

Tuna Price in Relation to Economic Factors and Sea Surface Temperature

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Acknowledgments

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Previous Studies on Tuna Price in Hawaii Market

- McConnell, et. al. 1998
 - ◆ Fish quality (grade) vs. price
 - ◆ Evaluate price on the basis of the grade of fish, not on a species basis
- Bartram, et. al. 1996
 - ◆ Fish grading vs. pricing
 - ◆ Graded based on species, size, body defects, & muscle quality
 - ◆ Price varied by species and grade

Previous Studies on Tuna Price in Hawaii Market (cont'd)

■ Pooley, 1991

- ◆ Yellowfin price (monthly) vs. landings
- ◆ Correlation w/ landings insignificant
- ◆ Suggested to use weekly data & evaluate substitutive effect

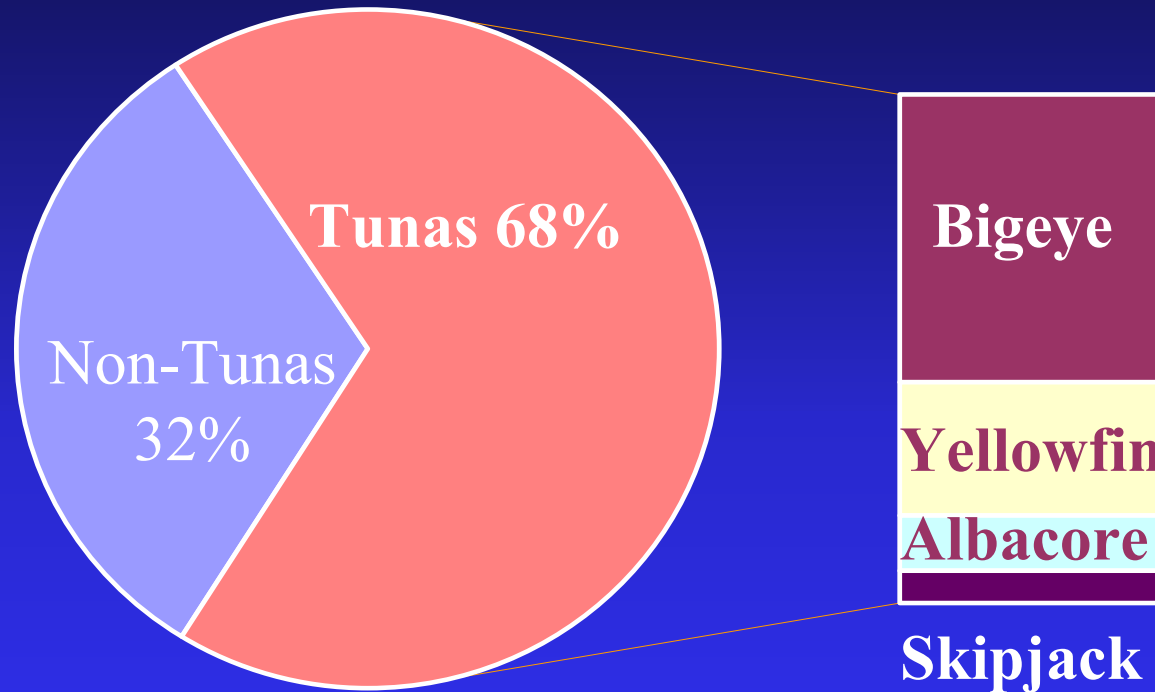
■ Pooley, 1990

- ◆ Pelagic price (weekly) vs. landings
- ◆ Tuna price correlation w/ landings is weak

Objective of the Current Study

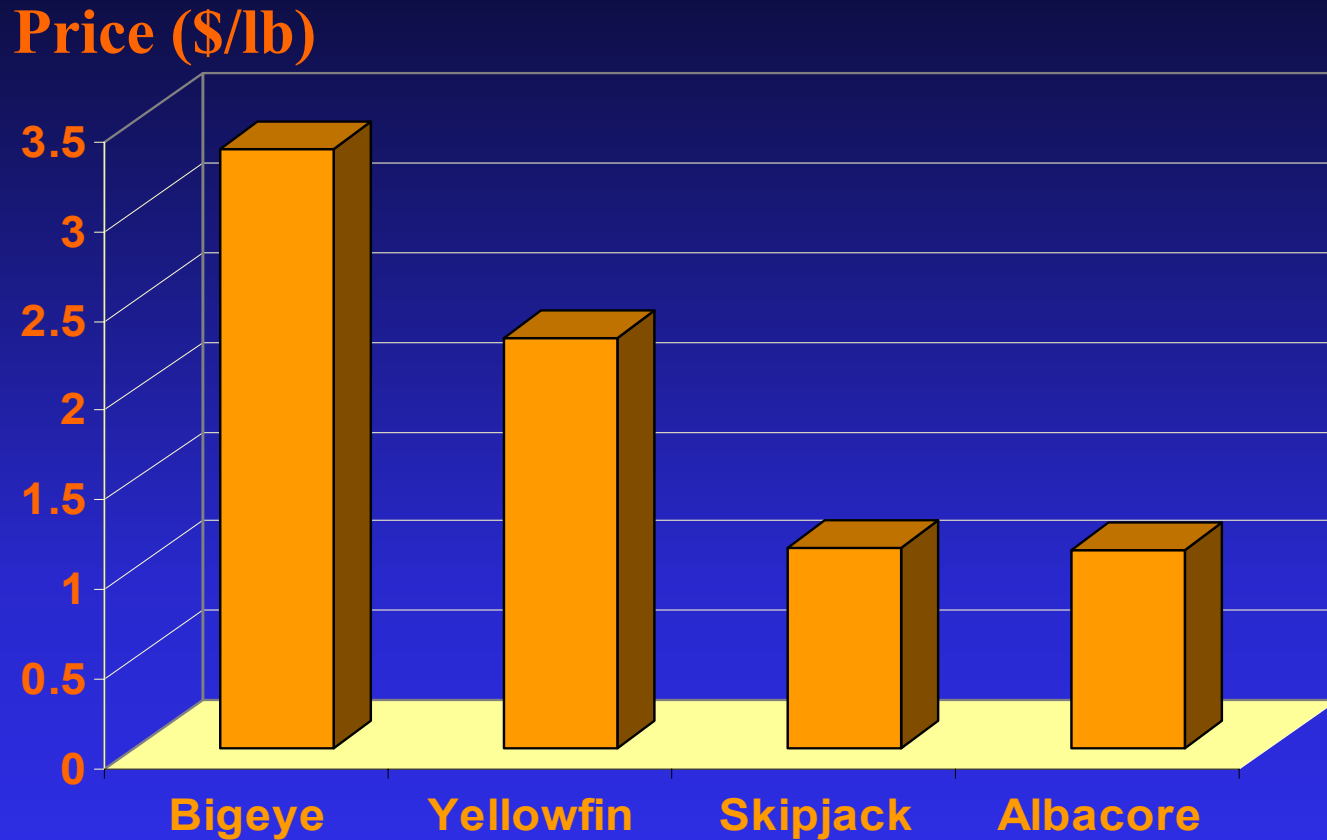
- Evaluate the main factors that affected seasonal variation of tuna price for individual species
 - ◆ Weekly price
 - ◆ Landings
 - ◆ Substitutes
 - ◆ Seasonal demand (holidays)
 - ◆ Quality change caused by oceanographic factors

Tuna production & Revenue Composition



Total Commercial Revenue of Hawaii Fisheries in 2001
\$48.5 million

Price Variation by Species



Annual Average Price by Species in Hawaii Market, 2001

Market Preference vs. Price

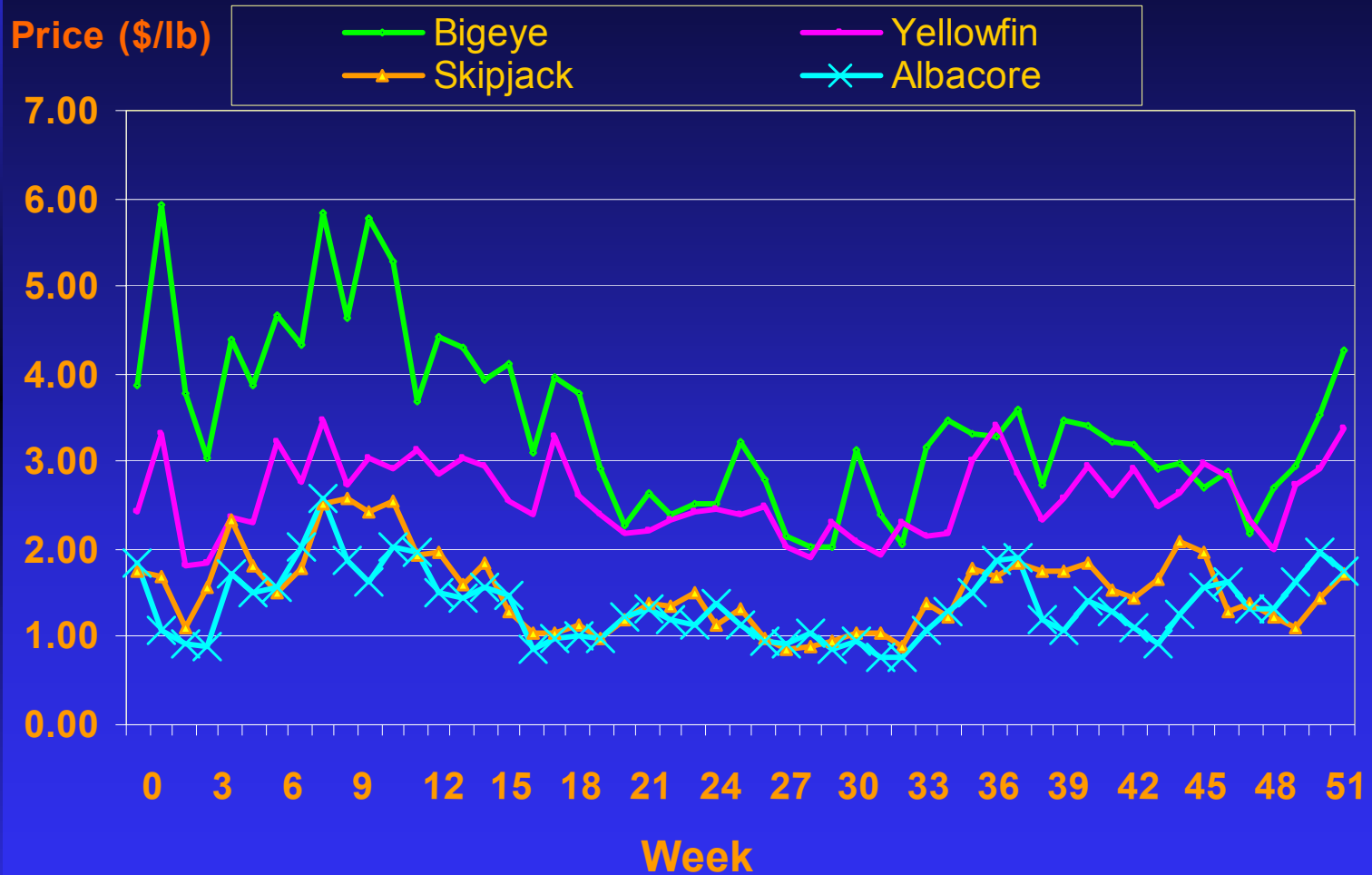
- Market preference toward fresh tuna in Hawaii market

Bigeye > yellowfin > albacore/skipjack

- World market price (mainly cannery)

Albacore > yellowfin > bigeye > skipjack

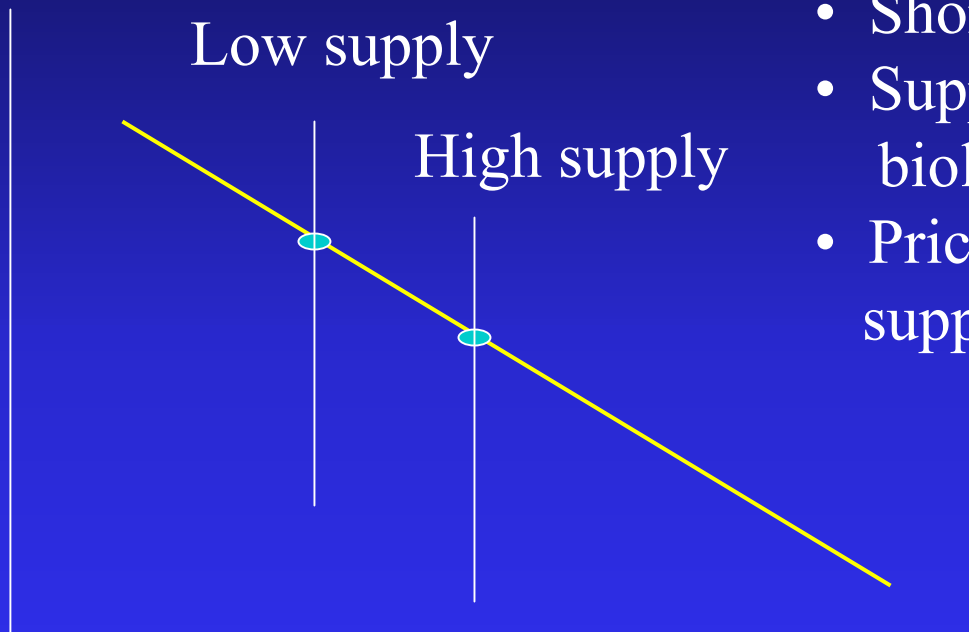
Tuna Price Variation by Season



Weekly Tuna Prices in Hawaii Market, 1996

Short-term Demand of Fresh Fish

Price



Seasonal variation

- Short shelf life
- Supply depends on biological availability
- Price goes down as supply increases

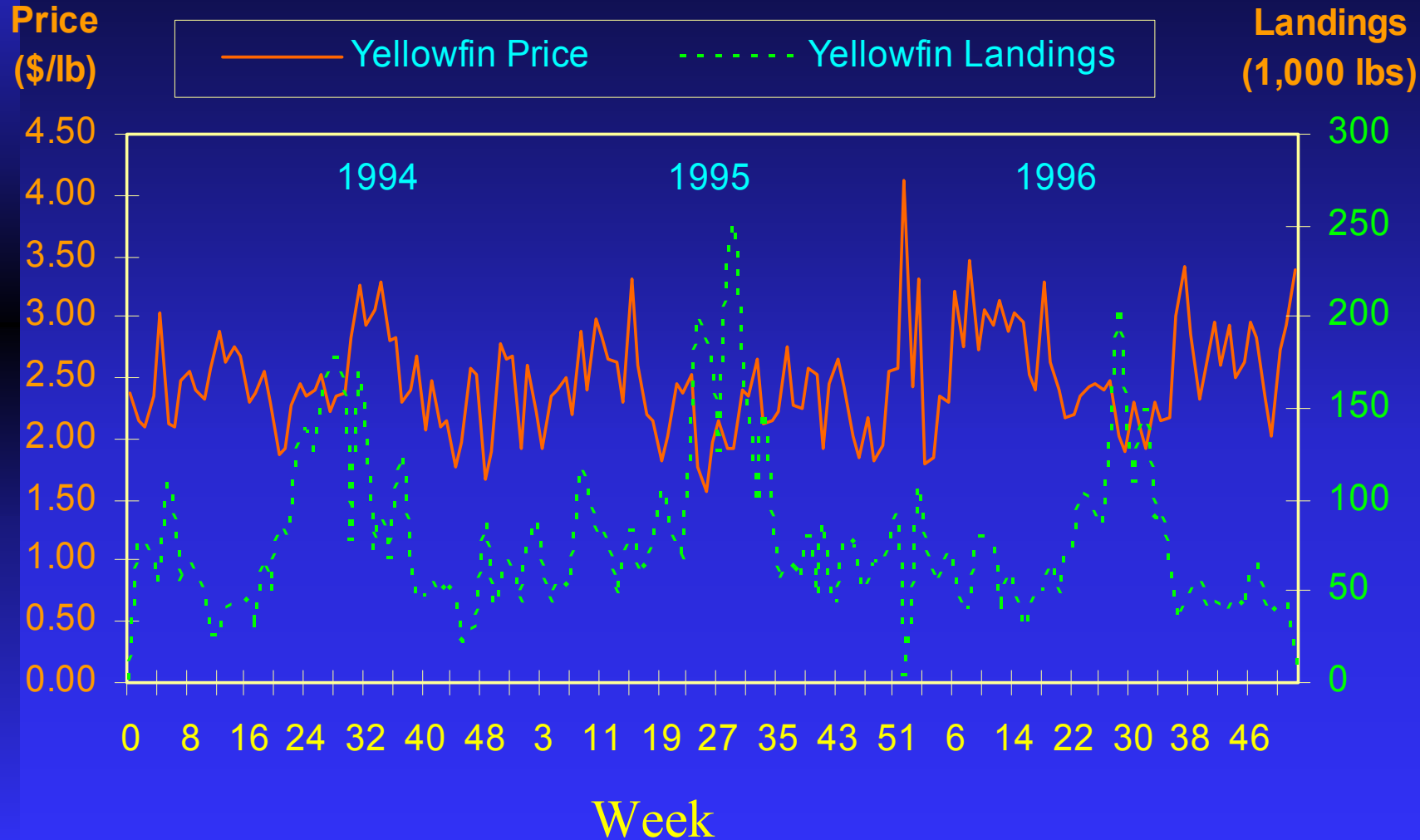
Quantity

Price-dependent Equation

- Commonly used in estimating demand of agricultural products where price and quantity is determined recursively
- Fishermen may not be able to change supply in response to price change in short-term
- Price is dependent variable

Price = f (Supply, Substitutes, Lagged price, Seasonal demand)

Yellowfin Landings and Price, 1994-1996



Estimated Price Dependent Equation - Yellowfin

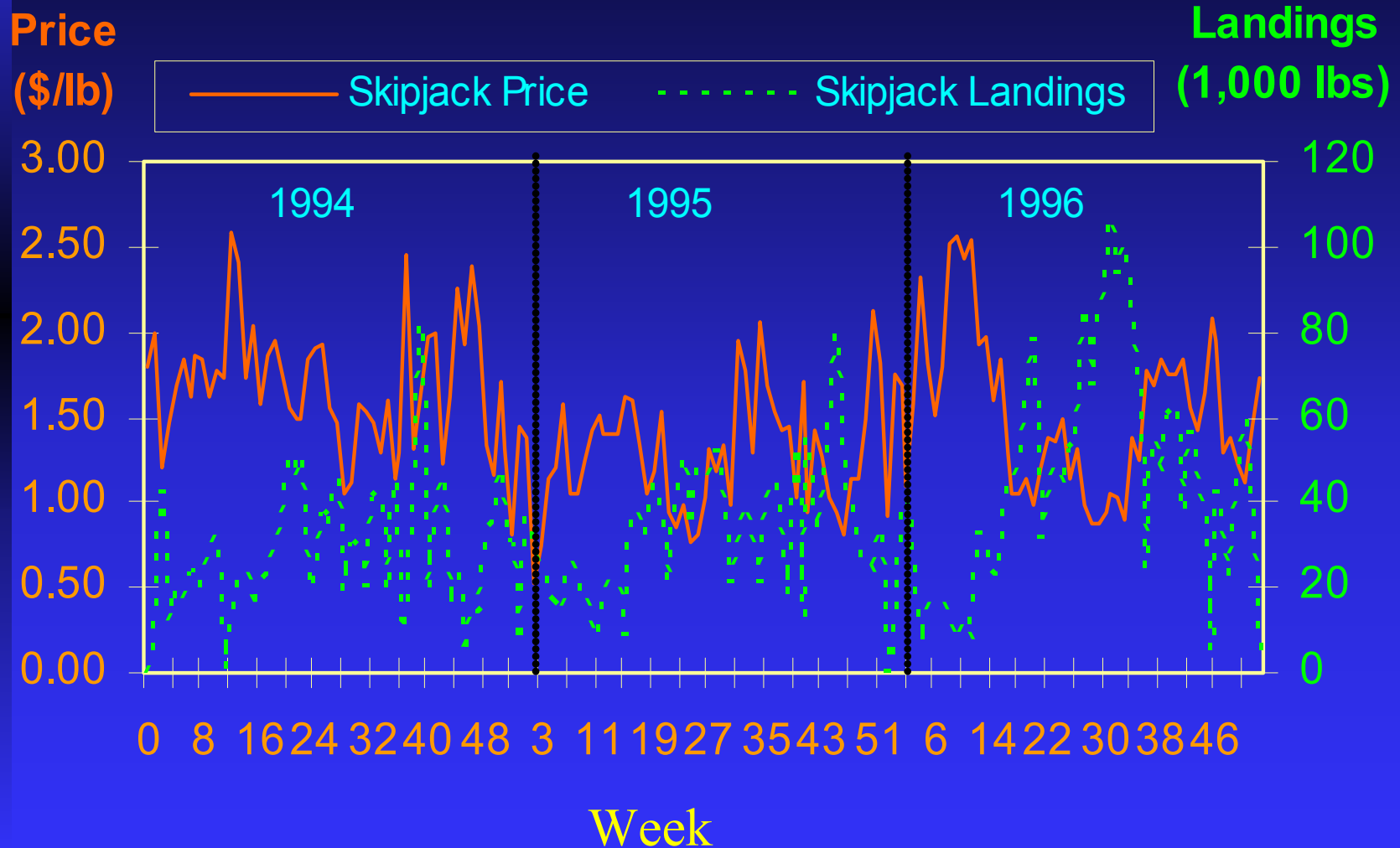
	Coefficient	t - statistic
Constant	2.140	9.81*
Landings of yellowfin	- 0.003	- 3.60*
Landings of bigeye	- 0.002	- 2.18*
Landings of skipjack	- 0.003	- 3.50*
One-week lagged price	0.308	3.33*
Holiday Dummy	0.346	4.37*

* 5% significance level

R² adjusted: 0.30

Observations: 158 (1994-1996 weekly data)

Skipjack Landings and Price, 1994-1996



Estimated Price Dependent Equation - Skipjack

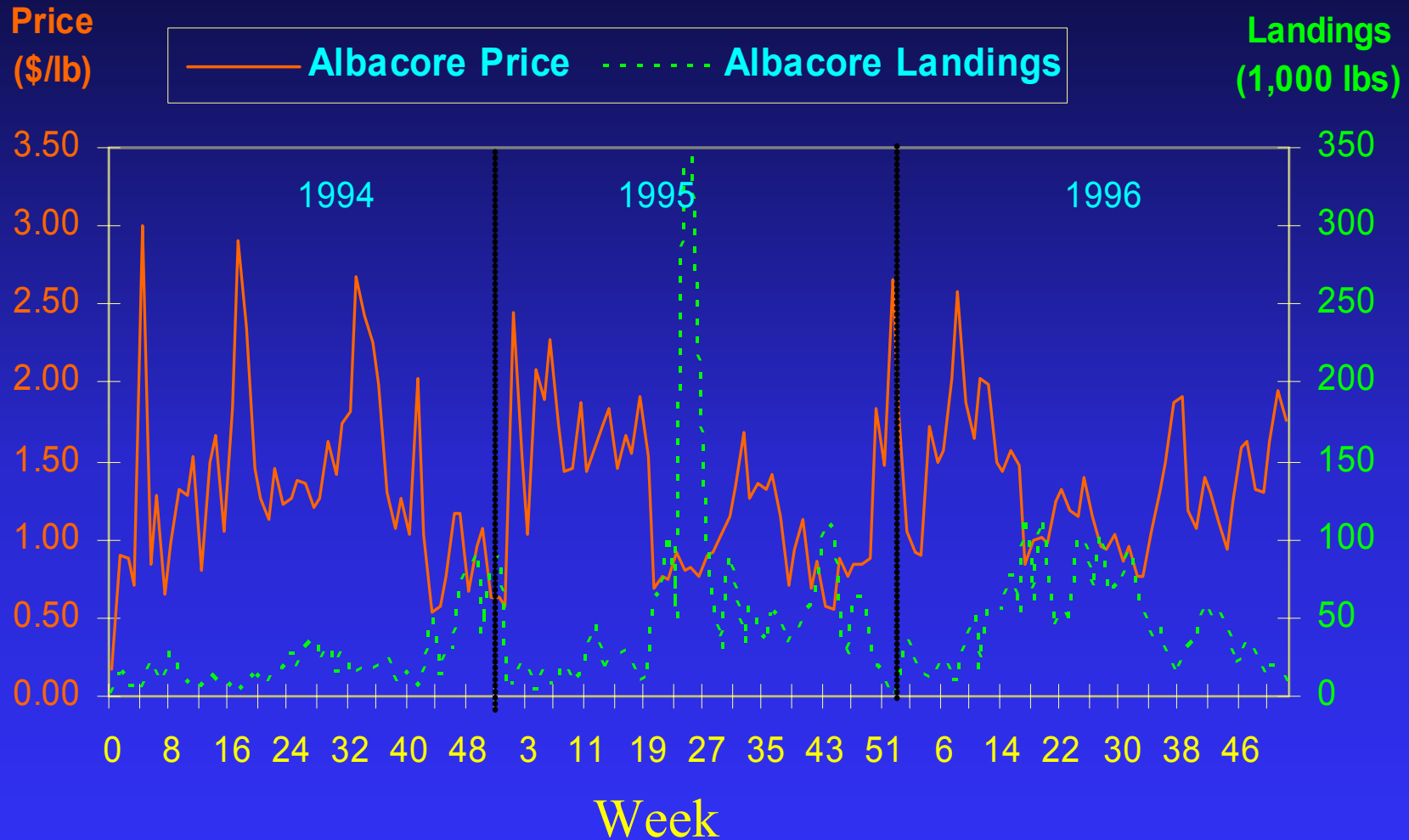
	Coefficient	t - statistic
Constant	1.326	9.48*
Landings of skipjack	- 0.007	- 5.13*
Landings of ahi (bigeye & yellowfin)	- 0.001	- 3.09*
Landings of albacore	- 0.001	- 1.74
One-week lagged price	0.429	6.69*

* indicates 5% significance level

R² adjusted: 0.36

Observations: 158 (1994-1996 weekly data)

Albacore Landings and Price, 1994-1996



Estimated Price Dependent Equation - Albacore

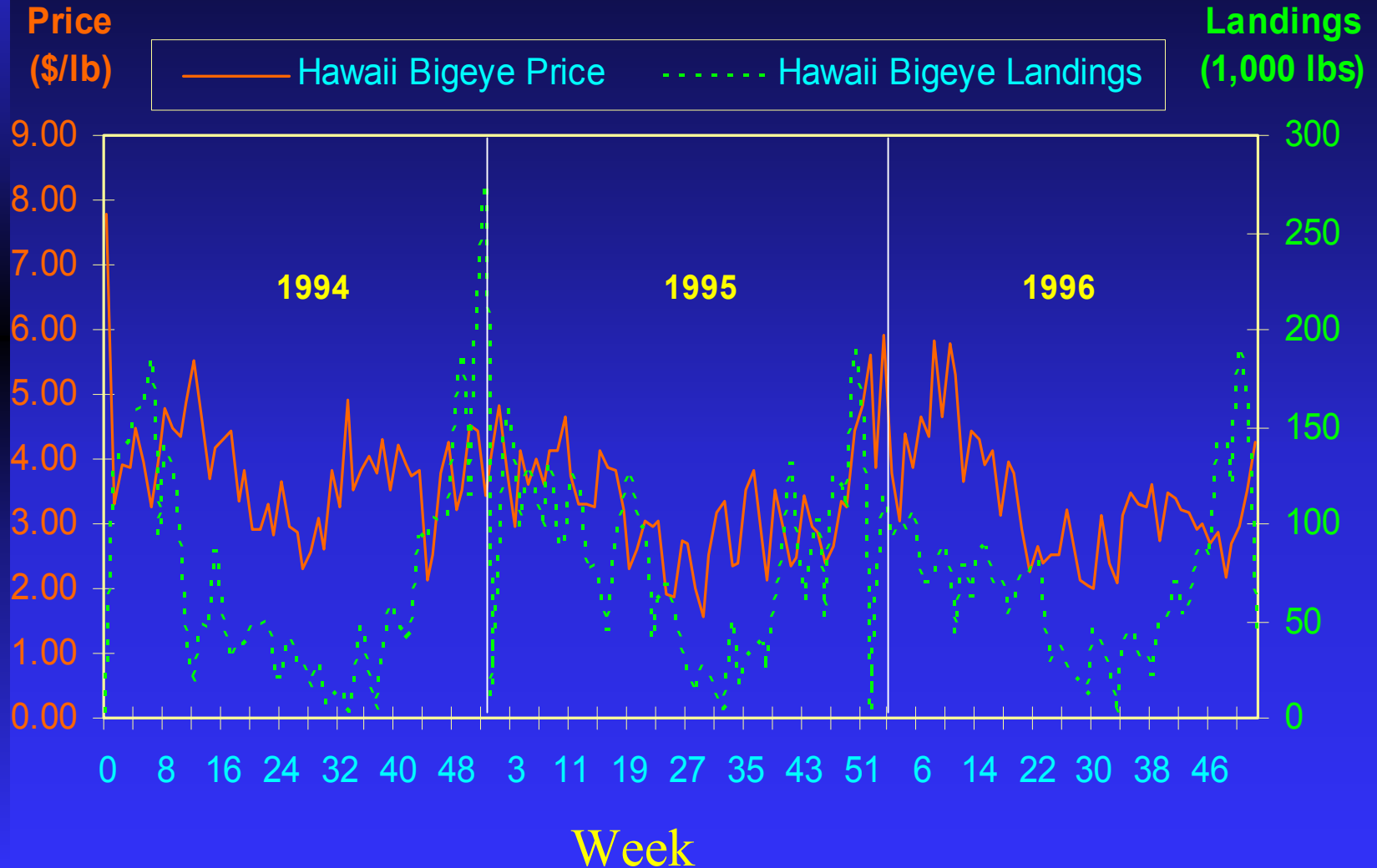
	Coefficient	t - statistic
Constant	1.18	7.55*
Landings of albacore	- 0.002	- 2.96*
Landings of Ahi (bigeye & yellowfin)	- 0.001	- 2.07*
Landings of skipjack	- 0.003	- 1.78
One-week lagged price	0.429	5.97*

* indicates 5% significance level

R² adjusted: 0.49

Observations: 158 (1994-1996 weekly data)

Bigeye Price and Landings, 1994-1996



Estimated Price Dependent Equation - Bigeye

	Coefficient	t - statistic
Constant	8.646	5.60*
Landings of bigeye	- 0.004	- 3.18*
Landings of yellowfin	- 0.007	- 4.47*
Landings of skipjack	- 0.006	- 1.98*
One-week lagged price	0.277	4.24*
Holiday dummy	0.560	3.04*
Sea surface temperature (°F)	- 0.209	- 3.74*

* indicates 5% significance level

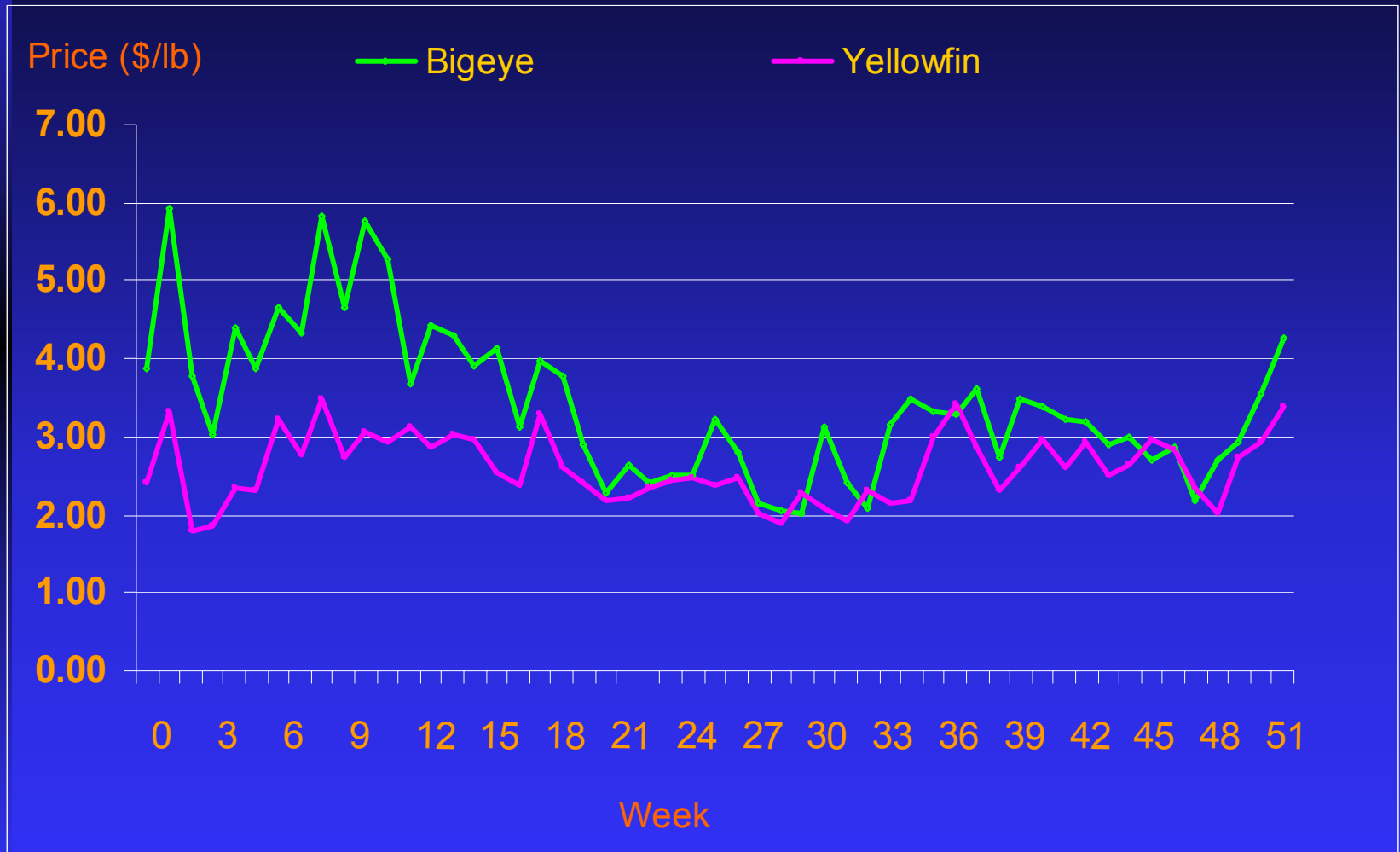
R² adjusted: 0.50

Observations: 158 (1994-1996 weekly data)

Summary

- Price fluctuation is related to a series of seasonal variables, such as landings and holiday demand;
- Each tuna species appeared to have its unique price dependant equation;

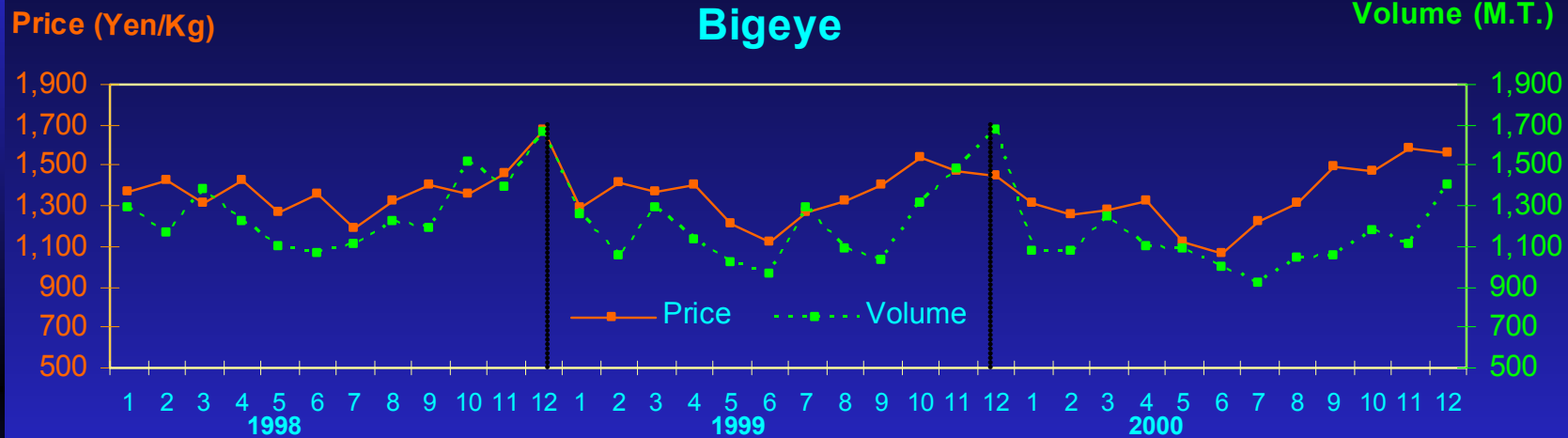
Weekly Bigeye and Yellowfin Price, 1996



Summary

- Price fluctuation is related to a series of seasonal variables, such as landings and holiday demand;
- Each tuna species appeared to have its unique price dependant equation;
- Substitutive effect between yellowfin & bigeye is stronger than that between albacore & skipjack;
- Holiday demand may lead to higher price on more preferable tunas (like bigeye and yellowfin), but unlikely affect price of skipjack and albacore;
- **Bigeye price strongly correlates to seasonal change in sea temperature.**

Monthly Wholesale Price in Japan 10 Major Wholesale Markets, 1998-2000



Question.....

- Further research