

Problem Set 3

Due in Lecture on Thursday, December 4th. "Box-in" your answers to the algebraic questions.

1. Policy under Fixed Exchange Rates

Suppose the economy is given by the following set of equations.

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

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

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

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

1.1 Assume the economy depicted in 1.1 experiences a rise in the foreign interest rate i^* . Show what happens under *fixed* exchange rates, if capital flows are not sterilized.

1.2 Now show what happens if the economy is under *floating* exchange rates.

1.3 Suppose that exports depend upon rest-of-world GDP:

$$EX = \overline{EXP} + vq + m^* Y^*$$

so that the BP=0 schedule is given by:

$$i = -\left(\frac{1}{\kappa}\right)[(\overline{EXP} - \overline{IMP} + \bar{KA}) + (n + v)q] + \bar{i}^* + \left(\frac{m}{\kappa}\right)Y - \left(\frac{m^*}{\kappa}\right)Y^*$$

and the IS curve by:

$$i = \frac{\bar{A} + \overline{EXP} - \overline{IMP} + (n + v)q + m^* Y^*}{b} - \left(\frac{1 - c(1 - t) + m}{b} \right) Y$$

Now answer 1.2 assuming that when i^* rises, Y^* falls.

1.4 What is the net effect on output? Can you determine what happens to the trade balance?

2. Covered and uncovered interest parity.

2.1 Assume that covered interest parity holds, so $(1+i) = (F/S)(1+i^*)$. Fill in the following grid (carry your answer out to three decimal places), for (a) and (b).

2.2 Assume that uncovered interest parity holds, so $(1+i) = (S^e/S)(1+i^*)$. Fill in the following grid (carry your answer out to three decimal places), for (c) and (d).

	i	i^*	F	S
a.	0.05	0.08	1.20	
b.	0.05		1.20	1.25
	i	i^*	S^e	S
c.		0.08	1.20	1.245
d.	0.06	0.09		1.245

3. Using real data to evaluate PPP and UIP. Consider the table drawn from the *Economist*, downloaded November 24 (<http://www.economist.com/indicators>), on the attached pages. Answer these questions using equations, and show your work.

3.1 Using the 3 month interest rates, and assuming UIP holds, calculate the expected change in the dollar/euro exchange rate over the next three months. Be sure to state what the rate will be, in annualized terms, and what will be the actual percentage change in the dollar/euro exchange rate.

3.2 Using 10 year bonds, calculate what the implied change in the dollar/euro exchange rate is, over the next ten years.

3.3 Given the empirical evidence on the relationship between exchange rate changes and interest differentials provided in the table in the handout on CIP and UIP, what do you expect to happen to the dollar/euro rate over the next three months, and over the next ten years? Explain.

3.4 Given the inflation rates over the past year, what should have been the rate of change in the US dollar/euro exchange rate if relative purchasing power parity (in growth rates) held?

ALL Country	Trade balance	Current-account balance		Currency units		Budget balance	Interest rates	
	latest 12 months, \$bn	latest 12 months, \$bn	% of GDP, 2014*	Nov 21st, per \$	year ago, per \$	% of GDP 2014*	3-month latest	10-year government bonds, latest
United States	-723.3 Sep	-389.2 Q2	-2.3	-	-	-2.8	0.23	2.32
China	+335.1 Oct	+206.0 Q3	+2.2	6.12	6.09	-3.0	4.15	3.48 *
Japan	-106.2 Sep	-2.5 Sep	+0.2	117	101	-8.0	0.11	0.46
Britain	-185.6 Sep	-147.5 Q2	-4.4	0.64	0.62	-4.5	0.53	2.24
Canada	+2.7 Sep	-50.4 Q2	-2.6	1.12	1.05	-2.4	1.22	2.01
Euro area	+235.3 Sep	+327.3 Sep	+2.4	0.81	0.74	-2.6	0.08	0.77

ALL Country	Gross domestic product, % change on a year ago				Industrial production, % change on a year ago	Consumer prices % change on a year ago			Unemployment rate, %
	latest	quarter*	2014*	2015*	latest	latest	year ago	2014*	latest
United States	+2.3 Q3	+3.6	+2.2	+2.9	+4.0 Oct	+1.7 Oct	+1.0	+1.8	5.8 Oct
China	+7.3 Q3	+7.8	+7.3	+7.0	+7.7 Oct	+1.6 Oct	+3.2	+2.1	4.1 Q2 *
Japan	-1.2 Q3	-1.6	+0.9	+1.1	+0.8 Sep	+3.3 Sep	+1.0	+2.8	3.6 Sep
Britain	+3.0 Q3	+2.8	+3.0	+2.7	+1.4 Sep	+1.3 Oct	+2.2	+1.6	6.0 Aug *
Canada	+2.6 Q2	+3.6	+2.3	+2.5	+3.2 Aug	+2.4 Oct	+0.7	+1.9	6.5 Oct
Euro area	+0.8 Q3	+0.6	+0.8	+1.2	+0.7 Sep	+0.4 Oct	+0.7	+0.5	11.5 Sep

3.5 Interpret the November 8th *Economist* poll of expected inflation rate for 2015 as the expected change from December 2014 to December 2015. What is the expected change in the US dollar/euro over that period if relative PPP holds?

The Economist poll of forecasters, November averages (previous month's, if changed)

	Real GDP, % change				Consumer prices % change		Current account % of GDP	
	Low/high range		average		2014	2015	2014	2015
	2014	2015	2014	2015				
Australia	2.6/3.2	2.3/3.3	3.0	2.9 (2.8)	2.6	2.5	-2.8 (-2.5)	-2.8 (-2.5)
Belgium	0.7/1.4	0.7/2.0	1.0	1.2 (1.3)	0.7	1.1 (1.2)	-0.9 (-0.7)	-1.1 (-0.7)
Britain	3.0/3.2	2.3/3.2	3.0 (3.1)	2.7	1.6 (1.7)	1.7 (1.9)	-4.4 (-4.2)	-3.8 (-3.7)
Canada	2.1/2.5	2.3/2.9	2.3	2.5	1.9	1.9 (2.0)	-2.6	-2.3
France	0.3/0.4	0.3/1.4	0.4	0.8 (1.0)	0.6 (0.7)	0.9 (1.0)	-1.4	-1.3 (-1.4)
Germany	1.2/1.6	1.1/1.9	1.4 (1.5)	1.5 (1.7)	1.0	1.4 (1.5)	7.0 (6.8)	6.7 (6.4)
Italy	-0.4/-0.2	-0.3/0.9	-0.3 (-0.2)	0.5 (0.6)	0.3	0.5 (0.7)	1.3 (1.2)	1.3
Japan	0.4/1.3	0.2/1.9	0.9 (1.0)	1.1 (1.2)	2.8	1.8	0.2	0.7 (0.6)
Netherlands	-0.1/0.9	0.7/1.7	0.6	1.3	0.8	1.3	9.7	9.5
Spain	1.1/1.4	1.0/2.3	1.2	1.7	nil	0.6	0.3 (0.4)	0.6
Sweden	1.5/2.5	1.9/3.1	2.1	2.6	nil (0.1)	1.1 (1.3)	5.9 (6.0)	5.9 (6.1)
Switzerland	1.1/2.3	1.1/2.8	1.5	1.7 (1.9)	0.1	0.5 (0.6)	12.0 (11.8)	11.6
United States	2.0/2.3	2.2/3.5	2.2	2.9 (3.0)	1.8	1.8 (2.0)	-2.3 (-2.5)	-2.2 (-2.5)
Euro area	0.7/1.2	0.8/1.6	0.8	1.2 (1.3)	0.5 (0.6)	0.9 (1.1)	2.4 (2.3)	2.4 (2.2)

Sources: Bank of America, BNP Paribas, Citigroup, Commerzbank, Decision Economics, Deutsche Bank, Economist Intelligence Unit, Goldman Sachs, HSBC Securities, ING, JPMorgan Chase, KBC Bank, Morgan Stanley, RBC, RBS, Schroders, Scotia Capital, Société Générale, Standard Chartered, UBS

Economist, Nov. 8th, 2014. <http://www.economist.com/news/economic-and-financial-indicators/21631054-economist-poll-forecasters-november-averages>

4. Flexible price monetary model of exchange rates. Assume $\lambda=5$.

4.1 If the money supply increases by 5% today, and stays 5% higher than it was expected to be, in all future periods, what happens to the nominal exchange rate and nominal interest rate today, and into the future?

4.2 Suppose the fundamentals are initially expected to grow by 0% per annum. Suppose the expected growth rate increases to 5%. What happens to the exchange rate, if anything, the instant the expected growth

rate changes?

5. Sticky price monetary model of exchange rates.

5.1 Explain what happens if the monetary authority in US decreases the money supply by 5 percent. In your answer, indicate the time paths of M , P , M/P , $r-r^*$, s . Use graphs.

5.2 Suppose θ equals infinity. Redo 5.1.

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