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Efficiency of the New Zealand annual catch entitlement market





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1. Introduction

An annual catch entitlement (ACE) gives the holder the right to catch a specified amount of a particular fish stock during the fishing year. ACE is allocated to those entities owning quota shares at the beginning of the fishing year. This allocation may be what the owner's will catch, or they may choose to acquire additional ACE, or conversely, dispose of excess ACE. It is also common for fishers to not own any quota. These fishers need to acquire all of their ACE requirements through the ACE market.

The ACE mechanism was introduced into the New Zealand QMS in 2001 to facilitate the transfer of catching rights. ACE allows a purchaser to participate in the fishery without having to own quota, thereby reducing barriers to entry. The effect can be seen in the snapper fishery: After the introduction of the ACE mechanism in 2001 the inshore fishery has seen a revival of small fishers. The snapper fishery has seen the number of ACE holders increase from approximately 150 to over 300 by 2006 [1]. However, despite this apparent improvement in access to catch rights in the inshore fishery, small fishers still report difficulty in accessing sufficient ACE to balance their catch (particularly bycatch) against ACE.

Given that quota is owned by a variety of fishers, processors, investors or others, it follows that participants in the ACE markets have varied motivations. Retired fishers and investors who own quota shares, but do not fish, sell their ACE as a means of generating income. Licensed Fish Receivers (LFRs) who own quota shares often sell ACE to fishers who supply them and may seek additional ACE to

ABSTRACT

Balancing catch with annual catch entitlement (ACE) is crucial both for the financial viability of fishers and for the efficient operation of the New Zealand quota management system (QMS). This study examines the information channels that are used by fishers to search for ACE availability, and notes how these channels differ between large and small fishers. Special attention is given to the viability of small independent fishers whose participation in the fishery is dependent on their acquiring ACE in the open ACE market. An ACE market survey along with extensive consultation captured the views of fishers, fish processors, and quota brokers. These sources provide valuable insights into the day-to-day operation of the ACE market. They suggest that while elements of market power are evident in the ACE market there are also characteristics of an efficient market.

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further facilitate this trade. Quota brokers buy and sell ACE on behalf of LFRs and fishers. They may also own quota shares, selling the derived ACE in the ACE market. Large, vertically integrated firms own considerable levels of quota, fishing the derived ACE themselves and also providing ACE to fishers who supply catch to them.

Fishers who are overfished will seek to buy ACE to balance against their catch. The process of balancing catch against ACE is on-going through the fishing year but becomes critical at year-end. If a fisher is unable to source sufficient ACE (thus remaining overfished), there are penalty payments imposed by the Deemed Value system.

Bycatch is the most common source for being overfished for a species. The fisher facing Deemed Value on the catch in excess of ACE may consider discarding bycatch. Bremner et al. [2] provide evidence from the Hoki fishery (a mixed species fishery on the West Coast of New Zealand) that fishers discard bycatch when ACE is not available. This is clearly undesirable and in breach of fisheries regulations and if detected can result in substantial penalties for the fisher.

Alternatively, fishers attempt to implement bycatch mitigation strategies. For example, fishers in the Snapper 1 fishery, whose target species is gurnard, have reported moving to another location as a strategy to avoid high bycatch of snapper. The highly progressive Deemed Value penalty rates create strong incentives to avoid bycatch [3–5]. Fishers report frustration at not having ACE to allow them to take the abundant snapper and having to move to another fishing-spot to attempt to catch only their target fish stock. This increases fuel costs and the time spent fishing due to lower catch-to-effort ratios associated with searching for a lower bycatch location [6].

If a mismatch routinely occurs between fishers who are overfished and holders whose unused ACE remains unfished, then the ACE market is not efficient. The matching of supply and demand for

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ACE in a timely, cost effective manner requires that clear information channels exist in the ACE market. Holders of excess ACE need price signals to determine the optimal sell strategy and potential buyers, similarly, require clear information on the availability and price of ACE.

This study identifies the available sources of ACE information used by fishers and quota holders and explores other key aspects for the existence of an efficient market, such as low transaction costs, the availability of clear information on price and the absence of barriers to entry. Of particular interest is the ability of independent, non-aligned fishers to successfully access and purchase ACE. The role of LFRs in providing ACE to fishers is also considered. The Snapper 1 (SNA1) ACE market is subsequently examined in detail as a single fish stock case study.

2. Methodology

An efficient market is characterised by some standard micro economic principles: Prices exist and are available to all participants, goods are standardised, entry and exit is easy, information on goods is readily available and transaction costs are low. To assess ACE market efficiency, fishers were asked to rate the availability and cost of the sources of information they use concerning ACE for the fish stocks they target as well as for those they catch as bycatch. While it is difficult to establish if a market meets all conditions for efficiency, it is reasonably easy to point to instances where it misses the mark. Fama [7] sets out a three-level hierarchy of efficiency for capital markets. A test for the highest level ("strong form") examines whether any investors or groups have monopolistic access to information relevant for price formation. To investigate whether this condition occurs in the ACE market respondents were asked to describe their information sources. The responses of large and small fishers were then compared.

The annual allocation of ACE for any given fish stock is not equal to the amount of ACE that will be offered for sale in the ACE market. Most ACE is fished out by the fisher quota share owner. There are also sizeable amounts of ACE transacted directly between a quota owner and a fisher or LFR, effectively sold in "off-market" transactions. The notion of an 'open' ACE market refers to ACE that is available to all buyers wishing to buy ACE at any given time. This open market ACE is often extremely limited in supply. Long term strategic behaviour by quota owners – such as withholding ACE from the market in order to rebuild fish stocks and improve quota values – exacerbates ACE shortages and forces price higher. Quota share owners are also permitted to carry forward up to 10% of unfished ACE to the next fishing year.

ACE price for a fish stock is influenced by normal supply and demand considerations; catch-to-effort levels and the market price for landed fish. The strong interconnections between ACE fish stocks in multi-species fisheries also causes ACE shortages (or surpluses) in one fish stock to impact on the ACE price for another fish stock. At times the interdependencies may even reduce the ACE price for a target stock to zero because ACE for the unavoidable bycatch stock is unavailable. Thus the value of ACE for a specific species varies greatly from fisher to fisher depending on the catch balancing position they are in. These factors together with the multiple interests involved in the fishery make the ACE market relatively complex.

The investigation of the ACE market began with consultations with a wide range of ACE market participants. These included fishers (ranging from independent individuals to large companies), shore managers, quota brokers, licensed fish receivers, FishServe (the fisheries data management and industry service provider), ACE market arbitrageurs, and analysts from the Ministry for Primary Industries (MPI). The 2013 conference of the New Zealand Federation of Commercial Fishermen (NZFCF) provided a venue for many fruitful discussions with various industry stakeholders.

Following the preliminary consultation phase, a questionnaire was distributed through industry contacts and directly to the delegates attending the 2013 NZFCF conference (the questionnaire is located in Appendix B). The FishServe website also advertised an online link to the survey on its home page. Fishers and others involved with the QMS fishery visit this website regularly. In a separate initiative, the majority of ACE holders in the SNA1 fishery received a link to the survey by email. The questionnaire included questions aimed at assessing perceptions of market efficiency and an open ended question asked fishers to provide written comments on the issues they felt were problematic and to propose a remedy. This produced extensive commentary by a wide range of market participants and produced observations that enhanced the richness of the results from the survey's structured questions.

While perceptions expressed by individual participants may not always be representative of the market, the opinions of such a large number of observers provide an opportunity to identify patterns that give a more reliable report of key market performance indicators. This study thereby adds another layer of knowledge to the policy debates over designs for optimal fisheries management [8].

3. The overall ACE market

The survey yielded 114 responses with 41 of these related specifically to SNA1.The results from the questionnaire sent to all ACE market participants in the QMS fishery are set out in this section. The findings from the SNA1 questionnaire are set out in Section 4.

3.1. ACE market participation: Nature of involvement

Respondents were asked to identify their primary involvement in the ACE market. Fig. 1 shows that for most respondents the main involvement in the ACE market is as a fisher.

A number of respondents reported dual, or multiple roles, with 30% involved as both a fisher and a quota holder, and 11.6% involved as fisher, processor and quota holder, and 4.7% involved as fisher, processor, quota holder and quota broker. Thirty-seven per cent reported that they were exclusively fishers (see Fig. 2).

Fig. 3 shows that the great majority of participants have been involved in the ACE market for a considerable time—a finding consistent with Stewart et al. [9].

The number of employees – an indicator of size – showed that a broad cross section of industry participants responded to the survey, including two large entities having over 1000 employees, and many small operators. The results for questions about sales turnover and vessel size provided a similar range in the scale of operation of the survey respondents.



Fig. 1. Type of involvement in the ACE market (main involvement).

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