Problem set 4 - Answer key

1. (a) consumption in the year of the hurricane will be lower due to the hurricane
   (b) current account surplus in the year of the hurricane will be lower due to the hurricane
   (c) net foreign income from abroad in the year after the hurricane will be lower due to the hurricane

In the case of Cuba, a closed economy, the fluctuations in consumption and output will be stronger. Not being able to borrow in international markets prevents the country from smoothing the effects of the hurricane over time.

2. (a) Yes, Argentina should invest in this project because \( MPK = 10\% > 5\% = r^* \)
   (b) If \( I_0 = 84 \) at year 0, with \( MPK = 10\% \), it will generate extra output equal to \( \Delta Q = MPK \times I = 0.10 \times 84 = 8.4 \) in later years (starting at time 1).
   The present value of all this extra output generated is
   \[
   \left( \frac{\Delta Q}{(1 + r^*)} + \frac{\Delta Q}{(1 + r^*)^2} + \frac{\Delta Q}{(1 + r^*)^3} + \ldots \right) = \frac{\Delta Q}{r^*} = \frac{8.4}{0.05} = 168
   \]
   (c) If the project is not undertaken \( Q=\text{GDP} \) in year 0 is $200 as stated above.
   However, if the project is undertaken, Argentina will obtain $8.4 extra output every year. In this case, the PV(Q) is
   \[
   PV(Q) = \left( Q + \frac{Q + \Delta Q}{(1 + r^*)} + \frac{Q + \Delta Q}{(1 + r^*)^2} + \frac{Q + \Delta Q}{(1 + r^*)^3} + \ldots \right) = Q \frac{1 + r^*}{r^*} + \frac{\Delta Q}{r^*} = 4200 + 168 = 4368
   \]
   (d) At year 0, the PV(I) is
   \[
   PV(I) = \left( I_0 + \frac{I_1}{(1 + r^*)} + \frac{I_2}{(1 + r^*)^2} + \frac{I_3}{(1 + r^*)^3} + \ldots \right) = 84 + 0 = 84
   \]
   As for the new PV(C) after undertaking the project, we have according to the Long Run
   Budget Constraint \( PV(TB) = 0 \), so
   \[
   PV(Q) - PV(C) - PV(I) = 0,
   \]so the new \( PV(C) = PV(Q) - PV(I) = 4368 - 84 = 4282 \)
   (e) Assuming consumption smoothing means consume \( C_{\text{new}} \) in all years.
   We can compute the percentage change in PV(C) as follows:
   \[
   \frac{\left| PV(C)_{\text{new}} - PV(C)_{\text{original}} \right|}{PV(C)_{\text{original}}} = \frac{4282 - 4200}{4200} = 2\%,
   \]
   so that the \( C_{\text{new}} = C_{\text{original}} \times (1 + 0.02) = 200(1.02) = 204 \).
   Alternatively, we could do
   \[
   PV(C)_{\text{new}} = C_{\text{new}} + \frac{C_{\text{new}}}{(1 + r^*)} + \frac{C_{\text{new}}}{(1 + r^*)^2} + \frac{C_{\text{new}}}{(1 + r^*)^3} + \ldots = C_{\text{new}} \frac{1 + r^*}{r^*},
   \]
   from here we have \( C_{\text{new}} = PV(C)_{\text{new}} \frac{r^*}{1 + r^*} = 4284 \frac{0.05}{1.05} = 204 \) Argentina achieved higher consumption each year, so it is better off.

1
(f) The information is displayed in the following table:

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<th>Variable</th>
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<th>time 2</th>
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</table>

3. (a) Government spending increases under a flexible exchange rate. What happens with Y, i, E?

We also know that consumption rises since it is a function of income, which rises. Investment would fall because the interest rate rises and makes loans more expensive. The graph show not only the IS-LM plot and FOREX market, but for more insight also shows the money market and Keynesian cross.

The dashed shift is the exogenous shift caused by government spending. The equilibrium point shows where the economy ends up after the endogenous effects are taken into account. The IS curve shift right because there is a rise in demand (by the government and consumers) at a given interest rate.
(b) Government spending increases under a fixed exchange rate. Now the LM curve shifts to the right also, because the fixed exchange rate commitment requires money supply to rise. This keeps the interest rate at the level consistent with the fixed exchange rate in the foreign exchange market. The end effect is that output rises even more than in part (a) above. The nominal interest rate remains unchanged and so does the nominal exchange rate, $E$.

4. An increase in investment optimism in a **closed economy**. In this case, we need to use the money market and IS-LM plots.
(a) Increase in investment optimism in a small open economy with flexible exchange rates. In this case, the plots will be for money market, IS-LM-FX.

(b) Increase in investment optimism in a small open economy with fixed exchange rates. The plots will be as before: money market, IS-LM-FX.
5. (a) if the exchange rate (peso/$) is flexible

(b) if the exchange rate (peso/$) is fixed to the U.S. dollar.

If the exchange rate regime is flexible, the variation in the nominal exchange rate would imply less volatility in output. However, if the exchange rate is fixed, the volatility in output is high, so if the objective of the government is to stabilize production, limiting the expansion of the IS curve through limiting corn exports may help.