

Economics 101: International Trade

Fall 2008

Problem Set 1c

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8 Endowments in the Heckscher-Ohlin Model

At current goods prices—and thus factor prices—the optimal ratio of land to labor in cloth production is 20 hours of labor for each acre of land and in food production is 5 hours of labor per acre of land. The economy is endowed with 1,200 hours of labor and 120 acres of land.

- What are the resource constraints for land and labor?
- Write down the equations for land used in production (T_i) as a function of labor used in production (L_i) for each sector.
- Which is the land-intensive good? How can you tell?
- Using the four equations above, determine the allocation of resources to production in each sector. [Hint: substitute the resource constraints into the equation for land used in food production.]
- Plot your equilibrium allocation in an Edgeworth box.
- The land endowment increases from 120 to 180 acres. Using the Edgeworth box, trace out the changing allocation of resources. What is the new allocation of land and labor in each sector? Which sector grows? Which sector shrinks?

- g. What happens if the endowment of land increases to 240 acres? What happens if land grows beyond 240 acres?

9 Endowments, Factor Intensities, and Trade

Home and Foreign produce two goods each, xylophones (X) and yams (Y), using two factors, land (T) and labor (L). In equilibrium, the relative price of xylophones P_X/P_Y is related to the wage-rental ratio by $P_X/P_Y = \sqrt{w/r}$.

The optimal land-labor ratio in xylophone production is given by $T_X/L_X = 0.25\frac{w}{r}$ and by $T_Y/L_Y = 2.5\frac{w}{r}$ in yam production. In autarky, the relative price ratios are $P_X/P_Y = 4$ in Home and $P_X^*/P_Y^* = 2$ in Foreign.

- Using a diagram relating relative goods prices and relative input choices to relative factor prices, indicate the autarky points for Home and Foreign. [Your diagram does not need to be drawn to scale.]
- Which is the land-intensive good? Which country is relatively more land-abundant?
- When relative the price changes, will the land-labor ratios move in the same direction in both sectors? If so, how can both sectors change land-labor ratios in the same direction with total land and labor resources fixed? If not, which way do they move?
- In world trade equilibrium, the relative price of cloth $P_X/P_Y = 3$. Show how trade affects the land-labor ratios T_X/L_X and T_Y/L_Y in Home.
- How does this price change affect Home's relative wage? What theorem explains this result?