

## Problem Set 2

Due in class on Thursday, February 23.  
To be handed at the beginning of lecture.

Please write your name, GSI name and section time in your problem set.

### Problem 1

In lecture we studied the effect of an unexpected permanent increase in the money supply on the money and foreign exchange markets and we analyzed the adjustment of the variables of the model over time. However, we did not study the behavior of the expected real interest rate  $r$ . Describe how  $r$  evolves over time after the shock. Present the evolution of  $r$  and the nominal interest rate  $i$  in a graph. Assuming that  $r$  is positive before the shock, can it become negative after the shock?

### Problem 2

Suppose there is a permanent decrease in the U.S. money supply. Trace the short-run and long-run effects on the current and expected exchange rate, interest rate, and price level. Draw the two-sided diagram to help explain your answer. Also draw the time paths of each of these variables. (We assume the economy starts with all variables at their long-run levels and that output remains constant as the economy adjusts to the money change, i.e. real output  $Y$  is given.)

### Problem 3

In our discussion of short-run exchange rate overshooting, we assumed that real output and prices were given. We will now relax these assumptions one at a time: in part (a) we allow prices to be flexible and in part (b) we allow real output to respond to changes in money supply.

- (a) Suppose that prices are fully flexible in the short run. Redo the analysis of a permanent increase in the money supply using the two-sided diagram and also show the time paths of the money supply, price level, nominal interest rate and exchange rate after the shock. How do these results differ from the baseline case with sticky prices?
- (b) Now suppose instead that an increase in the money supply raises real output in the short run (an assumption that will be justified later in the course). How does this affect the extent to which the exchange rate overshoots when the money supply first increases? Is it likely that the exchange rate undershoots? (*Hint: In Figure 14-12a of the textbook, allow the aggregate real money demand schedule to shift in response to the increase in output.*)

#### Problem 4

- (a) “In the short run, an increase in the money supply always lowers nominal interest rates and depreciates the currency.” Argue whether this statement is true, false, or uncertain. Explain your answer.
- (b) Discuss the following statement: When a change in a country’s nominal interest rate is caused by a rise in the expected real interest rate, the domestic currency appreciates. When the change is caused by a rise in expected inflation, the currency depreciates.
- (c) “According to the overshooting theory, nominal exchange rates are volatile because the money supply fluctuates randomly.” Argue whether the statement is true, false or uncertain and explain. Include in your answer a brief overview of the overshooting theory stating the assumptions, the predictions of the model and its importance.

#### Problem 5

Suppose that in December 2005, the euro exchange rate with the RON ( the Romanian currency) is 0.2620 €/RON. Over the year 2006, the Romanian inflation rate is 9.7%, and the Euro area inflation rate is 2%. If the exchange rate at the end of the year 2006 is 0.2735 €/RON, does the RON appear to be overvalued, undervalued, or at the PPP level? Explain. What if instead Romanian inflation were 2% and the Euro area inflation rate were 10% over the year? Explain why your answer changes.

#### Problem 6

Productivity growth has increased in Central and Eastern European countries relative to Western European countries. This has implications for the real exchange rate as well as for the long-run nominal exchange rate. (*Hint: The effect of a change in productivity is analogous to the discussion in Chapter 15 on the effect of a change in relative output supply on exchange rates.*) Let’s look at the Czech Republic versus France.

- (a) What happens to the Czech real exchange rate if the Czech Republic has a one-time increase in productivity relative to that of France? What happens to its nominal exchange rate?
- (b) How does the effect on the nominal exchange rate differ if, instead of a one-time drop in productivity, Czech productivity relative to France continues to increase for a very long time?

#### Problem 7

Why might it be that relative PPP holds more closely in the long run than the short-run? (Think about how international trading firms might react to large and persistent cross-border price differences.)

### Problem 8

- (a) A robust empirical fact is that price levels for services (or more generally, non-tradable goods) are generally lower in poor countries. Can you explain why this might be the case?
- (b) Suppose I told you that the price of a massage in Kenya is 3195 KES (Kenyan shillings) and the price of a massage in the US is \$80. Now, go on the web and look up Kenya's actual market exchange rate (<http://www.centralbank.go.ke/>). Using this market exchange rate, calculate the price in dollars of a massage in Kenya. Is this price higher or lower than the US price? Is this answer consistent with the Balassa-Samuelson theory?
- (c) Again using the prices given in part (b), calculate the implied PPP exchange rate between dollars and KES. Now, suppose that the Kenyan GDP is approximately 1,200 billion KES. Calculate the value of Kenyan GDP in dollars using both the market exchange rate and the PPP exchange rate you calculated. Is the value of Kenyan GDP higher or lower when using the PPP exchange rate relative to when you use the market exchange rate? Can you explain why?