LANDINGS AND EFFORT IN NORWEGIAN FISHERIES

Frank Asche and Siv Grønning

Centre for Fisheries Economics, Norwegian School of Economics and Business, Bergen, Norway

ABSTRACT

The present report documents official Norwegian fisheries catches (tonnage and value) from 1950-1999 for principal commercial species, based on data from the Directorate of Fisheries, Norway. Some information on broad spatial breakdown of catches are also available. Furthermore, fishing effort by major gear types, listing number of sea-days, average vessel length and tonnage, and number of vessels are also summarized, although temporal coverage varies by gear type and only starts in the late 1960s.

INTRODUCTION

The main component of this report are data files which contain annual Norwegian landings and fishing effort. The landing data are from 1950 onward, while the effort data are more limited and start in the late 1960s. The following text assesses the reliability of these data. Given that the data have been divided into landings and effort, we will maintain this distinction through-out the discussion.

Fisheries data are often thought of as being unreliable because there are often substantial incentives to cheat. These incentives change over time due to the situation that the fishers are in. For instance, fishers might over-report landings to establish a track record, but might under-report landings if they are bound by a quota. As well, data are rarely collected without a purpose, this purpose might influence both the resources spent to obtain the data, and the reliability of the data.

While we will discuss factors that influence the reliability of data in the different sections, a few general trends are useful to note. Fishing has always been important along the Norwegian coast. Because of this, sporadic records of landings, and effort, for some of the main fisheries can be found from several centuries back. However, the longest unbroken record, to our knowledge, is from the 1950s onward. The early records have little direct use, as the resources spent on collecting them were limited. To a large extent, this also holds true well into the 1960s. Because of the limited jurisdiction even of coastal waters, and because fish stocks appeared unlimited, management was not an issue. The invention and rapid introduction of the power block changed this, as it was quickly shown that one could fish down the herring stocks. During the 1950s and 1960s, the North Sea herring and then the Norwegian Spring Spawning herring were fished down by local fishers and international fleets (for overview of herring fisheries see Bjørndal *et al.*, 1999). Because the records had limited direct use until the late 1960s, they most likely are relatively reliable, because there was little incentive to misreport. In 1973 a licensing scheme was introduced for the purse seine gear, and after the extension of the EEZ to 200 miles in 1977, management schemes were introduced in most fisheries. Initially, these schemes were mostly a combination of limited entry and group quotas which then increased to tighter individual vessel quotas during the 1990s. As these management schemes made it more profitable to misreport, it is likely that the reliability of the landings data became poorer from the late 1970s. However, to some extent this may be countered by more resources being spent collecting the data.

Government support of fisheries also has a long history, and at least dates back to the temporary measures implemented in the Lofoten fishery in the 1930s. In the late 1960s these support measures became more permanent and continued into the 1970s and 1980s before almost disappearing in the early 1990s. Systematic collection of effort data is related to these measures and also started in the late 1960s. However, because these data had specific aims, and were mostly based on self declaration, there may have been incentives to misreport.

Catch

For the landings, we have used the official Norwegian data (for description see Appendix 1.1). The numbers for 1996-1999 are preliminary numbers. These figures include all landings by Norwegian fishers in Norway or abroad, independent of fishing area or vessel size. Catch value is the amount paid to the fishers for the catch (1 Kroner = US$ 0.11, 25-September 2001). This amount includes freight and price subsidies and mandatory production tax but does not include fees to the sales union or value added tax.

The Norwegian Directorate of Fisheries is responsible for the collection of the data. However, since the late 1930s, the fishers' sales organizations, who are entitled by law to take over and sell practically all species of fish on landing, have to an increasing extent, assumed the role of suppliers of fishery statistics. These organizations also set minimum prices for different species, which is the most likely source of inaccuracies in the data before the 1970s. The reason for this is that the report of each transaction must have a price that is not less then the minimum price. However, if one does not record the full quantity landed, the buyer pays a lower price, and recorded landings will be lower then actual landings.

In 1977, the 200 mile Exclusive Economic Zone (EEZ) became internationally accepted, giving the authorities the right to regulate beyond the coastal fisheries. This resulted in tighter regulations of all fisheries in cooperation with the European Union (EU) in the North Sea, and with the Soviet Union (later Russia) in the Barents Sea. Regulations were first introduced in the most valuable fisheries for vessels with the most powerful gear types, but have successively been introduced into new vessel groups. While restrictive quota regulations were introduced in the ocean going fleet relatively early, the process moved much slower for the cod fishery of the coastal fleet. From the beginning of 1980, certain restrictions concerning gear and short period closures of the fisheries were imposed on this fleet, but other than this, the group enjoyed free fishing. In 1989, the coastal fleet was put under stricter quota regulations. All these regulations have been on a group basis, creating 'race to fish' fisheries and overcapitalization. In 1990 individual vessel quotas were introduced for large purse-seines and cod trawlers to tackle these problems. However, this also increased the incentives for fishers to underreport landings and also to high-grade their catches, leading to increased discarding.

In the transition from a management scheme with group quotas to a scheme with individual vessel quotas, track records become important because quotas are allocated based on track record. This is demonstrated in Norway where there were incentives to overstate landings in some fisheries particularly around 1990. This issue might also be of importance in fisheries which occur in unregulated international waters during the period before a regional management body is set up. These quotas are often allocated between countries based on track records.

Since 1975 , the size of catches has been measured by the weight of the fish when caught. Prior to 1975, the catch was measured by the weight of the fish when delivered ashore. The weight of fish that is landed in gutted condition as fillet or salted etc., is then converted into live weight. The size of catches measured by the weight of the fish when caught exceeds the weight when delivered ashore by between 7 to 10 percent for whole fish, but with up to three times as much for fillets. In combination with the vessel quotas this gives increased scope for high-grading for the (few) vessels with onboard production. This is because one can keep only the best part of the fillet. Because the true live weight equivalent is much higher then the one used, this will also lead to recorded catches being lower then actual catches.

A last issue is that official Norwegian landings sometimes differ from the numbers reported to ICES. This seems related to the fact that the official landings should not exceed the Norwegian quota, and hence, when they do, the official numbers are corrected.

Generally, it is clear that most incentives are towards under-reporting the landings, and hence, the official statistics understates the actual catches. There are no official or published estimates of how much fish is landed and unreported or how big the high-grading problem is. Estimates of unreported landings tend to vary between nearly zero to approximately 20%, although one can also find higher estimates.

Fishing Areas

The landings presented by fishing areas (for description see Appendix 1.2) include landings by Norwegian fishers in Norway and abroad. Unfortunately, the landings are only divided into main groups of fish (i.e., cod, other whitefish, herring, other pelagics, and other fish) and we have not been able to obtain a better separation. The figures for 1951-1972 include only fishing in distant waters, whereas the second period (1972-1999) includes all fisheries (coastal and offshore).

Between 1973 and 1976 the catch was not divided into coastal fisheries and fisheries in distant waters. The Norwegian Directorate of Fisheries rearranged the statistics from 1977, making it possible to draw a clear distinction between coastal fisheries and ocean fisheries. Offshore fishing includes all fishing outside the 12 nm zone, whereas coastal fishing includes all fishing inside the 12 nm zone.

Effort Data

The effort data presented are based on annual surveys of Norwegian fishing vessels with overall length of 13+ m operating on a whole year basis (see Appendix 1.2).

The following criteria have to be met by the vessels participating in the survey:

- The vessel has been fishing for at least 30 weeks a year;
- The vessel has a motor no older than 25 years; and
- The vessel has operated in specific fisheries or combinations of fisheries.

In addition, the vessel needs to have the equipment and motor power typical for this fishery or combination of fisheries, it must have operated in specific geographical regions and fit into specific categories describing size.

Although completion of this survey is mandatory for all fishers who match these criteria, completion of the survey is not strictly enforced, and therefore participation rate varies substantially. In general, the number of participants have been rather low, and it is difficult to judge how representative the results are for the complete fleets. Generally, the response rate has been as high as 30%, but in 1997 only 27% of the fleet population were included in the survey. Also, as the surveys are filled in by the fishers themselves, this may introduce biases. Of the variables that we are reporting here, days of fishing are the one most likely to be misreported. However, given the type of regulations, it is hard to see what one can achieve by cheating here and thus it can only be speculated that perhaps fishers that do not fish very often may overstate the number of fishing days to remain on the record.

Until 1979, the foot was used as the unit of measurement, whereas the metric system has been in use from 1980 onwards. Conversion of feet to meters was done using 1 foot = 0.33 meters.

Changes to these categories are made from year to year and consist of adjusting the size of the vessels included, fishing gears, the fishing grounds and the type of fisheries the vessels participate in. The most important changes are stated in the footnotes in the tables (see data files). However, minor changes from year to year have been ignored. Changes in categories have also added to the difficulties in grouping, especially those categories for off-coast (offshore) fisheries with long-line, gillnet etc. and miscellaneous coastal fisheries which are composed of several vessel groups.

Up to and including 1967 the numbers presented in the column for number of vessels are vessels included in the survey, whereas from 1968 this is the number of boats in the population. In Norway, horsepower has not been used as a measure of effort. It has therefore not been possible to obtain data concerning this variable.

REFERENCES AND DATA SOURCES:

Publications by Fiskeridirektøren, Bergen, Norway:

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Anon. 1959. Fiskefarkosters lønnsomhet i 1956. Fiskets Gang, Nr.10 (March).

Anon. 1960. Fiskefartøyers lønnsomhet i 1967 sesongresultater. Fiskets Gang, Nr.22 (July).

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Anon. 1961. Fiskefartøyers lønnsomhet i 1959 sesongresultater. Fiskets Gang, Nr.30 (July).

Anon. 1963. Fiskefartøyers lønnsomhet i 1961 sesongresultater. Fiskets Gang, Nr.27 (July).

Anon. 1964. Lønnsomheten av fiskefartøyer over 40 fot i 1962. Fiskets Gang, Nr.28 (July).

Anon. 1965. Lønnsomheten av fiskefartøyer over 40 fot i 1963. Fiskets Gang, Nr.35 (September).

Anon. 1966. Lønnsomheten av fiskfarøyer over 40 fot i 1964. Fiskets Gang, Nr.50 (December).

Anon. 1967. Lønnsomheten av fiskefartøyer over 40 fot i 1965. Fiskets Gang, Nr.46 (December).

Anon. 1968. Lønnsomheten av fiskefartøyer over 40 fot i 1966. Fiskets Gang, Nr.51 (December).

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Anon. Lønnsomhetsundersøkleser for fiskefartøyer over 40 fot", 1968-1979. Budsjettnemnda for fiskerinæringen.

Anon. Lønnsomhetsundersøkelser for fiskefartøyer 13 m l.l. og over", 1980-1997. Budsjettnemnda for fiskerinæringen.

Central Bank of Norway:

Annual average exchange rates for NOK/USD

Directorate of Fisheries, Statistics Norway:

Historical Statistics 1978
Historical Statistics 1994

APPENDIX 1: DESCRIPTION OF DATA TABLES

Interested parties should contact the senior author for collaboration.

1.1 Catch data

Catch (t) and value (Norwegian Kroner; 1 Kroner = US$ 0.11, 25-September 2001) by year from 1950 to 1999 for principle commercial species. No area breakdown of catch is included. Principle species list: Capelin (*Mallotus villosus*), Salmon and sea trout (smelts), Halibut (*Hippoglossus hippoglossus*), Greenland halibut (*Reinhardtius hippoglossoides*), Plaice (*Pleuronectes platessus*), Witch (*Glyptocephalus cynoglossus*), Tusk (*Brosme brosme*), Haddock (*Melanogrammus aeglefinus*), Spawning cod (*Gadus morhua*), Finmark young cod (*G. morhua*), Other cod (*G. morhua*), Norway pout (*Trisopterus esmarki*), Saithe (*Pollachius virens*), Ling (*Molva molva*), Blue ling (*Molva dypterygia*), Winter herring (*Clupea harengus*), Fat herring (*C. harengus*), Redfish (*Sebastes* spp.), Catfish (*Anarhichas* spp.), Dogfish (e.g., *Squalus acanthias*), Porbeagle (*Lamna nasus*), Crab, Lobster, Deep water prawn, Other fish and by-products (Directorate of Fisheries, Norway).

1.2 Spatial data

Fisheries Catches allocated by broad geographic areas:

A) Fisheries catches (t) in distant waters, 1951-1972, including Iceland, North Sea and West Africa.
B) Quantity of catch (t) by fishing grounds, 1972-1999, including North of Latitude 62^{o} N, North Sea, Iceland/Faroe, West of Scotland, East of Greenland, NAFO areas, other areas.

1.3 Effort data

Fishing effort by major gear types, listing number of sea-days, average vessel length and tonnage, and number of vessels. Years covered varies by gear type (period in brackets): Factory trawlers (1968-97), fresh-fish trawlers (1968-97), small trawlers (1975-97), industrial trawlers (1971-97), ocean trawling for shrimp (1974-97), seining (1970-97), shrimp trawling (1955-97), shrimp trawling in combination with other gears (1968-97), purse seine (1965-97), off-shore long-liners and gillnet (1968-97), coastal gillnet and hand-lines and Danish seine (1968-97), large seine (1974-96), large trawl (1953-66).