# 30054 International and Monetary Economics (Spring 2023)

## Individual Assignment 3

## Instructions

**When?** The deadline to submit your solution is **May 3, 2023 (23:59 Milan time)**.

**Where?** Upload your solution to the bboard webpage of our class.

**What?** You can submit your solution in either **PDF or DOC** format. When drawing diagrams or writing formulas, you can either use build-in word processing tools or you can draw diagrams and write formulas by hand, take pictures, and insert them in your solution.

**Who?** This is an **individual** assignment. You must submit an individual solution.

**How much?** All problems have equal weight of **5 points each**. This problem set has a **10% weight** of your final grade.

**Be clear.** If you make additional assumptions in your solution, state them clearly. Also when drawing diagrams, clearly label all axes, lines, curves, and equilibrium points.

**Problem 1**

1. What is a currency crisis?

2. What is a self-fulfilling currency crisis?

The rest of the problem asks you to solve a simple model with the following assumptions (Hint: this is a 2nd generation model of currency crises that we studied in class). There are two foreign exchange traders and a domestic central bank. Both traders are endowed with $S$ units of domestic currency, and the central bank has $R$ units of foreign currency in reserves. The two traders can choose one of two actions: hold all of their domestic currency or sell domestic currency in exchange for foreign currency (this transaction costs $C$ units of domestic currency). The trades choose their actions simultaneously in non-coordinated way. The central bank, in turn, keeps its exchange rate fixed at the level of $E$, that is, the bank defends the peg, when the demand for foreign currency by two traders is below the reserves and drops the fixed exchange rate (in which case the new depreciated exchange rate becomes $E' > E$) when the total demand for foreign currency is equal or exceeds the level of reserves. Note also that when the total demand for foreign reserves exceeds $R$ and both traders attempt to convert currencies, each trader only gets $R/2$ of foreign reserves by paying the corresponding amount of domestic currency.

3. Assume that $E = 1$, $E' = 1.5$, $S = 6$, $C = 1$, and $R = 6$. Compute the profit of each of the traders (in domestic currency) when

   (a) both traders choose to hold on to domestic currency;
   (b) both traders sell domestic currency for foreign currency;
   (c) one trader sells and the other one holds.

4. Compute Nash equilibria in the currency crises model under the parameters in specified above in question 3. Intuitively explain why you obtained such a result.

5. Imagine that the government imposes a tax on currency exchange transactions which increases the cost $C$ from 1 to 2. The rest of the model parameters remain the same. Compute all Nash equilibria. Does this policy prevent currency crises?

**Problem 2**

1. Read Section "The Theory of Optimum Currency Areas" of Chapter 21 from the KOM book.

2. Suppose that soon after Norway pegs to the euro, EMU benefits from a favorable shift in the world demand for non-Norwegian EMU exports. What happens to the exchange rate of the Norwegian krone against noneuro currencies? How is Norway affected? How does the size of this effect depend on the volume of trade between Norway and the euro zone economies?

**Problem 3**

In a three-country world, a central bank fixes one exchange rate but lets the others float.

1. Can it use monetary policy to affect output?

2. Can it fix both exchange rates?

**Problem 4**

Suppose that a country's money supply is $1,200 million and its domestic credit (i.e., the supply of government bonds) is equal to $800 million in the year 2020. The country maintains a fixed exchange rate, the central bank monetizes any government budget deficit, and prices are sticky.

1. Compute total reserves for the year 2020. Illustrate this situation on a central bank balance sheet diagram.

2. Now, suppose the government unexpectedly runs a $100 million deficit in the year 2021 and the money supply is unchanged. Illustrate this change on your diagram. What is the new level of reserves?

3. If the deficit is unexpected, will the central bank be able to defend the fixed exchange rate?

4. Suppose the government runs a deficit of $100 million each year from this point forward. What will eventually happen to the central bank's reserves?

5. In what year will the central bank be forced to abandon its exchange rate peg and why? [*Assume for this question that government deficit comes as a surprise every year, that is, no one anticipates it.*]

6. What if the future deficits are anticipated? How does your answer to part (5) change? Explain briefly *in words*.

**Problem 5**

Suppose the central bank of a small country with a fixed exchange rate is faced by a rise in the world interest rate, $R^*$.

1. What is the effect on its foreign reserve holdings? On its money supply?

2. Can it offset either of these effects through domestic open-market operations?

**Problem 6**

In this problem, you are asked to analyze how valuation changes affected the net international investment position (NIIP) of China, Italy, and the U.S.

1. Read the description of the external wealth of nations database and answer the following questions:

(a) Does NIIP represent the overall country's wealth?

(b) Why do the authors like to exclude gold holdings from their calculations of the NIIP?

2. Download NIIP and current account data. For the NIIP of the three countries, use the time series in the external wealth of nations database. Current account data is available from the IMF's World Economic Outlook (WEO) Database, which you need to find and download.

3. On the same figure, plot a time series for the NIIP and a time series for the cumulative current account that starts from the initial level of the NIIP (that is, $NIIP_{t+T}^{\text{hypothetical}} = NIIP_t + \sum_{s=0}^{T-1} CA_{t+1+s}$ for $T > t$) for the three countries. In addition, make one figure where the units are billions of U.S. dollars and one graph where the units are percent of GDP (the GDP data are also available in the external wealth of nations database). In total, you should have six figures (two figures per country). Note that the starting dates differ across countries. Use the earliest available data.

4. One can attribute the difference between actual NIIP and cumulated current account to the valuation effect.

(a) Use the figures you created to contrast the valuation changes experienced by China and the United States. To what extent do your findings regarding the sign of the valuation changes support a view that, on net, China holds more low-risk/low-return assets than high-risk/high-return assets?

(b) Use the figures you created to contrast the valuation changes experienced by Italy and the United States. Is there anything notable about Italian valuation changes?

5. What else can explain the discrepancy between the NIIP data and the cumulated current account besides the valuation effect?