

An integrated and statistical approach for the valuation of economic status of small scale fisheries

Fabienne Daurès (1)
 E. Leblond (2)
 S. Van Iseghem (1)
 S. Demaneche (3)
 P. Berthou (2)
 C. Brigaudeau (3)
 O. Guyader (1)
 M. Jézéquel (1)

Ifremer

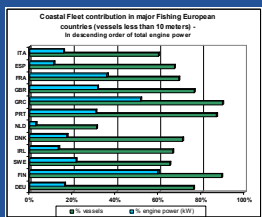
Context

Almost half of the European fleet: vessels less than 7 meters long. ¼ of the vessels at European level: less than 10m. long.

The European fleet of vessels less than 10m. long:

- 25% of the total engine power,

- more than 60% of the national fleet in all the member states (except the Netherlands and Belgium) and more than 20% of the national engine power for half of them.



Problem: a crucial lack of data on the Small scale Fleet at European level.

In France, fishing forms and auction sales data cover in 2006 around 80% of vessels less than 10 m. long BUT only 60% of the total fishing effort (approximated by the number of months at sea).

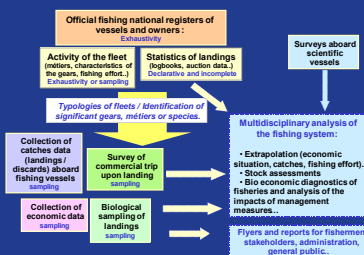
Material and Methods

Sources : Data from the Fisheries Information System (FIS) of Ifremer

The FIS: a permanent, operational and multidisciplinary national network for the observation of marine resources and their associated uses.

Objective: collection of relevant data to assess the total activity of the French fleet and understand the dynamics of the "Fishing system".

Multidisciplinary and statistical approach of the FIS



Specific features of the FIS

- Supported by a network of observers distributed along the French coast,
- Interested in the totality of the French fleet including small scale vessels. Gradual enlargement to recreational fisheries.
- Strong participation of fishermen
- Multidisciplinary of scientists involved.

Harmonie, the FIS database combines official data from the Fisheries ministry and surveys data from Ifremer observers. It has been used for the present assessment of the French Coastal fleet and specifically the following data (reference period: from 2001 to 2006):

- Capacity and features of vessels from the Fishing fleet register
- Annual landings per vessel from Auction sales
- Monthly Fishing activity and Effort per vessel from Ifremer Activity surveys
- Economic data including total earnings per vessel from Ifremer Economic surveys.

The "Revenue" model

Ifremer	Variables selection in the "Revenue" Model				
	2002	2003	2004	2005	2006
(Intercept)	***	***	***	***	***
Production Factor (Pfact)					
Capacity * Intensity	***	***	***	***	***
AGE	***	***	***	***	***
POLY					
Fleets	SE(1)CA(2)	DR(1)P(2)A(3)	FR(1)CA(2)	BE(1)TA(2)F(3)	BE(1)BN(2)P(3)N(4)
Sub Region	AD(1)BN(2)N(3)	BN(1)P(2)	AD(1)N(2)	BN(1)	AD(1)N(2)

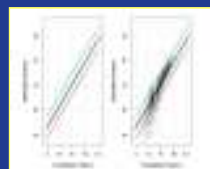
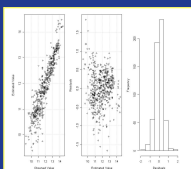
Production Factor : nb fishermen embarked/length of vessels/indice of activity of the vessel
 AGE : age of the vessel ; POLY : indice of the polyvalence of the vessel
 SE : seldiers ; DR : dragages ; TA : glass and ; P : netters ; Fica : netters-potters ; Fiba : netters-liners ; CAR : potters ; Siera ; SA : siera ; DI : mouchonnance ; Caba : potters ; AD : Aquitaine ; BN : Basse Normandie ; NN : Haute Normandie ; NB : Bretagne Nord ; NP : Nord Pas de Calais ; PC : Picardie ; Cherbourg ; P : Pays de Loire

ln(CA)=5.34+0.88 ln(Pfact) -0.08 ln(AGE)

All coefficients are significant at less than 1%
 Multiple R-Squared: 0.8538, Adjusted R-Squared: 0.8532
 F-statistic: 1454 on 2 and 498 DF, p-value: < 2.2e-16

Precision and Validity

The model is a log-linear model fitted by least squares estimates. Regression diagnostics have been applied to ensure that the fitted regression model adequately represents the data.



The "Revenue" model has been developed in 2003 to get a reliable estimation of the annual earnings of each French fishing vessel, including small scale fleet, based on explanatory variables available for each vessel.

The final model has been chosen to ensure the stability of the model over years and includes as explanatory variables the production factor (product of length of vessel, crew size and number of fishing months) and the age of the vessel.

The Final Estimation of the annual earnings per vessel is the result of the comparison between auction sale data and the "Revenue" model.

If the annual auction sale data is below the confidence interval of the "Revenue" model, the estimated earning equals the estimation of the model, otherwise it equals the auction sale data.

Global Features

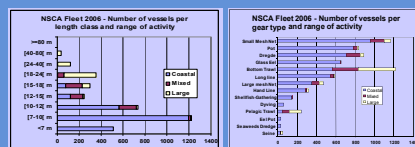
Definition of a Small scale vessel = A vessel spending more than 75% of its fishing time within 12 miles coastal area = a coastal vessel.

Key figures for the North Sea – Channel – Atlantic (NSCA) Coastal Fleet (2006).

	Number of vessels	Number of crew members	Engins power (kW)
Coastal Fleet	2 471	4 462	240 139
% in NSCA Fleet	71%	46%	36%

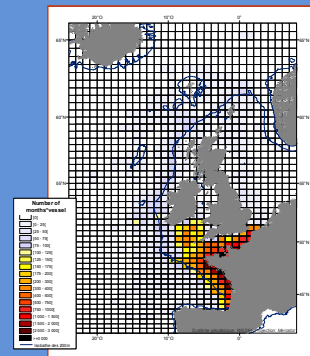
Average Coastal vessel:

- 9 meters long / 97 kW /
- 2 crew members inc. Skipper
- 2 gear types used per year



Results

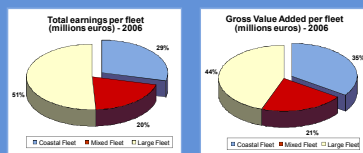
Spatial distribution of NSCA fleet's fishing effort (nb months*vessel) – 2006.



The NSCA Coastal Fleet:

- Mostly vessels less than 12 m. long.
- Large diversity of meters concerned.

Earnings



The NSCA Coastal Fleet (2006):

Total earnings = 282 M€ (29% of the total NSCA fleet).

Total Gross Value Added (GVA) = 181 M€ (35% of the total NSCA fleet).

Revenue Model estimation:

+30% compared to official sales data (207 M€) for the NSCA Coastal Fleet.

+21% compared to official sales data (830 M€) for the NSCA Total Fleet.

Within the coastal fleet, the re-assessment provided by the revenue model are particularly significant (more than 30%) for the vessels using active gears like dredge and glass eel trawl, and passive gears like pot.



The origins of earnings of the Coastal Fleet are very diversified compared to large vessels where 86% is coming from trawlers.

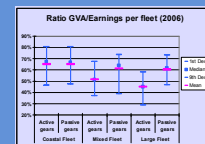
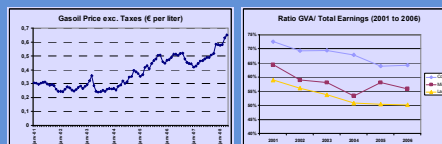


Productivity

The average NSCA Coastal Fleet GVA / Earnings ratio = 64%

10% of vessels have a ratio below 46% (1st decile) and 10% upper 80% (9th decile).

Within coastal fleet, there is no significant difference between vessels using passive and active gears. For large vessels, the ratio is lower for vessels using active gears.



Face to the increasing fuel prices, the GVA / Earnings ratio is decreasing over the period and goes from 73% in average in 2001 to 64% in 2006 for the coastal fleet.

	Mean GVA/Crew (€)	Mean GVA / Invested Capital (€)
Coastal Fleet	40 800	1.3
Mixed Fleet	58 094	0.6
Large Fleet	72 118	0.6

The labor productivity (GVA / Crew)

- 41 000 euros per crew member in 2006 for coastal vessels,
- increases with the range of activity,
- higher for trawlers within the coastal fleet.

The capital productivity (GVA / Capital invested):

- 1.3 euros per euro of capital invested for coastal vessels,
- decreases with the range of activity,
- high dispersion within the coastal fleet (1st decile=0.3, Median=0.7, 9th decile = 2.2).