Title: Inverse Demand Analysis of the Tuna Sashimi Market in Japan: An Application of Scaling in the Rotterdam inverse Demand System

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Abstract: The tuna market is really many markets, differentiated by product - sashimi (frozen and fresh) and canned - and by locale - Japan, US, EU, etc. Supply varies across these markets, but overall there are decreasing stocks requiring severe intentional reductions in catch to rebuild stocks for the long run.

The value-added tuna sashimi demand in Japan constitutes the largest fresh, chilled and frozen tuna sushimi market in the world. The annual total consumption of fresh and frozen bigeye, yellowfin, bluefin and southern bluefin reached the record high as 580 thousand MT in 1993 and shrunk to 349 thousand MT in 2008. Because of the scarcity of fresh bluefin tuna in Japan, substituting with different tuna species and fresh and frozen tuna became common (Yamamoto, 1994; Owen and Troedson, 1994; Bose and McIlgorm, 1996). Chiang, Lee, and Brown (2001) examine the impacts of inventories on tuna auction prices in Japan using the Rotterdam inverse demand system and claims that frozen tunas are more likely to be close substitutes. Since the demand conditions are varying quite well during 2000 -- e.g. declining demand in Japan for sashimi, declining demand in the US for canned, but increasing demand in EU for all tuna products, and cost increases are changing the composition of the fishing fleets -- from high cost nations to lower cost nations, which makes managing the overcapacity more difficult. While the domestic sashimi grade tuna harvests in Japan follow a decreasing trend since 1985, the total imports started increasing from 1985 to 2002. Imports of frozen tuna were about four times the imports of fresh tuna. Specifically, tuna imports in Japan had already begun exceeding domestic supply in 1996. As a result, 63.3% of the tuna sashimi consumption in Japan relied on imports in 2002; 1.7 times the level of Japanese domestic landings in 2002. However, since then, in 2008, tuna imports in Japan have experienced a 40% reduction, allowing domestic landings to account for 49.5% of the tuna used in sashimi market (Import Statistics in Japan, 2008).

Following Chiang, Lee, and Brown (2001), this study tries to estimate the inverse demand models of the yellowfin, bigeye, and bluefin tuna for the sashimi markets in Japan using the Barten and Bettendorf's Rotterdam Inverse Demand System. The estimated price flexibility can be used to examine the importance of global quota management control inventory variables, for the impacts of financial crisis on tuna prices, for the impact of changes in fishing capacity upon total revenues, and for the impacts that climate change and policies have on markets.