Consider the baseline Dynamic New Keynesian (DNK) model from Clarida, Gali and Gertler (2000):

\[
\begin{align*}
\pi_t & = \delta E_t \pi_{t+1} + \lambda x_t \\
x_t & = E_t x_{t+1} - (1/\sigma)(r_t - E_t \pi_{t+1}) + g_t \\
r_t & = \beta E_t \pi_{t+1} + \gamma x_t,
\end{align*}
\]

where \(E_t\) represents rational expectations based on time \(t\) information, \(\pi_t\) is inflation, \(x_t\) is the output gap, \(r_t\) is the nominal interest rate, and \(g_t\) is a demand shock. Using the DNK model, please answer the following questions.

1. Describe the economic intuition behind each of the three equations in the DNK model. How does the model differ from the traditional IS-LM-AS model?

2. Explain the Taylor principle of monetary policy.

3. Assuming naïve expectations, use the Volker-Greenspan parameter values \((\delta, \lambda, \sigma, \beta, \gamma) = (1, 0.3, 1, 2.15, 0.93)\) to calculate the impulse response functions (IRFs) for a one-time positive demand shock. Describe the dynamic paths of inflation, output and interest rates. Provide some economic intuition for each IRF.

4. How would the IRFs differ with interest-rate smoothing? Explain.

5. Assume the central bank suddenly becomes more concerned with inflation, such that \(\beta = 5\). How do the dynamics of the economy change? Does the change make sense? Is the public better off or worse with a more hawkish Fed?