# Concordia University
# Department of Economics

**Econ 443/543** **Ivan Tchinkov**
**International Economics: Finance** **Fall 2017**

## Problem Set # 1

(due Monday, Oct.16 in class )

**FIRST NAME:** _____ **LAST NAME:**_____

**STUDENT NUMBER:** _____

**I. True/False/Uncertain - Briefly explain. No credit without an explanation (8 marks each).**

1. A country cannot have a current account deficit and a capital inflow at the same time.

   **False. A CA deficit implies FA surplus, thus a net export of assets or a capital inflow.**

2. Capital controls are welfare decreasing.

   **False/Uncertain. They are in a small open economy when the country is an initial borrower, but not necessarily in a large economy which might *improve* its welfare by imposing strategic capital controls.**

3. An investment surge (improvement in expected future productivity) will raise the interest rates more in a closed economy than in a large open economy.

   **True. Figure 6.7 in the lecture notes: D to D' increase in closed economy, A to B increase in a large, open economy.**

4. The Great Moderation can account for the US current account deficit after the 2007-08 financial crisis.

   **True. US CA improved after the 2007-08 financial crisis (see figure 4.2 in notes), which is exactly what the Great Moderation hypothesis predicts with an increase in uncertainty after 2007-08, since it makes a country save more, i.e. improve its CA.**

5. The Reagan tax cuts can explain the Twin Deficits in the 1980s.

   **True/Uncertain. Assuming Ricardian Equivalence (RE) fails, then a tax cut will worsen the primary budget balance, and raise consumption and thus worsen the CA balance, thus leading to Twin Deficits. Only when RE holds, we must rely on other shocks for the Twin Deficits besides tax cuts, like an increase in G.**

**II. Problems - You have to show your work. No credit without an explanation (30 marks each).**

1. Let endowment be constant, so that $Q_1 = Q_2 = Q$. Also, assume zero world real interest rate and zero initial asset position, i.e. $r^* = 0$ and $B_0^* = 0$. Utility is given by $U(C_1, C_2) = C_1^{\frac{1}{2}} + C_2$.

(a) Solve for $C_1$, $C_2$, $TB_1$and $CA_1$ and provide intuition for the result. (8 marks)

**From first order tangency condition we have**

$$MRS = -(1 + r^*)$$

**since $r^* = 0$ and using $MRS = -\frac{MU_1}{MU_2}$ we get**

$$\frac{1}{2C_1^{\frac{1}{2}}} = 1$$

**or**

$$C_1 = \frac{1}{4}$$

**Then from the inter-temporal budget constraint with $r^* = B_0^* = 0$ and $Q_1 = Q_2 = Q$ we get**

$$C_2 = 2Q - C_1 = 2Q - \frac{1}{4}$$

**Then**

$$CA_1 = TB_1 + r_0 B_0^*$$

**and using $B_0^* = 0$, we get**

$$CA_1 = TB_1 = Q - C_1 = Q - \frac{1}{4}$$

**Thus, if $Q > \frac{1}{4}$ we have a lender, otherwise a borrower.**

Now assume second period endowment is uncertain, i.e.

$$Q_2 = \begin{cases} Q + \sigma & \text{with probability } 1/2 \\ Q - \sigma & \text{with probability } 1/2 \end{cases}$$

where $\sigma > 0$ is the standard deviation of $Q_2$.

(b) Should optimal $C_1$ in this case be more or less than before? (8 marks)

**Now the country maximizes expected utility. Substituting the simplified budget constraint in the utility function, problem becomes**

$$\max_{C_1} EU(C_1, C_2) = C_1^{\frac{1}{2}} + \frac{1}{2}\left[\underbrace{(2Q + \sigma - C_1)}_{\textbf{good state } C_2}\right] + \frac{1}{2}\left[\underbrace{(2Q - \sigma - C_1)}_{\textbf{bad state } C_2}\right]$$

**Differentiating with respect to $C_1$ and setting to zero gives**

$$\frac{1}{2C_1^{\frac{1}{2}}} - \frac{1}{2} - \frac{1}{2} = 0$$

**or**

$$C_1 = \frac{1}{4}$$

**$C_1 = \frac{1}{4}$ is exactly the same as in the case without uncertainty.**

(c) What happens to the $CA_1$ and $TB_1$ in this case? (7 marks)

**For the trade balance and current account we have**

$$CA_1 = TB_1 = Q - C_1 = Q - \frac{1}{4}$$

**So, with uncertainty, both CA and TB are exactly the same as before, i.e. in the case without uncertainty.**

(d) Intuitively, how does the increase in uncertainty affect the current account?(7 marks)

**It does not, since $C_2$ enters the utility function linearly, i.e. the country is not risk-averse, but risk neutral and does not care about the increased uncertainty in period 2 endowment, since the expected value of $Q_2 = \frac{1}{2}(Q+\sigma) + \frac{1}{2}(Q-\sigma) = Q$ is the same as in the case without uncertainty. Thus, with period 2 risk neutrality, increased uncertainty does not affect the CA.**

2. Let the world be composed of only 2 countries - US and China. Both countries preferences are given by

$$U(C_1, C_2) = C_1^{\frac{1}{2}} C_2^{\frac{1}{2}}$$

Also, $Q_1^{US} = Q_2^{US} = Q$ and $Q_1^C = \frac{Q}{2}$ and $Q_2^C = Q$.

(a) Solve for $CA_1^{US}$ and $CA_1^C$ under free capital mobility? Is the US running a CA surplus or deficit? Is China running a surplus or deficit? (6 marks)

**Solving the utility max problem for each country using any of the 3 methods gives:**

$$C_1^{US} = \frac{1}{2}\left(Q + \frac{Q}{1+r_1}\right)$$

$$CA_1^{US} = \frac{1}{2} Q \frac{r_1}{1+r_1}$$

$$C_1^C = \frac{1}{2}\left(\frac{Q}{2} + \frac{Q}{1+r_1}\right)$$

$$CA_1^C = \frac{Q}{4} - \frac{1}{2}\frac{Q}{(1+r_1)}$$

**Thus, US is running CA surplus and China a CA deficit (as long as $r_1 < 1$).**

(b) Solve for the world interest rate under free capital mobility. Using that interest rate, solve for $C_1^{US}, C_2^{US}, CA_1^{US}$ and $C_1^C, C_2^C, CA_1^C$. (6 marks)

**Using the market clearing condition**

$$CA_1^{US} + CA_1^C = 0$$

**to solve for the world interest rate $r* = r_1$, we get**

$$\underbrace{\frac{1}{2} Q \frac{r_1}{(1+r_1)}}_{CA_1^{US}} + \underbrace{\frac{Q}{4} - \frac{1}{2}\frac{Q}{(1+r_1)}}_{CA_1^C} = 0$$

**or**

$$r_1 = r* = \frac{1}{3}$$

**Using this value we get**

$$C_1^{US} = \frac{7}{8} Q$$

**and**

$$CA_1^{US} = \frac{1}{8}Q$$

**and**

$$C_2^{US} = \frac{7}{6}Q$$

**US CA surplus is $\frac{1}{8}Q$.**
**Then for China we get**

$$C_1^C = \frac{5}{8}Q$$

**and**

$$CA_1^C = -\frac{1}{8}Q$$

**and**

$$C_2^C = \frac{5}{6}Q$$

(c) Are US and China both better off under free capital mobility or under autarky? (6 marks)
**Both are better off under free capital mobility.Level of utility under free capital mobility can be found by the indirect utility function**

$$U(C_1^{US}, C_2^{US}) = lnC_1^{US} + lnC_2^{US} = ln\frac{7}{8}Q + ln\frac{7}{6}Q = ln(1.0208Q^2)$$

**and**

$$U(C_1^C, C_2^C) = lnC_1^C + lnC_2^C = ln\frac{5}{8}Q + ln\frac{5}{6}Q = ln(0.5208Q^2)$$

**As a comparison, under no capital mobility (autarky), each country's utility is**

$$U(Q_1^{US}, Q_2^{US}) = lnQ_1^{US} + lnQ_2^{US} = lnQ + lnQ = ln(Q^2) < ln(1.0208Q^2)$$

**and**

$$U(Q_1^C, Q_2^C) = lnQ_1^C + lnQ_2^C = ln\frac{1}{2}Q + lnQ = ln(.5Q^2) < ln(0.5208Q^2)$$

**So they are better off with free capital mobility as compared to no capital mobility.**

(d) If China, as a large economy, imposes capital controls to manipulate the interest rate, would it raise or lower it? Explain intuitively. (6 marks)
**Lower it, since it is an initial borrower, who would benefit from lower interest rate.**

(e) Comment on the effects of capital controls on welfare in the case of a large economy. (6 marks)
**Imposing optimal capital controls is welfare increasing for China, exactly the opposite of the result from a small, open economy.**