

ECON4925 - Resource
Economics Final Exam – Makeup
– Fall 2020

1. Discussion – 30 points, each questions 15 points.

- i) A first policy maker consults with you about the Faustman model of forestry. Briefly summarize the basic idea of the model and explain why the short-run and the long-run supply respond to a change in time preference in opposite ways. Do not use formulas, the policy maker wants a verbal discussion.
- ii) A second policy maker consults with you to understand the basics about the interaction of Hotelling's rule and carbon taxation. This policy maker is a former economics student and invites you to use equations. Explain a suitable model. You do not have to derive all equations, but the economist-policy-maker does want to know how you solve the model and wants you to summarize steps that you leave out verbally. Of course, the policy maker is particularly interested in the intuition for the relations you present to him.

2. Fishery Economics – 30 points, each question 10 points.

The constant price per unit of harvest of a fishery is p . The profits depend on harvest, y , and biomass x as follows $\pi = py - \frac{y^2}{x}$. In the absence of harvest, the fish stock evolves according to $\dot{x} = x(1 - x)$. The sole owner has the constant discount rate $r > 0$ and an infinite time horizon.

- i) Derive and interpret the Euler equation.
- ii) Substitute the harvest amount y by the harvest rate $z = \frac{y}{x}$. Draw the phase diagram in the $x-z$ -space. Mark all curves, some of which will be qualitative sketches. Assume the current biomass is at the carrying capacity. Explain qualitatively how the optimal harvest trajectory evolves over time.
- iii) Now let's assume we switch from the sole owner setting to open access. Moreover, let (inverse) demand be characterized by the function $D(y)$. You will have to change one parameter/feature of the above model to make the model well-defined (internally consistent), which one? State the conditions for biomass extinction and/or a long-run open access equilibrium with finite biomass.
Note: Use the conditions for an open access equilibrium, but keep looking at the problem from an aggregate perspective without worrying about how to split up costs and benefits across various fishermen.