1. Consider the simple OLG model with the following extensions and details: Assume that people face a lump-sum tax of $\tau$ goods when old and a rate of expansion of the fiat money supply of $z > 1$. The tax and the expansion of the fiat money stock are used to finance government purchases of $g$ goods per young person in every period. There are $N$ people in every generation. Assume that the utility function of people in the economy is $\ln(c_{1,t}) + \ln(c_{2,t+1})$.

   a. Find the real demand for money in a stationary equilibrium as a function of $z$, $\tau$, and $y$.
   
   b. Find the government budget constraint in a stationary equilibrium. Solve it for $\tau$ as a function of $z$. (The expression will also involve $y$ and $g$.)
   
   c. Substitute your expression for $\tau$ from the government budget constraint into the demand for money. Use the result to find seigniorage as a function of $z$, $y$, $g$, and $N$. Using a spreadsheet, graph seigniorage as a function of $z$, using the following parameter values: $N = 1000$, $y = 100$, and $g = 10$.

2. Go to the St. Louis Federal Reserve’s web page. Download the available data on the monetary aggregates $M_1$, $M_2$, and $M_3$ from the FRED database. Using a spreadsheet, draw a time-series plot of $M_1$, $M_2$, and $M_3$. In the context of the economics we studied in chapters 1 and 3, the optimal monetary policy was to maintain a constant stock of fiat money. Has the Fed followed such a policy?