International economics (2024–2025)

Nikolas A. Müller-Plantenberg*

13 January 2023, 12.00

Surname: _____

First name: _____

ID or passport number: _____

Question	Points	Obtained
1	8	
2	8	
3	8	
4	8	
5	8	
Total	40	

Instructions

The exam consists of **five questions.**

In total, it is possible to obtain up to **40 points**.

Duration of exam: **1 hour and 20 minutes** (= 2 minutes per point or 16 minutes per question).

Mobile phones must be **switched off** and placed **in your bag** before the exam begins.

*E-mail: nikolas.mullerpl@uam.es. Address: Faculty of Economics and Business Administration, Universidad Autónoma de Madrid, 28049 Madrid, Spain.

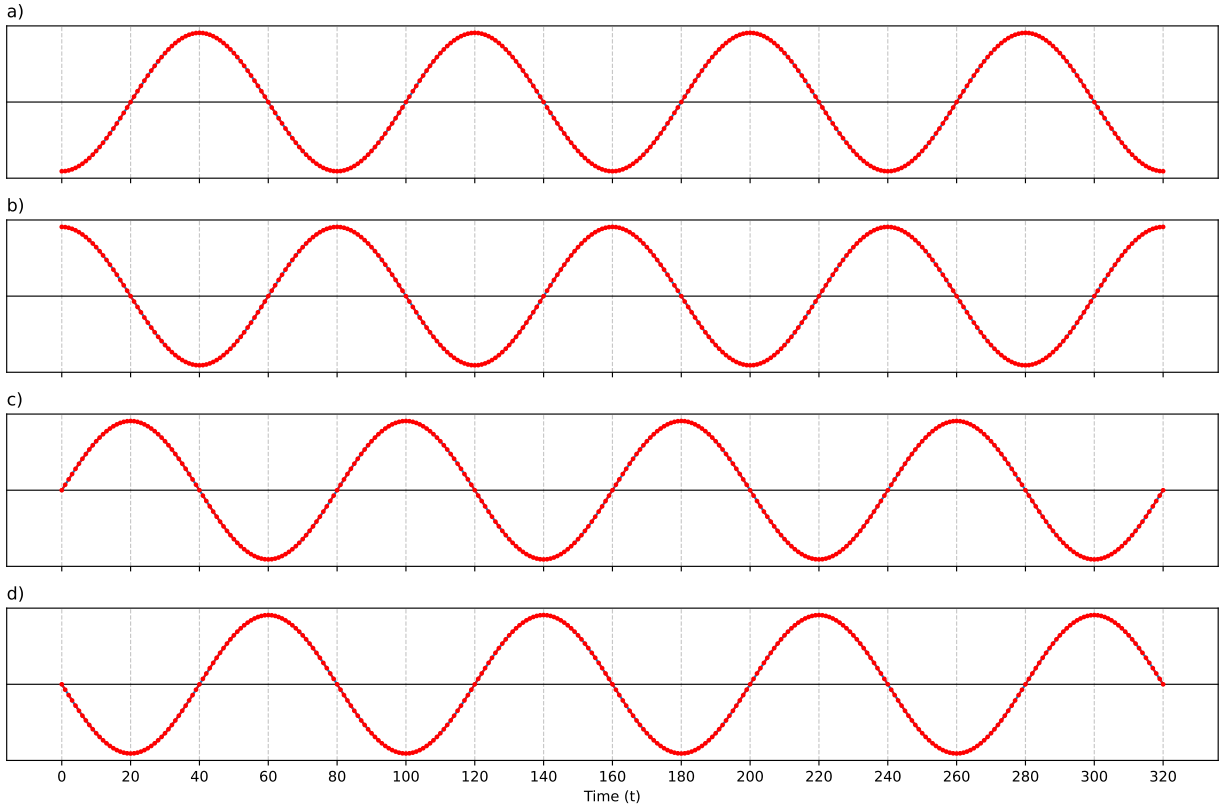

Figure 1: Time series of variables generated by the currency flow model.

1. Figure 1 contains four plots: a, b, c and d. Suppose that plot a represents the current account of a given country (the home country) and that all variables of this country move over time according to the currency flow model. Note that each of the plots a, b, c and d may represent one variable (with adequate scaling), several variables (with adequate scaling) or no variable at all of the home country. For simplicity, it is assumed that there are no capital flows between the home and the foreign country, that neither the domestic nor the foreign central bank engage in official intervention and that prices in the home country are equal to those in the foreign country. Time is measured in short periods, say in months.

   Please answer the following questions, being as technical as you can.

   (a) Which of the plots a, b, c and d do you think represents the net money inflows of the home country. Explain your answer. [2]

(b) Which of the plots a, b, c and d do you think represents the *nominal* exchange rate of the home country. Explain your answer. [2]

(c) Which of the plots a, b, c and d do you think represents the *real* exchange rate of the home country. Explain your answer. [2]

(d) Which of the plots a, b, c and d do you think represents the competitiveness in trade of the home country. Explain your answer. [2]

Total of question 1: [8]

2. (a) State the equations of the structural form of the monetary model of exchange rate determination with flexible prices (with variables in natural logarithms). [2]

(b) Suppose you have the following data: [2]

$$\frac{M_t^{\text{MAR}} - M_{t-1}^{\text{MAR}}}{M_{t-1}^{\text{MAR}}} = 0.8\%, \qquad \frac{M_t^{\text{EUR}} - M_{t-1}^{\text{EUR}}}{M_{t-1}^{\text{EUR}}} = 2.4\%, \tag{1}$$

$$\frac{V_t^{\text{MAR}} - V_{t-1}^{\text{MAR}}}{V_{t-1}^{\text{MAR}}} = -2.3\%, \qquad \frac{V_t^{\text{EUR}} - V_{t-1}^{\text{EUR}}}{V_{t-1}^{\text{EUR}}} = 0.0\%, \tag{2}$$

$$\frac{Y_t^{\text{MAR}} - Y_{t-1}^{\text{MAR}}}{Y_{t-1}^{\text{MAR}}} = 3.4\%, \qquad \frac{Y_t^{\text{EUR}} - Y_{t-1}^{\text{EUR}}}{Y_{t-1}^{\text{EUR}}} = 0.4\%. \tag{3}$$

According to the monetary model of exchange rate determination, what should be the rate of appreciation (or depreciation) of the Moroccan dirham (MAD) vis-à-vis the euro (EUR)? (Hint: Use the monetary model's reduced form equation of s_t in differences.)

(c) The current velocity of money in Morocco is approximately 8.37, whereas that in the eurozone is about 0.90. Why do you think is the velocity of money in Morocco so much higher than in the eurozone? What might be the reason? [1]

(d) The income growth rates in Morocco and the eurozone stated above are actually the growth rates of GDP, since data on GDP growth is easier to obtain that data on income growth. However, in class we have seen that GDP, Y^P, and national income, Y, are not the same. Can you provide an example of a transaction that contributes to income, but not to GDP? [1]

(e) In reality, the dirham appreciated 0.75% against the euro over the past year. Is your result in part b above the same? If not, what could be the reason for the difference? (Hint: Look beyond the monetary model of exchange rate determination.) [1]

(f) In 1994, Morocco's gross domestic product (GDP) was approximately 35.6 billion USD. The estimated GDP of Morocco for 2024 is 145.6 billion USD. How would you calculate the average *annual* growth rate of Morocco between 1994 and 2024? [1]

Note: If you do not have a calculator, it is sufficient that you indicate how you would arrive at the result; in this case, there is no need to provide a numerical solution. **Do not use your mobile phone as a calculator.**

Total of question 2: [8]

3. Suppose a domestic consumer wants to maximize their utility by consuming domestic and foreign goods:

$$\max_{C^{\text{HH}},C^{\text{HF}},x^{\text{HX}}} u(C^{\text{HH}} + C^{\text{HF}}), \tag{4}$$

subject to:

$$P^{\text{H}}C^{\text{HH}} = P^{\text{H}}Y^{\text{H}} - x^{\text{HX}}, \quad \text{LM: } \lambda^{\text{HC}}, \tag{5}$$
$$P^{\text{F}}C^{\text{HF}} = Sx^{\text{HX}}, \quad \text{LM: } \lambda^{\text{FC}}, \tag{6}$$

where Y^{H}, P^{H} and P^{F} are given.

The Lagrangian is therefore:

$$\mathcal{L} = u(C^{\text{HH}} + C^{\text{HF}}) - \lambda^{\text{HC}}(P^{\text{H}}C^{\text{HH}} + x^{\text{HX}}) - \lambda^{\text{FC}}(P^{\text{F}}C^{\text{HF}} - Sx^{\text{HX}}). \tag{7}$$

(a) By solving the model, please calculate the nominal exchange rate S, in terms of the Lagrange multipliers, λ^{HC} and λ^{FC}. [2]

(b) What values do λ^{HC} and λ^{FC} take in the solution of the model? [2]

(c) How are Lagrange multipliers λ^{HC} and λ^{FC} interpreted in economic terms? [2]

(d) Now combine your answers to parts a and b to calculate the value of the nominal exchange rate in terms of the variables of the model. [1]

(e) Calculate also the real exchange rate, Q, and state whether purchasing power parity holds in the model or not. [1]

Total of question 3: [8]

4. (a) i) What are economies of scale? [2]

ii) In the economies of scale model that we analysed in class, the cost function for the individual firm took the following form: [2]

$$C = F + cQ. \tag{8}$$

Demonstrate that this cost function exhibits economies of scale.

(b) According to data from the OECD, in 2022 a standardized basket of goods cost 1143 Swiss francs (CHF) in Switzerland whereas the same basket of goods cost 1000 US dollars (USD) in the United States. The exchange rate was 10 USD per 9 CHF. Was the Swiss franc over- or undervalued, and by how much? (Hint: Take absolute PPP as a benchmark for deciding whether a currency is over- or undervalued.) [4]

If you do not have a calculator, it is sufficient that you indicate how you would arrive at the result; in this case, there is no need to provide a numerical solution. **Do not use your mobile phone as a calculator.**

Total of question 4: [8]

5. The following explanation of the Ricardian model contains eight errors. Identify each error by numbering it directly in the text (for example, [1], [2] etc.). Then, in the space provided below, briefly explain the nature of each error. [8]

> The Ricardian model of trade is a foundational concept in international economics, developed by David Ricardo, which explains international trade based on absolute advantage. It assumes a world with two countries, each producing two goods, using labour and capital as the only factors of production. The model relies on the idea that countries specialize in producing goods where they have a higher absolute productivity, leading to gains from trade.
>
> The production possibilities frontier (PPF) in the Ricardian model is typically non-linear, reflecting diminishing returns to specialization. Labour productivity is determined by the amount of goods produced per unit of capital. Comparative advantage is derived from the higher opportunity cost of producing one good relative to another, and specialization occurs where opportunity costs are minimized.
>
> The model predicts that trade will equalize wages between the two countries and that both countries will necessarily be better off after trade. This is based on the assumption of perfect labour mobility across countries, which ensures that all workers benefit equally from trade opportunities.

1.
2.
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4.
5.
6.
7.
8.

Total of question 5: [8]