Homework 9- Fisher Equation

The Fisher equation is a way of constructing the real interest rate from the nominal interest rate and the inflation rate in an ex-post way.

\[(1 + i_t) = (1 + r_t)(1 + \pi_t)\]

- \(i_t\) - nominal interest rate
- \(r_t\) - real interest rate
- \(\pi_t\) - inflation rate
- \(m_t\) - money growth rate

The homework asks you to calculate real interest rates based on (i) the Fisher equation and (ii) data on nominal interest rates and inflation in the US. The data for this homework are in the spreadsheet and are from Sargent and Surico (2011) “Two Illustrations of the Quantity Theory of Money: Breakdowns and Revivals”, American Economic Review. The data set has quarterly data on the money stock, the GDP deflator and the (annualized) commercial paper nominal interest rate.

1. Graph \((i_t, r_t, \pi_t)\) on a single graph over time.
2. Calculate the mean values of \((i_t, r_t, \pi_t, m_t)\) over the sample period.
3. Calculate the correlation between (i) \(i_t\) and \(\pi_t\), (ii) \(i_t\) and \(r_t\), (iii) \(r_t\) and \(\pi_t\) and (iv) \(i_t\) and \(m_t\).
4. Summarize what you find.

Note:
1. It is easiest to use the data to compute annualized inflation and money growth rates based on the data from neighboring quarters. Thus, you will need to multiply by four to convert quarterly growth rates to annualized rates. The interest rates in the data set are already annualized.
2. The correlations that you calculate can be viewed as high frequency correlations as the data are quarterly. One goal of the Sargent and Surico paper is to analyze low frequency movements. This is beyond what we will do.