

Problem Set 1

Due *in lecture* on Wednesday, 18 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 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 (Ignore direct investment for purposes of this question)? What is the value of ORT ?

Download the most recent issue of *Economic Indicators*, compiled by the Council of Economic Advisers and published by the Joint Economic Committee; go to this link:
<http://www.gpoaccess.gov/indicators/>.

1.5 Calculate ORT for 2007.

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

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

2.1 US demand for Japanese autos increases.

2.2 Japanese demand for American real estate decreases.

2.3 Remittances from Filipino citizens in the U.S. back to the Philippines increases (use a graph of the USD/Philippine Peso market)

Using the Table reproduced from the *Economist* (February 7th edition), answer the following questions. **Show your work, and “box in” your answers.**

2.4 Has the US dollar (USD) appreciated or depreciated against the euro over the past year? By what amount has the USD appreciated/depreciated, in percentage terms? Specify whether you are using the exact formula or a log approximation.

2.5 How many US dollars does it take to buy a single Canadian dollar (CAD) now? How many did it take a year ago? Has the US dollar appreciated or depreciated?

2.6 What is the exchange rate of UK pounds (GBP) for Canadian dollars (CAD) (i.e., how many British pounds does it take to purchase a single Canadian 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 2008†	Feb 4th	year ago	% of GDP 2008†	3-month latest	10-year gov't bonds, latest			
United States	-833.1 Nov	-697.9 03	-4.6	-	-	-3.2	0.36	2.91			
Japan	+47.3 Nov	+167.1 Nov	+3.6	89.7	107	-3.1	0.61	1.35			
China	+295.1 Dec	+371.8 2007	+10.2	6.83	7.18	-0.1	1.34	3.24			
Britain	-178.6 Nov	-45.6 03	-2.2	0.69	0.51	-5.3	2.10	3.97			
Canada	+47.3 Nov	+19.2 03	+1.0	1.23	1.00	0.3	0.84	3.40			
Euro area	-52.0 Nov	-88.9 Nov	-0.4	0.78	0.68	-1.7	2.05	3.35			
Austria	-1.5 Nov	+16.8 03	+3.1	0.78	0.68	-0.9	2.05	4.21			
Belgium	+7.9 Sep	-8.2 Sep	+0.4	0.78	0.68	-0.6	2.08	4.31			
France	-83.3 Nov	-58.7 Nov	-1.8	0.78	0.68	-3.2	2.05	3.82			
Germany	+267.2 Nov	+244.3 Nov	+6.6	0.78	0.68	0.3	2.05	3.36			
Greece	-68.5 Oct	-52.6 Nov	-13.3	0.78	0.68	-3.9	2.05	5.69			
Italy	-18.7 Nov	-72.2 Oct	-2.8	0.78	0.68	-2.8	2.05	4.51			
Netherlands	+55.4 Nov	+67.6 03	+6.9	0.78	0.68	1.0	2.05	3.91			
Spain	-149.5 Oct	-164.1 Oct	-9.8	0.78	0.68	-3.3	2.05	4.29			
Czech Republic	+4.4 Dec	-6.6 Nov	-2.7	21.9	17.5	-1.9	2.67	4.30			
Denmark	+6.2 Nov	+6.3 Nov	+1.0	5.78	5.08	3.3	4.50	3.95			
Hungary	-0.1 Nov	-11.3 03	-5.6	230	179	-3.4	9.48	9.70			
Norway	+78.9 Dec	+86.5 03	+18.4	6.88	5.50	19.7	3.44	3.72			
Poland	-24.0 Nov	-29.4 Nov	-5.6	3.61	2.45	-1.8	4.76	5.52			
Russia	+189.4 Nov	+98.9 04	+6.0	36.3	24.6	5.5	13.00	10.84			
Sweden	+17.2 Dec	+40.5 03	+7.3	8.28	6.44	2.4	2.15	3.03			
Switzerland	+18.4 Dec	+40.3 03	+8.9	1.16	1.10	0.9	0.52	2.01			
Turkey	-69.8 Dec	-43.9 Nov	-6.0	1.63	1.18	-1.5	14.02	7.61†			
Australia	-4.0 Dec	-56.7 03	-5.0	1.54	1.11	-0.3	3.22	4.31			
Hong Kong	-26.0 Dec	+27.1 03	+10.0	7.75	7.80	-1.2	0.95	1.60			
India	-114.5 Dec	-28.5 03	-3.6	48.8	39.5	-6.0	4.78	7.01			
Indonesia	+12.1 Nov	+3.9 03	+0.4	11,675	9,242	-1.4	10.51	10.56†			
Malaysia	+42.2 Nov	+38.3 03	+11.4	3.63	3.23	-5.1	2.58	4.09†			
Pakistan	-21.8 Dec	-15.6 03	-5.5	79.2	62.8	-6.8	14.14	23.50†			
Singapore	+18.4 Dec	+29.2 03	+17.2	1.51	1.42	0.8	0.56	1.98			
South Korea	-12.2 Jan	-6.4 Dec	-2.1	1,379	942	1.7	2.93	5.18			
Taiwan	+3.9 Dec	+28.8 03	+4.7	33.7	32.0	-1.7	1.15	1.45			
Thailand	+0.2 Dec	-0.2 Dec	-0.3	34.9	32.9	-1.4	2.22	2.84			
Argentina	+13.2 Dec	+9.0 03	+2.7	3.50	3.17	0.2	15.13	na			
Brazil	+23.3 Jan	-28.3 Dec	-1.9	2.28	1.76	-0.7	12.66	6.16†			
Chile	+10.2 Dec	-1.6 03	-2.5	617	475	4.5	7.08	4.01†			
Colombia	+2.0 Dec	-5.3 03	-2.7	2,462	1,928	-1.4	9.56	7.21†			
Mexico	-16.0 Dec	-11.8 03	-1.9	14.6	10.8	nil	7.16	7.98			
Venezuela	+50.2 03	+49.4 03	+14.8	5.45	5.25§	-1.1	17.17	6.55†			
Egypt	-25.2 03	+0.1 03	-0.9	5.56	5.53	-6.8	11.48	4.79†			
Israel	-13.7 Dec	+2.6 03	+0.7	4.06	3.63	-1.2	0.86	3.38			
Saudi Arabia	+150.8 2007	+95.0 2007	+26.2	3.75	3.75	33.6	1.16	na			
South Africa	-10.9 Dec	-23.2 03	-7.5	9.93	7.67	0.1	10.85	7.87			
MORE COUNTRIES	Data for the countries below are not provided in printed editions of <i>The Economist</i>										
Estonia	-3.9 Nov	-2.5 Nov	-10.6	12.1	10.7	-1.5	6.93	na			
Finland	+10.2 Nov	+6.8 Nov	+3.5	0.78	0.68	4.6	2.01	4.05			
Iceland	-0.2 Jan	-5.4 03	-17.3	115	66.0	0.3	18.22	na			
Ireland	+41.4 Nov	-16.4 03	-4.9	0.78	0.68	-6.6	2.05	5.50			
Latvia	-5.9 Nov	-4.8 Nov	-14.1	0.55	0.48	-2.7	8.29	na			
Lithuania	-7.3 Nov	-6.4 Nov	-13.9	2.68	2.36	-0.9	7.53	na			
Luxembourg	-7.5 Oct	+4.0 03	na	0.78	0.68	0.1	2.05	na			
New Zealand	-3.8 Dec	-11.6 03	-9.0	1.95	1.27	-1.0	3.85	4.50			
Peru	+4.0 Nov	-3.0 03	-3.8	3.24	2.92	2.1	7.00	na			
Philippines	-7.5 Nov	+2.9 Sep	+2.6	47.5	40.7	-0.8	5.25	na			
Portugal	-34.3 Oct	-29.3 Nov	-11.5	0.78	0.68	-2.4	2.05	4.46			
Slovakia	-1.2 Nov	-6.7 Sep	-6.1	23.4	22.8	-2.3	1.35	4.19			
Slovenia	-4.7 Nov	-3.4 Oct	-6.3	0.78	0.68	0.4	2.05	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 0.70 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 surplus. 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. National savings identity

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

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

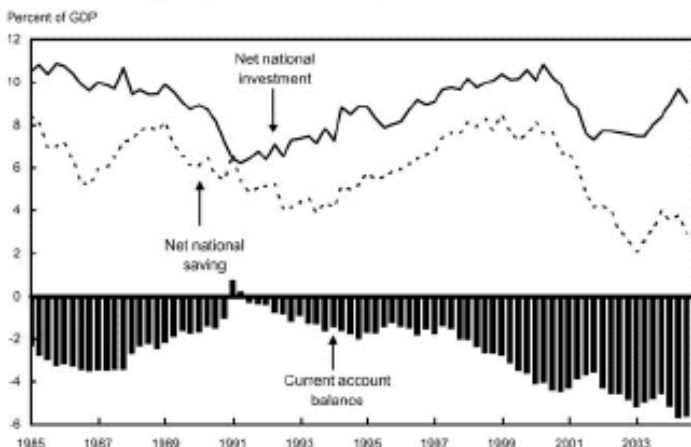
Treat Y as being GDP.

4.1 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.

4.2 Optional. Obtain the figures for 2007 for net domestic investment, net savings and government budget surplus, from Tables 5.1 and 3.1, respectively, of the National Income and Product Accounts of the Bureau of Economic Analysis. The website for the relevant section of the BEA website is:

<http://www.bea.gov/bea/dn/nipaweb/SelectTable.asp?Selected=Y>. Hint: You have to include the “statistical discrepancy” in Table 5.1. This figure from the *Economic Report of the President, 2005* may be helpful.

Chart 1-3 Saving, Investment, and the Current Account Balance
Lower national saving primarily accounts for the widening of the current account deficit since 2000.



Source: Department of Commerce (Bureau of Economic Analysis).

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)	$C = \bar{C}\bar{O} + c(Y - T + TR)$	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)	$TR = \bar{T}\bar{R}$	Transfers 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

There is no real exchange rate effect now because the real exchange rate is assumed constant (and so its effect is subsumed into the constant in (9) and (10)). **In your answers to the questions below, show your work, and “box in” your answers.**

5.1 Solve for Y , setting $\bar{A} \equiv \bar{C}\bar{O} + \bar{I}\bar{N} + \bar{G}\bar{O} + c(\bar{T}\bar{R} - \bar{T}\bar{A})$.

5.2 Calculate the change in income for a given change in lump sum transfers. Show your work!

5.3 Show what the multiplier is for a change in lump sum transfers.

5.4 Calculate the change in income for a given change in government spending. Show your work!

5.5 Calculate the change in the trade balance for a given change in government spending. 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 government spending. Show your work! What do your answers to 5.4 and 5.5 tell you about how these two variables should respond to changes in government spending?

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