

Some Mechanics in the Determination of the Money Supply

We defined the stock of money, M , as being equal to the sum of the amount of deposits, D , in our commercial banking system, and the stock of outstanding currency, C , in the hands of the public:

$$1 \quad M=C+D$$

We normally assume that people want to hold some fraction of their assets in the form of cash and some in the form of deposits at their banks. We assume that the desired amount of currency they wish to hold is proportional to their deposits: $C=cD$.

The stock of what we called “High-powered” money, H , was defined as equal to the stock of currency, C , plus the reserves, R , held by commercial banks at the Bank of Canada:

$$2 \quad H=C+R$$

We assume that commercial banks wish to hold some fraction of the deposits made at their institution in the form of reserves held at the Bank of Canada. Consequently we assume that $R=rD$.

We also assume that there is a relationship between the stock of money and the stock of high-powered money so that:

$$3 \quad M=mH.$$

To see what small m is, rearrange this so that we have:

$$3a \quad m=M/H$$

This in turn can be written as (substituting in from 1 and 2):

$$4 \quad m=[C+D]/[C+R]$$

Then divide both the numerator and the denominator by D , the stock of deposits:

$$4a \quad m=[(C/D)+(D/D)]/[(C/D)+(R/D)] \text{ and then substituting from the behavioural relationships:}$$

$$4b \quad m=[c+1]/[c+r].$$

Return to 3 so that we now have:

$$5 \quad M=mH=[(c+1)/(c+r)].H$$

It is this latter expression that links the supply of money to the behaviour of the public that determines the amount of cash relative to deposits they wish to hold – probably as a function of their confidence in the banking system and how much they are paid in interest on their deposits; and of the banks which choose how much of their deposits they wish to hold as reserves in case there are people who want to take their money out – probably as a function of how good the investment opportunities are in the economy and how much they have to pay to acquire deposits.¹

What we can see is that in 5, an increase in H causes the money stock to increase; and increase in r causes the money stock to decrease, and an increase in c also causes the money stock to decrease.

A numerical example:

To make the latter point clear assume initially that $c=.05$, $r=.05$ and $H=100$. In this case $M=[1.05/.10].100=1050$

Now let c increase from 0.05 to 0.10. This means that $M=[(1.10)/(0.15)].100=733$.

¹ Those of you who are sharp will notice that this looks like an identity since we use the definitions of M and H to define m . But if we assume that r and c are functions of behaviour, then say, they are constants, the relationship is really a theory that predicts how the money stock will change as the exogenous components change. For example, typically, government policy will affect H .