

**Problem 1**

Understand Balance of Payments

Below are Thailand's Balance of Payment and its real GDP from 1995 to 1999.

Bank of Thailand						
Balance of Payments (US\$)						
(Unit : Millions of US Dollars)						
	1999	1998	1997	1996	1995	
1	<b>Current account</b>	12,466	14,291	-3,110	-14,350	-13,234
2	a. Goods and services	15,086	17,470	-130	-11,723	-11,607
3	1. Goods	9,272	12,235	-4,624	-16,148	-14,652
4	Exports (f.o.b.)	56,801	52,878	56,725	54,667	55,731
5	Imports (c.i.f.)	-47,529	-40,643	-61,349	-70,815	-70,383
6	2. Services	5,814	5,235	4,494	4,425	3,045
7	Services receipts	14,653	13,214	15,779	17,022	14,859
8	Services payments	-8,839	-7,979	-11,285	-12,597	-11,814
9	b. Income	-2,973	-3,594	-3,455	-3,388	-2,114
10	Income receipts	3,096	3,333	3,749	3,973	3,805
11	Income payments	-6,069	-6,927	-7,204	-7,361	-5,919
12	c. Current transfers	353	415	475	761	487
13	<b>Capital and financial account</b>	-7,908	-9,742	-4,343	19,504	21,949
14	a. Capital account	0	0	0	0	0
15	b. Financial account	-7,908	-9,742	-4,343	19,504	21,949
16	1. Direct investment	5,742	7,360	3,298	1,406	1,183
17	2. Portfolio investment	-106	331	4,558	3,701	4,116
18	3. Other investment	-13,544	-17,433	-12,199	14,397	16,650
19	Errors and omissions	26	-2,815	-3,196	-2,985	-1,479
20	<b>Overall balance</b>	4,584	1,734	-10,649	2,169	7,236
21	<b>Reserve assets</b>	-4,584	-1,734	10,649	-2,169	-7,236
22	a. Reserve position in the fund	0	0	455	-22	-139
23	b. Foreign exchange	-4,707	-1,842	10,625	-2,131	-7,084
24	c. Monetary gold	0	0	0	0	0
25	d. SDRs	123	108	-431	-16	-13

Year	1995	1996	1997	1998	1999
<b>Real GDP ( in millions US \$)</b>	120,006	127,088	125,345	112,171	117,160

- 1) What was *balance of trade* (or BoT) of Thailand in 1995, 1996, and 1997, respectively? Show the numbers relative to GDP. (Hint: Balance of trade consists of both goods trade and services trade.)

**A:** The BoT is the net sum of item 3 & 6, or just item 2. In 1995, it was -11,607m; in 1996, it was -11,723m; in 1997, -130m.

Relative to GDP, these numbers became -9.7%, -9.2% and -0.1%. So in both 1995 and 1996, Thailand ran a huge trade deficit, and in 1997, the deficit became much smaller (partially due to sharp devaluation of Thai currency).

- 2) In 1996, what percentage of the total capital inflow was foreign direct investment (or FDI)? What was the ratio in 1995?

**A:** Essentially, we are looking at the composition of Thailand's capital inflow. FDI is long-term foreign investment, which is much less volatile than short-term foreign investments, including portfolio investment and other investment, or the so-called "hot money".

In 1996, FDI accounted for only  $1,406/19,504 = 7.2\%$  of total capital inflow. In 1995, the ratio was  $1,183/21,949 = 5.4\%$ . In other words, 92.8% of capital inflow was short-term inflow in 1996. Combined with persistent trade deficits from the calculation in question 1), Thailand was ripe for a financial crisis. As you can see from 1997-1999, Thailand later suffered a huge "capital flight", hot money moving out of Thailand all of a sudden.

- 3) In 1997, did Thailand have a net capital inflow or outflow? Were there capital inflows or outflows in the previous two years? Again show the numbers relative to GDP.

**A:** In 1997, Thailand had a net capital outflow of \$4.343 billion. In 1995 and 1996, Thailand had huge net capital inflow, \$21.9 billion and \$19.5 billion, respectively. And most of the capital inflow was short-term.

In relative terms, Thailand's net capital inflow was  $21.9/120 = 18.3\%$  of its 1995 GDP,  $19.5/127 = 15.4\%$  of 1996 GDP. In 1997, it had a net capital outflow of 3.5% of its GDP.

- 4) If we define Balance of Payment (BoP) as the sum of current account, capital and financial account, what was the BoP of Thailand in 1997? Did Thailand run a BoP deficit? How big was it relative to its GDP in 1997?

**A:** The BoP balance of Thailand in 1997 was - \$10.65 billion, or 8.5% of its GDP. Since this is a negative number, Thailand ran a huge BoP deficit in 1997. Unlike the US, Thailand's local currency, Thai Baht, cannot be used as international reserves (US\$, gold, SDR, other currencies such as Euro) – Thailand was in big trouble.

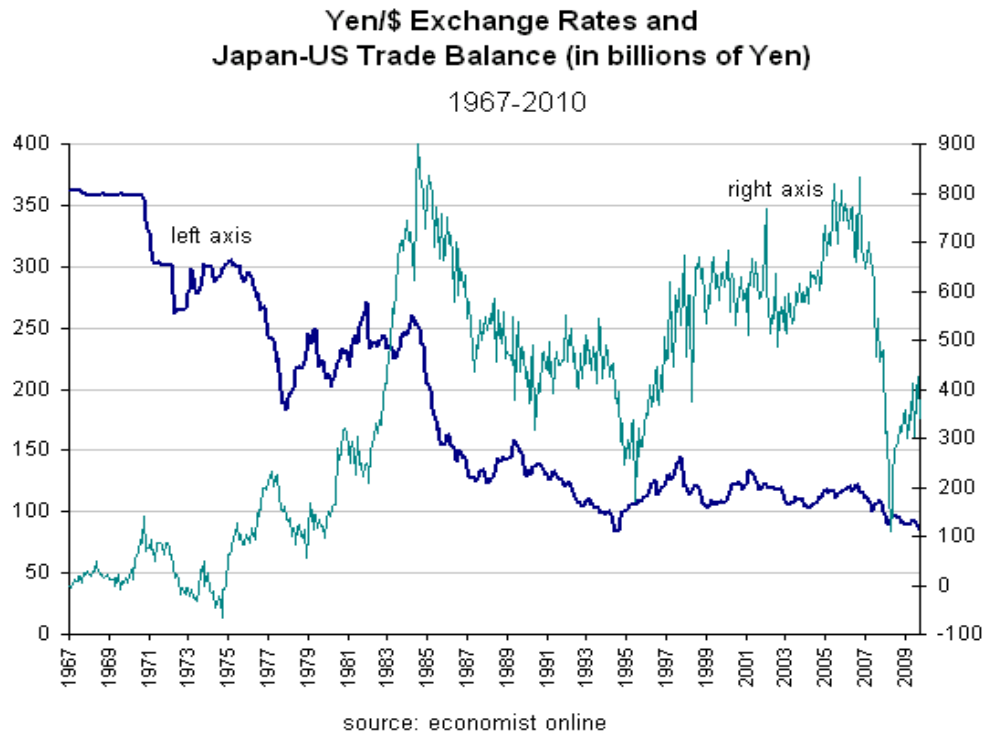
Read more about what happened to Thailand during 1997-1999 Asian Financial Crisis at the link below <http://www.frbsf.org/econsrch/wklyltr/el97-33.html>

In contrast, when the US runs a trade deficit in a similar magnitude, it's less likely the US will suffer a BoP crisis. The difference is: 1) US Dollar is a major component of international reserves; foreign governments are willing to recycle their surplus \$ back to the US (they do not have better alternatives), increasing US official reserve assets and narrowing down the US' BoP deficits; 2) If dollar recycling is not enough to make up the hole, the US can always print more \$ – but this game cannot go on forever.

## Problem 2

### Exchange rate and trade balance

The following graph shows you the exchange rate between Japanese Yen and the US dollar (in blue), and the trade balance (in green) between the two countries during 1967-2010. The left axis is the Yen/Dollar exchange rate, and the right axis is Japan's trade balance with the US, in billions of Yen.



- 1) In 1967, the exchange rate was around 360 Yen per dollar. More recently, the rate was around 90. First calculate how much Japanese Yen had appreciated against the US dollar. Then briefly describe how the exchange rate movement was connected to the trade balance between the two countries, over the past four decades.

**A:** To calculate Yen's appreciation, first, we need to convert the exchange rate from Yen/\$ to \$/Yen. Japanese Yen has appreciated  $(1/90 - 1/360) / (1/360) = 300\%$  against US dollar.

From 1967 to early 1980s, Yen's appreciation was correlated with an increase of Japan's trade surplus with the US. Then from 1985 to 1995, Yen appreciated against US dollar sharply, from over 250 Yen/\$ to below 100 Yen/\$. During this period, Yen's sharp appreciation reduced Japan's trade surplus with the US. After 1995, Yen was traded within 100-150 range, and Japan's trade surplus again trended upward, until the global recession hit in 2007.

- 2) Is above observation contradictory to what you've learned? Why or why not?

A: No, it's not contradictory. The above described pattern between yen/\$ exchange rate and Japan-US trade balance demonstrated the folly of simply relying on currency appreciation to cure trade deficit problem.

According to the theory, Yen's appreciation will reduce its trade surplus with the US - this was certainly the case during 1985-95 period. However, US trade deficit is also driven by many other factors, with the most important being US' own pattern of consumption (C) and production (Y). We know CA deficit =  $(C+I+G) - Y$ , everything else being equal, when consumption exceeds production, the US will run trade deficit.

The 1967-1980 period was also when Japan was a developing country. Their exports to the US tended to be necessity goods, just like China's exports today. Since consumers tend to have an inelastic demand toward such goods, so price change due to currency appreciation won't reduce demand that much.

- 3) Finally, explain why Japanese Yen had risen so much against the US dollar over time. (Hint - you may find this formula useful:  $q = EP^*/P$ )

A: Since we are looking at the trend of exchange rate for nearly 50 years, we ought to use the long-run exchange rate to tackle the above question. The best way is to analyze the real exchange rate.

In the growth process from a developing country to a developed country, Japan's labor productivity had been rising fast. The rising labor productivity was a combination of higher capital intensity (i.e., capital-labor ratio) and increasing skill intensity of Japanese workers.

When labor productivity increases, wages in both tradable sectors and non-tradable sectors tend to rise. Higher wage over time pushed up the average price in Japan.

According to real exchange rate formula,  $q_{¥/\$} = E_{¥/\$} * (P_{US}/P_{JP})$ , when  $P_{JP}$  rises,  $q_{¥/\$}$  falls, meaning now one typical US consumption basket can exchange for fewer typical Japanese consumption basket --- indicating a real appreciation of Japanese Yen.

### Problem 3

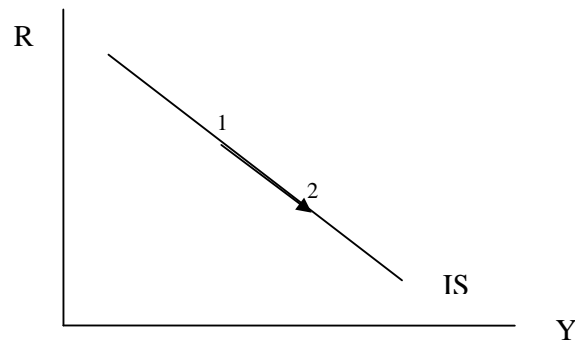
#### Exchange rate and trade balance

Denmark pegs its currency, Danish Kroner (or DKK), to the Euro, at roughly 7.45 DKK per euro. Denmark's neighboring country, Norway, does not.

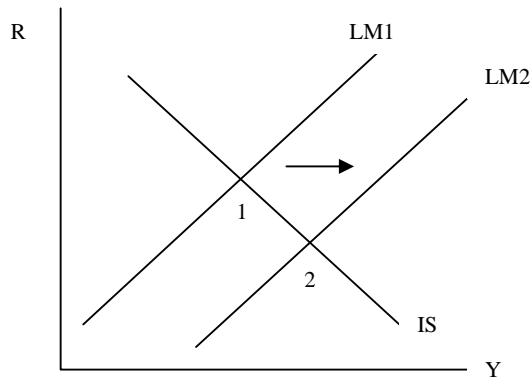
- a) When European Central Bank (or ECB) lowered its interest rate sharply during the recent global recession, how did it affect the monetary policy in Denmark? And how did this monetary expansion by ECB further affect the output level in Denmark? Draw graph(s) to help you explain. (5 points)

**A:** Since Danish Kroner is pegged the Euro, the interest rate in Denmark must equal to the interest rate controlled by the ECB, i.e.,  $R_{EU} = R_{DK}$ . When ECB lowers its interest rate, Denmark must also lower its own interest rate in order to keep Danish Kroner fixed to the Euro. In other words, an expansionary monetary policy at ECB automatically means a monetary expansionary in Denmark.

When Denmark lowers its interest rate  $R$ , we have a movement along the IS curve, output  $Y$  will increase, as shown below:



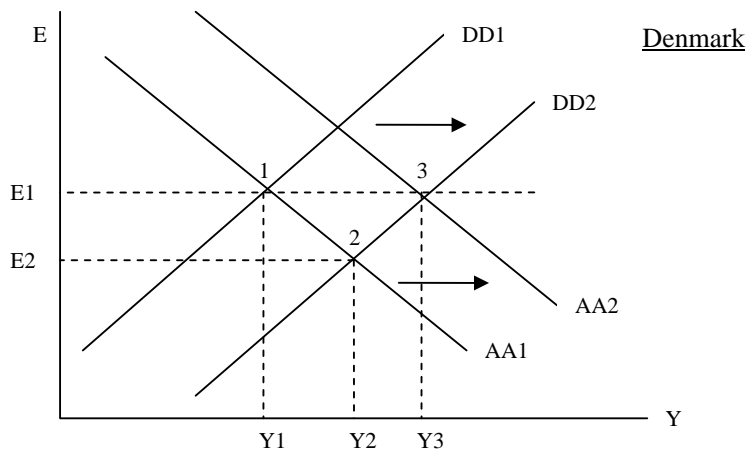
Alternatively, you can answer this question within the IS-LM framework. Since central banks often lower interest rate by increasing money supply (a shift of LM curve from  $LM_1$  to  $LM_2$  in the graph below), the equilibrium point move from point 1 to 2, corresponding to a higher output level.



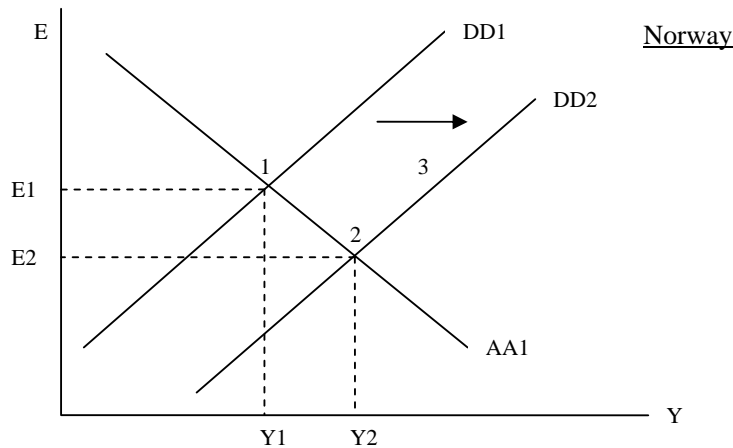
- b) To increase output and reduce unemployment, both Denmark and Norway engaged in expansionary fiscal policies during the recession. Compare and contrast the effects of fiscal policy on the output in both countries. Make sure you use diagram(s) to help you illustrate. (10 points)

**A:** Since Denmark has fixed exchange rate regime, the effect of an expansionary fiscal policy on its output will be magnified. In contrast, Norway has floating exchange rate regime, and its expansionary fiscal policy will have a smaller effect on output when compared to Denmark.

We can show this difference using a typical DD-AA schedule. At point 2, when an expansionary fiscal policy shifts DD curve from DD1 to DD2, exchange rate will appreciate from E1 to E2, and output will increase from Y1 to Y2. To keep exchange rate fixed at E1, Denmark has to increase its money supply so that AA1 shifts rightward to AA2. By doing so, exchange rate is restored to E1 (at point 3), and output increases from Y1 to Y3, which is at a higher level than Y2.



In contrast, since Norway does not need to keep its exchange rate at a fixed level, the output will just increase from Y1 to Y2, which is smaller than Y3.



- c) During the recent recession, Nordic countries, including Denmark, have had much better economic performance when compared to other member countries in the EU. Let's assume that this diverging economic performance is likely to persist over time and the difference is largely due to the different economic structures between the Nordic countries and other EU countries. Given the information provided above, discuss the potential drawbacks of fixing DKK to the Euro. (5 points)

**Answer:** When Denmark tends to have persistent better economic performance than other EU member countries, a too-easy monetary policy by the ECB tends to overheat Danish economy.

Let's imagine the scenario where Denmark and Euro area countries both fall into recession, but Danish recession is much less severe than other European countries. The more severe recession in the Euro area requires the ECB to lower its interest rate to a much lower level than optimal level in Denmark, at which Danish economy obtains its full employment.

But since DKK is pegged to the Euro and there is no capital control, Denmark lost its autonomy on monetary policy. So its interest rate has to stay at the same low level controlled by the ECB. This lower interest rate tends to cause inflation to rise to an undesirably high level, overheating the Danish economy.