

Finance 40500
Group Assignment #3

- 1) Suppose that the U.S. and Mexico produce and consume three goods - computers, petroleum, and medical care. Computers and petroleum are traded internationally, but medical care is not. America produces more computers than Mexico, but Mexico produces more oil. Consequentially the U.S. exports computers to Mexico and imports oil. Suppose that we have the following information on prices in the U.S. and Mexico

	U.S. (in \$s)	Mexico (in Pesos)
Medical Care (P_m)	\$750	P7,500
Computers (P_c)	\$2,500	P25,000
Oil (P_o)	\$38	P380

Further, suppose that the U.S. and Mexican price levels are defined as follows. The Mexican price level is more heavily weighted towards oil reflecting its higher production level while the US index is more heavily weighted towards computers.

$$P_{US} = .4P_m + .4P_c + .2P_o$$

$$P_M = .4P_m + .2P_c + .4P_o$$

- a) Calculate the price levels in the U.S. and Mexico.

$$P_{US} = .4(750) + .4(2,500) + .2(38) = 1,307.6$$

$$P_M = .4(7,500) + .2(25,000) + .4(380) = 8,152$$

- b) Calculate the exchange rate implied by the law of one price (the exchange rate that eliminates profitable arbitrage in computers or oil). Calculate the real exchange rate.

$$\frac{P_c}{P_c^*} = \frac{P_o}{P_o^*} = \frac{P_m}{P_m^*} = .10$$

$$RER = \frac{eP^*}{P} = \frac{(.10)8152}{1307.6} = .62$$

- c) Suppose that the price of Health care rises to \$1,000 in the US. Calculate the impact on the US price level, the Mexican price level, the nominal exchange rate, and the real exchange rate.

$$P_{US} = .4(1,000) + .4(2,500) + .2(38) = 1,407.6$$

$$P_M = .4(7,500) + .2(25,000) + .4(380) = 8,152$$

$$e = .10$$

$$RER = \frac{eP^*}{P} = \frac{(.10)8152}{1407.6} = .58$$

- d) Starting with the initial set of prices, suppose the conflict in the Middle East causes the price of oil to rise by 20% worldwide. What should happen to U.S. and Mexican price levels, the nominal exchange rate, and the real exchange rate? What happened to the US terms of trade?

$$P_{US} = .4(1,000) + .4(2,500) + .2(45.6) = 1,309.12$$

$$P_M = .4(7,500) + .2(25,000) + .4(456) = 8,182.4$$

$$e = .10$$

$$RER = \frac{eP^*}{P} = \frac{(.10)8,182.4}{1,309.2} = .63$$

The US Terms of Trade worsens.

- 2) Suppose that the price of oil in the US is \$70 per barrel while the price of the same barrel of oil in Europe is E50.
- a) Calculate the EUR/USD exchange rate implied by the law of one price.

$$\frac{P_o}{P_o^*} = \frac{70}{50} = 1.40$$

- b) Suppose that the US imposes a 10% export tariff (all goods leaving the US pay 10% of the good's purchase price to the government) while Europe has a 25% export tariff. Calculate the range in which the EUR/USD exchange rate can fluctuate with arbitrage opportunities opening up.

Buy in Europe, Sell in US

$$\pi = P - eP^*(1+t^*) > 0$$

$$e < 1.12$$

Buy in US, Sell in Europe

$$\pi = eP^* - eP(1+t) > 0$$

$$e > 1.54$$

- c) What does your answer tell you about the relationship between export tariffs and the exchange rate (i.e. are countries with high export tariffs more likely to be overvalued or undervalued relative to LOOP?)

The Euro is more likely to be undervalued.