

Problem Set 2

Due *in lecture* on Thursday, November 12. "Box - in" your answers to the algebraic questions.

1. Consider a CC-LM model, where CC is given by:

$$y = Y(i, \rho) \quad (4)$$

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$$\rho = \varphi(i, y, R, Z) \quad (6)$$

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So that:

$$dY(1 - Y_\rho \rho_Y) = (Y_\rho \rho_i + Y_i)di + Y_\rho \rho_R dR + Y_\rho \rho_Z dZ \quad (8)$$

and

$$dY = \frac{(Y_\rho \rho_i + Y_i)di + Y_\rho \rho_R dR + Y_\rho \rho_Z dZ}{(1 - Y_\rho \rho_Y)} \quad (8')$$

And the LM curve is given by:

$$di = \frac{m(dR) - D_Y dY}{D_i} \quad (10)$$

- 1.1 Show what happens if the investment projects that are funded by loans suddenly look more “risky” than they used to (e.g., loans for buying houses or loans for building shopping malls).
- 1.2 Show what happens if the Fed increases the amount of reserves in the economy by undertaking open market operations. Assume that the Fed does not pay interest on reserves.

1.3 Will an increase in government spending have a positive or negative impact on income? Explain, using a graph.

2. Data exercise: Taylor rule.

Consider the Taylor rule:

$$i_t^{FF} = \pi_t + 0.5(y_t - y_t^*) + 0.5(\pi_t - \pi_t^*) + r$$

Where i_t^{FF} is the target Fed Funds rate, y_t is log GDP, y_t^* is the measure of potential GDP (so $y_t - y_t^*$ is the output gap), π_t is the inflation rate, and π_t^* is the target inflation rate, and r is the natural rate of interest.

2.1 Download data for real GDP and core CPI from the St. Louis Fed's FREDII website, for the 1967Q1-2009Q3 period. Estimate the output gap by run a regression of log GDP on a constant, time trend (and possibly time trend squared), and taking the residual as the output gap. Setting the target inflation rate at 0.02 (2%) and the natural rate of interest as 0.025 (2.5%), calculate the target Fed Funds rate for 2009Q3.

2.2 Download an alternative output gap from <http://www.ssc.wisc.edu/~mchinn/outputgap.xls> . Redo your calculations for problem 2.1. How have your answers changed as a consequence of this alternative output gap?

3. Suppose we have an economy given by the following equations (IS-LM-BP=0) under floating exchange rates.

$$(1) \quad Y = \bar{\alpha}[\bar{A} + \overline{EXP} - \overline{IMP} + (n + v)q - bi] \quad \text{<IS curve>}$$

$$(1') \quad i = \frac{\bar{A} + \overline{EXP} - \overline{IMP} + (n + v)q}{b} - \left(\frac{1 - c(1 - t) + m}{b} \right) Y \quad \text{<IS curve>}$$

$$(2) \quad i = \frac{\mu}{h} - \left(\frac{1}{h} \right) \left(\frac{M}{P} \right) + \left(\frac{k}{h} \right) Y \quad \text{<LM curve>}$$

$$(3) \quad i = - \left(\frac{1}{\kappa} \right) [(\overline{EXP} - \overline{IMP} + \overline{KA}) + (n + v)q] + \bar{i}^* + \left(\frac{m}{\kappa} \right) Y \quad \text{<BP=0 curve>}$$

And assume we wish to increase output, and m/κ is small.

3.1 Show what happens when government spending is increased.

3.2 Show what happens if the money supply is increased.

3.3 Show what happens if the money supply is increased, both at home and abroad? Will the currency depreciate or appreciate (i.e., can you accomplish expenditure switching)?

3.4 Suppose import demand is given by:

$$IM = \overline{IMP} + mY - nq(1 + \tau)$$

Where τ is the tariff rate. Suppose the government raises the tariff rate from zero to $\tau_0 > 0$. What happens to output?

3.5 Suppose the foreign country responds to 3.4 by reducing \overline{EXP} . What happens to the home country?

Pa974ps2_f09, 31.10.2009