

14.02 Macroeconomics

May 18, 2006

Practice Question: Mundell-Fleming Model

Managing Vermont's Economy

Vermont has been an independently minded state for some time. It finally decides to introduce its own currency, VT\$. You are lucky and get the job as Vermont's first central bank president. In order to determine the best economic policy, you write down the following open economy model for Vermont:

$$\text{IS: } Y = A + \alpha Y - \beta T - \gamma i + \delta Y^{US} - \phi E$$

$$\text{LM: } M = Y - \lambda i$$

$$\text{UIP: } i = i^{US} - \frac{E^e - E}{E}$$

With the following notation:

Y : Vermont's Real GDP

Y^{US} : Real GDP of the US

T : Vermont's Taxes

i : Vermont's nominal interest rate

i^{US} : Nominal interest rate of the US

E : VT\$ in terms of US\$

E^e : Expected future VT\$ in terms of US\$

M : Vermont's stock of money in circulation

The only trading partner of Vermont is the US. Please note that the level of prices is normalized to 1 in both Vermont and the US, and there is no inflation. All of the coefficients $\alpha, \beta, \gamma, \delta, \phi$ and λ as well as the constant A are assumed to be positive, and $\alpha, \beta < 1$. Capital is perfectly mobile.

1. Interpret each of the coefficients ($\alpha, \beta, \gamma, \delta$ and ϕ) in the IS relation. (Hint: relate your answer to the marginal propensity to consume, invest, export, and import).

Assume that you start with a fixed exchange rate regime such that VT\$ 1 is US\$ 0.5, i.e., the fixed exchange rate $\bar{E} = 0.5$. Financial markets expect the exchange rate regime to prevail in the future ($E^e = \bar{E}$).

2. Suppose that the level of taxes in Vermont is changed from T to $T' > T$. How do you as the central banker need to adjust your money supply? Explain why, relating your answer to the interest parity condition.

Things start to go wrong in Vermont's economy. The exchange rate is still fixed at the level \bar{E} , but financial markets now expect that this exchange rate will be abandoned in the future for a lower exchange rate $E' < \bar{E}$ (i.e., financial markets expect a devaluation of VT\$).

3. If the initial exchange rate \bar{E} is maintained, how is Vermont's interest rate affected by the anticipation of a future devaluation? What is the appropriate central bank policy that you need to undertake in order to maintain the fixed exchange rate? Draw the IS-LM diagram for the open economy. Show the effects graphically, and explain your answer in words.

After a few months of financial turmoil, you decide to abandon the fixed exchange rate regime and let the VT\$ float.

4. What is the impact on Vermont's economy (output, interest rates, exchange rate, trade balance) of an increase in i^{US} given a fixed money supply and fixed exchange rate expectations? Draw the IS-LM diagram for the open economy. Show the effects graphically, and explain your answer in words.
5. Can the Central Bank of Vermont use monetary policy to offset the impact of the increase in i^{US} on Vermont's GDP? What does this imply for the exchange rate?