Problem set 1
ECON 4330

Part 1

We are looking at an open economy that exists for two periods. Output in each period Y_1 and Y_1 respectively, is given exogenously. A representative consumer maximizes life-time utility

$$U = u(c_1) + \beta u(c_2) \tag{1}$$

where c_1 and c_2 are consumption in the two periods and β is a subjective discount factor, $0 < \beta < 1$:The country can borrow and lend in world markets at a given real interest rate, r. The initial asset is zero. Hence, the budget constraint can be written

$$c_1 + \frac{c2}{1+r} = Y_1 + \frac{Y_2}{1+r} \tag{2}$$

1. Derive the first order condition for optimal consumption and interpret it.

2. Derive the welfare effects of an increase in r, i.e $\frac{dU}{dr}$. Provide intuition. (use the envelope condition)

3. Assume CRRA utility

$$u(c) = \frac{c^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}} \tag{3}$$

   Find an expression for date 1 consumption and current account as functions of exogenous variables $(Y1; Y2; r)$.

4. Assume $Y_2 = 0$

   (a) Derive $\frac{\partial c_1}{\partial r}$ and find the condition that makes sure the current account is improving when the world interest rate goes up.

(b) Describe how c_1 responds to changes in r in terms of substitution and income effects.

(c) What additional effect comes in if we assume $Y_2 > 0$?

5. Suppose a foreign country has the same preferences as the home country, equal date 1 output, $Y_1^* = Y_1$, but different date 2 output $Y_2^* \neq Y_2$

   (a) Assume higher income growth in the home country, i.e. $Y_2 > Y_2^*$. Derive the autarky interest rate in both countries and compare.

   (b) Suppose the world market consists of these two countries. State the equilibrium condition, and show in a graph how the interest rate will be determined. Which country will run a current account surplus in period 1? Intuitively, what are the gains from trade?

   (c) Using the answer from question 2: what happens to welfare in the home country if the foreign countrys output growth increases (Y_2^* up)?

6. We now extend the model to include a production side. Each country has access to the same technology and the technology does not change. The production function is $Y = F(N; K)$ where N and K are respectively the inputs of labor and capital. The production function is homogeneous of degree one and has standard neoclassical properties. The labor input is given exogenously and is the same in both countries and both periods. Each country has inherited a capital stock from the past, K_1 and K_1^* respectively, that can be used in production in period 1. The capital stock can be augmented by investment in period 1, which then adds to the input of capital in period 2, K_2 and K_2^* . At the end of period 2 the remaining capital stock is consumed. The budget constraint of the home country can then be written

$$c_1 + I_1 + \frac{c2 + I_2}{1+r} = Y_1 + \frac{Y_2}{1+r} \tag{4}$$

   where $I_1 = K_2 - K_1$ and $I_2 = -K_2$. Explain how the home countrys investment demand in period 1 is determined and what the inclusion of capital means for the relationship between the world interest rate and the home countrys current account in the two periods.

7. Compare the capital stocks of the two countries in the second period. Suppose the home country has inherited more capital than the foreign country ($K1 > K2$). What does this imply for the current accounts in the two periods?

8. Finally, suppose international borrowing and lending had not been possible. From the point of view of wage earners in the home country, would this be an advantage or a disadvantage?

Part 2: Discussion

Look at the article below. How can you use the model we have worked with today to explain Indias current account deficit and why it's now entering a surpluss? What about the comments and explanations in the article. Which are in line with out model and which are not? Discuss, no math.

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India's current account to swing into minor surplus in 2015: Morgan Stanley

By PTI | 26 Jan, 2015, 09.54AM IST

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NEW DELHI: India's current account which has been consistently in deficit over the last 10 years is likely to swing into a minor surplus of 0.3 per cent of GDP in 2015, says a Morgan Stanley report.

According to the global brokerage firm, improving terms of trade, coupled with declining global commodity prices (specifically oil), are likely to help current account to swing into surplus for the first time since 2004.

The current account deficit has been narrowing steadily since 2012 to an estimated 1.6 per cent of GDP in 2014.

"We now estimate that the current account will swing into a minor surplus of 0.3 per cent of GDP in 2015," Morgan Stanley said in a research note.

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The major factors that would drive the current account to surplus include, improving terms of trade, helped by falling global commodity prices (specifically oil) and decline in gold imports, among others.

Since June, the prices of crude oil, of which India is a major importer, had fallen by close to 60 per cent and hit a six-year low of USD 47 this month.

Analysts at investment banks Goldman Sachs and Credit Suisse have pegged the bottom at about USD 37-39 a barrel.

The report noted that "the substantial improvement in India's current account deficit bodes well from a macro stability point of view and comes at a time when the US Fed is likely to embark on a hiking cycle.

CAD stood at 1.9 per cent in the first quarter of this fiscal (March quarter of 2014), at 1.1 per cent in the June quarter and at 1.3 per cent of GDP in the September quarter of 2014.

For the fiscal as a whole, the consensus CAD was 1.8 per cent of GDP.

Commenting on the improvement in the current account balance, the report added that it will protect India from external funding risks and give the RBI comfort in targeting real interest rates at more moderate levels.

The global brokerage firm believes that it expects the current account to move back into deficit in FY2017.

"However, we estimate the deficit to be relatively small at 1.1 per cent of GDP, and well within policy makers' comfort zone of 2.5 per cent of GDP," the Morgan Stanley report added.