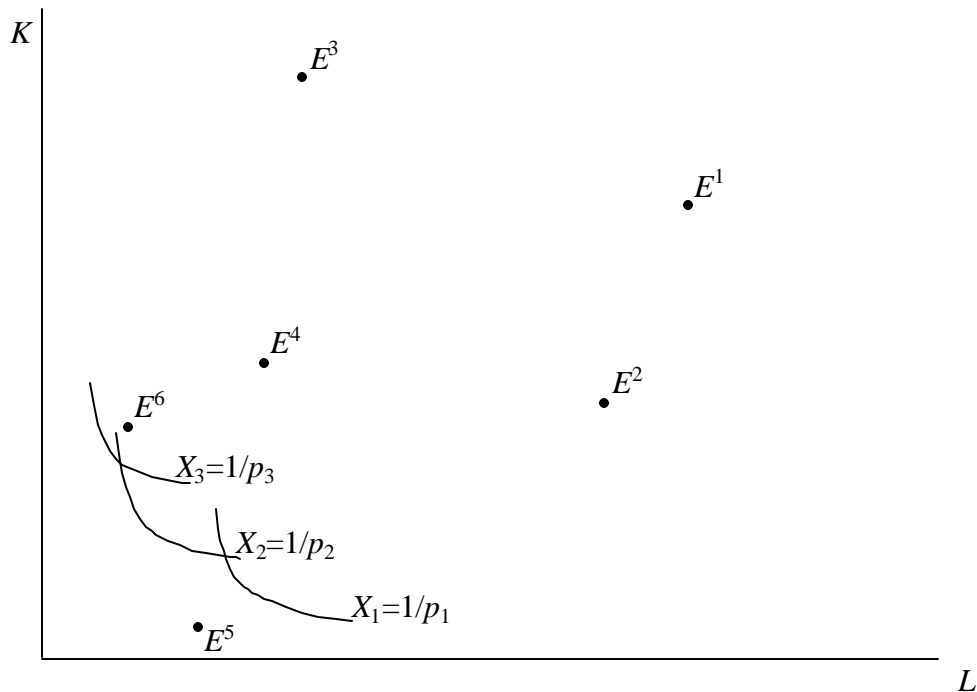


Problem Set 4 Two-Cone Model and Gains from Trade

1. The graph below shows unit value isoquants for three goods, X_1 , X_2 , and X_3 , based on prices that are assumed to prevail throughout a world of many countries with free trade. Also shown are points representing the factor endowments of several countries, E^1, E^2 , etc. Complete the two-cone Lerner diagram to identify the factor prices, factor ratios, and vectors of factors that will be employed in each sector by each country, and use these to answer the following questions:



- a. In which country or countries will the wage in units of good X_1 , be highest, and in which will it be lowest? Would the answer be any different for the wage in units of goods X_2 or X_3 ?
- b. Which country will produce the largest quantity of each good?
- c. Which country will produce the largest *ratio* of good X_3 to good X_2 ?
- d. (Hard) Which country has the largest national income?
- e. Suppose that consumer preferences in the world were to shift towards good 2 so as to cause a small increase in the price of good 2, the relative price of goods 1 and 3 remaining constant. Which country or countries would increase their output of good 2?

2. Suppose that population grows in an open economy, in a world characterized by a two-cone equilibrium, and that the country is too small to affect world prices, even after this population growth. If the country's capital stock fails to grow as rapidly as its labor force, what will happen to the real wage of labor, and how will this depend on its pattern of specialization? Would your answer be any different if the country were able, instead, to expand its capital stock in proportion to its population?
3. Suppose the world consists of just two countries and three goods, initially in a two-cone equilibrium with country 1 producing the most labor intensive good, X_1 , country 2 producing the most capital-intensive good, X_3 , and both producing the good of intermediate capital intensity, X_2 . Suppose now that a small part of the labor force in country 1 moves to country 2.
 - a. At initial prices, what happens to the real wage of the labor that moves? Does it rise, fall, remain unchanged, or is the effect ambiguous?
 - b. Also at initial prices, how, if at all, will this movement of labor affect the world's outputs of goods 1, 2, and 3?
 - c. Based on your answer to part (b), how would you expect world prices to change as a result, and how would this in turn affect real wages in the two countries? (Without details about preferences, you can't be sure of the answers to this, but you should be able to give answers that are plausible.)
4. Consider a small open economy in a two-sector, Heckscher-Ohlin world where all the labor is owned equally by 100 people in one group, and all the capital is owned equally by a different 50 people in another group. As usual in HO models, both labor and capital are perfectly mobile between sectors, and initially the economy is producing both goods.
 - a. Assuming that non-distorting transfers are possible, what can you say about the shape of the utility possibility frontier (UPF) for this economy?
 - b. If transfers are not in fact used, what can you say about the actual utilities of the members of the two groups?
 - c. Suppose now that some sort of disaster destroys 20% of the capital of each capitalist, leaving population and labor unchanged. Assuming that the country continues to diversify, what will happen to its UPF, and what will happen to the actual utilities of the members of both groups?
 - d. If instead the loss of capital causes the country to specialize in producing only one good, what then will happen to the UPF and to actual utilities?
 - e. Using the same criteria that we usually use for judging gains from trade, how would we judge the welfare effects of this loss of capital in the two cases of parts (c) and (d)?

5. Suppose that a small open economy that is exporting labor-intensive goods experiences an improvement in its terms of trade. In what sense does it “gain” from that improvement, in both the HO and the specific factors models?