Master EPP, International Macroeconomics
Lecture 1
Traditional Open Macro Models and Monetary Policy

1 The Cagan model (OR, 8.2)

Consider the Cagan model of Money and Prices. Let M denote a country's money supply and P its price level. The demand for real money balances M^d/P is explained by expected future price-level inflation.[1] In logarithms:

$$m_t^d - p_t = -\eta E_t\{p_{t+1} - p_t\}$$

with η the semielasticity of demand for real balances with respect to expected inflation.

1. Write the monetary equilibrium condition.

2. Write the general form of the equilibrium price level. Interpretation. (In the following, we will assume the following "no-speculative bubble" condition holds :

$$\lim_{T\to\infty} \left(\frac{\eta}{1+\eta}\right)^T E_t\{p_{t+T}\} = 0$$

3. Discuss the following particular cases : i) $m_t = \bar{m} \quad \forall t$, ii) $m_t = \bar{m} + \mu t$, iii) $m_t = \rho m_{t-1} + \varepsilon_t$ with $E_t\{E_{t+1}\} = 0$ and $0 < \rho < 1$.

4. What happens to the dynamics of the price level when, at date 0, the government announces the money supply is going to rise from $\bar{m}$ to $\bar{m}'$ on a future date T?

5. Consider a government that fixes the (constant) gross rate of money growth. What would be optimal to choose in order to maximize seignorage ?

2 A simple model of Exchange Rates (OR, 8.2)

Consider a small, open economy in which real output is exogenous and the demand for money is given by:

$$m_t - p_t = -\eta \mathrm{i}_{t+1} + \phi y_t$$

where $\mathrm{i}_{t+1} \equiv log(1 + i_{t+1})$, p is the log of the price level, m is the log of the nominal money demand and y is the log of output.
PPP holds: $P_t = \mathcal{E}_t P_t^*$ with $\mathcal{E}_t$ the nominal exchange rate, defined as the price of foreign currency in terms of home currency, and P_t^* the world foreign-currency price of the consumption basket.

1. Write the uncovered interest parity (UIP) relation. (Assume away the existence of an exchange-rate risk premia)

2. What is the dynamics of the exchange rate in the model?

3. Suppose $\eta \mathrm{i}^* - \phi y - p^* = 0$ and the money supply follows the process:

$$m_t - m_{t-1} = \rho(m_{t-1} - m_{t-2}) + \varepsilon_t$$

[1] The Cagan's model seeks to study hyperinflation episodes and thus neglects the real determinants of money demand proposed by Keynes-Hicks.

where ε is a serially uncorrelated mean-zero shock such that $E_{t-1}\{\varepsilon_t\} = 0$. Write the dynamics of the exchange rate.

4. Assume now that the government wishes to fix the (log of the) nominal exchange rate permanently at $\bar{e}$. What path of the money supply is consistent with having $e_t = \bar{e}$ permanently?

4. During the beginning of the US Reagan administration in 1981, some US officials seriously discussed the possibility of making a transition to a fixed exchange rate for the dollar. However, they argued that it would be presumptuous for government officials to decide the best exchange rate and that they should instead let the market decide. The policy they proposed was to announce today that at some future date T they would permanently fix the exchange rate (using monetary policy) at whatever level prevailed in the market at time $T-1$. Is this a coherent policy?

3 The Mundell-Fleming-Dornbusch model (OR, 9.2)

Consider a small open economy facing an exogenous world (foreign-currency) interest rate i^*. With open capital markets and perfect foresight, uncovered interest parity holds. Only domestic residents holds the domestic money, according to the following relationship:

$$m_t - p_t = \phi y_t - \eta \mathrm{i}_{t+1} \tag{1}$$

where m_t, p_t and y_t respectively denote the log of nominal money demand, the price level and output and $\mathrm{i}_{t+1} = \log(1 + i_{t+1})$. The Purchasing Power Parity needs not hold so that the real exchange rate $q_t = e_t + p_t^* - p_t$ can vary. (In the following, the foreign price p^* is assumed constant.)
The Dornbusch model effectively aggregates all domestic output as a single composite commodity and assumes that aggregate demand for home-country output, y^d, is equal to:

$$y_t^d = \bar{y} + \delta(q_t - \bar{q}), \quad \delta > 0 \tag{2}$$

where $\bar{y}$ is the "natural" rate of output and $\bar{q}$ the "equilibrium" real exchange rate consistent with full-employment. For simplicity, $\bar{y}$ and $\bar{q}$ are assumed to be constant.
Prices are rigid in the short-run and flexible in the long-run. Namely, p_t is assumed to be predetermined so that unanticipated shocks can lead to excess demand or supply. In the Keynesian tradition, it is assumed that output is demand determined. The price level adjusts according to the inflation-expectations-augmented Phillips curve:

$$p_{t+1} - p_t = \psi(y_t^d - \bar{y}) + (\tilde{p}_{t+1} - \tilde{p}_t) \tag{3}$$

where $\tilde{p}_t \equiv e_t + p_t^* - \bar{q}_t$ is the price level that would prevail if the output market cleared.
In the following, it is assumed that $\psi\delta < 1$ which assures a monotonic adjustment of the real exchange rate. To simplify, the following normalizations are also assumed: $p^* = \bar{y} = \mathrm{i}^* = 0$.

1. Interpret the assumption $\delta > 0$ in equation (**??**).

2. Interpret equation (**??**).

3. Assume that money supply is constant ($m_t = \bar{m}$). What is the the dynamics of the nominal and real exchange rates?

4. What is the impact of an unanticipated permanent rise in the money demand at date 0?

5. Consider now the same model with $\bar{y} \neq 0$. Discuss and show graphically (and partially analytically) the short- and long-run effects of a rise in natural output.