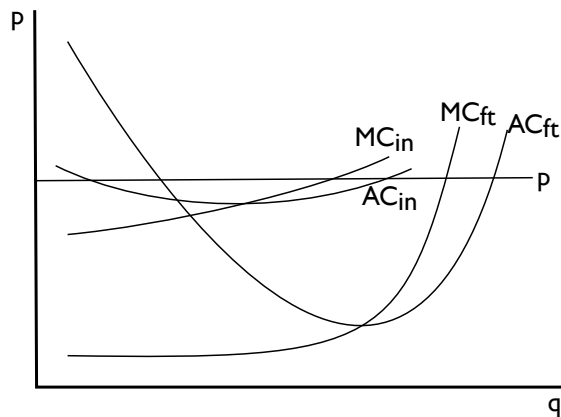


### Problem Set 3

1. *Cod.* Codfish in Newfoundland has been terribly overfished. This is a case where each fishing firm fails to take account of its marginal social cost in depleting the overall stock, leading to a negative externality in production. In real life, the Canadian government responded with a fishing moratorium, but in this problem we consider whether a Pigouvian tax would work.

- (a) Draw the supply and demand for cod (conventional "x" diagram), show the marginal social cost, and label the deadweight loss from the externality.
- (b) Now show the Pigouvian tax. What price do consumers pay? What price do fishing firms receive? How much is the government tax revenue?

It turns out that there are two types of cod fishing, and their private cost curves are shown in the following diagram:



Inshore fishermen operate in a labor-intensive way, using small boats and many workers. To catch more fish requires more boats and labor hours on the margin. Freezer trawlers, on the other hand, use large ships with freezer equipment. They have huge economies of scale up to a point, but little ability to expand output beyond that point since the ship already operates 24/7.

- (c) Assume the Pigouvian tax doesn't change prices in a way that puts either type of fishing firm out of business. How does each firm react to the tax? Which firms react more strongly?
- (d) Suppose that the phrase "Grand Banks cod" is valuable and recognizable to consumers, although some cod is from outside Newfoundland's Grand Banks. What would be the costs and benefits of creating an official geographic indication for "Grand Banks cod"?
- (e) If the geographical indication were an EU-style *protected designation of origin* that specified small-boat fishing methods, how would this affect the industry and the overfishing externality?
- (f) Suppose the Canadian government also became concerned about the dangers of fishing work and mandated that every boat have expensive GPS emergency gear. How would this affect the industry?
- (g) The safety regulation would require cost-benefit analysis regarding the value of fishermen's lives. What methods could the government use to value the lives? Given that fishing is a low-paid, risky type of job, would these methods value fishermen's lives more or less than a typical Canadian worker?

- 2. You should know how to do Chapter 12, problems 3, 6.
- 3. You should know how to do Chapter 18, problem 3.
- 4. You should know how to do Chapter 20, problems 5, 6.

5. You should know how to do Chapter 21, problem 3.
6. You should know how to do Chapter 22, problem 2.