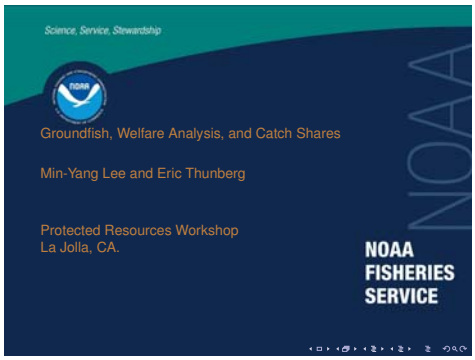
Appendix D6: Groundfish, Welfare Analysis, and Catch Shares



Outline

Research Question and Motivation

New England Groundfish switched from Days-at-Sea to catch shares and saw big reductions in catch limits in 2010.

Question: How much better/worse would the nation have been with a modified DAS system instead?

Motivation 1:Catch shares are a bit controversial. We wanted to provide some with-/without- analysis instead of a pre-/post-comparison.

Motivation 2:Include consumers.

This talk in 1 slide

- Figure out which fishing trips would have occurred under the input control
  - Gives us Q_s
  - Gives us costs $C(Q_S)$
- Plug the Q_s into a demand model to compute consumer welfare measures
- Incorporate uncertainty in Q_s, C, and demand parameters to get a distribution of welfare measures

Recalibrated DAS would have been about $33M worse than the catch-share system, 80% of that cost falls on consumers.

Northeast Groundfish

- 13 species, 20 stocks, 2 broad areas
- Catch is minimally processed before first sale to processors, wholesalers, middlemen
- Lots of fish in this form is imported into the US
- Final products include fillets, chunks, sticks, and steaks

	2010 Catch	2010 Value	YoY Δ Catch	YoY Δ in Value
Cod	12.6 M lbs	$26.9M	-32.6%	-1.6%
Haddock	16.7	20.5	15.4%	28.2%
Pollock	10.6	9.9	-19.7%	-3.3%

Things we know:

- Price & Quantity in 2009 (DAS; high output)
- Price & Quantity in 2010 (Catch Shares; low output)

Things we would like to know:

- Price & Quantity under a counterfactual policy with (DAS; low output)

Counterfactual Regulations & Quantities:

"common pool" regs applied to the entire fleet

Trips:

- Distribute fishing time within the year based on an optimization model.
- Randomly select trips for the first month from the pool of trips which occurred in the first month in 2008 & 2009.
- Adjust the trips by the management changes. Draw trip costs based on survey data from 2010.

"Welfare" for Producers

- Compute output prices from uncompensated flexibilities.
- Make some assumptions about the owner/labor split.
- ... "Net operating revenues"

Generalized Inverse Demand System

- Aggregate our 13 species into 3 groups
- Monthly time-step: 1994-2011
- Include Imports & Monkfish
- Use a GMM estimator instead of the commonly used SUR, 3SLS, or GLS (autocorrelation) system estimators

Consumer Welfare

- No closed form distance function corresponding to the GDIDS estimating equations
- Approximate the demand curves using the definition of flexiblities
- Numerically integrate under the inverse demand curve
- Simulate over the Q_S's and GDIDS parameters ~$N(\beta, \Omega)$.

Some Results

Relative to catch shares with low output, DAS with low output is:

- $25M (std. dev 0.6M) worse for consumers (CV)
- $7.5M(std. dev 2.1M) worse for producers ("Net operating returns")

Some Problems:

- A "real" model of supply would have been far more realistic
- No changes to Import quantities
- No closed form for the demand model – yuck
- *ex-post* analysis can be done, but we couldn't do this *ex-ante*.

This talk in 1 slide

- Figure out which fishing trips would have occurred under the input control
  - Gives us Q_s
  - Gives us costs $C(Q_S)$
- Plug the Q_s into a demand model to compute consumer welfare measures
- Incorporate uncertainty in Q_s, C, and demand parameters to get a distribution of welfare measures

Recalibrated DAS would have been about $33M worse than the catch-share system, 80% of that cost falls on consumers.

Estimating equation

$$\bar{w}_{it}\Delta\ln\frac{p_{it}}{M} = \sum_j \pi_{ij}\Delta\ln q_{jt} + \pi_i\Delta\ln Q_t - \theta_1\bar{w}_{it}\Delta\ln Q_t - \theta_2\bar{w}_{it}\Delta\ln\frac{q_{it}}{Q_t} + \varepsilon_{it}$$

- Nests 4 popular inverse demands models using 2 extra parameters
- Estimate using seasonal differences
- Moment conditions based on no correlation between ε and instruments
- Try a few "sets" of instruments