

Method to evaluate the catches of Cod in the Baltic Sea using the Polish Fisheries as an example

By

Alex Elmerdahl Olsen and Klaus Nielsen
A. Espersen a/s
Fiskerivej 1, DK-3700 Ronne, Denmark

Summary

This document is an attempt to evaluate the quantity of cod catches in the Baltic Sea using Poland as an example. The calculations will be based on Supply Balance techniques using export and import data available in EUROSTAT and conversion of the yield as realised by Espersen Polska Sp. z o.o for fresh and frozen cod.

The result shows that Supply Balance can be used to estimate the over fishing in the Baltic Sea for all EU countries and it is recommend, that a working group with representatives from ICES and the Baltic Sea RAC develop a methods based on Supply Balance to estimate un-reported landings / over-fishing.

Introduction

Unaccounted Fishing Mortality is a significant source of error in Stock Assessments and will lead to uncertain or direct misleading information for policy decision makers and managers. Two sources of particular concern

- Illegal, unreported and unregulated fishing (IUU)
- Discarding.

ICES have estimated that the true catch for Eastern Baltic Cod is 35-45% greater than reported. As the largest seafood processor in Poland, A. Espersen for a long time has recommended the EU commission to take action on the problems regarding over-fishing in the Baltic Sea.

Different techniques have been used in the past to estimate unreported catches e.g. supply balance, discard observer data, and estimate total landing from the entire stock or correct catch from inspection data. But all of these techniques have problems. Overall estimates based on either of these methods are lower than data provided by ICES.

This document is an attempt to evaluate the quantity of cod catches in the Baltic Sea using Poland as an example. Poland is chosen as they often are accused of a considerable over-fishing. The calculations are based on Supply Balance techniques.

Methods

The following conditions create the basis of the evaluation:

- The official quota for the individual countries
- The official import and export statistics of Eurostat for cod and cod products.
- Conversion of the yield as realised by Espersen Polska Sp. z o.o for fresh and frozen cod. It has not been possible to procure realised figures for the German model of conversion
- Export of fresh fillet, pos. no. 03041031 is exported as pin-bone-in fillets
- Import and export of mince is not included as the fillet yields are calculated as pin-bone-out fillets
- The gain to frozen fillet such as glazing and/or addition of phosphate is estimated as the figures realised by Espersen.
- The assessment of the domestic consumption of cod is based on the availability of fresh products in the retail sector and in restaurants in Poland as well as the available income per inhabitant. Domestic consumption in Poland is estimated to 1,000 tons of whole round cod, this can be verified by national statistic on per capita consumption.

Calculations

Results from Supply Balance calculations are shown in table 1 (2005) and table 2 (2006). Eurostat figures are shown in appendix 1 (2005) and appendix 2 (2006).

Products	Custom code number	Export in tons	Import in tons	Balance in tons	Change in holdings tons	Converted quantity tons whole cod
FRESH OR CHILLED COD	3025010	646	327	318		375
FROZEN COD	3036011	61	13.317	-13.256	-278	-23.144
FRESH OR CHILLED FILLETS OF COD AND OF FISH OF THE SPECIES	3041031	1813	25	1.788	121	4.504
FROZEN FILLETS OF COD AND OF FISH OF SPECIES	3042029	13.168	453	12.715	-116	35.782
FROZEN MEAT (EXCL. FILLETS) OF COD	3049038	2.327	253	2.074		0
FILLETS OF COD AND OF FISH OF THE SPECIES DRIED, SALTED OR IN BRINE, BUT NOT SMOKED	3053019	0	1	-1		-3
COD DRIED, UNSALTED AND UNSMOKED STOCKFISH (EXCL. FILLETS)	3055110	0	0	0		-1
COD DRIED, SALTED, NOT SMOKED KLIPPFISH (EXCL. FILLETS)	3055190	0	0	0		
COD SALTED OR IN BRINE ONLY (EXCL. FILLETS)	3056200	0	0	0		
Sum		18.014	14.376	3.637		
FROZEN RAW FISH FILLETS, COATED WITH BATTER OR BREADCRUMBS, WHETHER OR NOT PRE-FRIED IN OIL	16041991	4.982	156	4.826		
COD OF THE SPECIES GADUS MORHUA, GADUS OGAC, GADUS MACROCEPHALUS, PREPARED OR PRESERVED, WHOLE OR IN PIECES	16041992	19	15	3		0
Sum		5.000	171	4.829		
Total Sum		23.014	14.547	37.561		17.514

Table 1. Import and Export 2005 for Poland by custom code number.

Products	Custom code number	Export in tons	Import in tons	Balance in tons	Change in holdings tons	Converted quantity tons whole cod
FRESH OR CHILLED COD	3025010	798	2.786	-1.988	-92	-2.455
FROZEN COD	3036011	123	12.066	-11.944	-526	-21.324
FRESH OR CHILLED FILLETS OF COD AND OF FISH OF THE SPECIES	3041031	2.922	15	2.907	25	6.920
FROZEN FILLETS OF COD AND OF FISH OF SPECIES	3042029	12.707	1.078	11.629	-155	34.422
FROZEN MEAT (EXCL. FILLETS) OF COD	3049038	2.173	277	1.897		0
FILLETS OF COD AND OF FISH OF THE SPECIES DRIED, SALTED OR IN BRINE, BUT NOT SMOKED	3053019	0	1	-1		-1
COD DRIED, UNSALTED AND UNSMOKED STOCKFISH (EXCL. FILLETS)	3055110	0	0	0		0
COD DRIED, SALTED, NOT SMOKED KLIPPFISH (EXCL. FILLETS)	3055190	0	0	0		0
COD SALTED OR IN BRINE ONLY (EXCL. FILLETS)	3056200	1	0	1		0
Sum		18.725	16.222	2.502		
FROZEN RAW FISH FILLETS, COATED WITH BATTER OR BREADCRUMBS, WHETHER OR NOT PRE-FRIED IN OIL	16041991	9.364	81	9.283		3,017
COD OF THE SPECIES GADUS MORHUA, GADUS OGAC, GADUS MACROCEPHALUS, PREPARED OR PRESERVED, WHOLE OR IN PIECES	16041992	35	18	17		0
Sum		9.399	99	9.300		
Total Sum		28.123	16.321	11.802		20.580

Table 2. Import and Export 2006 for Poland by custom code number.

A summary of the Supply Balance for 2005 and 2006 is given in table 3. The over-fishing of whole, round Baltic cod in Poland in 2005 was 5,357 tons or 40,3 % and in 2006 5.570 tons or 34,8%.

The results from the Supply Balance estimate for 2005 is close the estimate given by the EU commission and the results are more or less at the same level as estimated by ICES.

As soon as the EUROSTAT data for 2007 is available, the Supply Balance estimate for Poland will be added.

	2005	2006
Export-import	17.514	20.580
Quota	13.300	16.010
Landings outside	-143	
	4.357	4.570
Domestic consumption	1.000	1.000
Balance	5.357	5.570
Over-fishing	40,3 %	34,8 %

Table 3. Summary of Supply Balance 2005 and 2006 for Poland in tons.

Conclusion

Based on the conditions described in the introduction, the report concludes that there has been a considerable over-fishing in Poland in 2005 and 2006.

It is our belief that the Supply Balance can be used to estimate the over fishing in the Baltic Sea for all EU countries. The estimation can be optimised even further by e.g. using country statistics for domestic consumption per country or include data for discards in the calculation. Therefore we recommend, that a working group with representatives from ICES and the Baltic Sea RAC develop a methods based on Supply Balance to estimate un-reported landings / over-fishing.

Eurostat Poland 2005**Fresh or chilled cod "Gadus morhua"**

Taric code: 03025010

Import		Export	
PARTNER / REPORTER	Tons	PARTNER / REPORTER	Tons
DENMARK	121,4	CZECH REPUBLIC (CS->1992)	0,1
FRANCE	0,6	GERMANY (incl DD from 1991)	2,5
LITHUANIA	151,6	DENMARK	28,2
NETHERLANDS	7,2	SPAIN	15,3
RUSSIAN FEDERATION (RUSSIA)	25,2	FRANCE	558
SWEDEN	21,4	NORWAY (incl.SJ excl.1995,1996)	41,5
TOTAL	327,4	TOTAL	645,6

Frozen cod "Gadus morhua"

Taric code: 03036011

GERMANY (incl DD from 1991)	238,6	DENMARK	59,8
DENMARK	4335,6	STORES AND PROVISIONS WITHIN//OUNTRIES	0,7
UNITED KINGDOM	117,3		
INDIA	0,4		
ICELAND	0,2		
LITHUANIA	308,3		
NETHERLANDS	2212,1		
NORWAY (incl.SJ excl.1995,1996)	1663		
RUSSIAN FEDERATION (RUSSIA)	4441,4		
TOTAL	13316,9	TOTAL	60,5

Fresh or chilled fillets of cod "gadus morhua, Gadus ogac, Gadus macrocephallus" and of fish of the species "Boreogadus saida"

Taric code: 03041031

GERMANY (incl DD from 1991)	0,3	AUSTRIA	6,2
FRANCE	0,7	BELGIUM (and LUXBG -> 1998)	56,3
NETHERLANDS	0,5	SWITZERLAND (incl. LI->1994)	52,4
RUSSIAN FEDERATION (RUSSIA)	23,8	CZECH REPUBLIC (CS->1992)	0,4
		GERMANY (incl DD from 1991)	112,9
		DENMARK	224,6
		FINLAND	0,5
		FRANCE	1319,1
		UNITED KINGDOM	9,8
		NETHERLANDS	27,7
		STORES AND PROVISIONS WITHIN//OUNTRIES	2,3
		COUNTRIES AND TERRITORIES//COUNTRIES	0,6
TOTAL	25,3	TOTAL	1812,8

Eurostat Poland 2005

Frozen fillets of cod "Gadus morhua, Gadus ogac" and of fish of the species "Boreogadus Saida"

	Import		Export
Taric code: 03042029	Tons	PARTNER / REPORTER	Tons
CHINA (PEOPLE'S REPUBLIC OF)	144,8	BELGIUM (and LUXBG -> 1998)	1319,6
GERMANY (incl DD from 1991)	37,8	GERMANY (incl DD from 1991)	1813,1
SPAIN	3,2	DENMARK	1419,1
ICELAND	0,9	FRANCE	991,5
NETHERLANDS	16,2	UNITED KINGDOM	6497,6
NORWAY (incl.SJ excl.1995,1996)	1,3	MOLDOVA, REPUBLIC OF	1
NEW ZEALAND	7,8	NETHERLANDS	77,1
RUSSIAN FEDERATION (RUSSIA)	240,5	STORES AND PROVISIONS WITHIN//OUNTRIES	1,4
		COUNTRIES AND TERRITORIE//COUNTRIES	0,1
		SWEDEN	38,2
		UNITED STATES	1009,1
TOTAL	452,5	TOTAL	13167,8

Frozen meat (Excl. Fillets) of cod "Gadus morhua"

Taric code: 03049038			
DENMARK	170,5	BELGIUM (and LUXBG -> 1998)	127,8
UNITED KINGDOM	82,6	GERMANY (incl DD from 1991)	219,4
		DENMARK	1318,7
		FRANCE	16,3
		UNITED KINGDOM	572,3
		NETHERLANDS	0,1
		UNITED STATES	72
TOTAL	253,1	TOTAL	2326,6

Fillets of cod "gadus morhua, gadus ogac" and of fish of the species "boreogadus saida" dried, salted or in brine, but not smoked

Taric code: 03053019			
PORTUGAL	0,6		
TOTAL	0,6	TOTAL	0

Cod dried "gadus morhua, gadus ogac, gadus macrocephalus" unsalted and unsmoked stockfish (excl. fillets)

Taric code: 03055110	
GERMANY (incl DD from 1991)	0,1
TOTAL	0,1

Eurostat Poland 2005

Cod dried "gadus morhua, gadus ogac, gadus macrocephalus" salted not smoked klippfish (excl. fillets)

Taric code: 03055190
PARTNER / REPORTER

Import
Tons

PARTNER / REPORTER
GERMANY (incl DD from 1991)

Export
Tons

0,2

TOTAL

0,2

Cod dried "gadus morhua, gadus ogac, gadus macrocephalus" salted or in brine only (excl. fillets)

Taric code: 03056200

FRANCE

0,3

TOTAL

0,3

Frozen raw fish fillets, coated with batter or breadcrumbs, wheater or not pre-fried in oil (excl. salmonidae, herrings, sardines, sardinella, brisling or sprats, tunas, skipjack and atlantic bonito, bonito "sarda spp", mackerel, anchovies, fish of species euthynnus and fish of species orcynopsis unicolor)

Taric code: 16041991

CHILE

0,1

BULGARIA

6,6

GERMANY (incl DD from 1991)

131,7

BELARUS (BELORUSSIA)

18,9

DENMARK

5,6

CZECH REPUBLIC (CS->1992)

1498,9

UNITED KINGDOM

18,5

GERMANY (incl DD from 1991)

1666,5

DENMARK

122,3

ESTONIA

8,9

FINLAND

217,2

FRANCE

175,9

UNITED KINGDOM

32,6

CROATIA

64,2

HUNGARY

194

ITALY

9,7

LEBANON

24,6

LITHUANIA

121,2

LATVIA

85,2

MOLDOVA, REPUBLIC OF

11,5

NETHERLANDS

4,5

ROMANIA

172,5

SWEDEN

385,7

UKRAINE

158,7

UNITED STATES

2

TOTAL

155,9

TOTAL

4981,6

Cod of the species "gadus morhua, gadus ogac, gadus macrocephallus", prepared or preserved whole or in pieces (excl. finely minced and fillets, raw, merely coated with batter or breadcrumbs, whether or not pre-fried in oil, frozen)

Taric code: 16041992	Import		Export
PARTNER / REPORTER	Tons	PARTNER / REPORTER	Tons
SPAIN	0,1	SWITZERLAND (incl. LI->1994)	1,2
UNITED KINGDOM	13,6	CZECH REPUBLIC (CS->1992)	0,2
LITHUANIA	1,7	LATVIA	16,2
		STORES AND PROVISIONS WITHIN//OUNTRIES	0,2
		UNITED STATES	0,7
TOTAL	15,4	TOTAL	18,5

Eurostat Poland 2006
Fresh or chilled cod "Gadus morhua"

Tarif code: 03025010 PARTNER / REPORTER	Import Tons	PARTNER / REPORTER	Export Tons
Germany (incl. DD from 1991)	3	Czech Republic (CS -> 1992)	0,1
Denmark	2382,9	Germany (incl. DD from 1991)	0,1
Finland	12,9	Denmark	70,4
Lithuania	17	France	570,7
Netherlands	0,4	Lithuania	108,1
Russian Federation (Russia)	59,9	Netherlands	29,6
Sweden	309,8	Norway (incl. SJ excl. 1995, 1996)	18,1
		Countries and Teriitorie//Countries	0,3
		Slovakia	0,3
Total	2785,9		797,7

Frozen cod "Gadus morhua"

Tarif code: 03036011 PARTNER / REPORTER	Import Tons	PARTNER / REPORTER	Export Tons
Denmark	1193	France	55,6
Iceland	0,7	United Kingdom	6,6
Netherlands	487,7	Lithuania	59,9
Norway (incl. SJ excl. 1995, 1996)	1232,3	Stores and Provisions within //Countries	0,4
Russian Federation (Russia)	9152,7		
Total	12066,4		122,5

Fresh or chilled fillets of "Gadus morhua, Gadus ogac, Gadus macrocephallus" and of fish of the species "Boreogadus saida"

Tarif code:03041031 PARTNER / REPORTER	Import Tons	PARTNER / REPORTER	Export Tons
Germany (incl. DD from 1991)	1,4	Belgium (and Luxbg -> 1998)	107,3
France	2,5	Switzerland (incl. LI -> 1994)	66,8
Netherlands	0,5	Czech Republic (CS -> 1992)	0,7
Russian Federation (Russia)	10,6	Germany (incl. DD from 1991)	5
		Denmark	74,7
		Finland	4,2
		France	2604,8
		United Kingdom	10,2
		Netherlands	44,5
		Stores and Provisions within //Countries	2,6
		Countries and Teriitorie//Countries	1,5
Total	15		2922,3

Eurostat Poland 2006**Frozen fillets of "Gadus morhua, Gadus ogac" and of fish of the species "Boreogadus saida"**

Tarif code:03042029 PARTNER / REPORTER	Import Tons	PARTNER / REPORTER	Export Tons
China (People's Republic of)	440,4	Belgium (and Luxbg -> 1998)	782,4
Germany (incl. DD from 1991)	43,9	Germany (incl. DD from 1991)	1655,1
Denmark	41,5	Denmark	756,1
Iceland	2,8	Estonia	31,1
Netherlands	0,5	France	1234,3
Russian Federation (Russia)	548,8	United Kingdom	7465,2
		Lithuania	21
		Netherlands	55,5
		Stores and Provisions within //Countries	1,8
		Countries and Teriitorie//Countries	0,3
		United States	704,1
Total	1077,9		12706,9

Frozen meat (Exc. Fillets) of Cod "Gadus morhua"

Tarif code:03049038 PARTNER / REPORTER	Import Tons	PARTNER / REPORTER	Export Tons
Denmark	83,9	Belgium (and Luxbg -> 1998)	152,7
Spain	0,5	Germany (incl. DD from 1991)	256,9
Iceland	33,2	Denmark	1103,1
Russian Federation (Russia)	158,9	France	91,7
		United Kingdom	544,9
		United States	24,1
Total	276,5		2173,4

Fillets of cod "Gadus morhua, Gadus ogac" and of fish of the species "Boreogadus saida" dried, salted or in brine, but not smoked

Tarif code:03053019 PARTNER / REPORTER	Import Tons	PARTNER / REPORTER	Export Tons
Portugal	0,5	Germany (incl. DD from 1991)	0,3
Total	0,5		0,3

Eurostat Poland 2006**Cod dried "Gadus morhua, Gadus ogac, Gadus macrocephalus" salted or in brine only (excl. Fillets)**

Tarif code:03056200 PARTNER / REPORTER	Import Tons	PARTNER / REPORTER	Export Tons
		France	1,4
Total			1,4

Frozen raw fish fillets, coated with batter or breadcrumbs, whether or not pre-fried in oil (excl. Salmonidae, herrings, sardines, sardinella, brisling or sprats, tunas, skipjack and atlantic bonito, bonito "sarda spp", mackerel, anchovies, fish of species euthynnus and fish of species orcynopsis unicolor)

Tarif code:16041991 PARTNER / REPORTER	Import Tons	PARTNER / REPORTER	Export Tons
Germany (incl. DD from 1991)	78,5	Austria	21,2
Denmark	0,3	Azerbaijan	4
Spain	2,1	Belgium (and Luxbg -> 1998)	62,9
Portugal	0,1	Belarus (Belorussia)	41,6
		Czech Republic (CS -> 1992)	1254,1
		Germany (incl. DD from 1991)	2838,3
		Denmark	282,3
		Estonia	1,3
		Egypt	45
		Spain	251
		Finland	384,1
		United Kingdom	2840,6
		Croatia	29,8
		Hungary	407,2
		Italy	11,3
		Lebanon	18
		Lithuania	78,5
		Latvia	84,9
		Moldavia, Republic of	5,6
		Romania	217,6
		Sweden	250,6
		Slovakia	35,7
		Ukraine	150,1
		Serbia (EU data from 01/06/05 ex CS)	48,1
Total	81		9363,8

Eurostat Poland 2006

Cod of the species "Gadus morhua, Gadus ogac, Gadus macrocephalus" prepared or preserved whole or in pieces (excl. Finely minced and fillets, raw, merely coated with batter or breadcrumbs, whether or not pre-fried in oil, frozen)

Tarif code:166041992 PARTNER / REPORTER	Import Tons	PARTNER / REPORTER	Export Tons
United Kingdom	17,2	Switzerland (incl. LI -> 1994)	6
Latvia	0,6	Czech Republic (CS -> 1992)	1,2
		Germany (incl. DD from 1991)	1
		United Kingdom	1,9
		Ireland	0,2
		Latvia	21,3
		Netherlands	3
		Countries and Territories//Countries	0,1
Total	17,8		34,7