ESSAYS ON ECONOMICS OF NATURAL RESOURCE MANAGEMENT AND EXPERIMENTS, by Wisdom Akpalu

Abstracts

This thesis has five self-contained essays. The titles and the abstracts of the various essays are as follows.

Paper 1: Natural Resource use Conflict: Gold Mining in Tropical Rainforest in Ghana: Gold is frequently mined in rainforests that can provide either gold or forest benefits, but not both. This conflict in resource use occurs in Ghana, a developing country in the tropics where the capital needed for mining is obtained from foreign direct investment (FDI). We use a dynamic model to show that an ad valorem severance tax on gross revenue can be used to internalize environmental opportunity costs. The optimal tax must equal the ratio of marginal benefits from forest use to marginal benefits from gold extraction. Furthermore, the tax should increase (decrease) when adjusted net return on all other assets in the economy is higher (lower) than the growth in the price of gold. Empirical results suggest that the 3 percent tax rate currently used in Ghana is too low to fully represent the external cost of extraction (i.e., lost forest benefits).

Paper 2: A Dynamic Model of Regulatory Compliance in Fisheries: The Case of Mesh Size: This paper employs a dynamic model for crimes that involve time and punishment to analyze the use of nets with illegal mesh size under two management regimes: competitive and regulated open access fishery. The model is based on the consideration that the illegal net is used repeatedly until detection; the net decreases the expected weight recruitment of catchable fish; and lowers the average cost of harvest. We find that under the competitive fishery, the equilibrium stock and harvest are lower if the fishers use the illegal mesh size. However, under regulated open access, the size of the equilibrium stock depends on the ratio of the elasticity of catchability coefficient to the elasticity of the hazard rate. Furthermore, under some condition, the fine for violation should be higher under open access relative to the competitive fishery for any given level of violation.

Paper 3: Individual Discount Rate and Regulatory Compliance in a Developing Country Fishery: Studies on compliance with fishing regulations have looked at fishery crimes for which the offender faces a one-period decision problem of maximizing an expected utility. Moreover, the returns to the crimes are uncertain because the offender may lose them if caught. This paper extends these models by considering a fishery crime that generates flow of returns until the offender is caught and then punished. Consequently we incorporate into the existing model, the influence of dynamic deterrence in which the discount rate affects violation levels. The predictions of the model are tested on data from an artisanal fishery in Ghana.

Paper 4: Does Ostracism Decrease Over-fishing? A Common Pool Resource Experiment in Ghana: This paper investigates how the presence of ostracism, which is a familiar punishment mechanism to the subjects in an experiment, affects harvest in a common pool resource experiment. The experiment was framed as a fishing problem and the subjects were young fishers in Ghana. We find that the introduction of the possibility to ostracize other members of a group at a cost to the remaining members of the group decreased over-fishing significantly in comparison to the case where ostracism was not possible. Moreover, the subjects demonstrated a strong desire to ostracize those who over-fished.

Paper 5: Public Goods and Internalized Norms: This paper links a utility theoretical model based on internalized norms, influenced by Bowles and Gintis (2005), with the results from a novel public goods experiment in Ghana. The results indicate that, on average, people are motivated by conditional cooperation of two kinds: people want to contribute more if others have contributed more in the previous round, and people want to contribute more if others are expected to contribute more. We also found evidence of learning, in the sense that people's contribution decrease over time even if others' contribution is held constant.

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