

Problem Set 5

Rational Expectations

1. *The robustness of the money neutrality proposition.* In class, we developed and solved a model showing that under RE only the **errors** made in monetary policy affected output, whereas the **systematic** component affected only prices. The implications are that a) there is a relationship between money and output, just as we see in the data, but b) monetary authorities cannot exploit this relationship even in the short run.

It was also pointed out that the money neutrality proposition would be overturned if the Fed chose its systematic policy on the basis of the outcomes of observed variables that the public had not yet seen. This question asks you to prove this formally. Consider the following model:

$$\text{AS curve:} \quad y_t = \beta(p_t - E[p_t | I_{t-1}])$$

$$\text{AD curve:} \quad y_t = m_t - p_t + v_t, \quad v_t = \rho v_{t-1} + u_t$$

$$\text{Policy rule:} \quad m_t = -\phi v_t + e_t,$$

where the random terms have the following expectations: $E[u_t | I_{t-1}] = 0$ and $E[e_t | I_{t-1}] = 0$. This is identical to the model solved in class, with one exception: the Fed now chooses the money supply on the basis of the current value of velocity, v_t , rather than last year's value v_{t-1} . Note that all the expectations formed by the public are based on information observable in period $t-1$ (that is, of course, the meaning of " I_{t-1} "), so that they have not observed v_t when the Fed observes it. Thus, the equations above, with one tiny change from what we have already seen, capture the idea that the Fed has information that the public does not.

Your task is to use the method of undetermined coefficients to solve first for p_t and then for y_t . In so doing, show that output does depend on the systematic component of monetary policy, ϕ . Be sure to explain the steps you are taking in solving the model, and interpret verbally the meaning of your solutions.