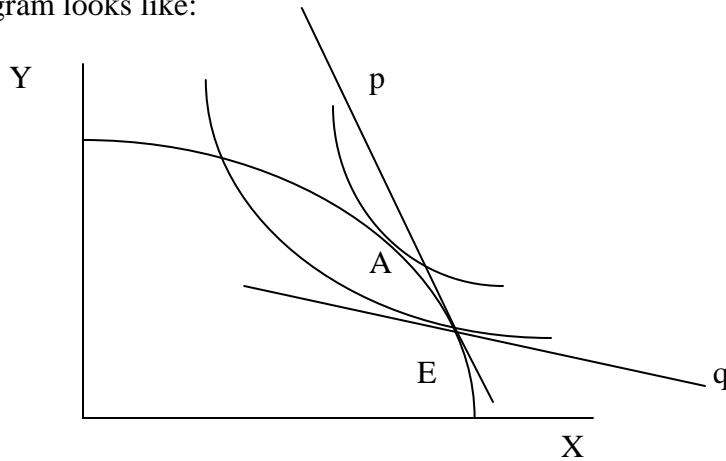


Answers to Problem Set 3

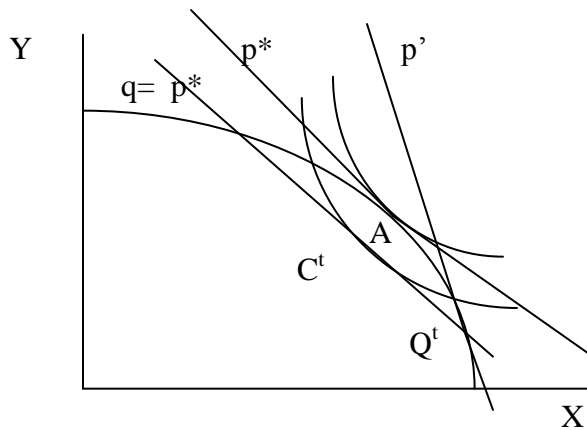
Distortions, Imperfect Competition, and Trade

1. This question asks you to reverse the analysis from the class notes on a production tax on X, now imposed instead on Y. Start with relative price relationships: $q = q_x/q_y = p_x/p_y (1+t_y) < p_x/p_y$. So $q < p$ but $p = MRT$ (slope of PPF) in this case. So the PPF diagram looks like:



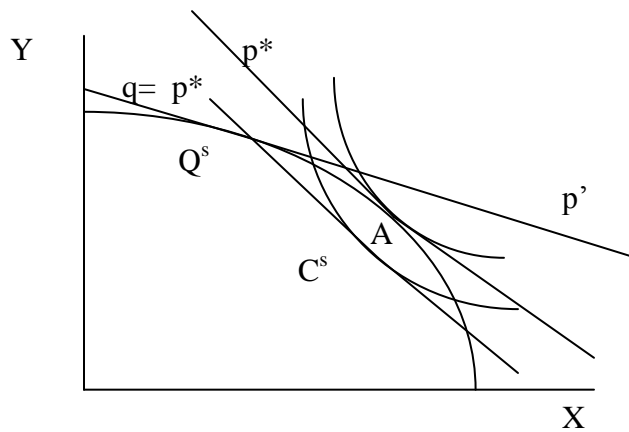
Note that autarky is at E, which involves a welfare loss compared to A, without the tax. The tax on Y is equivalent to a production subsidy on X because both reduce output of Y and raise output of X. They have the same effect on relative prices. In the subsidy case we get $q = p_x(1-s_x)/p_y < p = MRT$. I'll leave the partial equilibrium case to you.

2. A similar diagram provides the basics but I'll draw it again.



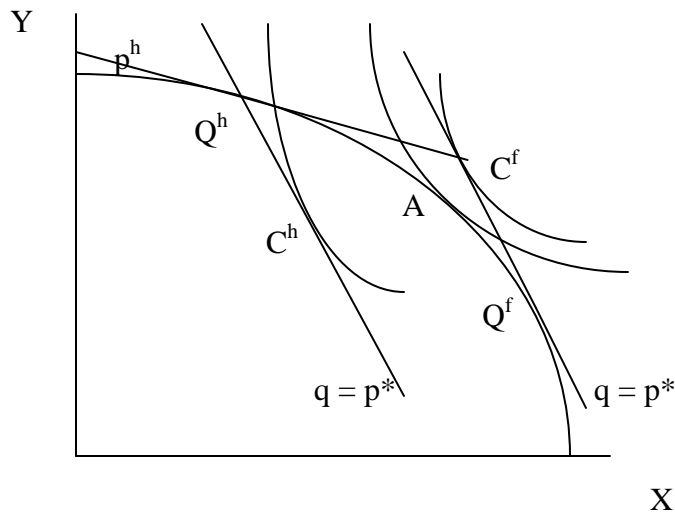
A is the undistorted case; in free trade there would be no trade. Now let this SOE impose the production tax on Y. Consumers in the SOE realize they can buy Y at the cheaper relative price p^* since there is no tax in ROW. This means the full incidence of the tax is paid by domestic producers of Y. In the new equilibrium we must have $q = p^* < p'$, where p' incorporates the tax on Y. This means the economy produces less Y and more X to move to a point like Q^t but consumption lies along price line p^* . The SOE exports X and imports Y; the tax generates an inefficient trade pattern (excess demand for Y) and welfare falls compared to free trade. The deadweight loss is the movement from A to C^t .

3. The production subsidy on Y would induce more production of Y (less X) and cause the SOE to import X and export Y. Equilibrium would look like this:



Because consumers can transact at p^* prices, we must have $q = p^* < p'$. So output moves to Q^s , consumption at C^s , and the SOE imports X, exports Y. The subsidy generates an export surplus in Y but it is worse off.

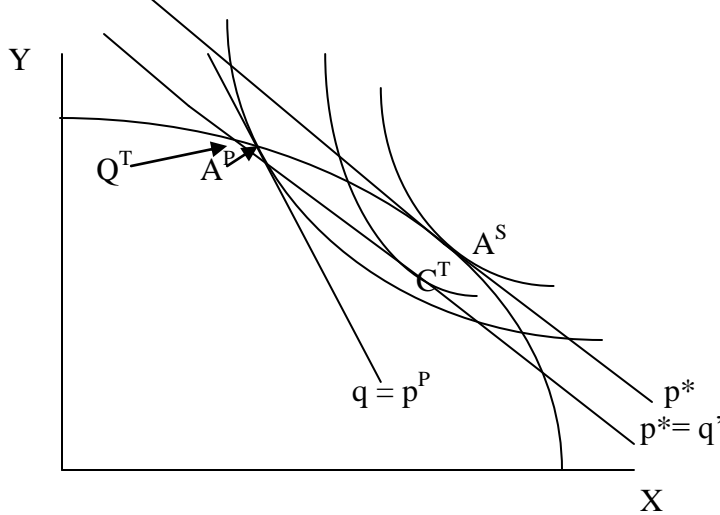
4. This case is shown in Figure 10.3 in the text. But the analysis would go like this.



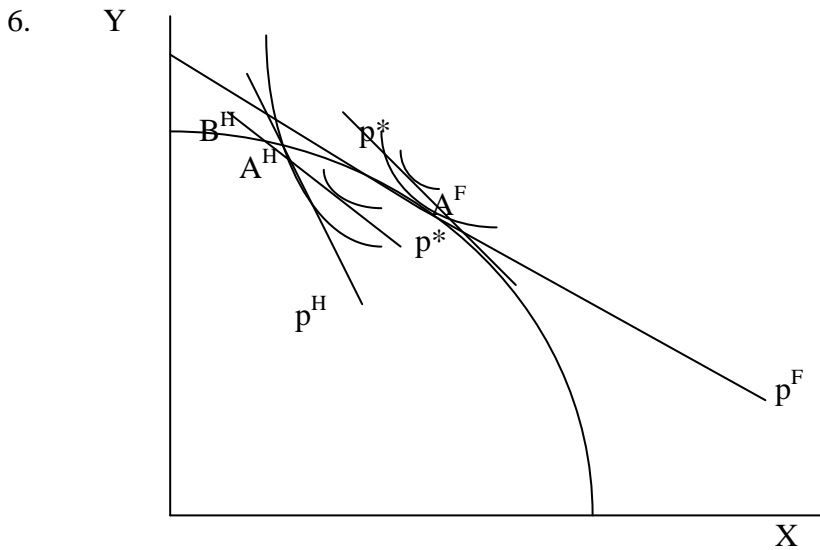
A would be the undistorted autarky for both; there would be no trade in free trade. With the tax on X production in h the output of X falls (Y rises) in h because the relative producer price of X falls there. Again, h consumers can transact at international prices, which are shown by p^* . So we have $q = p^*$ in both countries in free trade. But in h we have $q = p^* > p^h$. But f does not have the tax so we have $q = p^*$ there. The result is that h production moves to Q^h and consumption to C^h , causing it to import X and export Y. Output in f moves to Q^f and consumption to C^f , causing it to import Y and export X. f is better off and h is worse off.

5. This basically requires you to reverse the analysis from the class notes, where now Y is the polluter rather than X. You should be able to show that in autarky there is too much Y produced (and too little X). The failure to force the polluting firms in Y to pay for their external costs on X means that in free trade the home relative price of Y will be lower than the world relative price. So H will export Y and import X. This means Y output will expand, which is a worsening of the resource allocation and makes the economy worse off. However, there would be a gain from exchange for consumers so the economy could be worse off or better off.

I'll leave the partial equilibrium case to you. Here's what it would look like in general equilibrium.



The undistorted socially optimal equilibrium is at A^S but the pollution externality generates autarky at A^P and a reduced level of welfare in autarky. The pollution means that the price of Y is too low (and of X too high) where $q = p^P$. Free trade at undistorted p^* lets consumers take advantage of that price so $p^* = q^T$. But the uncorrected distortion means that the price of Y is low in the SOE compared to the world so the SOE imports X and exports Y at p^* . For this to happen it pushes production toward more Y, as at point Q^T . In the case drawn this is a small production shift and the economy can be better off at C^T than in autarky. But we could have drawn a large movement along PPF toward more Y, which is inefficient, and the economy could have been worse off.

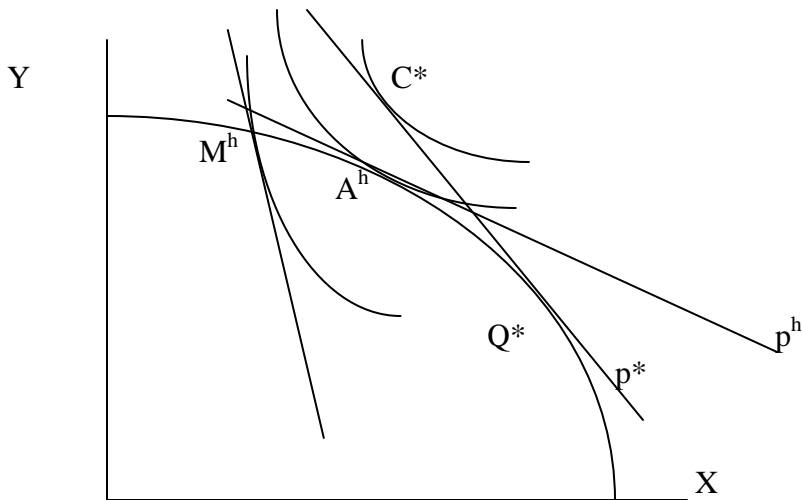


The initial autarky points are shown. H is worse off than F in autarky because it suffers the monopoly distortion. The monopoly means that $p^H > p^F$. If these countries enter trade, H would import X, export Y while F would do the opposite at p^* . This will move H's production point to B^H at the lower relative price p^* . I've drawn it so that H is better off but H could be worse off if output shifts by a lot. F ends up producing more X and is better off.

7. You'll find this in the notes for chapter 11 under "First Case: Economy h is an SOE importing X at fixed relative price p^* ".

8. You'll find this in the notes for chapter 11 under "Second Case; Duopoly in Free Trade" and we discussed it in class. Be sure you can explain why the perceived elasticity of demand rises in free trade and why price of X goes down.

9. Consider the case where the SOE has a "true" comparative advantage in X:



Try to reason through this case. Without the monopoly the autarky would be A^h and this would be a standard HO trade problem of comparative advantage. But the monopoly generates autarky at M^h and we have this strange outcome: $p^{mh} > p^* > p^h$. So the economy has an “apparent” CA in Y (cheap Y in autarky) but a true CA in X. If we get rid of the monopoly by entering free trade there are really 2 things that happen.

- A. PC gain is moving from M^h to A^h (monopoly is destroyed, go to perf. Comp.)
- B. The standard CA gain from trade is from A^h to C^* .

Increasing Returns to Scale

10. $AC = F/X + m$. Now price must be at least equal to AC in order to break even. If price equaled AC it would still be higher than MC. So price must exceed MC.

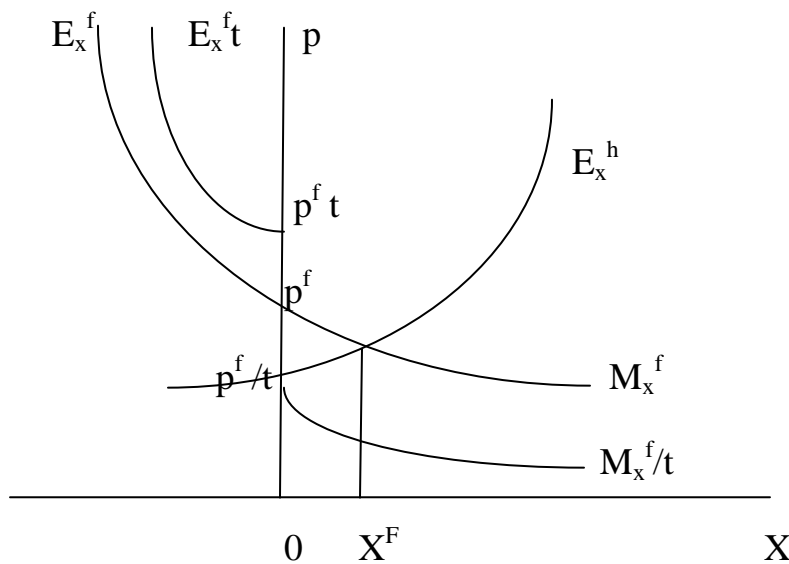
11. Try to define pro-competitive gains, gains from declining average costs, gains from exit of firms, and gains from product variety. You will find answers to these issues in the notes for Chapter 11. Use the PPF with fixed costs in X and constant marginal costs. Be sure you can depict price, average cost, and profits (if there is a monopoly). In the case of free entry show the expansion of the PPF due to the rationalization gain.

Monopolistic Competition

12. See the notes for chapter 12 and figure 12.2 in the text.

Trade Costs and the Gravity Model

13.



In the diagram above, the trade costs shift down the f import demand curve. Here it shifts down enough that it goes fully below h export supply curve. As a result trade is reduced from X^F to zero; that is trade is eliminated.

14. I will leave this essay to you. See notes for chapter 13.

15. I will leave this essay to you. See section 13.8 that I emailed to you.