

Finance 462
Project #3

There are two key components to monetary policy. The first component has to do with choosing the appropriate policy. That is, should we follow an inflation target or an interest rate target, what should the target be, etc. The second component has to do with proper implementation of the policy. That is, if we are going to target the interest rate at 4%, what actions need to be taken to insure we hit the target? Proper implementation of monetary policy requires that money supply equals money demand. In this exercise, we will look at both sides of the equation.

Part I: Predicting Money Demand (M2)

The first step is to predict what money demand will be in the upcoming quarter. This part of the project is very similar to project #1. We will be making *in sample forecasts*. That is, imagine that it is October 1st, 1959. We want to forecast money demand for January 1st, 1960. We have the following forecasting equation:

$$\begin{aligned} \Delta m_t = & -.05 + .23(\% \Delta m_{t-1}) + .08(\% \Delta m_{t-2}) + .45(\% \Delta c_t) + \\ & + .24(\% \Delta c_{t-1}) - .002\Delta(R - RM2)_t - .003\Delta(R - RM2)_{t-1} - .11m_{t-1} + \\ & + .11\tilde{y}_{t-1} - .002(R - RM2)_{t-1} + .0072T_t + .03D83Q1 \end{aligned}$$

Where

Δm_t = percentage change in real money demand from time t to time t+1 (i.e. 10/1959 to 1/1960)

Δm_{t-1} = percentage change in real money demand from time t-1 to time t (i.e. 7/1959 to 10/1959)

Δm_{t-2} = percentage change in real money demand from time t-2 to time t-1 (i.e. 4/1959 to 7/1959)

Δc_t = percentage change in real consumption expenditures from time t to time t+1 (i.e. from 10/1959 to 1/1960)

Δc_{t-1} = percentage change in real consumption expenditures from time t-1 to time t (i.e. from 7/1959 to 10/1959)

$\Delta(R - RM2)_t$ = change in the difference between the interest rate on 1 year T-bills and M2 from t to t+1 (i.e. 10/1959 to 1/1960)

$\Delta(R - RM2)_{t-1}$ = change in the difference between the interest rate on 1 year T-bills and M2 from t-1 to t (i.e. 7/1959 to 10/1959)

m_{t-1} = real M2 in t-1 (i.e 10/1959)

$$\tilde{y}_t = \frac{\ln(y_{t-1}) + \ln(y_t)}{2}$$

y_t = Real GDP in time t

$(R - RM2)_{t-1}$ = the difference between the interest rate on 1 year T-bills and M2 at time t-1

T_t is a time trend

$D83Q1$ is a dummy variable equal to 1 in 1983 quarter 1 and zero elsewhere

To forecast Money Demand, you will need to do a few calculations first:

- 1) Calculate real M2 by dividing Nominal M2 by the price level
 - 2) Calculate the percentage change in real M2
 - 3) Calculate the spread between the TBill interest rate and the rate of return on M2
 - 4) Calculate the change in the difference between the TBill interest rate and the rate of return on M2
 - 5) Calculate the percentage change in real consumption expenditures
 - 6) Calculate \tilde{y}_t .
- Once you've calculated the various components, you can insert them into the forecasting equation to generate your first predicted percentage change in real M2.
 - Then you can use the predicted percentage change to calculate the predicted level for real M2.
 - Multiply your predicted real M2 by the price level to get predicted nominal M2
 - Now, copy the formula down the entire column to generate predicted M2 from 1960 to 2004.
 - Plot the predicted percentage change with the actual percentage change.
 - Plot the predicted level of nominal M2 with actual M2

Part II: The Money Multiplier

Recall that the Fed can only directly control the monetary base. Therefore, once we've predicted M2 demand, we need to understand how a change in the monetary base will influence the supply of M1 and M2. This is given by the M1 and M2 money multipliers:

$$mm1 = \frac{1 + c/d}{c/d + rr/d + er/d}$$

$$mm2 = \frac{1 + c/d + nm1/d}{c/d + rr/d + er/d}$$

Where

c = currency in circulation
d = checkable deposits
nm1 = Non-M1 Components
rr = required reserves
er = excess reserves

Note that to calculate the multipliers, you need to do a little work first:

Currency in Circulation = Monetary Base - Total Reserves

Checkable Deposits = M1 - Currency in Circulation

Non-M1 Components = M2 - M1

Required Reserves = Total Reserves - Excess Reserves

- Once you've done the above calculations, you can calculate the multipliers for the period 1960 to 2004.
- Given your predictions for M2 demand and the M2 multipliers, explain the changes in the monetary base that would be required to maintain a constant interest rate.