

THE PENNSYLVANIA STATE UNIVERSITY
Department of Economics

Economics 428
Homework 4
Due October 7

Gallant
Fall 2021

This is an individual assignment in the sense that each individual must submit his or her answers. However, you should feel free to work with another classmate to solve the problems. Ultimately, it is important that each individual understand how to solve these problems because questions similar to these will appear on exams. Turn in via Canvas

1. Consider a pollution problem involving a paper mill located on a river and a commercial salmon fishery operating on the same river. The fishery can operate at one of two locations: upstream (above the mill) or downstream (in the polluted part of the river). Pollution lowers profits for the fishery: without pollution, profits are \$300 upstream and \$500 downstream; with pollution, profits are \$200 upstream and \$100 downstream. The mill earns \$500 in profit, and the technology exists for it to build a treatment plant at the site that completely eliminates the pollution, but at a cost of \$200. There are two possible assignments of property rights: (i) the fishery has the right to a clean river and (ii) the mill has the right to pollute the river.
 - (a) What is the efficient outcome (the maximum of total joint profit)? Specifically, where does the fishery locate and does the mill build a treatment plant or not?
 - (b) What are the outcomes under the two different property rights regimes when there is no possibility of bargaining? What are the profits of the fishery and mill in each case?
 - (c) How does your answer to (b) change when the two firms can bargain costlessly?