Institutional Structure and Profit Maximization in the Eastern Bering Sea Fishery for Alaska Pollock

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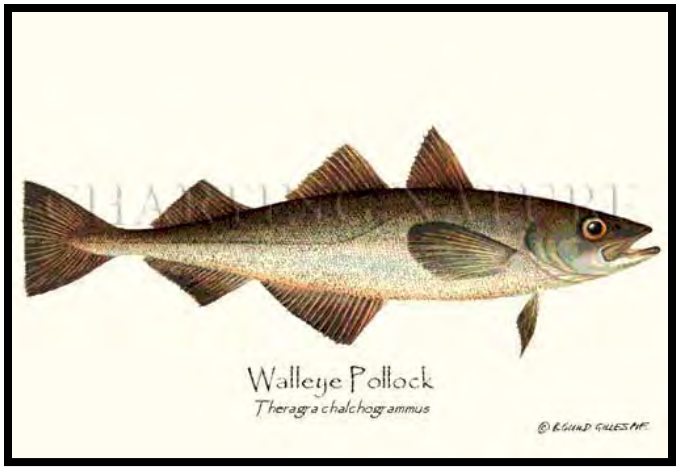
Background

- 1960's - Foreign fishing
- 1976 – Fishery Conservation and Management Act
- 1981 - Joint ventures
- 1985 - End of TALFF
- 1990 - End of joint ventures
- 1990s- Inshore/offshore battles
- 1998 – American Fisheries Act (AFA)

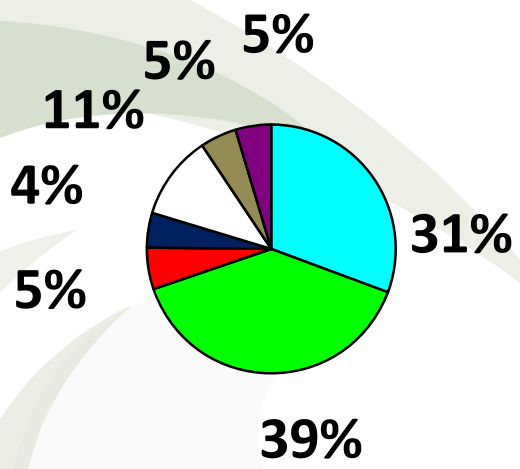
Background

- Pollock TAC apportionment
  - Split into A and B seasons
  - Allocated to sectors
    - Catcher processor
    - Mothership
    - Shoreside
    - Community Development Quota
- Shoreside sector left 37,991 metric tons, or 10.36%, unharvested in 2007 B season

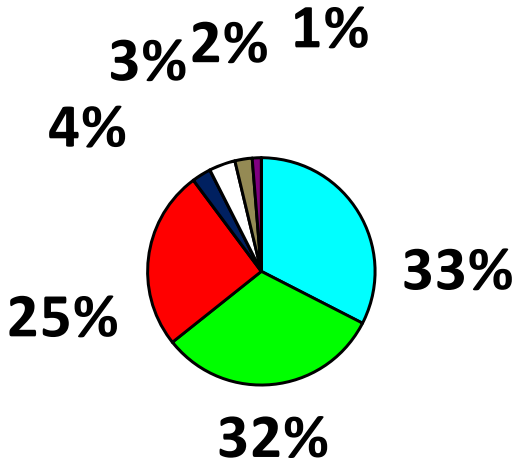


2000-2009 Alaska Pollock Production

Volume



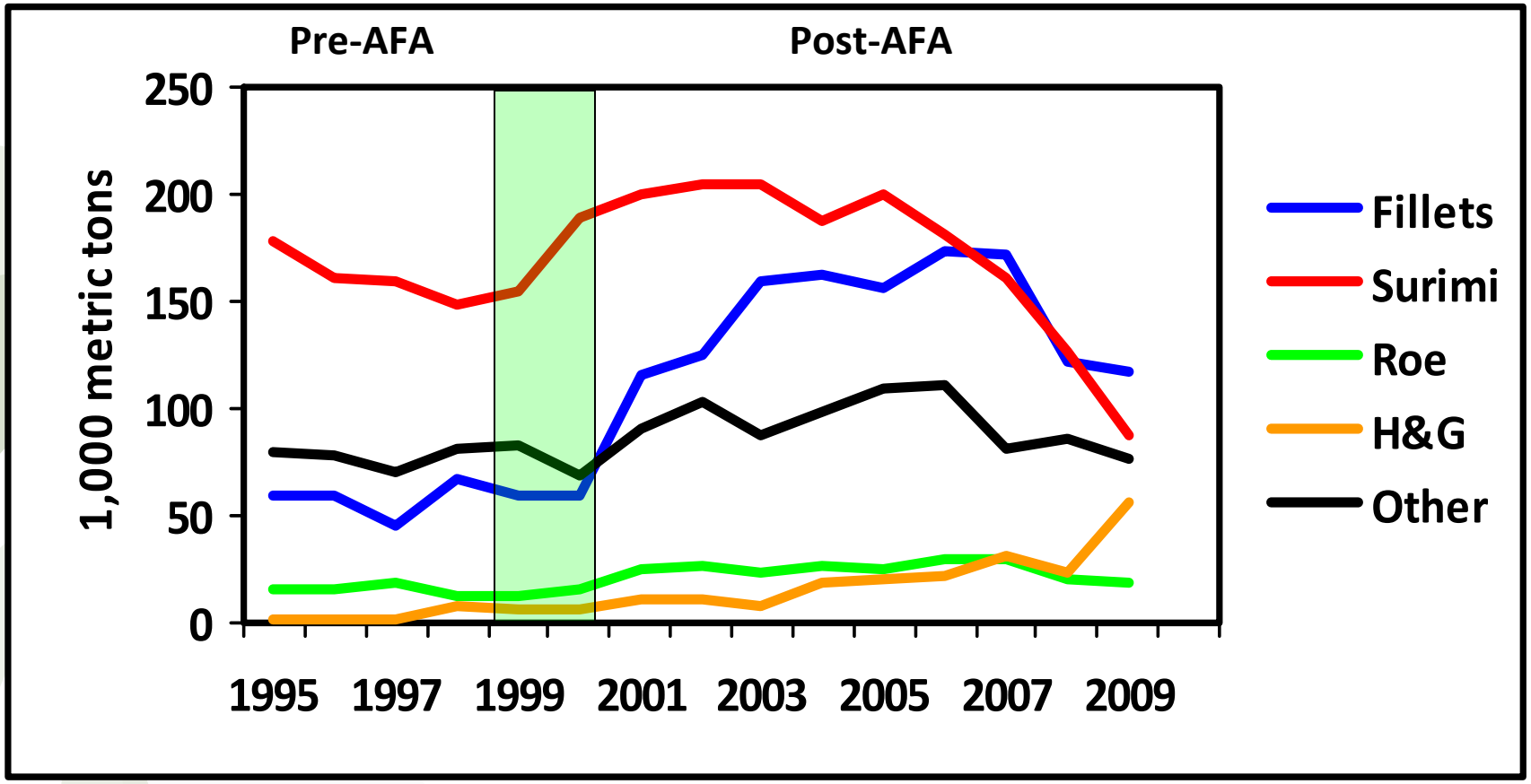
Value



Fillets Roe Minced fish Fish meal Surimi Head & gut Other products

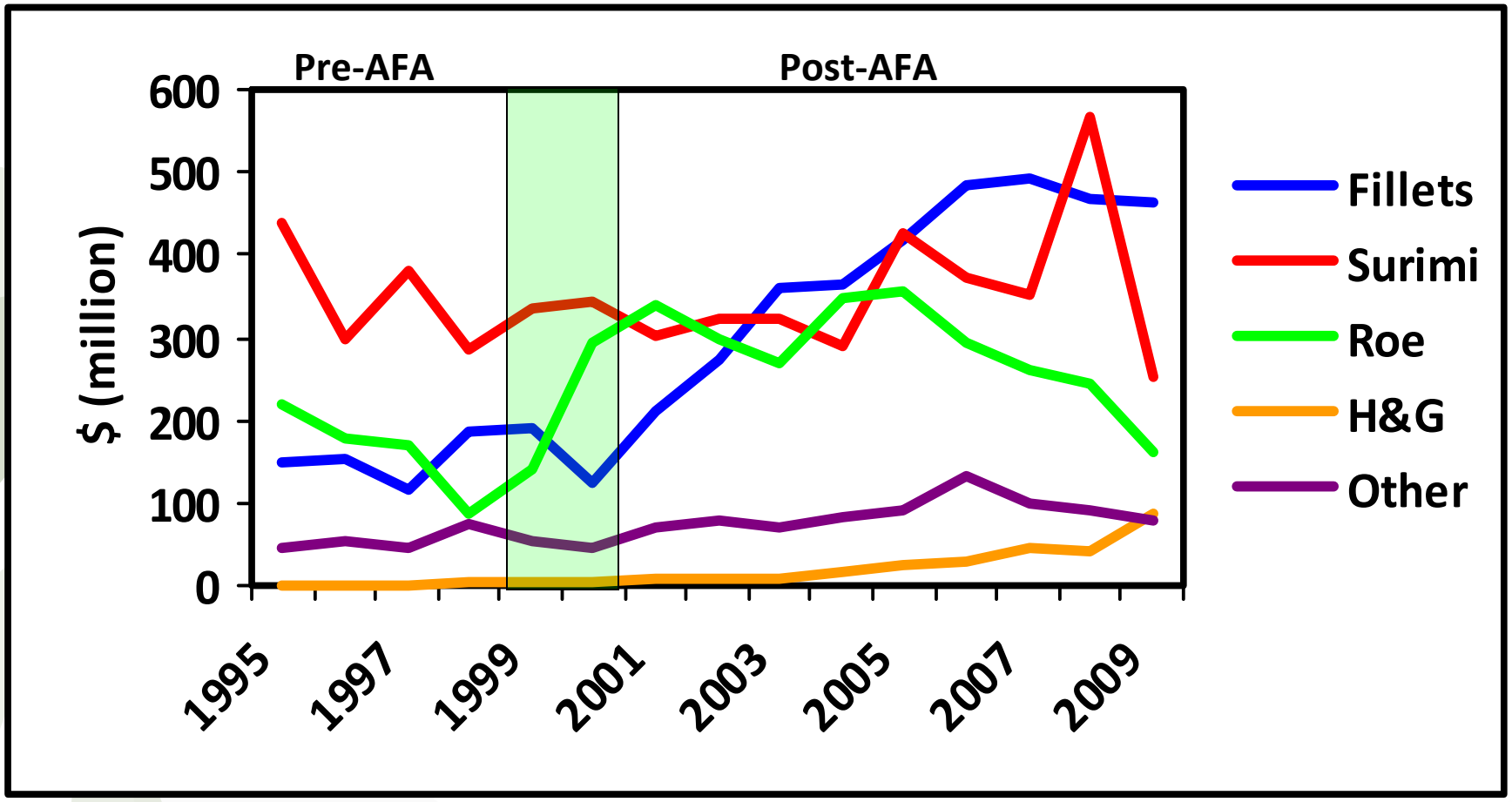
Source: National Oceanic and Atmospheric Administration

Alaska Pollock Product Quantities



Source: National Oceanic and Atmospheric Administration

Alaska Pollock Product Values



Source: National Oceanic and Atmospheric Administration

Fillet

- Markets
  - Europe
  - U.S.
- Products
  - Pin bone out (PBO)
  - Deep-skinned fillets
  - Individual quick frozen (IQF)
- Substitutes in the market
  - Other whitefish
  - Especially Russian pollock

Surimi

- Markets
  - Japan
  - U.S.
  - Europe
- Products
  - Primary, secondary, and recovery grades
- Substitutes for U.S. pollock surimi
  - Threadfin bream, lizard fish, big eye
  - Pacific whiting, hoki, blue whiting

Roe

- Markets
  - Japan
- Product
  - Skeins
  - Salted
  - Spicy
- Substitutes in the market
  - Russian pollock roe
  - Other roe

Operational Differences

- **At-sea sector can spend longer on fishing grounds**
- **At-sea produces higher grades of surimi and roe and comparable grades of fillets**
- **At-sea has consistently out-bid shoreside for CDQ pollock**

Statistical Model of Pollock Markets

- Four allocation (supply) equations
- Five inverse demand equations
- Monthly data from 2000-2008
- 27 exogenous variables
- 108 seasonal variables
- Jointly estimated using iterated 3 SLS

Model Performance

Equation	Variable	Coefficient of Variation	Correlation	Thiel Inequality Coefficient
1	U.S. fillet allocation	13.0%	0.98	0.10
2	European fillet allocation	47.0%	0.90	0.31
3	Japanese surimi allocation	32.3%	0.90	0.24
4	U.S. surimi allocation	34.6%	0.94	0.24
5	U.S. fillet demand	3.7%	0.94	0.03
6	EU fillet demand	8.0%	0.88	0.07
7	Japanese roe demand	23.2%	0.87	0.20
8	Japanese surimi demand	11.2%	0.90	0.10
9	U.S. surimi demand	26.2%	0.75	0.22
10	*Total revenue*	*14.2%*	*0.97*	*0.12*

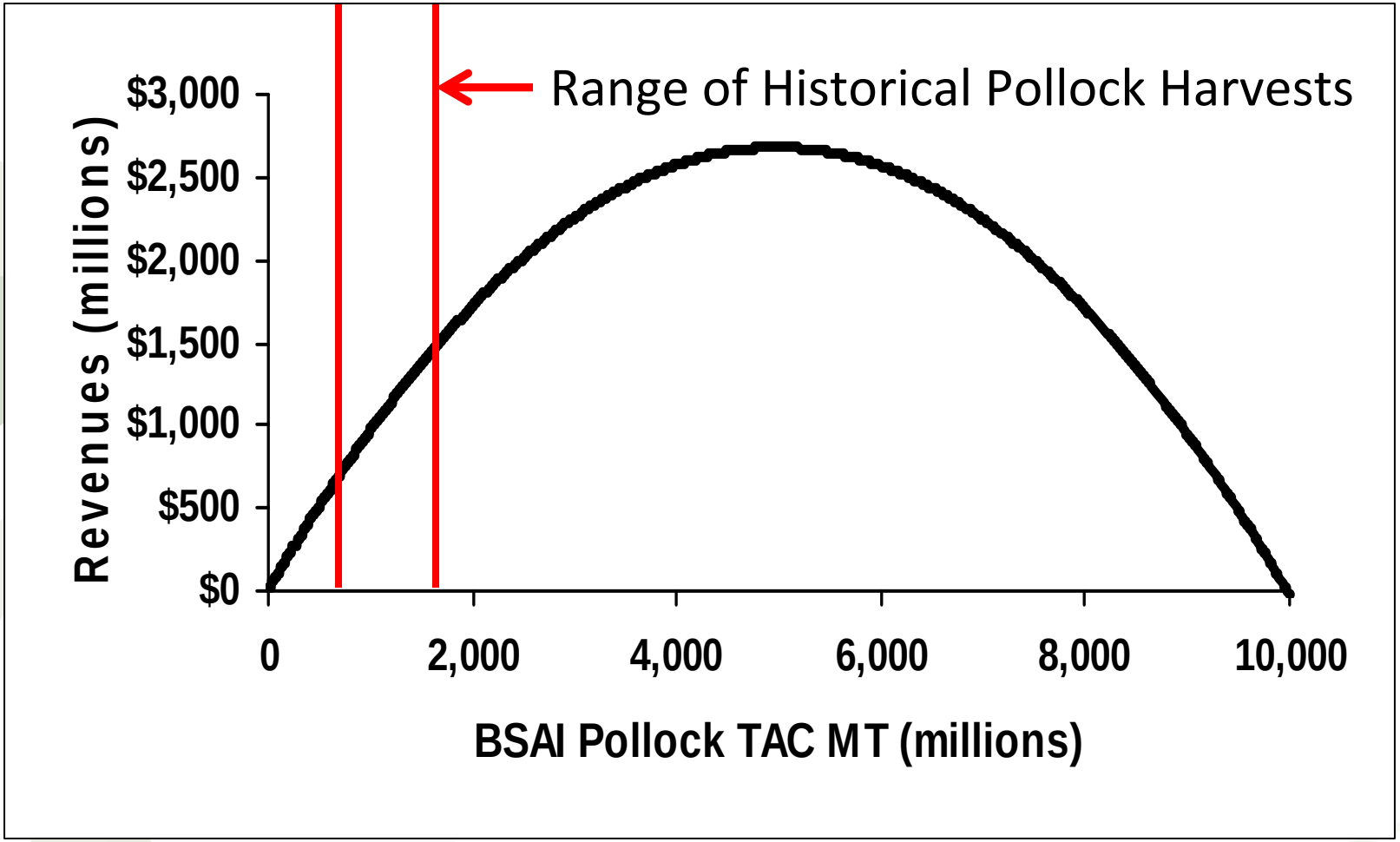
Comparative Static Simulation

- At-sea sector maintains operational advantages
- 2007 season
  - Recovery rates
  - Most recent year before financial crisis
- Allocation of pollock to flesh
- Scenarios
  - Variations in product prices
  - Rising fuel costs
- Performance measures
  - Revenue
  - Allocation of pollock meat to fillet and surimi

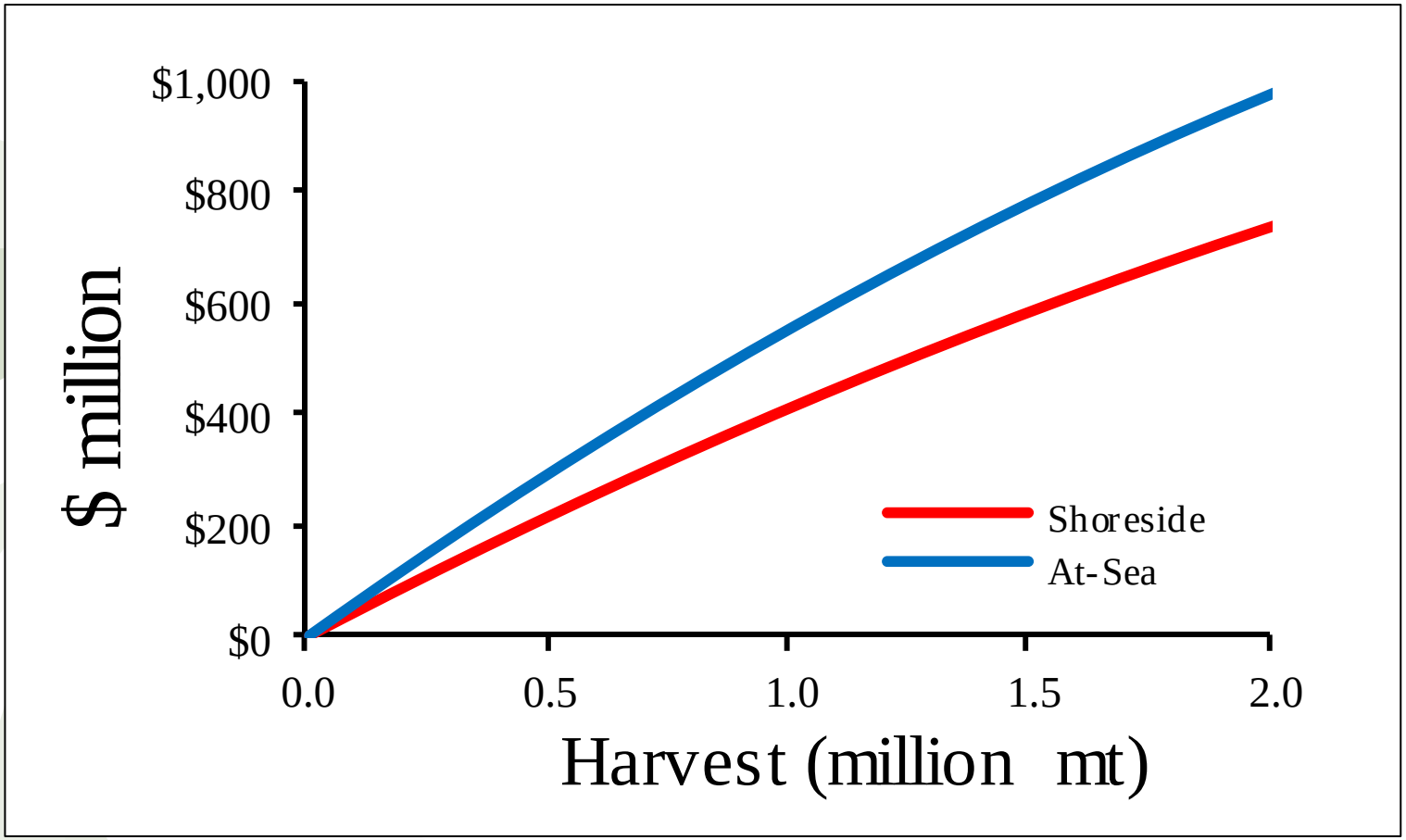
Results

- European and U.S. fillet allocation
  - More sensitive to changes in at-sea production
- Japanese surimi allocation dependent on fillet price
- European pollock prices moved in response to imports of Russian pollock
- Surimi indicated behavior consistent with an inferior good
- Japanese roe prices highly sensitive to changes in Japanese inventories

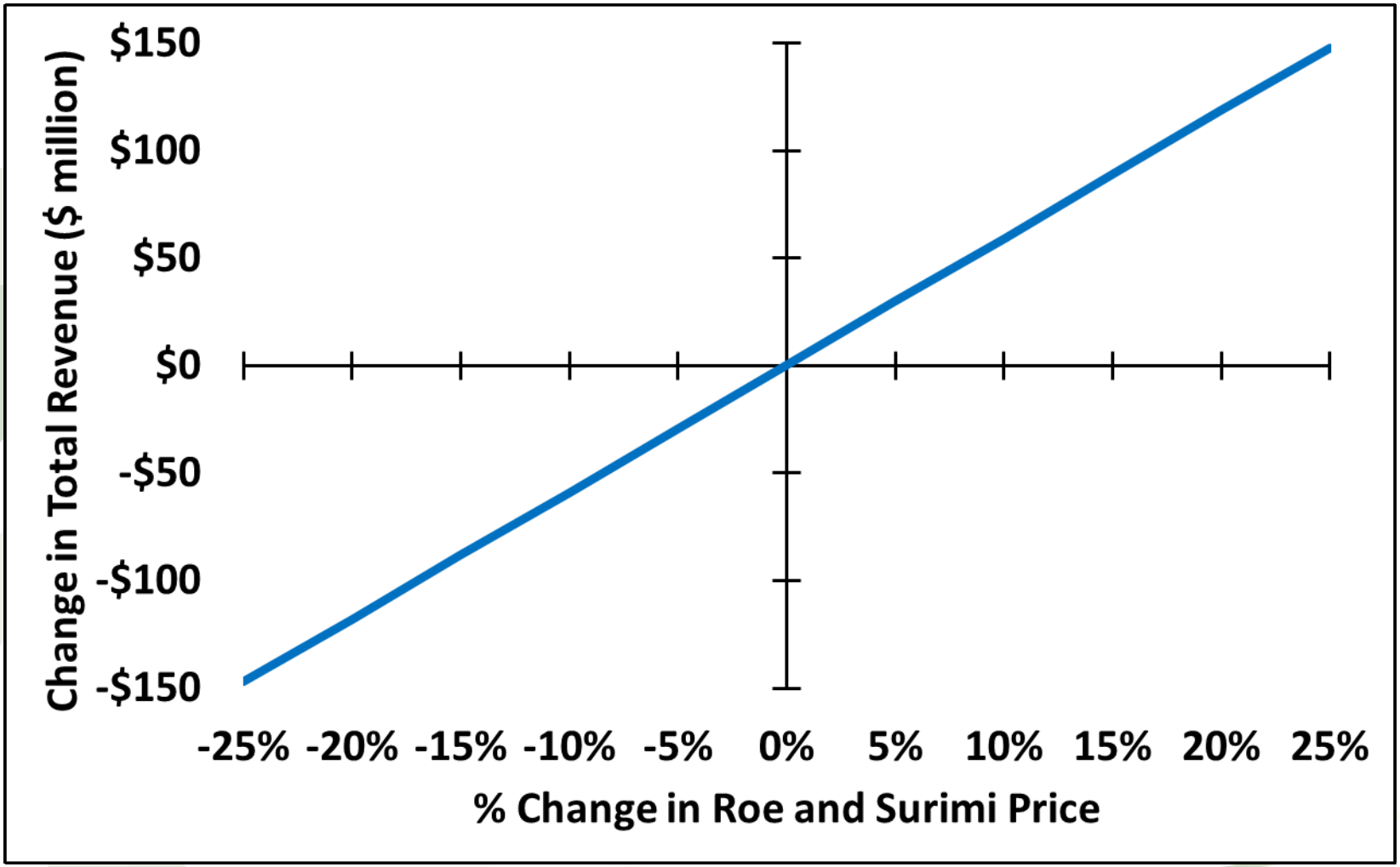
Pollock Revenue Curve



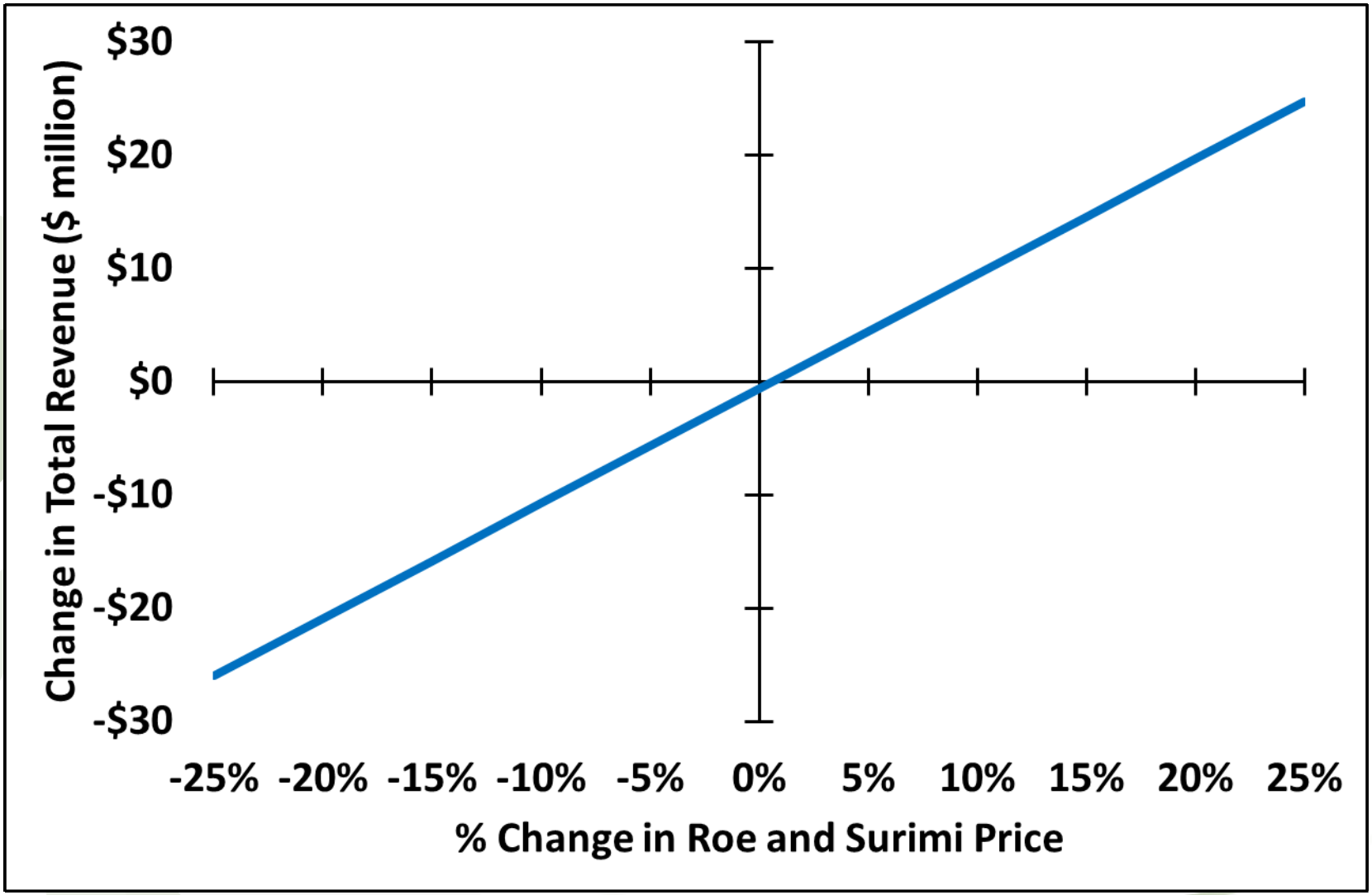
Sector Revenue Curves



Change in Total Revenues



Potential Shoreside B Season Loss



Discussion

- **Increasing costs of production**
  - **Growing input prices**
  - **Increased travel distances**
- **Macroeconomic factors**
  - **Exchange rates**
  - **Interest rates**
- **Value of product**
  - **Substitutes**
  - **Consumer preferences**

Conclusion

- Overall fishery revenues are maximized when harvests are fully utilized
- In the future, if costs increase relative to prices, there is a possibility that portions of the TAC will go unharvested
- Changing the AFA to allow leasing of quota shares between sectors would reduce the likelihood that underharvesting would occur

Acknowledgements

- Saltonstall-Kennedy Grant Program
- North Pacific Research Board
- University of Alaska Fairbanks
- Major Advisor
  - Dr. Keith Criddle
- Committee Members
  - Dr. Gordon Kruse
  - Dr. Milo Adkison