Seafood Safety and Marketing: The Case of the Deepwater Horizon Tragedy

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Introduction

Most economists would tend to agree that our oceans are rival in consumption yet not excludable hence satisfying the classic definition of a common resource good. For example, one fisherman's catch can affect the productivity of other fishermen. And the Gulf of Mexico is no exception to these criteria of being rival and non-excludable in consumption. Further, a 'tragedy of the commons' can occur when the quality of a common resource good becomes so degraded such that all users are made worse off (Hardin 1968).

The unthinkable became a reality on April 20, 2010 when Transocean's Deepwater Horizon suffered a catastrophic accident; the BP-contracted oil rig exploded killing eleven workers and injuring numerous other crew members (BBC News 2015).[1] After burning for 1.5 days, the ill-fated rig then sank to the bottom of the Gulf. A third firm, Halliburton, was also considered partially negligent in causing this accident allegedly due to faulty cementing of the oil well. In the days and weeks to come, a subsequent environmental disaster ensued due to a malfunctioning blowout preventer (BOP), perhaps damaged in the original explosion. The BOP is the apparatus designed to stop and seal a leaking oil well in the event of an emergency.

On May 8, 2010 a containment dome failed due to the presence of crystalized gas. Between May 9, 2010 and May 10, 2010 BP considered using both a junk shot (i.e., an attempt to fill the well with pieces of rubber tires and golf balls) as well as a using smaller containment done (i.e., known as a top hat). On May 26, 2010 a top kill procedure was initiated to stop the leaking well with drilling mud, but the attempt failed on May 29, 2010. On June 4, 2010 BP successfully affixed a lower marine riser package cap to the well, slowed the leak, and began to route oil to tanker ships above. Over a month later on July 10, 2010 BP attempted to affix

[1] Incidentally, the Deepwater Horizon, a year earlier in 2009, set an astonishing drilling record in terms of measured depth of 30,055 feet and vertical depth of 35,050 feet (Transocean 2015).

another yet better-fitting cap to the leaking well. All told, 5 months from the initial explosion, the well was finally capped and deemed effectively dead on September 19, 2010 after having leaked an estimated 4.9 million barrels of oil.[2]

In concert with the timing and size of the oil spill the US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) closed part of the Gulf of Mexico Federal Waters to fishing on May 2, 2010 (Federal Register 2014). The size of the closed area increased to a peak of 88,522 square miles on June 2, 2010 or 37 percent of the Gulf of Mexico Federal Waters. The NMFS started to reverse the fishing bans and reopen formerly closed Federal Waters on July 22, 2010. On April 19, 2011, one year after the Deepwater Horizon tragedy, the NMFS reopened the remaining closed Federal Waters.

Discussion Questions

Did the Gulf of Mexico become a 'tragedy of the commons' after the sinking of the Deepwater Horizon? Why? Common resources are just one type of good. Based on the notions of rivalry and excludability, classify a private good, a club good, and a public good. Next, give an example of each type of good in the context of the seafood industry. In closing the Gulf of Mexico Federal Waters to fishing, the NMFS collaborated with the US Food and Drug Administration in an abundance of caution to assure the safety of the Gulf seafood for human consumption. Besides the oil, what else may have affected the quality and safety of the Gulf seafood?

[2] Prior to the Deepwater Horizon tragedy, the Exxon Valdez tragedy on March 24, 1989 was the largest US oil spill. The estimates of oil spilled from the Exxon Valdez into Alaska's Prince William Sound ranged from 260,000 to 750,000 barrels of oil.

Retail Frozen Seafood

Nielsen, a leading firm globally in the market for syndicated retail scanner data as well as media analysis, assembled the data set for this study (Nielsen 2015). These data, spanning the 156-week time frame from the Saturday ending May 24, 2008 through May 14, 2011, represent volume sales in pounds for unbreaded frozen seafood products in the grocery store distribution channel. As discussed in the Singh, Dey, and Surathkal (2012) paper on seafood demand systems, this segment of the retail seafood industry composes 36 percent of all seafood purchased in the food-at-home distribution channel excluding fresh, random weight items. Chidmi, Hanson, and Nguyen (2012) also utilized a similar data set to characterize the demand for frozen seafood products. McBee (2012) points out that seafood demand depends not only on the relative prices of other protein sources but also on the growth rate of the population as well as the impact of the business cycle on household incomes.

Figures 1-3 were created using detailed, representative point-of-purchase scanner data for fish, shrimp, and crab, respectively. As observed in Table 1, frozen fish had average weekly volume sales of 1,739,445 pounds. In Figure 1, the trajectory of volume sales steadily increased in a stairstep pattern with notable seasonality each marketing year. Frozen shrimp volume sales averaged 2,656,229 pounds per week during the study period with highly visible seasonal Christmas and New Year holiday spikes of nearly 6 million pounds (Figure 2). Similar to frozen shrimp, the other frozen shellfish segment, crab, had a relatively flat volume sales series with some seasonality throughout each year; average weekly volume sales for frozen crab was 145,613 pounds.

Discussion Questions

For undergraduate students and extension clientele, overlay key points in the Deepwater Horizon timeline on Figures 1-3. Are there discernable patterns as to how the timing of the events may have affected the volume sales of frozen fish, shrimp, and crab? For graduate students, utilize the underlying scanner data to test for potential changes in the volume sales of frozen seafood. What additional data would you collect to analyze the potential impact of the Deepwater Horizon tragedy on other marketing distribution channels for seafood products? How might retail frozen seafood be apparently insulated for the impact of the Deepwater Horizon tragedy from both the supply and demand sides of the market (Setar 2013)?

Locavores and Boat-to-Plate Seafood Traceability

In the aftermath of a tragedy such as the sinking of the Deepwater Horizon, it becomes clear that the notion of traceability systems, which have been widely considered in the beef, pork, and poultry industries, would also have merit in the seafood industry. Consumers not only have an expectation of safe food, but also increasingly express a preference and willingness-to-pay for locally sourced food as well, evidenced by the ubiquitous farm to table movement. The supply of seafood has two main sources, the production from both aquaculture and capture fisheries (Smith et al. 2010; Asche, Guttormsen, and Tveteras 2008). Tank-to-plate traceability in principle should be quite feasible. For example, when Redkey, Indiana-based Bell Aquaculture sold yellow perch to a local restaurants, chefs and diners knew the source of their seafood (Bell Aquaculture 2015).

The boat-to-plate concept of seafood traceability is becoming a reality. According to the Portland Press Herald (2015), the Maine Coast Fishermen's Association received a grant of

$175,000 from the National Fish and Wildlife Foundation to help develop the technologies and procedures to make transparent to seafood consumers the fishermen who caught their dinner in addition to the location and time of the capture harvest. A local grocer and the Gulf of Maine Research Institute are also collaborating to bring the project to fruition.

Discussion Questions

If seafood traceability systems are implemented industry-wide, what impact might they have on consumer decision making at the point-of-purchase? What benefits and costs do seafood traceability systems accrue to firms in capture fisheries as well as aquaculture producers? Repeat this analysis for seafood processors, wholesalers, and retailers. In the absence of seafood traceability systems for capture fisheries, what advantages might aquaculture producers maintain during an event such as the sinking of the Deepwater Horizon?

Corporate Environmental Policies: The Whole Foods Market Story

Many corporations have embraced the sustainability paradigm as a matter of essential corporate strategy (Savitz and Weber 2006; Nidumolu, Prahalad, and Rangaswami 2009; The Economist 2011). Not only is a firm accountable to its shareholders for bottom-line profitability, but also accountable to its general stakeholders for the firm's impact on people (i.e., society) and the planet (i.e., environment). This well-known sustainability paradigm is known as the triple-bottom line (i.e., TBL, 3BL or 3Ps).

Austin, Texas-based Whole Foods Market, a popular publicly-traded grocer in the US, has been considered a leader with sustainability initiatives in the food industry. In particular, they have gone beyond stringent seafood procurement policies by setting the corporate tone with their

eight core values and institutionalizing those values throughout the entire organization (Whole Foods Market 2015). With respect to aquaculture, or farmed seafood, their suppliers are prohibited to use antibiotics and growth hormones, genetically modified seafood, mammalian- and poultry-based feed, and preservatives. Moreover, the farm-to-store traceable aquaculture facilities are audited by third parties to guarantee the foregoing assurances in addition to verifying the seafood farms are designed and managed in an environmentally-sound way. Further, Whole Foods Market maintains assurances for various farm-raised species of fish and shellfish.

In terms of capture harvest or wild-caught seafood, Whole Foods Market utilizes a set of sustainability certifications including the Marine Stewardship Council (MSC) certification process, the Monterey Bay Aquarium Seafood Watch, and The Safina Center. The MSC is considered the global 'gold standard' of seafood certification. As was the case with aquaculture, they have species-level policies for capture harvest. For example, they do not purchase any Orange Roughy or Sturgeon, and they do not purchase trawl-caught Atlantic Cod. All seafood procurement policies are considered dynamic, rather than static, in that they may be updated as ecosystems change.

Discussion Questions

How have corporate environmental policies of firms such as Whole Foods Market changed the seafood industry? As technology improves for seafood traceability systems, could the Whole Foods Market business model be more easily duplicated by other grocers? If all grocers eventually converge to a similar business model, what does that say about their differentiation efforts?

References

Asche, F., A.G. Guttormsen, and R. Tveteras. 2008. Aquaculture - Opportunities and Challenges. Marine Resource Economics 23:395-400.

BBC News. 2015. Timeline: BP Oil Spill. http://www.bbc.com/news/world-us-canada-10656239. Accessed June 16, 2015.

Bell Aquaculture. 2015. http://www.bellaquaculture.com. Accessed May 7, 2015.

Chidmi, B., T. Hanson, and G. Nguyen. 2012. Substitutions between Fish and Seafood Products at the US National Retail Level. Marine Resource Economics. 27(2012):359-370.

Federal Register. 2014. Volume 79 Number 36. February 24, 2014: 10028-10029.

Hardin, G. 1968. The Tragedy of the Commons. Science 162:1243-1248.

McBee, J. 2012. Fish & Seafood Markets in the US. IBISWorld Industry Report 44522.

Nidumolu, R., C.K. Prahalad, and M.R. Rangaswami. 2009. Why Sustainability is Now the Key Driver of Innovation. Harvard Business Review 87(4):57-64.

Nielsen. 2015. http://www.nielsen.com/us/en.html. Accessed May 20, 2015.

Portland Press Herald. 2015. http://www.pressherald.com/2015/05/10/boat-to-plate-program-gets-175k-for-seafood-tracker-project/. Accessed May 12, 2015.

Savitz, A.W., and K. Weber. 2006. The Triple Bottom Line. San Francisco: Jossey-Bass.

Setar, L. 2013. Fish & Seafood Aquaculture in the US. IBISWorld Industry Report 11251.

Singh, K., M.M. Madan, and P. Surathkal. 2012. Analysis of a Demand System for Unbreaded Frozen Seafood in the United States Using Store-level Scanner Data. Marine Resource Economics 27:371-387.

Smith, M.D., C.A. Roheim, L.B. Crowder, B.S. Halpern, M. Turnipseed, J.L. Anderson, F. Asche, L. Bourillon, A.G. Guttormsen, A. Khan, L.A. Liguori, A. McNevin, M.I. O'Connor, D. Squires, P. Tyedmers, C. Brownstein, K. Carden, D.H. Klinger, R. Sagarin, and K.A. Selkoe. 2010. Sustainability and Global Seafood. Science 327:784-786.

The Economist. 2011. Schumpeter: Why Firms Go Green. November 12, 2011.

Transocean. 2015. http://www.deepwater.com/about-transocean/history. Accessed April 27, 2015.

Whole Foods Market. 2015. http://www.wholefoodsmarket.com/mission-values/seafood-sustainability. Accessed June 6, 2015.

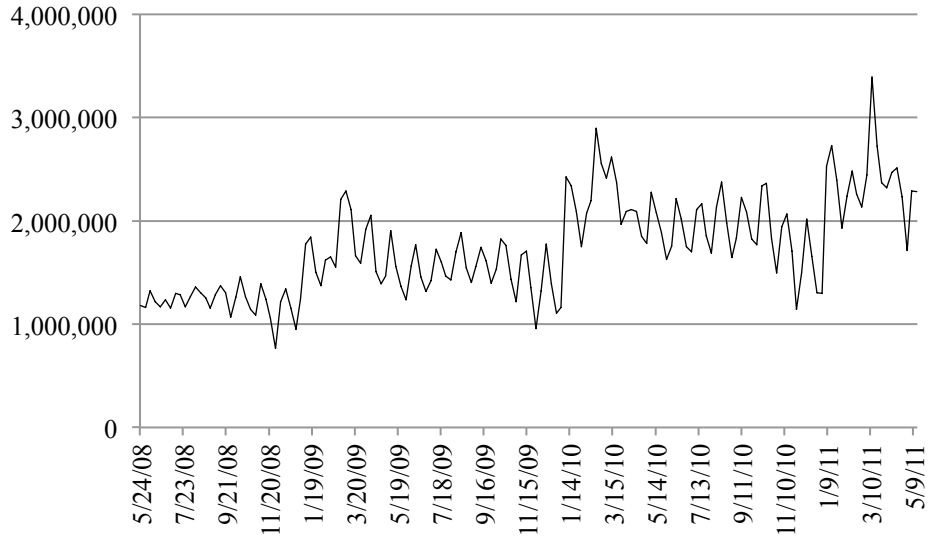

Figure 1. US frozen fish volume sales (pounds)

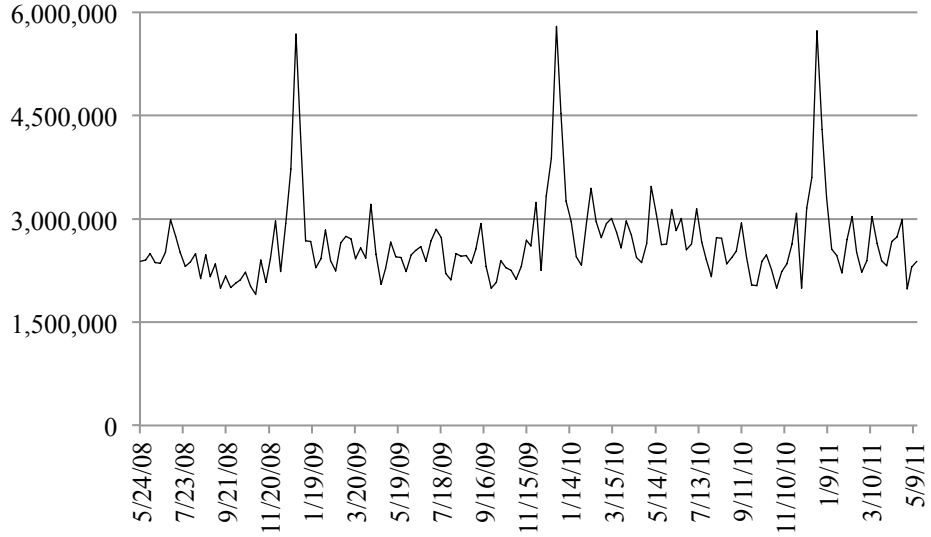

Figure 2. US frozen shrimp volume sales (pounds)

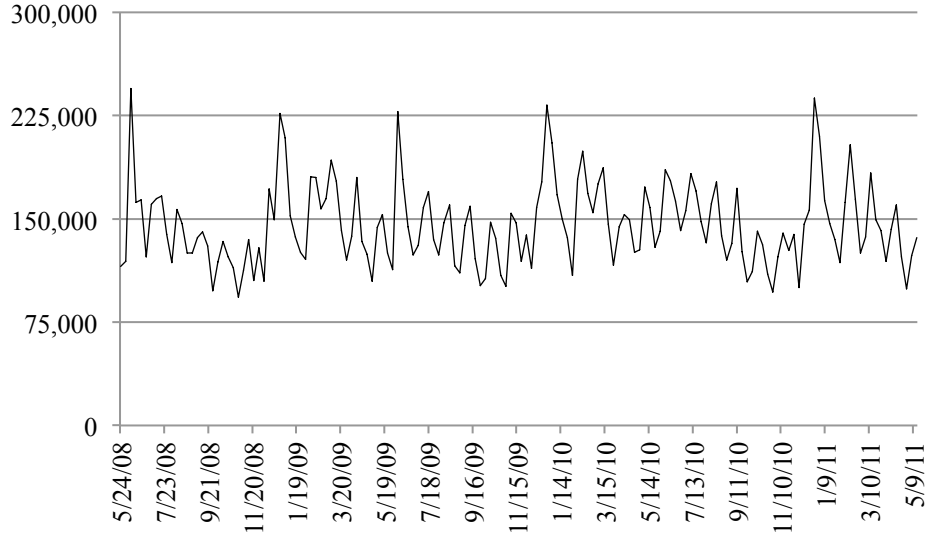

Figure 3. US frozen crab volume sales (pounds)

Table 1. Descriptive Statistics of Frozen Seafood Volume Sales

Market Segment	Mean	Standard Deviation	Minimum	Maximum
Fish	1,739,445	468,513	763,617	3,394,831
Shrimp	2,656,229	620,965	1,903,375	5,793,981
Crab	145,613	30,079	93,069	244,793

Based on a sample of 156 observations for the US grocery store distribution channel. Volume sales are measured in pounds per week.