broad theoretical confines known as monetarism, the level of economic activity depends on the relationship between the demand for and the supply of money. The quantity of money supply is determined by the monetary authority. The demand for money is that an individual's desire to hold a portion of his income in the form of money. So, the demand for money is determined primarily by income, interest rates, prices and price expectations. When the quantity of money that individuals desire to hold is either greater or less than the quantity that the monetary authority is supplying, there exists a monetary disequilibrium. Since individuals attempt to maintain equality between desired and actual money holdings, they

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change their spending habits in order to get back to their monetary equilibrium. Consequently, these actions affect the current level of economic activity. The change in total spending eventually influences the rate of inflation. In the short run, producers are unable to tell the difference between a permanent and a temporary change in aggregate demand (spending). This information problem leads producers initially to change production instead of prices. For example, a decline in the growth of the money supply creates a situation that individuals desire to hold larger money balances than they actually holding. To increase their money holdings, they reduce their spending. Producers react initially by reducing output because they are unsure whether the slackening demand for their products will be lasting. Therefore, in the short run, the decline in money growth results in slowdown in real economic activity; if pronounced enough and sustained long enough, it can produce a recession. Only when the decline in spending has been identified as permanent will producers reduce their prices and increase production back to normal levels which are consistent with the long-run growth of productive resources and technology. In other words, the impact of the monetary contraction on real output reduces in the long run; whereas the impact on the rate of inflation remains unchanged. According to the monetarist theory, inflation is defined as the continuing, rapidly rising price level. Monetarists maintain that "inflation is always and everywhere a monetary phenomenon."As such, they assert that inflation is primarily caused by the continually increasing money supply. In the long-run, permanent changes in the rate of money growth should be reflected by equivalent changes in the rate of inflation, other things being equal. The implication of this result is obvious: the control of money growth over the long term is necessary for control of inflation. If short-run money growth is volatile, the growth of real output (and employment) will be similarly volatile. In other words, sufficiently unstable money growth in the short-run, by which we mean frequent and substantive reductions in money growth relative to its trend, may cause recession. Therefore, it should minimize the variability of short-run money growth and greatly enhance the potential for a stable environment in which the economy can grow.

2. A Review of Monatarism

The most explicit monetarist alternative is the recently influential rational expectations version of monetarism. This view insists that unpredictable shifts in the money stock are primarily generated by random policy decisions, not systematically related to contemporaneous private-sector developments. Lucas (1972) supports this version of monetarism which depends on introducing persistent informational asymmetries across common agents. A rational expectations approach implies that if the money stock could be made to grow in a smoothly predictable way, real fluctuations would be smaller. We use the Lucas aggregate supply curve for the determination of the general price level and rate of inflation as follows. Lucas aggregate supply curve:

$$y_t - y_n = f\left(p_t - E_{t-1} p_t\right)$$
if
$$p_t > E_{t-1} p_t \Rightarrow y_t > y_n$$
where:

y_t : the actual level of output

y_n : the natural level of output

p_t : prevailing price level

$E_{t-1} p_t$: the public's prior expectation of the contemporaneous price level.

If you are a supplier and the price of your product increase, you should be expected to increase your output. But, is the rising price due to relative increment in demand or is it only product of inflation? If you know that it is product of inflation, you will not increase output because you know there is no extra demand for your output. The model says that output will deviate from its trend value if prevailing prices differ from expected prices. We can rearrange the model as follows.

$$y_t = y_n + f\left(p_t - E_{t-1} p_t\right)$$

and we know the quantity equation:

$$p = (\frac{V}{Y_R}) m_t^s$$

People look at the money supply to form their expectations about prices.

$$y_t = y_n + f(m_t^s - E_{t-1} m_t^s)$$

$$y_t = y_n + f(m_t^s - m_t^e)$$

where $m_t^s - m_t^e$ = money surprise.

If people make an error in forecasting m^s, then, they make an error in forecasting inflation and we get an output deviation. Any central bank would fail consistently to create "money surprise" after a short time. It is because people learn about it and central bank can only achieve this objective if it uses the technique occasionally. We can explain the Lucas aggregate supply (AS) curve more clearly by using Figure 1.
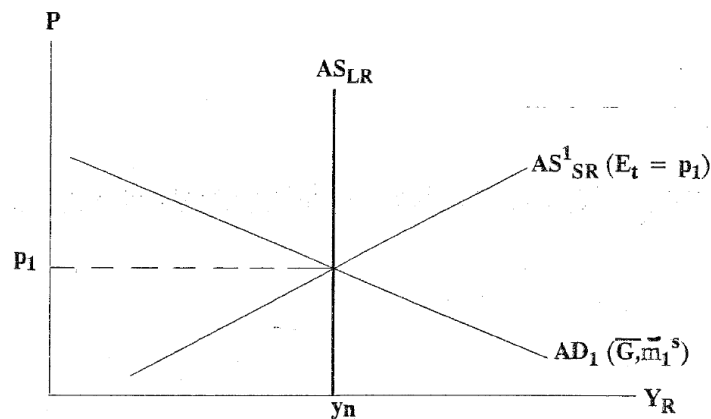

Figure 1. *Lucas aggregate supply curve*

$$y - y_n = f(p_t - E_{t-1} p_t)$$

$$y = y_n + f(p_t - E_{t-1} p_t)$$

if $E_{t-1} p_t = p_t$ (no error for price expectation)

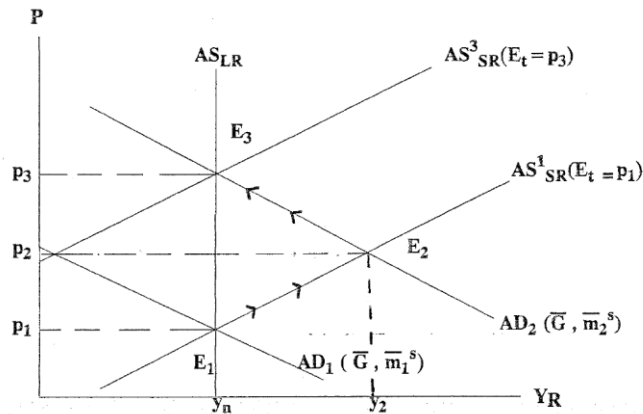Then $y = y_n$ (here, money is neutral in long-run)

Figure 2. *Monetary expansion: no real output effects in long-run*

As shown in Figure 2, the initial full-employment equilibrium at E_1 is disturbed by an increase in the money stock that shifts aggregate demand to AD_2. Short-run equilibrium is at point E_2 where both output $\left(y_2\right)$ and $\left(p_2\right)$ have increased. Prices are higher because the output and employment expansion have increased wages, and firms pass these cost increases into higher prices. As long as output is above y_n, wage costs and equilibrium prices will be rising. From the short-run equilibrium at E_2, the upward-shifting aggregate supply schedule leads to declining output and rising pricesas shown by the arrows. The adjustment continuous until at E_3, prices have risen in proportional to the increase in money stock. At this point, output and employment have returned to full-employment level. In the long-run, therefore, a monetary expansion has no real output effects. People make mistakes in their expectation of price level, so a monetary expansion $\left({}^{+}\Delta m^s\right)$ has a real effect on changes in real output in short-run. However after full adjustment, monetary expansion has a lasting effect on the price level in the long-run and has no lasting effect on real output in the long-run. If people do not make mistakes (they are not fooled) in their expectation of the price level, a monetary expansion $\left({}^{+}\Delta m^s\right)$ just has a direct effect on the price level and no effect on output and employment. This is the bases of the long-run Philips Curve. Thus after a period of years, the expected inflation rate will catch up to the actual inflation rate. In the long-run, the actual and expected inflation rates are equal. The long-run Philips Curve describes the tradeoff, if any, between inflation and unemployment when the actual and expected inflation rate are equal. When inflation has been high in the past, people are not easily fooled. However, if inflation has never been present, people are more likely to make mistakes. This is because people learn from the past. Some evidence suggests that unpredictable changes in money supply cause real output to change but other evidence also suggests that predictable changes in money supply cause real output to change, because of contracts and sticky prices in those countries. In high inflation countries, people are not fooled and they adjust their expectations as soon as prices start to rise (see Figure 3). If people correctly interpret the monetary expansion, the supply curve shifts as soon as the demand curve shifts, there is no mistake and the change in the

money supply will be reflected immediately in rise in price from p_1 to p_2 and output $\left(y_n \right)$ is unchanged.
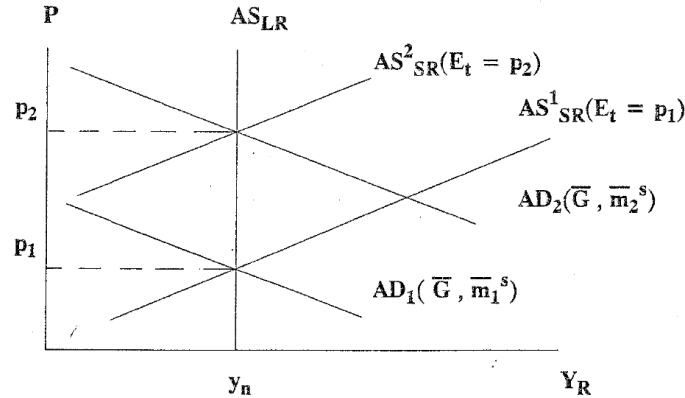

Figure 3. *Monetary expansion: the supplycurve shifts as soon as the demand curve shifts*

The 'Lucas critique' is that if expectations are rational the type of structure which many econometric models have estimated is not the constant structure and will not be policy invariant. On the contrary, it will depend amongst other things on the policies the government is pursuing. We consider the Barro model as follows.

$$Y_t = \pi_1 W_t + \pi_2 DM_t + \pi_3 X_{t-1} + \pi_4 Z_{t-1} + V_t$$

where:

Y_t : real output.

W_t : a variable or a number of variables which determine the natural level of output.

DM_t : the rate of growth of the quantity of money in period t.

X and Z: variables whose values in periods t-1 partly determine monetary growth in period t.

π_i : estimated coefficients.

If this model is used to persuade a government to change its policies the non-rational expectation model of Y_t will collapse whereas the rational expectation will not.

Lucas's point is that if expectations of a variable are rational they will be determined by the process governing that variable. Estimated models of the economy which do not allow for changes in expectations when policy regimes change are therefore likely to be seriously flawed in that they will begin to predict the behavior of the economy badly whenever a policy regime change occurs. Lucas (1973) concentrates on testing the prediction. The more unpredictable aggregate demand is, the less the effect on real output of any given unpredictable movement in aggregate demand. Barro (1997) and Barro & Rush (1980) test that only the unpredictable component of aggregate demand affects real variables such as output and real unemployment. Some notable criticisms and extensions of the Lucas and Barro tests have been discussed by Gordon, Mishkin & Pesaran (1991). Gordon summarizes his interpretation as follows: to the extent that output

was insulated from the impact of anticipated monetary changes… this occurred more because of a restricted impact of money on spending than because of any independence of real output from anticipated changes in spending. In other words, policy ineffectiveness… is more related to factors set forth in early postwar Keynesian models than those advanced by Lucas. Mishkin lengthened the lag on unanticipated money, nominal income and inflation and also found that anticipated change in aggregate demand had important output and employment effects in the US economy. Lastly, Pesaran tested the Barro model against an alternative Keynesian model and found he could reject the Barro model on the assumption that Keynesian model is true; however, he was not able to reject the Keynesian model under the assumption that Barro model was true. Another aspect of this problem concerns the credibility of government policy. Recent theoretical literature on this topic uses the model of the game between the public and central bank behavior as follows.

The Monetary Policy Game: Basic Model

I Output Relationship

$$y = y_n + (m - m^e) \tag{1}$$

II Social Welfare Function = Policymaker's Objective Function

$$W = -m^2 + 2(y - y_n) \tag{2}$$

III Policymaker's Objective Function in terms of m

$$W = -m^2 + 2(m - m^e) \tag{3}$$

IV Public's Utility Function

$$U = -(m - m^e)^2 \tag{4}$$

Payoff Tables for Basic Monetary Policy Game:

Table 1. *Policymaker's Payoff Table (from equation 3)*

	Public expect (m^e)	
Policymaker choose (*m*)	0	1
0	0	-2
1	1	-1

Table 2. *Public's Payoff Table (from equation 4)*

	Public expect (m^e)	
Policymaker choose (*m*)	0	1
0	0	-1
1	-1	0

Source: Cukierman (1986), pages 6-7.

In Table 1, inflation is clearly the dominant strategy from the point of view of monetary authority, the payoffs for *m* = 1 are higher regardless of what inflation rate the public expects. In Table 2, the inflationary bias occurs because the monetary authority has the incentive to inflate in order to increase employment once the public's inflationary expectations have been set. The policymaker is assumed to have imperfect control of the money supply and to be uncertain about his own future objectives. If he expected to

care more about employment in the future than he does now, he will increase his ability to create surprises at relatively low inflation in future periods by choosing a relatively low current monetary growth. If he expects to care less about employment in the future than he does at present, he will choose faster current monetary growth (and faster inflation). The important point is that the policymaker must predict his own uncertain objectives in the future when choosing the current rate of money growth. The policymaker must also take into account the costs of reversing inflationary expectations. Fisher (1984) has stressed the importance of the speed with the public's expectations adjust for determining the costs of disinflation policy actions. The faster expectations adjust, the lower the output costs of disinflation will be. Following Cukierman (1986) if the best predictor of future inflation is given by the following equation.

$$m_i^e = (\rho - \lambda)m_{i-1} + \lambda m_{i-1}^e + (1-\rho)B_0A^1$$

This equation specifies the expected money growth as a weighted-average of last period's expectation, m_{i-1}, the last period's expectation, m_{i-1}^e

and B_0A (B_0A can be recognized as the unconditional mean money growth). Cukierman conceive of credibility as the speed with which the public recognizes that a change in the policymaker's objectives has actually occurred. This concept of credibility seems appropriate when policy is discretionary and the policymaker's objectives (known only to him) are in constant flux. The parameter (λ) from the above equation is a natural and convenient measure of credibility. Using this measure, credibility is higher, the more precise monetary control is.

Dornbusch (1976a; 1976b) developed the sticky-price monetary model which makes the assumption that the domestic level is sticky, but money markets and foreign exchange markets adjust instantaneous to any disturbance. It holds that uncovered interest parity: r = r* + x (where r is domestic interest rate, r* is foreign interest rate, x is rate of depreciation) exists. If the domestic monetary authority starts an expansionary monetary policy, the domestic price level cannot adjust immediately (sticky price). The pressure from the monetary expansion must be felt somewhere. The exchange rate will depreciate in line with equation: P = EP* (where P is domestic price level, P* is foreign price level, E is exchange rate) in long-run. However, there is a problem: the right shift of the LM curve will lower domestic interest rate. This mean that, for equation (r = r* + x) to hold, the domestic currency must be expected to appreciate (x<0). This apparent inconsistency between the need for long-run depreciation and an expected appreciation is the source of overshooting. Bilson (1978) demonstrated the vicious circle view of the international monetary system. The vicious circle view is based upon the belief that flexible exchange rate system have a significant propensity toward dynamic instability and that exchange rate changes constitute an independent source of inflationary pressure. There are at least two major objectives that can be raised against this test of vicious circle hypothesis. First, the approach ignore the fact that the exchange rate is an endogenous variable. The causality tests may indicate that exchange rate

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[1]In statistical terms m_i^e is the expected value of m_i conditioned on m_{i-1}, m_{i-2} ….

'cause' price when the correct explanation is simply that exchange rates respond more rapidly than prices to changes in underlying economic conditions. Second, the vicious circle hypothesis is that the implicit economic model underlying the discussion neglects the expenditure – reducing role of the exchange rate in adjustment process. The pattern of price, wage and exchange rate dynamics described by proponents of the vicious circle hypothesis may be derived from a general equilibrium model of an economy operating under a regime of managed flexible exchange rate. Although it appear that the exchange rate causes subsequent movements in prices and wages, Bilson has demonstrated that the probable cause of both the depreciation of the exchange rate and inflation of domestic prices is an expansionary money supply.

3. Conclusion

When asset price, exchange rates and interest rate are determined in auction markets, while wages and commodity prices are set by contract, changes in underlying economic conditions are first reflected in the auction price, so that the impression is created that these prices cause change in the contractual prices. Proponents of the vicious circle hypothesis express the view that rapid adjustment in price and wages limits the effectiveness of monetary policy, and that monetary policy is likely to be less effective in more open economies. However, the opposite conclusion was reached in regard to policies that attempted directly to increase the demand for, or the supply of, domestically-produced goods. In these cases, rapid price and wage adjustment not only results in a greater stimulus to output and employment but also serve to lessen the inflationary pressure on prices and costs. Tight monetary policy may be infeasible because of the resulting increase in unemployment. As an alternative, an expansionary demand or supply policy was found to both stimulate output and employment and reduce the inflation of prices and costs. The only necessary restriction on the policy is that the increase in demand must not be financed, either directly or indirectly, by an expansion in the money supply. The increase in real income will increase the demand for money. This increase in demand for Money will lead an incipient balance of payments surplus, which will be eliminated by an appreciation of the exchange rate. The appreciation of the exchange rate will lessen the inflation of wages and prices by lowering the cost of imported final and intermediate goods. This conclusion should not be interpreted as an avocations of persistent policy of deficit financing. The benefits of higher level of real income must be weighed against the increase in the level of international indebtedness in assessment of the long-run impact the policy.

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