Market and Non-market Value

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Total Economic Value = Market Value + Non-Market Value

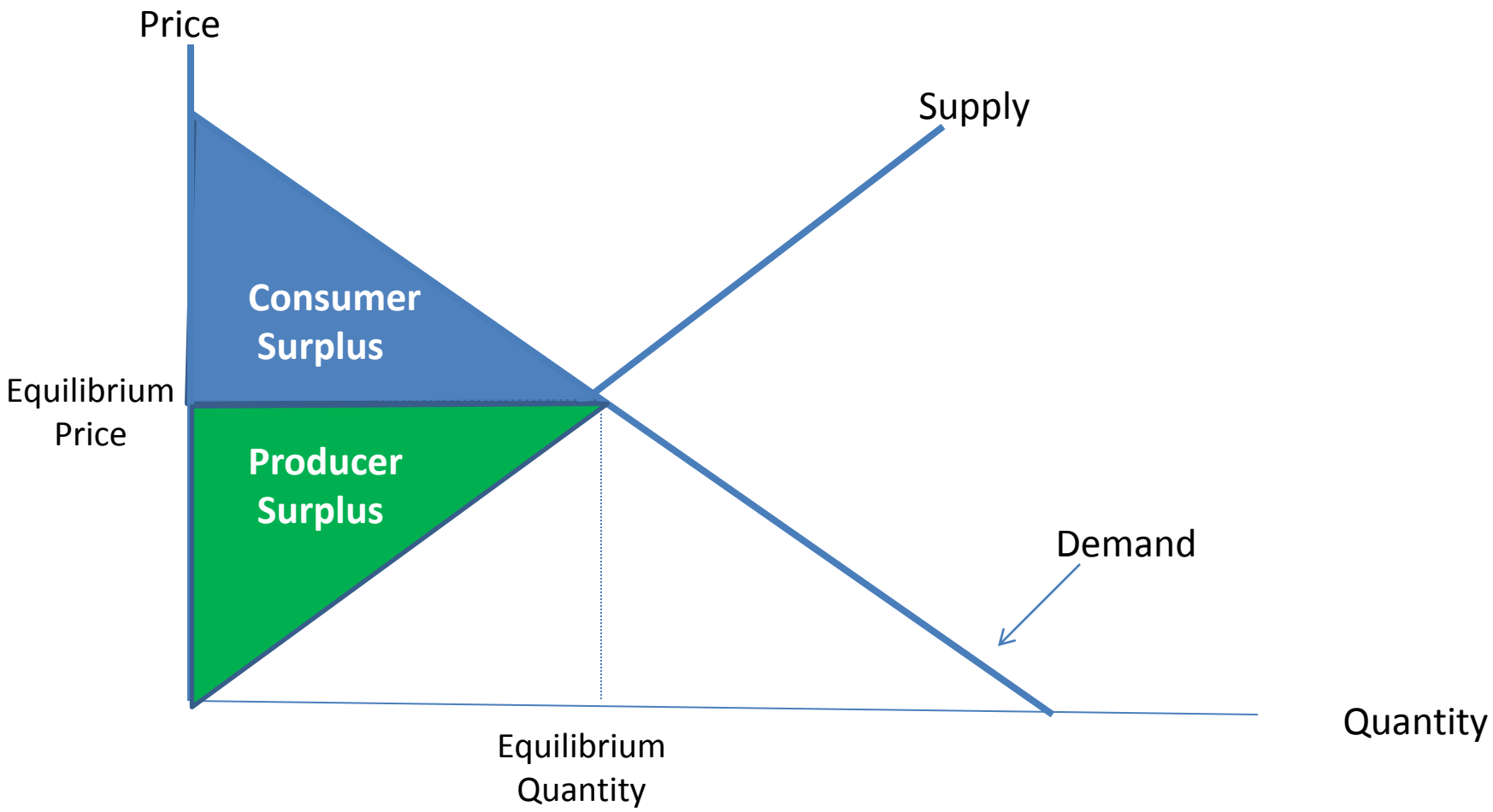
Outline

1. Market Value
2. Indirect Market Value
3. Non-Market Value
4. Trading Off Market and Non-Market Value
   - Sector Allocation Recreational/Commercial
   - Conservation and Extraction

1. Market Value

Commercial Fisheries Market Value

Market Value = Consumer Surplus + Producer Surplus

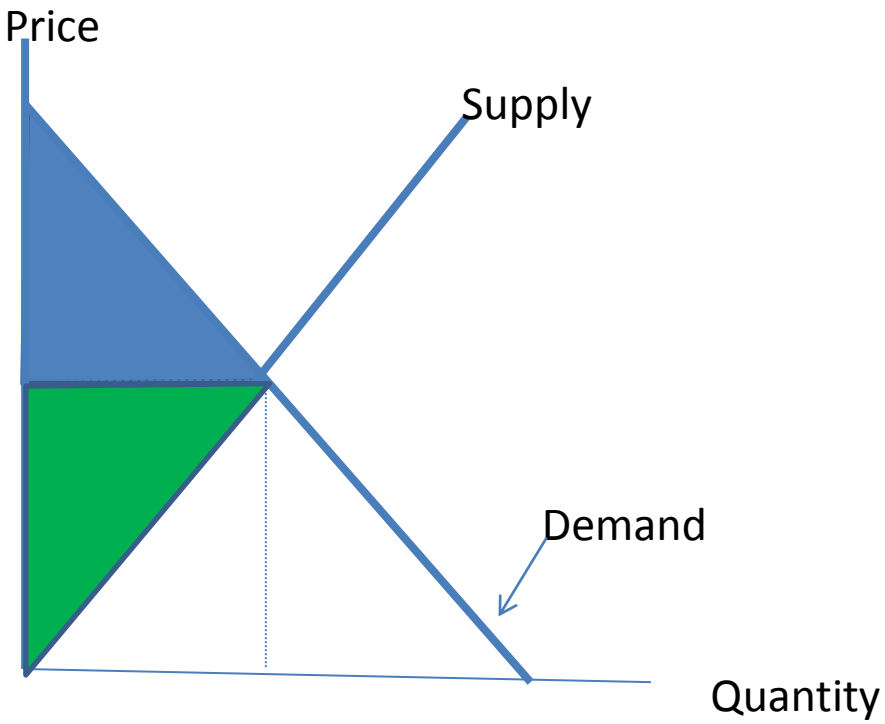


Commercial Fisheries Market Value

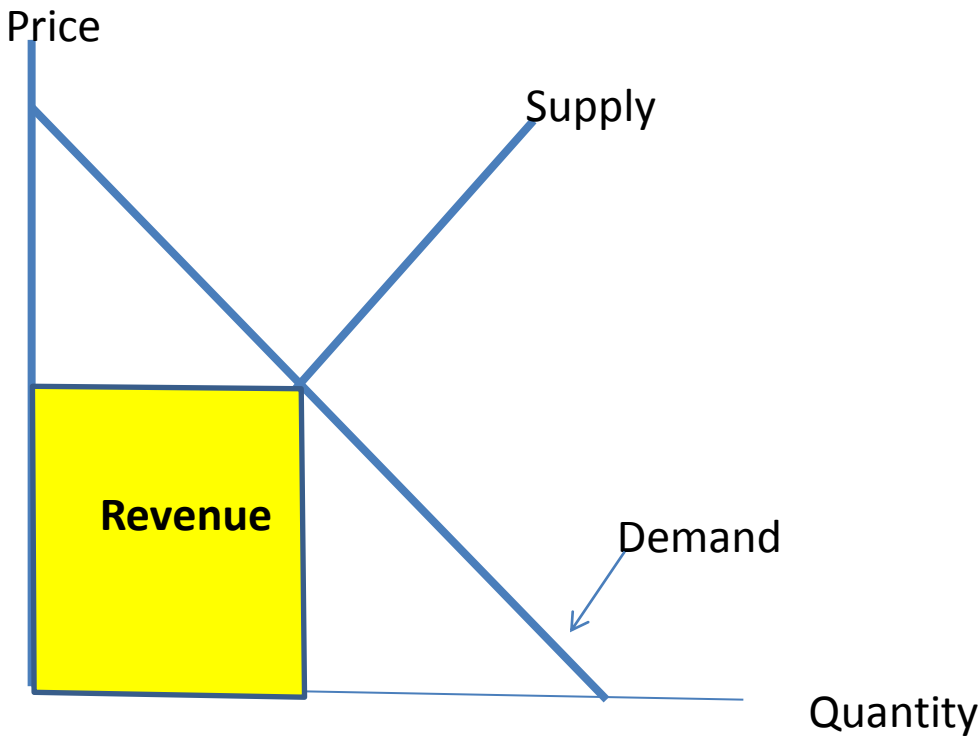
Market Value = Consumer Surplus + Producer Surplus

Value ≠ Revenue

Right

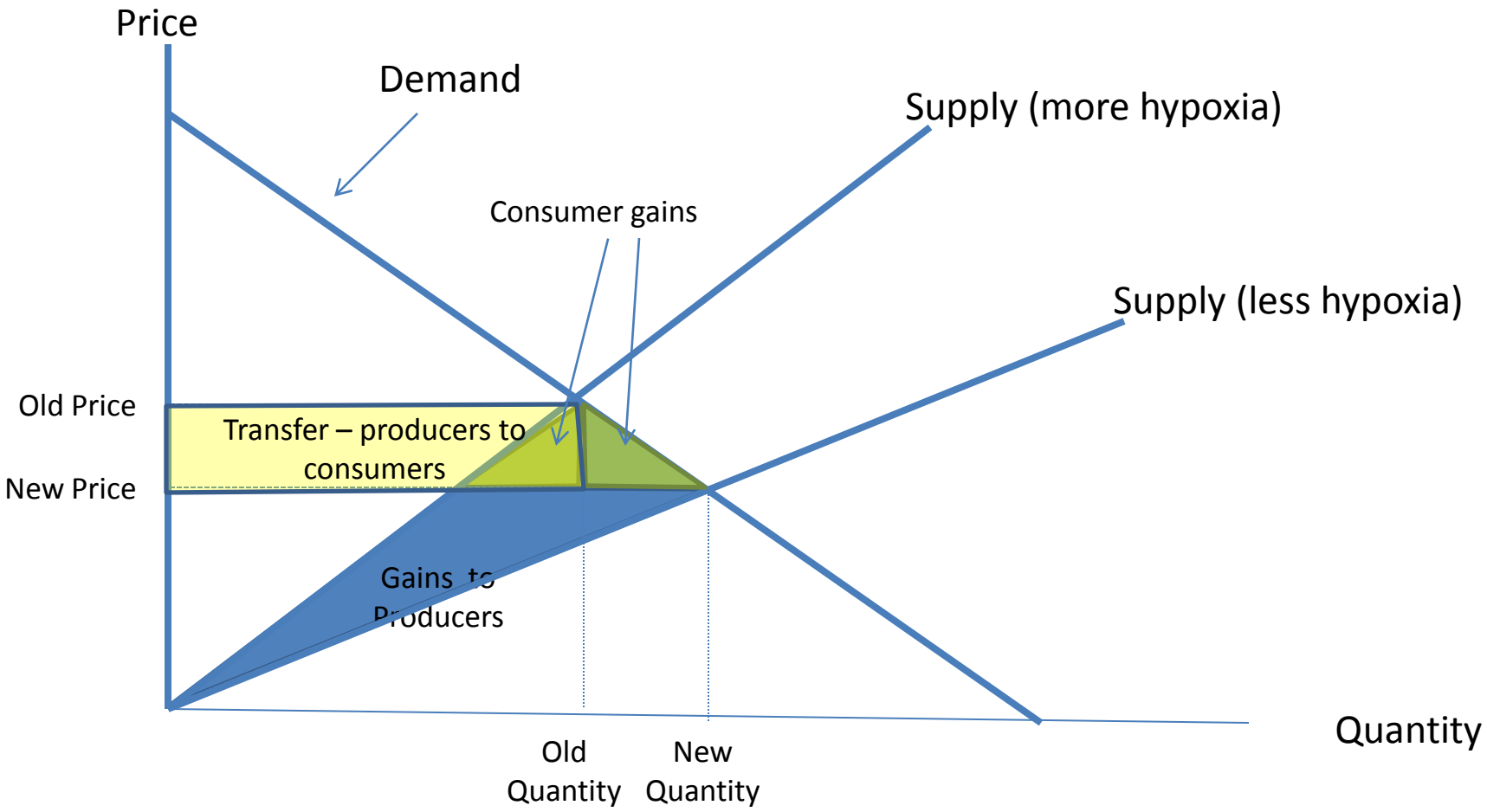


Wrong



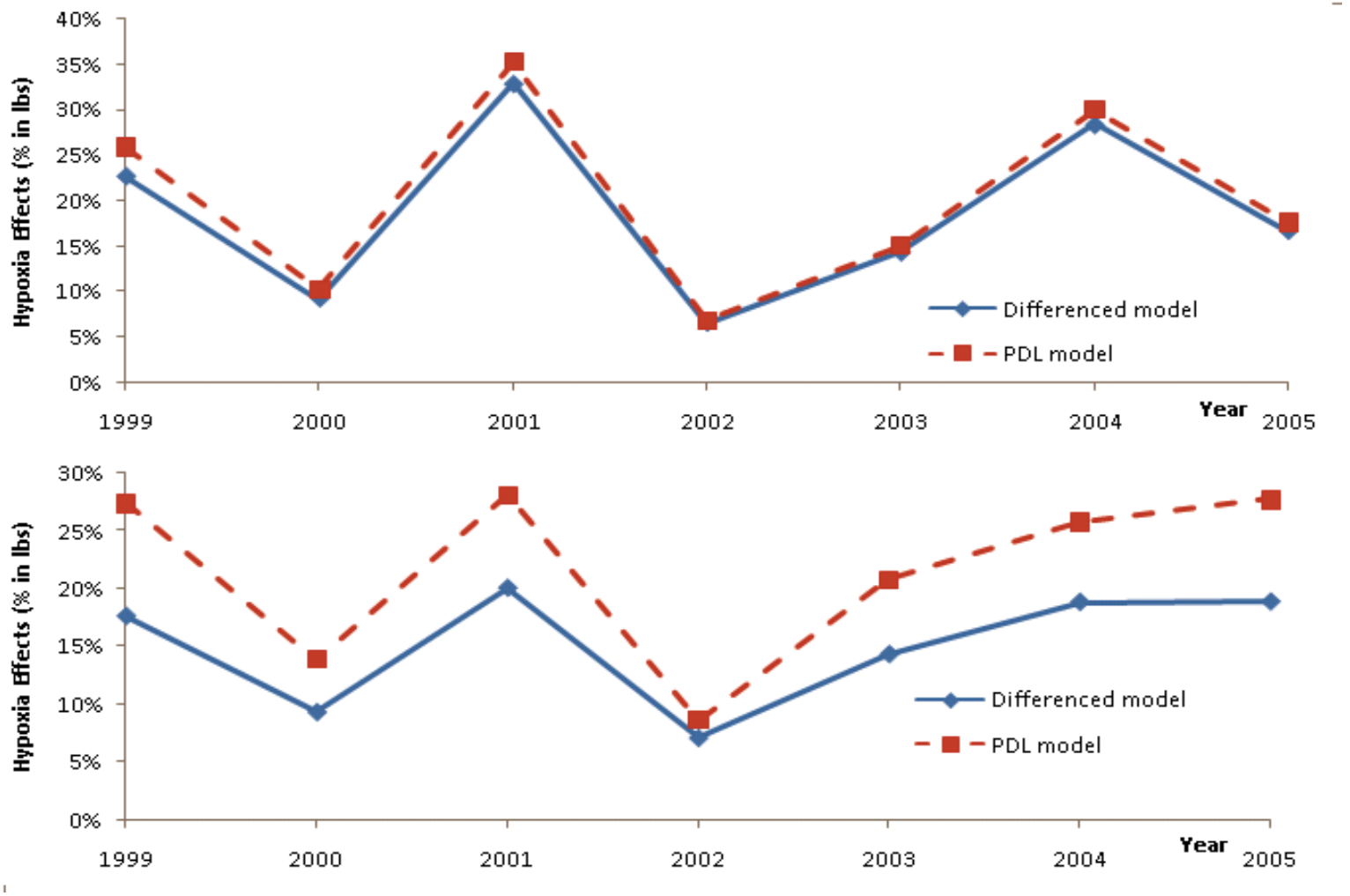
Example: Economic Losses from Hypoxia in NC Shrimp Fishery

Conceptual Economic Impacts (each period)



Lost Catches From Hypoxia

Neuse R. and Pamlico Sound



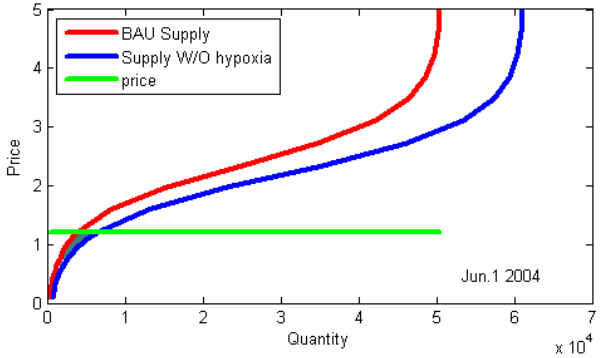
Huang, Smith, and Craig (2010)
"Measuring Lagged Economic Effects of Hypoxia in a Bioeconomic Fishery Model"
Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science

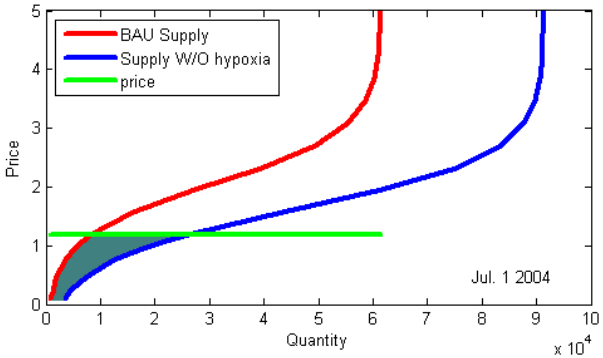
Measuring impacts on consumers and producers

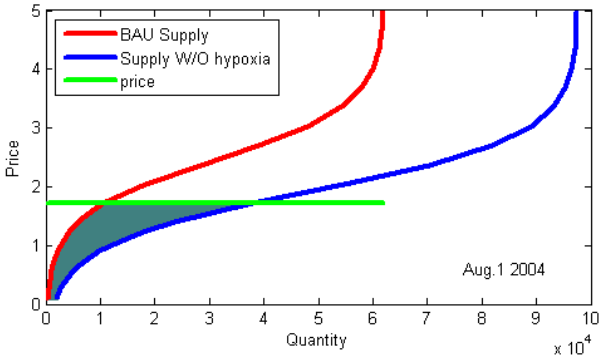
- The demand curve for NC brown shrimp is flat and determined mostly by the world market
- The supply is determined by environmental factors
- A hypothetical reduction in hypoxia would increase surplus for both consumers and producers by $0.45 million annually (25% of revenue loss)

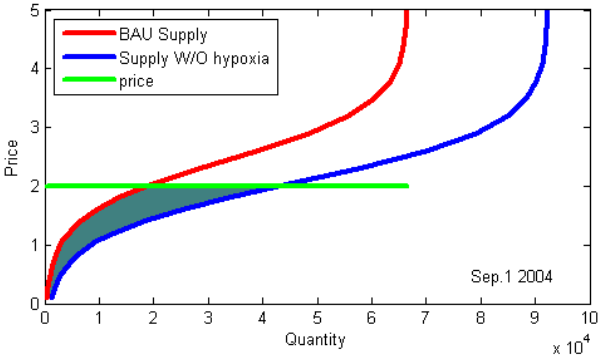
Huang, Nichols, Craig, and Smith (2012)
"The welfare effects of hypoxia in the NC brown shrimp fishery"
Marine Resource Economics

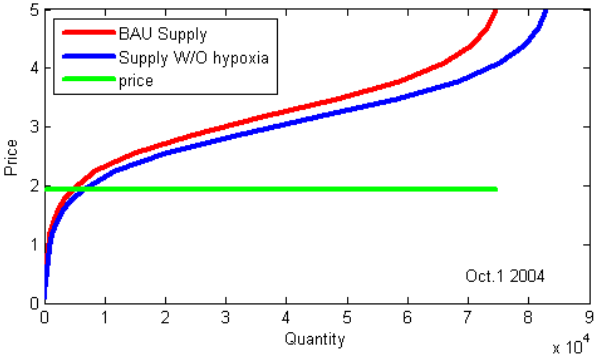
Actual economic losses are only 25% of revenue losses

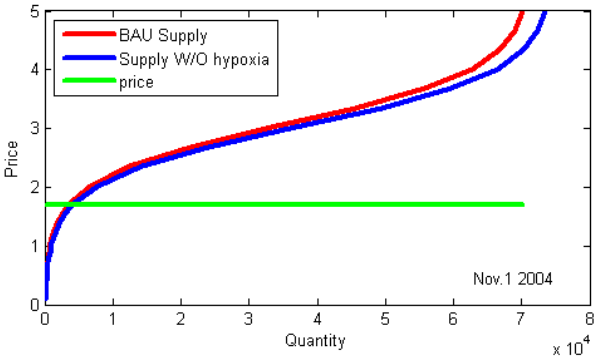




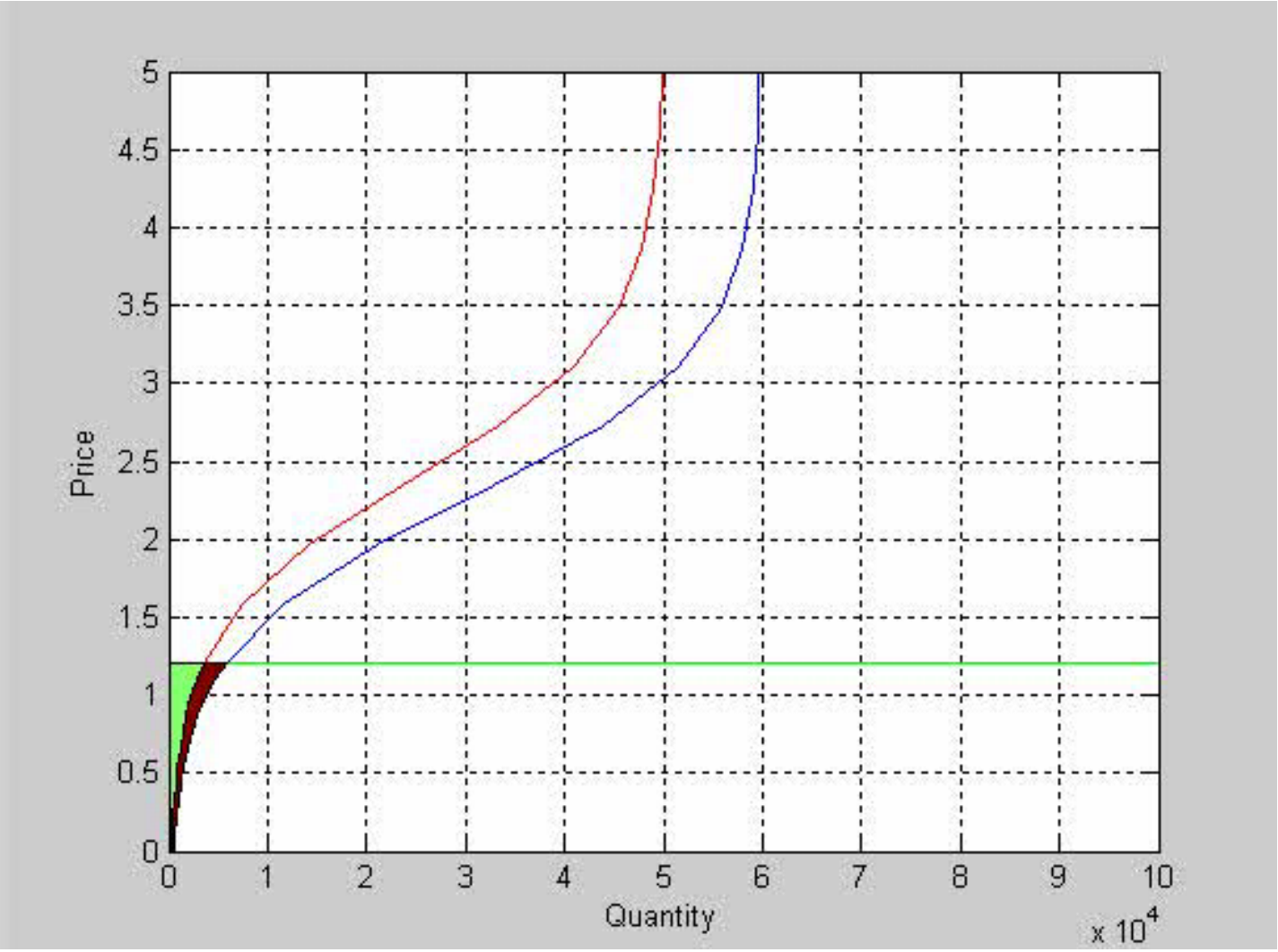




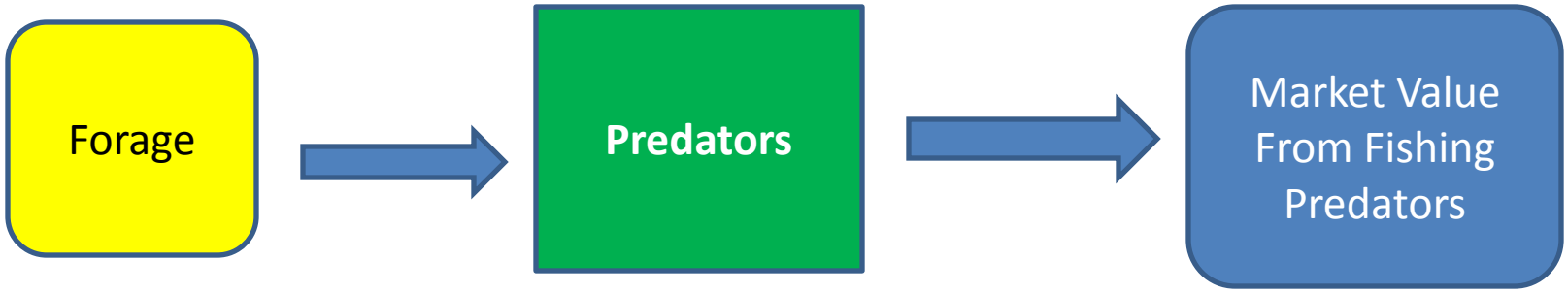




Daily surplus losses due to hypoxia



2. Indirect Market Value



Difficulty is that forage has market value too!

Recent Pew Report on Forage Extremely Misleading about **Economic** Value

- Confuses Revenue with Value
  - Forage fisheries likely to be lower cost due to highly schooling features
  - No attention to demand – could cut in the other direction?
- Confused about decision-making under uncertainty
  - Trading a certain outcome (market for forage) for an uncertain outcome (possible increases in predators)
  - Strategy is risk-taking economically, not precautionary
- Promoting top predator fisheries over forage may be regressive
- Trading off direct market value of forage and indirect value from predators is empirical question
  - Setting aside more than zero forage is probably optimal, but Pew numbers have little basis in economic reality

Employment ≠ Value

Business A

- $1 million revenue
- $1 million costs
- 20 employees

Business B

- $1 million revenue
- $0.5 million costs
- 8 employees

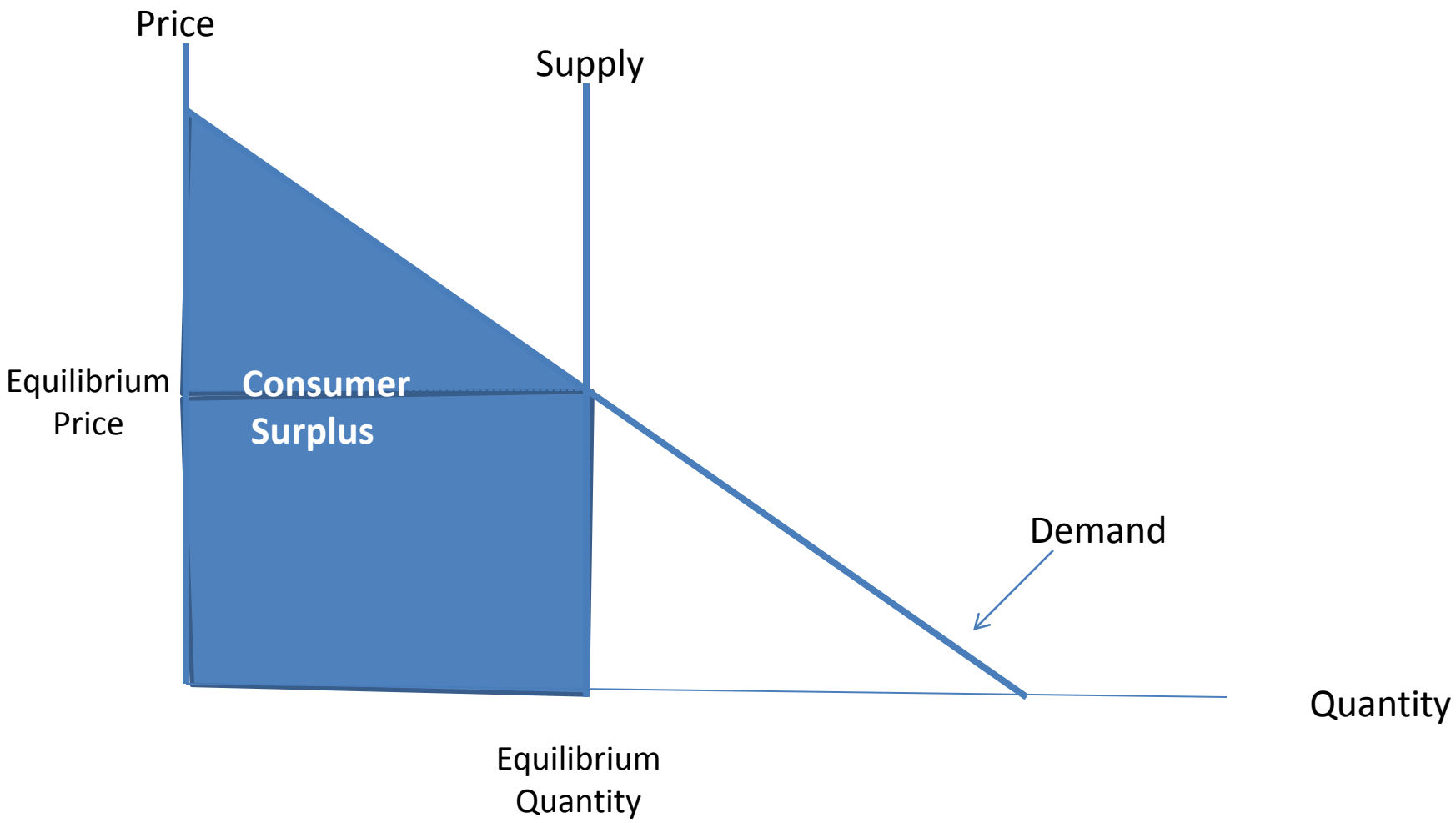
Business B is more valuable!

3. Non-Market Value

Sources of Non-Market Value

- Use
  - Recreational fishing/angling
  - Recreational diving
  - Whale watching
- Passive Use
  - Pristine ecosystems (Prince William Sound)
  - Conservation of charismatic species (turtles, dolphins, bluefin tuna?)
  - Biodiversity in general
- Other ecosystem services
  - Climate regulation
  - Storm protection

Conceptually, consumer values are same for non-market as for market values. But, we don't see "prices."

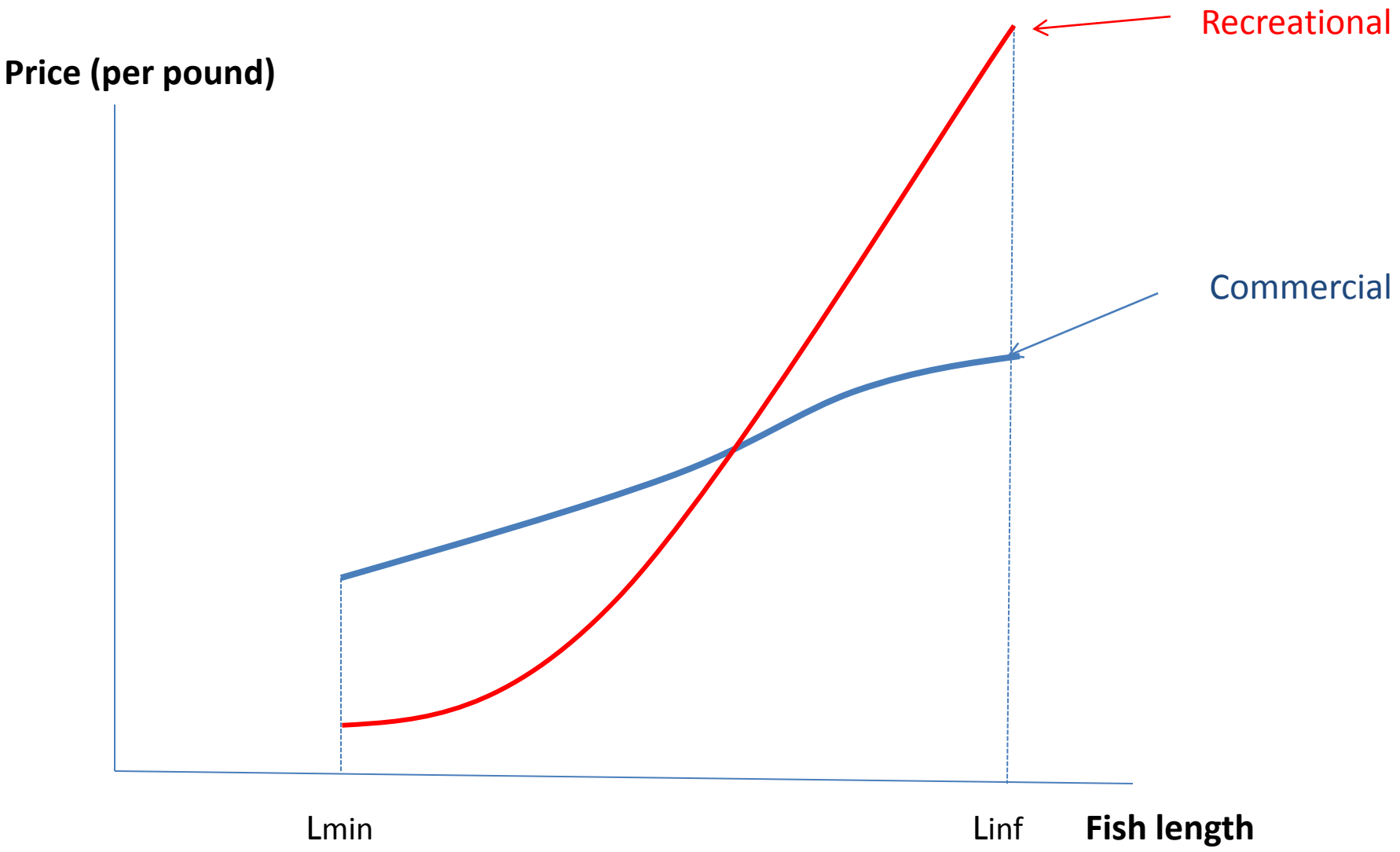


4. Trading Off Market and Non-Market Value

Values Across Sectors

- Recreational
  - Concentrated consumer surplus (anglers)
  - Concentrated producer surplus (charter and head boat owners)
  - Regional economic impact (bait and tackle, boat rentals, seasonal restaurant and accommodation)
- Commercial
  - Highly diffuse consumer surplus (virtually undetectable)
  - Concentrated producer surplus (fishermen, dependent on institutions)
  - Regional economic impact (fish processing, fishery supplies, year-round local economy)

Competing Values for Stock Composition



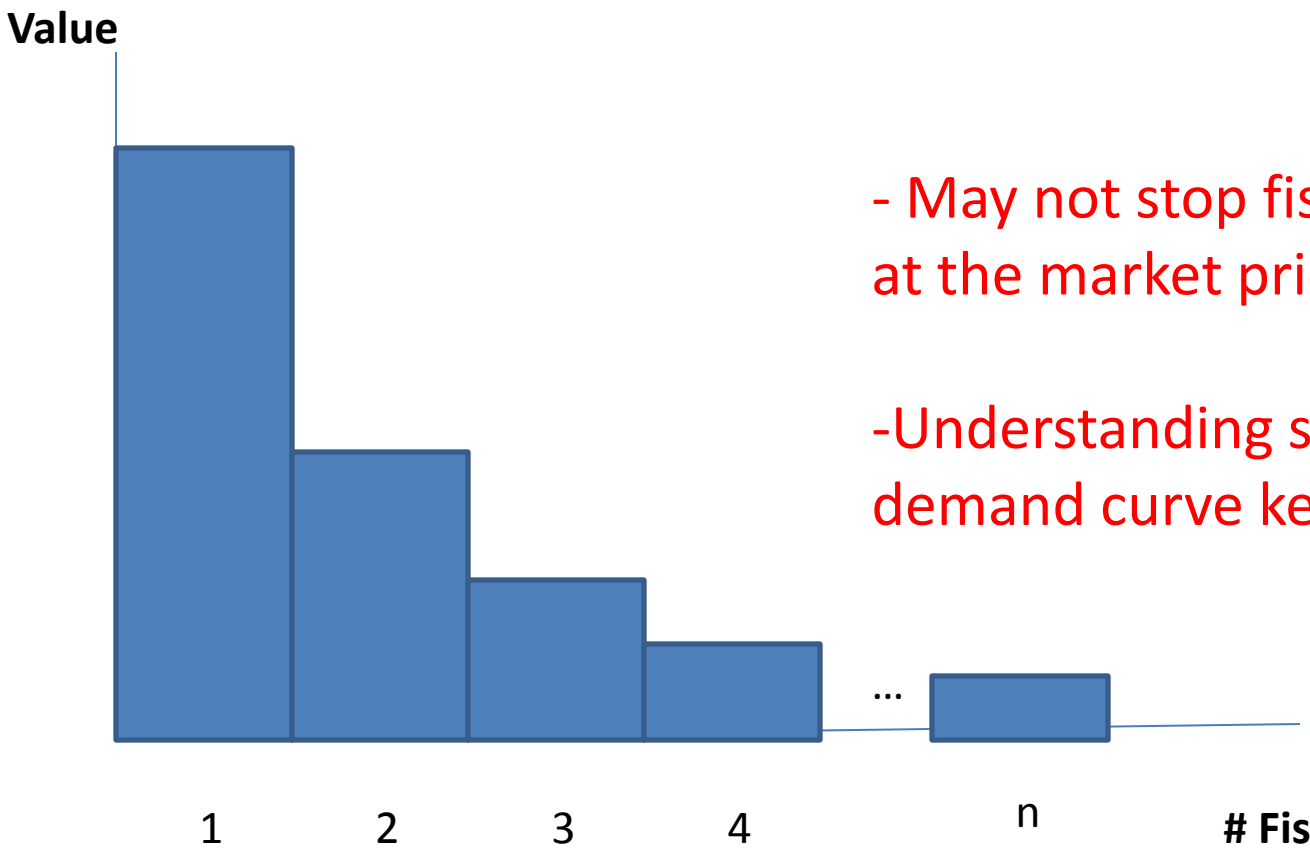
Is recreational sector the highest bidder?

- Allocating more fish from commercial to recreational appears to pass a potential Pareto compensation test
- A result or an assumption?
- Does deeper consideration of seafood markets alter this outcome?

Importance of Institutional Context for Commercial Values

- Open access – a tautology of no value
  - In equilibrium, no producer surplus
  - Assumption of constant price means no consumer surplus
- Optimal management w/ ITQs (Wilen, Bull. Mar. Sci. 2006)
  - Higher price due to quality
  - Lower costs (less capacity, smarter capacity)
  - Still no consumer surplus but hinting (via quality)

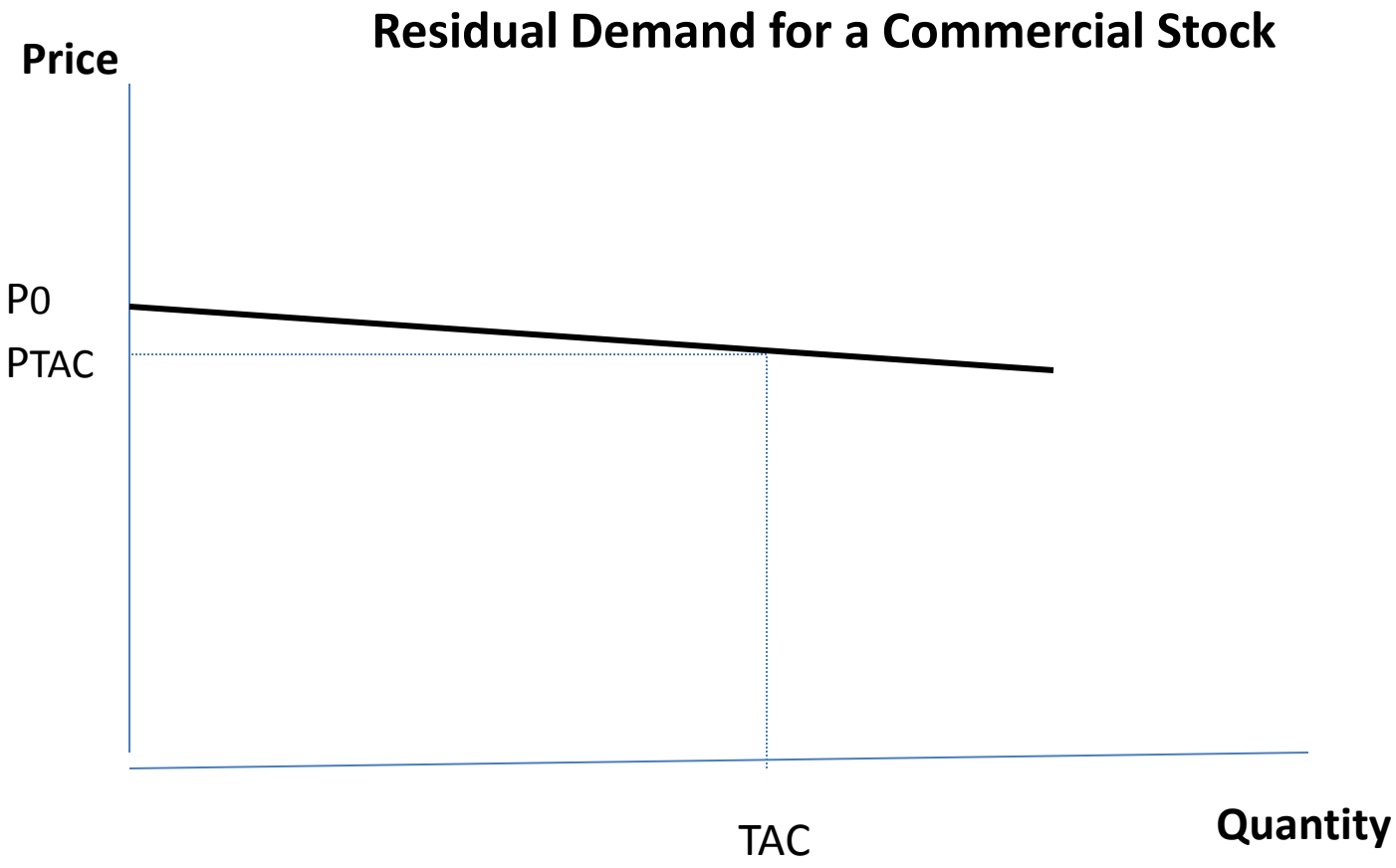
Consumer Surplus in Recreation Demand at Level of the Individual



- May not stop fishing at the market price

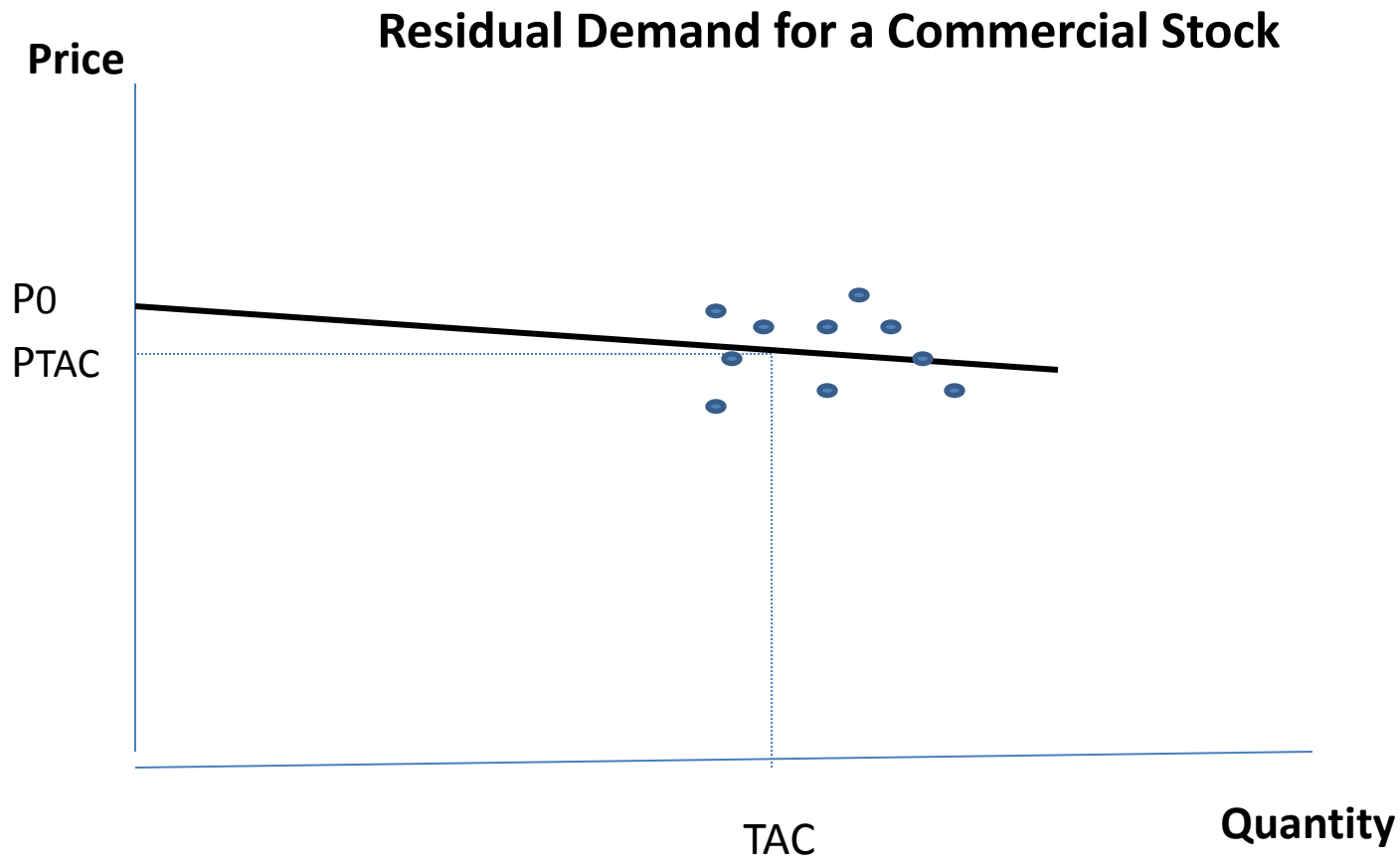
-Understanding shape of demand curve key

Consumer Surplus in Commercial Demand at the Level of the Market



Move from PTAC to P0 reflects influence on market of shutting this fishery down or Allocating all to recreational sector given substitute locations and seafood products

Problem: Narrow range of data makes demand curve appear perfectly elastic

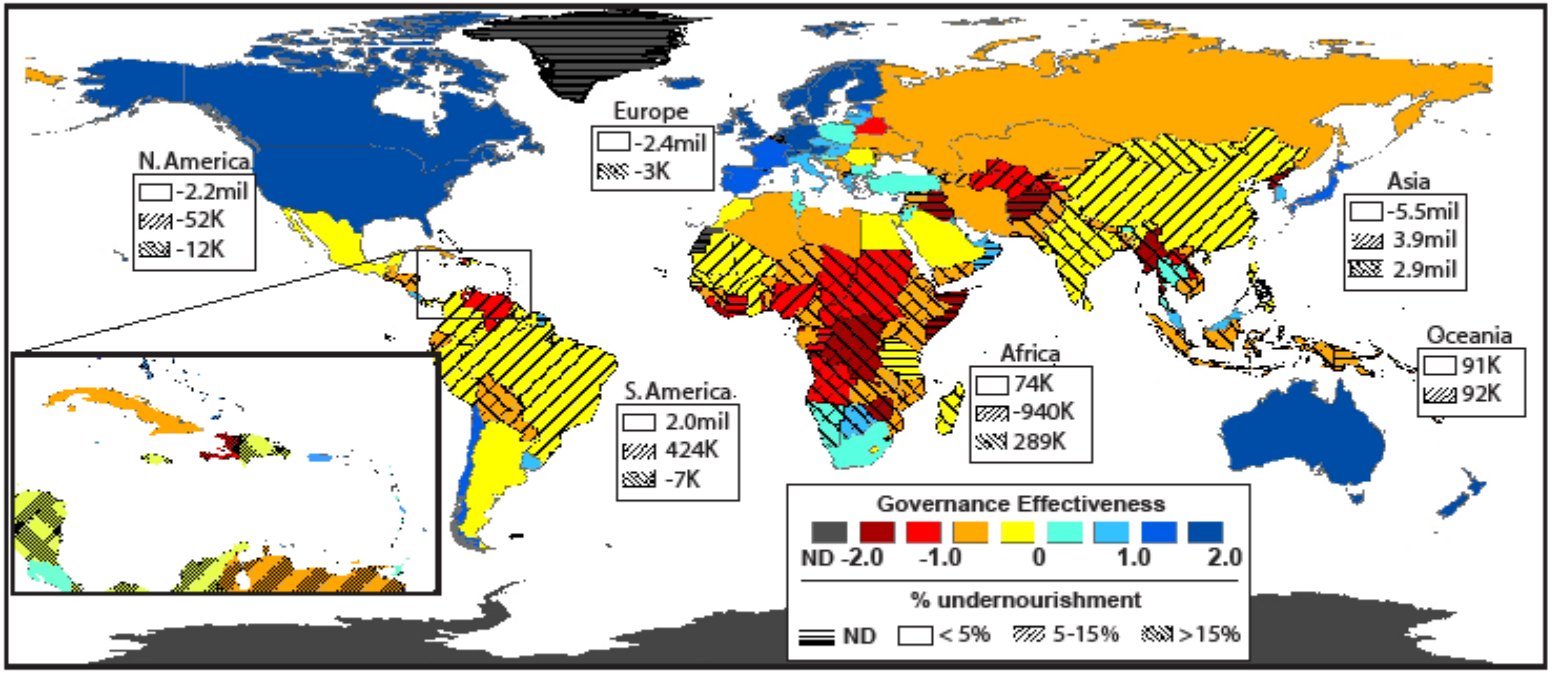


“Wild” Seafood Market Realities

- Supply
  - Leveling out (possibly decreasing) of wild catches
  - **Increasing supply of imports from developing countries – questionable sustainability**

Global Governance and Seafood Net Exports

Smith, Roheim, and 18 others *Science* 2010

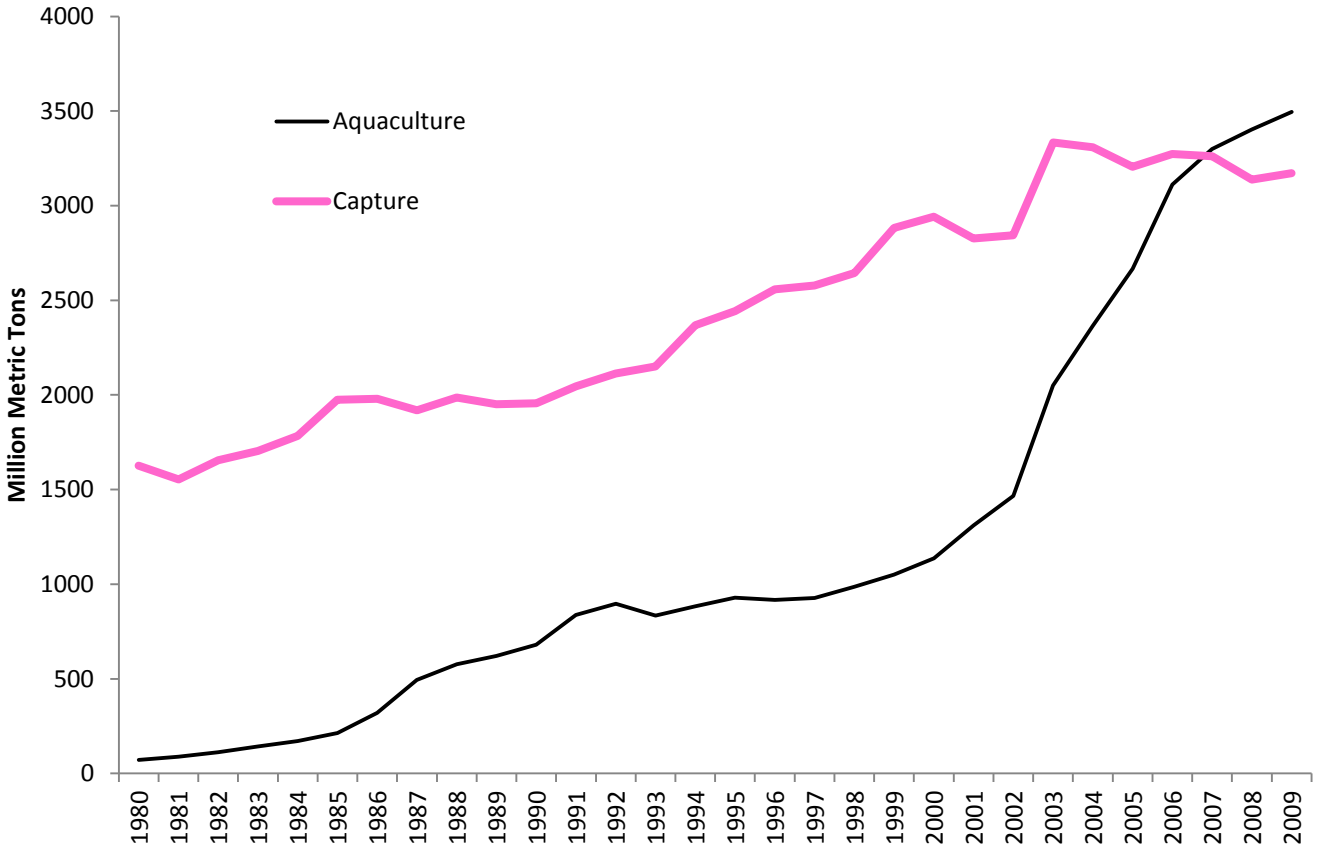


Countries with weak governance are net exporters of seafood

“Wild” Seafood Market Realities

- Supply
  - Increasing supply of imports from developing countries – questionable sustainability
  - Leveling out (possibly decreasing) of wild catches
- **Growing Demand**
- **Market Integration and Segmentation**
- **Competition from aquaculture**

Global Shrimp Production



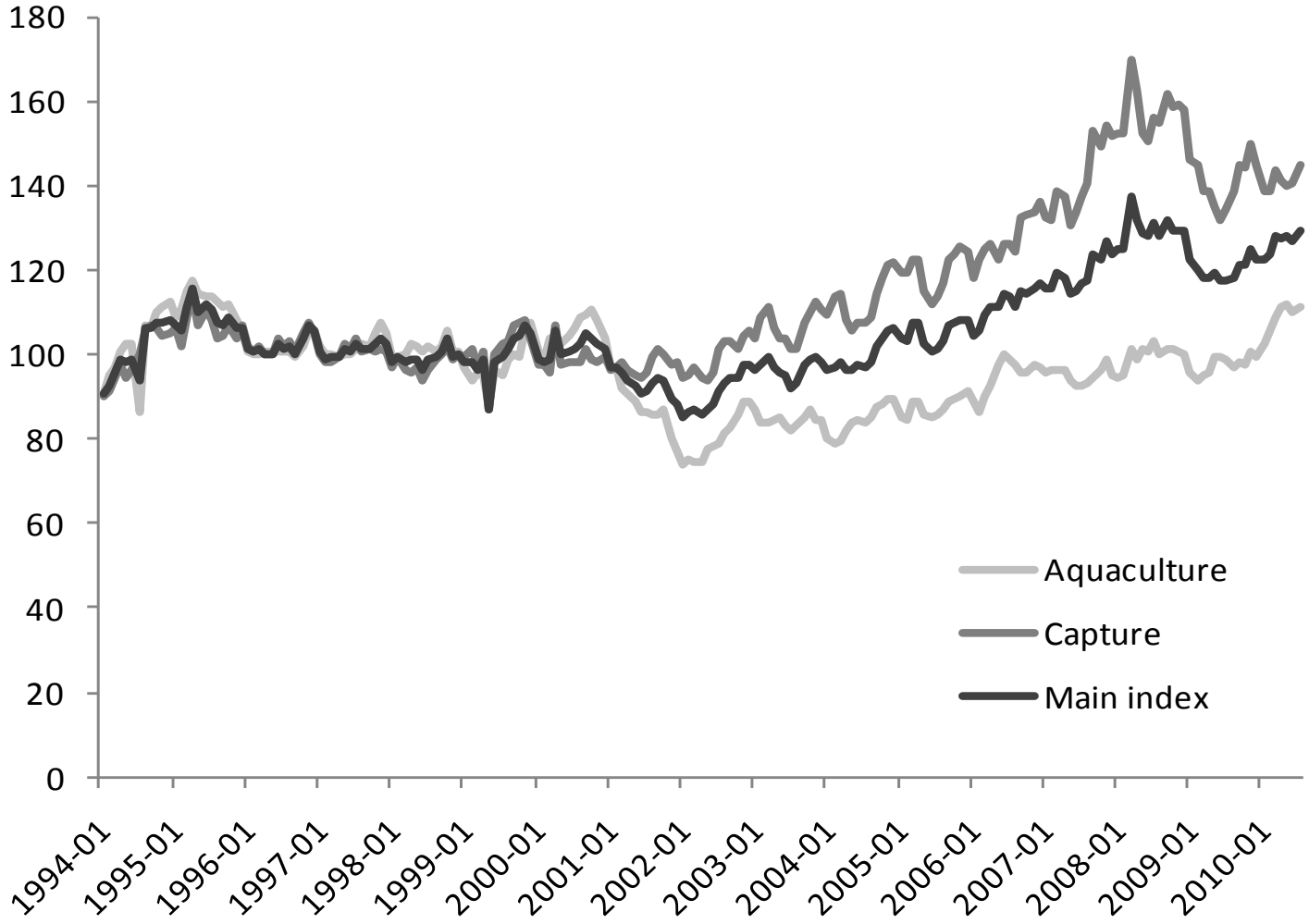
Asche, Bennear, Oglend, Smith *Marine Resource Economics* 2012

“Wild” Seafood Market Realities

- Supply
  - Increasing supply of imports from developing countries – questionable sustainability
  - Leveling out (possibly decreasing) of wild catches
- Growing Demand
- Market integration and segmentation
- Competition from aquaculture
- **Prices rising?**

Fish Price Index

(Stvetaras, Asche, Bellemare, Smith et al. PLOS One 2012)



Are we headed for Extremo World?

- Domestic Commercial Catch
  - Industrial-scale commodity whitefish
  - Industrial-scale small pelagics for fishmeal and fish oil (to feed aquaculture)
  - Limited shellfish harvests
- Farmed
  - Most seafood in the market, mostly imported
  - Continued technological innovations growing the market including proliferation of GMOs (Smith, Asche, Guttormsen, Wiener, *Science* 2010)
- Domestic Recreational Catch
  - Virtually all seafood currently in the market as commercial catch
  - Michael Pollan hunting his own food
- Imported wild seafood
  - Some tuna (where we've gotten a handle on illegal fishing)
  - Handful of boutique fisheries with effective governance

Trading off conservation and resource extraction

Marine Mammals and Fisheries

- Can do tradeoff analysis using bioeconomic models
- Example: Steller sea lions in Alaska and groundfish fisheries
  - Some area closures around sea lion rookeries due to concerns about competition for resources
- Example: Costs the California sea urchin fishery $45,000 (2000 Dollars) to add one sea otter (assuming competition from food resources Kaplan and Smith, *IIFET Proceedings* 2001

- Not the same as saying the non-market (passive use) value of the otter is $45K (could be higher or lower)

Concluding Remarks and Opinions

- Quantifying Total Economic Value allows managers to make tradeoffs explicit and transparent

- There are outstanding NOAA Fisheries economists in science centers, headquarters, and regional offices with expertise in all of what I have discussed

- Fishery managers have an ethical obligation to generate **economic value** from marine resources
  - Stewards of public trust resources
  - Spending taxpayer dollars that could stimulate other sectors of the economy
  - Incentivizing investment in fisheries that otherwise could be invested in other sectors of the economy

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