

### Problem Set 1

Due *in lecture* on Wednesday, 15 February.

**1. Balance of payments identities.** Recalling the balance of payments identity,  $CA + KA + ORT \equiv 0$ , answer the following questions.

- 1.1 If  $CA < 0$  and the central bank is neither accumulating nor decumulating foreign exchange reserves, what must be true about private capital inflows?
- 1.2 If foreigners are purchasing more U.S. securities (T-bills, corporate bonds and stocks) than U.S. residents are purchasing of foreign securities, then what is the value of  $KA$ ? (Ignore direct investment for purposes of this question).
- 1.3 If a country maintains a pegged exchange rate and runs a balance of payments deficit, then what must be true about  $ORT$ ? Explain what this means in words.

Download the most recent issue of *Economic Indicators*, compiled by the Council of Economic Advisers and published by the Joint Economic Committee. There is a link to this at <http://www.whitehouse.gov/cea>. Go to the “Economic” link.

- 1.4 Calculate  $KA$  for 2007, using the data in Economic Indicators, “U.S. International Transactions”.
- 1.5 Calculate  $ORT$  for 2007.

**2. The foreign exchange market.** Using a supply and demand diagram, and defining the US as the home country and either euro area as the foreign, show what happens in the following situations (assuming a flexible exchange rate regime).

- 2.1 US demand for French cheese increases.
- 2.2 French demand for American stocks declines.

Using the Table reproduced from the *Economist* (January 28<sup>th</sup> edition), answer the following questions. I suggest using log approximations.

- 2.3 Has the US dollar (USD) appreciated or depreciated against the yen over the past year? By what amount has the USD appreciated/depreciated (in percentage terms)?
- 2.4 How many US dollars does it take to buy a single Australian dollar (AUD) now? How many did it take a year ago? Has the US dollar appreciated or depreciated?
- 2.5 What is the exchange rate of Swiss francs (SFR) for Australian dollars (AUD) (i.e., how many Swiss francs does it take to purchase a single Australian dollar)?

## Trade, exchange rates, budget balances and interest rates

	Trade balance*		Current-account balance		Currency units, per \$		Budget balance	Interest rates, %		
	latest 12 months, \$bn		latest 12 months, \$bn	% of GDP 2011 <sup>1</sup>	Feb 1st	year ago	% of GDP 2011 <sup>1</sup>	3-month latest	10-year gov't bonds, latest	
<b>United States</b>	-730.7	Nov	-466.8	Q3	-3.1	—	—	-8.7	0.15	1.84
<b>China</b>	+157.9	Dec	+259.3	Q3 <sup>2</sup>	+2.9	6.31	6.59	-1.8	5.46	3.57
<b>Japan</b>	-9.4	Nov	+130.8	Nov	+2.2	76.1	81.6	-8.6	0.15	0.96
<b>Britain</b>	-162.7	Nov	-70.6	Q3	-1.9	0.63	0.62	-8.6	1.10	2.11
<b>Canada</b>	+0.2	Nov	-49.7	Q3	-2.9	1.00	0.99	-4.1	0.88	2.01
<b>Euro area</b>	-32.3	Nov	-63.7	Nov	-0.5	0.76	0.72	-4.3	1.12	1.83
<b>Austria</b>	-10.3	Oct	+10.5	Q3	+2.5	0.76	0.72	-3.6	1.12	3.06
<b>Belgium</b>	+12.4	Nov	+0.3	Sep	+1.1	0.76	0.72	-4.3	1.12	3.54
<b>France</b>	-97.9	Nov	-65.3	Nov	-2.5	0.76	0.72	-5.6	1.12	3.02
<b>Germany</b>	+193.5	Nov	+189.6	Nov	+5.2	0.76	0.72	-1.0	1.12	1.84
<b>Greece</b>	-37.2	Nov	-28.7	Nov	-8.6	0.76	0.72	-10.0	1.12	36.3
<b>Italy</b>	-39.8	Nov	-76.6	Nov	-3.6	0.76	0.72	-4.0	1.12	5.65
<b>Netherlands</b>	+57.0	Nov	+66.6	Q3	+7.0	0.76	0.72	-4.8	1.12	2.15
<b>Spain</b>	-61.8	Nov	-53.6	Nov	-3.7	0.76	0.72	-8.2	1.12	4.82
<b>Czech Republic</b>	+10.1	Nov	-5.6	Q3	-3.2	19.1	17.5	-4.4	1.17	3.21
<b>Denmark</b>	+14.3	Nov	+22.1	Nov	+6.0	5.63	5.40	-3.7	1.00	1.77
<b>Hungary</b>	+9.8	Nov	+1.8	Q3	+1.3	220	195	+1.3	7.49	9.03
<b>Norway</b>	+70.0	Dec	+70.2	Q3	+14.6	5.79	5.73	+14.0	2.69	2.38
<b>Poland</b>	-14.7	Nov	-21.9	Nov	-5.2	3.17	2.83	-5.6	4.89	5.52
<b>Russia</b>	+193.7	Nov	+101.1	Q4	+5.2	30.1	29.4	nil	6.72	4.73
<b>Sweden</b>	+12.0	Dec	+39.7	Q3	+7.3	6.72	6.44	+0.5	2.57	1.73
<b>Switzerland</b>	+26.8	Dec	+95.7	Q3	+13.6	0.91	0.94	+0.8	0.07	0.61
<b>Turkey</b>	-105.9	Dec	-77.8	Nov	-10.3	1.75	1.58	-1.7	11.2	9.52
<b>Australia</b>	+30.2	Dec	-32.6	Q3	-2.2	0.93	0.99	-2.6	4.65	3.79
<b>Hong Kong</b>	-62.9	Dec	+13.6	Q3	+5.4	7.75	7.79	+1.5	0.40	1.10
<b>India</b>	-131.1	Nov	-65.1	Q3	-2.7	49.3	45.6	-5.4	8.81	8.47
<b>Indonesia</b>	+26.3	Dec	+3.6	Q3	+0.4	8,985	9,021	-1.0	9.90	3.94 <sup>1</sup>
<b>Malaysia</b>	+39.8	Nov	+32.7	Q3	+12.5	3.04	3.04	-5.5	3.22	2.86 <sup>1</sup>
<b>Pakistan</b>	-18.6	Dec	-0.2	Q3	-0.8	90.4	85.5	-5.9	11.5	15.3 <sup>1</sup>
<b>Singapore</b>	+43.8	Dec	+49.2	Q3	+18.2	1.25	1.27	+0.6	0.54	1.39
<b>South Korea</b>	+27.7	Jan	+27.7	Dec	+2.4	1,126	1,117	+2.1	3.55	3.71
<b>Taiwan</b>	+11.2	Dec	+38.6	Q3	+8.4	29.7	29.0	-3.9	1.15	1.28
<b>Thailand</b>	+23.5	Dec	+12.1	Nov	+3.1	31.0	30.9	-2.9	3.08	3.22
<b>Argentina</b>	+10.3	Dec	nil	Q3	-0.3	4.34	4.01	-1.4	12.8	na
<b>Brazil</b>	+29.8	Dec	-49.3	Nov	-2.2	1.73	1.66	-2.6	10.4	11.2**
<b>Chile</b>	+10.6	Dec	-1.2	Q3	-0.8	487	480	+1.0	5.52	2.82 <sup>1</sup>
<b>Colombia</b>	+0.9	Nov	-9.6	Q3	-2.6	1,796	1,851	-2.5	5.13	3.66 <sup>1</sup>
<b>Mexico</b>	-1.2	Dec	-10.0	Q3	-1.9	12.9	12.0	-2.9	4.24	5.83
<b>Venezuela</b>	+43.0	Q3	+26.0	Q3	+7.7	5.30	na	-5.0	14.5	6.55 <sup>1</sup>
<b>Egypt</b>	-25.0	Q3	-4.1	Q3	-2.1	6.03	5.86	-10.0	9.90	7.40 <sup>1</sup>
<b>Israel</b>	-15.2	Dec	+1.8	Q3	+0.2	3.72	3.68	-3.0	2.40	3.39
<b>Saudi Arabia</b>	+149.5	2010 <sup>5</sup>	+75.3	2010 <sup>5</sup>	+24.4	3.75	3.75	+14.3	0.82	na
<b>South Africa</b>	-2.9	Dec	-11.6	Q3	-4.1	7.66	7.16	-5.5	5.60	7.63
<b>Estonia</b>	-0.7	Nov	+0.7	Nov	+1.8	0.76	0.72	-0.1	1.12	na
<b>Finland</b>	-0.5	Nov	-0.4	Nov	-0.2	0.76	0.72	-1.6	0.95	2.25
<b>Iceland</b>	+1.0	Dec	-1.0	Q3	-5.9	123	115	-4.8	4.55	na
<b>Ireland</b>	+61.7	Nov	+1.2	Q3	+0.4	0.76	0.72	-10.3	1.12	7.11
<b>Latvia</b>	-2.4	Nov	+0.3	Nov	-0.6	0.53	0.51	-5.0	1.18	na
<b>Lithuania</b>	-3.5	Dec	-0.3	Nov	-2.2	2.62	2.50	-5.3	1.39	na
<b>Luxembourg</b>	-8.1	Nov	+4.2	Q3	na	0.76	0.72	-0.7	1.12	na

### 3. Elasticities approach.

- 3.1 Suppose that each one percent depreciation in the US dollar induces a 0.75 increase in exports and a 0.25 decrease in imports. Starting from a position where exports equals imports, what will be the impact on the trade balance?
- 3.2 Suppose the US experiences the exchange rate depreciation while running a large trade deficit. What will happen to the trade balance?
- 3.3 Suppose that instead of the elasticities being constant, they are smaller in the short run, and larger in the long run. What is the time path of the trade balance over time (starting from initial balance)?

**4. Equilibrium income and multipliers.** Consider the following model of the economy (where there are no taxes):

<u>Eq.No.</u>	<u>Equation</u>	<u>Description</u>
(1)	$Y = AD$	Output equals aggregate demand, an equilibrium condition
(2)	$AD \equiv C + I + G + EX - IM$	Definition of aggregate demand
(3)	$C = \bar{C}\bar{O} + cY$	Consumption function, $c$ is the MPC
(6)	$I = \bar{I}\bar{N}$	Investment function
(7)	$G = \bar{G}\bar{O}$	Government spending on goods and services
(9)	$EX = \bar{E}\bar{X}\bar{P}$	Export spending
(10)	$IM = \bar{I}\bar{M}\bar{P} + mY$	Import spending

- 4.1 Solve for  $Y$ , setting  $\bar{A} \equiv \bar{C}\bar{O} + \bar{I}\bar{N} + \bar{G}\bar{O}$ .
- 4.2 Calculate the change in income for a given change in (autonomous) exports. Show your work!
- 4.3 Calculate the change in income for a given change in government spending. Show your work!
- 4.4 Calculate the change in the trade balance for a given change in autonomous exports. Hint:  $TB \equiv EX - IM$ , so  $\Delta TB = \Delta EXP - \Delta IMP - m\Delta Y$ . Show your work!
- 4.5 In words, explain why the change in the trade balance is not equal to the change in autonomous exports.