A4. ECONOMIC SUMMARY OF THE BSAI AND GOA COMMERCIAL GROUNDFISH FISHERIES IN 2007-08: A DECOMPOSITION OF THE CHANGE IN FIRST-WHOLESALE REVENUES

November 20, 2009

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Introduction

According to data taken from the 2009 Economics SAFE report, first-wholesale revenues from the processing and production of Alaska groundfish rose from $2.1 billion in 2007 to $2.3 billion in 2008, a difference of $186.5 million. During that same time-period, the total quantity of groundfish products decreased from 758.4 thousand metric tons to 688.4, a difference of 70.0 thousand metric tons. thousand metric tons. In general, a decrease in production can be accompanied by an increase in revenues if (i) prices increase, for example, as a demand-side response to the decrease in production, or (ii) the pattern of production changes to favor higher-valued species or products. This brief report analyzes the change in groundfish revenues in 2007-08, across species and products, to identify where the largest changes, both positive and negative, occurred.

Method

The method employed here is commonly used in energy economics, for example, to analyze changes in industrial energy consumption over time (Liu 2005) but it applies equally well to any change in values and is widely used in other fields too. In fact, the method reduces to a simple algebraic identity. For the analysis here, first-wholesale revenue R is the product of a first-wholesale average price index P and the quantity of production Q such that $R = P\,Q$. By definition, the average price index is the ratio of total revenues divided by the total quantity produced. Let $\Delta R = R_{2008} - R_{2007}$, and apply the same notation and corresponding time subscripts to P and Q. For clarity, all economic values are in real (2008) dollars, and quantities are metric tons. Then, a "complete decomposition model" is represented by the following algebraic identity:

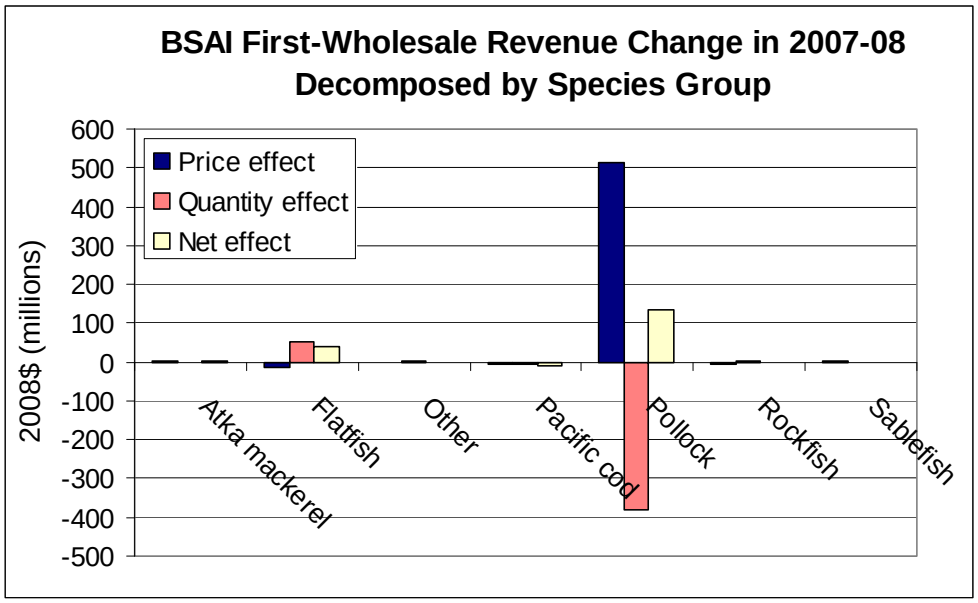
$$\Delta R = (P_{2007}\,\Delta Q) + (Q_{2007}\,\Delta P) + (\Delta P\,\Delta Q)\,.$$

Here, 2007 is taken to be the base period, and all changes are calculated relative to it. Interpreting the first two terms of the decomposition is straightforward: these represent respectively the contributions of quantity and price effects. The third term, usually referred to as the residual, is more complicated. A common practice, adopted here, is to follow the "principle of jointly created and equally distributed production" and simply split the residual evenly between the contributions of price and quantity effects (i.e., each is assigned half of the residual term).

References

Liu, C. (2005). An overview for decomposition of industry energy consumption, American Journal of Applied Science 2, 1166-1168.

Fig. 1: Decomposition of the change in first-wholesale revenues from 2007-08 in the BSAI area. The first decomposition is by the species groups used in the Economics SAFE report, and the second decomposition is by product group. The price effect refers to the change in revenues due to the change in the first-wholesale price index (2008 dollars per metric ton) for each group. The quantity effect refers to the change in revenues due to the change in production (in tons) for each group. The net effect is the sum of price and quantity effects.



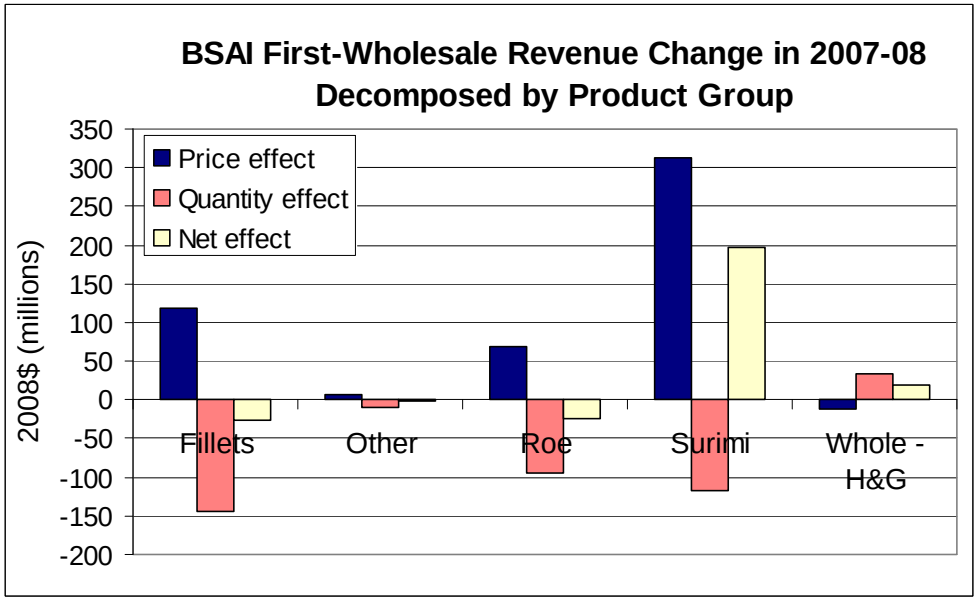
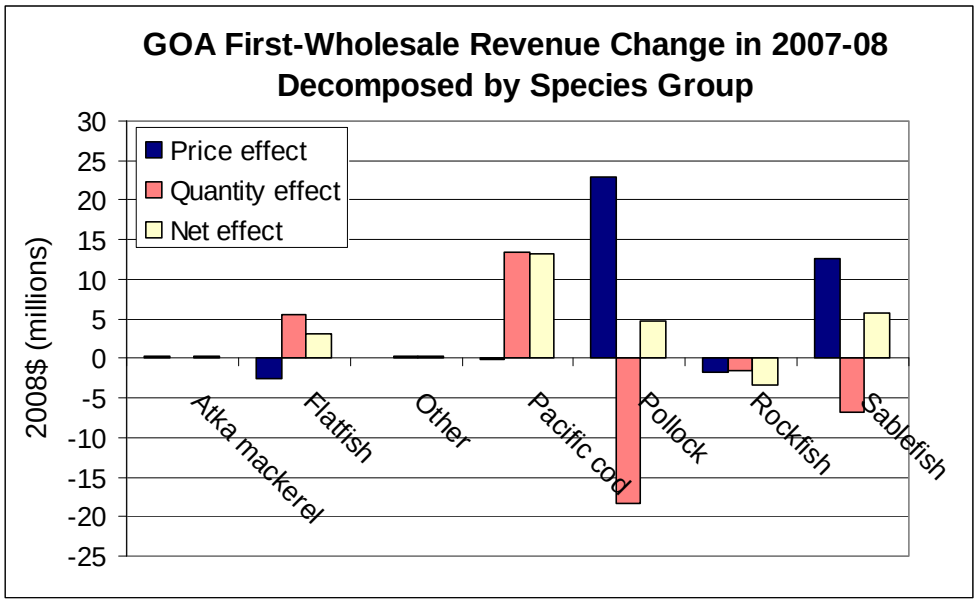
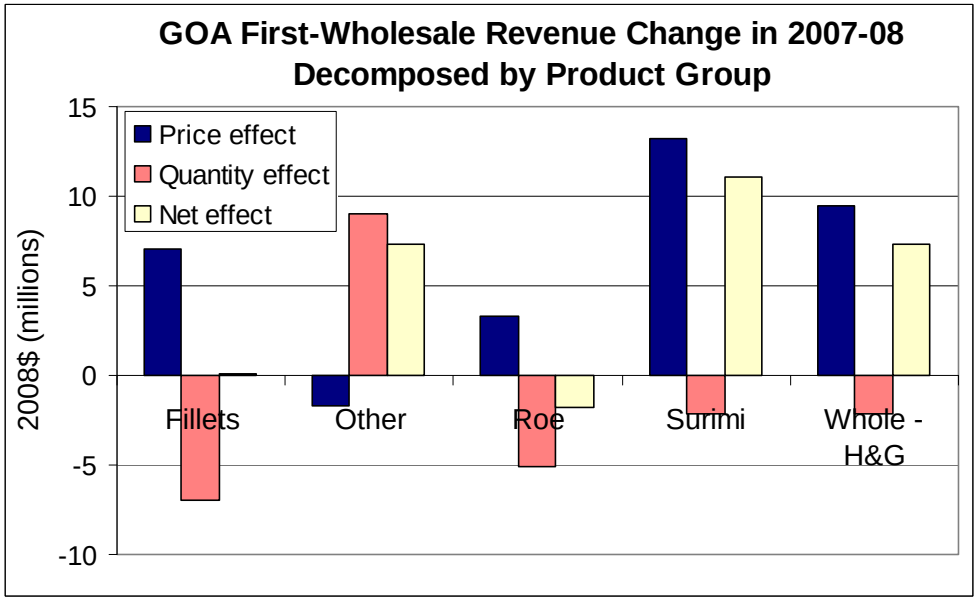


Fig. 2: Decomposition of the change in first-wholesale revenues from 2007-08 in the GOA area. The first decomposition is by the species groups used in the Economics SAFE report, and the second decomposition is by product group. The price effect refers to the change in revenues due to the change in the first-wholesale price index (2008 dollars per metric ton) for each group. The quantity effect refers to the change in revenues due to the change in production (in tons) for each group. The net effect is the sum of price and quantity effects.





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