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Contrasting trends in the Northeast United States groundfish and scallop processing industries

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A B S T R A C T

In the northeast United States, groundfish landings have declined almost continually since 1983. Fresh groundfish processors have redeployed their marketing capital by substituting other seafood products in place of regional groundfish and expanding into different markets. Meanwhile, northeast U.S. Atlantic sea scallop landings sharply increased starting in 1998, peaked in 2004, remained relatively constant until declining in 2013 and 2014. In order to leverage their favorable access to increased landings, scallop processors invested in development of new products, such as individually quick frozen (IQF) scallops, and invested in marketing activities to attract new customers, including those located in foreign nations. This behavior is consistent with Montgomery and Wernerfelt's theory of diversification in response to excess capacity of firm-specific resources and investments in product development and marketing in firm specific resources. Price and quantity indicators were used to examine the effects of shifting landings and composition of landings on exvessel values. These indicators show that declines in groundfish exvessel values were driven by declining quantities, which is consistent with processors substituting other products rather than biding up exvessel prices. Increases in scallop exvessel values were driven by both increasing prices for all sizes and by increasing quantities for large scallops, which is consistent with investment in marketing for larger scallops.

1. Introduction

Since the mid 1990s, landings from two major fisheries in the northeast United States, groundfish and sea scallops, have tracked in opposite direction. U.S. groundfish[1] landings declined from 34,000 metric tons (mt) in 1998 to 20,000 mt in 2015, continuing a long-term decline that began in 1983, when landings peaked at 186,000 mt (Fig. 1). In 2016, ten of the 22 groundfish stocks were classified as overfished, while six were classified as experiencing overfishing [29]. Due to statutory mandates to rebuild depleted stocks, groundfish landings are not likely to recover soon to 1980s highs or even 1990s levels.

In contrast to groundfish species, the higher priced sea scallops sharply increased from 6000 mt in 1998 to 29,000 mt in 2004 (the record year for U.S. scallop landings) and remained near that peak, until declining in 2013 and 2014 (Fig. 1). From 2006 through 2015, scallop landings in meat weight almost equaled groundfish landings in landed weight. Atlantic sea scallops are neither classified as overfished nor are experiencing overfishing [29].

Substitutes abound for fillets produced from regionally landed groundfish including whitefish fillets produced from groundfish landed at U.S. Pacific ports, from Canada, from Northern Europe, from Australia, and from New Zealand, each of which currently exceeds U.S. Atlantic groundfish landings. In addition to these direct groundfish substitutes, Bronnmann et al. [4] showed that farmed pangasius and tilapia has been integrated with the wildfish groundfish market to form a worldwide market for whitefish fillets.

While there are other species of scallops consumed in the U.S. (bay, calico, weathervane, and Hokkaido scallops), only Hokkaido scallops are a close substitute for Atlantic sea scallops in terms of size, color, taste and density. Landings of Hokkaido scallops in Japan from 2002 through 2012 were roughly 30% greater than landings of Atlantic sea scallop landings in the U.S. [9], but have declined since then.

Since the commercial fishery began in the 19th Century, nearly all groundfish landed in northeastern U.S. ports were filleted and sold by fresh groundfish processors, mostly located in New England. These

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[1] Throughout the manuscript, “groundfish” is used to denote the set of Atlantic groundfish frequently landed in the Northeast United States: American plaice (*Hippoglossoides platessoides*), cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), pollock (*Pollachius virens*), Acadian redfish (*Sebastes fasciatus*), white hake (*Urophycis tenuis*), windowpane flounder (*Scophthalmus aquosus*), winter flounder (*Pseudopleuronectes americanus*), witch flounder (*Glyptocephalus cynoglossus*), and yellowtail flounder (*Limanda ferruginea*).

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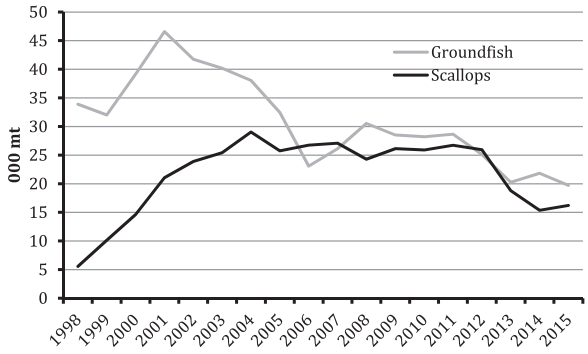

Fig. 1. Annual landings (000 mt) for US Atlantic Groundfish (landed weight) and sea scallops (meat weight).

processors also filleted large quantities of whole groundfish imported from Canada until the Canadian cod fishery was closed in 1992 [7]. While shucked at sea, almost all scallops landed in the U.S. were packaged and sold by fresh scallop processors, a set of firms that were distinct from the fresh groundfish processors.

This article examines the impact of changes in landing patterns on U.S. Atlantic groundfish and scallop processors using business strategies based on comparative advantages. Evidence is presented that processors adopted different strategies that depended on the market they wished to service. Groundfish processors diversified into highly competitive product markets to satisfy their customers, while scallop processors invested in marketing, activities that would increase future sales or prices, in response to sharply increasing regional landings.

Before presenting the methods used to examine both strategies, brief histories of U.S. Atlantic groundfish and scallop fisheries and management are presented. This is followed by the methods and data section. Findings are then discussed with a focus on processor adjustments to changing resource availability, followed by conclusions.

2. Brief histories of U.S. atlantic groundfish Atlantic groundfish and scallop fisheries and management

With high local demand for fresh fish fillets from its Catholic population, Boston led all New England ports in processing groundfish with the opening of the Boston Fish Pier in 1914, then the world's largest [35]. Groundfish fillets were a basic commodity with processors competing fiercely on price [35]. Foreign factory ships, which could not land fish in the U.S., sharply increased their effort on Georges Bank and in the Gulf of Maine during the 1960s and early 1970s [6]. Groundfish prices increased in the U.S. during this period due to reduced supply and shifts in consumer preferences toward low-cholesterol, low-calorie, nutritious food groups without much marketing investments by the fishing industry [6].

The increase in domestic groundfish landings following the Fishery Conservation and Management Act (FCMA) of 1976 was caused by the "Americanization" of the fleet in replacing foreign vessels [18]. Standardized days fished with trawl gear in the Gulf of Maine, Georges Bank, and the Mid-Atlantic Bight nearly doubled to 48,000 days from 1976 to 1985, causing groundfish landings to peak in 1983 and then fall as decreases in catch per unit effort overwhelmed increases in fishing effort [27].

In 1994, in response to a court ruling that required ending overfishing of the New England groundfish stocks, the management regime switched from output controls to effort controls systems using Days-at-Sea (DAS) designed to achieve annual target (soft) catch limits [23]. Due to compromises on allocations based on landings histories, the initial allocation of DAS was more than four times higher than the peak DAS fished, which failed to constrain fishing mortality of some key stocks [23]. Subsequent management actions intended to reduce fishing mortality of specific diminished stocks reduced groundfish DAS, introduced differential values for DAS in specific areas frequented by diminished stocks, and added or changed output constraints [14,3]. Also in 1994, management regulations closed three large areas off the coast of New England to groundfish trawls and scallop dredges [22,24].

The DAS system, with these frequent adjustments, remained the primary method of controlling fishing mortality until 2010. In 2010, partially due to general dissatisfaction with the complex system of input controls and partially in response to 2007 revision in the FCMA that mandated hard quotas, fishery managers adopted a catch-share system in which groups of fishermen (sectors) were allocated shared quotas by species with transferability within and between sectors [26]. After a brief increase in landings in 2010 and 2011, groundfish landings resumed their general decline, although at a slower rate with hard quotas enforced by accountability measures.

From the beginning of the commercial fisheries in the 1930s, scallops were shucked on board, landed as meats in 40-pound cloth bags, and sold to processors, dealers, and wholesalers. Minimal on-shore processing occurred until the 1970s when some scallop vessel fleet owners built shore-side scallop processing plants, repackaging scallops to sell directly into wholesale and retail markets.

Scallop processors sorted some scallops by size in their plants because customers paid higher prices for larger scallops, but these price signals were not transmitted to fishing vessels. The original New Bedford scallop auction, which ran from 1941 until 1986, sold entire trips of fish and scallops without reference to size category [32]. Older scallopers taught shackers (trainees) the mantra, "Cut 'em all large & small, they pay the same for 'em all" (Captain Tony Alvernaz per. comm.).

From 1982–1994, the scallop management plan used a minimum meat-count to limit the catch of small scallops, enforced by random sampling of scallop bags [11]. In response to this regulation, scallopers separated their catch by size on deck, then mixed large and small scallops into the same bag. Although the meat-count standard was discontinued in favor of the DAS system in 1994, the custom of culling scallops by size continued in order to sell larger scallops at higher prices.

An ad-hoc program of access into previously closed areas began in 1999, which led in 2004 to a formal rotational program [25]. This program combined DAS in open areas with scheduled trips with fixed quotas in access parts of the closed areas, based on predicted gains in yield-*per*-recruit and unusually large year classes [12,31]. Three areas were added in the Mid-Atlantic region to the rotational system. Scallop production increased rapidly in the closed areas [11]. By 2013, the biomass in Georges Bank and the Mid-Atlantic were, respectively, fourteen and seven times larger than the 1993 levels [28]. U.S. scallop landings increased from 5600 mt in 1998 to 10,100 mt in 1999 (with 2729 mt from the access area) and continued to increase to 29,000 mt in 2004 (with 2415 mt from the access area). Scallop landings remained near that record peak until 2012 before declining in 2013 and 2014. (Fig. 1).

The closed areas allowed scallops to grow to larger sizes, which could be cut in shorter time allowing more pounds shucked per day (given maximum crew size regulations), and the trip quotas in access areas allowed more time to search for larger scallops. Landings of U10 (under 10 scallop meats per pound) and 10–20 s increased from 25% of total landings in 1998 to 75% in 2005 [11].

Valderrama and Anderson [33] credited rotational management with increases in economic rent mostly due to price premiums for larger scallops, which they assumed were constant. Hart [13] agreed that rotational area management improved scallop production and landings but questioned the previous authors' optimistic conclusion for higher rents by showing declines in price premiums following increased landings of large scallops.