Ecological Economics 153 (2018) 89–99

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

Analysis

A Comparative Analysis of Fishing Rights From a Transaction Cost Perspective

Jing Liu, Tianbao Qin*

Research Institute of Environmental Law, Wuhan University, Wuhan 430072, China

ARTICLE INFO

Keywords:
Fishing rights
Limited entry
Individual transferable quotas
Territorial use rights in fisheries
Transaction costs

ABSTRACT

Different types of fishing rights are used to address the problem of overfishing. The three most commonly used are limited entry system, individual quotas and territorial use rights in fisheries. Substantial transaction costs can be involved in the establishment and maintenance of fishing rights, including definition costs, enforcement costs and coordination costs. This paper compares these fishing rights by examining the three types of transaction costs they may incur. The comparison is conducted through an analysis of the success and failure of their applications in different regions (Australia, New Zealand, Canada, Mexico and South Africa). The main findings of this research suggest that, firstly, there is no panacea for fishery problems and the three types of fishing rights have different advantages and disadvantages in reducing transaction costs. Secondly, sometimes a mixture of the different fishing rights has the potential to create better protection than a pure regime. Thirdly, governmental intervention is crucial for overcoming residual externalities of fishing rights. This paper synthesises the literature which examines fishing rights individually by providing a comparison between these fishing rights. An analytical framework for comparison is established by linking the discussion of fishing rights with the transaction costs literature.

1. Introduction

Fish resources provide valuable sources of protein for human health and play an important role in the local economy of coastal areas. Fish production and per capita consumption have increased steadily over the past few decades (FAO, 2014: 3). However, the health of fish stocks has become a global concern. It was reported that for 2013 58.1% of fish stocks were fully exploited and 31.4% were overexploited (FAO, 2016: 5–6).[1]

Over-exploitation 'has led to the collapse of target species', to large quantities of by-catch and to 'alternation of entire marine ecosystems and the "fishing-down" of marine food webs to lower trophic levels' (Chu, 2009: 219; Pauly et al., 1998; Hutchings, 2000; Jackson et al., 2001). The environmental impact has been further passed on to human life and the economy, given the important share of fish in animal protein intake for people,[2] and the large amount of livelihood support fishing and ancillary activities provide.[3]

Given the existence of long-term environmental trends and human behaviours, finding causes for fluctuations in marine fish stocks has been difficult. This is especially true for aquaculture and inland capture fisheries, for which many factors, such as 'habitat quantity and quality', 'water abstraction and diversion, hydroelectric development, draining wetlands, and siltation and erosion from land use patterns' contribute to the declining fish stocks (Auld, 2007: 13). However, the present study focuses on marine capture fisheries, for which over-exploitation is accepted as the main driver for declining fish stocks (Sharpe and Hendry, 2009: 12; Delgado et al., 2003).

The underlying drivers of over-exploitation include the general overcapacity of the fishing industry (FAO, 2012: 10; Pauly et al., 2002: 692); ways of fishing, processing, storing and transportation (Cooper, 2004: 5–6; Auld, 2007: 12); market demand and price (Caddy and Seijo, 2005); and lack of governmental regulatory capacity or willingness to

* Corresponding author.
E-mail address: tianbaoq@hotmail.com (T. Qin).

[1] Fully exploited stocks mean that catches are 'at or very close to their maximum sustainable yield' so that there is no room to further expand catch or some stocks 'may even be at some risk of decline unless properly managed'. 'Overexploited stocks produce lower yields than their biological and ecological potential', hence requiring 'strict management plans to rebuild stock abundance and restore full and sustainable productivity'. See FAO (2012: 53).

[2] This is especially true in developing countries. Fish constitute 19.2% of animal protein in developing countries and 24% of low-income food-deficit countries. See FAO, 2012: 5.

[3] Together, they support the livelihoods of about 10–12% of the world's population (employment and their dependents; see FAO, 2012: 10).

https://doi.org/10.1016/j.ecolecon.2018.07.010
Received 1 September 2017; Received in revised form 13 July 2018; Accepted 18 July 2018

enforce regulations (Auld, 2007: 12). Though the specific drivers may be context specific, it is widely accepted that the fundamental issue is that fish stocks are common pool resources (Andersen, 1983; Gordon, 1954; Hardin, 1968). Without proper governance regimes to regulate access to fishery resources, there would be the prevalence of an open access regime that may allow 'too many people to chase too little fish', leading to overfishing (Gordon, 1954; Scott, 1955).

In response to the open access problem, scholars proposed license limitations to restrict the access to fish (Sinclair, 1961). Under the limited entry system, the number of permits or fleets is limited, either with or without a cap on the volume of fish capture (total allowable catch [TAC]). In general, under this model, there is no individual quota for permit holders. Therefore, individuals may still compete with each other to harvest stocks. This system has been widely used since the 1970s (Townsend, 1990). However, later practices found that limited entry often failed to end the race for fish (Copes, 1986; Wilen, 1988, 2006).

Therefore, dividing the TAC into quotas with each quota holder having a specific share of the TAC has been proposed as one solution to this problem (Christy, 1973; Moloney and Pearse, 1979). The quotas provide individuals or groups of fishermen with more durable and exclusive harvesting rights; this has been viewed as creating better incentives to protect the fishing resources (Scott, 1989). In some schemes, quotas are made transferable (individual transferable quotas [ITQs]) to allow more flexibility and efficiency in allocating access rights. The first ITQ fisheries came into being in the late 1970s. As of 2009, 249 species in 18 countries were under ITQ management, covering 10% of the total marine harvest (Chu, 2009: 217–218).

Another approach to address the open access problem is the territorial use rights in fisheries (TURFs), which define the rights based on fishing areas. Under such a scheme, the right to access or harvest in a specific area is limited to the members of a community and other groups or individuals according to custom or statutes. Although the adoption of TURFs remains limited compared with limited entry and ITQs, an incomplete overview shows that there are at least 1000 fisheries managed under TURFs in 41 countries (Costello et al., 2014). TURFs often exist in traditional fishing communities in terms of customary marine tenure but can also be introduced by the government (Johannes, 1978; Ruddle et al., 1992).

These different types of fishing rights have seen mixed results in addressing overfishing[4]; the reasons for these varied results and what makes a certain type of fishing right successful are key fields to investigate. The functioning of the limited entry systems, ITQs as well as TURFs have been examined extensively in the literature, but mostly individually (Arnason, 2005; Branch, 2009; Christy, 1982; Chu, 2009; Copes, 1986; Costello and Deacon, 2007; Costello et al., 2008; Grafton et al., 2006; Homans and Wilen, 1997; Karpoff, 1989; Townsend, 1990). Some have pointed out the advantages of the 'rights-based' fishing rights, vis-a-vis limited entry systems, in treating the cause of the 'race for fish' rather than symptom (Wilen, 2006). Less effort has been directed towards a comprehensive overview and comparing the advantages and disadvantages of different types of fishing rights (Huppert, 2005; Hilborn et al., 2005). Therefore, this article makes such a comparison by examining case studies of fisheries managed under these three types of fishing rights. The case studies are analysed using the existing literature.

This paper links with existing literature on the various fishing rights with focus on their transaction costs in developing the analytical framework. It analyses the potential of different fishing rights in addressing overfishing problems by focusing on their transaction costs. Section 2 categorises three types of transaction costs—definition, enforcement and coordination costs—in establishing and maintaining property rights and discusses different fishing rights from the perspective of transaction costs. Section 3 examines several case studies of three fishing rights from different jurisdictions, while Section 4 proceeds to compare these case studies in terms of their potential in reducing transaction costs. The final section concludes the discussion and makes some recommendations as to the reduction of transaction costs in relation to fishing rights.

2. Transaction Costs in Establishing Fishing Rights

2.1. Common Pool Resources, Property Rights and Transaction Costs

Common pool resources have two important characteristics: subtractability and non-excludability. With incentives to maximise personal benefits and externalise the costs, multiple resource users can be trapped in the collective action dilemma to free ride on each other and to overharvest the resources (Olson, 1965). The literature identifies different types of property rights (public property rights, private property rights and communal property rights) and institutions (state, market and self-governing institutions) in overcoming this problem, also referred to as the 'tragedy of the commons' (Hardin, 1968; but see Ostrom, 1990, 2010; Schlager and Ostrom, 1992; Imperial and Yandle, 2005).

However, the establishment and maintenance of property rights and relevant institutions can entail substantial transaction costs. The relevant costs and benefits of property rights are influenced by diverse factors, including the nature of the resources, ecological, technological and institutional circumstances, and even culture and ideology (Cole, 2002: 135). Property rights usually only start to evolve when the benefits of the establishment outweigh their transaction costs (Anderson and Hill, 1975, 1990; Demsetz, 1967; Dennen, 1976).

Conceptually introduced by Coase (1937), transaction cost remains a concept that is often vaguely defined or only illustrated with examples (Alchian and Woodward, 1988: 66; Allen, 2000: 898–899; Barzel, 1985: 8). Coase (1960) linked transaction costs with liability rules and Cheung (1969) extended the analysis to the context of contract law. Alchian (1958, 1965) started to analyse property rights from the perspective of economics. The property rights literature usually uses the term transaction costs in a broad sense to incorporate 'costs associated with the transfer, capture and protection of rights' (Barzel, 1989: 122) or 'the resources used to establish and maintain property rights' (Allen, 1991).

Categorising transaction costs of property rights is one way to establish a framework to analyse the functioning of different fishing rights. Epstein (1994: 20–22) differentiated exclusion costs and coordination costs as two forms of transaction costs. Cole (2002: 131) further defined exclusion costs as 'the costs of drawing and enforcing boundaries to restrict access to and use of the resource to the owner(s) of the property'. In other words, to reduce exclusion costs requires a clear definition of property rights and the capacity to enforce the rights, including policing, dispute settlement and sanctioning. Cole (2002: 131) argued that coordination costs were costs associated with solving collective action problems. It may involve the coordination between multiple rights holders in using the resources, or the negotiation between rights holders and external parties. In summary, the transaction costs in establishing and maintaining property rights include definition costs, enforcement costs and coordination costs. The rest of this section examines the potential of the above-mentioned fishing rights in reducing three types of transaction costs.

2.2. Limited Entry System

Under the limited entry system, the access to fishery resources is

[4] Debates surround the definition of the access of actors engaged in fishing activities. Some view it as property rights (e.g., use rights), while others regard it as 'privileges'. This research will not discuss its legal nature but will use the term 'fishing rights' to refer to the rights of fishing actors to access and harvest fish.