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Fish as a heterogeneous product.

Decomposing the price of fish

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Introduction

Fishing is an economic activity aimed at satisfying the whishes of consumers to consume fish.

Fish is heterogeneous with a number of attributes

Consumers have preferences for attributes and the value of fish is to a large extent determined by its attributes.

Freshness - a valuable attribute

The value of fish

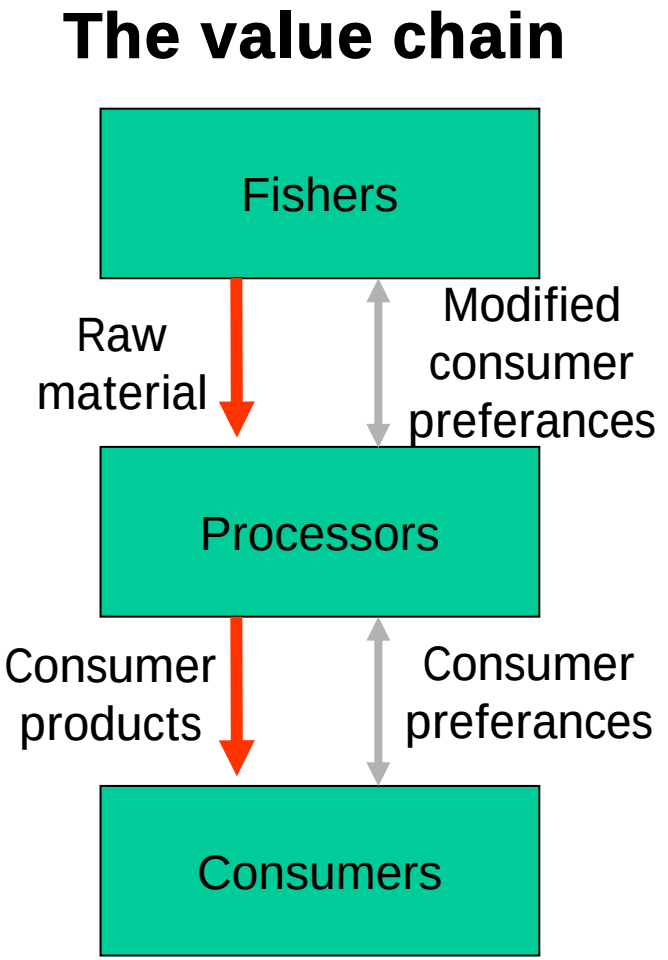
What determines the value of fish?

- consumer preferences
  - species, freshness, size, color…
- properties affecting processing
  - size, firmness…

Demands flow of information from consumers and processors to fishermen

The value chain

In theory the market pricing mechanism should pass on information up the value chain from consumers, trough processors to primary producers.



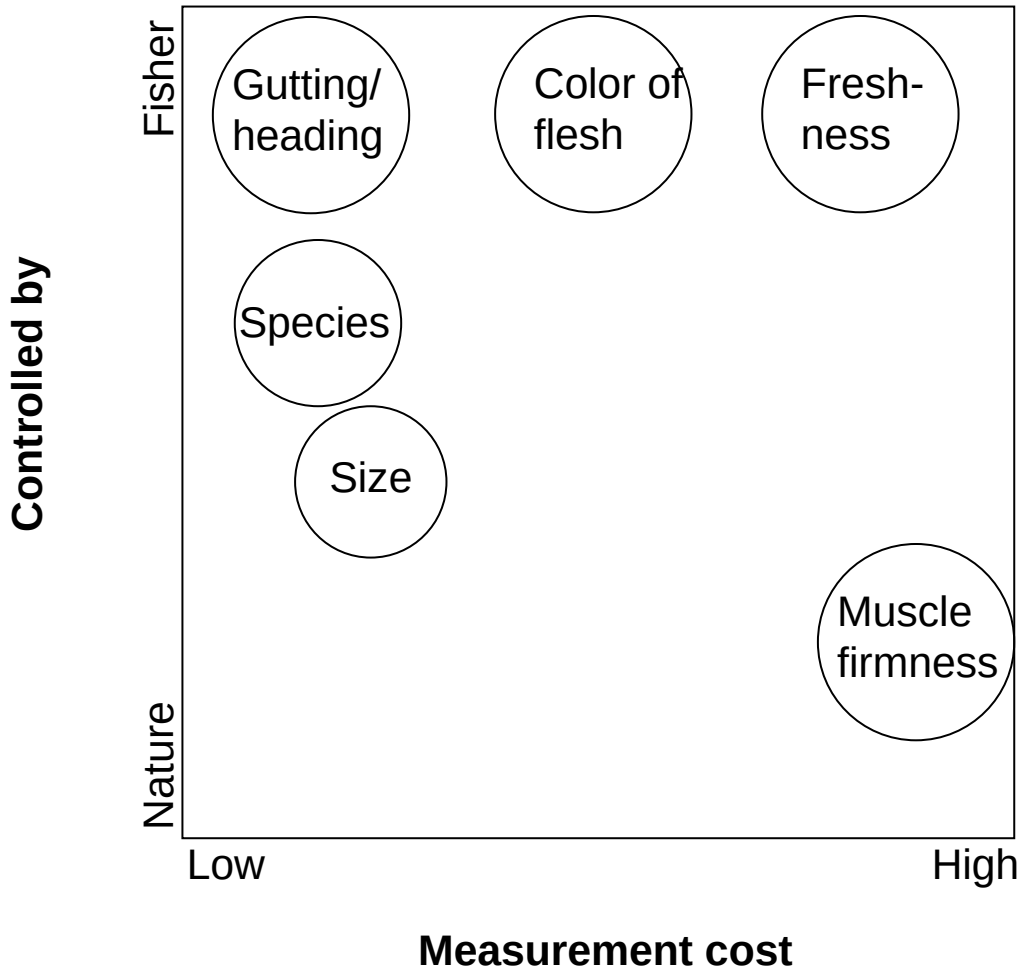
Problems associated with fish attributes

- Market failure due to information asymmetry
  - used car syndrome => a market for lemons
- Incentives to affect catch attributes
  - attempts to limit catch to most valuable individuals
  - attempts to limit landings to most valuable individuals - highgrading

First problem - information asymmetry

- Inaccurate description of attributes and costly confirmation of quality lead to an information asymmetry in the market.
  - The fisher knows more about the attributes of the fish than the buyer
- Information asymmetry increases the quantity of low-quality goods sold at the expense of high quality goods.
  - Low quality producers are able to take advantage of lower production cost

Types of attributes



Second problem – supply of attributes

- Especially concerns size
- Targeting by gear or location choice
  - Non-targeted individuals have increased probability of reaching sexual maturity
    - => breeding for a smaller fish
    - – rents from the whole fishery reduce
- Highgrading by discarding less valuable catch
  - – mortality of discarded fish high so no effects on mortality rate
  - – rents lost in non landed catch + data fouling

Case study – Icelandic fish auctions

- Auctions started in 1987
- Sell about 100.000 tons each year
- Value about 14 billion ISK
- Locations around Iceland but one central auction on the internet

Registered attributes

Size class

Gutting

Storage class

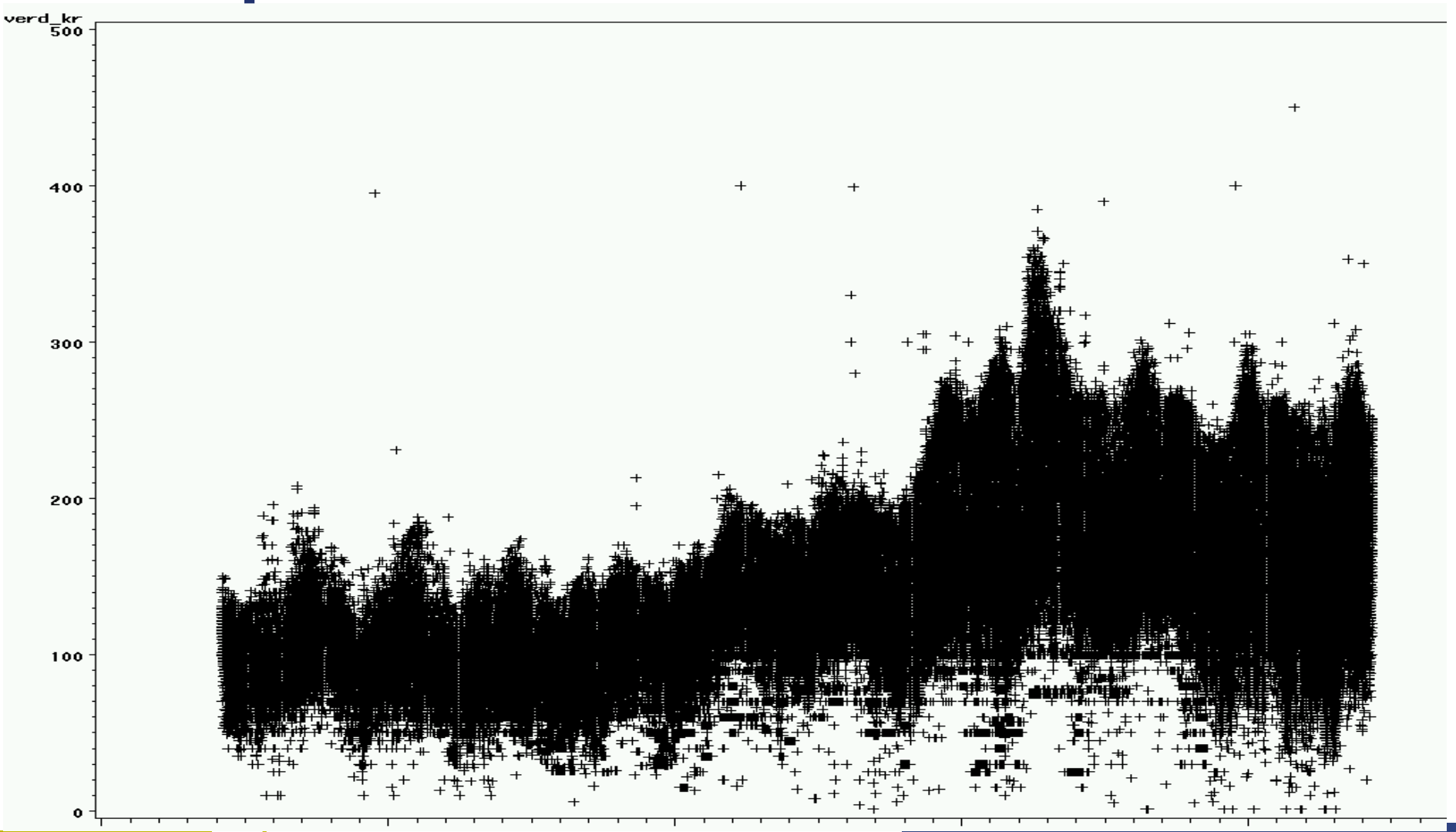
Gutting and/or storage method

Vessel

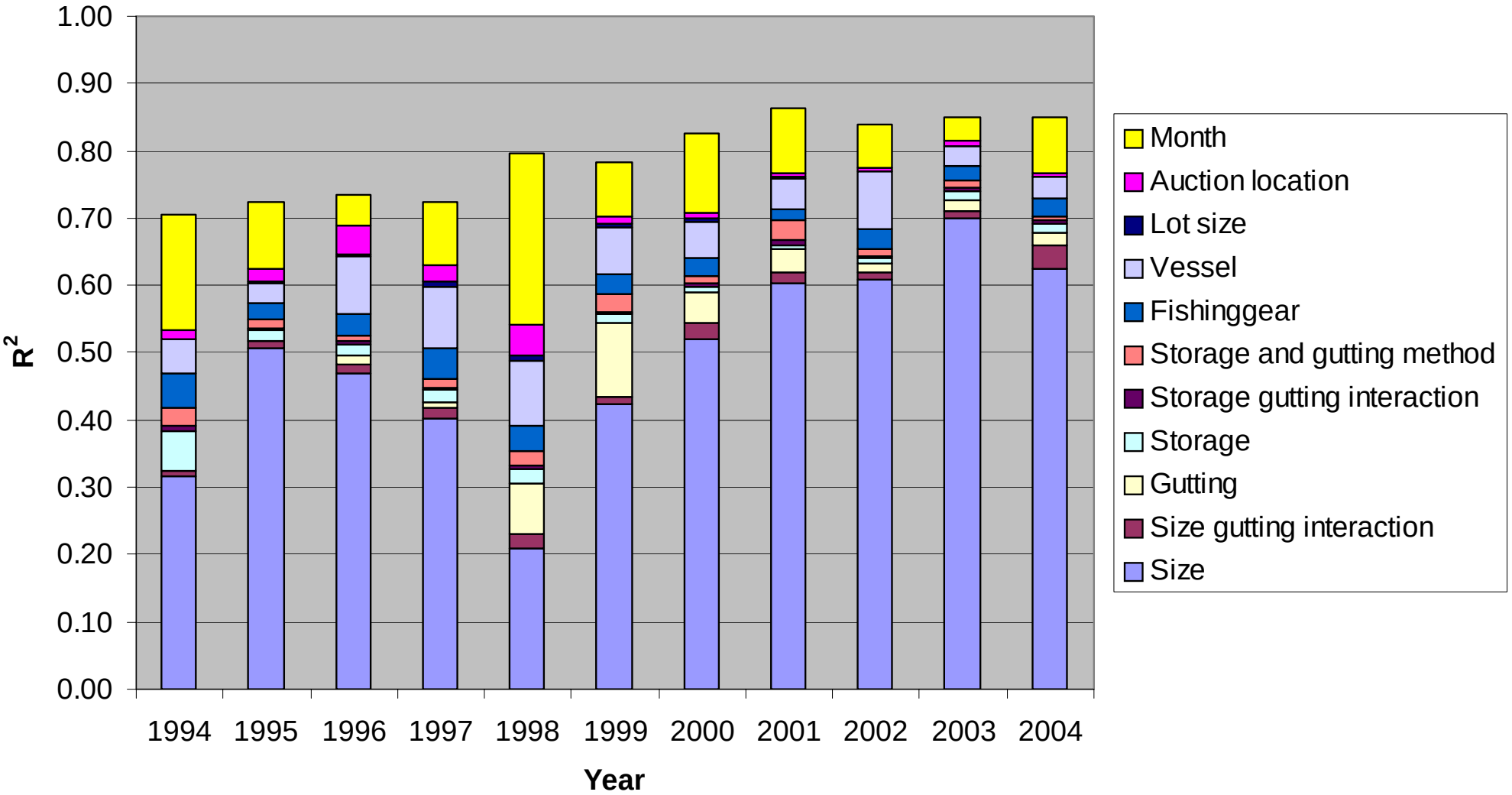
Location

Lot size

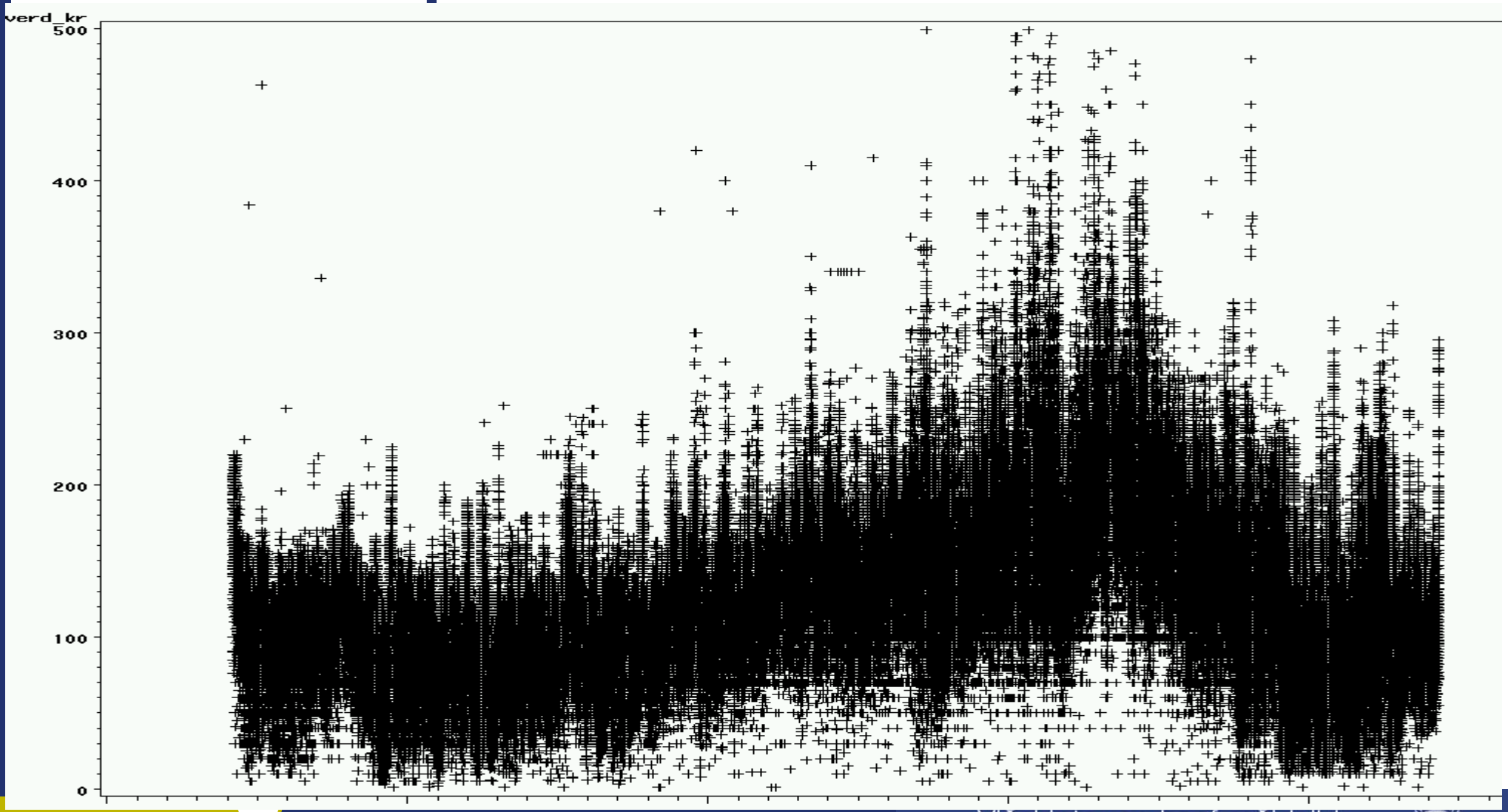
Cod price in the auctions 1994-2005



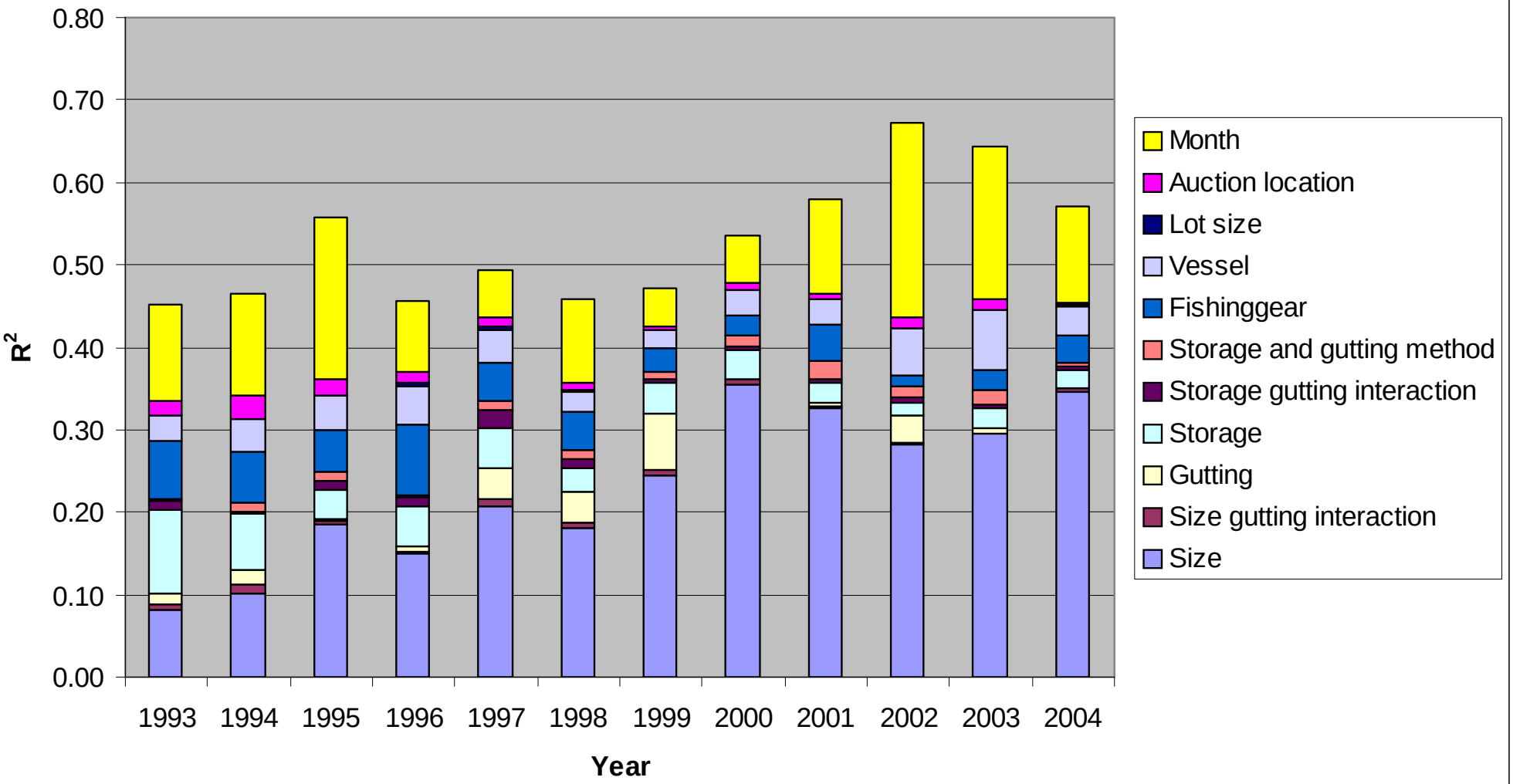
Factors explaining cod price



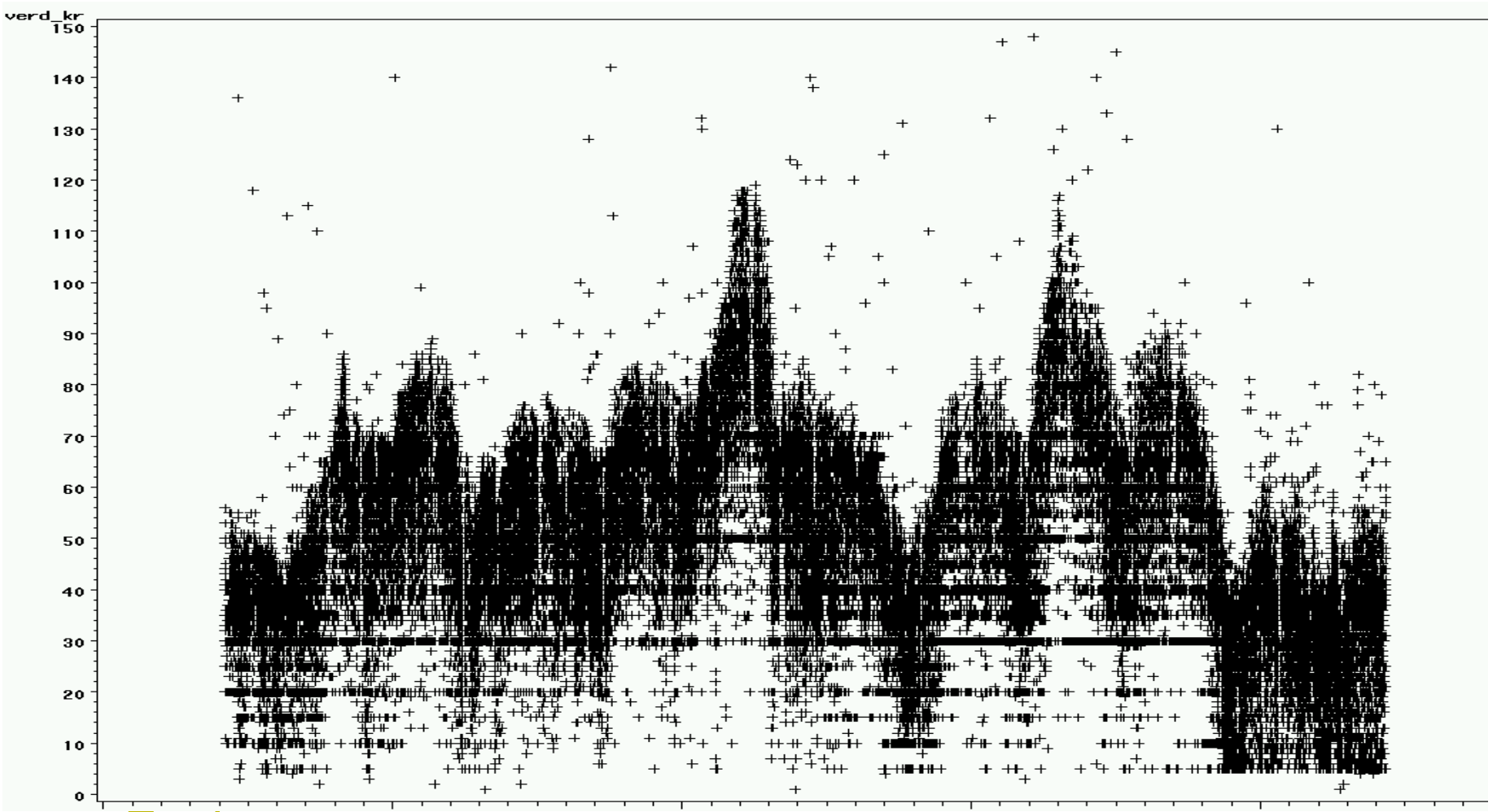
Haddock price 1994-2005



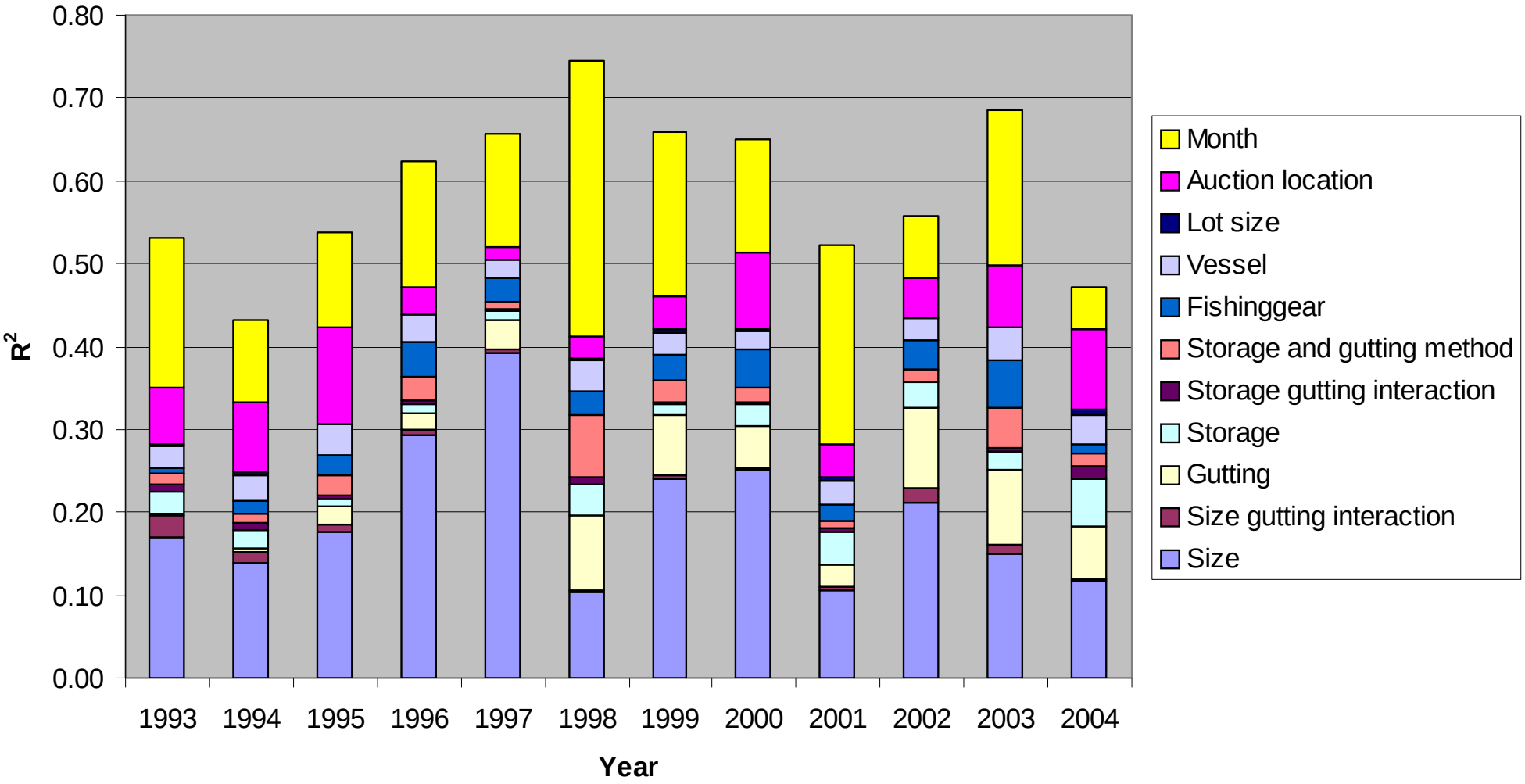
Factors explaining haddock price



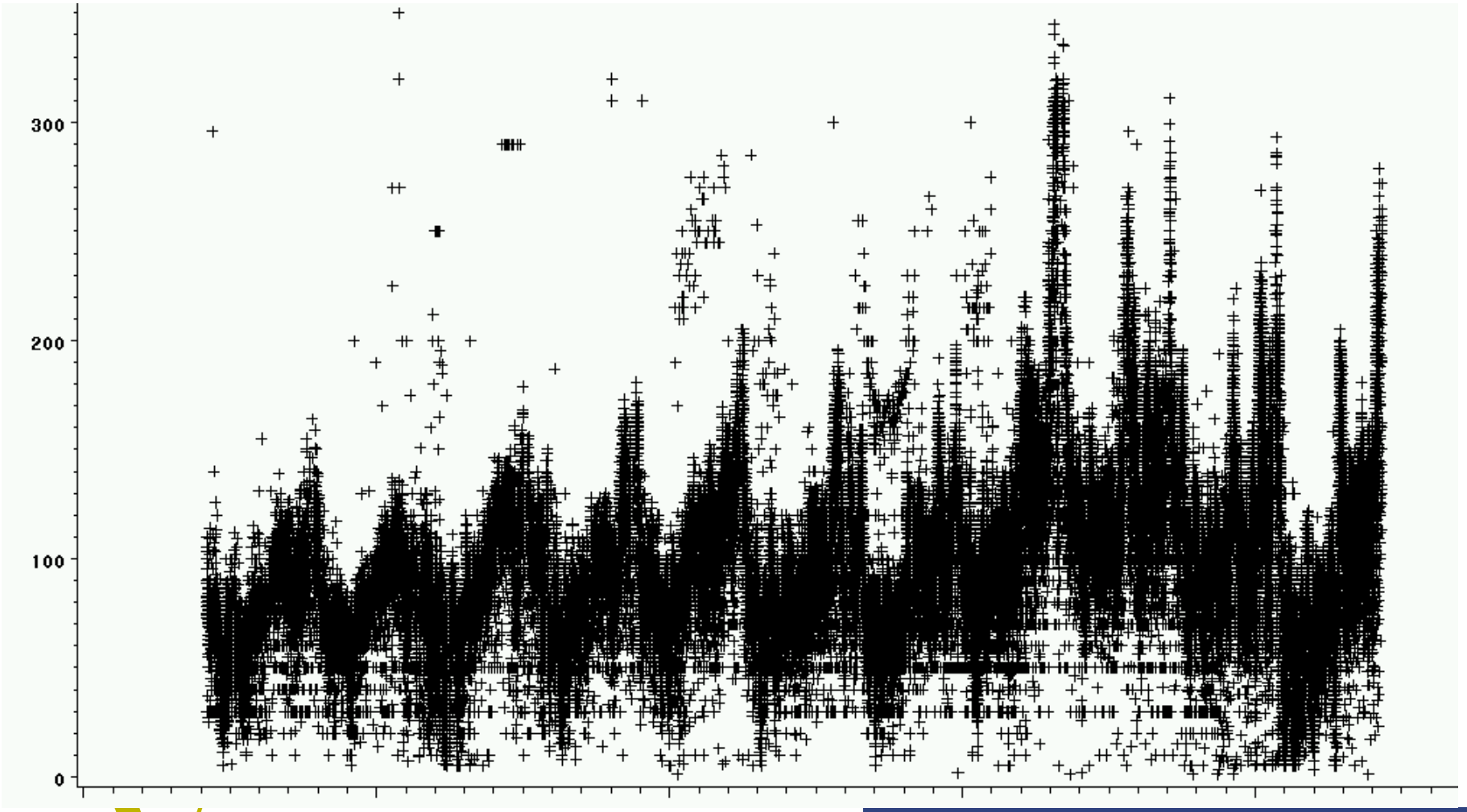
Saithe price 1994 - 2005



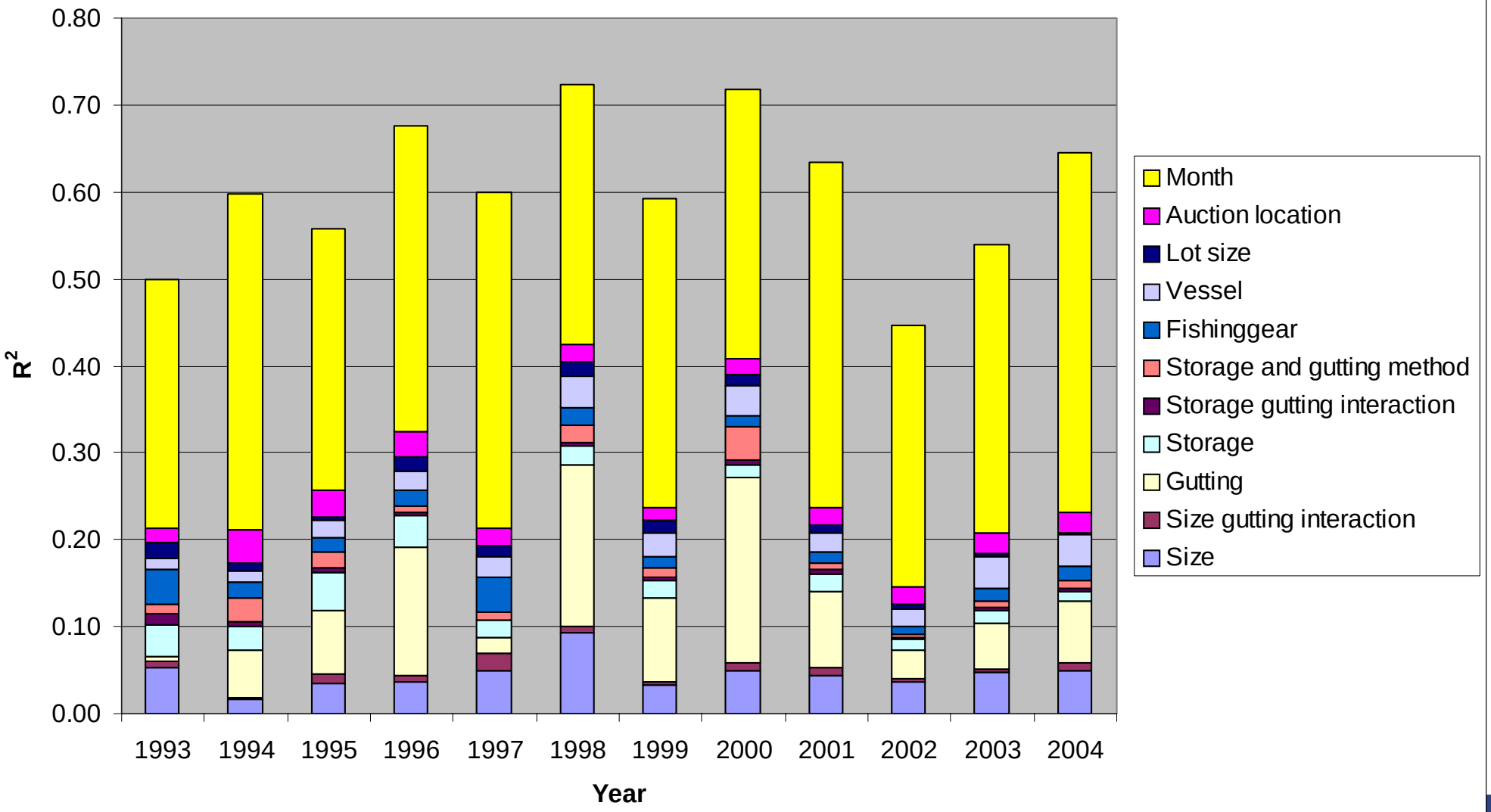
Factors explaining saithe price



Wolffish price 1994-2005



Factors explaining wolffish price



Valuable attributes

Very high degree of explained price variation

- attributes affect price

Size, gutting and month of the year most important

- varying degree of importance of attributes compared to seasonal patterns cod>haddock>saithe>wolffish

Indications of information asymmetry

Easily measured attributes most important

- size, gutting, time of year

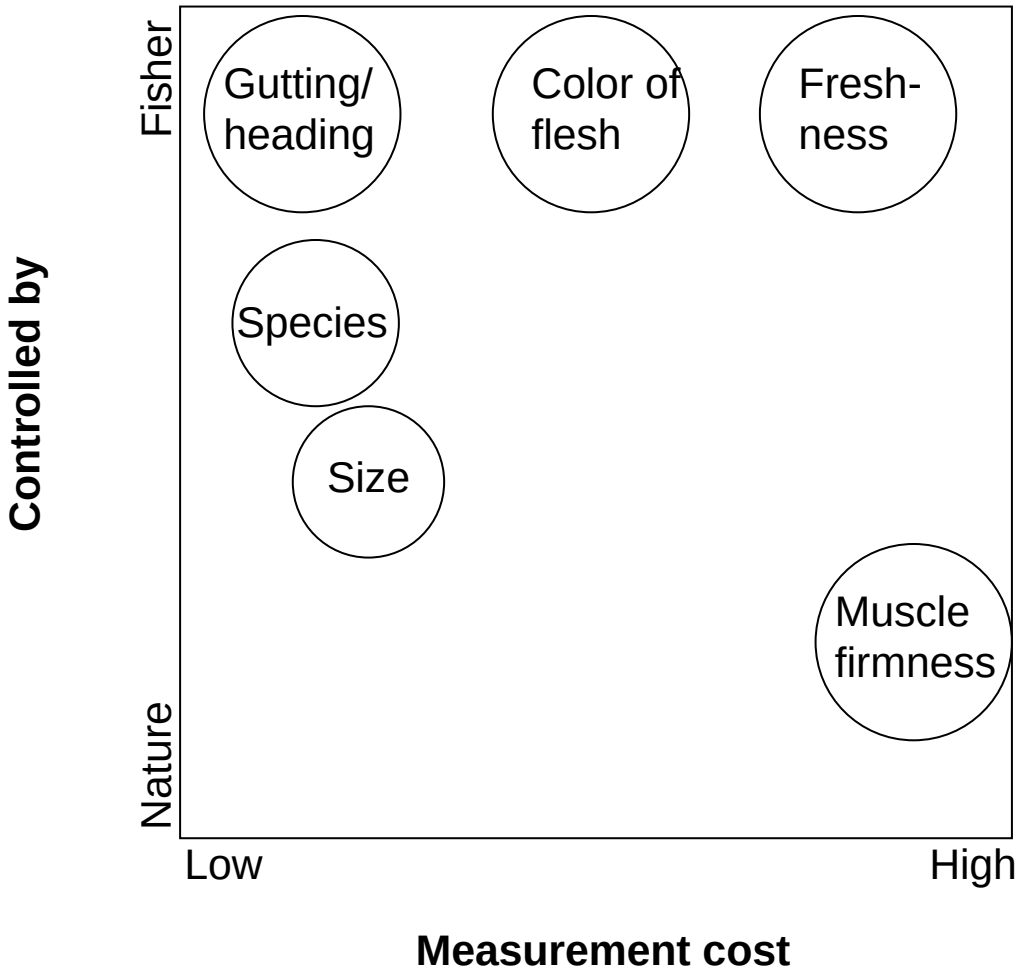
Storage less important than vessel number

Vessel number maybe a personal guarantee of quality => some information asymmetry

- improvements in quality registration may reduce unexplained variance

Still a small proportion left of unexplained variation

Types of attributes



Indications of highgrading

The incentives is most definitely there

Development of the importance of size indicates an increased incentive for cod and haddock

We need to look more closely at data

Development of marginal attribute prices

Look at the development for cod

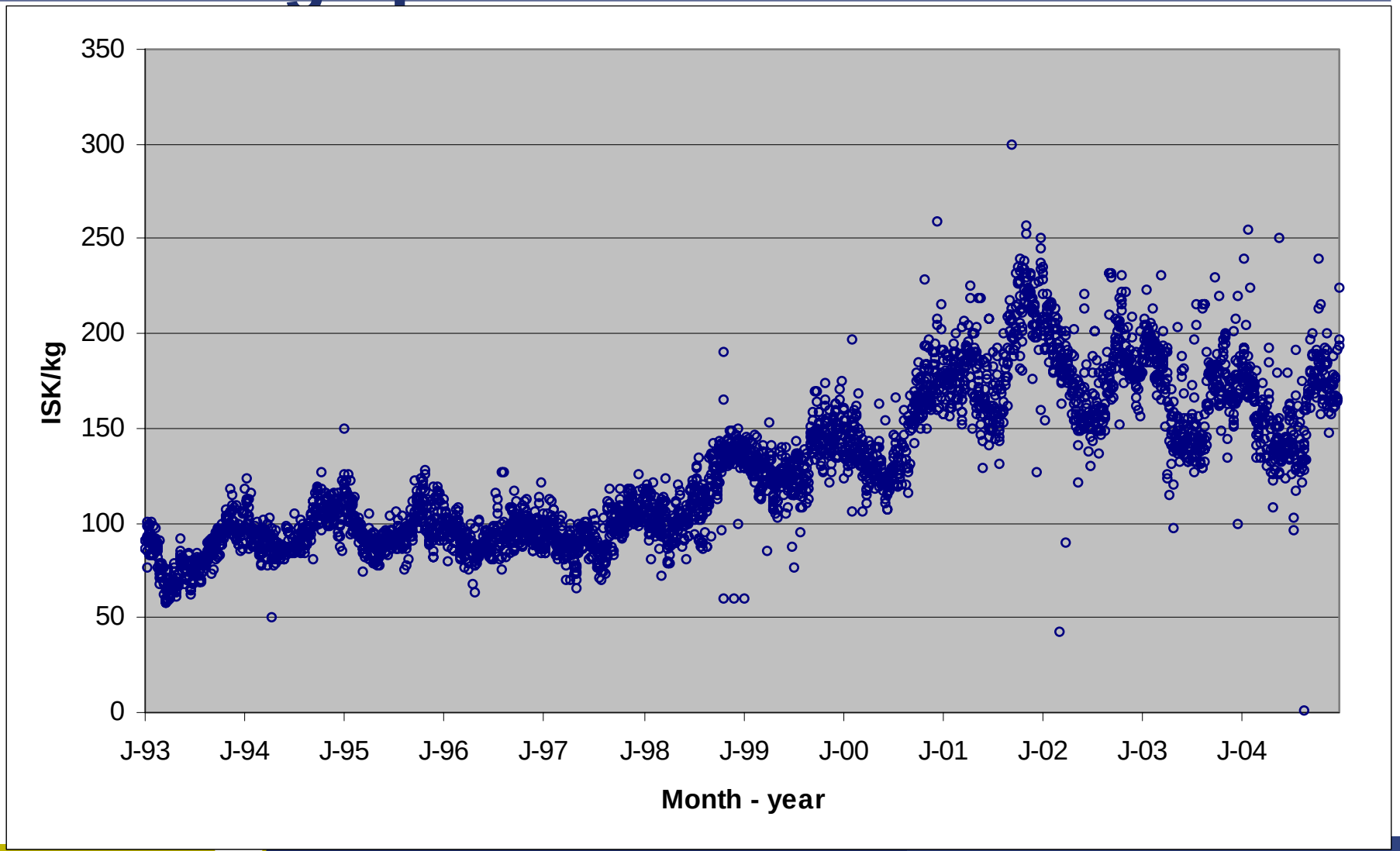
Estimate the model

$$price_i = \beta_0 + \beta_1 size_i + \beta_2 storage_i + \beta_3 gutting_i + e_i$$

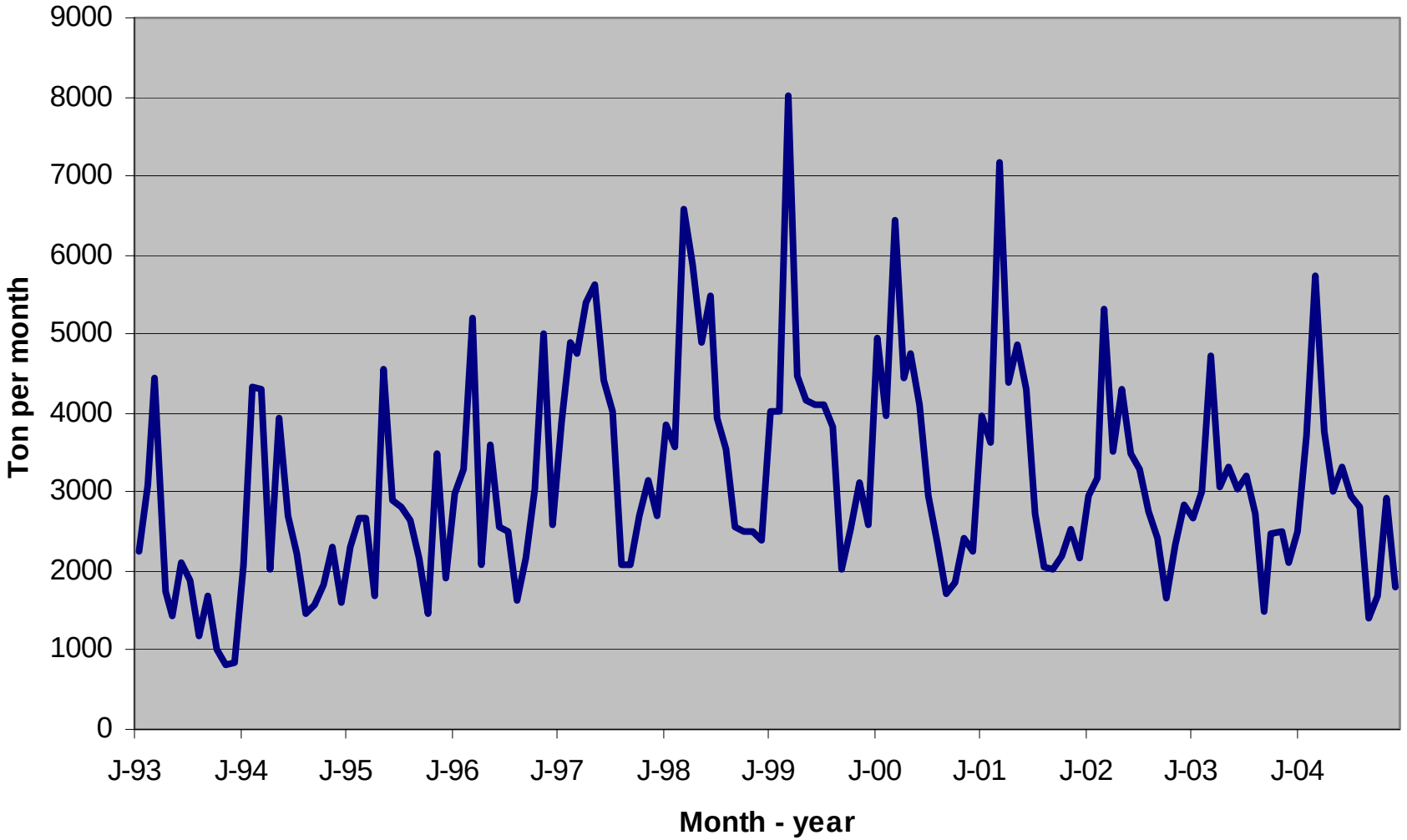
for each day of trading from 1993 through 2004 (3595 days)

Add the supply of attributes

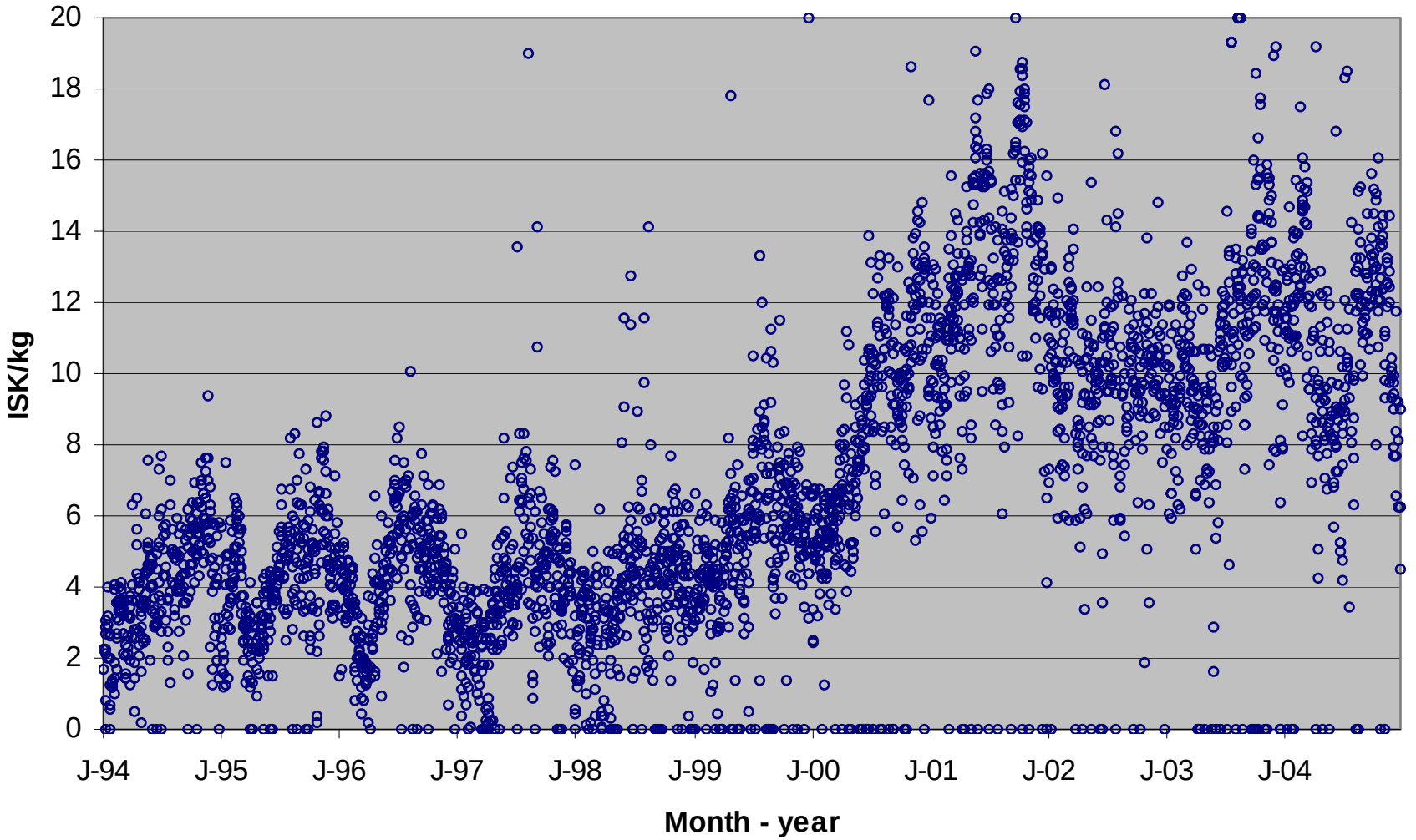
Average price



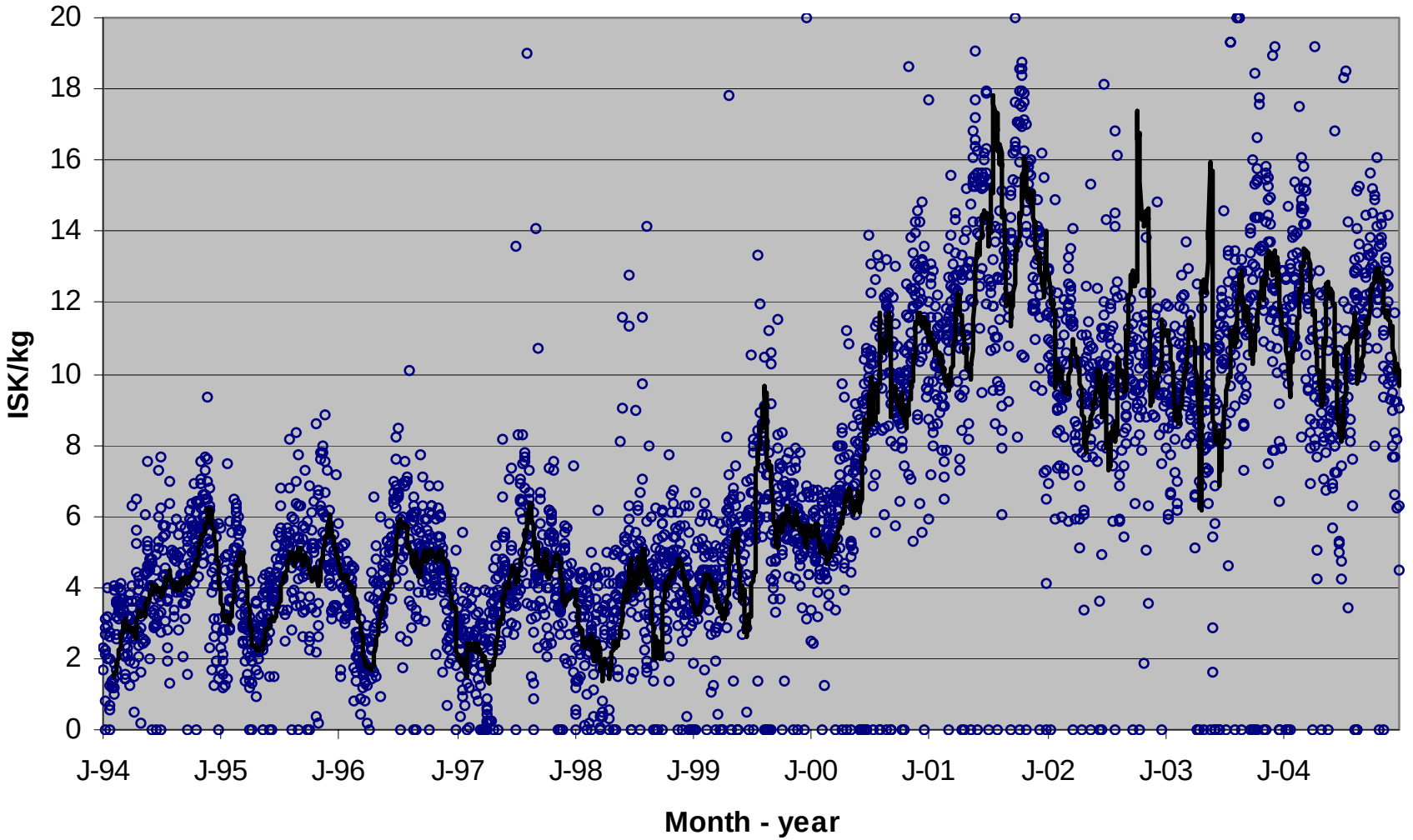
Supply


9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Ton per month
J-93
J-94
J-95
J-96
J-97
J-98
J-99
J-00
J-01
J-02
J-03
J-04
Month - year

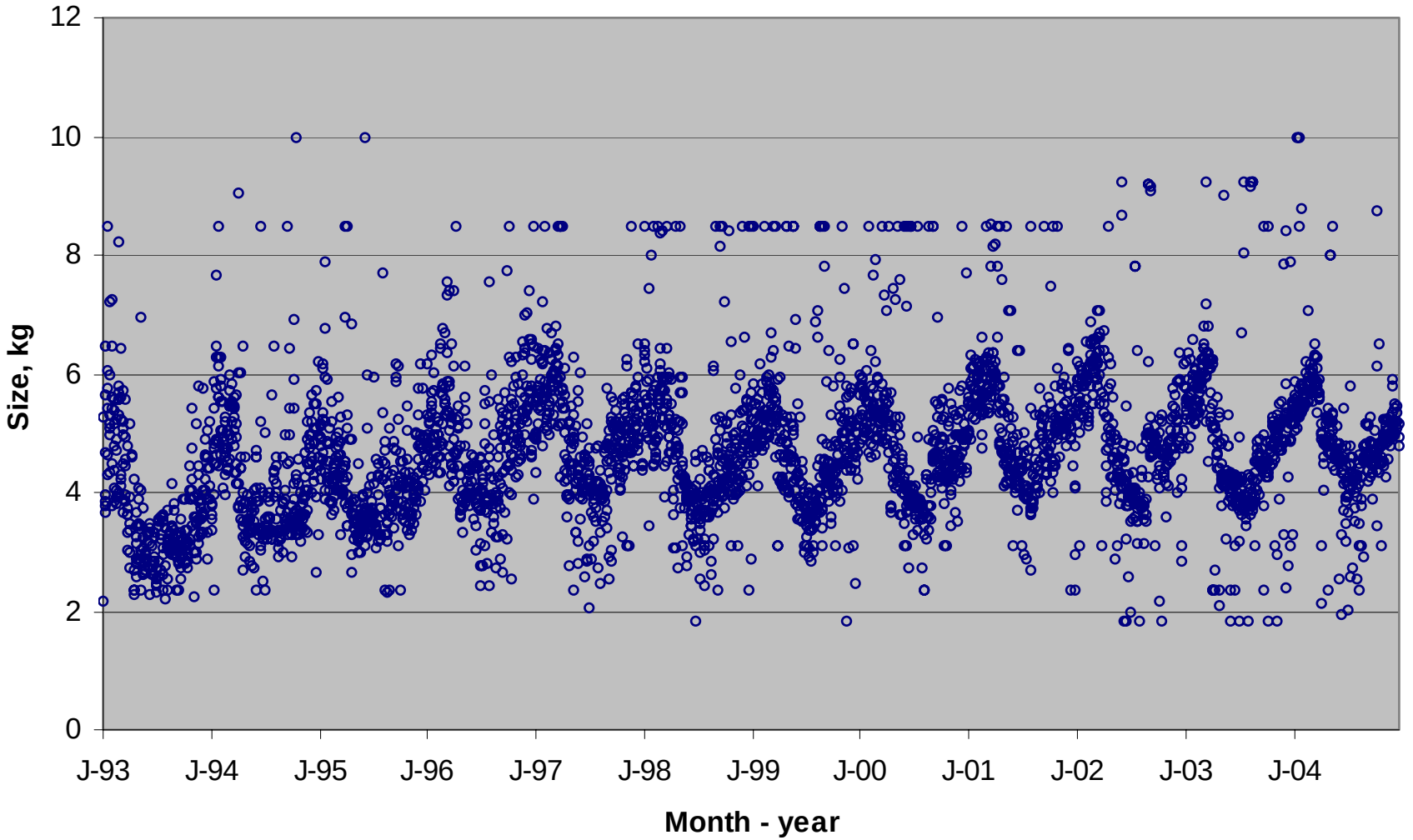
Marginal price for size



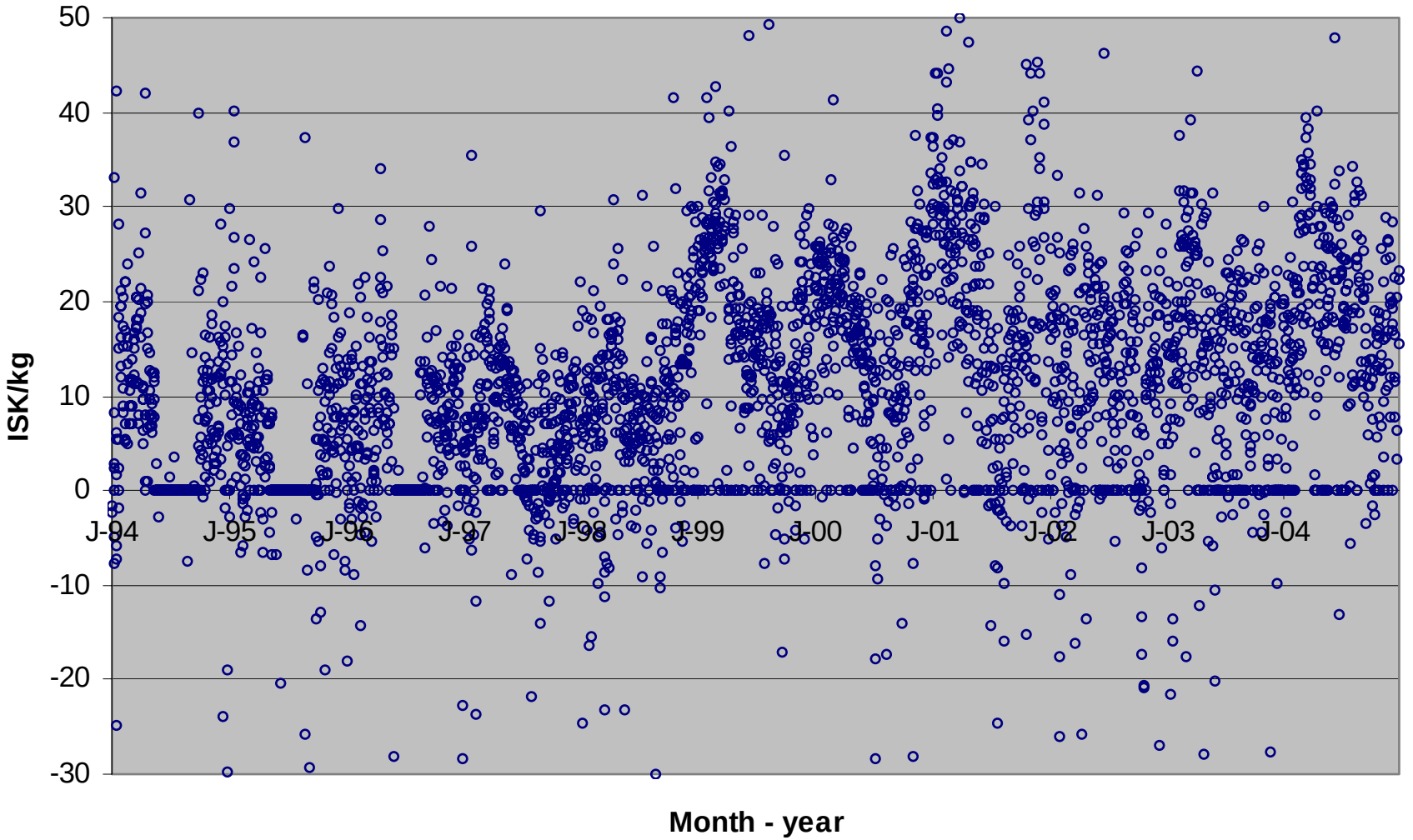
Marginal price for size



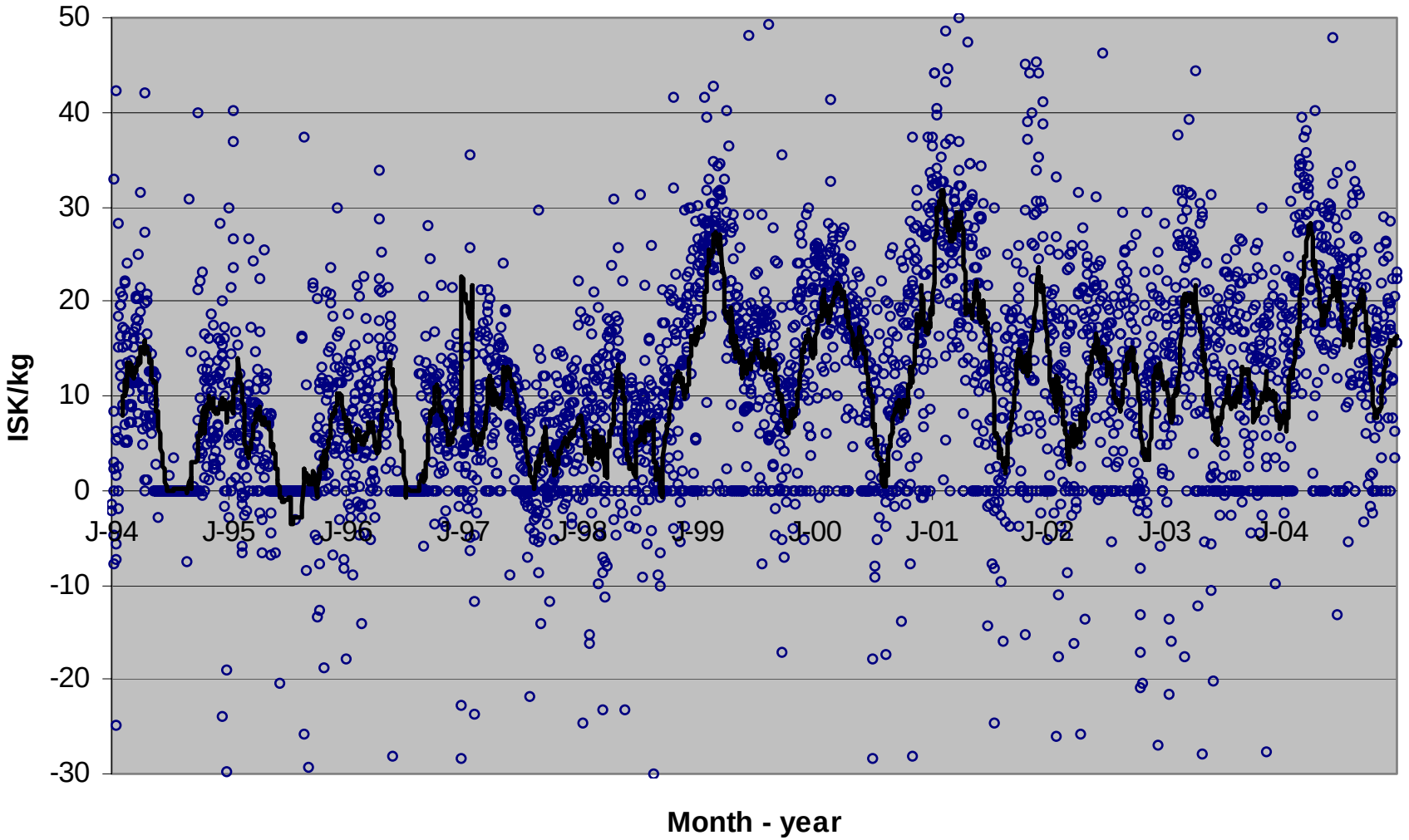
Average size



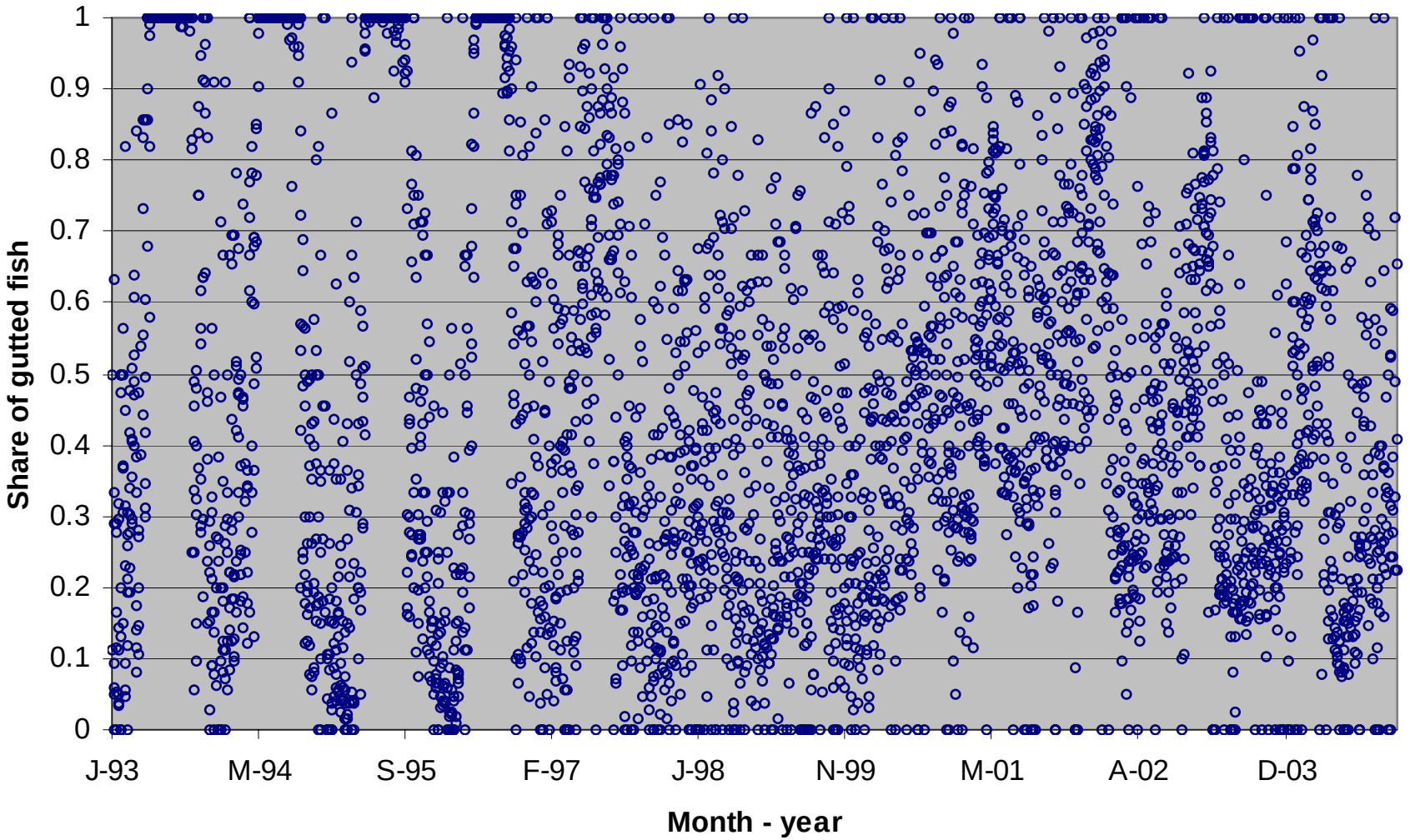
Marginal price for gutting



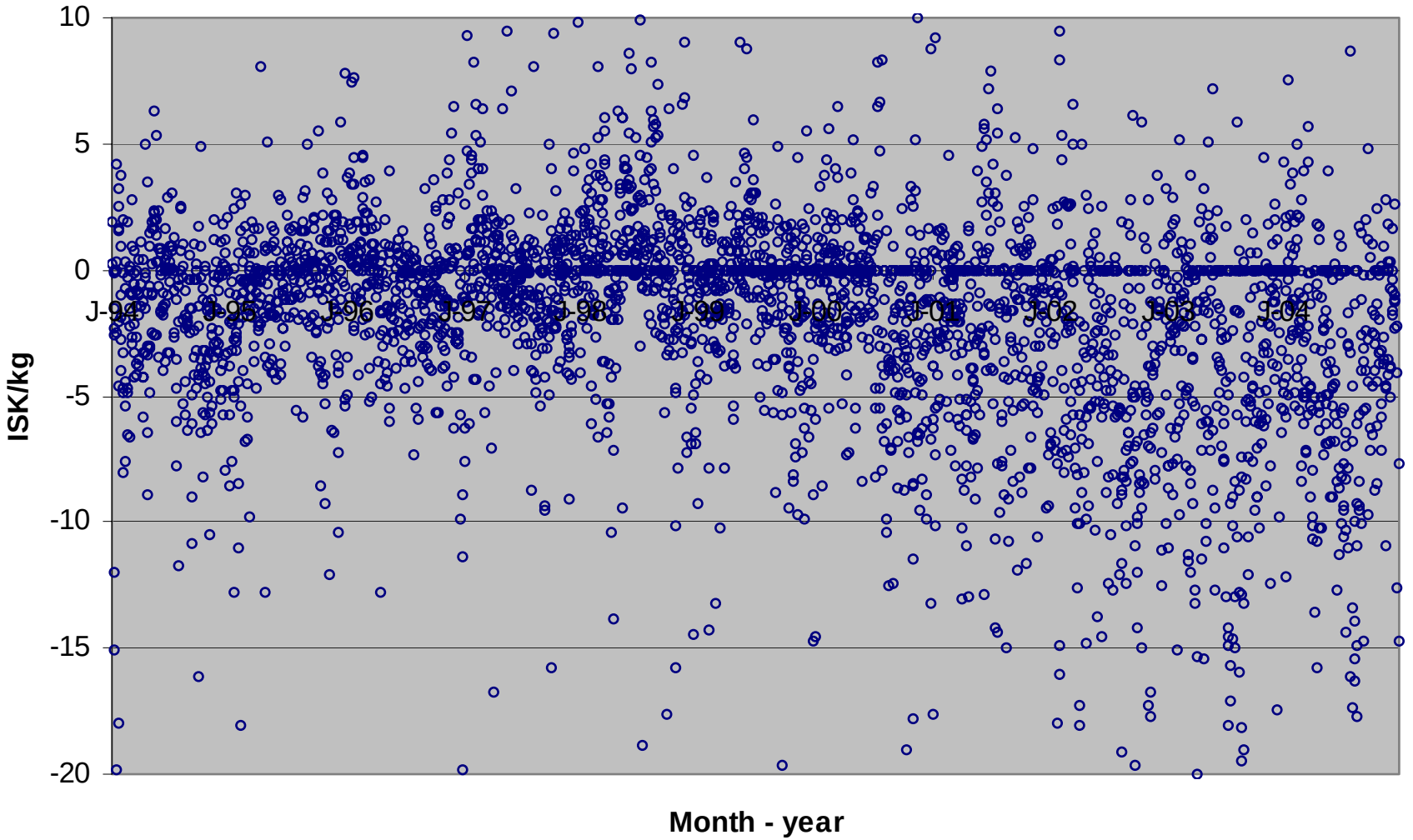
Marginal price for gutting



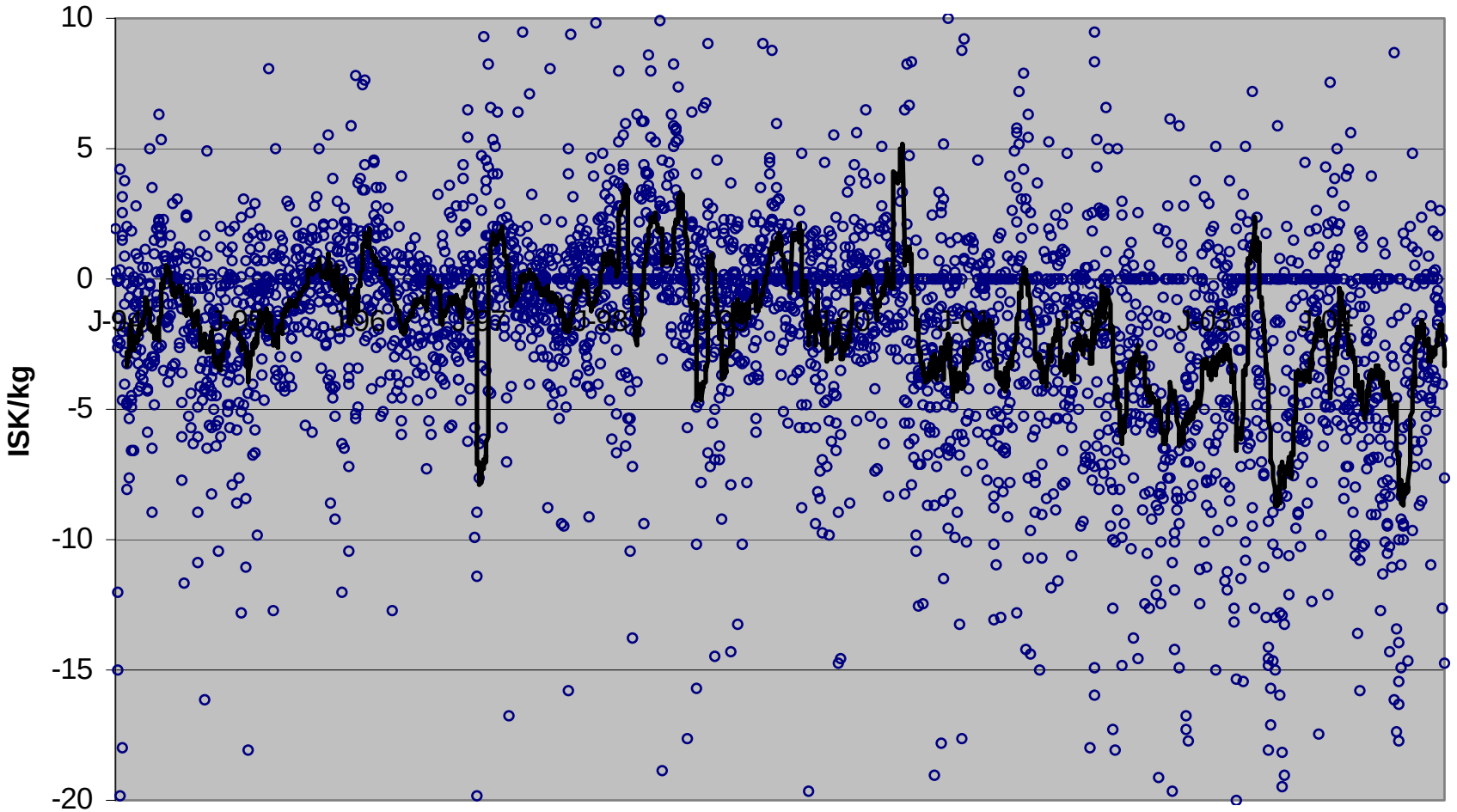
Average gutting



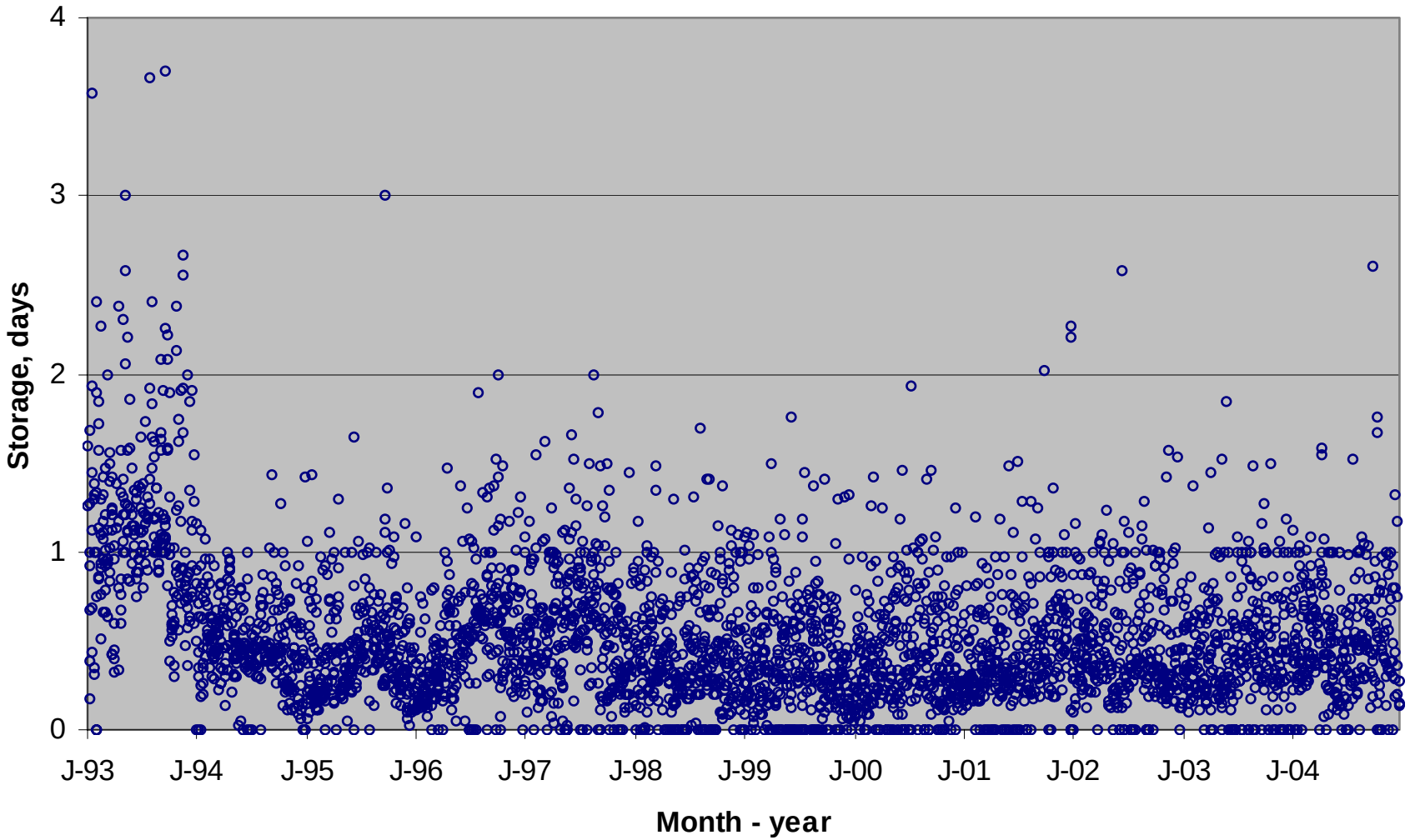
Marginal price for storage



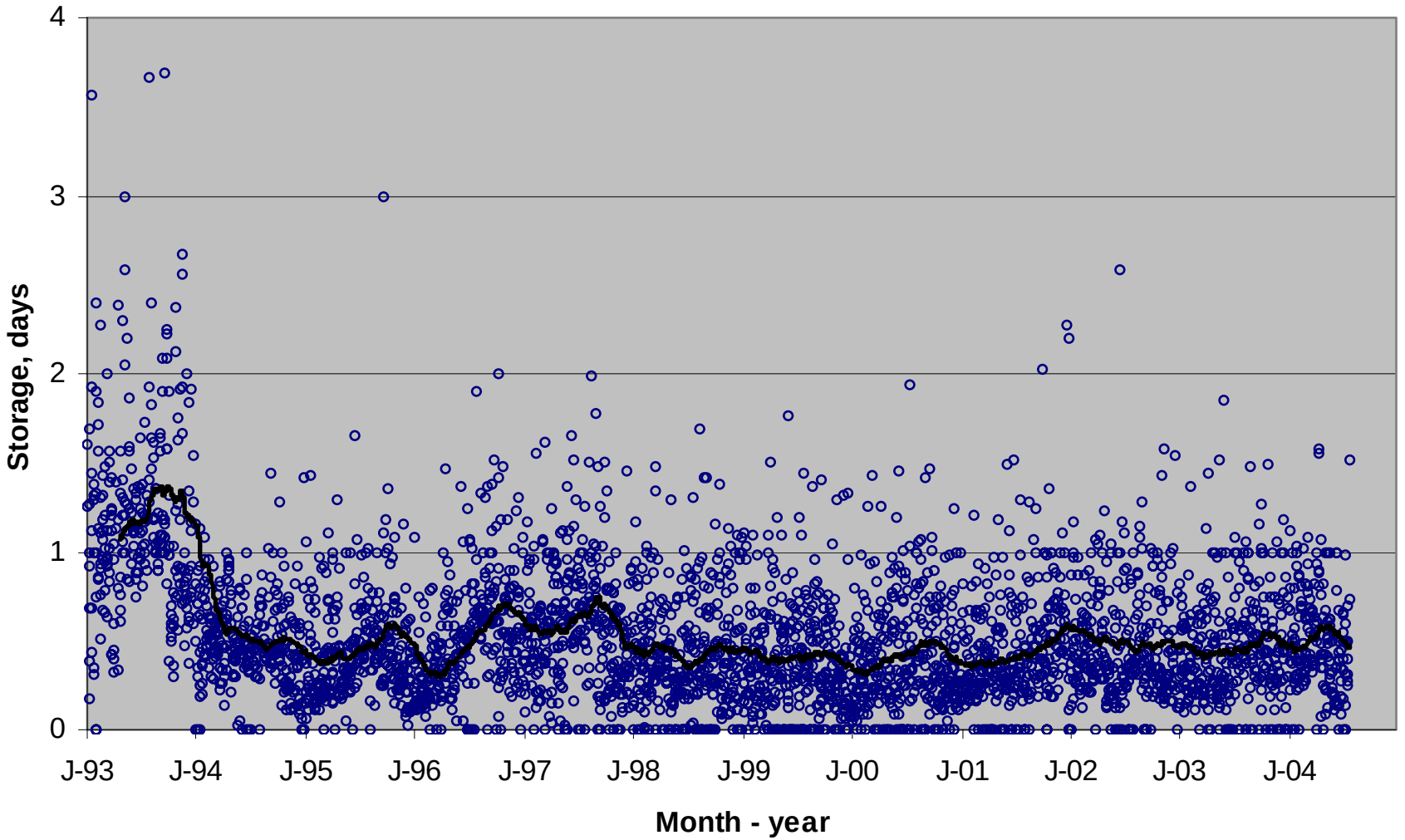
Marginal price for storage



Average storage



Average storage



Closer analysis – supply of attributes

Results from Kristofersson and Rickertsen (2007)

Estimate the daily bid functions for cod in the Icelandic fish auctions

The effects of relative changes in supply on MAP

	Quantity	Average size	Average storage	Gut ratio
Size	1.22	-19.25	-2.79	-21.96
	(1.41)	(-12.55)	(-5.50)	(-16.96)

Supply effects marginal attribute prices in the short run

Closer analysis - highgrading

Results from Kristofersson and Rickertsen (in review)

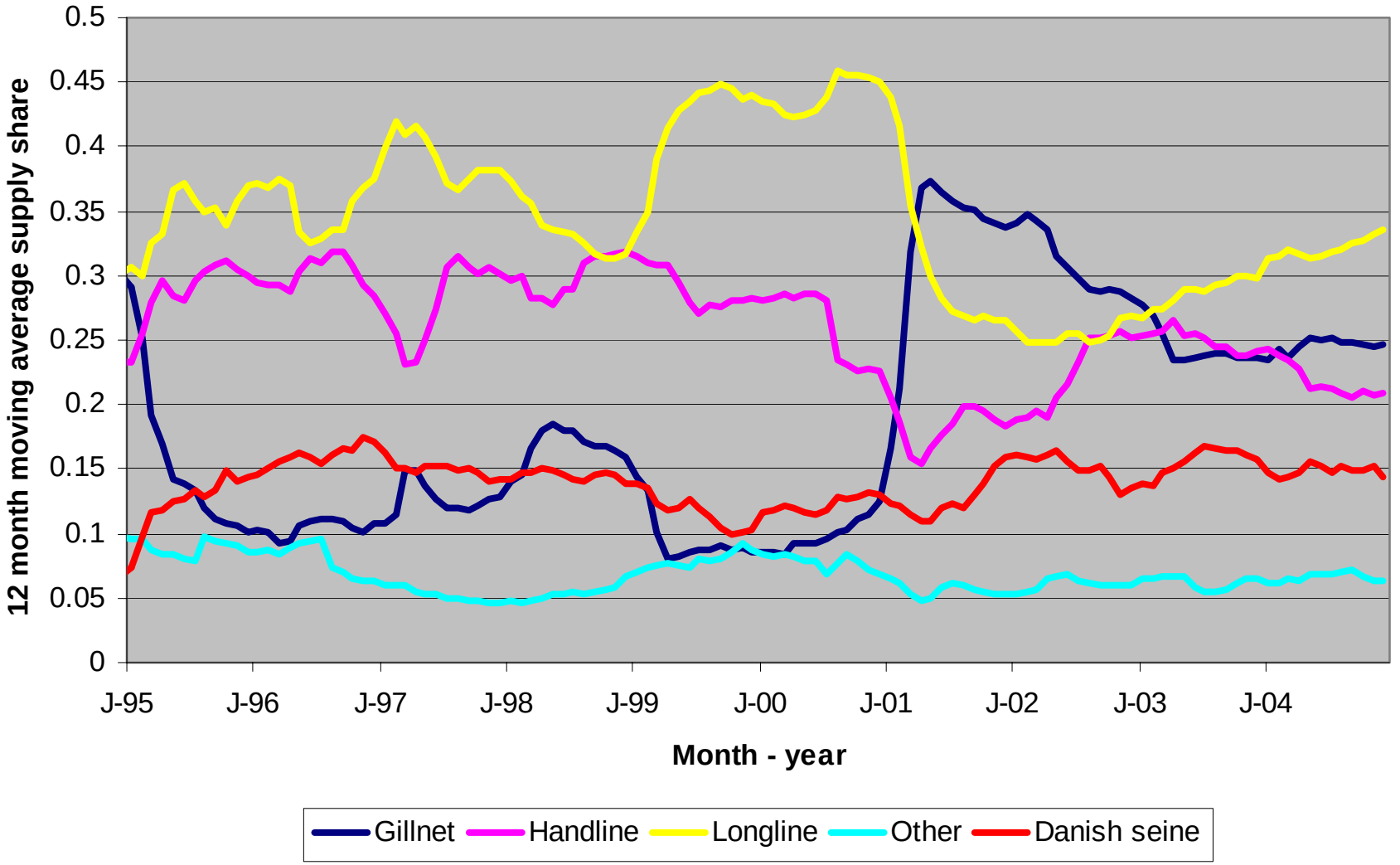
Estimate the upper limit of discards under the hypothesis that fishing technology is completely inflexible with respect to size

Test for price induces highgrading and simulate discard rates

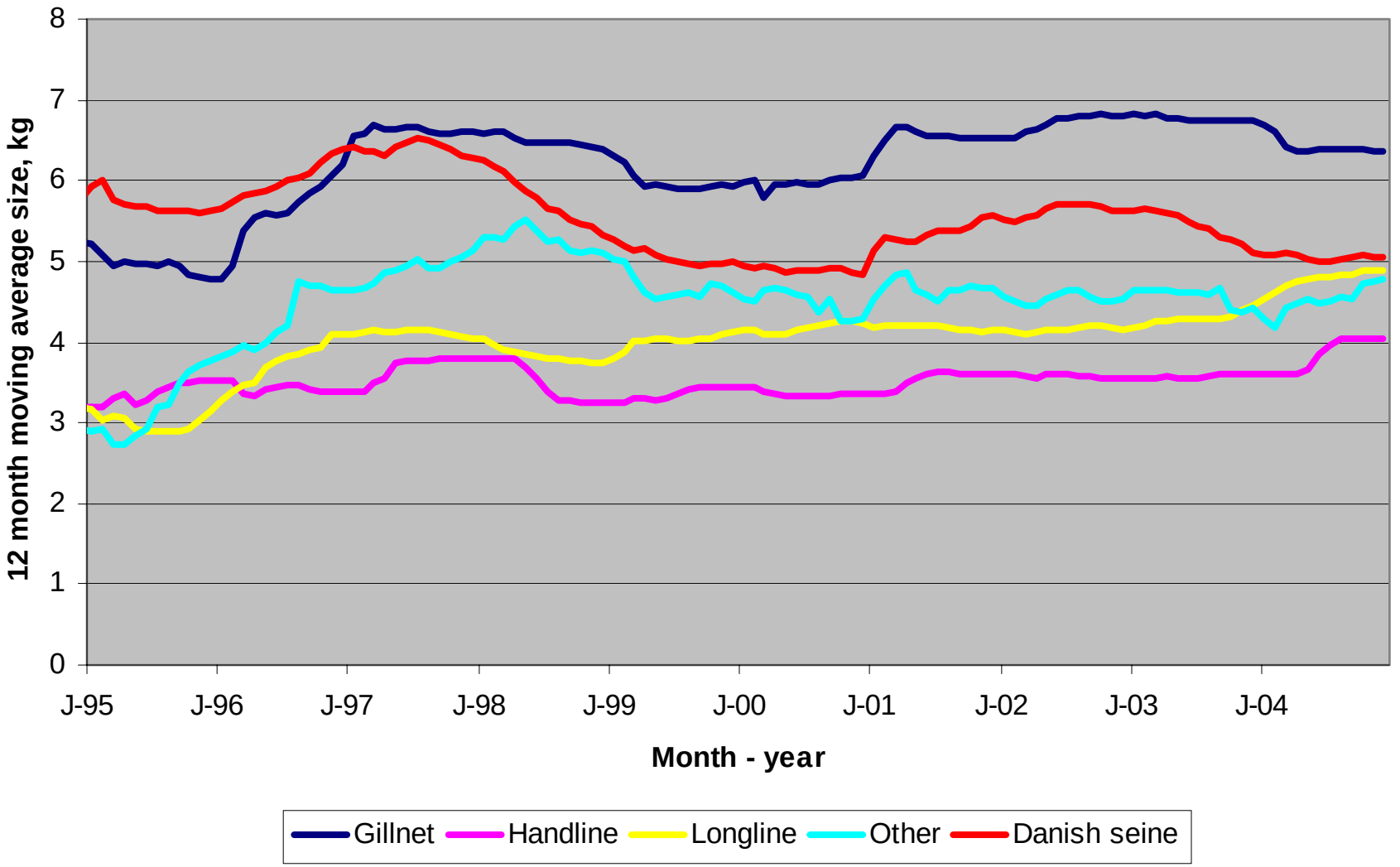
Closer analysis - highgrading

		Net	Long-line
P-values for the null hypothesis	No highgrading	0.000	0.008
	No Quota induced Discarding	0.041	0.336
Composition of landings	Small	1.00%	11.00%
	Medium	18.00%	67.00%
	Large	80.00%	22.00%
Predicted Discard Rates	Small	3.90%	2.44%
	Medium	0.79%	0.27%
	Large	0.00%	0.00%
	Total	4.70%	2.71%
Estimated Total Discards from IMRI		3.00%	1.00%

Supply gear type



Gear type supply



Indications

- Development of average storage indicates increased focus on freshness
  - not consistent with a market for lemons
- Vessel and seasonal effect indicates that information system can be improved

Indications

Size effect clear

- seasonal supply
- affected by supply

A clear incentive and some evidence of it having an effect on average sizes

- some highgrading
- some change in catch composition

Conclusions

Large variability in the price of fish

Most of the variability can be explained by information on fish and fishing season

- Price mostly affected by easily measurable attributes
- Limited evidence for information asymmetry

Conclusions

Large incentives to highgrade or target large cod and haddock

- Some evidence that fishermen have responded to these incentives
  - some highgrading
  - some targeting

The fish auctions are a well functioning market system for a very heterogeneous product

…but there is room for improvement

The End

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