

Management of Shared Fish Stocks: Economic and Institutional Aspects

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by

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Shared Fish Stocks: An Overview

- Some Definitions
 - (a) fish stocks crossing EEZ boundary of one coastal State into EEZs of one or more other coastal States – transboundary stocks (UN 1982 Convention, Art. 63 (1))
 - (b) highly migratory stocks (UN 1982, Art. 64)
 - (c) all other fish stocks (except anadromous)- found both inside EEZs and adjacent high seas - straddling stocks (UN 1982, Art. 63 (2))
 - (d) fish stocks found exclusively in high seas – discrete high seas stocks

Shared Fish Stocks: An Overview

- Cooperative management of shared fish stocks -is there always at least a *prima facie* case to be made for cooperation between and among relevant states?
 - Not always: the exceptions to the rule -the case of the Georges Bank scallop fishery shared by Canada and the U.S.

Shared Fish Stocks: An Overview

1982 UN Convention on the Law of the Sea:

Where the same stock or stocks of associated species occur within the EEZs of two or more coastal States, these States shall seek, either directly or through appropriate subregional or regional organizations, to agree upon the measures necessary to coordinate and ensure the conservation and development of such stocks ... (UN, 1982, Article 63(1))

Shared Fish Stocks: An Overview

- Levels of Cooperation (Gulland, 1980)
 - Primary level -cooperation in biological research, divorced from coordinated management
 - relatively easy, since all parties should benefit from increased information.
Emphasis on word relative
 - in retrospect, such cooperation often seen to have been a precursor to successful coordinated management programmes

Shared Fish Stocks: An Overview

- Levels of Cooperation cont.
 - Secondary level - coordinated joint resource management programmes. Will, according to Gulland, involve:
 - determination of optimal management strategy through time
 - allocation of harvest shares among relevant states
 - implementation and enforcement of coordinated management programme

Shared Fish Stocks: An Overview

- Cooperation at secondary level can be a formidable and costly undertaking. For example:
 - even cooperation in research may lose its benign character;
 - no guarantee that relevant states will have identical resource management goals.

Shared Fish Stocks: An Overview

- Relevant states may conclude that cooperation not worth the cost, encouraged by the view that non-cooperation can still produce results, which are “good enough”
- Important question: is this sanguine view of the world in fact reasonable?

Basic Economics of Shared Fish Stock Management

- Economic model of shared fish stock management is a blend of two components:
 - 1. Dynamic bioeconomic model of fishery
 - 2. Theory of games

Basic Economics of Shared Fish Stock Management: Game Theory

The Elements:

- theory designed to analyse strategic interaction between “individuals”, where “individuals” can be persons, firms, nations, or others
- theory relevant when action of one “individual” has clearly perceived impacts on others, inviting a reaction.

Basic Economics of Shared Fish Stock Management: Game Theory

- Some terms:
 - *players* - “individuals”
 - *strategies* -courses of action open to a player
 - *payoff* -expected return to player in following given strategy
 - *the game* - interaction between players as they execute strategies
 - *solution to game* -stable outcome of game

Basic Economics of Shared Fish Stock Management: Game Theory

- Classes of games:
 - (a) non-cooperative, or competitive, games
 - (b) cooperative games
- fundamental difference between (a) and (b) is in ability of players to communicate with one another
- in cooperative games, players assumed to be motivated by self-interest only

Basic Economics of Shared Fish Stock Management

- The Economist's Fundamental Questions:
 - (1) What are the negative consequences, if any, of states sharing a resource refusing to cooperate?
 - Implication is that each state will go its own way, and manage its segment of resource as best it can
 - If answer to (1) is that the negative consequences are trivial, then one need proceed no further.

Basic Economics of Shared Fish Stock Management

- The Fundamental Questions, cont.
 - (2) What requirements must be met for a cooperative resource management regime to be sustainable over the long run?
 - This question, raises, inter alia, the issue of equity. Cooperative regimes, which are perceived by one, or more, players to be inequitable, are, by definition, not sustainable.

Basic Economics of Shared Fish Stock Management: No Cooperation

- In examining non-cooperative management of a shared stock:
 - theory of non-cooperative games brought to bear
 - assume that the players have adequate capacity to manage fleets within their own waters

Basic Economics of Shared Fish Stock Management: No Cooperation

- theory predicts that resource will be overexploited from society's point of view
- outcome is example of the famous non-cooperative game, the "Prisoner's Dilemma"
- players are driven *inexorably* to adopt strategies, which they know to be harmful

Basic Economics of Shared Fish Stock Management: No Cooperation

- CONCLUSION - very risky to assume that non-cooperative management of shared stocks will produce “good enough” results.
- Like it or not, **Cooperation Does Matter.**

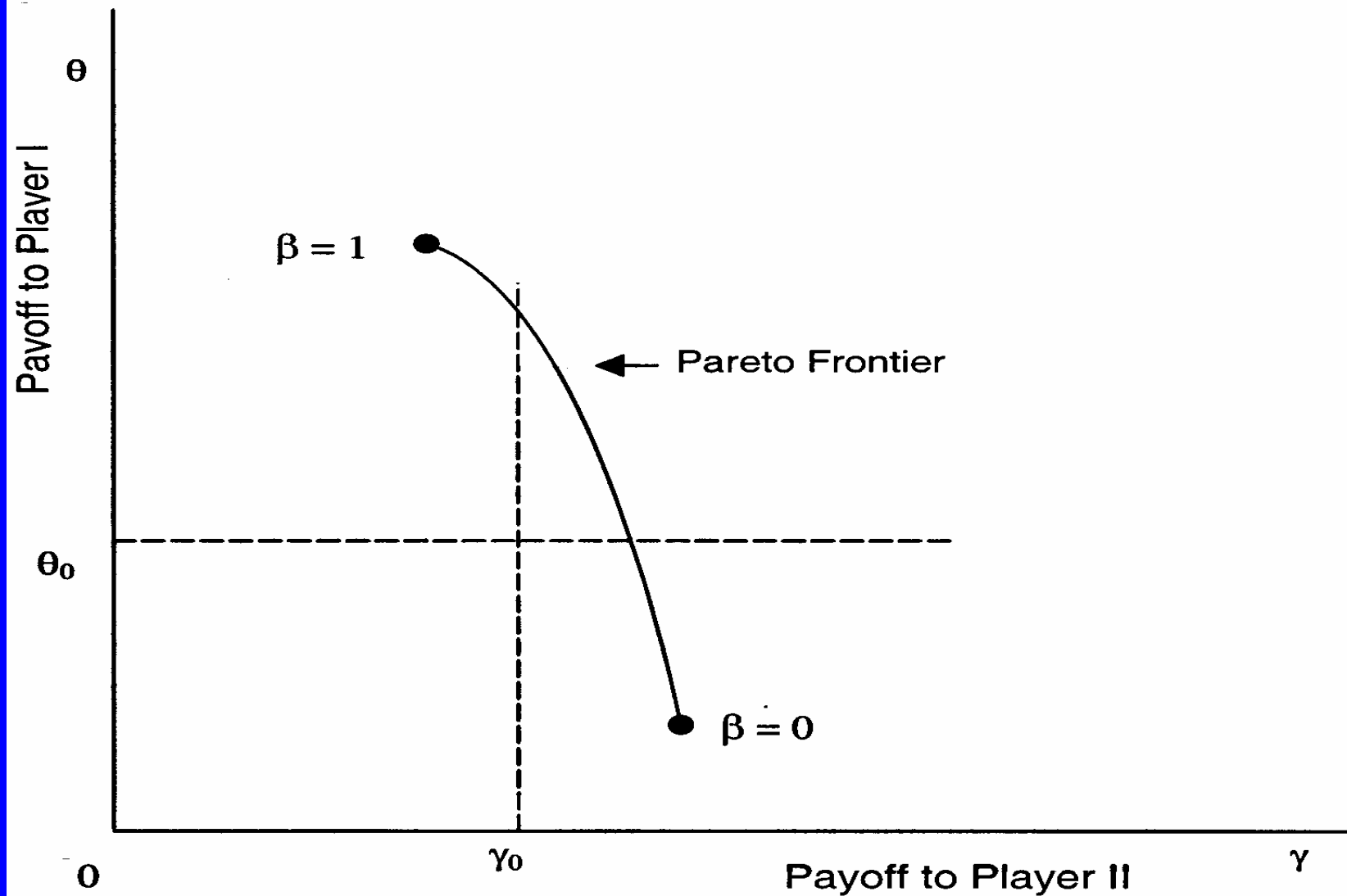
Basic Economics of Shared Fish Stock Management: Cooperation

- Key conditions for a stable cooperative arrangement: two players -
 - (1) not possible to make one player better off, except at the expense of the other (“Pareto Optimality”)
 - (2) each player at least as well off as it would be in absence of cooperation (Individual Rationality)- concept of the **Threat Point**

Basic Economics of Shared Fish Stock Management: Cooperation

- A diagrammatic representation of a two player game- now widely used
- Assumptions:
 - arrangement, if feasible, will be binding
 - players have different resource management goals
 - no allowance for “side payments”

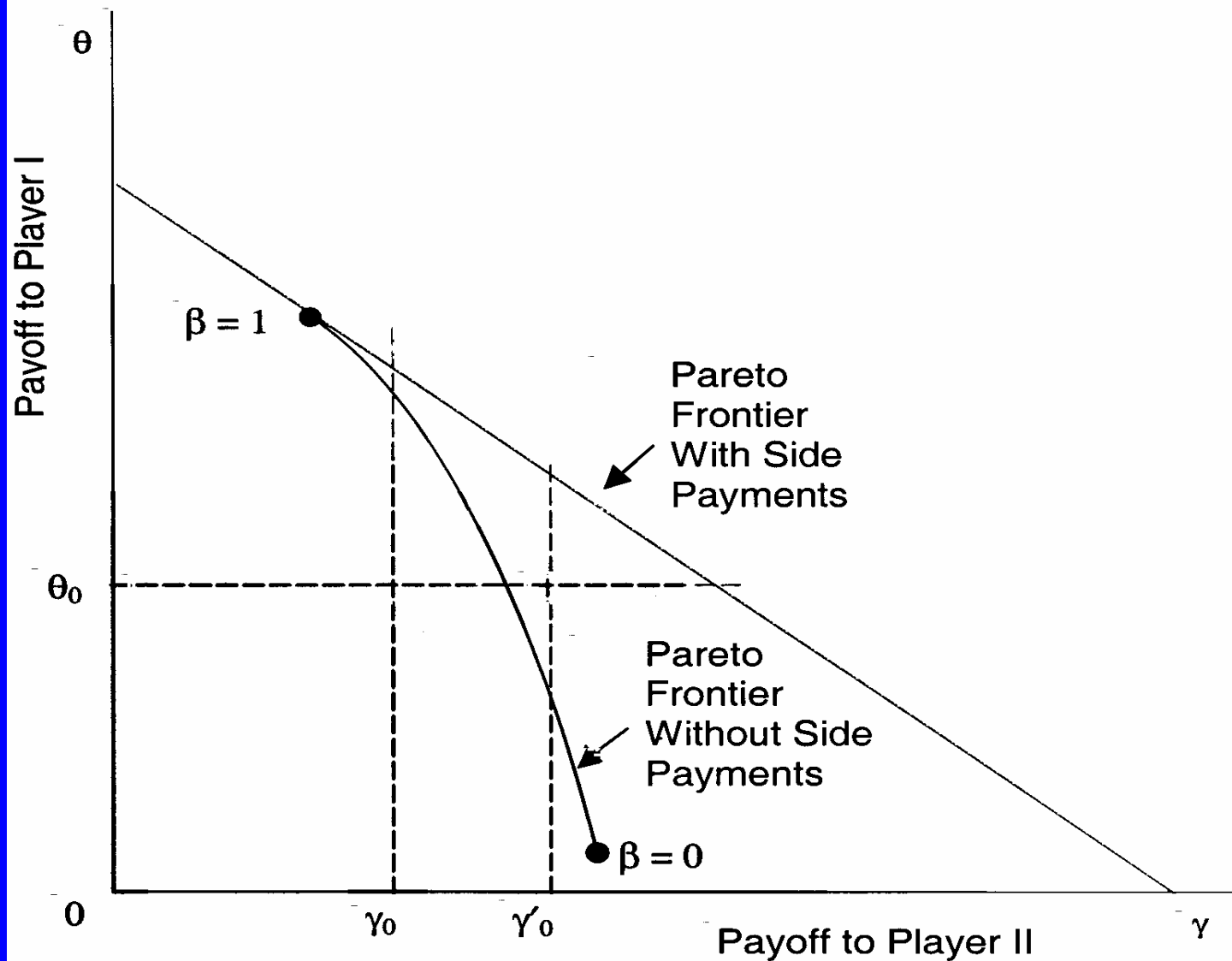
Figure 1. A cooperative game without side payments



Basic Economics of Shared Fish Stock Management: Cooperation

- A second picture of a two player cooperative game, with side payments allowed
- With side payments, one player's returns from the fishery not solely dependent that player's fleets' harvests in domestic waters
- “Pareto Frontier” as a 45° line- reasons for

Figure 2. Cooperative game with, and without, side payments



Basic Economics of Shared Fish Stock Management: Cooperation

- A Central Question: what is really being shared, is it harvested fish per se, or is it the economic (and perhaps social) benefits from the fishery?
- If it is the latter, then sharing of the harvests must be seen as just one of several ways of sharing economic benefits

Basic Economics of Shared Stock Management: Cooperation

- Side payments particularly important when players have different management goals
- A common sense approach to optimal management when goals differ:
Compensation Principle

Basic Economics of Shared Fish Stock Management: Cooperation

- “Time Consistency” - difficult to overstate importance of, given uncertainties to be faced , environmental and otherwise
 - Pacific salmon
- Side payments, enhance scope for bargaining, thus increase robustness of arrangement
 - Arcto-Norwegian cod

Shared Stocks Management

Further considerations for stability

- enforcement and surveillance, with particular emphasis on IUU fishing activities
- institutional structures

Effective implementation and enforcement measures (1)

Simple scenario (i.e. 2 states; stocks only exploited by fleets of the two states; no boundary disputes) Minimum requirements:

- maintenance of vessel registry
- use of a system to monitor fishing activities
- port inspections of vessels

Effective implementation and enforcement measures (2)

Scenario 2 (simple case plus unclear boundary) Minimum requirements as for simple case plus:

- agreement on “grey zone”
- Special reporting requirements for grey zone
- reciprocal MCS in grey zone

Effective implementation and enforcement measures (3)

Scenario 3 (simple case plus foreign fishing)

Minimum requirements as for simple case plus:

- Fishing activities by foreign fleet(s) controlled and subject to surveillance by respective coastal State(s)
- Third party vessels subject to at least same terms and conditions of license applicable to domestic fleet(s);
- Flag state legislation obligates control measures for its vessels operating in the EEZ of other States

Effective implementation and enforcement measures (4)

Scenario 4 (simple case but with reciprocal access of cooperating coastal states' fishing fleets). Minimum requirements as for simple case plus:

- Special reporting requirements (e.g. for catch; area of operation; entry and exit from EEZ; etc.);
- Awareness and education programmes to encourage compliance with management measures among fishers and others
- A means that can be invoked in the case of offences in the adjacent EEZ(s)
- Observer programme(s) for scientific and enforcement purposes

Institutional and organizational structures (1)

No single ideal structure but various options:

- 1) A set of agreements taking the form of periodic (usually annual) arrangements negotiated under a pre-existing framework treaty (example: EU-Norway)
- 2) A special bilateral commission is setup for the specific purpose of management of transboundary stocks (Norway-Russia; International Pacific Halibut and Pacific Salmon Commissions (Canada-US);
- 3) Regional fisheries management organization (International Baltic Sea Fisheries Commission)
- 4) General cooperation agreement for the management of transboundary stocks on an ad-hoc basis (Convention on Fisheries Cooperation among States Bordering the Atlantic Ocean)

Institutional and organizational structures (2)

Example: International Baltic Sea Fisheries Commission

Mandate: a) coordinate resource management; b) promote cooperation; c) prepare and submit recommendations including TAC by species and fishery rules such as quota exchange and transfer; catch reporting; logbooks; etc.

Structure: Commission; various subsidiary working groups including on Fishery Rules and on Long-Term Management Objectives. Quorum: 2/3 of votes by contracting States. Objection procedure. Joint inspection/observers schemes to address illegal fishing and under-reporting.

Conclusions

- 1. Shared fish stock management continues to be a large issue in world fisheries
 - the scope for improved management is immense
- 2. Cooperation in management does, except in few cases, matter - dangerous to assume that non-cooperative management can lead to “good enough” results

Some Conclusions

- 3. Cooperation at the level of joint, integrated management is admittedly difficult and costly, but several examples of successful cooperative management do exist
- 4. Stability in arrangements requires the importance of certain obvious requirements
 - Every country should be better off with cooperation
 - The outcome of cooperation should be perceived as fair and equitable
 - Need for “time consistency”
- 5. Need for ensuring that scope for bargaining is broad: significance of so-called side payments or negotiation facilitators

Thank you for your attention!