Problem Set #5 Due in class 12/15

1. If stock price level is determined by \( P_t = E_t \sum_{j=0}^{\infty} \beta^j D_{t-j} \) and the dividend process contains a unit root, will stock prices and dividends necessarily be cointegrated?

2. If the stock price is determined by \( P_t = D_t + \beta E_{t+1}P_{t+1} \) and the dividend process contains a unit root, will stock prices and dividends necessarily be cointegrated?

3. Suppose that the behavioral model of output is

\[
y_t = y_{t-1} + \mu(L)(m_t - E_{t-1}m_t) + \varepsilon_t.
\]

Suppose that the money process contains a unit root. Is it possible for money and output to be cointegrated?

4. Compute the impulse response function from a one unit shock to the dividend process for the stock price level, using the model in question 1; assume for this question that dividends are stationary in levels. Does the impulse response function have to monotonically decline in magnitude?

5. Suppose dividends contain a unit root. What is the impulse response function that describes the effect at different horizons on the stock price level of a one unit shock to the Beveridge-Nelson trend component of dividends?

6. Suppose that the stock price level is not cointegrated with dividends. Does this mean that there is a bubble in the stock price process?