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An Analysis of the Variables that Influence Fishing Vessel Exit and Entry

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Abstract

A prosperous fishery draws more effort (vessels), which eventually results in overcapacity and lower profit. Similar to this, fishing vessels leave the industry depending on their economic viability (or diminished expectations of future benefits), or when programmes like decommissioning grants encourage them to do so, and/or when fishing effort is consolidated within a system of tradable rights-based quotas (e.g. individual transferable quotas). By combining information on vessel characteristics with cost data, decommissioning grant information, and other factors that could potentially affect anticipated benefits or future risks, a discrete choice model is used to analyse the strategic decision-making behaviour of fishers when they enter or exit the English North Sea beam trawl fishery. The decision of operators to enter, remain, leave, or decommission can then be predicted. Vessel age and size, future earnings, operating costs (such as fuel), the status of the main target species' stock, the effect of management measures (such as the total permissible catches), and the size of the overall fleet are all significant factors that can affect investment (a proxy for congestion). The expected marginal effects of each element are shown based on the findings, and their significance is highlighted in relation to the development of policies to match fishing opportunities with fleet capacity.

Keywords: Fishery; Vessel characteristics; Trawl; Marginal effects

Introduction

Equilibrium models based on entering and leaving common property fisheries were presented in early studies in fisheries economics. According to those writers, as long as the fishery was successful, fishing effort would increase with the arrival of additional vessels. On the other hand, if profits dropped, it was believed that vessels would leave the fishery if they could get a better return on their money elsewhere [1]. These traditional models presuppose that boats and fishing effort can readily enter and exit fisheries due to open access to a stock and to other stocks in other fisheries, or that they can be employed for purposes other than fishing. The ability of people to enter and exit fisheries is nonetheless restricted in the UK because of the limited licencing system that is used to control fisheries. Entry is constrained by the availability of permits or quotas, and leave is complicated by the limited number of alternate uses for the boat, which cannot be utilised in another production process and is hence not malleable [2]. The theoretical economics of entry-exit strategies in industrial organisations is well-documented in the literature, but there is little empirical research on the subject. The majority of industry study that has taken into account a firm's dynamic character has focused on new entrants and mostly sees leaving as a sign of failure. Many authors have proposed two strategies for businesses to exit. A company has two options: it can either stop operating or sell its assets at a loss, or it can exit its current business and reallocate its resources to another area of the market. Owner-operator or larger fishing businesses act similarly, but with more volatility due to shifting stock levels, management rules, market prices, and fuel costs [3]. Consequently, a combination of economic, biological, and individual factors, as well as motives of their own, impact the decisions of vessel operators to remain in, enter, or leave a fishery.

Other research on the North Sea flatfish fishery found that factors such as vessel age, realised and predicted earnings, and the status of the primary target species affected whether a vessel would join a fishery. We expand on previous analyses by including data on fuel prices, sole and anglerfish catches individually, together with data on the major target stock, plaice, and additional data on the rates of decommissioning and the costs of fishing [4]. In this case study, the option to swap quota offers the chance for fleet rationalisation in addition to voluntary decommissioning programmes. As a result, in the context of non-market and market measures to lower capacity, we examine here the options accessible to fishers and their responses, whether to I continue in a fishery, (ii) depart, (iii) decommission, or (iv) join and enter the fishery [5]. Both departure and decommission options assume that the vessel will leave the fishery; however decommissioning involves a premium payment to the owner. Here, we distinguish between the two possibilities to see if various variables have a distinctive impact on each.

A fixed percentage of a species quota, known as relative stability, is allotted to each Member State under the EU's Common Fishery Policy. This percentage is based on the country's historical access rights, and, with the exception of a few minor exceptions, every boat in the UK is allotted a quota that is a percentage of the country's share [6]. Producer Organizations (POs) manage quota entitlements and their trading in the UK as well under a quasi-ITQ system; nevertheless, the government has never authorised a system of fully traded harvest rights. Before 1999, the English fleet was controlled by quota and licence limitations, with quotas transferrable to other fishing boats within the POs. Although periodically the government permitted once-off permanent trades (within and between POs) to purge the system of all leasing agreements that had become permanent, quota could only be leased and not permanently exchanged. After 1999, fixed quota allocations were made directly to boats (FQA). Even though FQAs are a set nominal amount of quota rather than a percentage of the entire country's total authorised catch (TAC), they can be permanently exchanged or leased on an annual basis. Prior to the 1990s, flatfish fisheries in the Netherlands were managed using an individual quota

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(IQ) system, in contrast to the management practises in the UK [7, 8]. IQs could not be permanently sold or leased because it was believed that quotas would become excessively concentrated. A new policy was implemented in the early 1990s, giving complete quota management authority to groups of vessels operating within a PO framework. The fishermen in those groups pooled their ITQs and days at sea, giving the PO board permanent control over the distribution of ITQs and days at sea.

A system of vessel capacity units (VCUs), depending on size and engine power, was developed in the UK to govern fishing capacity in addition to the regulation via quotas previously outlined. Through multiannual guiding programmes, there were attempts to lower fishing effort and capacity in the 1980s, 1990s, and 2002. Many nations, including the UK, implemented decommissioning initiatives at the time. The MAGPs were financed using a variety of financial tools [9, 10]. Under MAGP I, this investment drastically decreased the number of warships in the UK by decommissioning 225 vessels between 1984 and 1986. In order to reduce engine power tonnage and effort, another 686 ships were decommissioned between 1987 and 1991 as part of MAGP II. Another 578 boats were removed throughout the course of MAGP III, which was launched in 1992 and ran for five years. Then, additional 170 boats were decommissioned between 1997 and 2002 as part of MAGP IV based on fleet section and the degree of overexploitation of the targeted stocks [11, 12]. Since the end of MAGP IV, capacity control has been replaced by effort ceilings that are governed by entry and exit regulations. Or to put it another way, a vessel can only enter a fishery when the comparable capacity has left. Decommissioning typically resulted in the removal of older, less-efficient boats, resulting in a modern, efficient fleet, failing to effectively reduce capacity and thereby reduce fishing mortality, particularly since the quota for decommissioned vessels found its way back into the pool of quota entitlements that were traded and/or leased.

Here, we use the assumption that decisions about investments (or withdrawals) are primarily influenced by predicted or actual earnings as well as the availability of decommissioning plans. Revenues are used as a stand-in for economic viability, however, as the calculation of individual profits necessitates precise cost data that is challenging to get and frequently proprietary [13]. Hawaiian long liners' exit and entry strategies were modelled by Pradhan and Leung using revenue by gross tonnage within a multinomial logit framework [14]. We accommodate a multinomial logit model (unordered) and estimate the likelihood of vessels to enter, stay, exit, or decommission from the English North Sea beam trawl fleet based on the informational value of their results and a random utility framework offered by McFadden. Significant factors impacting investment are explored in the context of regulations created to align fleet capacity with fishing possibilities, and this information is utilised to evaluate viable alternative management plans.

Conclusion

If possible, future studies should look into externalities besides fuel subsidies and payments for decommissioning. Subsidies could take the shape of tax relief in the form of supplemental income and unemployment insurance, capital support for vessel modernization (a new engine refit), minimum price, processing and marketing subsidies, and minimum price. A fisher's future investment choices may be influenced by such financial instruments, which could aid in achieving profitability. Additionally, it would be intriguing to see whether the skippers of decommissioned vessels invested in newer vessels as a result of being encouraged by the fishery's revenues. Such assessments would be further enhanced if regulations, policies, alternative fishery performance, pre-entry and post-exit income, and costs were known. Overall, our work has shed more light on how to evaluate fisher behaviour using econometric RUMs.

Conflict of Interest

None

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