Marine Policy 62 (2015) 326–336

Contents lists available at ScienceDirect

Marine Policy

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

Multifactor productivity, environmental change, and regulatory impacts in the U.S. West Coast groundfish trawl fishery, 1994–2013

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ARTICLE INFO

Article history:
Received 1 June 2015
Accepted 1 June 2015
Available online 27 June 2015

Keywords:
Lowe Index
Productivity
Groundfish
Catch shares

ABSTRACT

This paper provides estimates of multifactor productivity for vessels participating in the West Coast Limited Entry groundfish trawl fishery from 1994 to 2013. Impacts of regulatory change on productivity are examined and productivity dynamics are evaluated across spatial and behavioral dimensions. Results suggest four different periods of consistency: (i) a decline in productivity from 1994 to 2002, (ii) a sharp increase in productivity following a permit buyback in 2003, (iii) stagnant productivity from 2005 to 2010, and (iv) another increase in productivity following implementation of individual transferable quotas ("catch shares"). Important spatial differences in productivity are uncovered-vessels fishing south of 40°10′ N latitude were generally less productive than those fishing north of the same line. Additionally, the productivity gap between north and south was enlarged following the policy changes (buyback in 2003 and catch shares in 2011). Productivity from 1994 to 2013 tended to be higher among vessels that were more diversified in terms of their total portfolio of commercial fishing revenue. However, productivity tended to be lower among vessels whose targeting strategies were more diversified within the groundfish fishery.

1. Introduction

Productivity has served as an important metric for evaluating the performance of commercial fishing vessels and fishing fleets both within the United States and internationally (See [1-3] for examples from fisheries around the world). Often, productivity emerges as the best feasible measure of firm or fleet performance since high resolution micro data that might permit direct evaluation of profitability is rare in regulated fisheries. Even when direct evaluation of firm profits is possible, productivity remains a valuable metric as it can be used to help fisheries managers understand the drivers of profitability change.

This paper estimates productivity change at the vessel level for firms participating in the so-called non-whiting, shoreside sector of the Limited Entry West Coast Groundfish Trawl Fishery (hereafter referred to as groundfish trawl) from 1994 to 2013. The fishery has experienced many regulatory changes during this time including implementation of a license limitation program in 1994, a permit buyback in 2003, which was conducted in concert with the introduction of a system of coast wide spatial closures, and the implementation in 2011 of catch share management. Under catch shares, total allowable catch (pounds) of each managed species was allocated to individual vessels and these allotments were transferable. The primary purpose of this paper is to examine the impact of regulatory changes on productivity for vessels belonging to different subgroups within the groundfish trawl fleet.

As noted in [4], fisheries managers are generally concerned not only with the overall costs and benefits of regulatory intervention but also with how benefits and costs are distributed among vessels or groups of vessels within a fishing fleet. They specifically identify (i) sustained participation of small owner operated vessels, (ii) avoiding geographic consolidation of fishing activity, and (iii) encouraging diversity of the fishing fleet as important goals for fisheries managers. This study addresses these management concerns by providing estimates of an important metric of fishing success for each vessel in the fleet.

In this study productivity dynamics are compared for the following management relevant vessel groupings:

- Spatial: The West Coast commercial groundfish trawl fishery extends from about 34°27′ N latitude in the south to the US-Canadian border in the north, covering almost the entire West Coast of the US. Productivity growth is compared over

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http://dx.doi.org/10.1016/j.marpol.2015.06.002

Fig. 1. International North Pacific Fisheries Commission area boundaries for the US West Coast.