

## THE CENTRAL BANK, INFLATION & HYPERINFLATION

We know that any factor that increases demand for goods and services in an economy or that decreases the supply of goods and services can push up the price level.

However, if inflation is persistent and rapid, the ultimate source of this is rapid increase in the money supply.

To see why this is so recognize that if the price level is moving up rapidly, then the factor causing this must also be changing rapidly. But, considering the factors that increase demand or decrease supply, it is impossible to imagine factors such as consumer demand, business demand, etc. changing at continuous very high rates. Increases in the price of inputs also cannot be the cause of perpetual, high levels of inflation. It is impossible for the supply of or demand for a widely used input like labor or oil to change so much and continuously as to cause the price of the input to rise at such perpetual, very high levels to cause sustained, rapid inflation.

Also, government purchases can only rise at the very high rates necessary to cause sustained high levels of inflation if the government is able to obtain the funds to finance its purchases. It cannot obtain extraordinarily large amounts of funds from raising tax rates because there is a limited amount of taxes that people can pay. So if government spending is to rise at very high rates, the government has to borrow funds to finance its purchases. The central bank, however, is the only lender that can continually create money to lend to the government. Lenders other than the central bank have only limited amounts to lend. The central bank, however, can continually purchase bonds issued by the government and so lend more and more money to the government.

Government spending is therefore likely to rise persistently and rapidly only if the government is borrowing from the central bank. As the central bank lends to the government, the central bank issues money in return for the bonds it receives from the government. This issuing of money by the central bank in return for bonds increases the money supply. As the government continually borrows large sums from the central bank, the money supply increases sharply causing very high levels of inflation.

Rapid increase in the money supply is therefore the ultimate cause of persistent, rapid inflation. Any factor that increases demand or decreases supply of goods and services in an economy can cause inflation, but persistent, high levels of inflation is caused by rapid increase in the money supply. To deal with such inflation, there is only one remedy—the growth of the money supply must be reduced.

## **THE EQUATION OF EXCHANGE**

The equation of exchange, which we will now learn, gives us further insights into the role of money in causing inflation.

Suppose in 2007 the total amount of purchases (or sales) in an economy was \$500 million, and the money stock was \$100 million. Then on the average each dollar of the money stock was used  $500/100 = 5$  times in paying for the transactions during 2007.

As money moves from person to person when purchases and sales occur, the same currency note gets used many times in making payments. For example, if I pay you \$5 for a good I purchase from you, you may then use these \$5 to pay for your purchases from another person, who then uses them to pay another person. The same \$5 are used 3 times in making these transactions, so on the average each dollar of these 5 is used 3 times in making payments.

The average number of times each dollar of the money stock is used in paying for transactions is called the **velocity of circulation of money**, or just **velocity of circulation** or **velocity** for short.

If, in a given time period in an economy, Q is the total amount of goods and services bought or sold and P is the average price level, then the dollar value of transactions equals PQ. If M is the money stock, then the velocity of circulation is PQ/M. Therefore, **MV = PQ**.

In calculations of V, nominal GDP is generally used as an approximation for PQ, which would mean Q is approximated by real GDP. This happens because GDP figures are readily available in statistical sources.

$MV = PQ$ , or  $MV = \text{Nominal GDP}$ , or  $MV = P \text{ times real GDP}$ , is called the **equation of exchange**.

This equation can be used to examine the role of money in causing inflation. By simple mathematical manipulation (take logarithms, then differentiate with respect to time, and rearrange terms), the equation of exchange,  $MV = P \text{ times real GDP}$ , can be re-expressed as:

$$\begin{aligned} \text{Inflation rate} = & \text{Growth rate of the money stock} \\ & + \text{Growth rate of velocity} \\ & - \text{Growth rate of real output} \end{aligned}$$

This formula shows that declining growth of output, increasing growth of the money stock, and increasing growth of velocity result in rising inflation. But it is impossible for output growth to decline at continuous, very high levels. So very high and rising levels of inflation cannot be due to declining output growth. Of

the two other possible causes of inflation, growth of the money stock and growth of velocity, it is rapid growth of the money stock that causes very rapid rates of inflation. In fact, as the money stock grows rapidly and speeds up inflation, this causes people to want to get rid of money very quickly by buying goods and services. This is what will increase velocity—which measures the average number of times each dollar of the money stock is used in making payments. So it is large increases in the money stock that is the ultimate cause of very high levels of inflation.

If you became a political leader and you were inclined to have your government borrow from the central bank to finance very large increases in spending, bear in mind that the central bank by issuing money increases the money stock. If these increases in the money stock occur in very large and rising amounts, this will cause high levels of inflation, even hyperinflation.

If, after taking this seminar, you know this lesson alone, you will be wiser than many political leaders the world has very painfully endured.

### **CENTRAL BANK IRRESPONSIBILITY AND HYPERINFLATION**

Various countries have suffered from prolonged bouts of hyperinflation as a result of their central bank engaging in massive money creation to lend to their governments, as described above. In all of these cases of hyperinflation, inflation fell sharply when the central bank ceased its excessive money creation.