

### Problem Set 1

Due *in lecture* on Monday, 25 February. "Box-in" your answers to the algebraic questions.

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

1.1 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.

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  $KA$ , assuming the U.S. is on a pure float? (Ignore direct investment for purposes of this question).

1.3 If  $CA < 0$  and the central bank is neither accumulating nor decumulating foreign exchange reserves, what must be true about private capital inflows?

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 "publications" link.

1.4 Calculate  $KA$  for 2006, using the data in *Economic Indicators*, "U.S. International Transactions".

1.5 Calculate  $ORT$  for 2006.

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

2.1 US demand for Japanese autos decreases.

2.2 Japanese demand for American soybeans increases.

2.3 Remittances from US residents in Japan back to the US increases.

Using the Table reproduced from the *Economist* (February 9<sup>th</sup> edition), answer the following questions.

2.4 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)?

2.5 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?

2.6 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 \$ Feb 6th year ago	Budget balance % of GDP 2008†	Interest rates, %	
	latest 12 months, \$bn	latest 12 months, \$bn	% of GDP 2008†	latest 12 months, \$bn	% of GDP 2008†			3-month latest	10-year gov't bonds, latest
United States	-813.0 Nov	-752.4 Q3	-4.8	-	-	-	-1.7	2.83	3.61
Japan	+107.0 Nov	+212.9 Nov	+4.8	107	121	-	-2.4	0.74	1.40
China	+261.5 Dec	+249.9 2006	+10.9	7.18	7.75	-	0.1	4.50	4.01
Britain	-168.2 Nov	-129.4 Q3	-3.7	0.51	0.51	-	-3.2	5.55	4.46
Canada	+48.7 Nov	+16.3 Q3	+0.3	1.00	1.18	-	0.8	3.32	3.84
Euro area	+47.6 Nov	+32.8 Nov	nil	0.68	0.77	-	-0.9	4.36	3.90
Austria	+1.2 Nov	+11.3 Q3	+3.1	0.68	0.77	-	-0.7	4.36	3.99
Belgium	+18.4 Nov	+13.3 Sep	+2.5	0.68	0.77	-	-0.6	4.42	4.14
France	-53.8 Dec	-31.6 Nov	-1.4	0.68	0.77	-	-2.8	4.36	4.01
Germany	+268.1 Nov	+218.0 Nov	+5.7	0.68	0.77	-	0.6	4.36	3.90
Greece	-53.7 Oct	-44.8 Nov	-12.9	0.68	0.77	-	-2.7	4.36	4.27
Italy	-10.7 Nov	-43.1 Nov	-2.4	0.68	0.77	-	-2.6	4.36	4.28
Netherlands	+56.4 Nov	+57.2 Q3	+7.3	0.68	0.77	-	0.3	4.36	4.00
Spain	-130.1 Nov	-133.0 Oct	-9.0	0.68	0.77	-	nil	4.36	4.08
Czech Republic	+4.2 Dec	-4.9 Nov	-3.6	17.5	21.6	-	-2.6	3.93	4.43
Denmark	+4.2 Nov	+4.0 Nov	+1.3	5.08	5.73	-	2.8	4.75	4.02
Hungary	-0.4 Nov	-6.8 Q3	-6.2	179	194	-	-4.4	7.51	7.45
Norway	+59.0 Dec	+59.9 Q3	+15.3	5.50	6.23	-	17.8	5.76	4.27
Poland	-11.8 Nov	-15.8 Nov	-4.1	2.45	2.97	-	-2.0	5.65	5.68
Russia	+128.2 Nov	+76.6 Q4	+4.3	24.6	26.5	-	1.2	10.25	6.29
Sweden	+17.8 Dec	+29.4 Q3	+6.0	6.44	7.00	-	2.3	3.99	3.93
Switzerland	+11.6 Dec	+69.6 Q3	+14.7	1.10	1.24	-	0.6	2.67	2.80
Turkey	-62.8 Dec	-35.7 Nov	-7.1	1.18	1.40	-	-2.9	16.58	5.99‡
Australia	-18.0 Dec	-49.9 Q3	-5.4	1.11	1.28	-	1.5	7.42	6.08
Hong Kong	-23.5 Dec	+26.9 Q3	+6.4	7.80	7.81	-	2.6	2.36	2.39
India	-68.9 Dec	-10.9 Q3	-2.0	39.5	44.1	-	-3.3	7.25	7.75
Indonesia	+39.8 Dec	+10.3 Q3	+1.9	9,242	9,039	-	-1.8	8.03	6.71‡
Malaysia	+29.9 Nov	+28.7 Q3	+12.0	3.23	3.49	-	-3.1	3.62	3.24‡
Pakistan	-15.2 Dec	-7.3 Q3	-6.5	62.8	60.8	-	-5.0	10.11	9.58‡
Singapore	+36.1 Dec	+46.3 Q3	+22.4	1.42	1.53	-	0.1	1.63	2.21
South Korea	+10.7 Jan	+6.0 Dec	+0.8	942	934	-	0.2	5.46	5.26
Taiwan	+16.7 Dec	+28.4 Q3	+5.9	32.0	33.0	-	-2.1	2.60	2.52
Thailand	+12.1 Dec	+14.9 Dec	+2.4	32.9	34.4	-	-2.1	3.30	3.79
Argentina	+11.2 Dec	+6.8 Q3	+1.7	3.17	3.10	-	1.2	10.56	na
Brazil	+38.5 Jan	+3.6 Dec	-0.1	1.76	2.08	-	-2.5	11.18	6.16‡
Chile	+24.5 Dec	+6.7 Q3	+4.0	475	548	-	5.4	6.36	3.73‡
Colombia	-1.4 Nov	-5.2 Q3	-3.8	1,928	2,237	-	-1.3	9.21	5.96‡
Mexico	-11.2 Dec	-7.5 Q3	-1.4	10.8	10.9	-	nil	7.42	7.57
Venezuela	+23.4 Q3	+20.2 Q3	+7.0	5.25	4.23§	-	-2.6	13.59	6.55‡
Egypt	-18.0 Q3	+1.2 Q3	+0.9	5.53	5.70	-	-7.0	5.99	4.91‡
Israel	-10.2 Dec	+5.9 Q3	+3.3	3.63	4.24	-	-1.4	4.37	5.21
Saudi Arabia	+146.6 2006	+98.9 2006	+21.8	3.75	3.75	-	12.0	3.00	na
South Africa	-10.3 Dec	-19.9 Q3	-7.8	7.67	7.18	-	0.6	11.20	8.80
<b>MORE COUNTRIES</b>	Data for the countries below are not provided in printed editions of <i>The Economist</i>								
Estonia	-4.2 Nov	-3.2 Nov	-14.1	10.7	12.0	-	1.3	7.30	na
Finland	+13.1 Nov	+14.8 Nov	+4.2	0.68	0.77	-	3.7	4.26	3.98
Iceland	-1.7 Jan	-3.0 Q3	-10.3	66.0	67.9	-	2.3	13.77	na
Ireland	+37.3 Nov	-11.1 Q3	-3.2	0.68	0.77	-	-1.1	4.36	4.12
Latvia	-7.2 Nov	-6.5 Oct	-21.5	0.48	0.54	-	1.0	7.39	na
Lithuania	-6.9 Nov	-5.3 Nov	-14.2	2.36	2.65	-	-0.6	5.08	na
Luxembourg	-6.0 Nov	+4.7 Q3	na	0.68	0.77	-	0.9	4.36	na
New Zealand	-3.9 Dec	-10.2 Q3	-7.4	0.78	1.46	-	3.8	7.30	6.33
Peru	+8.3 Nov	+2.2 Q3	+1.3	0.34	3.19	-	1.4	4.30	na
Philippines	-5.0 Nov	+5.8 Sep	+5.2	40.7	48.4	-	-0.4	5.69	na
Portugal	-24.7 Oct	-18.6 Oct	-8.1	0.68	0.77	-	-2.6	4.36	4.17
Slovakia	-0.9 Nov	-3.5 Sep	-3.1	22.8	26.5	-	-2.3	4.16	4.26
Slovenia	-2.8 Nov	-1.8 Oct	-2.5	0.68	0.77	-	-0.7	na	na

\*Merchandise trade only. †The Economist poll or Economist Intelligence Unit forecast. ‡Dollar-denominated bonds. §Unofficial exchange rate.

Sources: National statistics offices and central banks; Thomson Datastream; Reuters; JPMorgan; Bank Leumi le-Israel; Centre for Monitoring Indian Economy; Danske Bank; Hong Kong Monetary Authority; Standard Bank Group; UBS; Westpac.

### 3. Elasticities approach.

3.1 Suppose that each one percent depreciation in the US dollar induces a 0.60 increase in exports and a 0.30 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, assuming income stays constant?

### 4. National savings identity

$$C + S + TA \equiv Y$$

$$C + I + G + EX - IM \equiv Y$$

Treat  $Y$  as being GDP.

Defining  $TB \equiv EX - IM$ , solve for the  $TB$  on the left hand side, and the government budget surplus (taxes minus government spending), and private savings minus private investment on the right hand side.

### 5. Equilibrium income and multipliers. Consider the following model of the economy.

<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)	$C = \bar{C}\bar{O} + c(Y - T)$	Consumption function, $c$ is the MPC
(4)	$T = \bar{T}\bar{A} + tY$	Tax function; $\bar{T}\bar{A}$ is lump sum taxes, $t$ is tax rate.
(5)	$I = \bar{I}\bar{N}$	Investment function
(6)	$G = \bar{G}\bar{O}$	Government spending on goods and services
(7)	$EX = \bar{E}\bar{X}\bar{P} + vq$	Export spending
(8)	$IM = \bar{I}\bar{M}\bar{P} + mY - nq$	Import spending

5.1 Solve for  $Y$ , setting  $\bar{A} \equiv \bar{C}\bar{O} + \bar{I}\bar{N} + \bar{G}\bar{O}$ .

5.2 Calculate the change in income for a given change in investment. Show your work!

5.3 Calculate the change in income for a given change in lump sum taxes. Show your work!

5.4 How does  $\Delta Y / \Delta TA$  change as  $t$  rises? What is the intuition for your answer?

5.5 Calculate the change in the trade balance for a given change in lump sum taxes. Hint:  $TB \equiv EX - IM$ , so  $\Delta TB = \Delta EXP - \Delta IMP - m\Delta Y$ . Show your work!

5.6 Solve for a change in the budget surplus resulting from the change in lump sum taxes. Show your work! What do your answers to 5.5 and 5.6 tell you about how these two variables should respond to changes in lump sum taxes?

5.7 Suppose autonomous imports *decrease*. What are the implications for the trade balance and the budget balance? Do they move in the same or different directions?

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