PROBLEMS SET 2 (Fall 2007)

Free access and regulation

We wish to further analyze the problem of free access to a fishery with n identical fishers. We consider still the symmetrical Nash equilibrium which was characterized as

(1)
$$pf'(X^e) = w + \frac{n-1}{n} p X^e \frac{\partial}{\partial X} \left(\frac{f(X^e)}{X^e} \right),$$

where X^e denotes the equilibrium total number of boats operating on the fishery, i.e. $X^e = nx^e$. Answer the following questions analytically and provide an intuitive explanation for each.

1) Taxes

- a) Find the tax rate per unit of effort that would re-establish optimality. What does it represent exactly?
- b) How does the unit tax value vary with the number of firms?
- c) Do fishing firms prefer the free-access regime with the tax or without? Discuss.
- d) Assume now that the number of fishing firms is large, i.e. $n \to \infty$. Compare the optimal tax rate obtained in 1a) to the price of an entry ticket per boat (q^*) charged by a *single* rights holder as found in our analysis of the *anti-commons* in class, i.e. with m = 1 and $n \to \infty$. Comment on what it really means to impose a tax as a regulation measure.

2) Licenses

a) Instead of taxes, assume now that the government chooses to distribute fishing licenses. Each license confers a right to add one boat to the fishery. A firm may own more than one license. We assume that initially, the government *randomly* distributes a total number X^l of licenses between firms that can thereafter be traded. A market for licenses thus develops.

What will be the equilibrium price of each license? To simplify, assume that firms are price-takers in the market for licenses and denote the price as q.

- b) If the government distributes an optimal number of licenses, how does the price of a license compare to the efficient tax rate found above?
- 3) Do firms prefer regulation through licenses or taxes? Discuss.