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Capacity Analysis and Fisheries Management: Is the Tail Wagging the Dog?

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Introduction

Capacity analysis has been one of the most studied areas of fisheries economics over the last ten years, with much of the research focusing on refining the myriad of definitions of fishing capacity and developing techniques for measuring capacity. A great deal of intellectual effort has been devoted to these tasks, and much has been achieved. The fisheries economics profession is now much better informed about the complexities underlying indicators of capacity output, capacity utilisation, capital stock, *etc.* There is broad international agreement on definitions of capacity, achieved primarily as a result of workshops and meetings to develop and implement the FAO International Plan of Action for the Management of Fishing Capacity (IPOA) (Cunningham and Greboval 2001; Pascoe and Greboval 2003). Fisheries managers at national and supranational (*e.g.*, the European Union) levels are increasingly adopting some of the concepts in the day-to-day management of fisheries as they seek to match fishing effort with available resources.

However, it may be useful to reflect on a couple of issues regarding the increasing popularity of capacity analysis and its relationship to both fisheries management and the policy development process more generally. The first issue concerns what has driven this (relative) explosion in capacity analysis. The second issue relates to the extent to which capacity analysis is actually helping fisheries policy makers address the right management questions.

What has Driven the Growth in Capacity Analysis?

The huge amount of intellectual energy that has been devoted to analysing capacity seems to have been driven by two interrelated factors. First, there is no doubt that for many in our profession, capacity analysis is technically interesting, intellectually demanding, and offers exciting new avenues of research. This has gone hand in hand with a rapid increase in computing power over the last ten years so that researchers are now able to develop sophisticated and increasingly complex solutions to previously intractable problems. Advances in the theory and application of data

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envelopment analysis and the stochastic production frontier framework are particularly striking in this regard (Kirkley, Morrison Paul, and Squires 2002).

A second driving factor has been demand from policy makers. The problems of excess capacity and overcapitalisation in many of the world's fisheries came to a head in the mid-1990s and prompted a surge in demand for ways to measure the extent of the problem so that policy makers could develop policy responses. This was manifested in the development of the Code of Conduct for Responsible Fisheries and the IPOA at the international level, many provisions of which flowed into national policy regimes. In this environment, policy makers' demands for information both drove and were driven by advances in capacity analysis techniques such that there developed a mutually reinforcing relationship between efforts to manage capacity and capacity analysis. Policy makers were increasingly able to get the sort of fleet-level data that they felt was necessary to effectively manage capacity in their fisheries, particularly given that many fisheries are managed through input controls. In turn, researchers were encouraged to deepen and strengthen their analytical techniques to measure capacity and predict the outcomes of various management options. These two trends have been evident in the policy focus and research programs of many governments, particularly in Europe (through projects financed by the European Commission; *e.g.*, Hatcher and Robinson 1998) and the United States (*e.g.*, National Marine Fisheries Service 2001). While there is, undoubtedly, something of a "chicken and egg" issue concerning which is driving which, there seems to be a growing symbiotic relationship between capacity analysis and fisheries management in a number of countries.

Focusing on the Right Management Questions?

One of the outcomes of this relationship has been an increasing preoccupation by fisheries managers with trying to optimise fleet development, fleet structure, and fleet reductions in the fisheries under their control. As the available technical tools have improved, governments have increasingly sought to micro-manage the size and structure of fishing fleets as they try to match the potential output of fleets with available resource stocks. However, the notion that fisheries managers can consistently and accurately predict the evolution of fleets and technological developments over time, and efficiently manage entry and exit from the fleet, is largely illusory for two reasons. First, the current techniques in capacity analysis do not capture the dynamic nature of fish stocks or fishers' behaviour. Second, outside the fisheries sector, it is widely recognised that there are inherent problems of government failure in such undertakings as a result of asymmetric information and the principal-agent problem (Weimer and Vining 2005). Yet within the fisheries sector, policy makers persist with relatively narrowly framed responses to the market failure problems associated with exploitation of common property resources, and micro-managing fishing fleets is an example of such a response.

It is questionable whether governments should, indeed, even be in the business of determining the optimum development profile of fishing fleets, particularly when the main policy tools available for doing so are relatively blunt command and control instruments of input controls and decommissioning schemes. Such top-down approaches to managing fishing capacity are widespread. A prime example is the European Union's Multi-Annual Guidance Programmes (MAGP) for fleet reductions which were implemented in the 1990s to achieve across-the-board fleet reductions in EU Member States. The last of these programmes (MAGP IV) was recognised as

having had only modest success, and the mechanics of EU fleet management were altered in the 2002 reform of the Common Fisheries Policy, with more responsibility placed on Member States for capacity management. Nevertheless, there remains a heavy reliance on governments to adequately determine the optimal structure for fishing fleets. For example, one of the objectives of a recent major European Commission-funded project on capacity analysis was to identify the “balanced” or target structure of the industry for a range of European countries (Vestergaard 2005).

To some degree, the improvements in capacity analysis have helped to perpetuate an illusion of control by providing managers with a ready mechanism for identifying how fleets can be grown, shrunk, or reconfigured to meet management goals. As a result, in my opinion, it seems as though capacity analysis may be the tail that is wagging the dog of fisheries policy by distracting fisheries policy makers from the real problem that is driving excess capacity and its attendant consequences; the lack of appropriate incentives for fishers.

Excess capacity is a symptom of poor fisheries management and degradation of fish stocks, rather than the cause. The prescription for remedying the fundamental problem is generally well understood, at least within the economics profession: closing the commons, appropriate specification of access rights, managing negative externalities, stakeholder involvement in designing and implementing management regulations, and effective enforcement of rights and regulations (Grafton *et al.* 2006). Fisheries policy makers would probably find their time better spent focussing on developing fisheries management frameworks that altered the incentives facing fishers, rather than on determining optimal fleet configurations. In particular, there are property rights solutions to fisheries management problems that generally will be more effective at ensuring that capacity matches the available resources. This does not just refer to individual transferable quotas, which tend to be the immediate corner to which many commentators turn when property rights are discussed. There is, in fact, a wide range of economic instruments that will help fishers undertake the kind of self-adjustment process that is better handled by market forces than by bureaucratic fiat (*e.g.*, individual transferable effort quotas, community quotas). It is noteworthy that capacity analysis has not really figured in the research agendas of those countries where property rights-based systems predominate (such as Iceland, New Zealand, Australia).

One of the other major rationales underlying the extensive use of capacity analysis in fleet management is to determine which vessels should be decommissioned in the event of excess capacity, and what the structure of the remaining fleet should look like. Decommissioning schemes are one of the major policy mechanisms available to fisheries managers to try to reduce capacity and effort in fisheries. However, it is widely recognised that most of the decommissioning schemes that have been employed have not achieved their objectives (OECD 2006). Once again, this is because the schemes are focused on addressing the symptom of excess capacity, rather than the root cause of the problem. Where they have been introduced as part of a package of management changes involving a fundamental shift towards improved specification and enforcement of access rights, one-off decommissioning schemes have generally been effective as a kind of shock tactic to correct previous poor policy choices, after which the capacity issue largely resolves itself, if the ensuing policy framework is well constructed. But even here, there are more efficient, market-oriented means of identifying which vessels should be decommissioned, rather than fisheries managers micro-managing the process.

Conclusion

There is no doubt that capacity analysis has advanced our profession's understanding of the theoretical and empirical underpinnings of capacity management challenges. In a policy environment largely dominated by the use of input controls to manage fisheries, the data and insights generated by capacity analysis represent valuable improvements in the information base available to managers. At the same time, however, capacity analysis may have inadvertently encouraged fisheries managers to focus on addressing the symptoms of the overexploitation in fisheries, rather than the cause. While there is undoubtedly a role for capacity analysis, there is also a pressing need to shift policy makers' attention back to effectively managing fisheries through improving the specification and enforcement of access rights. We need to ensure that the dog is wagging the tail, rather than vice versa.

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