

September 2000

Part 4 Notes

Revenue and Rent seeking: an application of the HOS model.

Revenue/Rent seeking

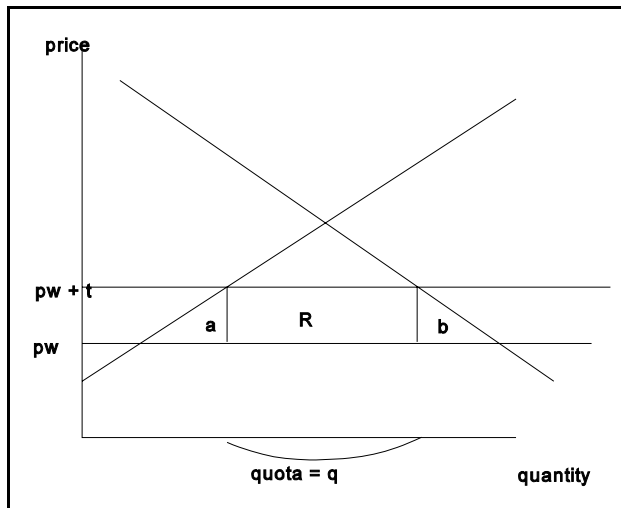


Figure 1 Deadweight loss and rent/revenue

Real resources are used to "capture" the rent from quotas or the revenue from tariffs. This activity is known as rent or revenue seeking. Resources that are used in rent/revenue seeking cannot be used for other, productive activities. Economists distinguish between the efficiency and the distribution effects of policies, such as quotas. Figure 1 shows the effect of a quota of q , or equivalently of a tariff of t , in a partial equilibrium model. The triangles a and b show the deadweight loss - the efficiency effect of the policy. The rectangle R shows the quota rent or tariff revenue. (In this partial equilibrium setting the tariff and quota lead to the same equilibrium result: they are equivalent.)

If this revenue is distributed in some way which does not encourage people to spend resources to obtain it, then R is a "pure transfer" and does not represent an efficiency loss.

However, if it is possible to compete for R , then individuals would be willing to spend up to the amount R to obtain that amount. The amount of resources spent in obtaining the rent or revenue represents an efficiency loss, since it means that resources are being spent over the division of the pie, rather than on the creation of something useful. Thus, the real cost, in this partial equilibrium model, may be as high as $a + b + R$, which is much larger than $a+b$. By ignoring rent/revenue seeking, we may vastly understate the costs of trade restrictions or of other distortionary policies ..

"Revenue seeking" occurs if the policy is a tariff, and "rent seeking" if the policy is a quota. Sometimes, these two terms are used interchangeably, but you should be aware that tariffs and quotas may not be equivalent in a general equilibrium setting -- so it is best to make the distinction between the two clear.

When we say that 50% of the revenue is "sought" we mean that individuals are willing to hire and pay for \$0.5 worth of resources in order to capture \$1 worth of revenue. "Full revenue seeking" means that there are 0 profits in the revenue seeking sector. That means that people would hire \$1.0

worth of resources in order to capture \$1.0 worth of revenue. If 0% of the revenue is sought, it means that it is not necessary to devote any resources (or at least any resources that have a positive opportunity cost) to the capture of that revenue. (Hey, I didn't invent this terminology.)

We will begin by examining a model in which all of the revenue is "sought". This means that if, for example, the revenue is R , individuals are willing to spend R to capture it.

(Possible confusion with notation: Here I use R to denote the amount of tariff revenue or quota rents. Elsewhere I use R to refer to a Ryb.. Line.)

We will use this model to ask the following question: *In a general equilibrium setting, does the amount of revenue that is "sought" equal the social cost of the activity (revenue seeking)?*

If, for example, individuals are willing to spend $\$x$ to pay for resources to capture revenue, is the social cost $\$x$? At first blush it might seem that the answer is "yes". If 1000 hours of skilled work are devoted to capturing revenue then those hours cannot be devoted to a productive activity such as teaching. In this case society "loses" 1000 hours of skilled work. If each hour is worth \$50, then it might appear that the cost to society is \$50,000. In other words, if individuals are willing to pay for \$50,000 worth of resources (labor, in this example) in order to capture revenue, it might appear that the social cost of the activity is \$50,000.

However, we saw from the example of immiserizing growth in the previous section, that the price people are willing to pay for resources is not necessarily equal to the social marginal value of those resources. Therefore, the fact that people are willing to spend \$50,000 on a socially unproductive activity does not mean that the social cost is \$50,000.

We will first give an answer to the italicized question above under the assumption that all of the revenue is sought. Again, this means that if tariff revenues equal $\$x$, then people are willing to spend $\$x$ on resources to capture the revenue. That is, there is 0 profits in the "revenue seeking sector".

In order to analyze this situation using geometric methods, you need to understand three things: (a) How to determine the size of the tariff revenue or quota rents, in units of one of the goods, given a level of production and consumption. (b) How to determine the consumption point under full revenue seeking. (c) How to determine the production point.

We already know how to determine the consumption point when none of the revenue is sought, so if we also know how to determine the consumption point under full revenue seeking, we know the welfare cost of revenue seeking. We can measure that loss in utility in units of one of the goods.

If I know the consumption and production point (under full revenue seeking) and also know how to determine the associated tariff revenue (measured in units of one of the goods), I can compare the tariff revenue (measured in units of one of the goods) with the welfare cost of revenue seeking (measured in the same units). Thus, I can determine whether the amount of revenue that is sought

is greater, less than or equal to the welfare cost.

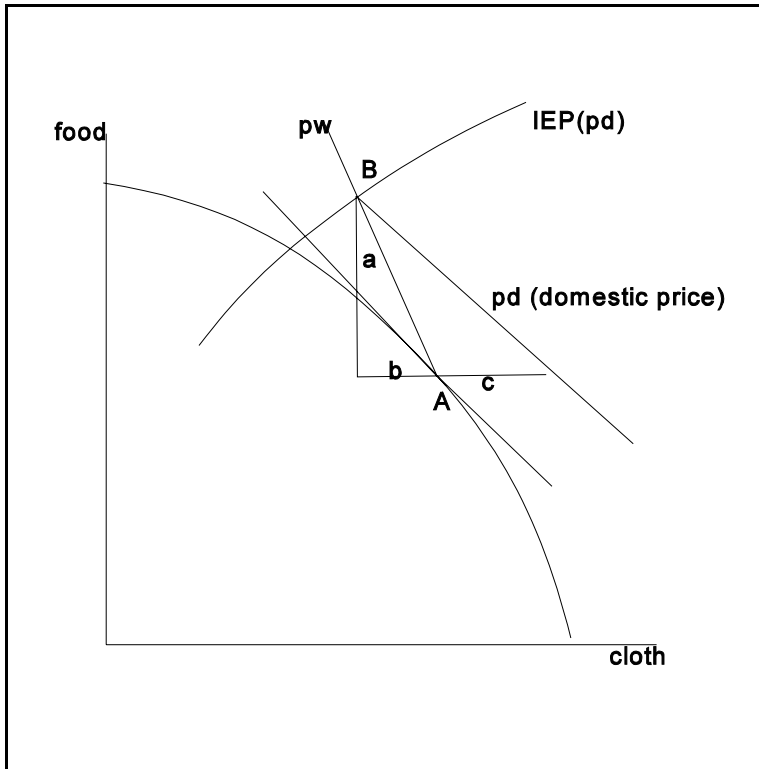


Figure 2 Tariff revenue without revenue seeking

(a) Show how to determine the size of tariff revenue, in units of cloth. Figure 2 shows the equilibrium with a tariff of τ and no revenue seeking. I want to show that the value of tariff revenues, measured in units of cloth, is given by distance c . The country imports food, and places an ad valorem tariff of τ on imports. The world relative price of cloth is $P_c/P_f = a/b$, and the domestic relative price is $P_c/(1+\tau)P_f = a/(b+c)$. Dividing the first equality by the second gives $1+\tau = (a/b)/[a/(b+c)] = (b+c)/b$, so $\tau = c/b$. Tariff revenue = (imports $\cdot \tau P_f$) = $aP_f\tau$. This is in units of dollars. To convert to units of cloth, divide by the price of cloth: (tariff revenue)/ $P_c = \$/(\$/\text{cloth}) =$ units of cloth. So, tariff

revenue/ $P_c = a(P_f/P_c)(c/b) = a(b/a)(c/b) = c$. This is what we wanted to show. Note that c is the loss in utility, measured in units of cloth, that would result from throwing the tariff revenue into the sea.

In expressing the tariff revenue in units of cloth (rather than in dollars) all that I needed to know was the consumption point and the production point and the domestic price. It did not matter that these points happened to be associated with an equilibrium without revenue seeking.

RULE: To find the magnitude of tariff revenue, in units of the good on the horizontal axis, draw lines with the slope of the *domestic* price ratio through the consumption and the production points, and take the horizontal distance between those lines.

b) Now I will explain how we determine the equilibrium consumption point when all of the revenue is sought. (Again, this means that the value of the productive resources spent on trying to capture the tariff revenue equals the amount of the tariff revenue.) Once I know the consumption point under full revenue seeking, I can measure the welfare cost of revenue seeking (since I already know the consumption point in the absence of revenue seeking).

With full revenue seeking, the amount of domestic income is equal to payments to factors (labor and

capital). Remember that in the usual model with a tariff (and no revenue seeking) total income is equal to payments to factors plus the amount of the tariff revenue (which by assumption is redistributed to consumers in a lump sum). Under full revenue seeking, each dollar of revenue that is sought requires the diversion of a dollar's worth of factors from productive activities.

If world price and the tariff are fixed, then domestic commodity prices are fixed. This fixes factor prices. With full employment, this determines income to factors. If the domestic relative price is given by P_d , the payments to factors gives an income level associated with the line through point A in figure 3, and consumption occurs at point c_r rather than at c_t . (The latter is the level of consumption with the tariff and no revenue seeking.) From the digression above, the social cost of revenue seeking, measured in units of cloth, is the distance c .

Note that point A is not the production point. "A" is the point at which production would have occurred in the absence of revenue seeking. Now, however, factors are used in three activities, food and cloth production and revenue seeking. In order to represent the revenue seeking activity, I would need a third dimension. As we move up in this dimension (i.e. as revenue seeking increases) factors are drawn from the food and cloth sector, so production of food and cloth occurs at a point inside the production possibility frontier in the figure -- not at point A.

Notice that, under the assumption that all of the revenue is sought, I was able to determine the consumption point (and consequently the cost of revenue seeking) without determining the level of production. This is because I know that consumption has to occur on the IEP associated with P_d , and because I know the level of income to factors (which is determined by the relation between commodity and factor prices, and by the assumption of full employment).

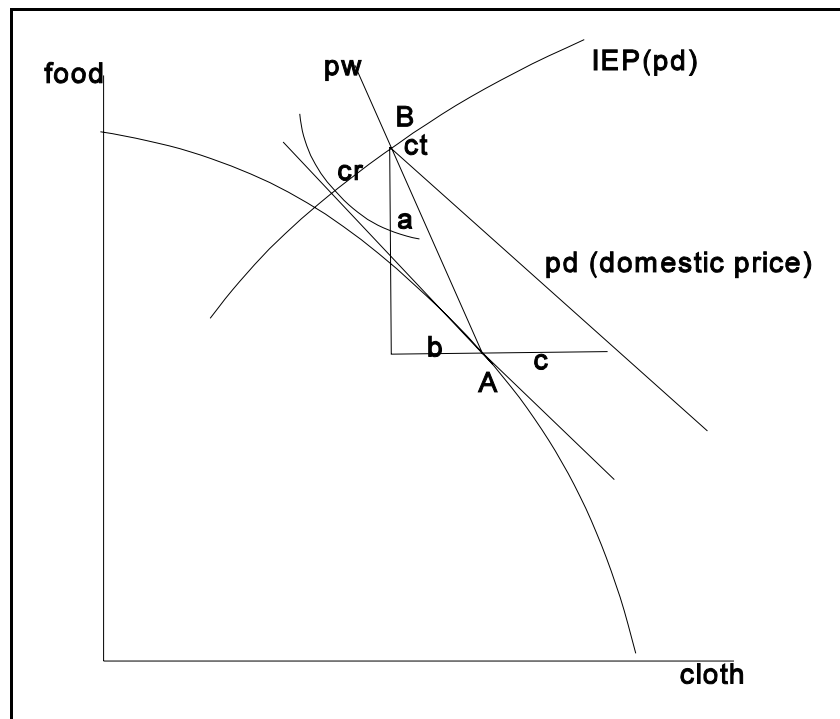


Figure 3 Consumption with all revenue sought

In other words, I used the facts that consumers face domestic prices and maximize their utility subject to an income constraint, and that income equals the total returns to factors of production

Now I want to consider the situation where not all of the revenue from a tariff is sought. For example, if tariff revenues are R , an amount less than R is spent in trying to capture that revenue.¹ There are positive profits in the “revenue seeking sector”.

In this case, it is possible that welfare is higher with revenue seeking than without revenue seeking. This can occur even though revenue seeking involves the diversion of real resources (labor and capital) from productive activities (food and cloth) to unproductive activities (lobbying). In order for this to occur, it must be the case that the shadow value of those resources (that is, the true social marginal value, as opposed to the amount that individuals are willing to pay for them) is negative.

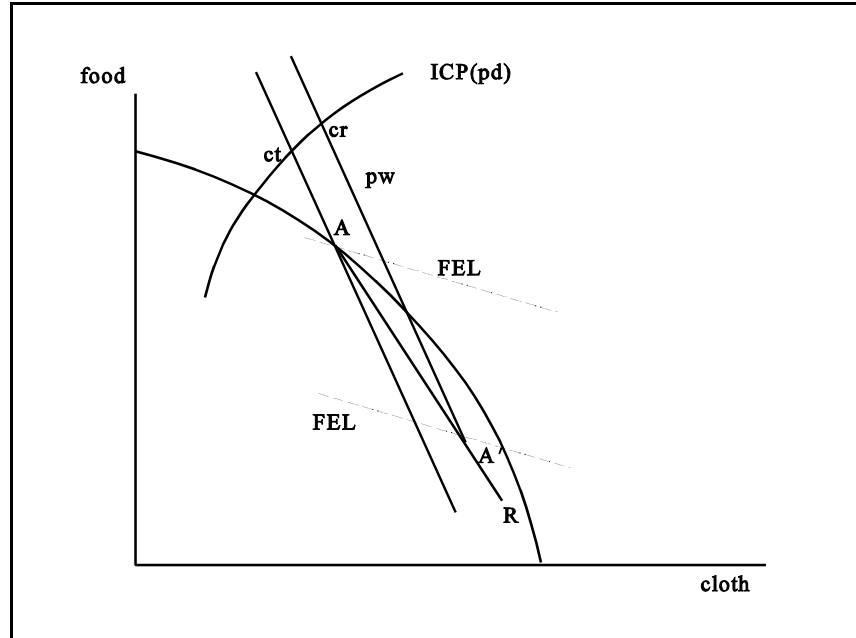


Figure 5 Welfare gain due to partial revenue seeking

To see how this occurs, take the extreme case where revenue seeking requires only labor (no capital), and food (the imported good) is labor intensive. Here, a withdrawal of labor means that food production decreases and cloth production increases (the Rybczynski theorem). In this case the Rybczynski curve slopes downward - it is just the "lower portion" of the "full employment line for capital". If the Rybczynski line is less steep than the world-price line through A , as shown in figure 5 (where it is labeled R), revenue seeking increases domestic welfare. (Remember: A is the production point without revenue seeking. Revenue seeking causes the reduction in the amount of labor available for production of food and cloth. This reduction is indicated by shifting down the dashed line, labeled FEL - Full Employment of Labor.) The increase in welfare occurs because revenue seeking results in less labor available, which causes an increase in cloth production - a movement toward the free trade level of production. (The decrease in food production results in a loss in real income, but this loss is more than offset by the increase in cloth production.)

¹ Why is it important that not all of the revenue is sought? We saw that in the case where all the revenue is sought, consumption is pinned down, independently of the level of production.

This is another example of a “counterintuitive” result in a distorted economy. Here the distortion is a tariff, which results in one factor having a negative shadow value. Bringing in another “distortion” (revenue seeking) partly offsets the distortion caused by the tariff.

[Note that we already saw - in the exercise on page 3:12 - that growth could be immiserizing. Here we have the flip side: “shrinking”, or “negative growth” caused by the diversion of productive assets into non-productive activities, can increase welfare.]

Finally, note that if the policy is a quota rather than a tariff, partial rent seeking cannot improve welfare. Why are a tariff and quota different in this regard? The possible welfare improvement under a tariff is caused by the fact that revenue seeking *can change the level of imports*, thus changing domestic production and the value of domestic production. With a binding quota, on the other hand, imports are fixed; rent seeking cannot change them, and therefore there is no scope for rent-seeking to improve welfare.

(Maybe skip the following)

Q2. Are tariffs and quotas equivalent, in the following sense: If I pick a quota and a tariff that results in the same level of imports as the quota, is the resulting level of welfare the same under the two policies? (The answer is NO.) (In a partial equilibrium model, the two policies are equivalent, as illustrated by figure 1.)

Suppose that the rent seeking and the revenue seeking technologies are the same; this means that the same Rybczynski curve applies to both activities. Suppose that we want to compare a quota of a (fig 2 or 3) and the tariff that results in that level of imports, in the absence of rent seeking. This (ad valorem) tariff is $\tau = c/b$ in figure 3. We have seen that once we introduce revenue seeking, this tariff results in $a' > a$ imports of food. This would violate the quota. Therefore, if a quota rather than a tariff were used (and all quota rents were sought), national income would have to be lower (so that imports are lower). In this case, a quota with rent seeking results in lower welfare than a tariff with revenue seeking. This is the sense in which tariffs and quotas are not equivalent in this model. [This is a bit confusing, because it is still true that for every tariff there is a quota which - when there is full revenue/rent seeking and the rent seeking and revenue seeking technologies are the same, i.e. the Rybizinski lines are the same - results in the same level of imports and the same level of welfare. If the tariff is c/b , the equivalent quota in the absence of rent/revenue seeking is a . If the tariff is c/b , the equivalent quota in the presence of revenue/rent seeking is a' (fig 3).]