Final Exam

Answer Key

Answer the following questions. You can use a (1 page) notes sheet and a calculator (but no other devices).

You must answer question 1 and 2. Then, pick any other 3 questions to answer (you will respond 5 questions in total). Your grade is computed as a percentage of the sum of possible points of the choice.

1. (28 points) **Exchange Rates**. Use some hypothetical currencies of countries "A", "B", and "C" as necessary to answer the following questions (A, B, and C, are the countries adopting the currencies with the same name, e.g., we can talk about country A or currency A).

   (a) Define briefly what is an exchange rate? Focus on what it's being priced and explain what depreciates and what appreciates when it increases. Use currency A and B for this definition. Either can be home or foreign but state which is which.

> Answer: An exchange rate is the amount of one currency that is paid to buy one unit of another. In that sense, it's the price of a foreign currency expressed in home currency units.
>
> Let A be the currency of country A, and B or B then: the exchange rate is given by $E_{A/B}$ and indicates how much units of curency A you pay for one unit of B.
>
> If $E_{A/B}$ increases then currency A depreciated and currency B appreciated.

   (b) If you have the exchange rate of A for B and of B for C, how can you get the exchange rate of currency A for currency C? Show your work with formula(s).

> Answer: If I have $E_{A/B}$ and $E_{B/C}$ I can obtain $E_{A/C}$ as: $E_{A/B} \times E_{B/C} = E_{A/C}$

   (c) Set the UIP between country A and B. Take A as home and B as foreign. If the interest rate at home goes up what happens with the spot exchange rate, and what happens with the expected (future) exchange rate?.

> Answer: UIP: $i_A = i_B + \left(\frac{E^e_{A/B}}{E_{A/B}} - 1\right)$
>
> If $\uparrow i_A$, all things equal $E^e_{A/B}$ and $E_{A/B}$ go down. Intuitively, the currency A is gaining value since it's deposits yield a higher interest rate.

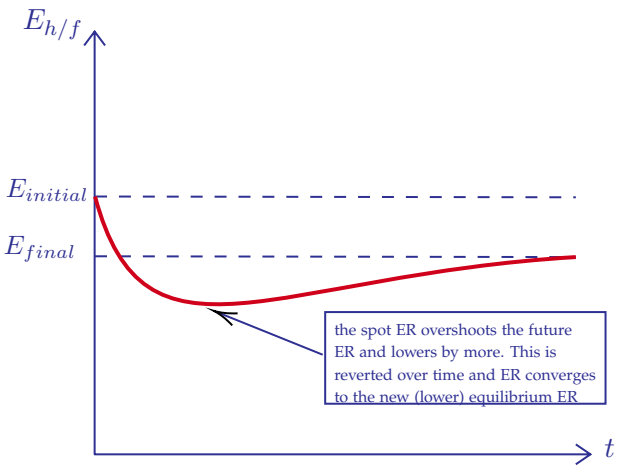
   (d) If the interest rate after the increase at home is higher than that of country B, is the depreciation term in the UIP positive or negative?

Answer: It's positive: $0 < i_A - i_B = \left(\frac{E^e_{A/B}}{E_{A/B}} - 1\right)$

Both the spot and expected exchange rate are going down, but the spot one lowers by more (overshooting), making the depreciation term positive.

(e) Plot the trajectory over time of the exchange rate after this increase in the interest rate at home and explain whether overshooting occurs and in what direction. Indicate how the overshooting is reflected in the plot.

Answer: Overshooting can be seen in the fact that the spot rate lowers by more than the future rate and later converges to the new exchange rate value that is still lower than the initial one.



(f) Explain what happens with the spot exchange rate if: (i) Money supply at home increases, (ii) The interest rate abroad increases

Answer:

(i) If money supply at home increases the interest rate goes down, then the exchange rate depreciates

(ii) If the interest rate abroad increases the home currency depreciates too. In terms of the UIP and the depreciation term this is equivalent to the home interest going down.

(g) If inflation in country A is always 8%, and inflation in C is always 2% what do you expect the depreciation of currency A against currency C to be? What theory do you use for this and in what horizon is valid?

Answer: Depreciation should be given by the inflation differential in the long-run: $d^e_{A/B} = \pi_A - \pi_B = 8\% - 2\% = 6\%$

The theory used for this is the Purchashing Power Parity (PPP) which is valid only in the long-run

2. (24 points) **Balance of Payments and External Wealth**.

(a) Define briefly what is the balance of payments (BOP)? Could a country run a balance of payment surplus or deficit?

Answer: The balance of payments is a summary of the transactions between domestic and foreign agents in an economy. It incorporates transactions for trade of goods and services, trade of assets, and donations transfers among others.

By construction the BOP adds to zero. Thus, it's impossible to run a BOP surplus or deficit.

(b) List each big account in the BOP and describe what transactions are recorded in each.

Answer: The following is the BOP equation that includes the main accounts:

$$CA + KA + FA = 0$$

CA is the current account and consists includes transactions due to trade of goods, services as well as factor payments and net unilateral transfers. An example of a transaction entering the CA would be an import of foreign clothes.

KA is the capital account and records payments due to capital transfers that are non-bilateral. That is, mostly assets' donations. An example would be the return of a government bond from a foreigner that is forgoing a debt of the domestic country on its favor.

FA is the financial account and includes transactions for trade of assets. It records the net imports of assets issued both at home and in other countries. An example of a transaction in this account would be the purchase of foreign equity stock by nationals.

(c) For the Current Account, list each sub-account and give an example of a transaction recorded in each.

Answer: The currenct account (CA) is composed of the Trade Balance (TB), the Net Foreign Income Account (NFIA) and the Net Unilateral Transfers (NUT).

An example of a TB transaction would be the imports of coffee beans to the US from Vietnam made by Starbucks. An example of a NFIA transaction would be the payment of dividends to an american citizen made by Vodafone, a company based in the UK. An example of NUT would be the remittances of a Canadian living in the US and to Canada, the latter is a unilateral payment made by an agent (the Canadian residing in the U.S.) to another economy (relatives).

(d) How is the BOP related to external wealth? more precisely, what part of the BOP can you add to the previous stock of wealth to get the new external wealth of an economy?

Answer: You can add either minus the financial account or the equivalent: the current account plus the capital account.

In either case you are adding the value of your net imports of assets, i.e., how much your foreign assets' portfolio has increased due to the purchase of new assets.

(e) Provide a formula for the wealth on an economy at time t, assume a non-zero level of wealth the previous period, that there are no domestic workers abroad, no net unilateral transfers, but that in t the capital account (KA) is not zero.

Answer:

$$W_t = TB_t + KA_t + (1 + r^*)W_{t-1}$$

(f) Indicate three benefits of the financial globalization, and briefly explain at least two. One of the explanations should be made in the context of the Long-Run Budget Constraint (i.e., by using it).

Answer: The benefits are (i) higher consumption smoothing, (ii) higher capacity to carry out investments, (iii) risk diversification of shocks.

(i) refers to the fact that by accessing to foreign lending/saving a country can get indebted (or save) as necessary in order to achieve a more stable consumption path; (ii) refers to the same but in terms of investment opportunities, i.e., a country that needs to invest can do it even if it does not have the resources to do so, as long as it can get indebted with other economies; (iii) refers to the fact that countries could increase their ownership of foreign equity in order to offset the impact of shocks that affect their economy but don't impact other countries where they invest.

(i) and (ii) can easily be seen in the Long Run Budget Constraint:

$-$PV of Wealth $=$ PV of Trade Balance Flows

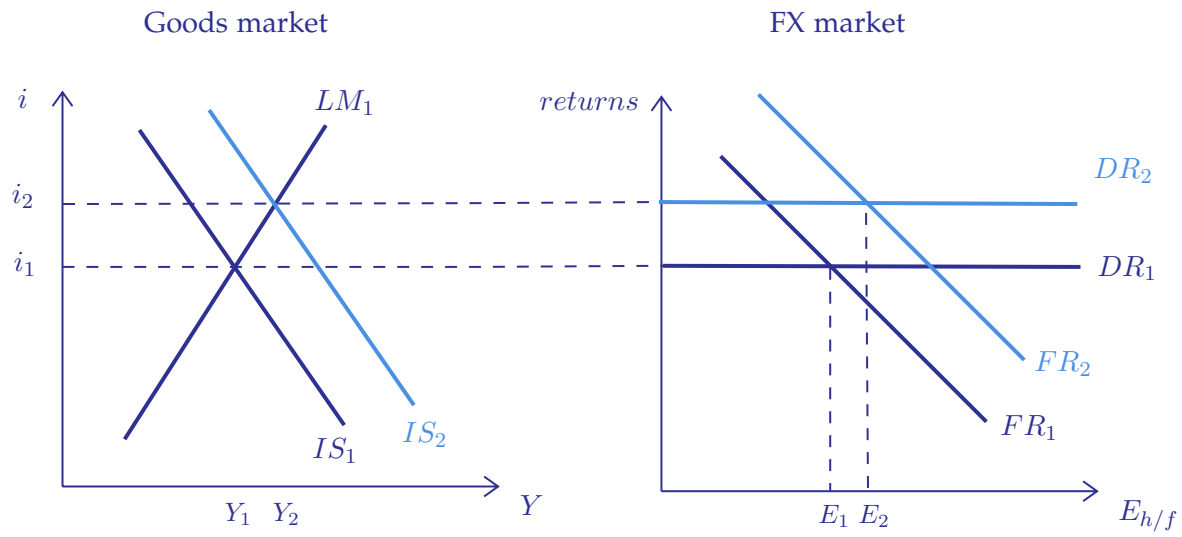
For a given level of wealth, a country can run a TB deficit to increase consumption (investment) beyond what they produced on any period (e.g. during a recession), they later will have to pay that debt back by generating more resources than they consume, i.e., by running trade surpluses.

3. (20 points) **External interest rate shock on IS-LM-FX**. Suppose the (Home) economy is initially in equilibrium and there is a sudden increase in the interest rate of the foreign country i^*. Use the IS-LM-FX model to answer the following questions. Assume a *floating exchange rate regime*. Provide plots with your answers.

   (a) How the change in i^* affects the new equilibrium values of the home interest rate (i), output (Y), and spot exchange rate $E_{h/f}$? Does the home currency appreciate or depreciate?

Answer: The increase in i^* shifts up the FR curve (foreign return) in the FX market as ROW returns are higher for any spot rate. As a result the exchange rate appreciates. This raises the trade balance shifting the IS curve upwards. This increases the equilibrium home rate which increases the DR curve in the FX market (domestic return).

The final equilibrium is the intersection of a higher IS curve, the same LM curve as before, and higher DR and FR curves. The final equilibrium values and change with respect to the initial equilibrium are: Y_2 (increased due to higher trade balance), i_2 (increased), E_2 (increased). Then, the ER depreciates:

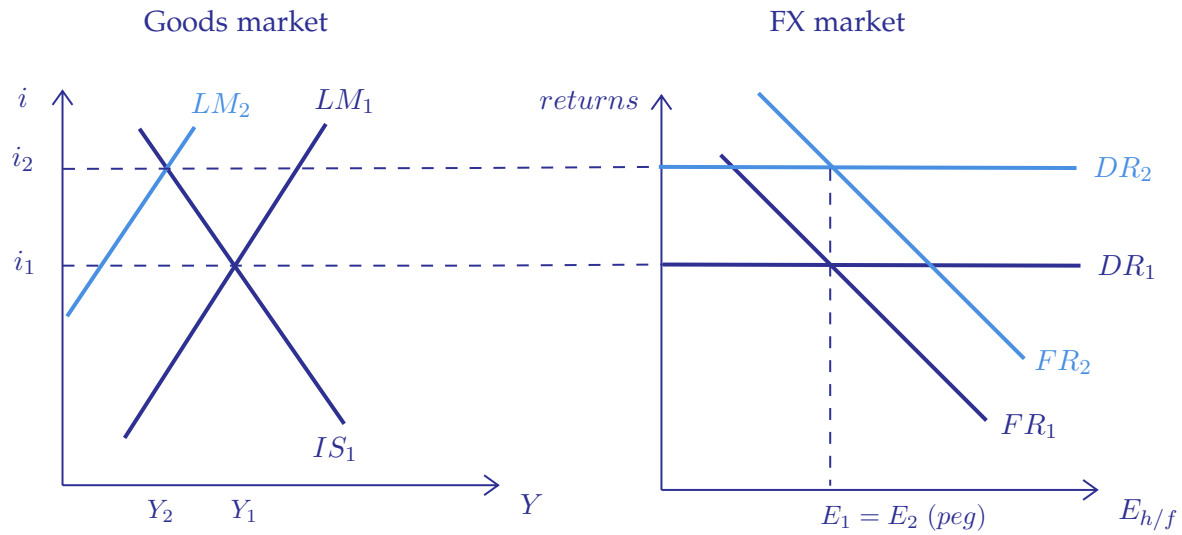


   (b) Explain the effect in the home trade balance.

Answer: The trade balance increased due to the depreciation of the exchange rate. The reason is that a depreciated currency implies home goods are cheaper for foreign consumers (higher exports) and foreign goods are more expensive for home consumers (lower imports).

(c) Now assume that the home country has a *fixed exchange rate regime*. How does the central bank responds to the change in i^*

Answer: The central bank must prevent the exchange rate from changing. It will intervene by pushing the interest rate up to match the change in the foreign rate. This is done with a money supply contraction (shifts the LM curve to the left).



(d) How does the home interest rate (i), output (Y), and spot exchange rate $E_{h/f}$ change in this case? Show the new equilibrium values with plots.

Answer: The FR curve shifts up due to the higher foreign rate. The home central bank, fearing the depreciation pressure, will contract the money supply, shifting the LM curve to the left and increasing the home rate. This shifts the DR curve up which undoes the changes in the exchange rate.

At the end, the final exchange rate is the same as before (fixed rate), output decreases and the home rate increased.

(e) When is an economy that follows a fixed exchange rate regime less likely to commit to this policy (and increase the interest rate at home). Pick one and explain your answer.

i. During a recession at home an a boom in the foreign country

ii. During a recession at home an a recession in the foreign country

iii. During a boom at home and a boom in the foreign country

iv. During a boom at home and a recession in the foreign country

Answer: During a recession at home an a boom in the foreign country

The home country is more likely to abandon the fixed rate regime when it makes it raise interest rates during a recession. This is more probable during a boom in the foreign country. In that case the foreign country wants to set high interest rates (to cool down their economy) and the home economy has a much harder time mimicking their policies since they have to manage their recession.

4. (15 points) **Exchange rate regime choice**. Explain what are the two key features that determine the choice of a fixed vs. floating exchange rate regime and how each relates to either the benefits or the costs of setting an exchange rate peg (fixed regime).

The main two features are (i) Economic Integration, and (ii) Symmetry of Shocks.

(i) refers to the volume of trade, financial flows and factor flows occur between a group of economies; (ii) refers to the correlation between output and other economic shocks experienced by the economies.

With higher economic integration the benefits of running a fixed exchange rate regime increase. For example with higher financial and trade flows between economies, it is more desirable to have a very stable currency rate. With that, the volume of trade will not be disrupted by currency valuations.

If the shocks are more symmetric (positively correlated), it is more likely that the desired monetary response of the countries considered will be the same, and thus the *policy cost of pegging a currency to another country will decrease* as the actual rate will go in the same direction it would have gone if the monetary policy was autonomous.

5. (20 points) **Policy regimes**. Answer briefly (1 or 2 paragraphs) the following question on exchange rate regimes management.

   (a) (10 points) **Policy choice**. Why do countries with a fixed exchange rate use monetary policy, rather than fiscal policy, to manage the exchange rate.

Monetary policy is far more flexible. It can be used on a regular basis and as much as necessary. Fiscal policy, on the contrary, can be used less frequently, and adjusting it may require further regulatory and legal changes that take a long time to be approved. Due to this, fiscal policy is subject to higher lags which deems it less available for short-run policy responses.

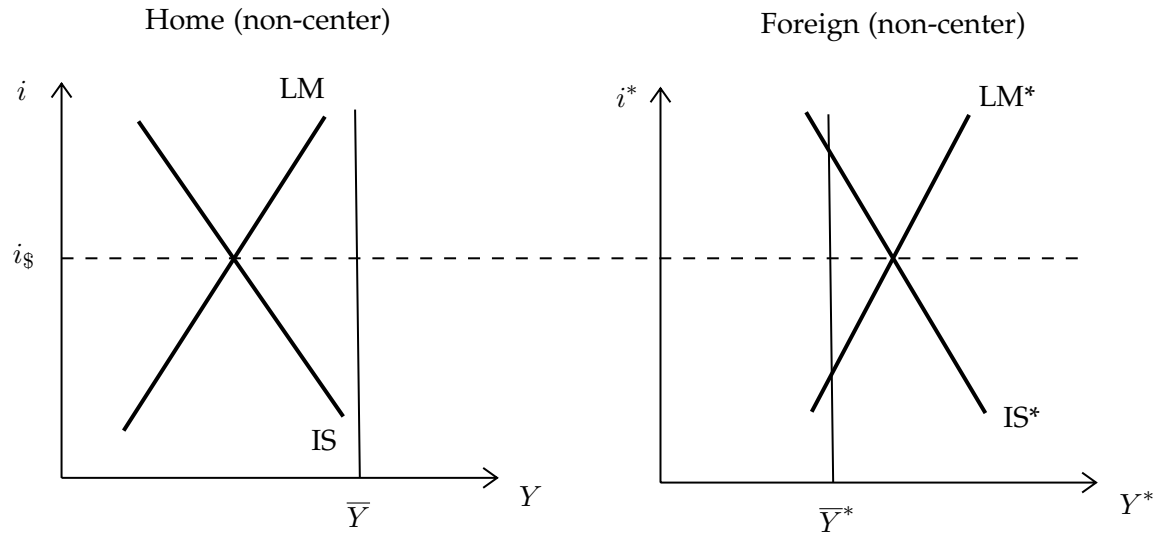
At the same time, the FX market is subject to changes (and shocks) all the time and policy interventions need to be prompt, frequent and be able to be adjusted to the nature of each new shock. This is done more easily with monetary policy tools.

(b) (10 points) **Exchange rate systems**. Multilateral fixed exchange rate systems have the advantage that cooperative adjustments are possible. Why would cooperative adjustments increase the viability of the multilateral system?

A peg system makes sense only as far as it's benefits are high and costs are low. With cooperative policies the costs are minimized as far as "beggar-thy-neighbor" policies are prevented. That is, countries will share the burden of shocks and will not act in a way detrimental to other economies which will make easier to maintain the pegs in each location.

6. (20 points) **Cooperation in an Exchange Rate system**

A home and foreign economy both set their currencies to the dollar. Neither economy is a center in their peg arrangement (the US is the center). In the plot below, the barred outputs $\bar{Y}$, $\bar{Y}^*$ are the desired GDP levels in each economy.



Additionally, i is the interest rate at home, i^* the interest rate at the foreign economy, and $i_\$$ is the US interest rate that both countries use as reference for pegging. Variables and labels with a star * denote foreign variables (or curves). Notice, how either economy pegs with respect to the dollar, not to each other, thus, their interest rates at any point and after the shocks is always $i_\$$ that we assume does not change.

However, these countries can still apply a type of depreciation where they adjust the peg (which is credible) level, this is called a devaluation. Notice that if the peg is credible, the spot and expected rate are set to the new levels and the UIP still dictates $i = i_\$$ and $i^* = i_\$$. Clearly, this has to be done infrequently or the exchange rate would be practically a floating one.

Based on this setup answer:

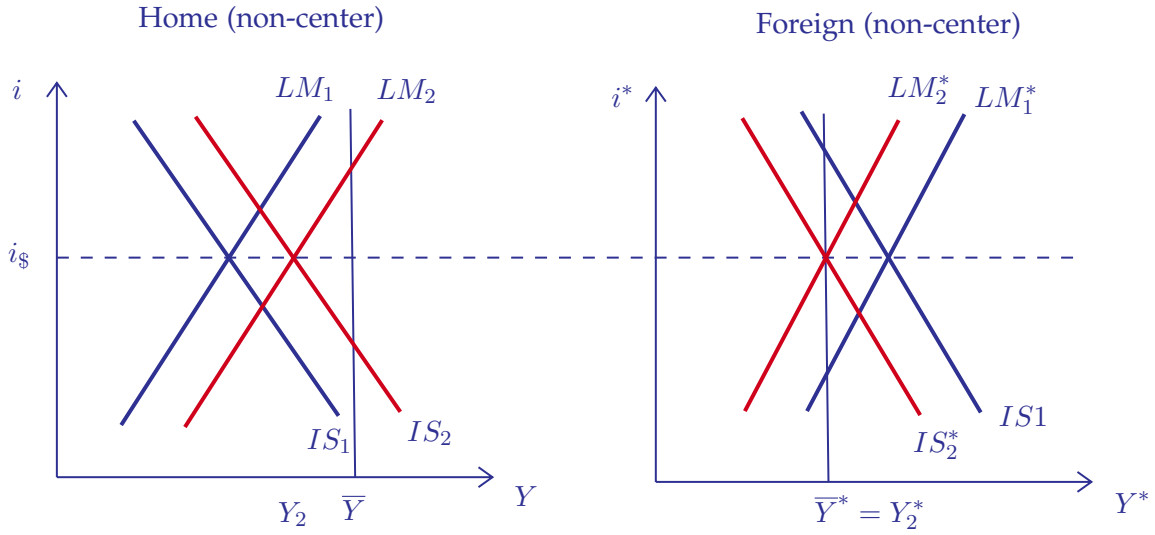
(a) Would the foreign country like to depreciate or appreciate its currency against the dollar? Would the home country agree with this change?

Answer: The foreign country wants to appreciate its currency which will cool down its economy and bring it closer to the desired level of output (it will lower the output).

The home country agrees with this change. They are impacted positively by it. The foreign country is inducing a lower trade balance which implies consumption expenditure switching towards home (higher trade balance at home). This shifts the demand up at home (IS curve shifts right) and home will see its output move closer to its desired level.

(b) Show the effects of the change made by the foreign country in the figure above (or redraw it in your answer sheet). Don't forget to include the central bank policies adjustments as needed to ensure the rates match the US one at the end. Label the new equilibrium $\{Y_2, i_2, Y_2^*, i_2^*\}$

Answer: It is critical for the rates to be the same as the US interest rate after the changes (we are assuming the pegs are maintained in each case). Thus, the changes consist on movements on either the IS or LM curves such that the end up equilibrium position still lies in the dashed line.



Optional. **Bonus question**. Describe the main idea behind one of the papers presented (maybe the one you liked more, or that you found most insightful) and explain how it relates to the contents of the course. The paper selected cannot be the paper you presented. When answering this question, there is no need to remember the exact name of the paper or its authors. But provide a guess of it (so I can know what paper you refer to).

Note: how many extra points I provide if you answer this question depends on my assessment of the quality of your answer. *Show your knowledge of the course!*