

Problem Set 1

Due *in lecture* on Wednesday, September 28.

1. Balance of payments identities. Recalling the balance of payments identity, $CA + FA + ORT \equiv 0$, 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 a country maintains a pegged exchange rate and runs a balance of payments surplus, then what must be true about ORT ? Explain what this means in words.

1.3 From the Chinese perspective, if the Chinese central bank is purchasing U.S. securities (T-bills, corporate bonds and stocks) and the U.S. central bank is purchasing no Chinese securities, then what is the value of ~~KA~~ **FA** (Ignore direct investment for purposes of this question)? What is the value of ORT ?

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1.4 Calculate FA for 2015, using the data in Economic Indicators, "U.S. International Transactions".

1.5 Identify ORT for 2015.

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* (September 17th edition, <http://www.economist.com/news/economic-and-financial-indicators/21707195-trade-exchange-rates-budget-balances-and-interest-rates>), answer the following questions. **Show your work, and "box in" your answers.**

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 Japanese yen (JPY) for Australian dollars (AUD) (i.e., how many Japanese yen 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 2016 ¹	Sep 14th	year ago	% of GDP 2016 ¹	3-month latest	10-year gov't bonds, latest
United States	-750.1 Jul	-473.1 Q1	-2.6	-	-	-3.2	0.85	1.72
China	+591.5 Aug	+256.1 Q2	+2.7	6.67	6.37	-3.8	2.79	2.58 ¹⁵⁵
Japan	+27.3 Jul	+167.6 Jul	+3.4	103	120	-5.0	-0.03	-0.01
Britain	-192.8 Jul	-161.9 Q1	-5.4	0.76	0.65	-3.9	0.36	0.89
Canada	-22.3 Jul	-51.1 Q2	-3.2	1.32	1.33	-2.5	0.85	1.19
Euro area	+291.1 Jun	+393.5 Jun	+3.2	0.89	0.89	-1.8	-0.30	0.03
Austria	-2.5 Jun	+10.5 Q1	+2.8	0.89	0.89	-1.4	-0.30	0.13
Belgium	+24.4 Jun	+6.5 Mar	+1.2	0.89	0.89	-2.8	-0.30	0.30
France	-53.1 Jul ¹	-22.5 Jul ¹	-0.5	0.89	0.89	-3.3	-0.30	0.35
Germany	+277.5 Jul	+300.2 Jul	+8.4	0.89	0.89	+0.4	-0.30	0.03
Greece	-17.7 Jun	+1.5 Jun	-0.1	0.89	0.89	-4.6	-0.30	8.47
Italy	+56.2 Jun	+53.9 Jun	+2.3	0.89	0.89	-2.6	-0.30	1.30
Netherlands	+53.4 Jul	+62.0 Q1	+9.8	0.89	0.89	-1.4	-0.30	0.14
Spain	-22.8 Jun	+22.7 Jun	+1.3	0.89	0.89	-4.3	-0.30	1.14
Czech Republic	+19.5 Jul	+3.7 Q2	+1.2	24.0	23.9	-0.5	0.29	0.27
Denmark	+9.4 Jul	+18.1 Jul	+6.8	6.62	6.61	-2.5	-0.19	0.10
Hungary	+10.5 Jul	+5.7 Q1	+4.3	276	277	-2.3	0.88	2.98
Norway	+18.8 Jul	+23.6 Q2	+6.6	8.25	8.21	+3.0	1.10	1.29
Poland	+6.8 Jul	-1.3 Jul	-0.8	3.86	3.73	-2.9	1.51	2.90
Russia	+99.9 Jul	+38.4 Q2	+3.3	65.2	67.3	-3.7	11.4	8.06
Sweden	+0.1 Jul	+25.4 Q2	+5.6	8.48	8.28	-0.4	-0.45	0.28
Switzerland	+38.5 Jul	+71.9 Q1	+9.7	0.97	0.97	+0.2	-0.74	-0.34
Turkey	-55.5 Aug	-28.9 Jun	-4.7	2.98	3.06	-2.0	9.35	9.75
Australia	-12.4 Jul	-52.8 Q2	-4.4	1.34	1.40	-2.1	1.94	2.10
Hong Kong	-52.0 Jul	+11.7 Q1	+2.7	7.76	7.75	nil	0.59	1.12
India	-98.6 Jul	-22.1 Q1	-1.2	66.9	66.3	-3.8	6.52	7.08
Indonesia	+6.0 Jul	-18.7 Q2	-2.2	13,205	14,348	-2.4	7.17	6.94
Malaysia	+22.6 Jul	+5.3 Q2	+2.8	4.12	4.31	-3.4	3.37	3.57
Pakistan	-25.1 Aug	-2.5 Q2	-0.7	104	104	-4.6	6.03	8.03 ¹¹¹
Singapore	+45.7 Jul	+58.4 Q2	+19.5	1.36	1.41	+0.7	na	1.86
South Korea	+93.7 Aug	+104.4 Jul	+7.4	1,119	1,183	-1.3	1.31	1.57
Taiwan	+15.8 Aug	+75.7 Q2	+13.5	31.7	32.5	-0.6	0.66	0.75
Thailand	+20.7 Jul	+42.4 Q2	+8.0	34.9	36.0	-2.5	1.24	2.20
Argentina	-1.6 Jul	-15.0 Q1	-2.3	15.0	9.36	-5.1	22.0	na
Brazil	+44.8 Aug	-27.9 Jul	-1.0	3.33	3.87	-6.6	14.1	12.2
Chile	+3.3 Aug	-5.1 Q2	-1.8	676	688	-2.5	0.49	4.25
Colombia	-17.6 Jun	-16.9 Q1	-5.5	2,989	3,027	-3.7	7.21	7.22
Mexico	-17.0 Jul	-30.9 Q2	-3.0	19.2	16.8	-3.0	4.60	6.02
Venezuela	-36.2 Oct~	-17.8 Q3~	-2.8	9.99	6.30	-24.2	14.6	10.6
Egypt	-41.4 Jun	-18.3 Q1	-6.8	8.88	7.83	-11.4	14.0	na
Israel	-11.5 Aug	+12.1 Q2	+3.6	3.79	3.89	-2.2	0.13	1.76
Saudi Arabia	+28.9 2015	-59.5 Q1	-7.3	3.75	3.75	-12.6	2.34	na
South Africa	-0.9 Jul	-12.9 Q2	-4.3	14.3	13.6	-3.4	7.36	8.68
Estonia	-1.9 Jul	+0.3 Jul	+0.8	0.89	0.89	-0.2	-0.30	na
Finland	-2.3 Jul	+0.2 Jun	+0.3	0.89	0.89	-2.6	-0.30	0.15
Iceland	-0.8 Aug	+0.9 Q2	+4.7	115	127	+13.2	6.05	na
Ireland	+50.5 Jun	+30.7 Q2	+7.8	0.89	0.89	-0.8	-0.30	0.49
Latvia	-2.1 Jul	+0.1 Jul	-1.3	0.89	0.89	-1.3	-0.30	na
Lithuania	-2.2 Jul	nil Q1	-2.4	0.89	0.89	-1.1	-0.30	0.40
Luxembourg	-5.9 Jun	+2.8 Q1	+5.4	0.89	0.89	+0.8	-0.30	na
New Zealand	-2.0 Jul	-4.9 Q2	-2.9	1.37	1.58	+0.8	2.24	2.56
Peru	-1.0 Jul	-8.2 Q2	-3.5	3.40	3.21	-3.0	1.37	na
Philippines	-20.8 Jul	+6.7 Mar	+2.5	47.5	46.8	-1.3	1.25	3.59
Portugal	-11.4 Jul	+0.4 Jun	+0.9	0.89	0.89	-2.5	-0.30	3.31
Slovakia	+3.7 Jul	-1.3 Jun	-0.4	0.89	0.89	-2.2	-0.30	0.23
Slovenia	nil Jun	+2.9 Jul	+6.9	0.89	0.89	-2.7	-0.30	na
Ukraine	-0.8 Jul	-0.2 Q2	-1.6	26.4	22.0	-3.7	15.5	na
Vietnam	+2.4 Aug	+2.0 2015	+0.7	22,303	22,488	-4.5	5.50	6.76

Source: Haver Analytics. ¹The Economist poll or Economist Intelligence Unit estimate/forecast. ²New series. ~2014 ¹⁵⁵5-year yield. ¹¹¹Dollar-denominated bonds.

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 (assuming initial balance)?

4. 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)	$C = \bar{C}\bar{O} + cY_D$	Consumption function, c is the MPC
(4)	$Y_D \equiv Y - T$	Definition of disposable income
(5)	$T = \bar{T}\bar{A} + tY$	Tax function
(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 $\bar{A} \equiv \bar{C}\bar{O} - c\bar{T}\bar{A} + \bar{I}\bar{N} + \bar{G}\bar{O}$	
4.2	Calculate the change in income for a given change in (autonomous) investment. 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 budget balance for 4.2, for 4.3. Recall the budget balance is $T-G$.	
4.5	Calculate the change in the trade balance for 4.2, for 4.3. Hint: $TB \equiv EX - IM$, so $\Delta TB = \Delta EXP - \Delta IMP - m\Delta Y$. Show your work!	
4.6	In words, explain why in one case the budget balance and trade balance move in the same way, and in another case, they move in opposite directions.	