

## FINAL EXAM

Answer a total of **three** questions. **Answer at most one question from Part II.**  
{answer three questions from Part I **or** answer 2 questions from Part I and one question from Part II}.

**Part I.**

1. Answer all parts.

a) Answer parts (i)-(iii) assuming the following exchange rates hold:

Currency	Exchange Rate (as US\$ per foreign currency)
Euro	\$1.200/Euro
British pound (£)	\$1.800/£
180-day forward rate	\$1.782/£

- i. What is the spot exchange rate between the Euro and the British pound? **(6 points)**
  - ii. If US 6 month interest rates are 2.0% (annual interest rates are 4%), what is the 6 month interest rate on British pound securities? Show how you got your answer. **(6 points)**
  - iii. Given the prices of goods produced in each country, what is the likely effect of an appreciation of the dollar against the Euro on US exports to, and US imports from, Euro countries (i.e., countries whose currency is the Euro)? Explain. **(5 points)**
- b) Historically, developing countries used multiple “fixed” exchange rates. For example, a country (e.g., Malaysia) would **require** its citizens to sell all the dollars they had to the Malaysian Central Bank in exchange for local currency (ringgit) at one exchange rate, while the Malaysian Central Bank would resell these dollars to importers at different exchange rates. For example, Malaysia would require exporters (and all citizens who acquire dollars) to sell these dollars to the Central Bank at the rate of 2 ringgit/\$, while the Central Bank sells dollars to food importers at the rate of 4 ringgit/\$, and to car importers at the rate of 6 ringgit/\$.
- i. Why might a government **require** its citizens to sell their foreign exchange (dollars) to the Central Bank at one rate and to buy from the Central Bank at a different rate? Why isn't the Central Bank willing to buy and sell foreign currency at the same “fixed” exchange rate, such as **3ringgit/\$**, to all individuals? **(5 points)**
  - ii. What are the economic effects of these multiple exchange rates? In what way are they similar to trade policies discussed earlier in the course? {Hint: It might help your discussion to assume given world prices for each good and to calculate how the exchange rate policy affected domestic relative prices}. **(6 points)**
  - iii. Illegal markets, in which private citizens (illegally) trade foreign currencies directly with each other (at rates different from those set by the Central Bank) are a common feature of countries that maintain multiple exchange rates, as in this example. Why would these illegal markets develop? Explain. **(5 points)**

2. Consider a small economy, such as Mexico, which is on a flexible exchange rate system. Assume that the US price level (in dollars) and US interest rates are independent of any Mexican policy. Under these circumstances answer all of the following parts. Your answer should be supported either with equations, or a clearly explained graph.
- a) Suppose that, due to high oil prices, economic analysts forecast a significant increase in **future** Mexican *real income*, even though there is no current change in Mexican income. Assuming the Mexican money supply does not change: **(i)** determine the **long run** impact on prices, Mexican interest rates and the Mexican exchange rate (in terms of \$/peso) if this prediction is correct (that is, if Mexican *real income* actually increases). **(6 points)**
- b) Next, as in part (a), suppose economic analysts predict a significant increase in future real income, even though current income is unchanged. Use your answer from part (a) to determine the short run impact of this revised forecast on Mexican interest rates and the exchange rate. (*By definition*, prices are fixed in the short run, and by assumption Mexican current income is unchanged; all that has changed is current forecasts of future economic variables). Use your answer to explain why exchange rates can be more volatile than real economic variables (like income). **(6 points)**
- c) Given Mexican income levels, discuss the **short run** effect of a **temporary doubling** of the Mexican money supply on Mexican *interest rates and the exchange rate*. (*By definition*, prices are fixed in the short run). **(6 points)**
- d) Given Mexican income levels, determine the **short run** and **long run** effects of a **permanent doubling** of the Mexican money supply on Mexican *interest rates and the exchange rate*. Use your answers to parts (c) and (d) to discuss how expectations concerning whether the monetary expansion is permanent affect the short run impact of the monetary expansion on *interest rates and the exchange rate*. **(9 points)**
- e) Use your answer to part (d) to discuss exchange rate overshooting. **(6 points)**

3. Answer all parts to this question. In answering this question, assume that the money demand functions for the two countries (US, Japan) have the following specific forms:

$$M^{US} = P^{us} l(y^{us}, R^{us}) = P^{us} \cdot y^{us} h(R^{us}); \quad M^J = P^J l(y^J, R^J) = P^J \cdot y^J h(R^J)$$

where, as always,  $P^{us}, y^{us}, R^{us}$  represent the price level, real income and nominal interest rates in the US (and  $P^J, y^J, R^J$  are the comparable variables for Japan). Also, as always, money demand decreases as the interest rate increases. *{The only difference from the model discussed in class is the special form for real income: as real income doubles, money demand doubles}.*

In this question, assume that **prices adjust immediately** and that income is always at “full employment”, so it is not affected by government policies.

- a) Suppose US real income grows at 3% per year. If the US money supply grows at 5% per year, what will the inflation rate in the US be? **(5 points)**
- b) Next, consider two countries, the US and Japan. Assume that real income (GDP) in both countries is stable, that the US money supply is increasing at 3% per year, and that the Japanese money supply is growing at 5% per year. Further, assume the exchange rate between the two countries is flexible, and can be explained by the exchange rate model discussed in class and developed in Chapter 15 (which assumes flexible prices, and full employment).
- i. Under these circumstances, what **specific** predictions would you make concerning: (i) the inflation rate in each country; (ii) the difference in nominal interest rates between the two countries; and (iii) how the exchange rate changes over time? Explain. **(8 points)**
  - ii. How would your answer to part (i) above change if the US economy were growing at 3% per year, while there was no real income growth in Japan? Explain. **(6 points)**
- c) Return to the situation in which real income in both countries is constant over time, the US money supply is increasing at 3% per year, and the Japanese money supply is increasing at 5% per year. Further, suppose - prior to today - people had expected these economic conditions to continue into the future. However, a just released - and widely believed - economic report predicts that, effective tomorrow, the Japanese monetary authority will increase the money supply growth rate from the current 5% to 7%, and that they will maintain this higher monetary growth rate indefinitely into the future.
- i. If this forecast is correct, then how will this policy change affect the **long run** inflation rate in Japan and the US, nominal interest rates in each country and the annual rate of \$ depreciation (or appreciation) against the Yen? Explain carefully. **(7 points)**
  - ii. Given your predictions in part (i), will there be any immediate impact - **before the Japanese money supply changes** - on prices or interest rates in either country, or on the exchange rate? If so, what will these changes be? **(7 points)**

4. In comparing fixed and flexible exchange rates, it is important to understand that fiscal and monetary policy have different impacts under each exchange regime. Similarly, foreign disturbances (such as a recession) have a different impact on an economy under flexible exchange rates than under fixed exchange rates. **To illustrate these points, consider the macroeconomic model for a small economy developed in Chapter 16.** Let  $AD$  represent the aggregate demand-aggregate supply equilibrium relation, and let  $LM$  represent the money market equilibrium condition. The  $AD$  locus is determined by setting the supply of goods ( $Y$ ) equal to the demand for goods ( $C+I+G+CA$ ), whereas money market equilibrium ( $LM$ ) is obtained by setting money supply equal to money demand. These relationships are summarized by the following equations:

$$Y = C(Y - T) + I + G + CA(Y, q, Y^*); \quad q \equiv (EP^*/P); \quad M^s = PL(Y, R)$$

where:  $M^s$  is the domestic money supply;  $L(Y, R)$  is the demand for real money balances;  $Y$  is real domestic income (output);  $T$  is taxes;  $G$  is government purchases;  $CA(\dots)$  denotes the current account balance;  $Y^*$  is real foreign income; and  $R$  is the domestic nominal interest rate.  $CA$  is decreasing in domestic income ( $Y$ ), but increasing in the real exchange rate ( $q$ ) and foreign income ( $Y^*$ ). The domestic interest rate is determined through covered interest arbitrage.

In the *short run*, it is assumed that prices are fixed, while *real income is variable* (i.e., it can go below or above the level corresponding to the “natural rate” of unemployment). In the *long run*, prices can vary, but *real income* always returns to its (“natural”) full employment level.

- a) Suppose that, due to consumer unease concerning the future, there is an unexpected - and temporary - decline in consumer spending (an unexpected increase in consumer saving). Assuming foreign and domestic prices and the foreign interest rate are fixed, show how this decline in consumer spending affects domestic income (employment) and the exchange rate under a flexible exchange rate system. **(8 points)**
- b) If the domestic government wanted to keep the exchange rate constant in the face of this decline in consumer spending, what additional policy would it have to use? Compared to a flexible exchange rate, what *additional* impact would “fixing” the exchange rate have on the domestic economy (on real income)? (That is, compare the effects of the decline in consumer spending on income under flexible and fixed exchange rates). **(8 points)**
- c) Return to assuming that Mexico pursues a flexible exchange rate strategy. Given the decline in consumer spending (as in part a), what monetary policy should Mexico adopt to counter the effect of the drop in consumer spending on domestic income? Explain. **(8 points)**
- d) In comparing the merits of fixed and flexible exchange rate systems, economists often discuss which exchange rate system does a better job of insulating the economy from foreign economic fluctuations. Assuming the US economy has a sizable impact on the Mexican economy, would Mexico be more affected by a US recession under fixed or flexible exchange rates? Carefully justify your answer. **(9 points)**

**Part II. Answer at most one of the following questions.**

5. Answer all parts.

- a) Consider the specific factor model for a small country (Honduras) in which there are two goods (clothing, electronics). Each good is produced, under constant returns to scale, using capital and labor. Since the current capital (machines) in each sector is the result of previous investment decisions, capital is **not mobile** between the two sectors (i.e., capital is sector specific). However, labor is mobile between the sectors and thus, in equilibrium, it earns the same wage in each sector. Under free trade, the country exports clothing and imports electronics.
- i. Given the amount of capital in each sector, show how an export subsidy on clothing affects the real return to each factor in Honduras and the output of each good. Who gains and who loses as a result of this subsidy? Be specific. **(7 points)**
  - ii. Suppose that, over time, capital can be shifted from one sector to the other (due to depreciation, etc.) but the **total** capital stock stays fixed. Assuming that production of electronics is *capital-intensive* (as compared to clothing), discuss the *long-run* effects on output and factor prices of this export subsidy to clothing producers. **(7 points)**
  - iii. Compare your results from parts (i) and (ii). Are the output changes larger in the short run or long run? Is there a difference between which interest groups gain in the long run than in the short run? Be specific. **(6 points)**
- b) Consider a world with two large countries (the US, Asia) and five goods. All goods are produced using only labor, and the assumptions of the Ricardian model hold so that the amount of labor required per unit output is independent of the level of output. These labor requirements are given in the following table:

*Amount of labor required per unit output*

	Food	Textiles	Electronics	Autos	Chemicals
US	2	6	4	8	3
Asia	8	3	10	12	9

- i. What can you conclude about the pattern of trade between the two countries? Be as specific as possible. **(6 points)**
- ii. Suppose initially Asia exports two goods and imports the other three. How will a doubling of productivity in Asia (halving the labor requirements) affect the pattern of trade between the two countries, the relative prices of goods and the real wage rate in each country? Who gains and who loses from this productivity increase in Asia? Explain. **(7 points)**

6. Consider the market for cars and steel within a small country (Peru). Assume that under free trade, cars and steel are produced domestically and both goods are also imported. Further, **assume that each car produced domestically requires one unit of steel**, as well as other inputs (e.g., labor). Also assume that the only domestic use for steel is in car production. Assume the following supply and demand curves in Peru:

$$Q_c = 2(P_c^d - P_s^d); \quad D_c = 240 - 2P_c^d$$

$$Q_s = 2P_s^d; \quad D_s = Q_c$$

where:  $Q_c$  is the domestic supply (production) of cars;  $Q_s$  is the domestic supply of steel;  $D_c$  is the domestic demand for cars;  $D_s$  is the domestic demand for steel;  $P_c^d$  is the domestic price of cars; and  $P_s^d$  is the domestic price of steel. To understand the above supply and demand equations, note that - since steel is used to produce cars - higher steel prices raise the cost of producing cars, and hence lower car output (that is what the supply curve for cars implies). The demand for cars and supply curve for steel are standard. Finally, since the only domestic use for steel is to produce cars, the domestic demand for steel equals domestic car output. Finally, assume the following world prices for cars and steel, respectively:

$$P_c^w = 40; \quad P_s^w = 10$$

- a) Calculate the free trade level of production, consumption and imports of each good. **(5 points)**
- b) Suppose a tariff of **20** is imposed on car imports, i.e.,  $t_c = 20$ . How does this tariff affect the domestic price, consumption, production and imports of **both** cars and steel? **(5 points)**
- i. Calculate the impact of this import tariff on cars on domestic consumer surplus, producer surplus (for both car and steel producers), and overall welfare. **(5 points)**
- c) **Given the tariff on cars**, how will an import tariff on steel affect domestic price, consumption, production and imports of steel and of cars? Who gains and who loses from the tariff on steel? Explain. **(5 points)**
- i. How does a small tariff on steel imports affect domestic welfare? Explain. **(5 points)**
- d) Suppose, before imposing the import tariff on steel, the tariff on cars is converted into a quota (set at the level of imports under the tariff  $t_c = 20$ ). Given this quota, how does a small tariff on steel imports affect domestic price, consumption, production, imports of each good and welfare? Compare your answer to that of part (c). {A numerical answer is **not** required} **(8 points)**