Finance 361  
Project #3

The goal of this assignment is to look at the relationship between the various policy variables and their statistical relationship with the business cycle. Secondly, we want to look at the behavior of the money multiplier over time.

**Part I: Money, Government, and the Business Cycle**

Part one of the spreadsheet contains the following variables:

Government Expenditures  
Taxes  
GDP  
Monetary Base  
M1 Money Supply  
M2 Money Supply  
The Government Deficit  
The CPI  
Nominal Interest Rate

1) First, we need to convert everything to real terms. For everything but the interest rate, Real = Nominal/Price. To calculate the real interest rate, you need to first calculate the annual inflation rate and then subtract it off the nominal rate.

2) Next, we need to detrend everything. In Project one, we did this using exponential trendlines. Here we are going to use a simpler process. For all the variables except the interest rate (the interest rate is already stationary) calculate the percentage change (there is no need to annualize it).

3) Now that we have the detrended variables, we need to calculate the correlations. If you have all your real, detrended variables is one continuous group, we can calculate the correlations all at one using the “correlation” option in data analysis.

   - Open “Data Analysis”  
   - Select “Correlation”  
   - For input range, highlight all the columns of data including the label in the top row.  
   - Check the box marked “labels in first row”  
   - For output range, select an area for excel to put the results. That’s it!

4) What do you see? Specifically,  
   - What are the correlations between money (MB, M1, M2) and interest rates?  
   - What are the correlations between Money (MB, M1, M2) and output?  
   - What are the correlation between the deficit and interest rates?  
   - What is the correlation between government expenditures and output?
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:

\[
m_{m1} = \frac{1 + \frac{c}{d}}{\frac{c}{d} + \frac{rr}{d} + \frac{er}{d}}
\]

\[
m_{m2} = \frac{1 + \frac{c}{d} + \frac{nm1}{d}}{\frac{c}{d} + \frac{rr}{d} + \frac{er}{d}}
\]

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.