Guillaume Bataille

Aix-en-Provence, France

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Website

Research Interests

- **Primary:** Fisheries Economics, Environmental and Resource Economics, Bioeconomics
- **Secondary:** Game Theory, Microeconomics

Current Position

PhD Candidate in Economics October 2021 – Present

Aix-Marseille School of Economics, Marseille, France
Dissertation: Essays on Fishery Management
Advisors: Prof. Agnes Tomini, Prof. Hubert Stahn

Education

Magistère Big Data Science, Economist Engineer September 2019 – June 2021

Aix-Marseille School of Economics, Marseille, France
Graduated with Honors

Master 2 in Empirical and Theoretical Economics September 2020 – June 2021

Aix-Marseille School of Economics, Marseille, France
Master Thesis: The Bio-Economics of Interacting Species
Graduated with Honors

Bachelor of Science in Economics & Industrial Organization September 2016 – April 2019

University of Tours, Tours, France
Graduated with Honors

Working Papers

Partial Considerations of a Predator-Prey Ecosystem with H. Stahn and A. Tomini

Submitted to *Resource and Energy Economics* — link

Abstract: This study presents new insights into the exploitation of a predator-prey ecosystem. It examines the emergence of biological externalities when agents specialize in harvesting specific fish types and only partially consider the dynamic of the ecosystem. We contrast this regime with the socially optimal outcomes. Specifically, private agents overestimate the conservation value of the targeted species and limit their fishing effort. This induces predator overpopulation and the depletion of the prey stock. This global under-fishing persists even given agents' strategic interactions among themselves when targeting the same fish. Finally, we propose a species-specific instrument to regulate the two main inefficiencies: strategic and biological externalities.

An Explicit Solution to Harvesting Behaviors in a Predator-Prey System

Forthcoming in *Natural Resource Modeling* — link

Abstract: This paper derives closed-form solutions for a strategic, simultaneous harvesting in a predator-prey system. Using a parametric constraint, it establishes the existence and uniqueness of a linear feedback-Nash equilibrium involving two specialized fleets and allow for continuous time results for a class of payoffs that have constant elasticity of the marginal utility. Theses results contribute to the scarce literature on analytically tractable predator-prey models with endogenous harvesting. A discussion based on industry size effects is provided to highlight the role played by biological versus strategic interactions in the multi-species context.

International Fisheries Agreements: Endogenous Exits, Shapley Values, and Moratorium Fishing Policy with B. Zou

Submitted to *Journal of Environmental Economics and Management* — link

Abstract: Motivated by recent examples, this study proposes a dynamic multistage optimal control problem to explain the instability of International Fishery Agreements (IFAs). We model two heterogeneous countries that exploit shared fishery resources, and investigate the conditions that lead to a shift from cooperation to competition. We assume that countries differ in their time preferences, initially behave as if the coalition will last indefinitely, use fixed sharing rules during cooperation, and adopt Markovian strategies after withdrawal. Our findings reveal that, for any sharing rule, coalitions of heterogeneous players always break down in finite time. We use the dynamic Shapley Value to decompose the coalition's aggregate worth over time, thereby eliminating the incentive to leave the agreement. Additionally, we show that a fishing moratorium policy accelerates the recovery of near-extinct fish stocks; however, fishing should resume under a cooperative regime once sustainable levels are achieved.

Work in Progress

- **Prey Refuges in Predator-Prey harvesting : Trade-off for efficiency**
- **Cross-ownership in Common-Property Natural Resource Oligopoly: The Role of Pollution Externalities** with Miao Dai

Awards

Best Student Presentation Award 2023

World Conference on Natural Resource Modeling (WCNRM)
Paper: *Bargaining Around the Prey-Refuge*

Research Visits

- **University of Luxembourg** 2023
- **Autonomous University of Barcelona** 2024

Conferences and Seminars

2024

- Mathematics for Bio-Economics and Sustainability of Fisheries
- European Meeting on Game Theory (SING 19)
- Environmental Economics: A Focus on Natural Resources

2023

- European Association of Environmental and Resource Economists (EAERE)
- CEE-M PhD Seminar
- World Conference on Natural Resource Modeling (WCNRM)

2022

- Association of Southern European Economic Theorists (ASSET)
- French Association of Environmental and Resource Economists (FAERE)
- World Conference on Natural Resource Modeling (WCNRM)

Teaching Experience

Teaching Assistant 2022 – Present

Aix-Marseille School of Economics, Marseille, France
Microeconomics, Mathematics & Environmental Economics

Technical and Language Skills

Programming Languages: R, SAS, STATA, PYTHON, VBA, Matlab
Markup Languages: LATEX, R Markdown, HTML
Databases: SQL
Office Software: MS Office, LibreOffice
Languages: English (Fluent), French (Native), Spanish (Basic)